![Carrier logo - United Technologies]

Touch Pilot Control

30XA/XAS/XB/XBP/XW
30XA-ZE/XW-ZE

AquaForce ® PUREtec with R-1234ze(E)

Original document

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PREFACE

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

■ 30XAS single-circuit air-cooled chillers,

■ 30XA dual-circuit and triple-circuit air-cooled chillers,

■ 30XB dual-circuit air-cooled chillers with fixed-speed fan control and 30XBP dual-circuit air-cooled chillers with variable-speed fan control,

■ 30XW single-circuit and dual-circuit water-cooled chillers,

■ units that come with R-1234ze refrigerant (30XA-ZE air-cooled and 30XW-ZE water-cooled chillers).

Instructions in this manual are given as a guide to good practice in the installation, start-up and operation of the control system. This document does not contain full service procedures for the correct operation of the equipment. The support of a qualified Carrier Service Engineer is strongly recommended to ensure optimal operation of the equipment as well as the optimization of all available functionalities.

Note that this document may refer to optional components and certain functions, options or accessories may not be available for the specific unit. 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 interface provided in this manual include text in English. After changing the language of the system, all labels will be displayed in the language selected by the user.

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

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

1 - SAFETY CONSIDERATIONS

1.1 - General description

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.*

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.

CAUTION: The equipment uses and emits electromagnetic signals. Tests have shown that the equipment conforms to all applicable codes with respect to electromagnetic compatibility.

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

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

IMPORTANT: Some specific safety precautions should be taken in case of HFO units.

For more information about handling the equipment safely, please refer to the IOM Unit documentation (Installation, Operation and Maintenance instructions).

2 - CONTROLLER OVERVIEW

2.1 - General description

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

The control system can operate in three independent modes:

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

The operating mode can be selected with the Start/Stop button (see also section 4.5). When the Touch Pilot system operates autonomously (Local or Remote), it retains all of its control capabilities but does not offer any of the features of the Network. The Network emergency stop command stops the unit regardless of its active operating type.

2.2 - Abbreviations

In this manual, the refrigeration circuits are called circuit A, circuit B and circuit C.

CCN	Carrier Comfort Network
DCFC	Dry Cooler Free Cooling
EMM	Energy Management Module
EXV	Electronic Expansion Valve
LED	Light Emitting Diode
LEN	Sensor Bus (internal communication bus linking the basic board to slave boards)
OAT	Outdoor Air Temperature
Network mode	Operating type: Network
Local-Off	Operating type: Local Off
Local-On	Operating type: Local On mode
Local-Schedule	Operating type: Local On following a time schedule
Master mode	Operating type: master unit (master/slave assembly)
Remote mode	Operating type: by remote contacts
VFD	Variable Frequency Drive

3 - HARDWARE DESCRIPTION

3.1 - General description

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

TCPM board is used to control the operation of screw compressors and AUX1 board is used for fans control (one AUX1 per each circuit). Please note that the first AUX1 board may also include the output used to control the customer variable speed pump for single-circuit units (see also section 7.4.3).

Options such as energy management, heat reclaim, free cooling require additional SIOB boards to be installed. Additionally, chillers fitted with a dry cooler have one extra AUX1 board used to control the optional dry cooler (the board included in the dry cooler).

NOTE: There are two types of dry coolers available, i.e. dry cooler (condenser) used for 30XW water-cooled units and free cooling dry cooler for 30XB air-cooled units.

All boards communicate via an internal LEN bus. The main board continuously monitors the information received from various pressure and temperature probes and accordingly starts the program that controls the unit.

The unit is equipped with the Touch Pilot user interface (5-inch colour LCD touch screen).

3.2 - Electrical box

The electrical box includes all boards controlling the unit and the user interface.

3.3 - Connections of the main controller

Connections are located on the bottom side of the main controller.
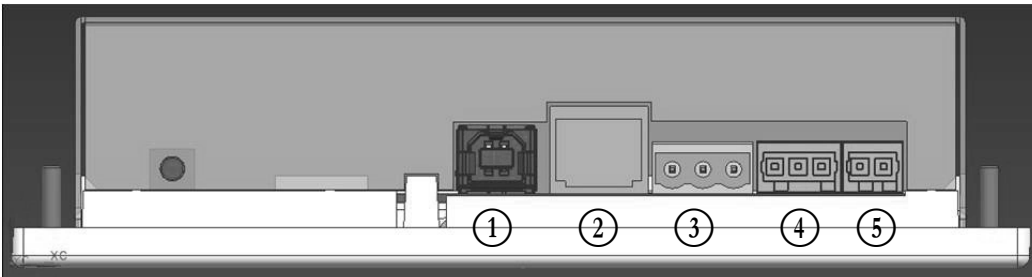
Legend
1. USB connector
2. Ethernet connector
3. CCN connector
4. LEN connector
5. Power supply connector (24 VAC)

3.4 - Power supply to boards

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

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

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

3.5 - Light emitting diodes on boards

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

■ The red LED flashing for a two-second period on the SIOB board 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. If the green LED is not flashing, this indicates a LEN bus wiring problem.

3.6 - Pressure sensors

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

These electronic sensors deliver 0 to 5 VDC. The sensors are connected to the SIOB board.

■ **Discharge pressure sensors (high pressure type)**
These sensors measure the discharge pressure in each circuit. They are used to control head pressure or high pressure load shedding. Discharge pressure sensors are mounted on the discharge line piping of each circuit.

■ **Suction pressure sensors (low pressure type)**
These sensors measure the suction pressure in each circuit. They are used for EXV control. Suction pressure sensors are located on the suction piping of each circuit.

■ **Oil pressure sensors (high pressure type)**
These sensors measure the oil pressure of each compressor. Oil pressure sensors are located at the oil port of the compressor. The economizer pressure is subtracted from this value to arrive at the differential oil pressure.

■ **Economizer pressure sensors (high pressure type)**
These sensors measure the intermediate pressure between high and low pressure. They are used to control the economizer performance.

■ **Heat reclaim condenser outlet pressure sensors (optional)**
These sensors (for air-cooled units with heat reclaim option) permit control of the load in the heat reclaim mode (see also section 7.17).

3.7 - Temperature sensors

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

■ **Evaporator entering and leaving water temperature sensors**
The evaporator entering and leaving water temperature sensors are installed in the entering and leaving side water box. They are used for capacity control and safety purposes.

■ **Condenser entering and leaving water temperature sensors**
These sensors measure the entering and leaving water temperatures in water-cooled units or air-cooled units with the heat reclaim option.

■ **Suction gas temperature sensor**
This sensor is used to control the suction gas temperature. It is located at the suction line of each compressor.

■ **Discharge gas temperature sensor**
This sensor is used to control the discharge gas temperature, and permits control of the discharge superheat temperature. It is located at the discharge line of the compressor.

■ **Motor temperature sensor**
This sensor is used to control the motor temperature of each compressor.

■ **Oil temperature sensor**
This sensor is used to control the oil temperature of each compressor.

■ **Temperature setpoint reset sensor**
This 4-20 mA sensor can be installed remotely from the unit. It is used to reset the setpoint on the unit.

■ **Outdoor temperature sensor**
This sensor is mounted on the control box of air-cooled units. Outdoor temperature sensor is used for start-up, setpoint temperature reset and frost protection control.

■ **Master/slave water sensor (optional)**
The water temperature sensor is used for master/slave assembly control.

3.8 - Actuators

■ **Evaporator pumps**
The controller can regulate one or two evaporator pumps and takes care of the automatic changeover between these pumps (see also section 7.4).

■ **Condenser pump**
In water-cooled units the controller can regulate one condenser pump.

■ **Electronic expansion valve**
The electronic expansion valve (EXV) is used to adjust the refrigerant flow to changes in the operating conditions of the machine. To adjust the refrigerant flow, a piston moves constantly up or down to vary the cross-section of the refrigerant path. This piston is driven by an electronically controlled linear stepper motor. The high degree of accuracy with which the piston is positioned provides precise control of the refrigerant flow.

■ **Water flow switch**
The water flow switch 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 measured water flow rate in the water loop is lower than the configured flow rate, the alarm condition shuts off the unit.

3.9 - Connections at the user terminal block

Connections available at the user terminal block may vary depending on the selected options.

3.9.1 - General description

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

The following table summarises the connections at the user terminal block.

Terminal block connections				
Description	**Board**	**Input/Output**	**Connector**	**Remarks**
On/Off switch	SIOB, circuit A	DI-01	J1	Used for the unit on/off control if the unit is in Remote mode
Second setpoint switch	SIOB, circuit A	DI-02	J1	The contact is taken into consideration if the unit is in Remote mode
Demand limit switch 1	SIOB, circuit A	DI-03	J1	Used to control demand limit. See section 7.7
Heat cool select status	SIOB, circuit A	DI-04	J1	Used to select heat cool mode
Condenser flow status (30XW only)	SIOB, circuit A	DI-08	J1	Used to control the condenser status
Setpoint reset control	SIOB, circuit A	AI-10	J9	Allows the customer to reset the currently selected setpoint
Alarm relay	SIOB, circuit A	DO-05	J23	Indicates alarms
Running relay	SIOB, circuit A	DO-06	J22	Indicates if the unit is ready to start or operating
Variable speed pump command (dual-circuit 30XW units and 30XB units with option 17)	SIOB, circuit B	AO-01	J10	Used to command the customer variable speed cooler pump (0-10V). See section 7.4.3
Variable speed pump command (single-circuit 30XW units)	AUX1 #1	AO	J5	Used to command the customer variable speed cooler pump (0-10V). See section 7.4.3
Optional				
Occupancy override	SIOB, EMM	DI-01	J1	Enables to switch between occupied (closed contact) and unoccupied mode (open contact)
Demand limit switch 2	SIOB, EMM	DI-02	J1	Used to control demand limit. See section 7.7
Customer interlock	SIOB, EMM	DI-03	J1	Used for the customer safety loops
Ice done contact	SIOB, EMM	DI-04	J1	Used to control the setpoint according to the occupancy schedule
Capacity limit control	SIOB, EMM	AI-10	J9	Used for capacity limitation
Chiller partially shutdown	SIOB, EMM	DO-05	J23	Indicates the shutdown of one of the circuits
Chiller shutdown	SIOB, EMM	DO-06	J22	Indicates the unit shutdown
Chiller capacity running output (0 to 10 V)	SIOB, EMM	AO-01	J10	Reports the capacity percentage of the unit
Heat reclaim condenser flow status (air-cooled units)	SIOB, Heat reclaim	DI-01	J1	Used to verify the water flow on the condenser side
Heat reclaim enable switch (air-cooled units)	SIOB, Heat reclaim	DI-02	J1	Used to switch between air-condenser (open contact) and water condenser (closed contact) in Remote mode
Free cooling disable switch (air-cooled units)	SIOB, Free cooling	DI-01	J1	Used to control free cooling when the unit is in Remote mode

3.9.2 - Volt-free contact on/off/cooling/heating

If the unit operates in Remote mode, on/off contacts and heating/cooling contacts operate as follows:

Without multiplexing

	Off	Cooling	Heating
On/Off contact	open	closed	closed
Cooling/heating contact	-	open	closed

With multiplexing

	Off	Cooling	Heating	Auto
On/Off contact	open	closed	closed	open
Cooling/heating contact	open	open	closed	closed

Legend
1. Off: Unit is stopped
2. Cooling: Unit is allowed to start in Cooling
3. Heating: Unit is allowed to start in Heating
4. Auto: Unit can run in Cooling or Heating in accordance with the changeover values.

3.9.3 - 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	
	Setpoint 1	Setpoint 2	Setpoint 1	Setpoint 2
Setpoint selection contact	open	closed	open	closed

3.9.4 - Volt-free demand limit selection contact

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

Capacity limitation with two contacts is as follows:

	100%	Limit 1	Limit 2	Limit 3
Demand limit 1 contact	open	closed	open	closed
Demand limit 2 contact	open	open	closed	closed

The limits are defined in the SETPOINT menu.

4 - TOUCH PILOT CONTROL INTERFACE

4.1 - General description

Touch Pilot includes the 5 in. touch screen allowing for easy system control. Navigation through the Touch Pilot control is either using the touch screen interface or by connecting to the web interface. It is recommended to use a pen for the navigation via the touch screen.

The navigation menus are the same for both connection methods (Touch Pilot user interface and web browser). Only two web connections are authorised at the same time.

NOTE: Some functionalities are unavailable when using the web browser interface.
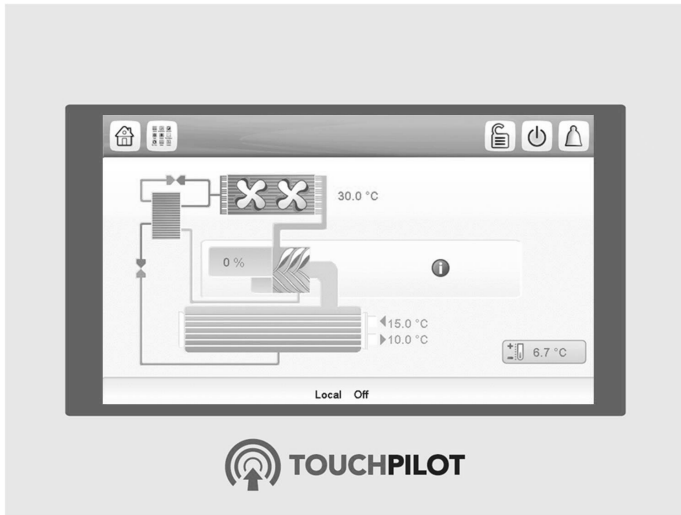

4.2 - Screens overview

The Touch Pilot control interface includes 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
- Trending visualisation screen

4.3 - Welcome Screen

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

In order to exit the Welcome screen, press the **Home** button
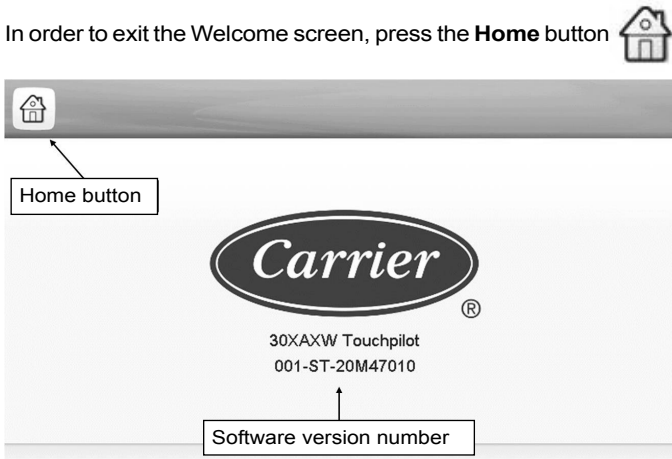
4.4 - Touch Pilot synoptic screen

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 condenser and evaporator pump, and the pre-defined setpoint parameter.

All unit functions can be accessed by pressing

the **Main menu** button

The bell located in the upper-right part of the screen lights when any fault is detected (see also section 8.2).

By default, the parameters are presented in metric units. For more information on how to change the system of measurement, see section 4.6.
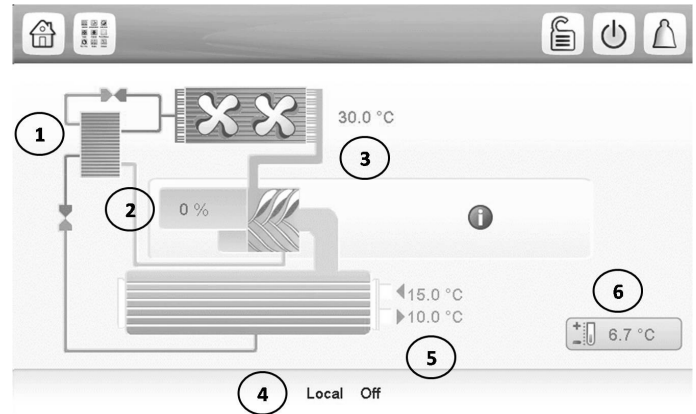
Legend
1. Economizer
2. Unit capacity percentage
3. Outdoor air temperature
4. Status screen message
5. Evaporator inlet and outlet water temperature
6. Setpoint

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

Information message box

The information 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 table data blocks.
LIMIT EXCEEDED!	The value entered exceeds the table limits.
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.

