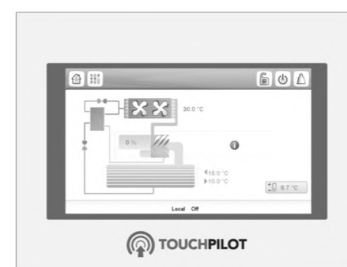




30XAV

Touch Pilot Control



Operation instructions



Quality and Environment
Management Systems
Approval

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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 30XAV single-circuit air-cooled liquid 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.

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.

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.

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.

Acronyms/abbreviations

In this manual, the refrigeration circuits are called circuit A and circuit B. Fans in circuit A are referred to as Fan A1, Fan A2, etc., whereas fans in circuit B are referred to as Fan B1, Fan B2, etc.

BMS	Building Management System
CCN	Carrier Comfort Network
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
PSM	Plant System Manager
VLT	Variable Speed Drive
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

1 - SAFETY CONSIDERATIONS

1.1 - Safety guidelines

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

Only qualified installation engineers and fully trained technicians are authorised to install and start the equipment. All instructions and recommendations provided in the service guide, installation and operation manuals, as well as on tags and labels fixed to the equipment, components and other accompanying parts supplied separately, must be read, understood and followed. Failure to comply with the instructions provided by the manufacturer may result in injury or product damage.

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

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.*

2 - CONTROL SYSTEM OVERVIEW

2.1 - Control system

Touch Pilot is a system used to control the operation of 30XAV single-circuit and dual-circuit air-cooled liquid chillers.

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

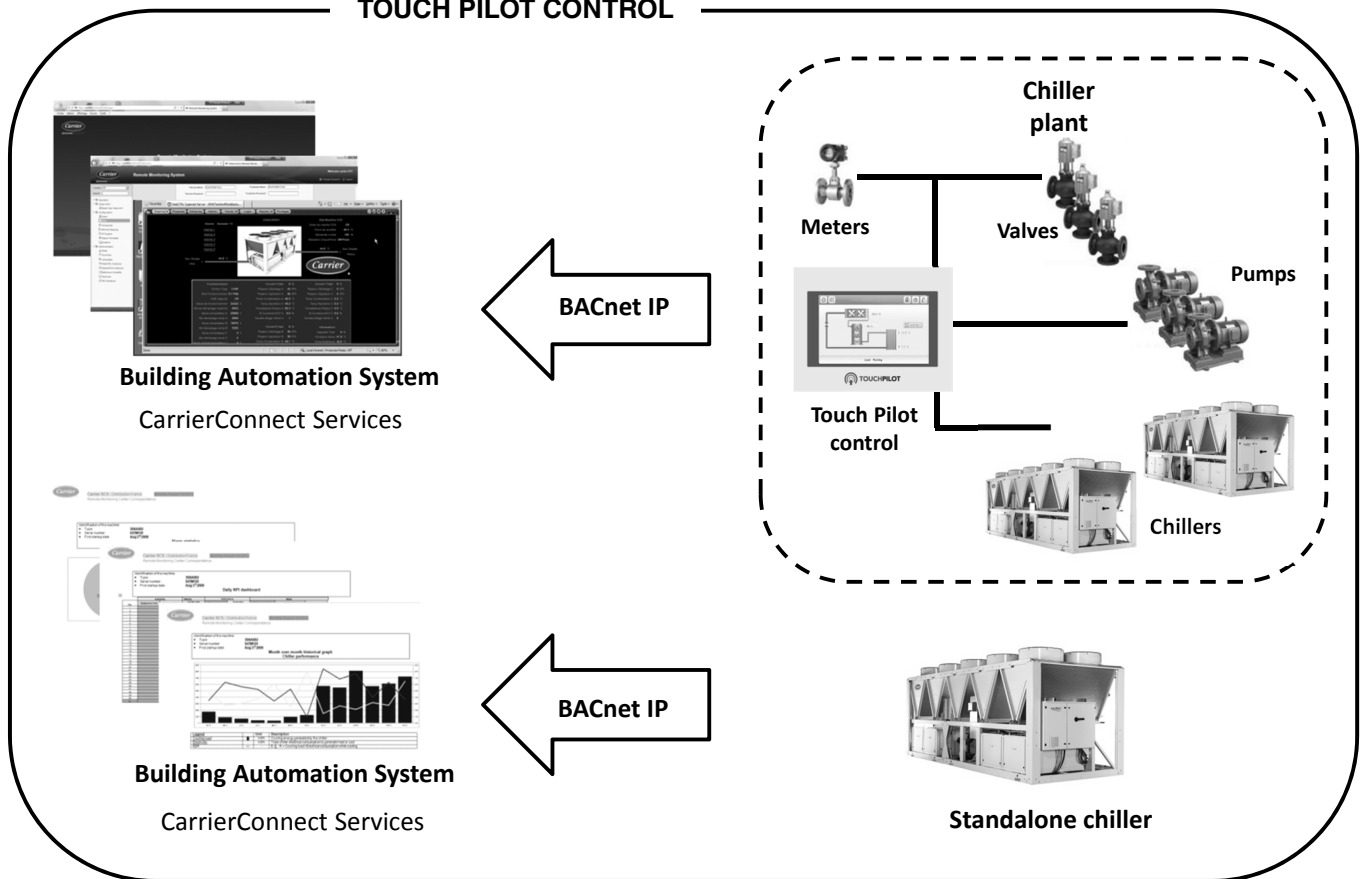
2.2 - System functionalities

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

Touch Pilot control system:

- Allows users to control the unit via the Touch Pilot user interface (7-inch colour touch screen)
- Provides web connectivity technology
- Includes the trending functionality
- Supports *Carrier Connect Services* (Remote connectivity, alarm notification, remote access, performance and operation automatic reporting, technical advice)
- Supports *Carrier Advanced Plant System Manager* for multiple chillers configuration
- Provides direct BMS integration capabilities (BACnet IP)

TOUCH PILOT CONTROL



2.3 - Operating modes

The control system can operate in three independent modes:

- **Local mode:** The unit is controlled by commands from the user interface.
- **Remote mode:** The unit is controlled by dry contacts.
- **Network mode:** The unit is controlled by network commands (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 4.3). 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.

3 - HARDWARE DESCRIPTION

3.1 - General description

Each circuit is by default fitted with one SIOB board used to manage all major inputs and outputs of the controller. The control system includes variators for compressor and fan control, as well as AUX1 boards used to manage additional inputs and outputs. Options such as hydraulic kit or master/slave assembly control require an additional AUX1 board. Energy management module requires the installation of NRCP2 board.



NOTE: The pictures are for reference only.

3.3 - 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.

3.4 - 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.

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 (7-inch touch screen).

3.2 - Electrical box

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



3.5 - 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. Liquid pressure sensors are connected to the AUX1 board and water pressure sensors of the optional hydraulic kit are connected to the additional AUX1 board.

Discharge pressure sensors (high pressure type)

These sensors measure the discharge pressure in each circuit. They are used to control head pressure. 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 suction pressure is subtracted from this value to arrive at the differential oil pressure.

Economizer pressure sensors (high pressure type)

These sensors measure the pressure on the economizer line. They are used to control the economizer performance.

Liquid pressure sensors (high pressure type)

These sensors measure the liquid pressure after the coils in each circuit. They are used for EXV control.

Water pressure sensors (low pressure type)

These sensors measure the water pressure before the pump and after the evaporator. Only units fitted with the optional hydronic kit have these sensors included.

3.6 - 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.

Outdoor air 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 freeze protection control.

Suction gas temperature sensor

This sensor is used to control the suction gas temperature. It is located at the suction side 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 side of each compressor.

Liquid line temperature sensors

These sensors are used to control the liquid line temperature in each circuit. They are used for EXV control to maintain the subcooling setpoint.

Economizer gas temperature sensors

These sensors measure the economizer line temperature in each circuit.

Compressor motor temperature sensors

These sensors are used to control the motor temperature of each compressor.

Temperature setpoint reset sensor (optional)

This sensor measures the space (room) temperature for the purpose of setpoint reset. Only units with the optional energy management module are fitted with this sensor.

Master/slave common fluid temperature sensor (optional)

This sensor is used to control the operation of chillers in the master/slave assembly. This sensor is located on the common chilled leaving piping. Only units in the master/slave configuration are fitted with this sensor.

3.7 - 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 6.3).

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

For units without internal pumps, the water flow switch configuration allows for the automatic control of the minimum water flow setpoint of the water flow switch. The configuration depends on the unit size and is made automatically at the start-up. If the measured water flow rate in the water loop is lower than the configured flow rate, the alarm condition shuts off the unit.

