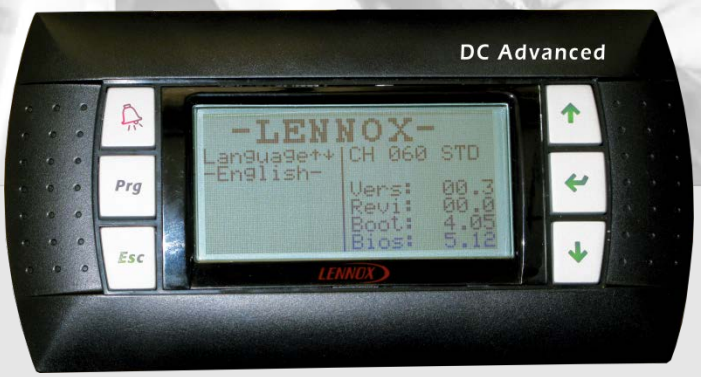
eCLIMATIC
CONTROL MANUEL



eCLIMATIC

eCOMFORT RANGE

eCLIMATIC_CH-
CMA-1703-E

www.lennoxemea.com

REAL TIME CLOCK

Function

The eCLIMATIC™ board includes a real time clock allowing a schedule programming.

Description

The clock time can be updated directly with the terminal displays (DC Advanced, DS and DM) or through a BMS system. The time is automatically updated for winter and summer season set by the eCLIMATIC™. This functionality can be disabled in menu (**2126**).

- The winter update is set the last Sunday of October at 3h00.
- The summer update is set the last Sunday of March at 2h00.

To update the clock by the BMS, the procedure is as follows:

- Set the flag to '1' to enable the clock update (register @51 = 1),
- Wait delay 5s,
- Send the new time (hour/minute/day/month/year) (register @52→56),
- Wait delay 5s,
- Reset the flag to '0' to end the clock update procedure (register @51 = 0).

Settings

(**2121**): Clock hour,
(**2122**): Clock minute,
(**2123**): Clock day (day of the month),
(**2124**): Clock month,
(**2125**): Clock year,
(**2126**): Automatic clock update.

Note

The weekday is automatically calculated by the eCLIMATIC™.

eCLIMATIC™ CONTROLLER

The new generation of microprocessor based control, eCLIMATIC™ may be fitted to the LENNOX chiller range. It inherits 30 years of technology and field operating experience from its predecessors the CLIMATIC 1, CLIMATIC 2, CLIMATIC 50 and eCLIMATIC™.

LENNOX has found the latest hardware technology available on the market place and developed software specifically designed for chiller applications, maximizing the LENNOX unit's efficiency and performance.

COMPATIBILITY

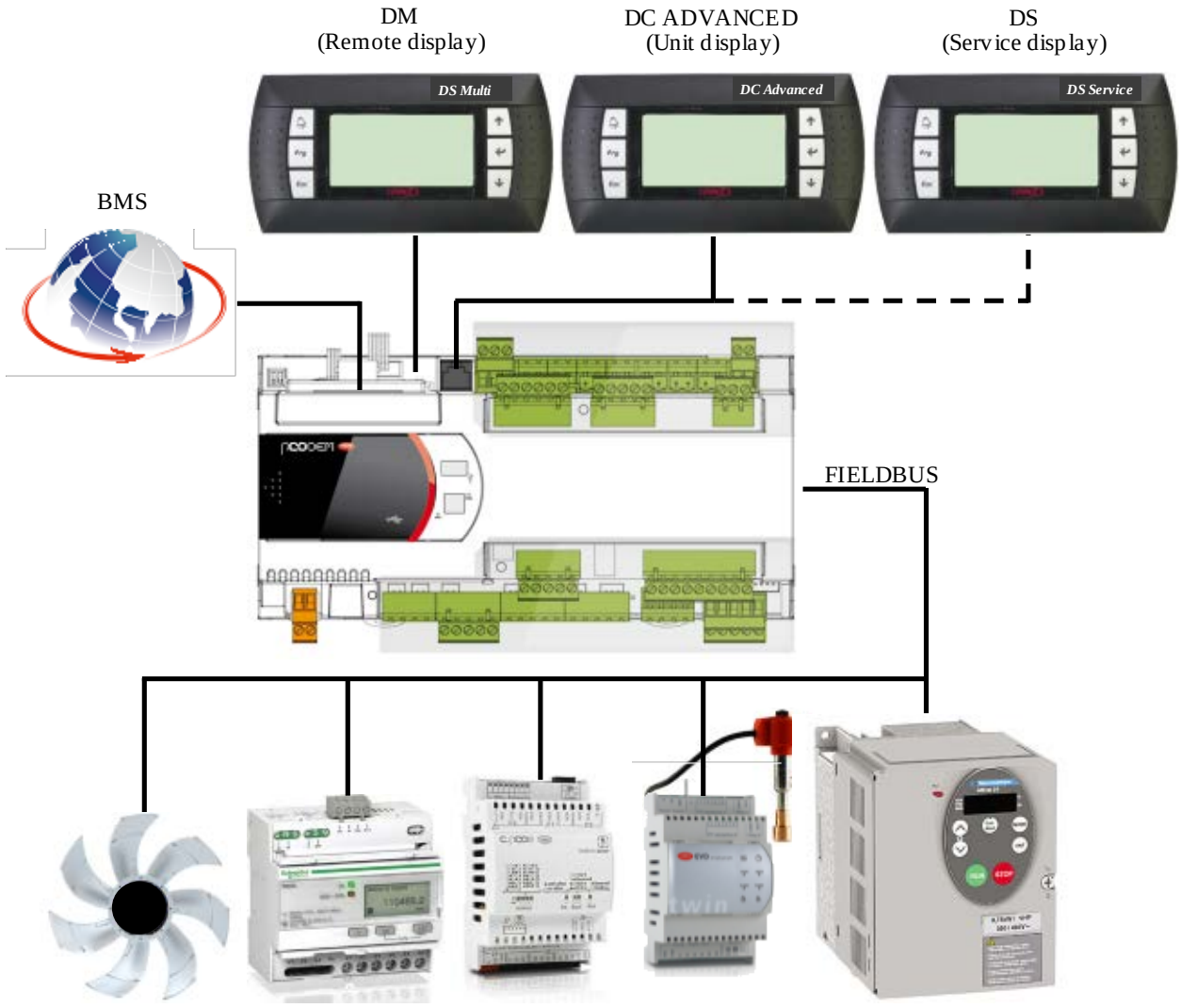
This documentation is compatible with the chiller programs:

• eCOMFORT range from software version eCH STD - Vers. 1 - Rev 0.0.

WARNING

Any parameter modification should be carried out by trained and licensed competent technician. Before start-up or restart of a unit controlled by the eCLIMATIC™, it is mandatory to check adequacy between eCLIMATIC™ and the unit with its options. In case of wrong parameters, the inputs / outputs connections could be incorrect and may create some operation problems for the units and ultimately breakdowns. LENNOX cannot be held responsible for any claims on the units due to a wrong parameters sequence or a parameters modification carried out by non-competent technicians. In this case, the warranty will be legally null and void.

OVERVIEW



SCHEDULING ZONES

Function

The programming schedule offers solutions to split each day in several time zones in order to customize the unit according to the building demand.

Description

The eCLIMATIC™ schedule manages up to 7 different clock zones per day from 00h00 to 24h00 and from Monday to Sunday. The zone can start at different time each day of the week in order to optimize the operating of the unit.

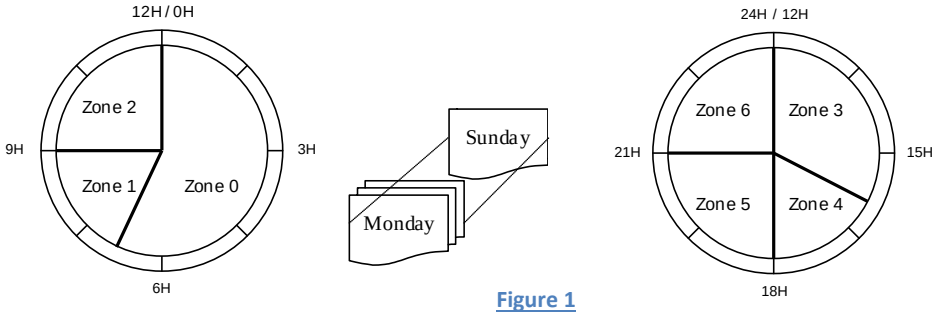


Figure 1

Settings

(**2138**): Number of zone desired
(**2141**): Start time of zone 0 set to 00h00 to start each day
(**2142**): Starts time of zone 1 adjustable every day from Monday to Sunday
(**2143**): Starts time of zone 2 adjustable every day from Monday to Sunday
(**2144**): Starts time of zone 3 adjustable every day from Monday to Sunday
(**2145**): Starts time of zone 4 adjustable every day from Monday to Sunday
(**2146**): Starts time of zone 5 adjustable every day from Monday to Sunday
(**2147**): Starts time of zone 6 adjustable every day from Monday to Sunday

SCHEDULING MODES

Function

The scheduling modes are completely customizable and directly linked to the time zones defined in the weekly schedule.

Description

The eCLIMATIC™ can manage up to 4 different modes. - Night / Day / Day I / Day II.