4.5 - Start/Stop screen

The Start/Stop screen allows users to select the operating mode of the unit.

4.5.1 - Unit start-up

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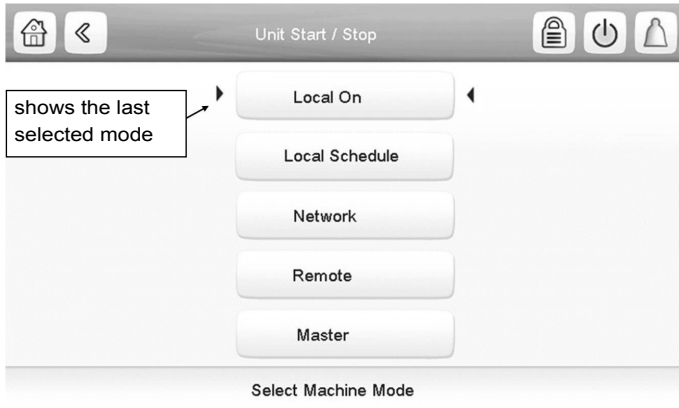
NOTE: When entering the menu, please note that the currently
selected item corresponds to the last running operating type.

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.

4.5.2 - Unit stop

In order to stop the unit, press the **Start/Stop** button

Confirm the unit shutdown by pressing **Confirm Stop** or return to

the previous screen by pressing the **Back** button

Once the unit has been stopped, the Synoptic screen will be displayed (see also section 4.4).

4.6 - User Login screen

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 (default password = 11).

The User Login screen can be accessed by pressing the **Log** button

in the upper-right corner of the screen (see also section 4.4).
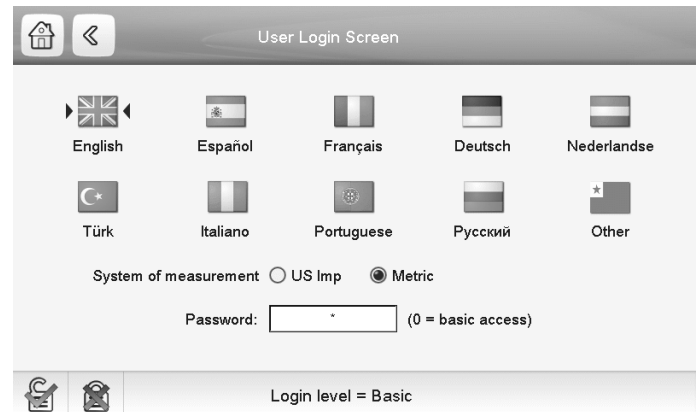
Legend
1. Cursor indicating the selected language
2. Logged-in button
3. Logged-off button
4. System of measurement selection: Metric/Imperial
5. Password dialog box

Once all the changes have been made, press to save or

to cancel changes.

NOTE: Password validation is effective only after pressing
the Logged-in button.

Security access settings

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

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

■ 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 password can be modified in the User Configuration menu.

To change your password

1. Go to the Main Menu.
2. Navigate to the Configuration menu (logged-in users only) and select User Configuration (USERCONF).
3. Select the User Password box and provide your new password.
4. Press OK. The User Configuration screen appears.
5. Press the Save button to save your changes or the Cancel button to exit the screen without making modifications.

4 - TOUCH PILOT CONTROL INTERFACE

4.7 - Language list selection

The control provides two different language lists which means that languages displayed in the User Login screen may vary depending on user preferences ("Language list" parameter in USERCONF - User Configuration).

Language list (in USERCONF menu) set to "0":

English, Spanish, French, German, Dutch, Chinese, Italian, Portuguese, Russian, and "other" (custom language).
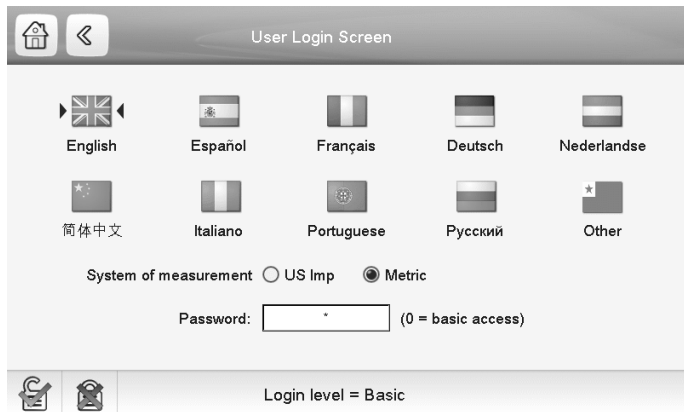
Language list (in USERCONF menu) set to "1":

English, Spanish, French, German, Dutch, Turkish, Italian, Portuguese, Russian, and "other" (custom language).
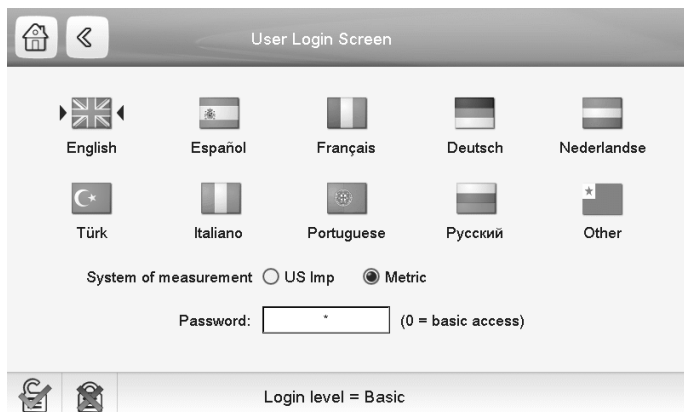
Custom language

The control system allows users to add new languages to the control. To learn more about language customization, please contact your local Carrier service representative.

NOTE: Custom languages can be uploaded only by Carrier service technicians.

4.8 - Main menu

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

In order to access the menu, press the **Main menu** button located in the upper-left part of the Synoptic screen (see also section 4.4).

Navigation through menu/tables
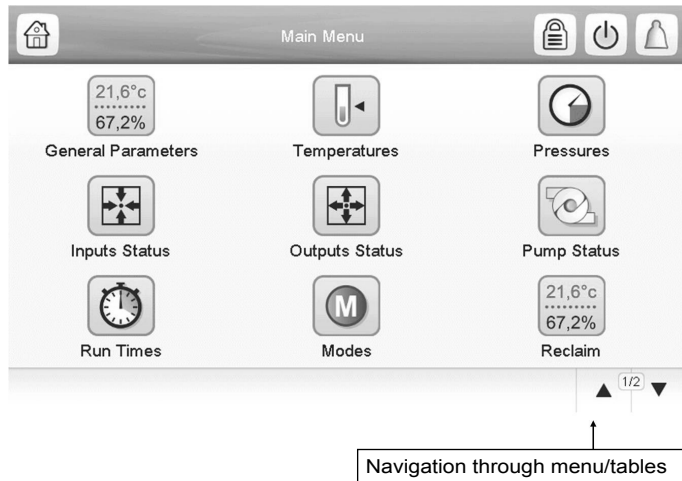
Specific unit parameters table/menu can be accessed by pressing the icon corresponding to the desired category. In order to go back to the Synoptic screen, press

4.8.1 - General parameters screen

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**
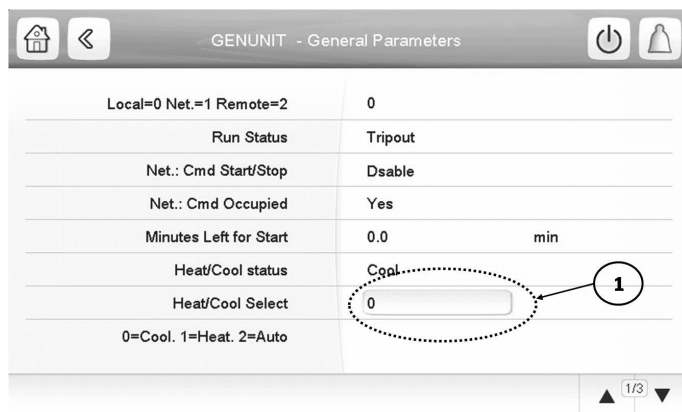
Legend
1. Forceable point

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

4.8.2 - Parameter modification

When the user selects the parameter to be modified, the following screen is displayed.

Press **OK** to save or **EXIT** to cancel the modification.

4.9 - Configuration menu

The Configuration menu gives access to a number of user-modifiable parameters such as pump configuration, schedule menu, etc.
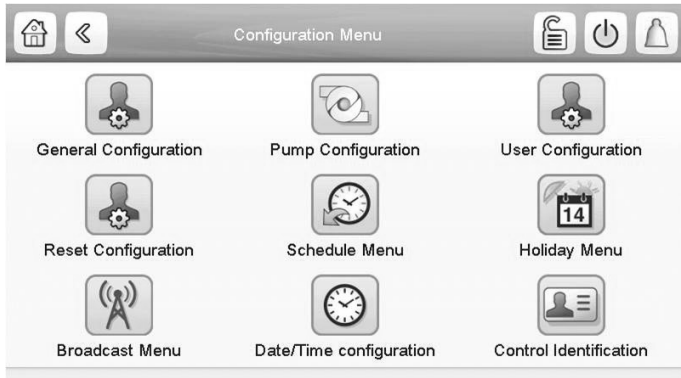
General configuration screen

To access the General configuration screen, go to the Configuration menu and select General Configuration
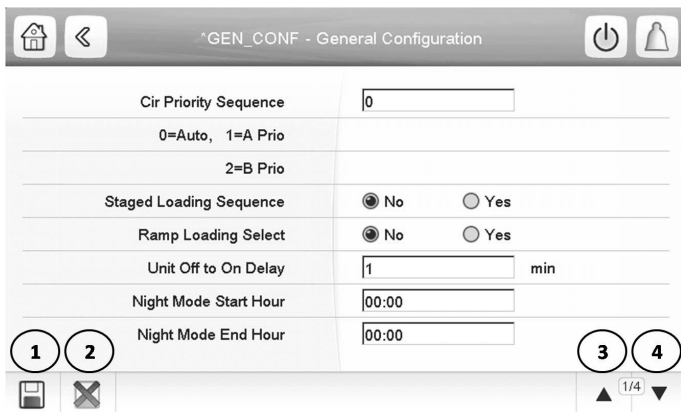
Legend
1. Save
2. Cancel
3. Previous page
4. Next page

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.

4.10 - Override screen

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.
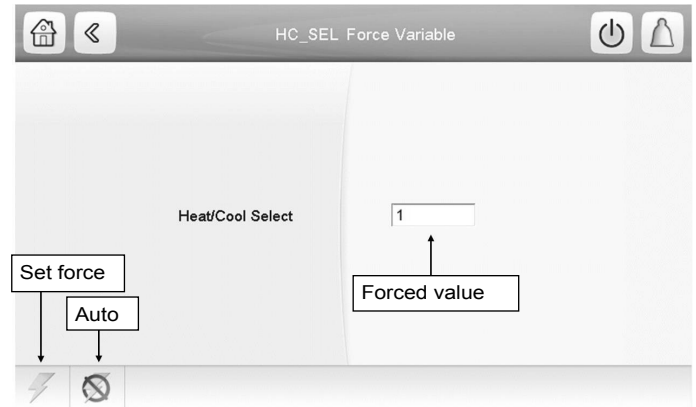
Press ⚡ to set or ⊘ to remove the forced point.

4.11 - Schedule screen

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.

To access the Schedule screen, go to the Configuration menu and select **Schedule** Menu 🕐

Set the time schedule and the selected period will be presented in the form of the green band on the timeline.

Press 💾 to confirm or ❌ to cancel changes.

Each program is in unoccupied mode unless a schedule time period is active. If two periods overlap and are both active on the same day, the occupied mode takes priority over the unoccupied period.
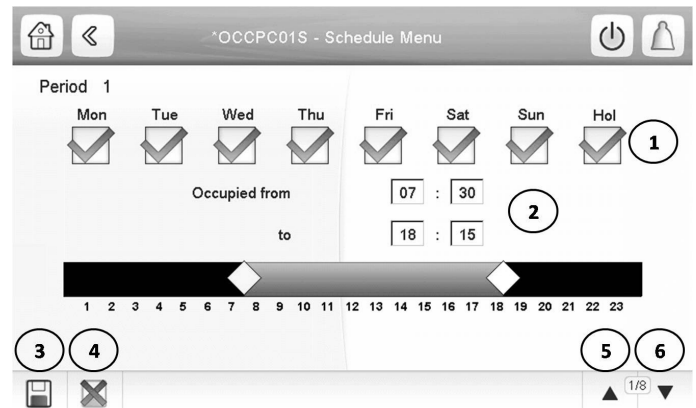
Legend
1. Selection of the applicable days for the time schedule
2. Modification of the period: start time and end time
3. Save
4. Cancel
5. Previous time period
6. Next time period

5 - WEB CONNECTION

The Touch Pilot system 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: PCD controllers accessible via the Internet must be protected by firewall and VPN connection.

5.1 - Web interface access

In order to access Touch Pilot, enter the IP address of the unit in the address bar of the web browser.

Unit default address: 169.254.0.1.
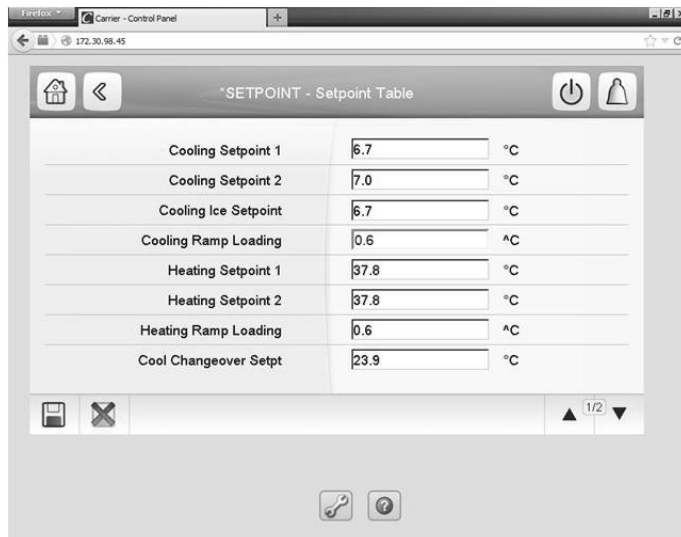
NOTE: Only two web connections may be authorised at the same time.

5.2 - Web browser configuration

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.

NOTE: Two users can be connected simultaneously with no priority between them. The last modification is taken into account.

5.3 - Technical documentation access

When the Touch Pilot control is used via a PC web browser, the controller allows the user to access the technical documentation for the product.

Press the **Technical document** button to access a list of documents related to the unit and its components.

Technical documentation includes the following documents:

■ Spare parts documentation: The list of spare parts included in the unit with reference, description and drafting.

■ Misc: Documents such as regulation algorithm, electrical plans, dimension plans, unit certificates.

■ PED: Pressure Equipment Directive.