3.8 - Connections at the user terminal block

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

3.8.1 - Terminal block connections

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 type	Channel/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 6.5
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
Optional				
Occupancy override switch	NRCP2, EMM	DI	Ch 08	Used to switch between occupied (closed contact) and unoccupied mode (open contact)
Capacity limit switch input 2	NRCP2, EMM	DI	Ch 09	Used to control demand limit
Customer interlock	NRCP2, EMM	DI	Ch 10	Used for the customer safety loops (if the contact is closed, the chiller is stopped)
Ice done contact	NRCP2, EMM	DI	Ch 11a	Used to control the setpoint according to the occupancy schedule

3.8.2 - Volt-free on/off contact

If the unit operates in Remote mode, the on/off contacts is as follows:

With multiplexing		
	Off	Cooling
On/Off contact	open	closed

Legend:

1. Off: Unit is stopped
2. Cooling: Unit is allowed to start in Cooling

3.8.3 - 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	
	Setpoint 1	Setpoint 2
Setpoint selection contact	open	closed

3.8.4 - Volt-free demand limit selection contact

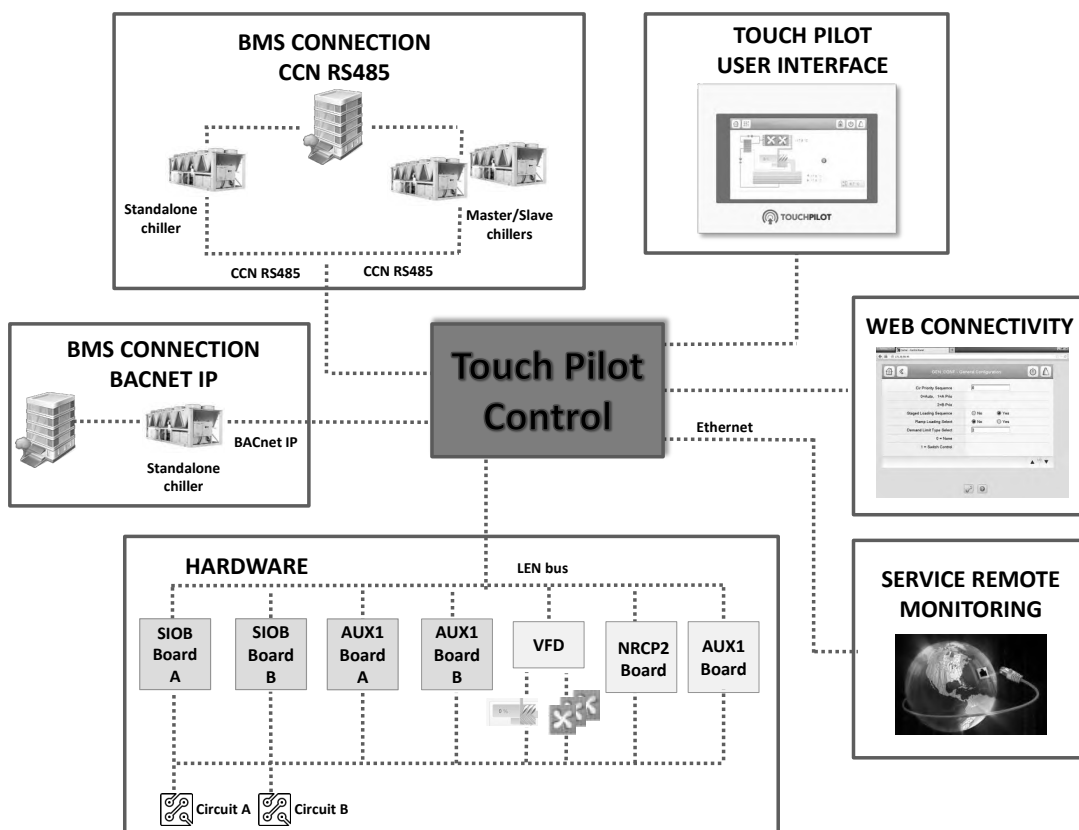
Up to two dry contacts can be used to limit unit capacity. Note that the second contact is available for units with the energy management module.

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

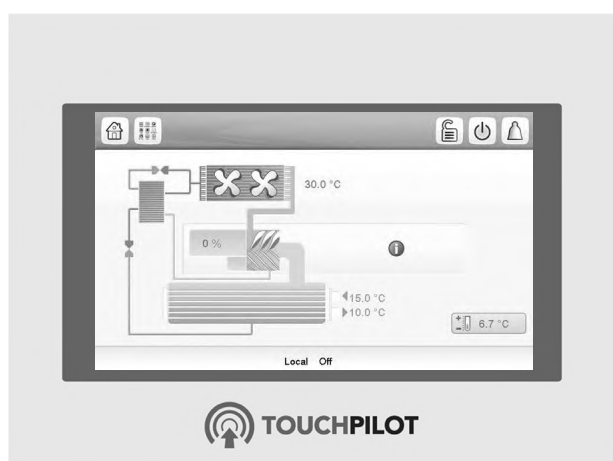
The limits are defined in the SETPOINT menu.

4 - SETTING UP THE TOUCH PILOT CONTROL



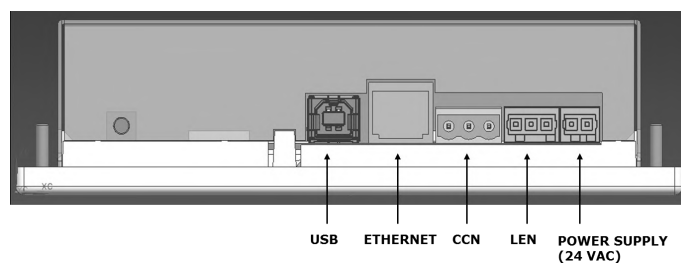
4.1 - Touch Pilot user interface

The Touch Pilot control includes the Touch Pilot user interface (7-inch touch screen) allowing for easy system control. It is recommended to use a stylus on the touch screen (the stylus is included with the unit).



Connections

Connections are located on the bottom side of the controller.



4.2 - Screens overview

Touch Pilot provides access to the following screens:

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

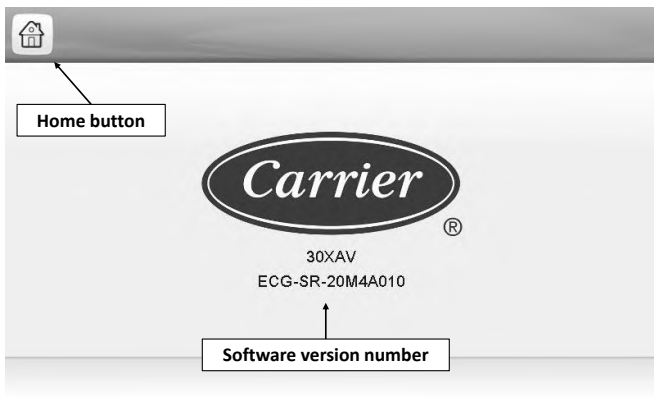
If the interface is not used for a long period, the Welcome screen is displayed, and then it goes blank. The control is always active and the operating mode remains unchanged. Press anywhere on the screen and the Welcome screen will be displayed.

4.2.1 - 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 



NOTE: In the event of a communication failure, the Settings button  is displayed.

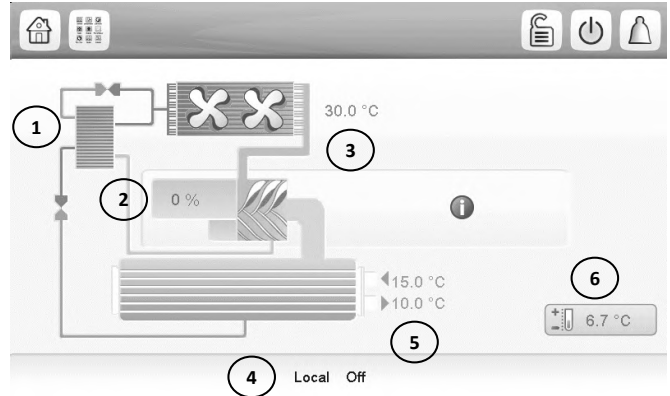
4.2.2 - Touch Pilot synoptic screen

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 pumps, 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 7.2).

By default, the parameters are presented in metric units. For more information on how to change the system of measurement, see section 4.4.