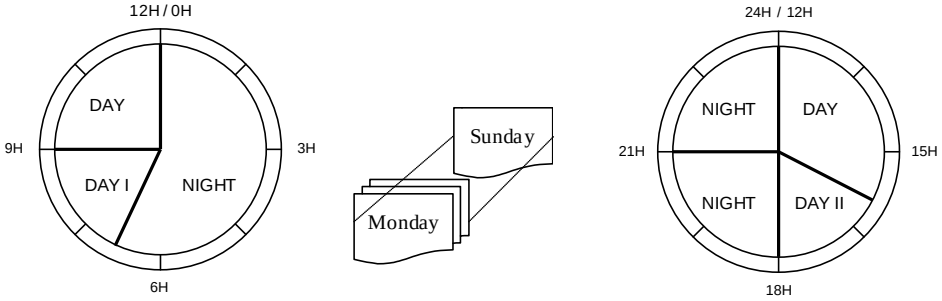


Figure 2

Settings

(**2139**): Number of mode desired
(**2141**): Mode linked to the zone 0 adjustable every day from Monday to Sunday
(**2142**): Mode linked to the zone 1 adjustable every day from Monday to Sunday
(**2143**): Mode linked to the zone 2 adjustable every day from Monday to Sunday
(**2144**): Mode linked to the zone 3 adjustable every day from Monday to Sunday
(**2145**): Mode linked to the zone 4 adjustable every day from Monday to Sunday
(**2146**): Mode linked to the zone 5 adjustable every day from Monday to Sunday
(**2147**): Mode linked to the zone 6 adjustable every day from Monday to Sunday

SCHEDULING ZONE 1 ANTICIPATION

Function

The eCLIMATIC™ allows the startup of the unit before the pre-specified hour of the first zone (zone 1) of the day.

Description

This function is able to start the unit in zone 1 earlier if the outdoor temperature is under a specify threshold. The typical application is to start the unit in heating mode if the weather is too cold compare to the actual season.

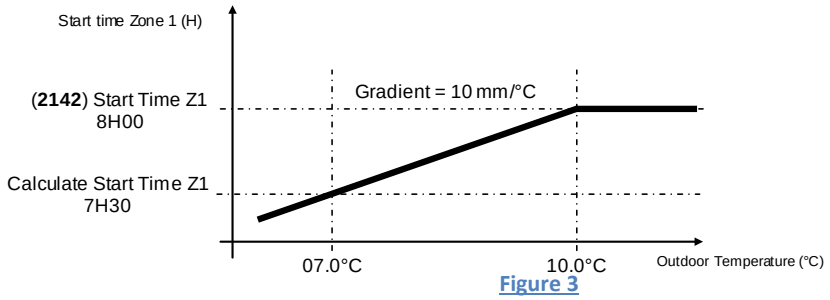


Figure 3

Example:

(**2142**): Zone 1 start time: 8h00,
(**2161**): Outside air temperature threshold to activate function: 10.0°C
(**2162**): Gradient (slope): 10 min/°C

In this example the foot is set to the value 10.0°C, which means zone '1' will always start at 8h00 if the outside air temperature is higher than 10.0°C. If the outside air temperature is less than 10.0°C zone 1 will start according to the selected gradient and the difference between the foot value and the actual outside air temperature (10.0 - 7.0 = 3.0 x 10 = 30 min). Then, the new start time for zone 1 is 7h30.

Settings

(**2161**): Outside air temperature threshold to activate function
(**2162**): Gradient (slope)

UNIT ON/OFF

Function

The on/off management allows the start and stop of the unit.

Description

There are many ways to start / stop the unit both manually and automatically.

Manually:
The unit can be turn on or off manually by the terminal in the menu (**2111**).

Remote control:
A remote contact can be connected directly to the electrical box to control the unit on/off. The dry contact status is displayed in the menu (**2112**).

BMS:
The BMS can control the general on/off to start/stop the unit. In this case, the BMS writes directly in the setting (**2111**).

Automatically:
The start of the unit can be configured according to a scheduling in the menu (**2113**). In this case the unit start and stop automatically in terms of the timetable.

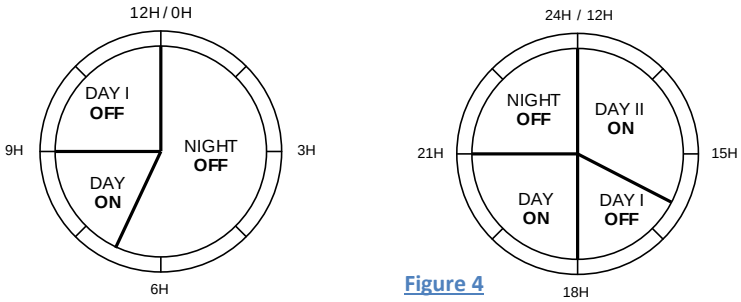


Figure 4

Note

The unit is really consider to 'ON' only if all settings (**2111**), (**2112**) and (**2113**) are set to on. If the dry contact input isn't configured as a 'remote on/off', the input status has no effect on the general on/off of the unit.

Note

Even if the unit is set to OFF, the unit can start for antifreeze protection reasons.

Settings

(**2111**), (**3111**): General on/off
(**2112**), (**3112**): Remote on/off
(**2113**), (**3113**): Schedule on/off

CHANGEOVER MODE (REVERSING UNIT ONLY)

Function

The changeover defines the mode of operation of the unit that is cooling or heating water and so satisfies the appropriate demand on heat or chilled water production.

Description

The eCLIMATIC™ offers various possibilities to select the changeover mode:

- Automatically,
- Manually (with the terminal display)
- Remotely (dry contact),
- BMS.

Automatically

The eCLIMATIC™ is able to swap automatically the changeover mode according to the outside temperature if the setting in the menu (**2224**) is set to 'Auto'. In this case it's necessary to define the winter temperature which forces the unit in heat pump and the summer temperature which forces the unit in chiller as described in the following figure.

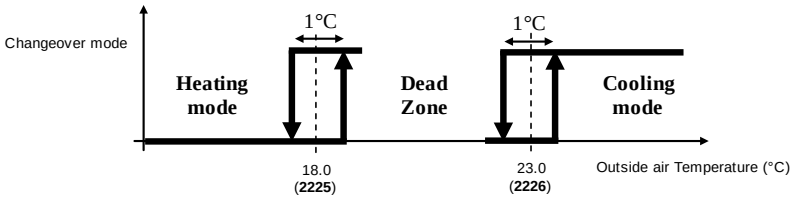


Figure 5

Note

When the outdoor temperature reaches one of the dead zone settings, a time delay of 3min is started before refreshing the changeover mode.

Manually

In this case the automatic changeover is disabled and the unit operates according to the setting in the menu (**2224**). ('Cool', 'Heat', 'Dead zone').

The changeover can be pre-configuring according to the scheduling in the menu (**2224**).

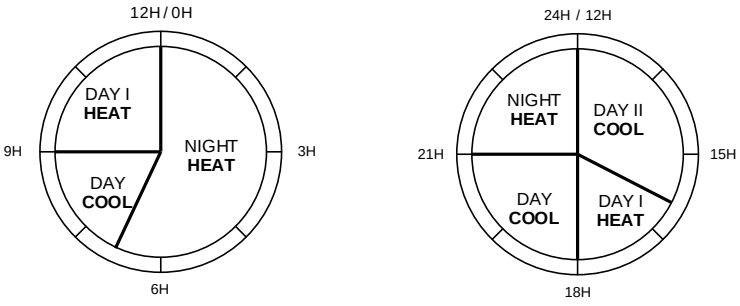


Figure 6

Remotely by dry contact

The changeover can be defined by a dry contact. (Refer to the paragraph "Free customize input/output"). In this case the dry contact has higher priority than the terminal display but lower priority than the BMS system. So the settings (**2224**) / (**3224**) have no effect on the changeover mode.

Remotely by BMS

The changeover mode can be defined by the BMS system. (Refer to the "BMS list")

Note

When the unit is swap from cooling to heating or heating to cooling a time delay of 15min is started before enable the new mode. If the DS display is connected, the time delay is reduce to 1min.

Settings

(**2224**): Changeover mode for each schedule mode (NIGHT, DAY, DAY I, DAY II, and BMS).
(**2225**): Winter outside air temperature to enable the heating mode. (Only if (**2224**) =“Auto”).
(**2226**): Summer outside air temperature to enable the cooling mode. (Only if (**2224**) =“Auto”).

FREE CUSTOMIZE INPUT/OUTPUT

Function

The free customize input/output are free connections on the expansion board to control or/and collect the unit status through a remote system.

Description

The eBE is an expansion module including up to 10 universal inputs (NTC, 4/20mA, dry contact) and 6 outputs relay. Each channel is a multifunction input or output and can be link to a function in order to perform the control of the installation.

Overview

The eBE is a DIN rail board linked to the eCLIMATIC™ on the "Fieldbus" network. The Fieldbus address must be set to '**1**' and the baud rate to '**19.2K'** and the protocol to '**Modbus'** using the dip switch.

ITEM	DESCRIPTION
1	Power supply 24vac (G-G0) Refer to the electrical wiring for the connection.
2	Universal inputs U1 to U10
3	+VDC: power supply for active probes +5V power supply for ratio metric probes
4	Digital output relay NO1 to NO6
5	Fieldbus network connection
6	LED communication
7	LED configuration
8	DIP-switch configuration: **Address**: ☐☐☐■ (☐=OFF ■=ON) **Ext.**: ☐ **Baud**: ☐☐ **Prot**: ☐