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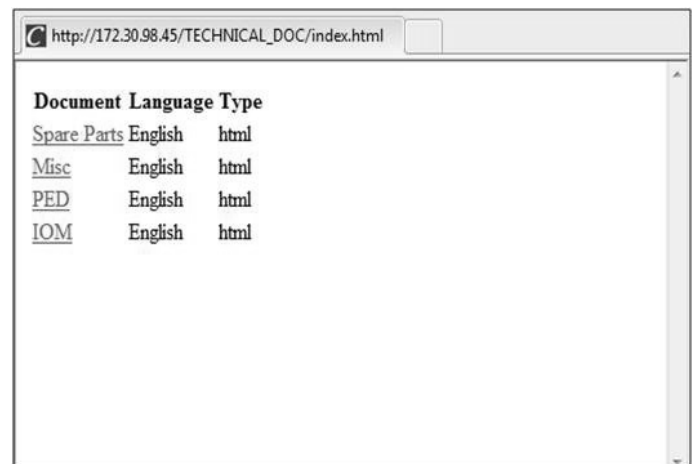
IMPORTANT: Please save all data (documents, drawings, diagrams, etc.), for example, on your computer. If display memory is erased or the display is replaced, all documents will be lost. Make sure that all documents are stored and may be accessed at any time.

6.1 - Menu structure

Home	Main Menu	Log in / Log out	Start / Stop	Alarms Menu
			Select Unit Mode	Alarms Menu

Main menu

General Parameters	Temperatures	Pressures
Inputs Status	Outputs Status	Pump Status
Run Times	Modes	Reclaim
Freecooling	DC Free Cooling Status	Trendings
Setpoint Table	Configuration Menu	

Configuration menu

General Configuration	Pump Configuration	User Configuration
Reset Configuration	Schedule Menu	Holiday Menu
Broadcast Menu	Date/Time Configuration	Control Identification

Alarms menu

Reset Alarms	Current Alarms
Alarm History	Major Alarm History

Legend:

Basic access (0 = user password)

User password required

6.2 - Detailed menu description

Icon	Displayed text*	Description	Associated table
21,6°c 67,2%	General Parameters	General parameters	GENUNIT
	Temperatures	Temperatures	TEMP
	Pressures	Pressures	PRESSURE
	Inputs Status	Inputs status	INPUTS
	Outputs Status	Outputs status	OUTPUTS
	Pump Status	Pump status	PUMPSTAT
	Run Times	Run times	RUNTIME
M	Modes	Modes	MODES
21,6°c 67,2%	Reclaim	Reclaim	RECLAIM
	DC Free Cooling Status	Dry Cooler Free Cooling status	DCFC_STA
21,6°c 67,2%	Freecooling	Free cooling	FREECOOL
	Setpoint Table	Setpoint table	SETPOINT
	Trendings	Trendings	TRENDING
	Configuration Menu	Configuration menu	CONFIG

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

21,6°c 67,2% GENUNIT – General parameters

No.	Status	Unit	Displayed text*	Description
1	0 to 3	-	Local=0 Net.=1 Remote=2	Operating mode: 0 = Local 1 = Network 2 = Remote
2	-	-	Run Status	Unit running status: Off, Stopping, Delay, Running, Ready, Override, Tripout, Test, Runtest
3	0 to 1	-	Net.: Cmd Start/Stop	Unit start/stop via Network
4	0 to 1	-	Net.: Cmd Occupied	Unit time schedule via Network
5	-	min	Minutes Left for Start	Minutes before the unit start-up
6	-	-	Heat/Cool status	Heating/cooling status
7	0 to 2	-	Heat/Cool Select	Heating/cooling selection
8	-	-	0=Cool. 1=Heat. 2=Auto	0 = Cooling 1 = Heating 2 = Automatic heating/cooling control
9	0 to 2	-	Setpoint Select	Setpoint selection
10	-	-	0=Auto. 1=Spt1. 2=Spt2	0 = Automatic setpoint selection 1 = Setpoint 1 2 = Setpoint 2
11	0 to 1	-	Setpoint Occupied?	Setpoint status
12	0 to 100	%	Percent Total Capacity	Total unit capacity

6 - TOUCH PILOT INTERFACE DETAILS

GENUNIT – General parameters (continued)

No.	Status	Unit	Displayed text*	Description
13	-	A	Actual Chiller Current	Actual chiller current
14	0 to 200	A	Chiller Current Limit	Chiller current limit
15	-	°C	Current Setpoint	Current setpoint value
16	-	-	Control Point	Control point
17	0 to 1	-	Emergency Stop	Emergency stop
18	0 to 100	%	Active Demand Limit Val	Active demand limit value
19	0 to 100	%	Actual Capacity cir A	Circuit A running capacity in %
20	0 to 100	%	Actual Capacity cir B	Circuit B running capacity in %
21	0 to 100	%	Actual Capacity cir C	Circuit C running capacity in %

* Depends on the selected language (English by default)

TEMP – Temperatures

No.	Status	Unit	Displayed text*	Description
1	-	°C	Cooler Entering Fluid	Evaporator entering water temperature
2	-	°C	Cooler Leaving Fluid	Evaporator leaving water temperature
3	-	°C	Condenser Entering Fluid	Condenser entering water temperature
4	-	°C	Condenser Leaving Fluid	Condenser leaving water temperature
5	-	°C	Saturated Cond Tmp cir A	Saturated condensing temperature, circuit A
6	-	°C	Saturated Suction Temp A	Saturated suction temperature, circuit A
7	-	°C	Compressor Suction Tmp A	Compressor suction temperature, circuit A
8	-	°C	Discharge Gas Temp cir A	Discharge gas temperature, circuit A
9	-	°C	Motor Temperature cir A	Motor temperature, circuit A
10	-	°C	Saturated Cond Tmp cir B	Saturated condensing temperature, circuit B
11	-	°C	Saturated Suction Temp B	Saturated suction temperature, circuit B
12	-	°C	Compressor Suction Tmp B	Compressor suction temperature, circuit B
13	-	°C	Discharge Gas Temp cir B	Discharge gas temperature, circuit B
14	-	°C	Motor Temperature cir B	Motor temperature, circuit B
15	-	°C	Saturated Cond Tmp cir C	Saturated condensing temperature, circuit C
16	-	°C	Saturated Suction Temp C	Saturated suction temperature, circuit C
17	-	°C	Compressor Suction Tmp C	Compressor suction temperature, circuit C
18	-	°C	Discharge Gas Temp cir C	Discharge gas temperature, circuit C
19	-	°C	Motor Temperature cir C	Motor temperature, circuit C
20	-	°C	Optional Space Temp	Optional space temperature
21	-	°C	CHWS Temperature	Master/slave common water temperature
22	-	°C	CHWS Heat Temp	Master/Slave common heat fluid temperature (available depending on unit configuration)
23	-	°C	External Temperature	External temperature
24	-	°C	Cooler Heater Temp	Evaporator heater temperature
25	-	°C	Circuit C Heater Temp	Heater temperature, circuit C
26	-	°C	Economizer Gas Temp A	Economizer gas temperature, circuit A
27	-	°C	Economizer Gas Temp B	Economizer gas temperature, circuit B
28	-	°C	Economizer Gas Temp C	Economizer gas temperature, circuit C
29	-	°C	Dry Cool Leav Water Tmp	Dry Cooler Leaving Water Temperature (units fitted with a dry cooler)

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

PRESSURE – Pressures

No.	Status	Unit	Displayed text*	Description
1	-	kPa	Discharge Pressure A	Discharge pressure, circuit A
2	-	kPa	Main Suction Pressure A	Suction pressure, circuit A
3	-	kPa	Oil Pressure A	Oil pressure, circuit A
4	-	kPa	Oil Pressure DifferenceA	Oil pressure difference, circuit A
5	-	kPa	Economizer Pressure A	Economizer pressure, circuit A
6	-	kPa	Discharge Pressure B	Discharge pressure, circuit B
7	-	kPa	Main Suction Pressure B	Suction pressure, circuit B

6 - TOUCH PILOT INTERFACE DETAILS

PRESSURE – Pressures (continued)

No.	Status	Unit	Displayed text*	Description
8	-	kPa	Oil Pressure B	Oil pressure, circuit B
9	-	kPa	Oil Pressure DifferenceB	Oil pressure difference, circuit B
10	-	kPa	Economizer Pressure B	Economizer pressure, circuit B
11	-	kPa	Discharge Pressure C	Discharge pressure, circuit C
12	-	kPa	Main Suction Pressure C	Suction pressure, circuit C
13	-	kPa	Oil Pressure C	Oil pressure, circuit C
14	-	kPa	Oil Pressure DifferenceC	Oil pressure difference, circuit C
15	-	kPa	Economizer Pressure C	Economizer pressure, circuit C

* Depends on the selected language (English by default)

INPUTS – Inputs status

No.	Status	Unit	Displayed text*	Description
1	open/close	-	Remote On/Off Switch	Remote On/Off switch
2	open/close	-	Remote HeatCool Switch	Remote heating/cooling selection switch
3	open/close	-	Remote Reclaim Switch	Remote reclaim switch
4	open/close	-	Free Cooling Disable Sw	Free cooling disable switch
5	open/close	-	Remote Setpoint Switch	Setpoint selection switch
6	open/close	-	Limit Switch 1	Demand limit switch 1
7	open/close	-	Limit Switch 2	Demand limit switch 2
8	open/close	-	Oil Level Input A	Oil level input, circuit A
9	open/close	-	Oil Level Input B	Oil level input, circuit B
10	open/close	-	Oil Level Input C	Oil level input, circuit C
11	-	A	Motor Current A	Motor current, circuit A
12	-	A	Motor Current B	Motor current, circuit B
13	-	A	Motor Current C	Motor current, circuit C
14	-	mA	Reset/Setpnt4-20mA Sgnl	4-20 mA signal, setpoint reset
15	open/close	-	Customer Interlock	Customer interlock
16	open/close	-	Ice Done Storage Switch	Ice storage end switch
17	open/close	-	Occupied Override Switch	Occupied override switch
18	-	mA	Limit 4-20mA Signal	4-20 mA signal, capacity limit
19	open/close	-	Electrical Box Interlock	Electrical box interlock
20	open/close	-	Cooler Heater command	Evaporator heater command
21	no/yes	-	BACnet Dongle	BACnet dongle
22	-	V	Leakage detector 1 val	Leakage detection (Refrigerant leak detection option)
23	-	V	Leakage detector 2 val	Leakage detection (Refrigerant leak detection option)
24	off/on	-	ElecBoxFan1 input state	Electrical Box Fan status 1 (units with HFO)
25	off/on	-	ElecBoxFan2 input state	Electrical Box Fan status 2 (units with HFO)
26	off/on	-	ElecBoxFan3 input state	Electrical Box Fan status 3 (units with HFO)

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

OUTPUTS – Output status

No.	Status	Unit	Displayed text*	Description
1	off/on	-	Compressor A	Compressor A status
2	off/on	-	Oil Solenoid Output A	Oil solenoid output, circuit A
3	off/on	-	Slide Valve 1 Output A	Slide valve 1 output, circuit A
4	off/on	-	Slide Valve 2 Output A	Slide valve 2 output, circuit A
5	-	V	Capacity Signal Cir A	0-10 V capacity signal, circuit A
6	off/on	-	Compressor B	Compressor B status
7	off/on	-	Oil Solenoid Output B	Oil solenoid output, circuit B
8	off/on	-	Slide Valve 1 Output B	Slide valve 1 output, circuit B
9	off/on	-	Slide Valve 2 Output B	Slide valve 2 output, circuit B
10	-	V	Capacity Signal Cir B	0-10 V capacity signal, circuit B
11	off/on	-	Compressor C	Compressor C status
12	off/on	-	Oil Solenoid Output C	Oil solenoid output, circuit C
13	off/on	-	Slide Valve 1 Output C	Slide valve 1 output, circuit C
14	off/on	-	Slide Valve 2 Output C	Slide valve 2 output, circuit C
15	-	V	Capacity Signal Cir C	0-10 V capacity signal, circuit C

OUTPUTS – Output status (continued)

No.	Status	Unit	Displayed text*	Description
16	-	V	Chiller Capacity signal	Chiller capacity signal
17	off/on	-	Alarm Relay Status	Alarm relay status
18	off/on	-	Running Relay Status	Running relay status
19	off/on	-	Alert Relay State	Alert relay state
20	off/on	-	Shutdown Indicator State	Shutdown indicator status
21	0 to 100	%	Cond 3 Way Valve Pos	Condenser 3-way valve position
22	off/on	-	Cooler Heater Command	Evaporator heater command status
23	off/on	-	Ready or Running Status	Unit ready/running status
24	off/on	-	Reclaim Condenser Heater	Reclaim condenser heater status
25	off/on	-	Ball Valve Close Out A	Ball valve close output, circuit A
26	off/on	-	Ball Valve Open OutA	Ball valve open output, circuit A
27	off/on	-	Ball Valve Close Out B	Ball valve close output, circuit B
28	off/on	-	Ball Valve Open OutB	Ball valve open output, circuit B
29	off/on	-	Ball Valve Close Out C	Ball valve close output, circuit C
30	off/on	-	Ball Valve Open Out C	Ball valve open output, circuit C
31	-	-	Fan Staging Number A	Fan stage, circuit A
32	-	-	Fan Staging Number B	Fan stage, circuit B
33	-	-	Fan Staging Number C	Fan stage, circuit C
34	0 to 100	%	Head Press Act Pos A	Head pressure control – actuator position, circuit A
35	0 to 100	%	Head Press Act Pos B	Head pressure control – actuator position, circuit B
36	0 to 100	%	Head Press Act Pos C	Head pressure control – actuator position, circuit C
37	off/on	-	Oil Heater Output A	Oil heater output, circuit A
38	off/on	-	Oil Heater Output B	Oil heater output, circuit B
39	off/on	-	Oil Heater Output C	Oil heater output, circuit C
40	off/on	-	4 Way Refrig Valve A	4-way refrigerant valve position, circuit A
41	off/on	-	4 Way Refrig Valve B	4-way refrigerant valve position, circuit B
42	close/open	-	Ball Valve Position A	Ball valve position, circuit A
43	close/open	-	Ball Valve Position B	Ball valve position, circuit B
44	close/open	-	Ball Valve Position C	Ball valve position, circuit C
45	off/on	-	Alarm Relay Status	Alarm relay output status
46	off/on	-	Electrical Box Fan sw	Electrical box fan status (units with HFO)
47	0 to 10	-	Dry Cool Vfan1 Output	Dry cooler – variable speed fan 1
48	0 to 10	-	Dry Cool Vfan2 Output	Dry cooler – variable speed fan 2
49	off/on	-	Dry Cool fan stage 1	Dry cooler fan stage 1
50	off/on	-	Dry Cool fan stage 2	Dry cooler fan stage 2
51	off/on	-	Dry Cool fan stage 3	Dry cooler fan stage 3
52	off/on	-	Dry Cool fan stage 4	Dry cooler fan stage 4
53	off/on	-	Dry Cool fan stage 5	Dry cooler fan stage 5
54	off/on	-	Dry Cool fan stage 6	Dry cooler fan stage 6
55	off/on	-	Dry Cool fan stage 7	Dry cooler fan stage 7
56	off/on	-	Dry Cool fan stage 8	Dry cooler fan stage 8

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

PUMPSTAT – Pump status

No.	Status	Unit	Displayed text*	Description
1	no/yes	-	Cooler Flow Setpoint Out	Evaporator flow setpoint output
2	0 to 1	-	Cooler Pump #1 Command	Evaporator pump 1 control
3	0 to 1	-	Cooler Pump #2 Command	Evaporator pump 2 control
4	0 to 1	-	Rotate Cooler Pumps ?	Evaporator pumps rotation
5	open/close	-	Cooler Flow Switch	Evaporator flow switch
6	0 to 1	-	Condenser Pump Command1	Condenser pump 1 control
7	0 to 1	-	Condenser Pump Command2	Condenser pump 2 control (not available!)
8	0 to 1	-	Rotate Condenser Pumps ?	Condenser pumps rotation (not available!)
9	-	kPa	Water pres before cooler	Evaporator entering water pressure
10	-	kPa	Water pres after cooler	Evaporator leaving water pressure
11	-	kPa	Water pres before filter	Filter entering water pressure
12	-	kPa	Water pres after filter	Filter leaving water pressure
13	-	l/s	Water flow	Water flow rate
14	-	kW	Cooling power	Cooling power
15	open/close	-	Condenser Flow Status	Condenser flow status
16	0 to 100	%	Variable speed pump cmd	Variable speed pump command

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

6 - TOUCH PILOT INTERFACE DETAILS

RUNTIME – Run times

No.	Status	Unit	Displayed text*	Description
1	-	hour	Machine Operating Hours	Unit operating hours
2	-	-	Machine Starts Number	Number of unit starts
3	-	hour	Compressor A Hours	Operating hours, compressor A
4	-	-	Compressor A Starts	Number of starts, compressor A
5	-	hour	Compressor B Hours	Operating hours, compressor B
6	-	-	Compressor B Starts	Number of starts, compressor B
7	-	hour	Compressor C Hours	Operating hours, compressor C
8	-	-	Compressor C Starts	Number of starts, compressor C
9	-	hour	Cooler Pump #1 Hours	Operating hours, evaporator pump 1
10	-	hour	Cooler Pump #2 Hours	Operating hours, evaporator pump 2
11	-	hour	Condenser Pump #1 Hours	Operating hours, condenser pump 1
12	-	hour	Condenser Pump #2 Hours	Operating hours, condenser pump 2 (not available!)
13	-	hour	Free Cool A Pump Hours	Pump operating hours in Free Cooling, circuit A
14	-	hour	Free Cool B Pump Hours	Pump operating hours in Free Cooling, circuit B

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

NOTE: The displayed run times are updated every hour.