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:

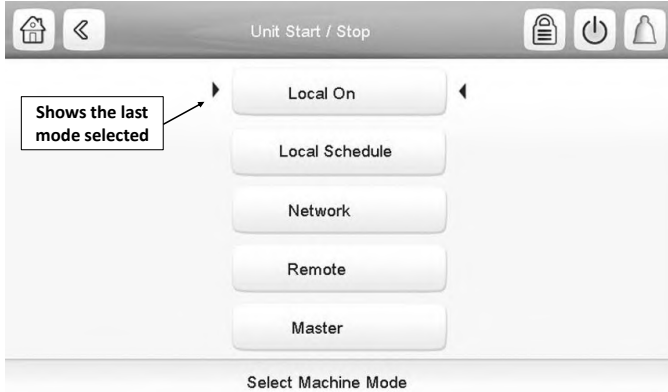
MESSAGE	STATUS
COMMUNICATION FAILURE!	Equipment controller did not respond while reading the table content.
ACCESS DENIED!	Equipment controller denies access to one of the tables.
LIMIT EXCEEDED!	The value entered exceeds the parameter limit.
Save changes?	Modifications have been made. The exit must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

4.3 - Start/Stop screen

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

4.3.1 - 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.

4.3.2 - 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

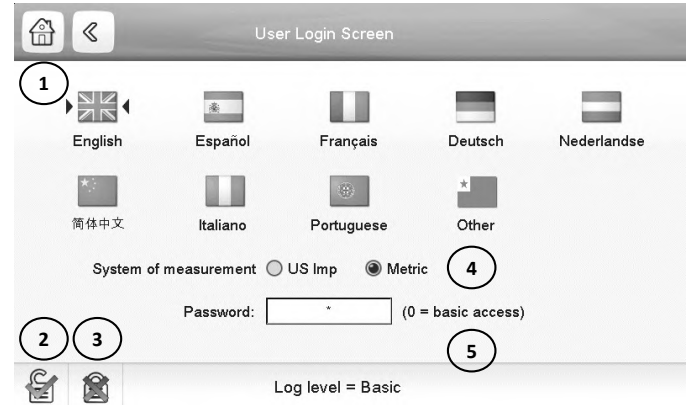
Back button .

Once the unit has been stopped, the Synoptic screen will be displayed (see also section 4.2.2).

4.4 - 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 4.2.2).



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

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

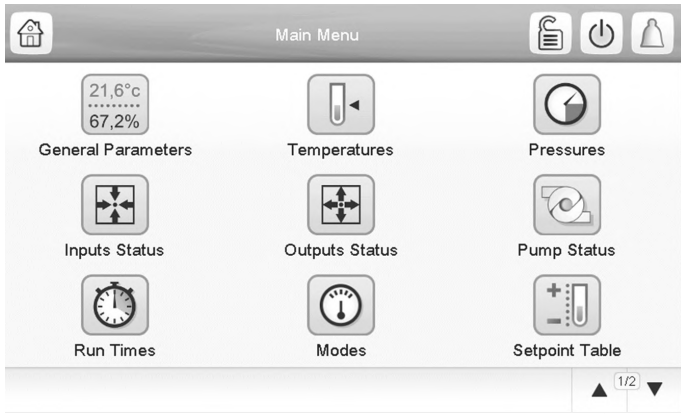
Once all the changes have been made, press  to save or  to cancel changes.

NOTE: The user password can be modified in the **Configuration menu (USERCONF – User Configuration)**.

4.5 - 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 4.2.2).



Navigation through menu/table

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 .

4.5.1 - 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**

Local=0 Net.=1 Remote=2	0
Run Status	Tripout
Net.: Cmd Start/Stop	Dsable
Net.: Cmd Occupied	No
Minutes Left for Start	0.0 min
Heat/Cool status	Cool
Heat/Cool Select	0
0=Cool. 1=Heat. 2=Auto	

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

Setpoint Select	0
0=Auto. 1=Spt1. 2=Spt2	
Setpoint Occupied?	Yes
Percent Total Capacity	0 %
Current Setpoint	6.7 °C
Control Point	6.7 °C
Actual Chiller Current	0.0 AMPS
Chiller Power Limit	0.0 KW

1. Forceable point

4.5.2 - Parameter modification

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

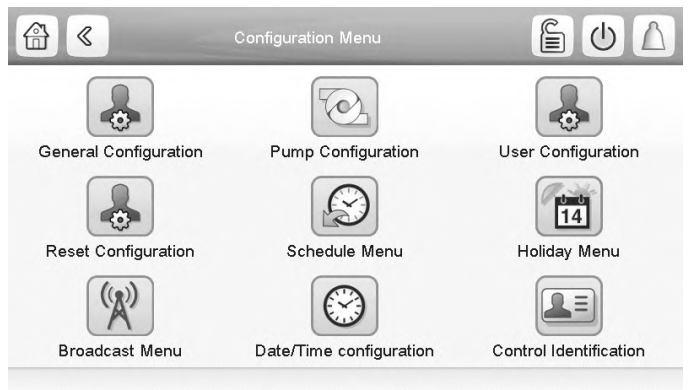


Press **OK** to save or **EXIT** to cancel the modification.

4.6 - Configuration menu

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

The Configuration menu is password-protected (see also section 4.4).



4.6.1 - General configuration screen

To access the General configuration screen, go to the Configuration menu and select

General Configuration

Cir Priority Sequence	0
0=Auto, 1=A Prio	
2=B Prio	
Staged Loading Sequence	☒ No ☐ Yes
Ramp Loading Select	☒ No ☐ Yes
Unit Off to On Delay	1 min
Demand Limit Type Select	0
0 = None	

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.

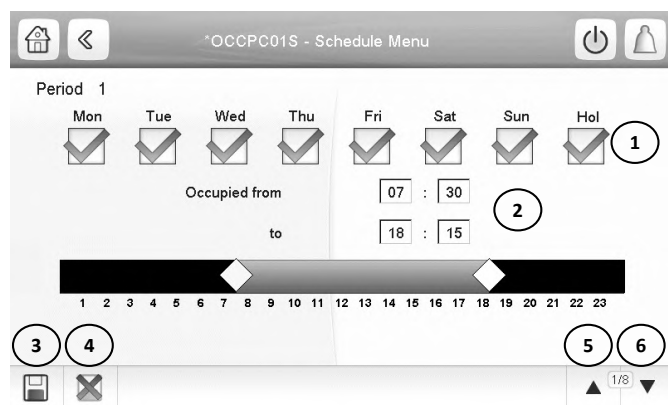
4.6.2 - Schedule screen

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.

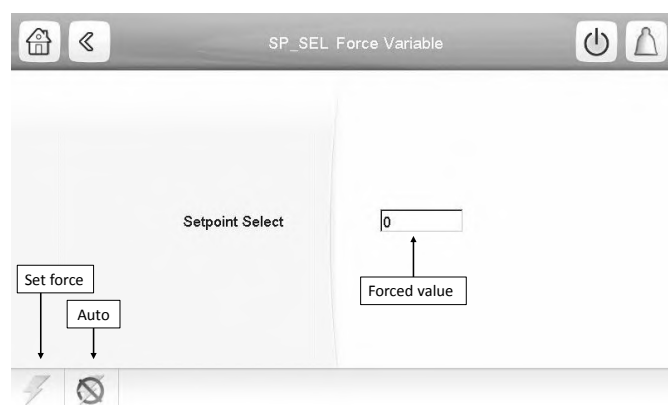
Press  to confirm or  to cancel changes.



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

4.7 - 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.



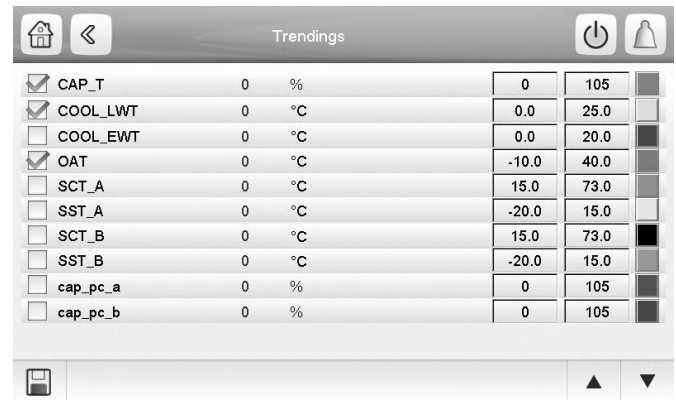
Press  to set or  to remove the forced point.

4.8 - Trendings screen

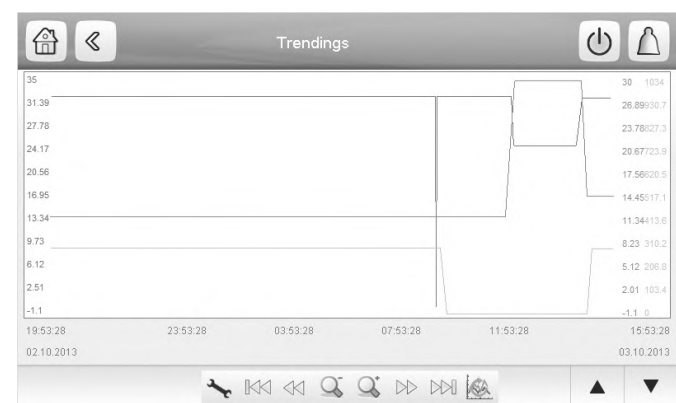
The Trendings screen allows for easy monitoring of parameters selected by the user.