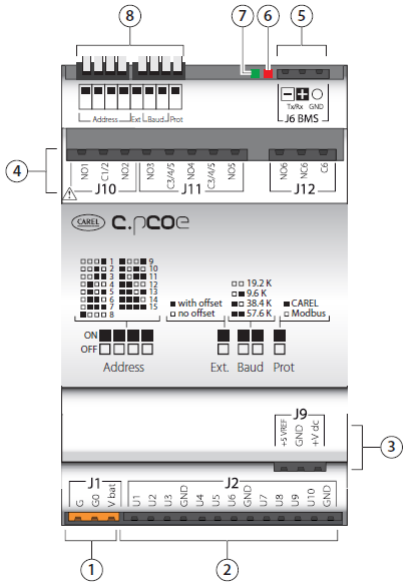


Figure 7

Input function list

Item	Description	Type
Evap Sp	*Evaporator set point* The evaporator water set point is fixed by an analogic signal. Refer to the paragraph 'WATER EVAPORATOR SET POINT'	4/20mA
THR Sp	*Total heat recovery set point* The total heat recovery water set point is fixed by an analogic signal.	4/20mA
Offset Evap Sp	*Evaporator set point offset* The evaporator water set point OFFSET (+/- 1°C) is fixed by an analogic signal. Refer to the paragraph 'WATER EVAPORATOR SET POINT'	4/20mA
Offset THR Sp	*Total heat recovery set point offset* The total heat recovery water set point OFFSET (+/- 1°C) is fixed by an analogic signal.	4/20mA
Free NTC 1,2,3,4	*Free NTC* Up to 4xNTC probes can be connected and the temperature is directly readable by the BMS system.	NTC
On/Off	*Remote ON/OFF* Contact opened: Unit stop Contact closed: Unit start	Dry contact
Reset Alarm	*Alarm reset* Contact opened: No reset Contact closed: Reset alarms (only on trig of the signal)	Dry contact
Evap Sp N°2	*Evaporator water second set point* Contact opened: Set point = settings (**2238**) in cooling or (**2248**) in heating Contact closed: Set point = settings (**2239**) in cooling or (**2249**) in heating	Dry contact
THR Sp N°2	*Total heat recovery water second set point* Contact opened: Set point = settings (**2248**) Contact closed: Set point = settings (**2249**)	Dry contact
Auto/Cool	*Changeover mode* Contact opened: "AUTO": The unit is operating according to the outside air T° and can switch to heating or cooling mode. Contact closed: "COOL": The unit is operating in cooling mode only.	Dry contact
Auto/Heat	*Changeover mode* Contact opened: "AUTO": The unit is operating according to the outside air T° and can switch to heating or cooling mode. Contact closed: "HEAT": The unit is operating in heating mode only.	Dry contact
Cool/Heat	*Changeover mode* Contact opened: "COOL": The unit is operating in cooling mode only. Contact closed: "HEAT": The unit is operating in heating mode only.	Dry contact
Heat/Cool	*Changeover mode* Contact opened: "HEAT": The unit is operating in heating mode only. Contact closed: "COOL": The unit is operating in cooling mode only.	Dry contact
Dead Zone	*Dead zone mode* Contact opened: The unit is operating in heating or cooling mode according to the setting (**2224**). Contact closed: The unit is forced in dead zone mode.	Dry contact
Delay Defrost	*Defrost delay* Contact opened: The unit could defrost according to its algorithm. Contact closed: The unit is forced to wait before defrosting.	Dry contact

Disable C1	*Disable circuit 1* Contact opened: The compressor on the circuit 1 are enabled according to the setting (**3431**) Contact closed: All compressor(s) on the circuit 1 are disabled	Dry contact
Disable C2	*Disable circuit 2* Contact opened: The compressor on the circuit 2 are enabled according to the setting (**3432**) Contact closed: All compressor(s) on the circuit 2 are disabled	Dry contact
Disable C1Cp1	*Circuit 1 - compressor 1* Contact opened: enable (according to the setting (**3431**)) Contact closed: disable	Dry contact
Disable C1Cp2	*Circuit 1 - compressor 2* Contact opened: enable (according to the setting (**3431**)) Contact closed: disable	Dry contact
Disable C1Cp3	*Circuit 1 - compressor 3* Contact opened: enable (according to the setting (**3431**)) Contact closed: disable	Dry contact
Disable C2Cp1	*Circuit 2 - compressor 1* Contact opened: enable (according to the setting (**3432**)) Contact closed: disable	Dry contact
Disable C2Cp2	*Circuit 2 - compressor 2* Contact opened: enable (according to the setting (**3432**)) Contact closed: disable	Dry contact
Disable C2Cp3	*Circuit 2 - compressor 3* Contact opened: enable (according to the setting (**3432**)) Contact closed: disable	Dry contact
Mode Day II	*Schedule mode DAY II* Contact opened: operating according to the scheduling Contact closed: operating in mode DAY II	Dry contact
Mode Day I	*Schedule mode DAY I* Contact opened: operating according to the scheduling Contact closed: operating in mode DAY I	Dry contact
Mode Day	*Schedule mode DAY* Contact opened: operating according to the scheduling Contact closed: operating in mode DAY	Dry contact
Mode Night	*Schedule mode NIGHT* Contact opened: operating according to the scheduling Contact closed: operating in mode NIGHT	Dry contact
Mode BMS	*Schedule mode BMS* Contact opened: operating according to the scheduling Contact closed: operating in mode BMS	Dry contact
Free DI 1,2,3,4	*Free DI* Up to 4xdigital inputs (dry contact) can be connected and the status is directly readable by the BMS system.	Dry contact

Output function list

Item	Description	Type
Fault	*Fault active* The relay is closed when a fault is active	Dry contact
Alarm	*Alarm active* The relay is closed when an alarm is active	Dry contact
Alarm C1	*Alarm circuit 1* The relay is closed when an alarm is active on the circuit 1	Dry contact
Alarm C2	*Alarm circuit 2* The relay is closed when an alarm is active on the circuit 2	Dry contact
Alarm cond	*Alarm condenser* The relay is closed when an alarm is active on the condenser (circuits 1/2)	Dry contact
Alarm Pump Evap	*Alarm pump evaporator* The relay is closed when an alarm is active on the evaporator pump (1/2)	Dry contact
Alarm Flow Evap	*Alarm evaporator flow* The relay is closed when an alarm is active on the evaporator flow	Dry contact
Enable	*Unit enable* The relay is closed when the unit is enable	Dry contact
Available	*Unit available* The relay is closed when the unit is available	Dry contact
Comp.ON	*Compressor ON* The relay is closed when one of the compressor(s) is running	Dry contact
Comp.100%	*Compressor 100%* The relay is closed when all the compressor(s) available are running	Dry contact
Cooling mode	*Cooling mode* The relay is closed when the unit is in cooling mode (chilled water)	Dry contact
Heating mode	*Heating mode* The relay is closed when the unit is in heating mode (heat water)	Dry contact
Dead zone	*Dead zone mode* The relay is closed when the unit is in dead zone mode (cooling/heating)	Dry contact
Zone Z0	*Schedule Zone 0* The relay is closed when the unit is in zone 0	Dry contact
Zone Z1	*Schedule Zone 1* The relay is closed when the unit is in zone 1	Dry contact
Zone Z2	*Schedule Zone 2* The relay is closed when the unit is in zone 2	Dry contact
Zone Z3	*Schedule Zone 3* The relay is closed when the unit is in zone 3	Dry contact
Zone Z4	*Schedule Zone 4* The relay is closed when the unit is in zone 4	Dry contact
Zone Z5	*Schedule Zone 5* The relay is closed when the unit is in zone 5	Dry contact
Zone Z6	*Schedule Zone 6* The relay is closed when the unit is in zone 6	Dry contact
Mode Day II	*Schedule Mode DAY II* The relay is closed when the unit is in mode DAY II	Dry contact
Mode Day I	*Schedule Mode DAY I* The relay is closed when the unit is in mode DAY I	Dry contact
Mode Day	*Schedule Mode DAY* The relay is closed when the unit is in mode DAY	Dry contact
Mode Night	*Schedule Mode NIGHT*	Dry

	The relay is closed when the unit is in mode NIGHT	contact
Mode BMS	*Schedule Mode BMSI* The relay is closed when the unit is in mode BMS	Dry contact
Defrosting	*Defrosting* The relay is closed when one of the circuit is defrosting	Dry contact
Free BM.NO1 BE.NO1,2,3,4,5,6	*Free DO* Up to 6 digital outputs (relay) on the eBE can be connected and controlled directly by the BMS.	Dry contact

Settings

(**3141**): BM-ID3 digital input configuration setting (BM-ID3 on the eCLIMATIC board)
(**3142**): BM-ID4 digital input configuration setting (BM-ID4 on the eCLIMATIC board)
(**3143**): BE-U1 universal input configuration setting
(**3144**): BE-U2 universal input configuration setting
(**3145**): BE-U3 universal input configuration setting
(**3146**): BE-U4 universal input configuration setting
(**3147**): BE-U5 universal input configuration setting
(**3148**): BE-U6 universal input configuration setting
(**3149**): BE-U7 universal input configuration setting
(**3151**): BE-U8 universal input configuration setting
(**3152**): BE-U9 universal input configuration setting
(**3153**): BE-U10 universal input configuration setting

(**3131**): BM-NO1 output relay configuration setting (BM-NO1 on the eCLIMATIC board)
(**3132**): BE-NO1 output relay configuration setting
(**3133**): BE-NO2 output relay configuration setting
(**3134**): BE-NO3 output relay configuration setting
(**3135**): BE-NO4 output relay configuration setting
(**3136**): BE-NO5 output relay configuration setting
(**3137**): BE-NO6 output relay configuration setting

WATER EVAPORATOR SET POINT

Function
The water evaporator set point defines the chilled or heat temperature request that the unit have to control.

Description
The eCLIMATIC™ offers various possibilities to specify and customize the water evaporator set point.

Dynamic set point
The eCLIMATIC™ calculs the water set point according to the outside temperature in order to optimise the energy consumption. This method requires pre-defining 2 different water set points linked to 2 outside temperatures.

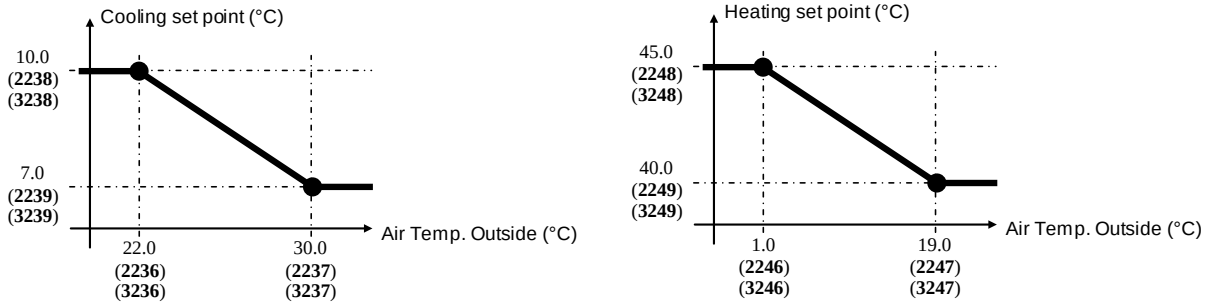


Figure 8

Note
The eCLIMATIC™ is able to manage different slopes according the scheduling mode (DAY, NIGHT, DAY I, DAY II). The dynamic method is not available in a BMS mode.