MODES – Modes

No.	Status	Unit	Displayed text*	Description
1	no/yes	-	Start Up Delay In Effect	Start-up delay in effect
2	no/yes	-	Second Setpoint In Use	Second setpoint in use
3	no/yes	-	Reset In Effect	Setpoint reset active
4	no/yes	-	Demand limit Active	Demand limit active
5	no/yes	-	Ramp Loading Active	Ramp loading active
6	no/yes	-	Cooler Heater Active	Evaporator heater active
7	no/yes	-	Cooler Pump Rotation	Evaporator pump rotation
8	no/yes	-	Pump Periodic Start	Pump periodic start active
9	no/yes	-	Night Low Noise Active	Night low noise active
10	no/yes	-	Master Slave Active	Master/slave mode active
11	no/yes	-	Auto Changeover Active	Automatic changeover active
12	no/yes	-	Heating Low EWT Lockout	Heating low EWT lockout
13	no/yes	-	Condenser Pump Rotation	Condenser pump rotation (not available!)
14	no/yes	-	Cond Pump Periodic Start	Condenser pump periodic start
15	no/yes	-	Ice Mode In Effect	Ice storage mode active
16	no/yes	-	Defrost Active On Cir A	Defrost mode active, circuit A
17	no/yes	-	Defrost Active On Cir B	Defrost mode active, circuit B
18	no/yes	-	Free Cooling Active	Free cooling mode active
19	no/yes	-	Reclaim Active	Reclaim mode active
20	no/yes	-	Low Suction Circuit A	Low suction, circuit A
21	no/yes	-	Low Suction Circuit B	Low suction, circuit B
22	no/yes	-	Low Suction Circuit C	Low suction, circuit C
23	no/yes	-	Map compressor Circuit A	Compressor mapping, circuit A
24	no/yes	-	Map compressor Circuit B	Compressor mapping, circuit B
25	no/yes	-	Map compressor Circuit C	Compressor mapping, circuit C
26	no/yes	-	High Pres Override Cir A	High pressure override, circuit A
27	no/yes	-	High Pres Override Cir B	High pressure override, circuit B
28	no/yes	-	High Pres Override Cir C	High pressure override, circuit C

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

RECLAIM – Reclaim

No.	Status	Unit	Displayed text*	Description
1	0 to 1	-	Heat Reclaim Select	Heat reclaim selection
2	-	°C	Reclaim Entering Fluid	Reclaim entering water temperature
3	-	°C	Reclaim Leaving Fluid	Reclaim leaving water temperature
4	0 to 100	%	Reclaim Valve Position	Reclaim valve position
5	-	-	Reclaim Status Circuit A	Reclaim status, circuit A
6	-	kPa	Pumpdown Pressure Cir A	Pump-down pressure, circuit A
7	-	°C	Sub Condenser Temp Cir A	Subcooling condenser temperature, circuit A
8	-	°C	Pumpdown Saturated Tmp A	Pump-down saturated temperature, circuit A
9	-	^C	Subcooling Temperature A	Subcooling temperature, circuit A
10	off/on	-	Air Cond Entering Valv A	Air condenser entering valve status, circuit A
11	off/on	-	Water Cond Enter Valve A	Water condenser entering valve status, circuit A
12	off/on	-	Air Cond Leaving Valve A	Air condenser leaving valve status, circuit A
13	off/on	-	Water Cond Leaving Val A	Water condenser leaving valve status, circuit A
14	-	-	Reclaim Status Circuit B	Reclaim status, circuit B
15	-	kPa	Pumpdown Pressure Cir B	Pump-down pressure, circuit B
16	-	°C	Sub Condenser Temp Cir B	Subcooling condenser temperature, circuit B
17	-	°C	Pumpdown Saturated Tmp B	Pump-down saturated temperature, circuit B
18	-	^C	Subcooling Temperature B	Subcooling temperature, circuit B
19	off/on	-	Air Cond Entering Valv B	Air condenser entering valve status, circuit B
20	off/on	-	Water Cond Enter Valve B	Water condenser entering valve status, circuit B
21	off/on	-	Air Cond Leaving Valve B	Air condenser leaving valve status, circuit B
22	off/on	-	Water Cond Leaving Val B	Water condenser leaving valve status, circuit B

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

DCFC_STA – DC Free Cooling Status Menu

No.	Status	Unit	Displayed text*	Description
1	-	°C	OAT Free Cooling	Free Cooling / Dry Cooler: OAT
2	-	°C	FC Leaving Water Temp	Free Cooling / Dry Cooler: Leaving water temperature
3	-	°C	FC Water Loop Temp	Free Cooling / Dry Cooler: Water loop temperature
4	no/yes	-	Free Cooling Mode Active	Dry Cooler Free Cooling mode active
5	0 to 100	%	FC Capacity	Free Cooling / Dry Cooler capacity
6	0 to 20	-	Fix Speed Fans Stage	Free Cooling / Dry Cooler fan stage (fixed speed fans)
7	0 to 100	%	Varifan Speed	Free Cooling / Dry Cooler: Fan speed
8	0 to 100	%	PID Output Value	Status of PID output
9	0 to 999999	hour	DCFC Operating Hours	Free Cooling / Dry Cooler: Operating hours
10	0 to 999999	-	DCFC Fan Stage 1 Start	DCFC / Fan stage 1: Number of starts
11	0 to 999999	hour	DCFC Fan Stage 1 Hours	DCFC / Fan stage 1: Operating hours
12	0 to 999999	-	DCFC Fan Stage 2 Start	DCFC / Fan stage 2: Number of starts
13	0 to 999999	hour	DCFC Fan Stage 2 Hours	DCFC / Fan stage 2: Operating hours
14	0 to 999999	-	DCFC Fan Stage 3 Start	DCFC / Fan stage 3: Number of starts
15	0 to 999999	hour	DCFC Fan Stage 3 Hours	DCFC / Fan stage 3: Operating hours
16	0 to 999999	-	DCFC Fan Stage 4 Start	DCFC / Fan stage 4: Number of starts
17	0 to 999999	hour	DCFC Fan Stage 4 Hours	DCFC / Fan stage 4: Operating hours
18	0 to 999999	-	DCFC Fan Stage 5 Start	DCFC / Fan stage 5: Number of starts
19	0 to 999999	hour	DCFC Fan Stage 5 Hours	DCFC / Fan stage 5: Operating hours
20	0 to 999999	-	DCFC Fan Stage 6 Start	DCFC / Fan stage 6: Number of starts
21	0 to 999999	hour	DCFC Fan Stage 6 Hours	DCFC / Fan stage 6: Operating hours
22	0 to 999999	-	DCFC Fan Stage 7 Start	DCFC / Fan stage 7: Number of starts
23	0 to 999999	hour	DCFC Fan Stage 7 Hours	DCFC / Fan stage 7: Operating hours
24	0 to 999999	-	DCFC Variable Fan Start	DCFC / Variable speed fan: Number of starts
25	0 to 999999	hour	DCFC Variable Fan Hours	DCFC / Variable speed fan: Operating hours

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

FREECOOL – **Free cooling**

No.	Status	Unit	Displayed text*	Description
1	-	-	GENERAL PARAMETERS	GENERAL PARAMETERS
2	0 to 1	-	Free Cooling Disable?	Free cooling mode status
3	-	^C	LWT-OAT Delta	LWT – OAT Delta
4	-	-	CIRCUIT A	Circuit A
5	-	kW	Mechanical Cooling Power	Mechanical cooling power
6	-	kW	Free Cooling Maxi Power	Free cooling maximum power
7	-	min	Next session allowed in	Next session allowed after the specified time
8	-	min	Cooling/FreeCool Timeout	Cooling/free cooling timeout
9	no/yes	-	Free Cool Conditions OK?	Optimal free cooling conditions
10	no/yes	-	Free Cool Request ?	Free cooling request
11	off/on	-	Free Cooling Heaters ?	Free cooling heaters status
12	no/yes	-	Free Cooling Active	Free cooling status
13	-	-	Fan Staging Number	Fan stage
14	off/on	-	Discharge valve Open out	Discharge valve open output
15	off/on	-	Dischrge valve Close out	Discharge valve close output
16	-	-	Discharge valve status	Discharge valve status
17	off/on	-	Bypass valve Open out	Bypass valve open output
18	off/on	-	Bypass valve Close out	Bypass valve close output
19	-	-	Bypass valve status	Bypass valve status
20	off/on	-	Refrigerant Pump Out	Refrigerant pump output
21	-	kPa	Pump Inlet Pressure	Pump inlet pressure
22	-	kPa	Pump Outlet Pressure	Pump outlet pressure
23	-	kPa	Pump Differential Press.	Pump differential pressure
24	0 to 100	%	EXV position	EXV position
25	-	°C	Free cooling Liquid Tmp	Free cooling liquid temperature
26	-	^C	Free cooling Subcool Tmp	Free cooling subcooling temperature
27	-	^C	Free cooling Subcool Spt	Free cooling subcooling setpoint
28	-	-	CIRCUIT B	Circuit B
29	-	kW	Mechanical Cooling Power	Mechanical cooling power
30	-	kW	Free Cooling Maxi Power	Free cooling maximum power
31	-	min	Next session allowed in	Next session allowed after the specified time
32	-	min	Cooling/FreeCool Timeout	Cooling/free cooling timeout
33	no/yes	-	Free Cool Conditions OK?	Optimal free cooling conditions
34	no/yes	-	Free Cool Request ?	Free cooling request
35	off/on	-	Free Cooling Heaters ?	Free cooling heaters status
36	no/yes	-	Free Cooling Active	Free cooling status
37	-	-	Fan Staging Number	Fan stage
38	off/on	-	Discharge valve Open out	Discharge valve open output
39	off/on	-	Dischrge valve Close out	Discharge valve close output
40	-	-	Discharge valve status	Discharge valve status
41	off/on	-	Bypass valve Open out	Bypass valve open output
42	off/on	-	Bypass valve Close out	Bypass valve close output
43	-	-	Bypass valve status	Bypass valve status
44	off/on	-	Refrigerant Pump Out	Refrigerant pump output
45	-	kPa	Pump Inlet Pressure	Pump inlet pressure
46	-	kPa	Pump Outlet Pressure	Pump outlet pressure
47	-	kPa	Pump Differential Press.	Pump differential pressure
48	0 to 100	%	EXV position	EXV position
49	-	°C	Free cooling Liquid Tmp	Free cooling liquid temperature
50	-	^C	Free cooling Subcool Tmp	Free cooling subcooling temperature
51	-	^C	Free cooling Subcool Spt	Free cooling subcooling setpoint

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

SETPOINT – **Setpoint table**

No.	Status	Default	Unit	Displayed text*	Description
1	-28.9 to 26	6.7	°C	Cooling Setpoint 1	Cooling setpoint 1
2	-28.9 to 26	6.7	°C	Cooling Setpoint 2	Cooling setpoint 2
3	-28.9 to 26	6.7	°C	Cooling Ice Setpoint	Ice storage setpoint
4	0.1 to 11.1	0.6	^C	Cooling Ramp Loading	Cooling ramp loading setpoint
5	26.7 to 63**	37.8	°C	Heating Setpoint 1**	Heating setpoint 1
6	26.7 to 63**	37.8	°C	Heating Setpoint 2**	Heating setpoint 2
7	0.1 to 11.1	0.6	^C	Heating Ramp Loading	Heating ramp loading setpoint
8	3.9 to 50	23.9	°C	Cool Changeover Setpt	Cooling changeover setpoint
9	0 to 46.1	17.8	°C	Heat Changeover Setpt	Heating changeover setpoint
10	26.7 to 60	35	°C	Water Val Condensing Stp	Water valve condensing setpoint
11	0 to 100	100	%	Switch Limit Setpoint 1	Limit setpoint switch 1
12	0 to 100	100	%	Switch Limit Setpoint 2	Limit setpoint switch 2
13	0 to 100	100	%	Switch Limit Setpoint 3	Limit setpoint switch 3
14	35 to 50	50	°C	Reclaim Setpoint	Heat reclaim setpoint
15	2.8 to 15	5	^C	Reclaim Deadband	Heat reclaim deadband
16	1 to 20	5	^C	Varipump Delta Temp Stp	Variable speed pump delta temperature setpoint

* Depends on the selected language (English by default).
** 26.7 to 70.0°C range for units with HFO.

NOTE: Since specific units may not include certain options, some tables provided in the document contain parameters that cannot be configured for a given unit.