To access the Trendings screen, navigate to the Main menu and select **Trendings** .

Select the parameters to be displayed and press . Press the **Up/Down** buttons   to see the graph showing the performance of the unit within a selected period of time.



Parameter	Unit	Value 1	Value 2
☒ CAP_T	0 %	0	105
☒ COOL_LWT	0 °C	0.0	25.0
☐ COOL_EWT	0 °C	0.0	20.0
☒ OAT	0 °C	-10.0	40.0
☐ SCT_A	0 °C	15.0	73.0
☐ SST_A	0 °C	-20.0	15.0
☐ SCT_B	0 °C	15.0	73.0
☐ SST_B	0 °C	-20.0	15.0
☐ cap_pc_a	0 %	0	105
☐ cap_pc_b	0 %	0	105



Press the **Settings** button  to adjust time and date settings for the Trendings display.

Press   to navigate across the timeline or press

  to go to the beginning or the end of the selected period.

Press the **Zoom in** button  to magnify the view or the **Zoom out** button  to expand the viewed area.

Press the **Refresh** button  to reload data.

4.9 - Web interface

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

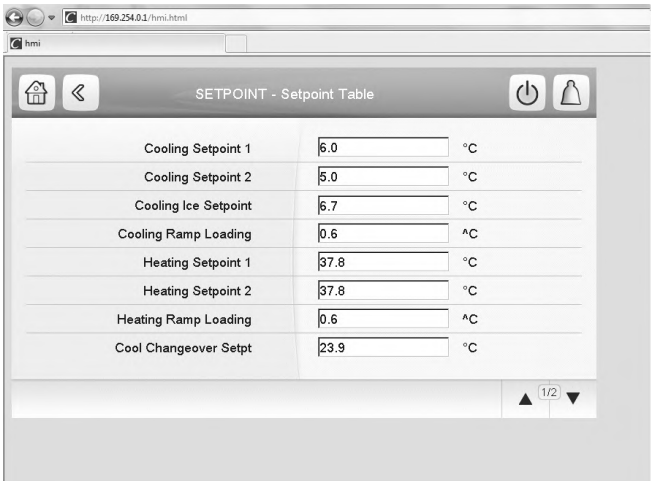


CAUTION: Use firewalls and VPN for secure connection.

4.9.1 - Web interface access

In order to access the Touch Pilot control, 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.

4.9.2 - 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.

4.9.3 - Technical documentation

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.

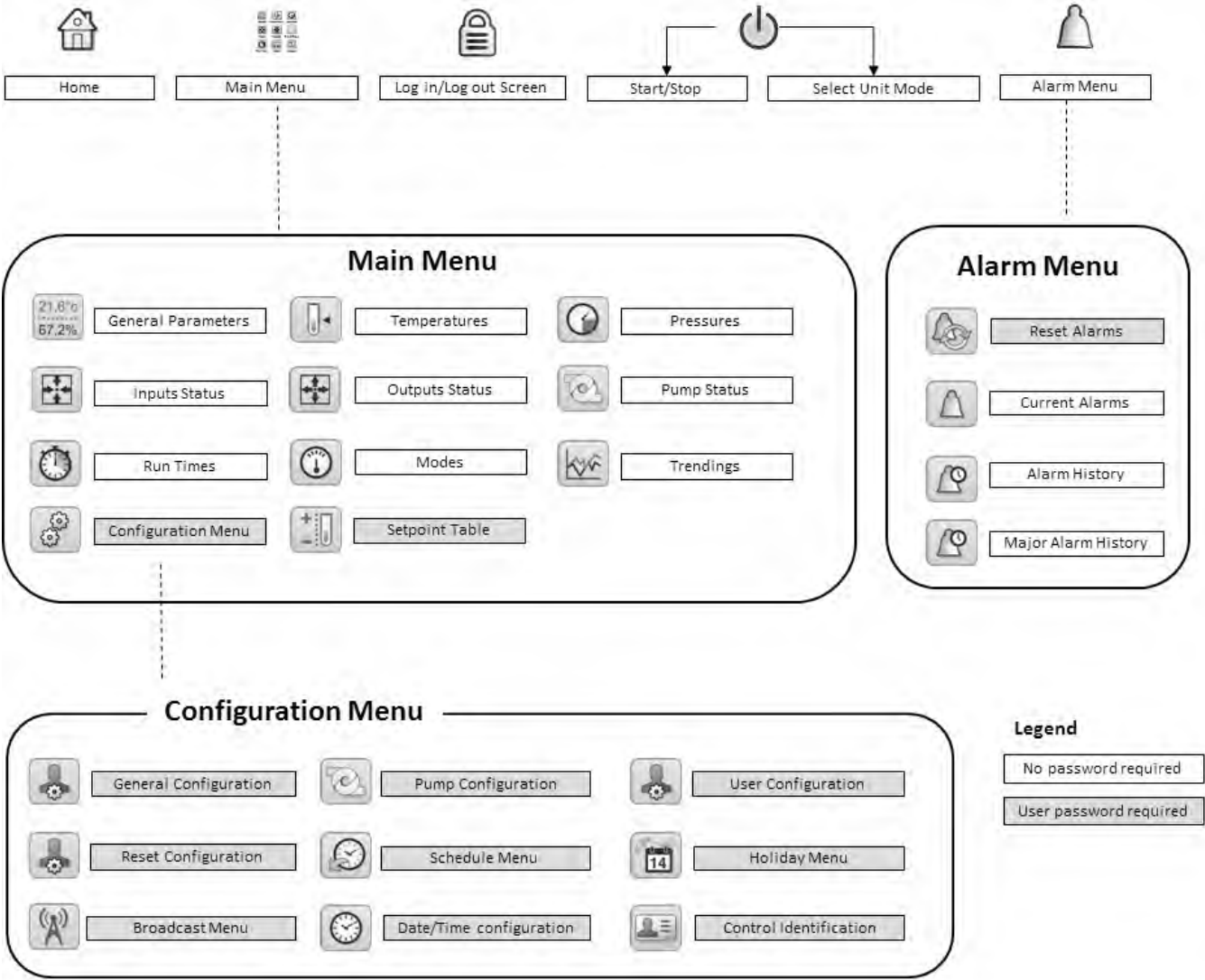
Technical documentation includes the following documents:

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



5 - TOUCH PILOT INTERFACE DETAILS

5.1 - Menu structure



5.2 - Detailed menu description

Icon	Displayed text*	Description	Associated table
	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
	Modes	Modes	MODES
	Setpoint Table	Setpoint table	SETPOINT
	Trendings	Trendings	TRENDING
	Configuration Menu	Configuration menu	CONFIG

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

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

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
13	-	°C/°F	Current Setpoint	Current setpoint
14	-20 to 67 -4 to 153	°C °F	Control Point	Control point
15	-	A	Actual Chiller Current	Actual chiller current, i.e. current delivered by compressor drives. (Note: This value is not the total current absorbed by the chiller.)
16	0 to 2000	kW	Chiller Power Limit	Chiller power limit (Not applicable)
17	-	kW	Cool. Power (kit hydro)	Cooling power (hydronic kit)
18	0 to 1	-	Emergency Stop	Emergency stop
19	0 to 100	%	Active Demand Limit Val	Active demand limit value

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



TEMP – Temperatures

No.	Status	Unit	Displayed text*	Description
1	-	°C/°F	Cooler Entering Fluid	Evaporator entering water temperature
2	-	°C/°F	Cooler Leaving Fluid	Evaporator leaving water temperature
3	-	°C/°F	Outdoor Air Temperature	Outdoor air temperature
4	-	°C/°F	Saturated Cond Tmp cir A	Saturated condensing temperature, circuit A
5	-	°C/°F	Saturated Suction Temp A	Saturated suction temperature, circuit A
6	-	°C/°F	Saturated Liquid Temp A	Saturated liquid temperature, circuit A
7	-	°C/°F	Compressor Suction Tmp A	Compressor suction temperature, circuit A
8	-	°C/°F	Discharge Gas Temp cir A	Discharge gas temperature, circuit A
9	-	°C/°F	Motor Temperature cir A	Motor temperature, circuit A
10	-	°C/°F	EXV Eco. Tmp cir A	EXV economizer temperature, circuit A
11	-	°C/°F	Liquid Temperature A	Liquid temperature, circuit A
12	-	°C/°F	Saturated Cond Tmp cir B	Saturated condensing temperature, circuit B
13	-	°C/°F	Saturated Suction Temp B	Saturated suction temperature, circuit B
14	-	°C/°F	Saturated Liquid Temp B	Saturated liquid temperature, circuit B
15	-	°C/°F	Compressor Suction Tmp B	Compressor suction temperature, circuit B
16	-	°C/°F	Discharge Gas Temp cir B	Discharge gas temperature, circuit B
17	-	°C/°F	Motor Temperature cir B	Motor temperature, circuit B
18	-	°C/°F	EXV Eco. Tmp cir B	EXV economizer temperature, circuit B
19	-	°C/°F	Liquid Temperature B	Liquid temperature, circuit B
20	-	°C/°F	Optional Space Temp	Optional space temperature
21	-	°C/°F	CHWS Temperature	Master/slave common water temperature
22	-	°C/°F	Cooler Heater Temp	Evaporator heater temperature