Fix set point
The eCLIMATIC™ controls the water temperature using a fix set point. In practice it's necessary to adjust the water set points 1 & 2 at the same value.

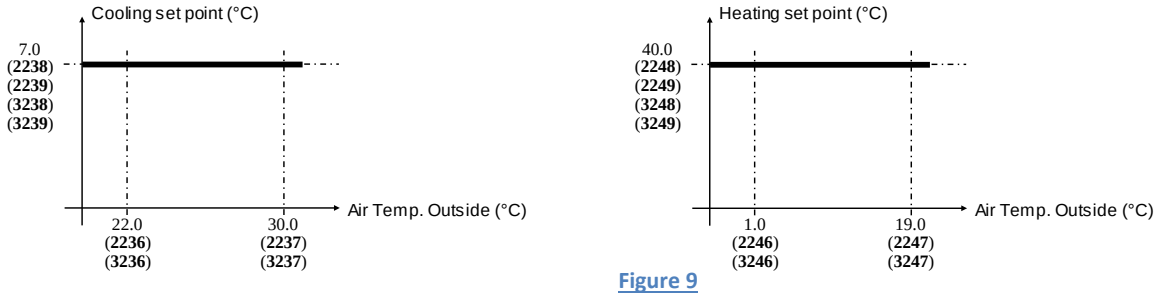


Figure 9

Note
As same as the dynamic method, the eCLIMATIC™ is able to manage different fix set point according the scheduling mode (DAY, NIGHT, DAY I, DAYII).

External signal (4/20mA) set point

The eCLIMATIC™ determines the water set point in terms of an external 4/20mA signal. This method requires pre-defining 2 different water set points corresponding to the minimum of signal (4mA) and to the maximum of signal (20mA).

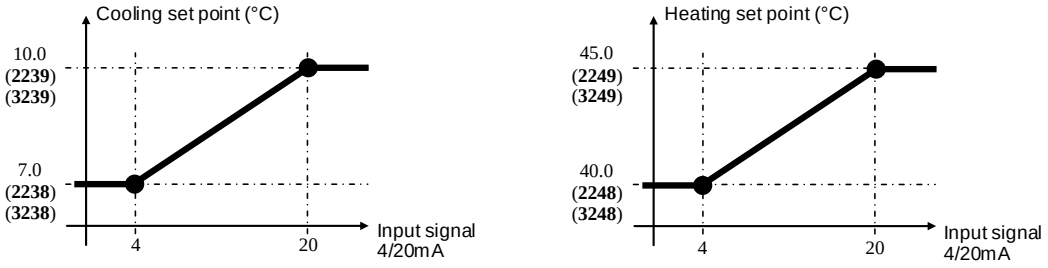


Figure 10

Second set point

The eCLIMATIC™ is able to work on two fix set points. The selection is done by a dry contact connected to a custom free input. This method requires to preset the two different water set points corresponding to the dry contact status (opened/closed).

Refer to the "Free customize input/output" paragraph for the configuration.

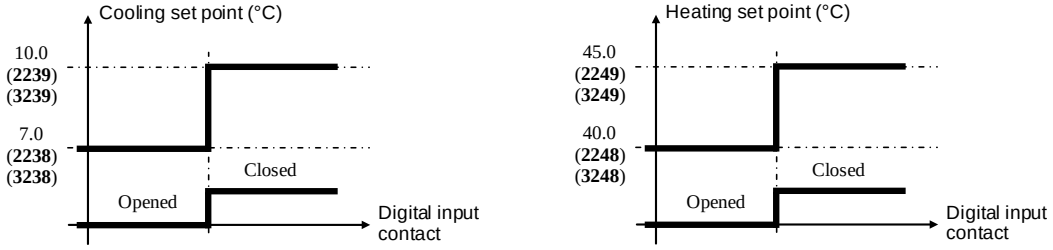


Figure 11

External signal (4/20mA) offset set point (+/- 1°C)

The current set point can be shifted from -1.0°C to +1.0°C using a remote 4/20mA signal. The offset is based on the actual set point and is available with all the previous methods (dynamic slope, fix value, 4/20mA signal, and second set point).

Refer to the "Free customize input/output" paragraph for the configuration.

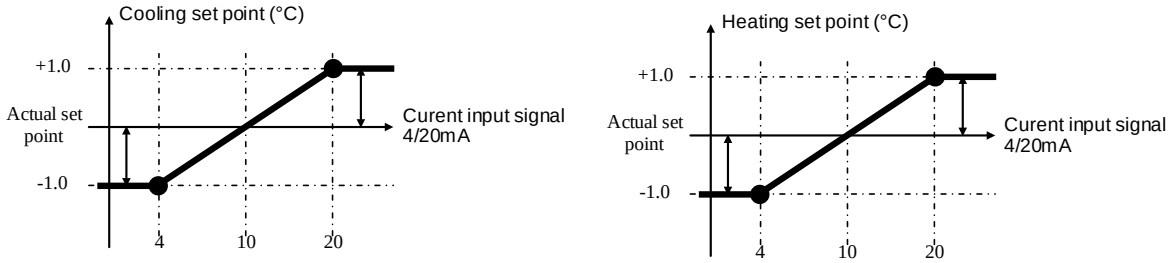


Figure 12

BMS

The eCLIMATIC™ can receive the set point from a BMS. In this case the BMS can write directly on the settings (**2238**).$_{BMS}$ or (**2248**).$_{BMS}$.

Note that these settings are saved in permanent memory (EEPROM). Due to that it's well advised to not overwrite too much time in these parameters. If the data send by the BMS is frequently changed, the BMS has to write the set point in another register in volatile memory (not saved after power off). Refer to the BMS list for more details.

Note

As same as the dynamic method, the eCLIMATIC™ is able to manage different fix set point according the scheduling mode (DAY, NIGHT, DAY I, DAY II).

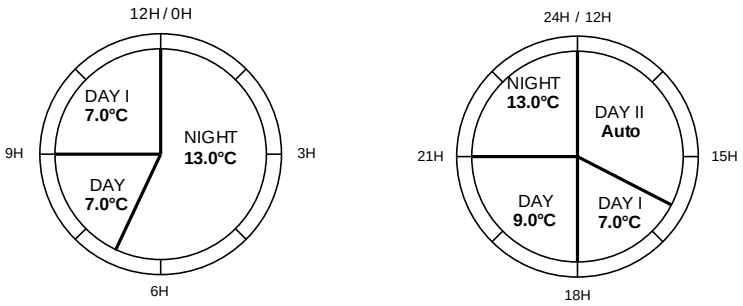


Figure 13

Settings

COOLING MODE

Dynamic set point

(**2236**): Outside air temperature corresponding to the water evaporator set point (**2238**)
(**2237**): Outside air temperature corresponding to the water evaporator set point (**2239**)
(**2238**): Water temperature set point corresponding to the outside air temperature (**2236**)
(**2239**): Water temperature set point corresponding to the outside air temperature (**2237**)

Fix set point

(**2238**), (**2239**): Water evaporator set point (select the same value)

External current signal (4/20mA)

(**2238**): Water temperature set point corresponding to a signal of 4mA
(**2239**): Water temperature set point corresponding to a signal of 20mA

Second set point

(**2238**): Water temperature set point N°1 corresponding to a dry contact opened
(**2239**): Water temperature set point N°2 corresponding to a dry contact closed

HEATING MODE

Dynamic set point

(**2246**): Outside air temperature corresponding to the water evaporator set point (**2248**)
(**2247**): Outside air temperature corresponding to the water evaporator set point (**2249**)
(**2248**): Water temperature set point corresponding to the outside air temperature (**2246**)
(**2249**): Water temperature set point corresponding to the outside air temperature (**2247**)

Fix set point

(**2248**), (**2249**): Water evaporator set point (select the same value)

External current signal (4/20mA)

(**2248**): Water temperature set point corresponding to a signal of 4mA
(**2249**): Water temperature set point corresponding to a signal of 20mA

Second set point

(**2248**): Water temperature set point N°1 corresponding to a dry contact opened
(**2249**): Water temperature set point N°2 corresponding to a dry contact closed

WATER EVAPORATOR CONTROL

Function

The eCLIMATIC™ adjusts and holds the water outlet temperature as close as possible to the set point, by controlling the number of compressor stages depending on the thermal load of the system.

Description

The eCLIMATIC™ calculates constantly the capacity demand to reach the temperature set point by measuring the outlet water. This control is based on a PID algorithm which is directly linked to the number of control stages of the unit.

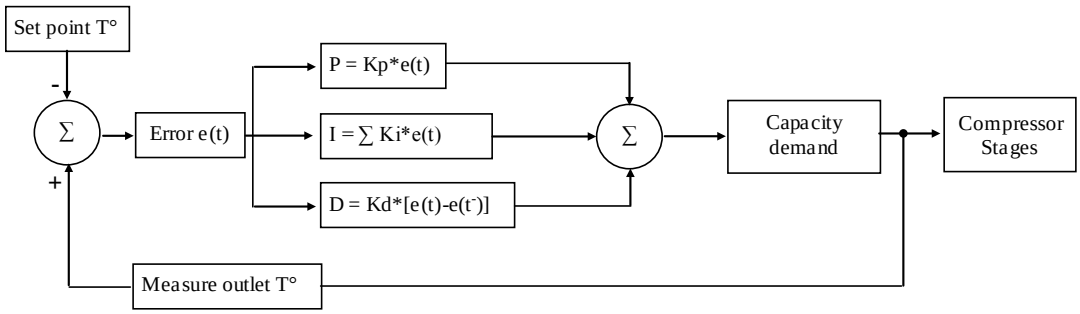


Figure 14

The PID action depends mainly on the coefficients KP, KI and KD. Yet in order to optimize the global system time response, the PID is linked to the reactivity setting which defines the frequency of refresh of the PID.