6.3 - Alarms menu

Icon	Displayed text*	Description
	Reset Alarms	Alarm reset
	Current Alarms	Current alarms
	Alarm History	Alarm History
	Major Alarm History	Major alarm history

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

6.4 - Configuration menu

Icon	Displayed text*	Description	Associated table
	General Configuration	General configuration	GEN_CONF
	Pump Configuration	Pump configuration	PUMPCONF
	User Configuration	User configuration	USERCONF
	Reset Configuration	Reset configuration	RESETCFG
	Schedule Menu	Schedule menu	SCHEDULE
	Holiday Menu	Holiday menu	HOLIDAY
	Broadcast Menu	Broadcast menu	BROCASTS
	Date/Time Configuration	Date/time configuration	DATETIME
	Control Identification	Control identification	CTRL_ID

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

GEN_CONF – General configuration

No.	Status	Default	Unit	Displayed text*	Description
1	0 to 2	0	-	Cir Priority Sequence	Circuit priority
2				0=Auto, 1=A Prio	0 = Automatic circuit selection 1 = Circuit A priority
3				2=B Prio	2 = Circuit B priority
4	no/yes	no	-	Staged Loading Sequence	Staged loading sequence
5	no/yes	no	-	Ramp Loading Select	Ramp loading selection
6	1 to 15	1	min	Unit Off to On Delay	Unit Off to On delay
7	00:00	0	-	Night Mode Start Hour	Night mode start time
8	00:00	0	-	Night Mode End Hour	Night mode end time
9	0 to 100	100	%	Night Capacity Limit	Night capacity limit
10				Basic Menu Configuration	Basic menu configuration
11				0 = All Access	0 = All access
12				1 = no alarm menu	1 = No alarm menu
13				2 = no setpoint menu	2 = No setpoint menu
14				3 = 1 + 2	3 = No alarm and no setpoint menu
15	0 to 2	0	-	Demand Limit Type Select	Demand limit selection
16				0 = None	0 = None
17				1 = Switch Control	1 = Switch control
18				2 = 4-20mA Control	2 = 4-20 mA control
19	0 to 20	0	mA	mA For 100% Demand Limit	100% demand Limit (mA)
20	0 to 20	10	mA	mA For 0% Demand Limit	0% demand Limit (mA)
21	no/yes	no	-	Current Limit Select	Current limit selection
22	0 to 4000	2000	A	CurrentLimit at 100%	Current limit at 100%
23	14.4 to 15	10	^C	Free Cooling Delta T Th	Free cooling delta temperature
24	20 to 300	30	min	Full Load Timeout	Full load timeout
25	no/yes	no	-	Ice Mode Enable	Ice mode enabled
26	no/yes	no	-	Reverse Alarms Relay	Reverse alarms relay

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

PUMPCONF – Pump configuration

No.	Status	Default	Unit	Displayed text*	Description
1	0 to 4	0	-	Condenser Pumps Sequence	Condenser pumps sequence **
2	0 to 4	0	-	Cooler Pumps Sequence	Evaporator pumps sequence
3				0 = No Pump	0 = No pump
4				1 = One Pump Only	1 = One pump
5				2 = Two Pumps Auto	2 = Two pumps automatic control
6				3 = Pump#1 Manual	3 = Pump 1 manual
7				4 = Pump#2 Manual	4 = Pump 2 manual
8	24 to 3000	48	hour	Pump Auto Rotation Delay	Pump rotation delay
9	no/yes	no	-	Pump Sticking Protection	Pump sticking protection
10	no/yes	no	-	Stop Pump During Standby	Pump stop when the unit is in standby
11	no/yes	yes	-	Flow Checked If Pump Off	Flow check when the pump is off
12	no/yes	no	-	Cooler Pump Off In Heat	Evaporator pump off in Heating
13	no/yes	no	-	Cond Pump Off In Cool	Condenser pump off in Cooling

* Depends on the selected language (English by default).
** Please note that the unit can control only one condenser pump. This value can be set to "0" or "1".

USERCONF – User configuration

No.	Status	Default	Unit	Displayed text*	Description
1	1 to 9999	11	-	User Password	User password
2	0 to 1	0	-	Language List	Selected language list
3				0 = eng/spa/fre/ger/dut	Languages available when "language list" is set to "0"
4				chi/ita/por/rus/und	
5				1 = eng/spa/fre/ger/dut	Languages available when "language list" is set to "1"
6				tur/ita/por/rus/und	

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

RESETCFG – Reset configuration

No.	Status	Default	Unit	Displayed text*	Description
1	0 to 4	0	-	Cooling Reset Select	Cooling reset selection
2	0 to 4	0	-	Heating Reset Select	Heating reset selection
3				0=None, 1=OAT	0 = None 1 = OAT
4				2=Delta T, 4=Space Temp	2 = Delta T 4 = Space temperature
5				3=4-20mA control	3 = 4-20 mA control
6				Cooling	Cooling
7	-10 to 51.7	-10	°C	OAT No Reset Value	OAT, no reset value
8	-10 to 51.7	-10	°C	OAT Full Reset Value	OAT, max. reset value
9	0 to 13.9	0	^C	Delta T No Reset Value	Delta T, no reset value
10	0 to 13.9	0	^C	Delta T Full Reset Value	Delta T, max. reset value
11	0 to 20	0	mA	Current No Reset Value	Current, no reset value
12	0 to 20	0	mA	Current Full Reset Value	Current, max. reset value
13	-10 to 51.7	-10	°C	Space T No Reset Value	Space temperature, no reset value
14	-10 to 51.7	-10	°C	Space T Full Reset Value	Space temperature, max. reset value
15	-16.7 to 16.7	0	^C	Cooling Reset Deg. Value	Maximum cooling reset value
16				Heating	Heating
17	-10 to 51.7	-10	°C	OAT No Reset Value	OAT, no reset value
18	-10 to 51.7	-10	°C	OAT Full Reset Value	OAT, max. reset value
19	0 to 13.9	0	^C	Delta T No Reset Value	Delta T, no reset value
20	0 to 13.9	0	^C	Delta T Full Reset Value	Delta T, max. reset value
21	0 to 20	0	mA	Current No Reset Value	Current, no reset value
22	0 to 20	0	mA	Current Full Reset Value	Current, max. reset value
23	-10 to 51.7	-10	°C	Space T No Reset Value	Space temperature, no reset value
24	-10 to 51.7	-10	°C	Space T Full Reset Value	Space temperature, max. reset value
25	-16.7 to 16.7	0	^C	Heating Reset Deg. Value	Maximum heating reset value
26	-4 to 32	-17.8	°C	Heating OAT threshold	Heating OAT threshold
27	no/yes	no	-	HSM Both Command Select	HSM both command selection
28	no/yes	no	-	Auto Changeover Select	Automatic changeover selection

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

6 - TOUCH PILOT INTERFACE DETAILS

SCHEDULE – Schedule configuration

No.	Name	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 – Holiday configuration

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

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

BROCASTS – Broadcast configuration

No.	Status	Default	Displayed text*	Description
1	0 to 2	2	Activate	Not applicable
OAT Broadcast				
2	0 to 239	0	Bus	Bus number of the unit with outdoor temperature sensor
3	0 to 239	0	Element	Element number of the unit with outdoor temperature sensor
4	disable/enable	disable	Daylight Savings Select	Summer/winter time activation (daylight saving selection)
Daylight Savings Select – Summer time (entering)				
5	1 to 12	3	Month	Month
6	1 to 7	7	Day of Week (1=Monday)	Day of the week (1 = Monday)
7	1 to 5	5	Week Number of Month	Week of the month
Daylight Savings Select – Winter time (leaving)				
8	1 to 12	10	Month	Month
9	1 to 7	7	Day of Week (1=Monday)	Day of the week (1 = Monday)
10	1 to 5	5	Week Number of Month	Week of the month

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

DATETIME – Date/Time configuration

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

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

6 - TOUCH PILOT INTERFACE DETAILS

CTRL_ID – Control ID configuration

No.	Status	Default	Displayed text*	Description
1	0 to 239	0	CCN Element Number	Element number
2	0 to 239	1	CCN Bus Number	Bus number
3	9600/19200/38400	9600	CCN Baud Rate	Communication speed
4	-	30XAXW Touch Pilot	Device Description	Unit description
5	-		Location Description	Location description: The number corresponds to the country
6	-	ECG-SR-20M47010	Software Part Number	Software version
7	-		Serial Number	Serial number (MAC address)

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

7 - TOUCH PILOT CONTROL OPERATION

This section points out the most significant control functionalities, e.g. unit start/stop operation, heat/cool control. It also gives instructions on how to perform critical operations of the main control system.

7.1 - Start/Stop control

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

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

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

LOFF	Local off
L-C	Local on
L-SC	Local schedule
rEM	Remote
Net.	Network
MASt	Master unit

■ **Start/stop force command:** Chiller start/stop force command can be used to control the chiller state in the Network operating type.
  - 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:** Start/stop contact can be used to control the chiller state in the Remote operating type.

■ **Master control type:** When the unit is the master unit in a two-chiller lead/lag arrangement, the master unit may be set to be controlled locally, remotely or via network (see also 7.15).

■ **Start/stop time schedule:** Occupied or unoccupied status of the unit.

■ **Network emergency stop command:** If activated, the unit shuts down regardless of the active operating type.

■ **General alarm:** The unit shuts down due to failure.

7.2 - Unit stop function

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

7.3 - Heating/Cooling selection

For units configured in the heat pump mode, heating/cooling selection can be controlled in various ways, depending on the active operating type. By default, the cooling mode is selected. Heating/cooling control can be automatic or manual.

Heating/Cooling selection can be determined as follows:

■ locally at the unit in the GENUNIT menu,

■ remotely via the heating/cooling selection contact if the unit is in the Remote operating type,

■ via a network command if the unit is in the Network operating type.

In the automatic mode, the outdoor air temperature determines the heating/cooling/standby changeover (see the SETPOINT menu for cooling and heating mode changeover thresholds). The automatic changeover is optional and requires user configuration (GENUNIT – General Parameters).

Parameter status

On/off status	Control type	Heating/Cooling selection in local mode	Heating/Cooling contact in local mode	Heat/Cool select	Operating mode
off	-	-	-		cooling
on	local	cooling	-		cooling
on	local	heating	-		heating
on	remote	-	on cooling		cooling
on	remote	-	on heating		heating
on	network	-	-	cooling	cooling
on	network	-	-	heating	heating

NOTE: Please remember that the automatic changeover mode cannot be selected on water-cooled units.

Active operating type						Parameters status						Control type	Unit state
LOFF	L-C	L-SC	rEM	Net.	MASt	Start/stop force command	Remote start/stop contact	Master control type	Start/stop time schedule	Network emergency shutdown	General alarm		
-	-	-	-	-	-	-	-	-	-	enabled	-	-	off
-	-	-	-	-	-	-	-	-	-	-	yes	-	off
active	-	-	-	-	-	-	-	-	-	-	-	local	off
-	-	active	-	-	-	-	-	-	unoccupied	-	-	local	off
-	-	-	active	-	-	-	open	-	-	-	-	remote	off
-	-	-	active	-	-	-	-	-	unoccupied	-	-	remote	off
-	-	-	-	active	-	disabled	-	-	-	-	-	network	off
-	-	-	-	active	-	-	-	-	unoccupied	-	-	network	off
-	-	-	-	-	active	-	-	local	unoccupied	-	-	local	off
-	-	-	-	-	active	-	open	remote	-	-	-	remote	off
-	-	-	-	-	active	-	-	remote	unoccupied	-	-	remote	off
-	-	-	-	-	active	disabled	-	network	-	-	-	network	off
-	-	-	-	-	active	-	-	network	unoccupied	-	-	network	off
-	active	-	-	-	-	-	-	-	-	disabled	no	local	on
-	-	active	-	-	-	-	-	-	occupied	disabled	no	local	on
-	-	-	active	-	-	-	closed	-	occupied	disabled	no	remote	on
-	-	-	-	active	-	enabled	-	-	occupied	disabled	no	network	on
-	-	-	-	-	active	-	-	local	occupied	disabled	no	local	on
-	-	-	-	-	active	-	closed	remote	occupied	disabled	no	remote	on
-	-	-	-	-	active	enabled	-	network	occupied	disabled	no	network	on

7.4 - Pumps control

The main control can manage one or two water exchanger pumps, determining each pump on/off state. 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.

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

7.4.1 - Pumps configuration

Basic pump configuration can be performed via the Configuration menu (PUMPCONF – Pump Configuration). Only logged-in users can access the menu (see also section 4.6). The unit must be stopped.

For units with two pumps, these pumps can be controlled automatically or each pump can be started manually.

Pump(s) available	Pumps sequence (PUMPCONF)
No pump	0 (no pump)
One fixed-speed pump	1 (one pump only)
Two fixed-speed pumps	2 (two pumps auto)
	3 (pump#1 manual)
	4 (pump#2 manual)

7.4.2 - Automatic pump selection

If two pumps are controlled and the reversing function has been selected (PUMPCONF – Pump Configuration), the control tries to limit the pump run time to the configured pump changeover delay. If this delay has elapsed, the pump reversing function is activated.

7.4.3 - Customer pump

30XW chillers as well as 30XB chillers with option 17 may be fitted with one external variable speed cooler pump (often also referred to as "customer cooler pump").

Customer cooler pump can be configured as follows:

Pump available	Cooler Pumps Sequence (PUMPCONF)
No pump	0 (no pump)
One pump (fixed or variable speed)	1 (one pump only)

Depending on the unit (30XW/30XB), the pump is commanded by one of the following outputs:

■ 0-10V output on AUX1 board for single-circuit 30XW chillers,

■ 0-10V output on the second SIOB board for dual-circuit 30XW chillers and 30XB chillers with option 17.

The "Varipump Delta Temp Stp" parameter in the SETPOINT menu is used to define the delta T that has to be maintained between cooler entering and leaving water temperatures.

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

If the unit is fitted with two pumps, the first pump is started on even days and the second pump is started on odd days. Starting the pump periodically for a few seconds extends the lifetime of the pump bearings and the tightness of the pump seal. Periodical pump quick start can be selected via the Configuration menu (Pump Sticking Protection, PUMPCONF – Pump Configuration).

7.5 - Condenser water pump control

The water condenser pump control applies to air-cooled units fitted with the optional heat reclaim module as well as water-cooled units. This function ensures constant water pumps control, providing the optimum condenser water flow rate and operating cost savings.

7.6 - Control point

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

Control point = Active setpoint + Reset

The control point is calculated based on the active setpoint and the reset calculation.

The forced value can be used instead of any other setpoint calculation only when the unit is in the Network operating type.

7.6.1 - Active setpoint

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

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

- **Heating or Cooling operating mode:** Heat/Cool select (GENUNIT menu)
- **Setpoint selected via the Touch Pilot user interface:** Setpoint select permits selection of the active setpoint if the unit is in the Local operating type (GENUNIT menu)
- **Setpoint switch status:** Remote setpoint switch (INPUTS menu)
- **Schedule 2 status:** Schedule for setpoint selection

LOCAL OPERATING TYPE

Parameter status						Active setpoint
Heating/cooling operating mode	Setpoint selection	Heating/Cooling selection in local mode	Ice storage configuration	Setpoint switch	Schedule 2 status	
cooling	csp1	-	*	*	-	cooling setpoint 1
cooling	csp2	no	*	*	-	cooling setpoint 2
cooling	csp2	yes	closed	*		cooling setpoint 2
cooling	csp2	yes	open	*		ice storage setpoint
cooling	auto	-	*	*	occupied	cooling setpoint 1
cooling	auto	no	*	*	unoccupied	cooling setpoint 2
cooling	auto	yes	closed	*	unoccupied	cooling setpoint 2
cooling	auto	yes	open	*	unoccupied	ice storage setpoint
heating	hsp1	-	*	*	-	heating setpoint 1
heating	hsp2	-	*	*	-	heating setpoint 2
heating	auto	-	*	*	occupied	heating setpoint 1
heating	auto	-	*	*	unoccupied	heating setpoint 2

*Any configuration, (-) default configuration.

REMOTE OPERATING TYPE

Parameter status						Active setpoint
Heating/cooling operating mode	Setpoint selection	Ice storage configuration	Ice done contact	Setpoint switch	Schedule 2 status	
cooling	-	-	*	open	-	cooling setpoint 1
cooling	-	no	*	closed	-	cooling setpoint 2
cooling	-	yes	closed	closed	-	cooling setpoint 2
cooling	-	yes	open	closed	-	ice storage setpoint
heating	-	-	*	open	-	heating setpoint 1
heating	-	-	*	closed	-	heating setpoint 2

*Any configuration, (-) default configuration.

NETWORK OPERATING TYPE

Parameter status						Active setpoint
Heating/cooling operating mode	Setpoint selection	Ice storage configuration	Ice done contact	Setpoint switch	Schedule 2 status	
cooling	-	-	*	*	occupied	cooling setpoint 1
cooling	-	-	*	*	unoccupied	cooling setpoint 2
heating	-	-	*	*	occupied	heating setpoint 1
heating	-	-	*	*	unoccupied	heating setpoint 2

*Any configuration, (-) default configuration.

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

7.6.2 - 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. This modification is in general a reaction to a drop in the load.