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



PRESSURE – Pressures

No.	Status	Unit	Displayed text*	Description
1	-	kPa/PSI	Discharge Pressure A	Discharge pressure, circuit A
2	-	kPa/PSI	Main Suction Pressure A	Main suction pressure, circuit A
3	-	kPa/PSI	Oil Pressure A	Oil pressure, circuit A
4	-	kPa/PSI	Oil Pressure DifferenceA	Oil pressure difference, circuit A
5	-	kPa/PSI	Economizer Pressure A	Economizer pressure, circuit A
6	-	kPa/PSI	Liquid Pressure A	Liquid pressure, circuit A
7	-	kPa/PSI	Discharge Pressure B	Discharge pressure, circuit B
8	-	kPa/PSI	Main Suction Pressure B	Main suction pressure, circuit B
9	-	kPa/PSI	Oil Pressure B	Oil pressure, circuit B
10	-	kPa/PSI	Oil Pressure DifferenceB	Oil pressure difference, circuit B
11	-	kPa/PSI	Economizer Pressure B	Economizer pressure, circuit B
12	-	kPa/PSI	Liquid Pressure B	Liquid pressure, circuit B
13	-	kPa/PSI	Entering water pressure	Entering water pressure (before evaporator)
14	-	kPa/PSI	Leaving water pressure	Leaving water pressure (after evaporator)
15	-	kPa/PSI	Water pressure 3	Water pressure (Not applicable)
16	-	kPa/PSI	Water pressure 4	Water pressure (Not applicable)

*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 Setpoint Switch	Remote setpoint switch
3	open/close	-	Limit Switch 1	Demand limit switch 1
4	open/close	-	Limit Switch 2	Demand limit switch 2
5	open/close	-	Oil Level Input A	Oil level input, circuit A
6	open/close	-	Oil Level Input B	Oil level input, circuit B
7	-	mA	Reset/Setpnt4-20mA Sgnl	4-20 mA signal, setpoint reset
8	-	mA	Limit 4-20mA Signal	4-20 mA signal, capacity limitation
9	-	V	Leakage detector 1 val	Leakage detection input 1
10	-	V	Leakage detector 2 val	Leakage detection input 2
11	open/close	-	Customer Interlock	Customer interlock status
12	open/close	-	Ice Done Storage Switch	Ice storage end switch
13	open/close	-	Occupied Override Switch	Occupied override switch
14	open/close	-	Remote Reclaim switch	Remote reclaim switch
15	open/close	-	Electrical box Interlock	Electrical box interlock
16	open/close	-	Cooler Heater Detector	Evaporator heater input
17	no/yes	-	BACnet dongle	BACnet dongle

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



OUTPUTS – Outputs 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	0 to 100	%	VariFan Speed A	Variable speed fan, circuit A
7	off/on	-	Ref Iso Valve Close A	Refrigerant isolation valve closed, circuit A
8	off/on	-	Ref Iso Valve Open A	Refrigerant isolation valve open, circuit A
9	close/open	-	Ref Iso Valve pos. A	Refrigerant isolation valve position, circuit A
10	off/on	-	Oil Heater Output A	Oil heater output, circuit A
11	off/on	-	Compressor B	Compressor B status
12	off/on	-	Oil Solenoid Output B	Oil solenoid output, circuit B
13	off/on	-	Slide Valve 1 Output B	Slide valve 1 output, circuit B
14	off/on	-	Slide Valve 2 Output B	Slide valve 2 output, circuit B
15	-	V	Capacity Signal Cir B	0-10 V capacity signal, circuit B
16	0 to 100	%	VariFan Speed B	Variable speed fan, circuit B
17	off/on	-	Ref Iso Valve Close B	Refrigerant isolation valve closed, circuit B
18	off/on	-	Ref Iso Valve Open B	Refrigerant isolation valve open, circuit B
19	close/open	-	Ref Iso Valve pos. B	Refrigerant isolation valve position, circuit B
20	off/on	-	Oil Heater Output B	Oil heater output, circuit B
21	-	V	Chiller Capacity signal	Chiller capacity signal
22	off/on	-	Alarm Relay Status	Alarm status
23	off/on	-	Running Relay Status	Run status
24	off/on	-	Alert Relay State	Alert status
25	off/on	-	Shutdown Indicator State	Shutdown status
26	off/on	-	Cooler Heater Output	Evaporator heater output
27	off/on	-	Electrical box fan	Electrical box fan

*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 100	%	Variable speed pump cmd	Variable speed pump command
7	-	l/s GPS	Cooler flow (kit hydro)	Evaporator flow (hydronic kit)

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



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	Cooler Pump #1 Hours	Operating hours, evaporator pump 1
8	-	hour	Cooler Pump #2 Hours	Operating hours, evaporator pump 2
9	-	hour	Circuit A Fan #1 Hours	Operating hours, fan A1
10	-	hour	Circuit A Fan #2 Hours	Operating hours, fan A2
11	-	hour	Circuit A Fan #3 Hours	Operating hours, fan A3
12	-	hour	Circuit A Fan #4 Hours	Operating hours, fan A4
13	-	hour	Circuit A Fan #5 Hours	Operating hours, fan A5
14	-	hour	Circuit A Fan #6 Hours	Operating hours, fan A6
15	-	hour	Circuit A Fan #7 Hours	Operating hours, fan A7
16	-	hour	Circuit A Fan #8 Hours	Operating hours, fan A8
17	-	hour	Circuit A Fan #9 Hours	Operating hours, fan A9
18	-	hour	Circuit A Fan #10 Hours	Operating hours, fan A10
19	-	hour	Circuit A Fan #11 Hours	Operating hours, fan A11
20	-	hour	Circuit A Fan #12 Hours	Operating hours, fan A12
21	-	hour	Circuit A Fan #13 Hours	Operating hours, fan A13
22	-	hour	Circuit A Fan #14 Hours	Operating hours, fan A14
23	-	hour	Circuit B Fan #1 Hours	Operating hours, fan B1

No.	Status	Unit	Displayed text*	Description
24	-	hour	Circuit B Fan #2 Hours	Operating hours, fan B2
25	-	hour	Circuit B Fan #3 Hours	Operating hours, fan B3
26	-	hour	Circuit B Fan #4 Hours	Operating hours, fan B4
27	-	hour	Circuit B Fan #5 Hours	Operating hours, fan B5
28	-	hour	Circuit B Fan #6 Hours	Operating hours, fan B6
29	-	hour	Circuit B Fan #7 Hours	Operating hours, fan B7
30	-	hour	Circuit B Fan #8 Hours	Operating hours, fan B8
31	-	hour	Circuit B Fan #9 Hours	Operating hours, fan B9
32	-	hour	Circuit B Fan #10 Hours	Operating hours, fan B10
33	-	hour	Circuit B Fan #11 Hours	Operating hours, fan B11
34	-	hour	Circuit B Fan #12 Hours	Operating hours, fan B12
35	-	hour	Circuit B Fan #13 Hours	Operating hours, fan B13
36	-	hour	Circuit B Fan #14 Hours	Operating hours, fan B14

* 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	-	Cooler Pump Rotation	Evaporator pump rotation
6	no/yes	-	Pump Periodic Start	Pump periodic start
7	no/yes	-	Night Low Noise Active	Night low noise active
8	no/yes	-	Master Slave Active	Master/slave mode active
9	no/yes	-	Auto Changeover Active	Automatic changeover active
10	no/yes	-	Condenser Pump Rotation	Condenser pump rotation
11	no/yes	-	Cond Pump Periodic Start	Condenser pump periodic start
12	no/yes	-	Ice Mode In Effect	Ice mode active