The compressor stage is directly link to the PID demand taking account of the capacity of each compressor on the unit.

Example

Unit with 3 x even compressor: The capacity of each compressor is Q=~33%.
The compressor start / stop is detailed in the following figure.

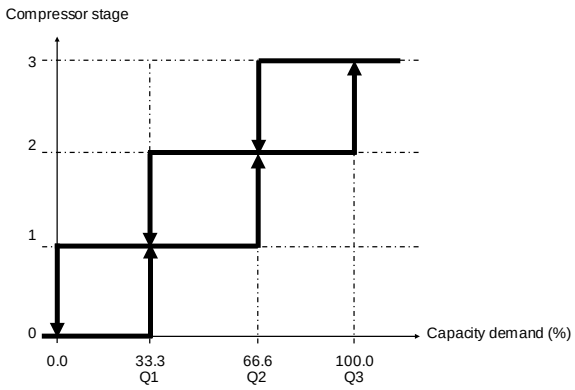


Figure 15

The eCLIMATIC™ controls also the inlet sensor in order to limit the number of compressor stage to engage. The maximum capacity demand depends on the capacity of each compressor and the inlet temperature measure. This limitation could be optimize thank to the global delta of temperature of the unit available in cooling and heating mode.

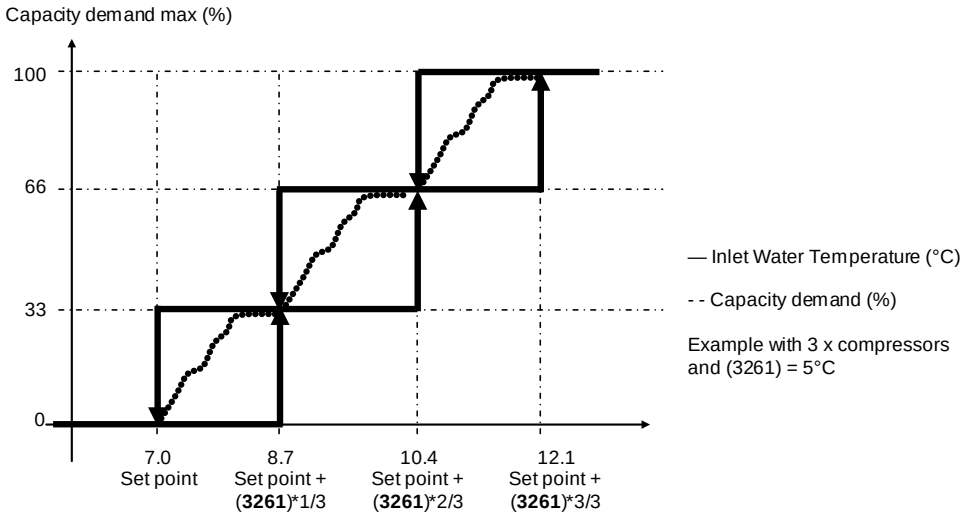


Figure 16

Settings

(**3261**): Delta temperature of the evaporator in cooling mode (100% compressor running)
(**3262**): Delta temperature of the evaporator in heating mode (100% compressor running)
(**3263**): PID reactivity setting
(**3264**): PID KP proportional coefficient setting
(**3265**): PID KI integral coefficient setting
(**3266**): PID KD derivate coefficient setting

WATER EVAPORATOR SAFETIES

Function

The water evaporator safeties define the temperature limits in order to prevent from any risk on the heat plate exchanger.

Description

In normal operating, the water PID demand returns to zero approximatively 1°C below the cooling set point. If not it's well advised to adjust the PID settings, the eCLIMATIC™ reset automatically the capacity demand in case of outlet temperature too low in cooling mode. If the temperature remains too low 5min after, the alarm is signaling.

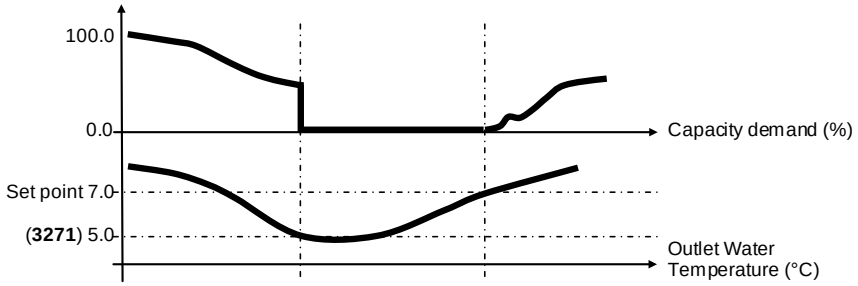


Figure 17

As same, the eCLIMATIC™ reset automatically the capacity demand in case of outlet temperature too high in heating mode. If the temperature remains too high 5min after, the alarm is signalling.

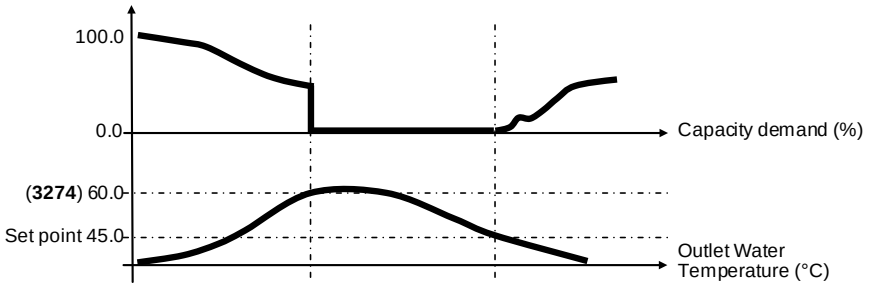


Figure 18

In the same way, the eCLIMATIC™ signals (without stopping the unit) if the temperature is too high in cooling mode or too low in heating mode.

Settings

(**3271**): Safety low temperature setting in cooling mode
(**3272**): Safety high temperature setting in cooling mode
(**3273**): Safety low temperature setting in heating mode
(**3274**): Safety high temperature setting in heating mode

COMPRESSOR ACTIVATION

Function
The compressor activation allows enable/disable the compressor on the unit.

Description
The eCLIMATIC™ offers possibilities to disable each compressor on the circuit in the menu (**3431**) / (**3432**).

Settings (3431) / (3432)	Compressor 1	Compressor 2	Compressor 3
No	×	×	×
1,.,.	✓	×	×
.,2,.	×	✓	×
1,2,.	✓	✓	×
.,.,3	×	×	✓
1,.,3	✓	×	✓
.,2,3	×	✓	✓
1,2,3	✓	✓	✓

The compressors activation can be pre-specified according to the scheduling and can take different values for each schedule mode (NIGHT, DAY, DAY I, DAY II, BMS)

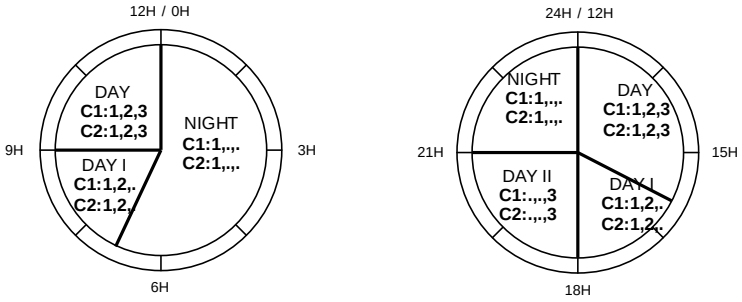


Figure 19

Note
In case of modification while the unit is running, the eCLIMATIC™ will re-evaluate the compressor stage according to the compressors available. Due to that some compressor could be stop temporally and re-start later.

Note
This method can also be done by dry contact (Refer to the paragraph “Free customize input/output”).

Settings
(**3431**): Enable of the compressor(s) on circuit 1
(**3432**): Enable of the compressor(s) on circuit 2

CIRCUIT PRIORITY

Function
The circuit priority defines the circuit which start first (only for units with 2 circuits).

Description
The eCLIMATIC™ offers possibilities to select the circuits priority in the menu (**3435**) in case of desuperheater on a single circuit.

Auto
The eCLIMATIC™ defines the circuits priority according to the operating hour counters. The selection is done by averaging of all compressors hour counters on each circuit. Note that the priority may be swapped only when all the compressors are stopped.

$$\text{Hour}_{C1} = \text{Hour}_{C1.Cp1} + \text{Hour}_{C1.Cp2} + \ldots + \text{Hour}_{C1.CpN}$$
$$\text{Hour}_{C2} = \text{Hour}_{C2.Cp1} + \text{Hour}_{C2.Cp2} + \ldots + \text{Hour}_{C2.CpN}$$
$$\text{Circuit priority} = \text{Minimum}(\text{Hour}_{C1}, \text{Hour}_{C2});$$

Priority C1
The priority is fixed to the circuit 1, which means the circuit 1 starts the first and stops the last.

Priority C2
The priority is fixed to the circuit 2, which means the circuit 2 starts the first and stops the last.
The compressor is subject to various operating time in order to prevent from damage operating.

Settings
(**3435**): Priority of the circuit rotation

COMPRESSOR ROTATION

Function

The compressor rotation defines the stage sequence. The eCLIMATIC™ optimizes the step order of the compressor to perform the durability of each of them.

Description

The eCLIMATIC™ selects the compressor priority according to the operating counter time (hour + minute). The compressor order on a same circuit is also based only on the operating counter time in ascending order. Moreover the eCLIMATIC™ equalizes the number of compressor running on each circuit and so optimizes the performance of them (COP).