The reset can be based on the following parameters:

■ OAT that gives the measure of the load trends for the building

■ Return water temperature (ΔT provides the average building load)

■ Space temperature (EMM option)

■ Dedicated 4-20 mA input

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

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

■ A reference at which reset is zero (no reset value)

■ A reference at which reset is maximum (full reset value)

■ The maximum reset value
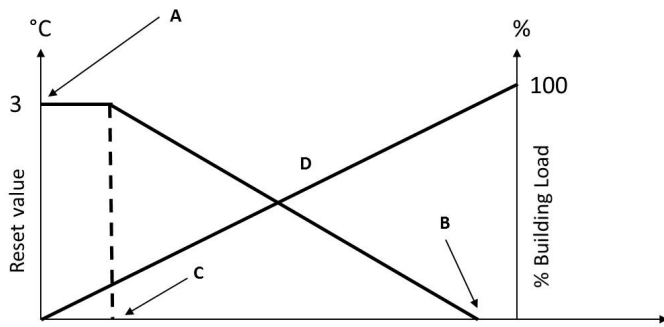
20	Reset based on OAT	25
0	Reset based on delta T	3
4	Reset based on analog input	20
no_reset	**selection**	**full_reset**

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

7.7 - Capacity limitation

The Touch Pilot control system allows for the constant control of the unit capacity by setting its maximum allowable capacity.

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

■ By means of user-controlled volt-free contacts. Units without the energy management module have one contact. Units with the energy management module permit three capacity limitation levels (see also section 3.9.4). The unit capacity can never exceed the limit setpoint activated by these contacts. The limit setpoints can be modified in the SETPOINT menu.

■ By lag limit set by the master unit (master/slave assembly).

■ By night mode limitation control. The demand limit value in the night mode is selectable if the value is below the selected limit. A limit value of 100% means that the unit can use all capacity stages.

In certain conditions, the unit power consumption can exceed the capacity limitation threshold to protect the compressors.

7.8 - Current limitation

Current limitation is used via the demand limit function. If the current limitation is active (Current Limit Select in the GEN_CONF menu), the control calculates the sum of compressors current to obtain the total compressor current. If this value exceeds the pre-defined limit, the control commands a reduction of the compressor load, until it is below the limit again. Before loading a capacity stage, the control estimates the future total compressor current and ensures that it does not exceed the limit.

The current limit is based on two parameters:

■ The current limit that corresponds to 100% capacity (CurrentLimit at 100%, GEN_CONF – General Configuration)

■ The active demand limit determined either by the demand limit contact (see also section 3.9.4) or by the network (Active Demand Limit Val, GENUNIT – General Parameters)

Chiller current limit is displayed in the GENUNIT menu.

Current limitation is disabled if the unit operates in the master/slave mode, the unit is controlled by a System Manager or the night mode is active.

7.9 - Capacity control

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

Compressors are started and stopped in a sequence designed to equalise the number of start-ups (value weighted by their operating time). For more information about compressors sequence, see *Balanced loading sequence* and *Staged loading sequence* in section 7.13.

7.10 - 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 and the number of operating fans is reduced.

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 (GEN_CONF – General Configuration).

Only logged-in users can modify Night Mode settings (see also section 4.6).

7.11 - Head pressure control

For air-cooled units, the condensing pressure of each circuit is generated by 10 fans maximum. As an option, a speed variator can be used to control up to four fans so that the speed of the fans is adjusted to maintain the head pressure setpoint. The condensing pressure is independently controlled 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.

For water-cooled units, condensing pressure control is assured if the three-way valve option is selected. The saturated condensing temperature is controlled based on a user-configurable fixed setpoint (SETPOINT menu). The three-way valve control can be configured only by Carrier service.

7.12 - Circuit lead/lag selection (multi-circuit units)

This function determines the lead and lag circuit on dual-circuit or triple-circuit units. It controls the start/stop sequence of the refrigeration circuits called circuit A, circuit B or circuit C. The circuit authorised to start first is the lead circuit. Lead circuit is used first for capacity increases and at the same time should be decreased last when decreasing capacity. The lead/lag circuits can be selected manually or automatically according to the unit configuration (GEN_CONF – General Configuration).

■ **Automatic lead/lag circuit determination:** The control system determines the lead circuit to equalise the operating time of each circuit (value weighted by the number of start-ups of each circuit). As a result, the circuit with the lowest number of operating hours always starts first.

■ **Manual lead/lag circuit determination:** Circuit A, B or C selected as the lead circuit. The selected circuit is always the leader. It is the first to start and the last to stop.

7.13 - Compressor loading sequence (multi-circuit units)

This function determines in which order the circuit capacity is changed. Compressor loading is managed by starting/stopping the compressors and controlling the position of the slide valve. Two types of sequencing are available and can be configured by the user via the Touch Pilot user interface (GEN_CONF – General Configuration).

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

■ **Staged loading sequence:** The control loads the lead circuit completely before the lag circuits are started. When the load is decreasing, the lag circuits are unloaded first.

Staged loading sequence is incorporated under the following conditions:
- One of the circuits is shut down due to its failure
- One of the circuits is in capacity override mode
- Remaining circuits are shut down or fully charged

7.14 - Circuit capacity loading sequence

7.14.1 - Dual circuit – balanced capacity loading

Loading sequence (%)		Unloading sequence (%)	
Lead circuit	Lag circuit	Lead circuit	Lag circuit
0	0	100	100
30 (15)	0	100	95
35	0	95	95
40	0	95	90
45	0	90	90
50	0	90	85
55	0	85	85
60	0	85	80
65	0	80	80
70	0	80	75
70	30 (15)	75	75
70	35	75	70
70	40	70	70
70	45	70	65
70	50	65	65
70	55	65	60
70	65	60	60
70	70	60	55
75	70	55	55
75	75	55	50
80	75	50	50
80	80	50	45
85	80	45	45
85	85	45	40
90	85	40	40
90	90	40	35
95	90	40	30 (15)
95	95	40	0
100	95	35	0
100	100	30 (15)	0
100	100	0	0

7.14.2 - Dual circuit – priority given to one circuit

Loading sequence (%)		Unloading sequence (%)	
Lead circuit	Lag circuit	Lead circuit	Lag circuit
0	0	100	100
30 (15)	0	100	95
35	0	100	90
40	0	100	85
45	0	100	80
50	0	100	75
55	0	100	70
60	0	100	65
65	0	100	60
70	0	100	55
75	0	100	50
80	0	100	45
85	0	100	40
90	0	100	35
95	0	100	30 (15)
100	0	95	30 (15)
100	30 (15)	90	30 (15)
100	35	85	30 (15)
100	40	80	30 (15)
100	45	75	30 (15)
100	50	70	30 (15)
100	55	70	0

Loading sequence (%)		Unloading sequence (%)	
Lead circuit	Lag circuit	Lead circuit	Lag circuit
100	60	65	0
100	65	60	0
100	70	55	0
100	75	50	0
100	80	45	0
100	85	40	0
100	90	35	0
100	95	30 (15)	0
100	100	0	0

NOTE: (15) minimum capacity for standard water-cooled units (without the option for high condensing temperature).

7.14.3 - Triple circuit – balanced capacity loading

Loading sequence (%)			Unloading sequence (%)		
Lead circ.	Lag circ. 1	Lag circ. 2	Lead circ.	Lag circ. 1	Lag circ. 2
0	0	0	100	100	100
30	0	0	100	100	95
35	0	0	100	95	95
40	0	0	95	95	95
45	0	0	95	95	90
50	0	0	95	90	90
55	0	0	90	90	90
60	0	0	90	90	85
65	0	0	90	85	85
70	30	0	85	85	85
70	35	0	85	85	80
70	40	0	85	80	80
70	45	0	80	80	80
70	50	0	80	80	75
70	55	0	80	75	75
70	60	0	75	75	75
70	65	0	75	75	70
70	70	0	75	70	70
70	70	30	70	70	70
70	70	35	70	70	65
70	70	40	70	65	65
70	70	45	65	65	65
70	70	50	65	65	60
70	70	55	65	60	60
70	70	60	60	60	60
70	70	65	60	60	55
70	70	70	60	55	55
75	70	70	55	55	55
75	75	70	55	55	50
75	75	75	55	50	50
80	75	75	50	50	50
80	80	75	50	50	45
80	80	80	50	45	45
85	80	80	45	45	45
85	85	80	45	45	40
85	85	85	45	40	40
90	85	85	40	40	40
90	90	85	40	40	35
90	90	90	40	40	30
95	90	90	40	40	0
95	95	90	40	35	0
95	95	95	40	30	0
100	95	95	35	0	0
100	100	95	30	0	0
100	100	100	0	0	0

7.14.4 - Triple circuit – priority given to one circuit

Loading sequence (%)			Unloading sequence (%)		
Lead circ.	Lag circ. 1	Lag circ. 2	Lead circ.	Lag circ. 1	Lag circ. 2
0	0	0	100	100	100
30	0	0	100	100	95
35	0	0	100	100	90
40	0	0	100	100	85
45	0	0	100	100	80
50	0	0	100	100	75
55	0	0	100	100	70
60	0	0	100	100	65
65	0	0	100	100	60
70	0	0	100	100	55
75	0	0	100	100	50
80	0	0	100	100	45
85	0	0	100	100	40
90	0	0	100	100	35
100	0	0	100	100	30
100	30	0	100	95	30
100	35	0	100	90	30
100	40	0	100	85	30
100	45	0	100	80	30
100	50	0	100	75	30
100	55	0	100	70	30
100	60	0	100	65	0
100	65	0	100	60	0
100	70	0	100	55	0
100	75	0	100	50	0
100	80	0	100	45	0
100	85	0	100	40	0
100	90	0	100	35	0
100	100	0	100	30	0
100	100	30	95	30	0
100	100	35	90	30	0
100	100	40	85	30	0
100	100	45	80	30	0
100	100	50	75	30	0
100	100	55	70	30	0
100	100	60	65	0	0
100	100	65	60	0	0
100	100	70	55	0	0
100	100	75	50	0	0
100	100	80	45	0	0
100	100	85	40	0	0
100	100	90	35	0	0
100	100	100	30	0	0
			0	0	0

7.15 - Energy management module

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

This option requires the installation of an additional SIOB board.

Energy management option – board connections				
Description	Input/Output	Connector	Type	Remarks
Occupancy override control	DI-01	J1	Digital input	If the contact is closed in Remote mode, the unit goes into the occupied mode
Demand limit switch 2	DI-02	J1	Digital input	If the contact is closed, the second capacity limit switch is active
Customer interlock	DI-03	J1	Digital input	Permits immediate unit shutdown (Remote mode only)
Ice storage	DI-04	J1	Digital input	If the contact is closed, the unit enters the ice storage mode
Space temperature	AI-01	J25	Analogue input	Active setpoint reset via space temperature control
Capacity limit control	AI-10	J9	Analogue input	Active setpoint reset via unit capacity control (4-20 mA)
Compressor A	DO-01	J2	Digital output	Output active if compressor A is operating
Compressor B	DO-02	J2	Digital output	Output active if compressor B is operating
Compressor C	DO-03	J6	Digital output	Output active if compressor C is operating
Chiller shutdown	DO-05	J23	Digital output	Output active (relay output) when the unit has completely stopped due to an alarm
Chiller in alert	DO-06	J22	Digital output	Output active (relay output) when the alert has been tripped
Unit capacity	A0-01	J10	Analogue output	0 to10 VDC output

7.16 - Master/slave assembly

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

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

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

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

7.17 - Heat reclaim option (30XA/30XB)

Air-conditioning system consumes a significant amount of energy that leaves the system in the form of wasted heat. Heat reclaim condenser water pump control enables to capture the energy and convert it into a useful heat source without decreasing the chiller plant capacity.

For air-cooled units fitted with water heat reclaim condenser, the option requires the installation of Reclaim SIOB board. The heat reclaim mode can be controlled locally with the Touch Pilot interface (RECLAIM – Reclaim mode), remotely with the user contact or by Network command.

The heat reclaim function is active when the heat reclaim entering water temperature is lower than the heat reclaim setpoint. The difference between the heat reclaim entering water temperature (RECLAIM menu) and the heat reclaim setpoint (SETPOINT menu) determines the number of circuits required to provide heat reclaim capacity.

Depending on the control mode, the Heat Reclaim option can be enabled as follows:

Mode	Description
Local	Use the Touch Pilot user interface to set "Heat Reclaim Select" parameter to "yes" in the Reclaim menu (Main menu).
Remote	Close the RECL_SW input (DI-02, Reclaim SIOB board).
Network	Force the RECL_SW parameter to "yes" through the CCN bus (RECLAIM table).

Units in Master/Slave assembly
When the unit is a Slave and operating in the Master/Slave assembly, the option is active depending on conditions given in the table below:

Reclaim mode	Local mode (Heat Reclaim Select = yes)	Remote mode (RECL_SW)	Network mode (RECL_SEL CCN bus)
no	no	open	no
yes	yes/no	closed	yes/no
yes	yes	open	yes/no
yes	yes/no	open	yes

The heat reclaim function can be deactivated manually or automatically when the heat reclaim entering water temperature is higher than the heat reclaim setpoint, plus half of the heat reclaim deadband. In the deadband the heat reclaim function is still active.

Changeover procedure from cooling to heat reclaim mode:
   • Start-up of the condenser pump.
   • Verification of the condenser flow switch control contact. If this remains open after one minute of the condenser pump operation, the circuit remains in cooling mode and an alarm will be activated.
   • As soon as delta between saturated condensing temperature and saturated suction temperature reaches 10°C, the pump-down sequence is activated.
   • Pump down. Opening of the water condenser water inlet valve and closing of the air condenser air valve.
   • The heat reclaim function starts after about three minutes

7.18 - Variable speed fans (option 17)

Air-cooled units fitted with the variable speed fans option allow for reducing the total unit consumption by adjusting the fan speed to the current operating conditions.

The control determines the optimum fan speed based on the current compressor capacity, outdoor air temperature, and leaving water temperature.

7.19 - Evaporator heater option (30XA/30XB)

The evaporator heater protects the evaporator against frost when the unit is stopped at low ambient air temperature. The heater is activated in the case of low outdoor air temperature conditions.

7.20 - Free cooling option (30XA/30XB)

In air-cooled units only, this option allows for the direct use of low outdoor air temperature to cool the water circuit without activating the compressors.

The direct-expansion free cooling system uses the principle of the natural migration of the refrigerant from the evaporator to the condenser. The fans and a refrigerant pump ensure the transfer of the liquid refrigerant from the condenser to the evaporator, which accounts for low power consumption.

The free cooling option enables automatic operation as well as combined operation of mechanical cooling (compressor operation) and free cooling (FREECOOL – Free cooling). The control determines which circuit is allowed to run free cooling. Each refrigerant circuit can operate independently.

Cooling operation may be performed in the following combinations:
- two circuits in mechanical cooling
- two circuits in free cooling
- one circuit in mechanical cooling and one circuit in free cooling

The free cooling option is available for dual-circuit units. It requires the installation of SIOB board that controls the operation of the motorised mechanical changeover valves and the operation of the refrigerant pump.

Free cooling option is enabled based on the following criteria:
- The temperature difference between the outdoor air temperature and the controlled water temperature. The threshold can be configured by the user (GEN_CONF – General Configuration)
- The maximum operating time in free cooling (Full Load Timeout) when the water temperature setpoint is not reached (Full Load Timeout, GEN_CONF – General Configuration)

7.21 - Dry Cooler Free Cooling (30XB)

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

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

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

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

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

7.22 - Dry cooler option (30XW)

30XW units may come with the dry cooler option that enables the control of a Carrier dry cooler.

The chiller and the dry cooler have to be connected through a LEN RS-485.

7.23 - Hydronic kit option (30XA/30XB)

The hydronic kit option allows for continuous monitoring of the water flow rate.

Hydronic kit option provides the following parameters:
- Inlet and outlet water pressure (PUMPSTAT in the Main menu)
- Evaporator flow rate
- Evaporator capacity

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

The evaporator capacity is calculated according to the flow rate, the water constant, and the difference between the entering and leaving evaporator water temperature.