* 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
	-20.0 to 78.8	44.0	°F		
2	-28.9 to 26	6.7	°C	Cooling Setpoint 2	Cooling setpoint 2
	-20.0 to 78.8	44.0	°F		
3	-28.9 to 26	6.7	°C	Cooling Ice Setpoint	Ice storage setpoint
	-20.0 to 78.8	44.0	°F		
4	0.1 to 11.1	0.6	^C	Cooling Ramp Loading	Cooling ramp loading setpoint
	0.2 to 20.0	1.0	^F		
5	26.7 to 63	37.8	°C	Heating Setpoint 1	Heating setpoint 1
	80.0 to 145.4	100.0	°F		
6	26.7 to 63	37.8	°C	Heating Setpoint 2	Heating setpoint 2
	80.0 to 145.4	100.0	°F		
7	0.1 to 11.1	0.6	^C	Heating Ramp Loading	Heating ramp loading setpoint
	0.2 to 20.0	1.0	^F		
8	3.9 to 50	23.9	°C	Cool Changeover Setpt	Cooling changeover setpoint
	39.0 to 122.0	75.0	°F		
9	0 to 46.1	17.8	°C	Heat Changeover Setpt	Heating changeover setpoint
	32.0 to 115.0	64.0	°F		
10	1 to 20	5	^C	Varipump Delta Temp Stp	Variable speed pump, delta temperature setpoint
	1.8 to 36	9.0	^F		
11	50 to 344.8	200	kPa	Varipump Delta Press Stp	Variable speed pump, delta temperature setpoint
	7.25 to 50	29.0	PSI		
12	0 to 100	100	%	Switch Limit Setpoint 1	Switch limit setpoint 1
13	0 to 100	100	%	Switch Limit Setpoint 2	Switch limit setpoint 2
14	0 to 100	100	%	Switch Limit Setpoint 3	Switch limit setpoint 3

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

5.3 - 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).

5.4 - 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	BROADCASTS
	Date/Time Configuration	Date/time configuration	DATETIME
	Control Identification	Control identification	CTRL_ID

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

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



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	0 to 1	0	-	Staged Loading Sequence	Staged loading sequence
5	no/yes	0	-	Ramp Loading Select	Ramp loading selection
6	1 to 15	1	min	Unit Off to On Delay	Unit Off to On delay
7	0 to 2	0	-	Demand Limit Type Select	Demand limit selection
8				0 = None	0 = None
9				1 = Switch Control	1 = Switch control
10				2 = 4-20mA Control	2 = 4-20 mA control
11	-	-	-	Night Mode Start Hour	Night mode start hour
12	-	-	-	Night Mode End Hour	Night mode end hour
13	0 to 100	100	%	Night Capacity Limit	Night capacity limit
14	0 to 1	0	-	Power Limit select	Power limit selection
15	0 to 1	0	-	Ice Mode Enable	Ice mode enabled
16	0 to 2000	2000	kW	Maximum Power Limit	Maximum power limit
17	0 to 1	0	-	short cycle management	Short cycle management

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



PUMPCONF – Pump configuration

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

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



USERCONF – User configuration

No.	Status	Default	Unit	Displayed text*	Description
1	1 to 9999	11	-	User Password	User password

*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 14 to 125	-10 14	°C °F	OAT No Reset Value	OAT, no reset value
8	-10 to 51.7 14 to 125	-10 14	°C °F	OAT Full Reset Value	OAT, max. reset value
9	0 to 13.9 0 to 25	0 0	°C °F	Delta T No Reset Value	Delta T, no reset value
10	0 to 13.9 0 to 25	0 0	°C °F	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 14 to 125	-10 14	°C °F	Space T No Reset Value	Space temperature, no reset value
14	-10 to 51.7 14 to 125	-10 14	°C °F	Space T Full Reset Value	Space temperature, max. reset value
15	-16.7 to 16.7 -30 to 30	0 0	°C °F	Cooling Reset Deg. Value	Maximum cooling reset value
16				Heating	Heating
17	-10 to 51.7 14 to 125	-10 14	°C °F	OAT No Reset Value	OAT, no reset value
18	-10 to 51.7 14 to 125	-10 14	°C °F	OAT Full Reset Value	OAT, max. reset value
19	0 to 13.9 0 to 25	0 0	°C °F	Delta T No Reset Value	Delta T, no reset value
20	0 to 13.9 0 to 25	0 0	°C °F	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 14 to 125	-10 14	°C °F	Space T No Reset Value	Space temperature, no reset value
24	-10 to 51.7 14 to 125	-10 14	°C °F	Space T Full Reset Value	Space temperature, max. reset value
25	-16.7 to 16.7 -30 to 30	0 0	°C °F	Heating Reset Deg. Value	Maximum heating reset value

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



SCHEDULE – Schedule menu

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 menu

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 menu

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 menu

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-Friday	-	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).



CTRL_ID – Control identification

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	-	30XAV	Device Description	Unit description
5	-		Location Description	Location description: The number corresponds to the country
6	-	ECG-SR-20M4A010	Software Part Number	Software version
7	-		Serial Number	Serial number (MAC address)

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

6 - CONTROL OPERATION

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

6.1 - Start/Stop control

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

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 6.11).
- **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.

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

6.2 - 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.

The unit can be stopped by pressing the **Start/Stop** button on the Touch Pilot user interface (see also section 4.3.2). Additionally, the unit will be stopped if any abnormal conditions are identified. The emergency stop command stops the unit regardless of its active operating type.

6.3 - Pumps control

The Touch Pilot control can manage one or two water exchanger pumps, determining the state of each pump. Both pumps cannot run together. The pump is turned on when this option is configured and when the unit is running.

The pump is turned off when the unit is shut down due to an alarm, unless the fault is a freeze protection error. The pump can be started in particular operating conditions when the water exchanger heater is active (see also section 6.13).

If the pump has failed and another pump is available, the unit is stopped and started again with the second pump. If there is no pump available, the unit shuts down.

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

6.3.1 - Pumps configuration

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

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

6.3.2 - Customer pump configuration

For units without internal pumps, customer pumps may be configured as follows:

Pump available	Pumps sequence (PUMPCONF)
No pump	0
One single speed pump	1
Two single speed pumps	2 - automatic control of two pumps 3 - pump 1 is selected 4 - pump 2 is selected

Units with customer pumps are fitted with the flow switch, allowing for the water flow control. For more information about actuators, see *Water flow switch* in section 3.7.

6.3.3 - Automatic pump selection

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

6.3.4 - 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).

6.4 - Control point

The control point represents the water temperature that the unit must produce. The required capacity can be decreased depending on the unit load operating conditions.

Control point = Active setpoint + Reset

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

6.4.1 - 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:

- **Operating mode:** Cooling mode (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						
Operating mode	Setpoint selection	Ice storage configuration	Ice done contact	Setpoint switch	Schedule 2 status	Active setpoint
cooling	sp-1	-	*	*	-	cooling setpoint 1
cooling	sp-2	no	*	*	-	cooling setpoint 2
cooling	sp-2	yes	closed	*	-	cooling setpoint 2
cooling	sp-2	yes	open	*	-	cooling ice setpoint
cooling	automatic	-	*	*	occupied	cooling setpoint 1
cooling	automatic	no	*	*	unoccupied	cooling setpoint 2
cooling	automatic	yes	closed	*	unoccupied	cooling setpoint 2
cooling	automatic	yes	open	*	unoccupied	cooling ice setpoint

*Any configuration, (-) default configuration.

REMOTE OPERATING TYPE						
Parameter status						
Operating mode	Setpoint selection	Ice storage configuration	Ice done contact	Setpoint switch	Schedule 2 status	Active setpoint
cooling	-	-	*	open	-	cooling setpoint 1
cooling	-	no	*	closed	-	cooling setpoint 2
cooling	-	yes	closed	closed	-	cooling setpoint 2
cooling	-	yes	open	closed	-	cooling ice setpoint

*Any configuration, (-) default configuration.

NETWORK OPERATING TYPE						
Parameter status						
Operating mode	Setpoint selection	Ice storage configuration	Ice done contact	Setpoint switch	Schedule 2 status	Active setpoint
cooling	-	-	*	*	occupied	cooling setpoint 1
cooling	-	-	*	*	unoccupied	cooling setpoint 2

*Any configuration, (-) default configuration.

NOTE: Ice storage configuration and ice done contact apply only to units with EMM.

6.4.2 - Reset

Reset means the active setpoint is modified so that less machine capacity is required. This modification is in general a reaction to a drop in the load.

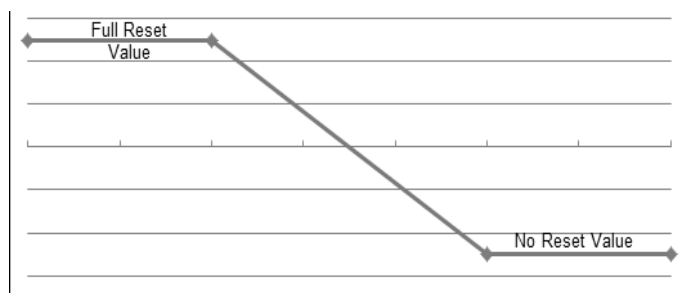
The reset can be based on the following parameters:

- OAT that gives the measure of the load trends for the building
- Return fluid temperature – the difference between the entering and leaving fluid temperature on the side of the evaporator (T provides the average building load)
- Space temperature (EMM option)
- Dedicated 4-20 mA input (EMM option)

The reset source and the reset parameters can be configured in the Main menu (RESETCFG – Reset Configuration). In response to a drop in the reset source, 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



6.5 - Capacity limitation

The Touch Pilot control system allows for the constant control of the unit capacity by setting its maximum allowable capacity. Capacity limitation is expressed in percentage, where a limit value of 100% means that no unit capacity limitation is required.