Example

Unit with 2x circuits with 3x compressors:

Stage	**Priority Circuit = C1**		**Priority Circuit = C2**	
0	**Circuit 1**	**Circuit 2**	**Circuit 1**	**Circuit 2**
1	Cp1			Cp1
2	Cp1	Cp1	Cp1	Cp1
3	Cp1 + Cp2	Cp1	Cp1	Cp1 + Cp2
4	Cp1 + Cp2	Cp1 + Cp2	Cp1 + Cp2	Cp1 + Cp2
5	Cp1 + Cp2 + Cp3	Cp1 + Cp2	Cp1 + Cp2	Cp1 + Cp2 + Cp3
6	Cp1 + Cp2 + Cp3	Cp1 + Cp2	Cp1 + Cp2 + Cp3	Cp1 + Cp2

Each hour counter is split in 2 bytes, the MSB (Most Significant Bits) and the LSB (Less Significant Bits) and the total is calculated as follows:

Total hour = MSB*1000 + LSB

Example: Circuit N°1 - Compressor N°1
(**2425**) = 123
(**2426**) = 456

Total Hour = (**2425**)*1000 + (**2426**) = 123 456 Hours.

COMPRESSOR ANTI-SHORT-CYCLES

Function

The anti-short cycles are time delays manage by the eCLIMATIC™ to secure the compressor operating in case of suddenly change of water temperature or stop of the unit.

Description

The anti-short cycles are divided in three topics:

- **Minimum on time**: once the compressor is started, it is remain on during 2min even if the eCLIMATIC™ requires a stop.
- **Minimum off time**: once the compressor is stopped, it is remain off during 2min even if the eCLIMATIC™ requires a start.
- **Minimum time between two starts**: the compressor must respect 6min delay before two consecutive starts.

The minimum on time: 2min

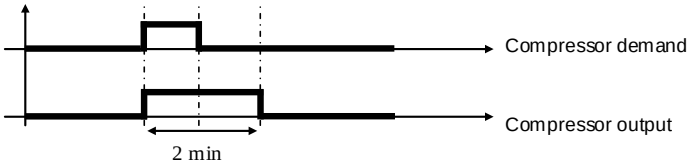


Figure 20

The minimum off time: 2min

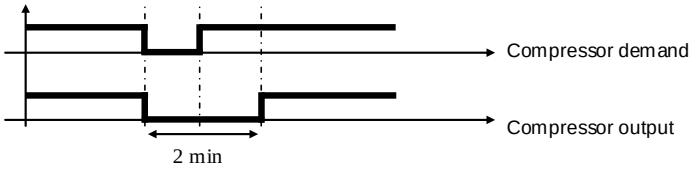


Figure 21

The minimum time between 2 starts: 6min

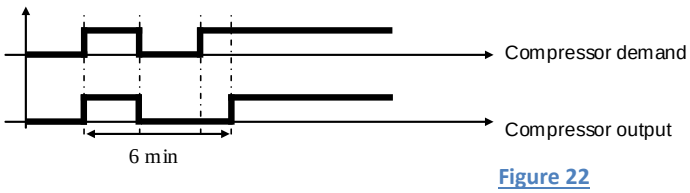


Figure 22

COMPRESSOR MAP CONTROL

Function

The compressor map control define the compressor safety limits to prevent from any operating out of range.

Description

The eCLIMATIC™ controls the entire map of the compressor by measuring the condensing and evaporating temperatures. The compressor map could be divided in 9 areas named A1…A9. The eCLIMATIC™ is able to detects if the compressor operating cross each zone and initiate an action to prevent from any risk of damage. If the compressor operating doesn't move inside the map, the alarm is signaling and the circuit is stopped. The current operating zone is displayed for each circuit in the menus (**3451**) / (**3461**).

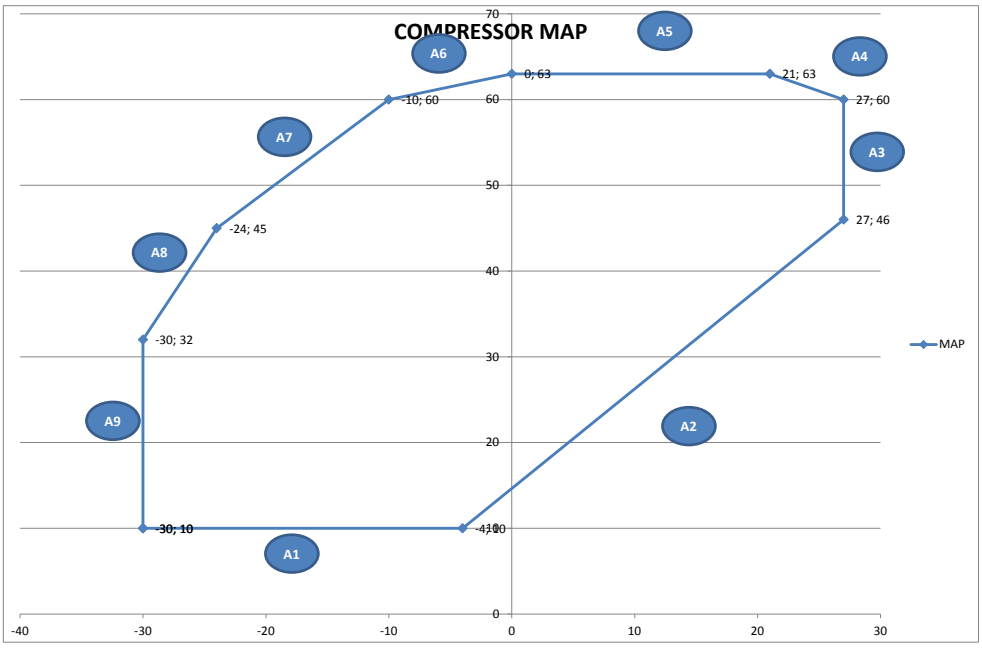


Figure 23

Area A1: *Condensing temperature too low*

In normal conditions, the eCLIMATIC™ controls the condensing temperature, and the minimum set point is 20.0°C (Refer to the 'Condenser/Evaporator Fan' paragraph). As consequence, in cooling mode, a low condensing temperature could appear only if the outside air temperature is very low while the fan is stopped.
In heating mode, this could occur only if the heat pump starts with a very low water temperature.
In both case, the alarm 119/219 will trip.

Areas A2/3: *Evaporating temperature too high*

In these areas, the MOP (Maximum Operating Pressure) protection is activated and the electronic expansion valve (EEV) closes in order to decrease the evaporating temperature. If this action has no effect, the alarm 119/219 will trip.

Areas A4/5: *Condensing temperature too high*
In these areas, the condensing temperature is too high and the eCLIMATIC™ unloads a compressor to prevent from a high pressure cut off. (Refer to "COMPRESSOR UNLOADING" for more details). If this action has no effect, the alarm 119/219 will trip.

Areas A6/7/8: *Evaporating temperature too low or HP/LP rate too high*
In these areas, the evaporating temperature is too low in cooling mode. The LOP (Low Operating Pressure) could help the evaporating to increase but due to the liquid flow back risk, the LOP protection is disable. As same, the HP/LP rate is too high and the compressor delta of pressure could damage the compressor. As consequence, the eCLIMATIC™ unloads a compressor to reduce the condensing temperature. If this action has no effect, the alarm 119/219 will trip.

Area A9: *Evaporating temperature too low*
In this area the evaporating temperature is too low and all compressors are immediately shut down.

Note
In case of map alarm, the eCLIMATIC™ saves the map zone and the HP/LP in permanent memory in the menus (**3456**) / (**3457**) (circuit 1), (**3466**) / (**3467**) (circuit 2).

COMPRESSOR UNLOADING

Function

The compressor unloading is a preventive method to reduce the circuit capacity and so prevent from an alarm trip which could stop all the circuit.

Description

The eCLIMATIC™ manages different situations that can lead to unload one compressor on the circuit.

High discharge temperature

If the discharge temperature reaches the limit defined in the menu (**3443**), the eCLIMATIC™ unload one compressor. If the discharge temperature is still higher than the limit 5min after the unloading, the alarm is signaling and the complete circuit is stopped.
Otherwise, the unloading is disable once the discharge temperature deceases at least 5°C.

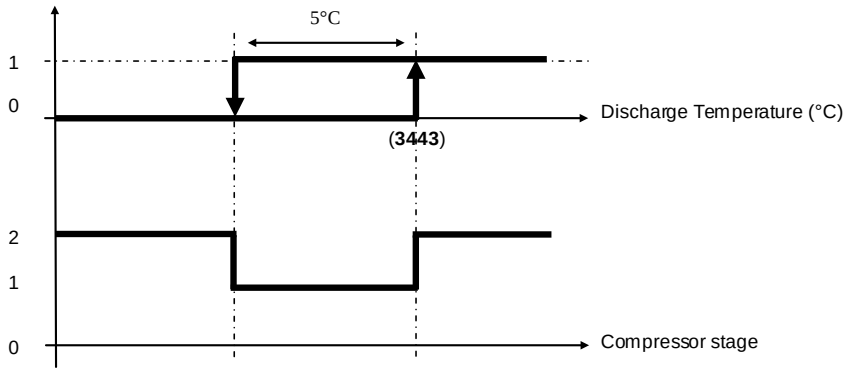


Figure 24

Compressor operating out of map

If the circuit operating cross the map limits defined by the zones A4, A5, A6, A7 and A8 during 30s, the eCLIMATIC™ unload one compressor on the circuit.

Note

- In both cases, the compressor unloading is launched during a minimum time of 10min.
- The unloading method can occur only if the circuit if running at 100%.
- The compressor unloaded is always the one which have the highest operating time.

EVAPORATOR PUMP SELECTION

Function

The evaporator pump selection offers solutions to manage single or double pumps.

Description

The eCLIMATIC™ select the pump priority according to the mode defined in the menu (**3341**).

'P1On'

The eCLIMATIC™ starts the pump 1 in priority. The pump 1 is kept running as soon as the machine is enabled. The pump 2 is used only as backup if the pump 1 is in alarm (only for double pump).