7.24 - 30XA-ZE and 30XW-ZE units (HFO)

The Touch Pilot system may also control air-cooled and water-cooled units with R-1234ze refrigerant (HFO).

Please note that this option comes with advanced electrical box fan protection. In the case of the electrical box fan failure, the unit is shut down and alarm 10100 is triggered.

7.25 - High condensing temperature option (30XW)

7.25.1 - R134a configuration

For water-cooled units only, the economizer enables the increase of the maximum condensing threshold. This means that the saturated condensing temperature can reach a maximum of 63°C (145°F) compared with a maximum of 50°C (122°F) for units that are not fitted with this option.

7.25.2 - HFO configuration

For HFO units (30XW units with R-1234ze refrigerant), the high condensing option authorizes the saturated condensing temperature to reach a maximum of 70°C (158°F) compared with a maximum of 55°C (131°F) for units that are not fitted with this option.

7.26 - Maximum condenser leaving water temperature option (30XW)

For water-cooled units only, this option allows the user to limit the condenser leaving water temperature to 45°C (113°F) and enables to limit the current absorbed by the compressor. When the condensing temperature reaches 44°C (111°F), the increase in the compressor loading is stopped. When the temperature exceeds 45°C (113°F), the compressor is unloaded.

7.27 - Time schedule function

The Touch Pilot system control includes two time schedules.

The first schedule (schedule 1 OCCPC01S) allows for the automatic changeover of the unit from occupied to unoccupied mode: the unit is started during occupied periods.

The second schedule (schedule 2 OCCPC02S) allows for the automatic change of the active setpoint from occupied to unoccupied setpoint, provided that the Auto mode has been selected (RESETCFG – Reset Configuration).

7.27.1 - Occupied/unoccupied periods

■ Cooling/heating setpoint 1 is active during occupied periods.

■ Cooling/heating setpoint 2 is active during unoccupied periods.

Each schedule consists of eight user-configurable periods. Each period can be validated as active or inactive for each day of the week as well as for a given holiday period. The day begins at 00:00 and ends at 23:59.

The schedule is in unoccupied mode unless a time period is active. If two periods coincide or they are active on the same day, priority is given to the occupied period. Time schedule can be modified by the user in the Configuration menu (see also section 4.11).

7.27.2 - Holidays

This function is used to define 16 holiday periods. Each period is defined by three parameters: the month, the start day and the duration of the holiday period.

During the holiday periods the controller will be in occupied or unoccupied mode, depending on the periods validated as holidays. Each holiday period can be modified by the user (see also section 6.4).

NOTE: The broadcast function (BROCASTS) must be activated in order to use the holiday schedule.

7.28 - Black box function

Touch Pilot registers the values of about 20 predefined variables every 5 seconds. If an operation alarm is raised, the control saves a data set of 180 registrations (including 168 records preceding the alarm and 12 following the alarm) for a duration of 15 minutes of the unit operation.

Each registration is associated with a time schedule defined in hours, minutes and seconds. The control can store the maximum of 20 data sets in the memory. If the threshold of 20 data sets is reached, a rotary registration mechanism is triggered (the old data set is replaced with the new data set).

NOTE: Former data sets can be recovered only by Carrier service.

7.29 - Trending

This function enables to visualise the operations of the unit.

To access the Trending menu, navigate to the Main menu and select **Trendings** 〰️

Select the parameters to be visualised and press 💾 .

Go to the visualization screen by pressing the **Up/Down** buttons.

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

8.1 - E-mail notifications

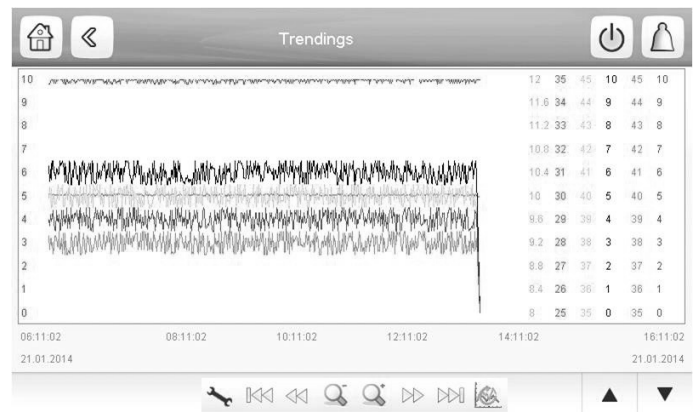The control provides the option to define one or two recipients who receive e-mail notifications each time the new alarm occurs or all existing alarms have been reset.

NOTE: E-mail notifications can be configured only by Carrier service.

8.2 - Displaying alarms

The control allows the quick display of the unit status. When the alarm is activated, the bell on the touch screen lights up.

■ 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.

8.3 - Current alarms

The Current alarms view provides a list of currently active alarms, including the date and time the alarm occurred. The control displays up to 10 current alarms.

To access the Current alarms view, press the **Alarm** button in the upper-right part of the screen, and then select **Current Alarms**

8.4 - Resetting alarms

Touch Pilot control distinguishes between two types of alarms:

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

■ Major alarms are used to indicate process failure.

The alarm can be reset either automatically or manually via the Reset alarms menu. The Reset alarms menu displays up to five alarm codes which are currently active on the unit. Only logged-in users can access the menu (see also section 4.6).

To access the Reset alarms menu, press the **Alarm** button and select **Reset Alarms**

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

8.5 - Alarm history

Information regarding resolved alarms is stored in the Alarm history menu which is divided into 50 recent alarms and 50 recent major alarms. Alarm history can be accessed through the Touch Pilot user interface or the Network Service Tool.

To access the Alarm history menu, press the **Alarm** button and select **Alarm History**

8.6 - Alarm codes

The alarm codes are displayed in the Reset Alarms menu, while in the Current Alarm menu and alarm histories textual information regarding the event is provided.

8.6.1 - General alarm codes

No.	Code	Alarm description	Reset type	Action taken	Possible cause
THERMISTOR FAILURE					
1	15001	Evaporator entering water thermistor fault	Automatic, if thermistor reading returns to normal	Unit shuts down	Defective thermistor
2	15002	Evaporator leaving water thermistor fault	As above	Unit shuts down	As above
3	15050	Cooler Leaving Fluid #2 Thermistor	As above	Unit shuts down	As above
4	15003	Defrost thermistor fault, circuit A	As above	Cooling mode: Alert is displayed Heating mode: Circuit A shuts down	As above
5	15004	Defrost thermistor fault, circuit B	As above	Cooling mode: Alert is displayed Heating mode: Circuit B shuts down	As above
6	15006	Condenser entering water thermistor fault	As above	Heating mode: Unit shuts down	As above
7	15007	Condenser leaving water thermistor fault	As above	As above	As above
8	15008	Reclaim condenser entering thermistor fault, circuit A	As above	Unit returns to the air-cooled mode	As above
9	15009	Reclaim condenser leaving thermistor fault, circuit B	As above	As above	As above
10	15010	OAT thermistor fault	As above	Unit shuts down	As above
11	15011	Master/slave common water thermistor fault	As above	Master/slave operation is disabled and the unit returns to the stand-alone mode	As above
12	15032	MASTER/Slave Common Heat Fluid Thermistor	As above	As above	As above
13	15012	Suction gas thermistor fault, circuit A	As above	Circuit A shuts down	As above
14	15013	Suction gas thermistor fault, circuit B	As above	Circuit B shuts down	As above
15	15014	Suction gas thermistor fault, circuit C	As above	Circuit C shuts down	As above
16	15015	Discharge gas thermistor fault, circuit A	As above	Circuit A shuts down	As above
17	15016	Discharge gas thermistor fault, circuit B	As above	Circuit B shuts down	As above
18	15017	Discharge gas thermistor fault, circuit C	As above	Circuit C shuts down	As above
19	15036	Dry Cooler Leaving thermistor failure	As above	None	As above
20	15046	Free Cooling Water Loop Thermistor Failure	As above	Dry cooler free cooling disabled	As above
21	15047	Free Cooling Leaving Water Thermistor Failure	As above	Dry cooler free cooling disabled	As above
22	15048	Free Cooling OAT Thermistor Failure	As above	Dry cooler free cooling disabled	As above
23	15018	Condenser subcooling liquid thermistor fault, circuit A	As above	Unit returns to the air-cooled mode	As above
24	15019	Condenser subcooling liquid thermistor fault, circuit B	As above	As above	As above
25	15021	Space temperature thermistor fault	As above	None	As above
26	15023	Evaporator heater feedback thermistor fault	As above	None	As above
27	15024	Economizer gas thermistor fault, circuit A	As above	Economizer function disabled	As above
28	15025	Economizer gas thermistor fault, circuit B	As above	As above	As above
29	15026	Economizer gas thermistor fault, circuit C	As above	As above	As above
30	15030	Free cooling liquid thermistor fault, circuit A	As above	Free cooling disabled	As above
31	15031	Free cooling liquid thermistor fault, circuit B	As above	As above	As above
TRANSDUCER FAILURE					
32	12001	Discharge transducer fault, circuit A	Automatic, if sensor voltage reading returns to normal	Circuit A shuts down	Defective transducer or installation fault
33	12002	Discharge transducer fault, circuit B	As above	Circuit B shuts down	As above
34	12003	Discharge transducer fault, circuit C	As above	Circuit C shuts down	As above
35	12004	Suction transducer fault, circuit A	As above	Circuit A shuts down	As above
36	12005	Suction transducer fault, circuit B	As above	Circuit B shuts down	As above
37	12006	Suction transducer fault, circuit C	As above	Circuit C shuts down	As above
38	12007	Heat reclaim pump-down pressure transducer fault, circuit A	As above	Reclaim session stopped and the unit returns to the air-cooled mode	As above
39	12008	Heat reclaim pump-down pressure transducer fault, circuit B	As above	As above	As above
40	12010	Oil pressure transducer fault, circuit A	As above	Circuit A shuts down	As above
41	12011	Oil pressure transducer fault, circuit B	As above	Circuit B shuts down	As above
42	12012	Oil pressure transducer fault, circuit C	As above	Circuit C shuts down	As above
43	12013	Economizer pressure transducer fault, circuit A	As above	Circuit A shuts down	As above
44	12014	Economizer pressure transducer fault, circuit B	As above	Circuit B shuts down	As above
45	12015	Economizer pressure transducer fault, circuit C	As above	Circuit C shuts down	As above

No.	Code	Alarm description	Reset type	Action taken	Possible cause
46	12016	Free cooling pump inlet pressure transducer fault, circuit A	As above	Free cooling stopped and the unit returns to mechanical cooling	As above
47	12017	Free cooling pump outlet pressure transducer fault, circuit A	As above	As above	As above
48	12018	Free cooling pump inlet pressure transducer fault, circuit B	As above	As above	As above
49	12019	Free cooling pump outlet pressure transducer fault, circuit B	As above	As above	As above
50	12022	Circuit A Heatpump Approach Pressure Transducer	As above	Cooler pinch control disabled in Cooling mode; discharge superheat control is required	As above
51	12023	Circuit B Heatpump Approach Pressure Transducer	As above	As above	As above
52	12024	Water pressure 1 transducer failure (before the evaporator)	As above	Alert - the values read by the hydronic kit function are not reliable	As above
53	12025	Water pressure 2 transducer failure (after the evaporator)	As above	As above	As above
54	12026	Water pressure 3 transducer failure (before the filter)	As above	As above	As above
55	12027	Water pressure 4 transducer failure (after the filter)	As above	As above	As above
57	12029	Low water pressure	As above	Alert – the unit continues to operate	Water loop pressure too low, risk of pump cavitation

COMMUNICATION FAILURE

No.	Code	Alarm description	Reset type	Action taken	Possible cause
59	4101	Communication loss with Compressor Board A	Automatic, if communication is re-established	Unit shuts down	Bus installation fault or defective board
60	4201	Communication loss with Compressor Board B	As above	Unit shuts down	As above
61	4301	Communication loss with Compressor Board C	As above	Unit shuts down	As above
62	4901	Communication loss with SIOB Board Number 1	As above	Unit shuts down	As above
63	4902	Communication loss with SIOB Board Number 2	As above	Unit shuts down	As above
64	4903	Communication loss with SIOB Board Number 3	As above	Unit shuts down	As above
65	4904	Communication loss with SIOB Board Number 4	As above	Unit shuts down	As above
66	4905	Communication loss with SIOB Board Number 5	As above	Unit shuts down	As above
67	4906	Communication loss with SIOB Board Number 6	As above	Unit shuts down	As above
68	4501	Communication loss with Fan Board Number 1	As above	Circuit A shuts down	As above
69	4502	Communication loss with Fan Board Number 2	As above	Circuit B shuts down	As above
70	4503	Communication loss with Fan Board Number 3	As above	Circuit C shuts down	As above
71	4504	Loss of Communication with Auxiliary # 4 (Dry Cooler Free Cooling Option)	As above	Dry cooler free cooling disabled and the unit returns to mechanical cooling	As above
72	4505	Loss of Communication with Auxiliary # 3 Dry cooler Option	As above	Dry cooler mode is stopped	As above
73	4801	Communication loss with VLT Board Number 1, (units w/o option 17)	As above	Circuit A shuts down	As above
74	4802	Communication loss with VLT Board Number 2, (units w/o option 17)	As above	Circuit B shuts down	As above
75	4803	Communication loss with VLT Board Number 3, (units w/o option 17)	As above	Circuit C shuts down	As above
76	4704	Loss of communication with Fan VLT Drive Board A1 (option 17)	As above	Circuit A shuts down	As above
77	4705	Loss of communication with Fan VLT Drive Board A2 (option 17)	As above	Circuit A shuts down	As above
78	4706	Loss of communication with Fan VLT Drive Board A3 (option 17)	As above	Circuit A shuts down	As above
79	4707	Loss of communication with Fan VLT Drive Board B1 (option 17)	As above	Circuit B shuts down	As above
80	4708	Loss of communication with Fan VLT Drive Board B2 (option 17)	As above	Circuit B shuts down	As above
81	4709	Loss of communication with Fan VLT Drive Board B3 (option 17)	As above	Circuit B shuts down	As above

PROCESS FAILURE

No.	Code	Alarm description	Reset type	Action taken	Possible cause
85	10001	Evaporator frost protection	Manual	Unit shuts down, but the pump continues to run	No water flow, defective thermistor
86	10002	Condenser frost protection, circuit A	Automatic (if saturated discharge temperature is more than 4.4°C) or Manual	Circuit A shuts down, but the pump is running	Discharge pressure transducer defective, refrigerant leak or low condenser water temperature
87	10003	Condenser frost protection, circuit B	As above	Circuit B shuts down, but the pump is running	As above
88	10004	Condenser frost protection, circuit C	As above	Circuit C shuts down, but the pump is running	As above