The unit capacity can be limited with 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 3.8.4). 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.

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



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

6.6 - Capacity control

This function adjusts the capacity using the compressor slide valve and the frequency variator 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. The master circuit is leading the capacity control.

Compressor capacity is controlled with the slide valve or the frequency variator depending on the current compressor capacity. The capacity is controlled with only one method at a time. Frequency controller is used when the circuit capacity is more than 50%. Otherwise, the slide valve is used to control the capacity of the unit.

6.6.1 - Lead/lag circuit capacity control

If both lead and lag circuits in the unit are running, then the lead circuit controls the unit capacity. Both circuits are controlled independently which means that if one of the circuits fails, another one continues to operate (if operating conditions permit).

For more information about lead/lag circuits, please refer to section 6.9.

6.6.2 - Ramp loading

The control provides the ramp loading function used to minimise the rate at which the water temperature changes. The minimum speed is calculated based on saturated condensing temperature and saturated suction temperature. Ramp loading sequence can be enabled by the user (*Ramp Loading Select*, GEN_CONF – General Configuration).

6.6.3 - Compressor management

The Touch Pilot control employs a number of functionalities allowing for the efficient operation of compressors:

- **Short cycle management:** Compressors can be protected by the short cycle management function preventing frequent compressor starts (*Short cycle management*, GEN_CONF – General Configuration).
- **Capacity limitation:** Controlling the maximum allowable capacity using one of the external commands (see also section 6.5).
- **Diagnostic function:** All abnormal conditions related to the operation of compressors are immediately announced and if necessary a certain action is taken on the unit (see also section 7).

6.7 - 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 4.4).

6.8 - Head pressure control

The condensing pressure of each circuit is controlled by 10 fans maximum. Up to 5 fans can be controlled by a speed variator. The fan speed is independently controlled in each circuit based on the outdoor air temperature, water exchanger fluid temperature and circuit capacity.

6.9 - Circuit lead/lag selection

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

The circuit authorised to start first is the lead circuit. Lead circuit is used first for capacity increases and at the same time should be decreased first when decreasing capacity. The lead/lag circuits can be selected manually or automatically 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 or circuit B selected as the lead circuit. The selected circuit is always the leader.

6.10 - 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).

6.10.1 - Occupied/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.

Cooling setpoint 1 is active during occupied periods.
Cooling setpoint 2 is active during unoccupied periods.

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 4.6.2).

6.10.2 - 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 5.4).

6.11 - Master/slave assembly (option 58)

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

All control commands to the master/slave assembly (start/stop, setpoint selection, 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.

6.12 - Energy management module (option 156)

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

This option requires the installation of NRCP2 board.

Energy management option – board connections			
Description	Type	Channel	Remarks
Space temperature for reset control	Analogue input	Ch 02	Active setpoint reset via space temperature control
Setpoint reset control	Analogue input	Ch 05	Used for setpoint reset control
Capacity limit control	Analogue input	Ch 06	Used for capacity limit control
Chiller capacity running output	Analogue output	Ch 07	0 to 10 V output
Occupancy override switch	Digital input	Ch 08	If the contact is closed in Remote mode, the unit goes into the occupied mode
Capacity limit switch input 2	Digital input	Ch 09	If the contact is closed, the second capacity limit switch is active
Customer interlock	Digital input	Ch 10	Permits immediate unit shutdown (Remote mode only) If the contact is closed, the unit is not allowed to start.
Ice done contact	Digital input	Ch 11a Ch 11b	If the contact is closed, the unit enters the ice storage mode
Compressor A running status	Digital output	Ch 16	Output active if compressor A is operating (the contact is closed)
Compressor B running status	Digital output	Ch 17	Output active if compressor B is operating (the contact is closed)
Chiller shutdown	Digital output	Ch 24	Used to indicate the unit shutdown (the contact is closed)
Chiller alert	Digital output	Ch 25	Used to indicate the unit alert condition (the contact is closed)

6.14 - Refrigerant gas leak detection (option 159)

The control permits refrigerant leak detection. Two additional sensors that detect the refrigerant concentration in the air must be installed on the unit. If one of these sensors detects an abnormal refrigerant level for more than one hour, the alarm will be triggered, but the unit will continue to operate.

6.15 - Low noise (option 257)

The low noise option is used to reduce the noise level by limiting the speed of the fans to 750 RPM.

6.16 - BACnet (option 149)

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

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

6.13 - Evaporator heater (option 41)

The evaporator heater protects the evaporator against freezing when the unit is stopped at low ambient air temperature. The heater is activated when the unit is stopped manually or shut down due to an alarm.

This option requires the installation of an additional AUX1 board.

6.17 - Hydronic kit (option 116X)

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 pump inlet and evaporator outlet pressures, the evaporator and piping pressure drops curves and the pump head curve.

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

This option requires the installation of an additional AUX1 board.

Flow rate and evaporator capacity are displayed for information only. Pressure instability and evaporator dirt can highly impact the calculation.

6.18 - Variable water flow control (option 299)

The control can be configured in three different modes:

- **Evaporator delta temperature:** Difference between entering and leaving temperature.
- **Evaporator output water pressure:** Controlling a constant water pressure output.
- **Schedule:** Two different 0-10V thresholds can be applied depending on whether the chiller is running or not.

7 - DIAGNOSTICS – TROUBLESHOOTING

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.

7.1 - 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.

7.2 - 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.

7.3 - 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** .

7.4 - Resetting 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.

The alarm can be reset either automatically or manually. When resetting the alarm manually, the reset can be performed through the Touch Pilot user interface or the web interface (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 4.4).

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

7.5 - 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.

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

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

7.6 - Alarm codes

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

7.6.1 - General/major alarms

Alarm code	Alarm description	Reset type	Action taken	Possible cause
THERMISTOR FAILURE				
15001	Evaporator entering water thermistor fault	Automatic, if thermistor reading returns to normal	Unit shuts down	Defective thermistor
15002	Evaporator leaving watert hermistor fault	As above	Unit shuts down	As above
15010	OAT thermistor fault	As above	Unit shuts down	As above
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
15012	Suction gas thermistor fault, circuit A	As above	Circuit A shuts down	As above
15013	Suction gas thermistor fault, circuit B	As above	Circuit B shuts down	As above
15015	Discharge gas thermistor fault, circuit A	As above	Circuit A shuts down	As above
15016	Discharge gas thermistor fault, circuit B	As above	Circuit B shuts down	As above
15018	Condenser subcooling liquid thermistor fault, circuit A	As above	Circuit A shuts down	As above
15019	Condenser subcooling liquid thermistor fault, circuit B	As above	Circuit B shuts down	As above
15021	Space temperature thermistor fault	As above	None	As above
15023	Evaporator heater feedback thermistor fault	As above	None	As above
15024	Economizer gas thermistor fault, circuit A	As above	Circuit A shuts down	As above
15025	Economizer gas thermistor fault, circuit B	As above	Circuit B shuts down	As above
15033	Compressor motor thermistor fault, circuit A	As above	Circuit A shuts down	As above
15044	Compressor motor thermistor fault, circuit B	As above	Circuit B shuts down	As above
TRANSDUCER FAILURE				
12001	Discharge transducer fault, circuit A	Automatic, if sensor voltage reading returns to normal	Circuit A shuts down	Defective transducer or installation fault
12002	Discharge transducer fault, circuit B	As above	Circuit B shuts down	As above
12004	Suction transducer fault, circuit A	Automatic (three alarms in the last 24 hours) or Manual	Circuit A shuts down	As above
12005	Suction transducer fault, circuit B	As above	Circuit B shuts down	As above
12010	Oil pressure transducer fault, circuit A	Automatic, if sensor voltage reading returns to normal	Circuit A shuts down	As above
12011	Oil pressure transducer fault, circuit B	As above	Circuit B shuts down	As above
12013	Economizer pressure transducer fault, circuit A	As above	Circuit A shuts down	As above
12014	Economizer pressure transducer fault, circuit B	As above	Circuit B shuts down	As above
12024	Water pressure 1 transducer failure (before the pump)	As above	Circuit A shuts down	As above
12025	Water pressure 2 transducer failure (after the evaporator)	As above	Circuit B shuts down	As above
12029	Low water pressure	Automatic	None or unit and pump shut down	Water loop pressure too low, risk of pump cavitation
12031	Condenser subcooling liquid pressure transducer, circuit A	As above	Circuit A shuts down	Defective transducer
12032	Condenser subcooling liquid pressure transducer, circuit B	As above	Circuit B shuts down	As above
COMMUNICATION FAILURE				
4901	Communication loss with SIOB board, circuit A	Automatic, if communication is re-established	Unit shuts down	Bus installation fault or defective board
4902	Communication loss with SIOB board, circuit B	As above	Unit shuts down	As above
4501	Communication loss with Auxiliary Board Number 1	As above	None	As above
4502	Communication loss with Auxiliary Board Number 2	As above	None	As above
4503	Communication loss with Auxiliary Board Number 3	As above	None	As above
4603	Communication loss with Energy Management NRCP2 board	As above	None	As above
4701	Communication loss with VLT Board Number 1	As above	Circuit A shuts down	As above
4702	Communication loss with VLT Board Number 2	As above	Circuit B shuts down	As above
4704	Communication loss with Fan A1 Drive board	As above	Circuit A shuts down	As above
4705	Communication loss with Fan A2 Drive board	As above	Circuit A shuts down	As above
4706	Communication loss with Fan A3 Drive board	As above	Circuit A shuts down	As above
4707	Communication loss with Fan B1 Drive board	As above	Circuit B shuts down	As above
4708	Communication loss with Fan B2 Drive board	As above	Circuit B shuts down	As above
4709	Communication loss with Fan B3 Drive board	As above	Circuit B shuts down	As above
PROCESS FAILURE				
10001	Evaporator freeze protection	Automatic (the first alarm in the last 24 hours) or Manual	Unit shuts down, but the pump continues to run	No water flow, defective thermistor
10005	Low suction temperature, circuit A	As above	Circuit A shuts down	Pressure sensor defective, EXV blocked or lack of refrigerant
10006	Low suction temperature, circuit B	As above	Circuit B shuts down	As above
10014	Customer safety loop failure	Automatic (the first alarm in the last 24 hours) or Manual	Unit shuts down	Customer interlock input set on
10090	Flow controller configuration fault	Manual	Unit shuts down	Defective flow controller or wiring error