'P1Auto'

Similar to the "P1On" mode except that the pump is stopped during the dead zone (winter / summer).

'P2On' (only for double pump)

The eCLIMATIC™ starts the pump 2 in priority. The pump 2 is kept running as soon as the machine is enabled. The pump 1 is used only as backup if the pump 2 is in alarm.

'P2Auto' (only for double pump)

Similar to the "P2On" mode except that the pump is stopped during the dead zone (winter / summer).

'P1P2On' (only for double pump)

The eCLIMATIC™ starts the pump according the operating hour counter. The pump priority is the one which has the less number of hours of operation.

'P1P2Auto' (only for double pump)

Similar to "P1P2On"mode except that the pump will be stopped in case of dead zone (winter / summer).

The pump selection is customizable according to the scheduling.

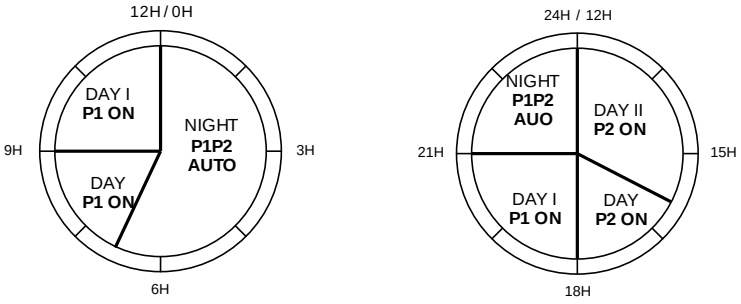


Figure 25

Note

If the setting is modified during the operating of the unit, the unit is automatically shortly stopped so as to swap the pump. (Stop compressor, post-flow, stop unit, swap pump, re-start unit)

Note

The pump operating hour counters are displayed in the menus (**2314**) / (**2315**) (Pump N°1) and (**2324**) / (**2325**) (Pump N°2). The pump counter is split in 2 bytes, the MSB (Most Significant Bits) and the LSB (Less Significant Bits) and the total is calculated as follows:

Total hour = MSB*1000 + LSB

Total hour = (**2314**)*1000 + (**2315**) (Pump N°1)

Example:

(**2314**) = 123,

(**2315**) = 456.

Total Hour = (**2314**)*1000 + (**2315**) = 123 456 Hours.

Setting

(**3341**)/ Pump evaporator mode

EVAPORATOR PUMP MANAGEMENT

Function

The evaporator pump management regroups various processes for an efficient management.

Description

The eCLIMATIC™ pump management is subject to the following topics:

- **Minimum on time**: once the pump is started, it is remain on during 30s even if the eCLIMATIC™ requires a stop.
- **Minimum off time**: once the pump is stopped, it is remain off during 30s even if the eCLIMATIC™ requires a start.
- **Minimum time between two starts**: the pump must respect 30s delay before two consecutive starts (in case of pump permutation)
- **Pre-flow**: At starting of the pump, a timing (2min) is started before enable the water control PID (unit available).
- **Post-flow**. At stopping of the last compressor, a timing (1min) is started before stopping the pump.

The minimum on time: 30s

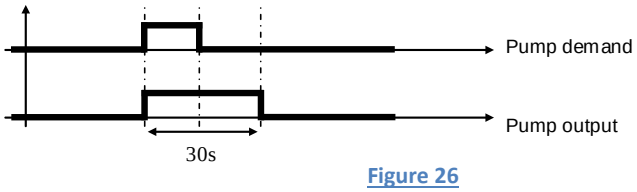


Figure 26

The minimum off time: 30s

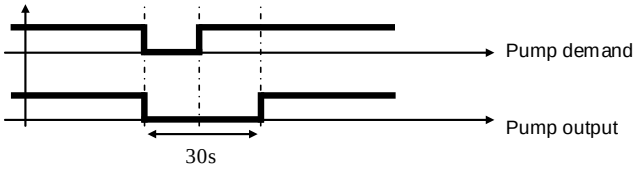


Figure 27

The minimum time off between 2 pumps: 30s

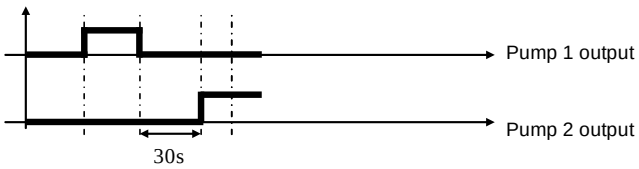


Figure 28

The pre-flow: 2min

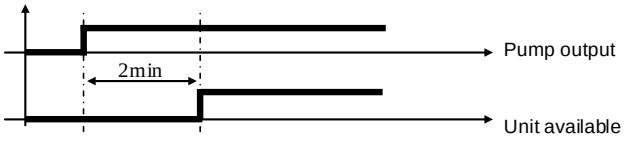


Figure 29

The post-flow: 1min

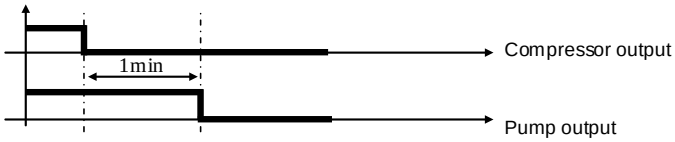


Figure 30

Note

In case modification of the pump selection (menu (**3341**)), the unit is automatically shortly stop so as to swap the pump. In case of pump alarm the sequence is similar. Yet after a pump changing cause by an alarm, the backup pump is remaining on until the next stop of the unit even if the alarm is reset.

In order to equalize the number of hours the unit is automatically shortly stopped every week to swap the pump. The day/hour of the weekly stop is configurable in the settings (**3181**)/ (**3182**).

EVAPORATOR PUMP ANTIFREEZE

Function

The evaporator pump antifreeze is a safety procedure in order to prevent from freezing risk in the installation and in the unit (heat plate exchanger).

Description

If the eCLIMATIC™ detects a low water temperature, the evaporator pump is re-starting even if the unit is stopped (Refer to UNIT ON/OFF paragraph for more detail).

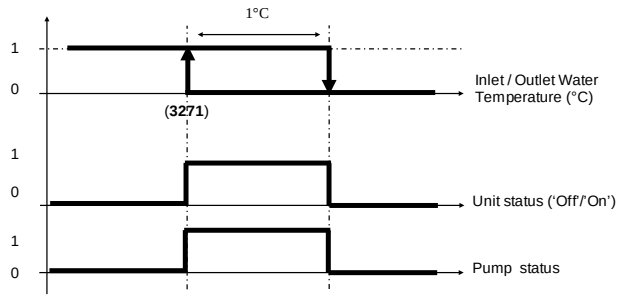


Figure 31

Note

The antifreeze protection has higher priority to the automatic pump stop method during the dead zone.

EVAPORATOR PUMP eDRIVE™

Function

The evaporator pump eDRIVE™ includes a pump controlled by a frequency inverter so as to modulate the water flow.

Description

The eCLIMATIC™ manages up to 5 modes configurable in the setting (**3343**).

'Fix'

The eCLIMATIC™ maintains a fix speed according to the settings (**3348**) and (**3349**). The pump capacity depends only on the compressor status and allows energy saving when the unit is in standby in regulation.

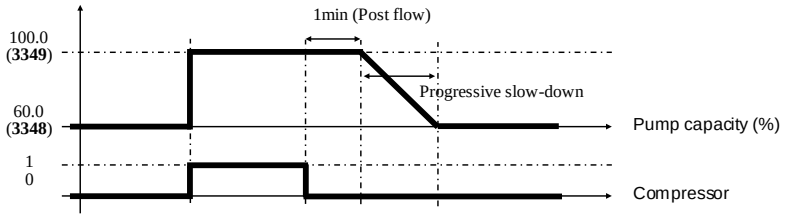


Figure 32

'Delta T'

The eCLIMATIC™ maintains a constant delta of temperature according to the inlet and outlet water temperature in the evaporator. The delta of temperature desired is available in the menu (**3344**).

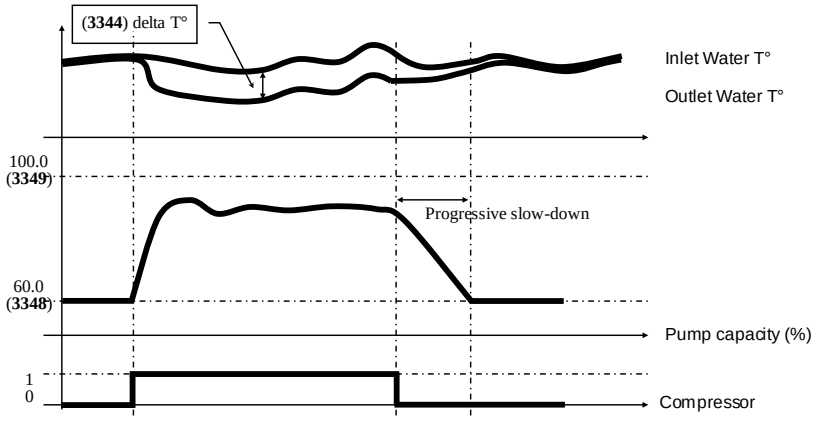


Figure 33

'Delta P'

The eCLIMATIC™ maintains a constant delta of pressure according to the inlet and outlet water pressure of the unit. The delta of pressure desired is available in the menu (**3345**).

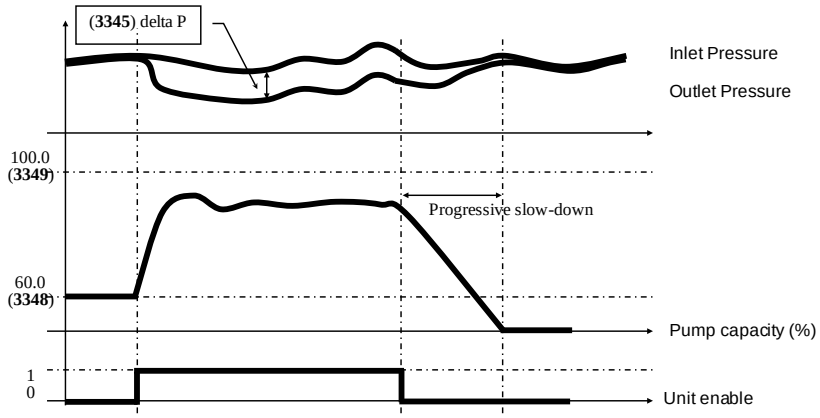


Figure 34

Note:

The eCLIMATIC™ calculates automatically the minimum pump speed according to the setting (**3345**) selected.