No.	Code	Alarm description	Reset type	Action taken	Possible cause
89	10005	Low suction temperature, circuit A	Automatic (the first alarm in the last 24 hours) or Manual	Circuit A shuts down	Pressure sensor defective, EXV blocked or lack of refrigerant
90	10006	Low suction temperature, circuit B	As above	Circuit B shuts down	As above
91	10007	Low suction temperature, circuit C	As above	Circuit C shuts down	As above
92	10008	High superheat, circuit A	Manual	Circuit A shuts down	As above
93	10009	High superheat, circuit B	Manual	Circuit B shuts down	As above
94	10010	High superheat, circuit C	Manual	Circuit C shuts down	As above
95	10011	Low superheat, circuit A	Manual	Circuit A shuts down	As above
96	10012	Low superheat, circuit B	Manual	Circuit B shuts down	As above
97	10013	Low superheat, circuit C	Manual	Circuit C shuts down	As above
98	10014	Customer safety loop failure	Automatic (the first alarm in the last 24 hours) or Manual	Unit shuts down	Customer interlock closed
99	10028	Electrical box thermostat	Automatic	Unit shuts down	Electrical box fault: Control box poorly ventilated or poor electrical connection
100	10029	System manager communication fault	Automatic, if communication is re-established	Unit returns to the stand-alone mode	CCN bus installation defective
101	10030	Master/slave communication failure	Automatic	Master/slave control disabled	As above
102	10067	Low oil pressure, circuit A	Manual	Circuit A shuts down	Pressure sensor fault, defective wiring or oil filter installation fault
103	10068	Low oil pressure, circuit B	Manual	Circuit B shuts down	As above
104	10069	Low oil pressure, circuit C	Manual	Circuit C shuts down	As above
105	10070	Maximum oil filter differential pressure, circuit A	Manual	The affected compressor is stopped, other compressors continue to run	As above
106	10071	Maximum oil filter differential pressure, circuit B	Manual	As above	As above
107	10072	Maximum oil filter differential pressure, circuit C	Manual	As above	As above
108	10084	High oil filter drop pressure, circuit A	Manual	None	Pressure sensor fault, wiring defective, oil filter installation fault
109	10085	High oil filter drop pressure, circuit B	Manual	None	As above
110	10086	High oil filter drop pressure, circuit C	Manual	None	As above
111	10075	Low oil level, circuit A	Automatic (three alarms in the last 24 hours) or Manual	Circuit A shuts down	Oil level too low or oil level detector defective
112	10076	Low oil level, circuit B	As above	Circuit B shuts down	As above
113	10077	Low oil level, circuit C	As above	Circuit C shuts down	As above
117	10031	Emergency stop	Automatic	Unit shuts down	Network emergency stop command
118	10032	Evaporator pump 1 fault	Manual	Unit is restarted with another pump running. If no pumps are available, the unit shuts down	Pump overheats or poor pump connection
119	10033	Evaporator pump 2 fault	Manual	As above	As above
120	10015	Flow controller fault - condenser flow switch failure	Automatic (the first alarm in the last 24 hours) or Manual	Condenser pump is stopped	Condenser flow switch open
121	10034	Reclaim operation failure, circuit A	Manual	Circuit A returns to the air-cooled mode	Low condenser flow
122	10035	Reclaim operation failure, circuit B	Manual	Circuit B returns to the air-cooled mode	As above
123	10037	High condensing temperature, circuit A	Automatic	Circuit A shuts down	Defective transducer
124	10038	High condensing temperature, circuit B	Automatic	Circuit B shuts down	As above
125	10039	High condensing temperature, circuit C	Automatic	Circuit C shuts down	As above
129	10043	Low entering water temperature in heating	Automatic, if EWT returns to normal or Heating mode is disabled	None	Entering water temperature is below 3.3°C
130	10073	Condenser pump 1 fault	Manual	Unit is restarted with another pump running. If no pumps are available, the unit shuts down	Pump overheats or poor pump connection
131	10074	Condenser pump 2 fault (not available!)	Manual	As above	As above

No.	Code	Alarm description	Reset type	Action taken	Possible cause
132	10078	High discharge gas temperature, circuit A	Manual	Circuit A shuts down	Defective transducer, max. condensing temperature setpoint too low or refrigerant charge too high
133	10079	High discharge gas temperature, circuit B	Manual	Circuit B shuts down	As above
134	10080	High discharge gas temperature, circuit C	Manual	Circuit C shuts down	As above
135	10081	Suction valve closed, circuit A	Manual	Circuit A shuts down	Economizer pressure transducer defective, suction valve fault
136	10082	Suction valve closed, circuit B	Manual	Circuit B shuts down	As above
137	10083	Suction valve closed, circuit C	Manual	Circuit C shuts down	As above
138	10087	Slide valve control unverifiable, circuit A	Manual	None	Defective or incorrectly wired solenoid valves, defective current transformer
139	10088	Slide valve control unverifiable, circuit B	Manual	None	As above
140	10089	Slide valve control unverifiable, circuit C	Manual	None	As above
141	10090	Flow controller configuration fault	Manual	Unit is not allowed to restart	Defective flow controller or wiring error
142	10091	Flow controller fault – evaporator flow switch failure	Automatic (the first alarm in the last 24 hours) or Manual	Compressors and the evaporator pump are stopped	As above
143	10100	Electrical box fan failure (units with HFO only)	Manual	Unit shuts down	Electrical box fan malfunction or fan current probe malfunction
144	10094	Free cooling operation failure, circuit A	Automatic (three alarms in the last 24 hours) or Manual	Circuit A shuts down, Free cooling can be started 30 minutes later	Refrigerant pump fault
145	10095	Free cooling operation failure, circuit B	As above	Circuit B shuts down, Free cooling can be started 30 minutes later	As above
146	10097	Water exchanger temperature sensors swapped	Manual	Unit shuts down	Leaving water temperature is higher than entering water temperature
180	10050	Refrigerant Leakage Detection	Manual	None	Refrigerant leak or leak detector defective
181	10101	Free Cooling Process Failure	Automatic, if free cooling conditions return to normal	Dry cooler free cooling stopped and the unit returns to mechanical cooling	Conditions not suitable for dry cooler free cooling
MAINTENANCE ALARMS					
147	13-nnn	Service maintenance alert	Manual	None	Preventive maintenance date has passed
182	13005	Fgas check needed, call your maintenance company	Manual	None	As above
VLT DRIVE FAILURE					
148	20-nnn	Variable speed controller error, circuit A (units w/o option 17)	Manual	Circuit A shuts down	Speed controller fault (see section 8.6.2)
149	23-nnn	Variable speed controller error, circuit B (units w/o option 17)	Manual	Circuit B shuts down	As above
150	26-nnn	Variable speed controller error, circuit C (units w/o option 17)	Manual	Circuit C shuts down	As above
151	20-nnn	VLT Fan Drive A1 Failure (option 17)	Manual	Circuit A shuts down	As above
152	21-nnn	VLT Fan Drive A2 Failure (option 17)	Manual	Circuit A shuts down	As above
153	22-nnn	VLT Fan Drive A3 Failure (option 17)	Manual	Circuit A shuts down	As above
154	23-nnn	VLT Fan Drive B1 Failure (option 17)	Manual	Circuit B shuts down	As above
155	24-nnn	VLT Fan Drive B2 Failure (option 17)	Manual	Circuit B shuts down	As above
156	25-nnn	VLT Fan Drive B3 Failure (option 17)	Manual	Circuit B shuts down	As above
160	38-nnn	Variable speed controller alert, circuit A (units w/o option 17)	Manual	None	Speed controller alert (see section 8.6.2)
161	41-nnn	Variable speed controller alert, circuit B (units w/o option 17)	Manual	None	As above
162	44-nnn	Variable speed controller alert, circuit C (units w/o option 17)	Manual	None	As above
163	38-nnn	Variable speed controller A1 alert (option 17)	Automatic	None	As above
164	39-nnn	Variable speed controller A2 alert (option 17)	Automatic	None	As above
165	40-nnn	Variable speed controller A3 alert (option 17)	Automatic	None	As above

No.	Code	Alarm description	Reset type	Action taken	Possible cause
166	41-nnn	Variable speed controller B1 alert (option 17)	Automatic	None	As above
167	42-nnn	Variable speed controller B2 alert (option 17)	Automatic	None	As above
168	43-nnn	Variable speed controller B3 alert (option 17)	Automatic	None	As above
EXV FAILURE					
174	57020	Main EXV stepper motor Failure - cir A	Manual	Circuit A shuts down	Stepper motor failure
175	57021	Main EXV stepper motor Failure - cir B	Manual	Circuit B shuts down	As above
176	57022	Main EXV stepper motor Failure - cir C	Manual	Circuit C shuts down	As above
177	57023	EXV eco stepper motor Failure - cir A	Manual	Circuit A shuts down	As above
178	57024	EXV eco stepper motor Failure - cir B	Manual	Circuit B shuts down	As above
179	57025	EXV eco stepper motor Failure - cir C	Manual	Circuit C shuts down	As above
COMPRESSOR FAILURE					
183-201	11nn	Compressor A fault	Manual	Unit shuts down	See section 8.6.3
202-220	21nn	Compressor B fault	Manual	Unit shuts down	As above
221-239	31nn	Compressor C fault	Manual	Unit shuts down	As above
SOFTWARE FAILURE					
172	55001	Database module fault	Automatic	Unit shuts down	Software problem. Contact Carrier Service
173	56001	Lenscan module fault	Automatic	Unit shuts down	Software problem. Contact Carrier Service
CONFIGURATION FAILURE					
114	9001	Master chiller configuration error Number #1 to nn	Automatic, if master/slave configuration returns to normal	Master/Slave control disabled	Incorrect unit configuration
115	8000	Initial factory configuration required	Automatic, if configuration is made	Unit not allowed to start	Factory configuration required
116	7001	Illegal factory configuration	Automatic, if configuration is corrected	Unit not allowed to start	Incorrect unit configuration

8.6.2 - Drive alarms

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

Code	Alarm /Alert	Description	Action to be taken
Variator alarms (-nnn)			
2	Alarm	Live zero fault	Contact Carrier Service
4	Alarm	Mains phase loss	Check the VFD supply voltage and the phase balance (±3%)
7	Alarm	Overvoltage	Contact Carrier Service
8	Alarm	Undervoltage	Contact Carrier Service
9	Alarm	Inverter overloaded	Check the VFD output current
10	Alarm	Motor overtemperature	Check the motor temperature
11	Alarm	Motor thermistor	Contact Carrier Service
12	Alarm	Torque limit exceeded	Check the VFD output current
13	Alarm	Overcurrent	Check the VFD output current
14	Alarm	Earth fault	Check if an earth fault exists
16	Alarm	Motor short-circuit	Check if there is a short-circuit at the VFD terminals
17	Alarm	Serial communication timeout	Check the connections and the shielding of the serial communication cable
23*	Alarm	Internal fan fault	Check the internal fan rotation
25	Alarm	Brake resistor short-circuited	Contact Carrier Service
26	Alarm	Brake resistor power limit	Contact Carrier Service
28	Alarm	Brake verification	Contact Carrier Service
29	Alarm	VFD temperature too high	Space temperature too high or VFD ventilation obstructed or damaged
30	Alarm	Motor phase U missing	Check wiring of phase U
31	Alarm	Motor phase V missing	Check wiring of phase V
32	Alarm	Motor phase W missing	Check wiring of phase W
33	Alarm	Inrush fault	Current demand too high: Let the VFD cool down for 20 minutes before starting it again
34	Alarm	Fieldbus communication fault	Check the connections and the shielding of the serial communication cable
36	Alarm	Mains failure	Check the VFD supply voltage and the phase balance (±3%)
38	Alarm	Internal fault	Contact Carrier Service

Code	Alarm /Alert	Description	Action to be taken
47	Alarm	24 V supply low	Contact Carrier Service
48	Alarm	1.8 V supply low	Contact Carrier Service
57**	Alarm	AMA timeout	Contact Carrier Service
65	Alarm	Control board overtemperature	Check the space temperature and the VFD fan
67	Alarm	Option configuration has changed	Contact Carrier Service
68	Alarm	Emergency stop	Contact Carrier Service
71	Alarm	PTC 1 emergency stop	Contact Carrier Service
72	Alarm	Emergency stop	Contact Carrier Service
80	Alarm	Drive initialized to default value	Contact Carrier Service
94	Alarm	End of curve	Contact Carrier Service
95	Alarm	Torque loss	Contact Carrier Service
243	Alarm	IGBT defective	Contact Carrier Service
251***	Alarm	New parts detached	Contact Carrier Service
Variator alerts (-nnn)			
1	Alert	10 V low	Contact Carrier Service
2	Alert	Live zero error	Contact Carrier Service
3	Alert	No motor	Check the motor connections
4	Alert	Mains phase loss	Check the VFD supply voltage and the phase balance (±3%)
5	Alert	DC link voltage high	Check the VFD supply voltage and the phase balance (±3%)
6	Alert	DC link voltage low	Check the VFD supply voltage and the phase balance (±3%)
7	Alert	DC overvoltage	Contact Carrier Service
8	Alert	DC undervoltage	Contact Carrier Service
9	Alert	Inverter overloaded	Check the VFD output current
10	Alert	Motor overtemperature	Check the motor temperature
11	Alert	Motor thermistor	Contact Carrier Service
12	Alert	Torque limit exceeded	Check the VFD output current
13	Alert	Overcurrent	Check the VFD output current
14	Alert	Earth fault	Check if an earth fault exists
17	Alert	Control word timeout	Check the connections and the shielding of the serial communication cable
23***	Alert	Internal fan fault	Check the internal fan rotation
25	Alert	Brake resistor short-circuited	Contact Carrier Service
26	Alert	Brake resistor power limit	Contact Carrier Service
28	Alert	Brake verification	Contact Carrier Service
34	Alert	Fieldbus communication fault	Check the connections and the shielding of the serial communication cable
36	Alert	Mains failure	Check the VFD supply voltage and the phase balance (±3%)
47	Alert	24 V supply low	Contact Carrier Service
49	Alert	Motor speed limit exceeded	Contact Carrier Service
59	Alert	Current limit exceeded	Check the VFD output current
62	Alert	Output frequency at maximum limit	Check the VFD output current
64	Alert	Voltage limit	Supply voltage too low
65	Alert	Control board overtemperature	Check the space temperature and the VFD fan
66	Alert	Heat sink temperature low	Space temperature too low
71	Alert	PTC1 emergency stop	Contact Carrier Service
72	Alert	Emergency stop	Contact Carrier Service
90†	Alert	Encoder loss	Contact Carrier Service
94	Alert	End of curve	Contact Carrier Service
95	Alert	Torque loss	Contact Carrier Service
96	Alert	Start delayed	Contact Carrier Service
97	Alert	Stop delayed	Contact Carrier Service
98	Alert	Clock fault	Contact Carrier Service
243	Alert	IGBT defective	Contact Carrier Service
247	Alert	Capacity board temperature	Contact Carrier Service

*   Error 24 and 104 possible
** Error 50 to 58 possible
***Error 70 or 250 possible
†   Not applicable to variator size 102

8.6.3 - Compressor alarms

Alarm code*	Description	Reset type	Possible cause
XX-01	Motor temperature too high	Manual	Motor/wiring fault
XX-02	Motor temperature outside the range	Manual	Probe defective or incorrect wiring
XX-03	Motor temperature outside the range	Manual	Coil fouled, lack of condenser flow, condenser valve blocked, fan circuit fault, high entering air or condenser water temperature
XX-04	Current consumption too high	Manual	-
XX-05	Locked rotor	Manual	Mechanical compressor fault, motor fault or defective compressor slide valve
XX-06	Phase L1 lost	Manual	Power supply wiring fault
XX-07	Phase L2 lost	Manual	As above
XX-08	Phase L3 lost	Manual	As above
XX-09	Low current alarm	Manual	Defective contactor or capacity fault
XX-10	Current increase fault during the star-delta passage	Manual	Incorrect wiring or no power for the delta contactor
XX-11	Contactor fault	Manual	Incorrect wiring or defective contactor or TCPM board
XX-12	Motor stop impossible	Manual	Incorrect wiring or defective contactor
XX-13	Phase reversal	Manual	-
XX-14	MTA configuration fault	Manual	MTA configuration incorrect or defective TCPM board
XX-15	Incorrect configuration switch	Manual	Configuration switch S1 incorrect wiring or defective TCPM board
XX-16	Switch modification detected	Manual	As above
XX-17	Power supply cut during operation	Automatic	Verify that power supply cuts have occurred
XX-18	Critical software error (UL 1998)	Manual	Power network noise or defective TCPM board
XX-19	Critical error on two current parameters (UL 1998)	Manual	Power network noise or defective TCPM board

*XX stands for compressor (11 – compressor A, 21 – compressor B, 31 - compressor C)