Alarm code	Alarm description	Reset type	Action taken	Possible cause
10091	Flow controller fault	Automatic (the first alarm in the last 24 hours) or Manual	Compressors and the evaporator pump are stopped	As above
10030	Master/slave communication failure	As above	Unit shuts down	As above
10031	Emergency stop	Automatic	Unit shuts down	Network emergency stop command
10032	Evaporator pump 1 fault	Manual	Unit shuts down	Pump overheats or poor pump connection
10033	Evaporator pump 2 fault	Manual	Unit shuts down	As above
10037	High condensing temperature, circuit A	Manual	Circuit A shuts down	Defective transducer
10038	High condensing temperature, circuit B	Manual	Circuit B shuts down	As above
10050	Refrigerant leak detection	Automatic	None	Refrigerant leak or leak detector defective
10067	Low oil pressure, circuit A	Automatic (three alarms in the last 24 hours) or Manual	Circuit A shuts down	Pressure sensor fault, defective wiring or oil filter installation fault
10068	Low oil pressure, circuit B	As above	Circuit B shuts down	As above
10070	Maximum oil filter differential pressure, circuit A	Manual	Circuit A shuts down	As above
10071	Maximum oil filter differential pressure, circuit B	Manual	Circuit B shuts down	As above
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
10076	Low oil level, circuit B	As above	Circuit B shuts down	As above
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
10079	High discharge gas temperature, circuit B	Manual	Circuit B shuts down	As above
10081	Suction valve closed, circuit A	Manual	Circuit A shuts down	Economizer pressure transducer defective, suction valve fault
10082	Suction valve closed, circuit B	Manual	Circuit B shuts down	As above
10084	High oil filter drop pressure, circuit A	Manual	None	Pressure sensor fault, wiring defective, oil filter installation fault
10085	High oil filter drop pressure, circuit B	Manual	None	As above
10097	Water exchanger temperature sensors swapped	Manual	Unit shuts down	Leaving water temperature is higher than entering water temperature
10101	High condensing temperature, circuit A	Manual	Circuit A shuts down	Defective transducer, SST too high
10102	High condensing temperature, circuit B	Manual	Circuit B shuts down	As above
MAINTENANCE ALARMS				
13nnn	Service maintenance alert	Manual	None	Preventive maintenance date has passed
VLT DRIVE FAILURE ALARMS				
17nnn	Compressor variable speed controller error, circuit A	Manual	Circuit A shuts down	Speed controller fault (see section 7.6.2)
18nnn	Compressor variable speed controller error, circuit B	Manual	Circuit B shuts down	As above
20nnn	Fan A1 variable speed controller error	Manual	Circuit A shuts down	As above
21nnn	Fan A2 variable speed controller error	Manual	Circuit A shuts down	As above
22nnn	Fan A3 variable speed controller error	Manual	Circuit A shuts down	As above
23nnn	Fan B1 variable speed controller error	Manual	Circuit B shuts down	As above
24nnn	Fan B2 variable speed controller error	Manual	Circuit B shuts down	As above
25nnn	Fan B3 variable speed controller error	Manual	Circuit B shuts down	As above
VLT DRIVE FAILURE ALERTS				
35nnn	Compressor variable speed controller alert, circuit A	Automatic	None	Speed controller alert (see section 7.6.2)
36nnn	Compressor variable speed controller alert, circuit B	Automatic	None	As above
38nnn	Fan A1 variable speed controller error	Automatic	None	As above
39nnn	Fan A2 variable speed controller error	Automatic	None	As above
40nnn	Fan A3 variable speed controller error	Automatic	None	As above
41nnn	Fan B1 variable speed controller error	Automatic	None	As above
42nnn	Fan B2 variable speed controller error	Automatic	None	As above
43nnn	Fan B3 variable speed controller error	Automatic	None	As above
COMPRESSOR FAILURE				
1101	Compressor A fault: High motor temperature	Manual	Circuit A shuts down	Defective wiring, open high pressure switch
2101	Compressor B fault: High motor temperature	Manual	Circuit B shuts down	As above
1103	Compressor A fault: High pressure switch	Manual	Circuit A shuts down	As above
2103	Compressor B fault: High pressure switch	Manual	Circuit B shuts down	As above
SOFTWARE FAILURE				
55001	Database module fault	Manual	Unit shuts down	Software problem. Contact Carrier Service
56001	Lenscan module fault	Manual	Unit shuts down	Software problem. Contact Carrier Service

7.6.2 - Drive alarms

Compressor drive alarms or alerts are displayed based on the following formula: 17+X-YYY for alarms and 35+X-YYY for alerts (X stands for the number of the circuit and YYY is the alarm/alert code).

Fan drive alarms or alerts are displayed based on the following formula: 20-YYY to 25-YYY (20=A1, 21=A2, 22=A3 and 23=B1, 24=B2, 25=B3) or alert 38-YYY to 43-YYY (38=A1, 39=A2, 40=A3, 41=B1, 42=B2, 43=B3; YYY stands for the alarm/alert code).

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

Code	Alarm /Alert	Description	Action to be taken
Variator alarms			
2	Alarm	Live zero fault	Contact Carrier Service
4	Alarm	Mains phase loss	Check the VFD supply voltage and the phase balance ($\pm 3\%$)
7	Alarm	Over voltage	Contact Carrier Service
8	Alarm	Under voltage	Contact Carrier Service
9	Alarm	Inverter overloaded	Check the VFD output current/compressor 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/compressor current
13	Alarm	Overcurrent	Check the VFD output current/compressor 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 ($\pm 3\%$)
38	Alarm	Internal fault	Contact Carrier Service
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 over temperature	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

Code	Alarm /Alert	Description	Action to be taken
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 ($\pm 3\%$)
5	Alert	DC link voltage high	Check the VFD supply voltage and the phase balance ($\pm 3\%$)
6	Alert	DC link voltage low	Check the VFD supply voltage and the phase balance ($\pm 3\%$)
7	Alert	DC over voltage	Contact Carrier Service
8	Alert	DC under voltage	Contact Carrier Service
9	Alert	Inverter overloaded	Check the VFD output current/compressor current
10	Alert	Motor over temperature	Check the motor temperature
11	Alert	Motor thermistor	Contact Carrier Service
12	Alert	Torque limit exceeded	Check the VFD output current/compressor current
13	Alert	Overcurrent	Check the VFD output current/compressor 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 ($\pm 3\%$)
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/compressor current
62	Alert	Output frequency at maximum limit	Check the VFD output current/compressor current
64	Alert	Voltage limit	Supply voltage too low
65	Alert	Control board over temperature	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



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