'P.Out'

The eCLIMATIC™ maintains a constant outlet pressure according to the outlet water pressure of the unit. The outlet pressure desired is available in the menu (**3346**).

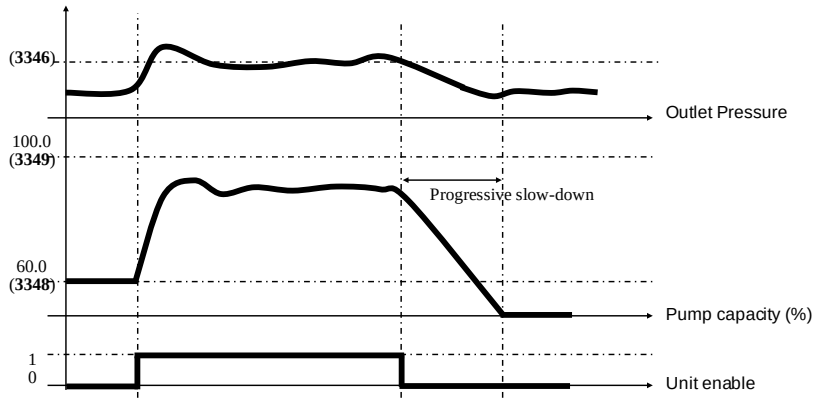


Figure 35

'Flow'

The eCLIMATIC™ maintains a constant water flow according to the flowmeter measure of the unit. The flow desired is available in the menu (**3347**).

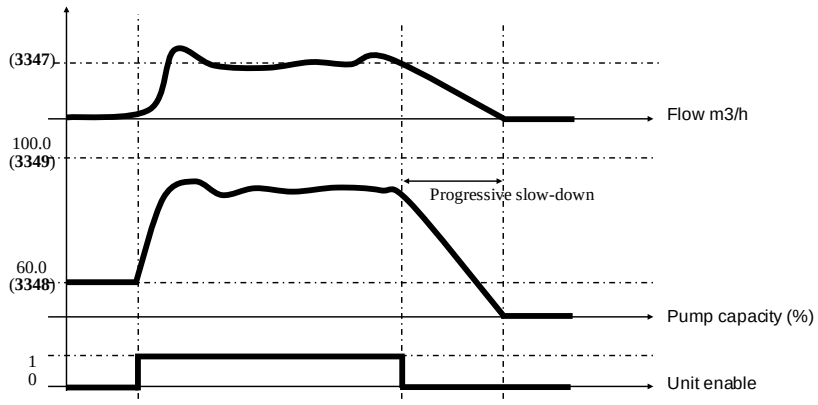


Figure 36

Note:
The eCLIMATIC™ can override the pump capacity at the maximum speed fixed by the setting (**3348**) in order to optimize the unit operating. These exceptions are:

- During defrosting procedure (only when the compressor are defrosting)
- In case of antifreeze protection (refer to PUMP EVAPORATOR ANTIFREEZE paragraph for more details)
- In case of flowmeter device alarm, the pump is set to the maximum speed defined by the setting (**3349**).

The evaporator pump control is based on a PID algorithm and could be customized in terms of the response time of the installation.

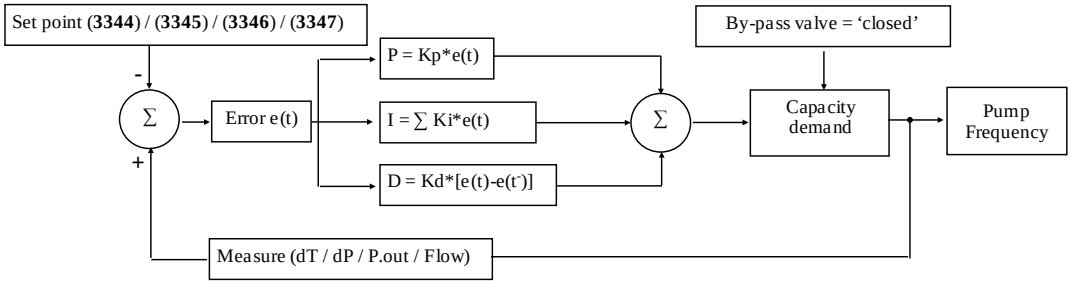


Figure 37

Settings
(**3343**): Evaporator pump eDrive mode setting
(**3344**): Delta temperature setting (only for "Delta T" control)
(**3345**): Delta pressure setting (only for "Delta P" control)
(**3346**): Outlet pressure setting (only for "P.Out" control)
(**3347**): Flow setting (only for "Flow"control)
(**3348**): Minimum capacity of water evaporator pump
(**3349**): Maximum capacity of water evaporator pump
(**3391**): PID KP proportional coefficient setting
(**3392**): PID KI integral coefficient setting
(**3393**): PID KD derivate coefficient setting

EVAPORATOR BY-PASS VALVE

Function

The evaporator by-pass valve is a 3 ways hydraulic valve connected to the unit dedicated to the delta pressure control. The by-pass valve is well advised on installation equipped with 2-ways fan coil without by-pass on the hydraulic installation piping.

Description

The by-pass valve management requires the eDrive™ pump option. The eCLIMATIC™ modulates the evaporator by-pass valve and maintain a constant water pressure in the installation. The by-pass valve is managed only for the “Delta P” control mode (setting (**3343**)).

The eCLIMATIC™ coordinates the regulation of the pump and the by-pass valve and prioritizes decreasing the pump speed before opening the valve.

In practice, the eCLIMATIC™ reduces first the pump speed as much as possible without risking a water flow switch trip alarm. Then when the pump has reached the minimum speed and the delta P is still higher than the demand, the by-pass valve control starts opening the valve to continue decreasing the delta pressure.
Inversely, when the measure is lower than the demand, the eCLIMATIC™ closes the valve first and then increases the pump speed in second step.

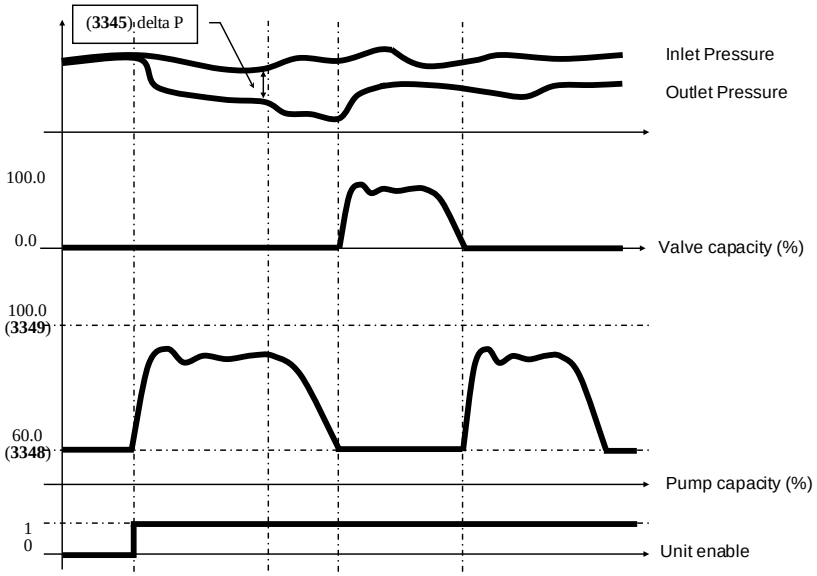


Figure 38

The by-pass valve control is based on a PID algorithm and could be customizing in order to the response time of the installation.

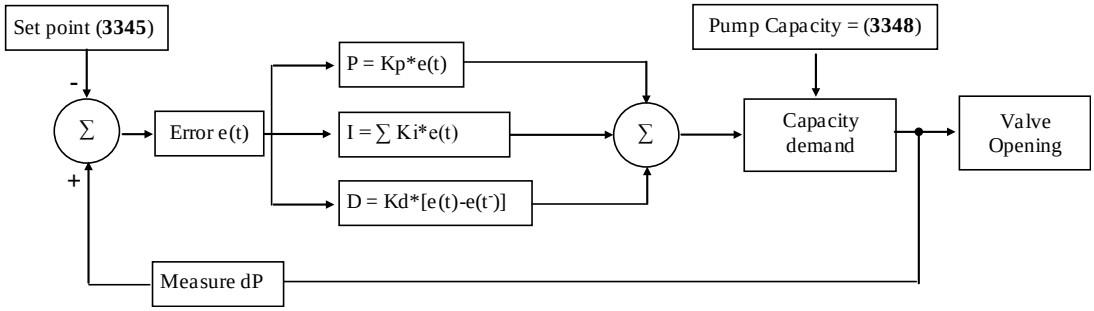


Figure 39

Settings

(**3394**): PID KP proportional coefficient setting
(**3395**): PID KI integral coefficient setting
(**3396**): PID KD derivate coefficient setting

CONDENSER/EVAPORATOR FAN LOW/HIGH SPEED

Function

The fan is used as condenser in cooling mode to evacuate the heat outside to cool down the refrigerant. In heating mode, the coil is used as an evaporator to pick up the heat outside to warm up the refrigerant.

Description

The eCLIMATIC™ controls the condensing/evaporating temperature as stable as possible in order to reach the better performances of the unit.
In cooling mode, the eCLIMATIC™ starts if the condensing temperature reaches the threshold select in the menu (**3544**). If the condensing temperature reaches the threshold select in the menu (**3546**), the controller engages the high speed.

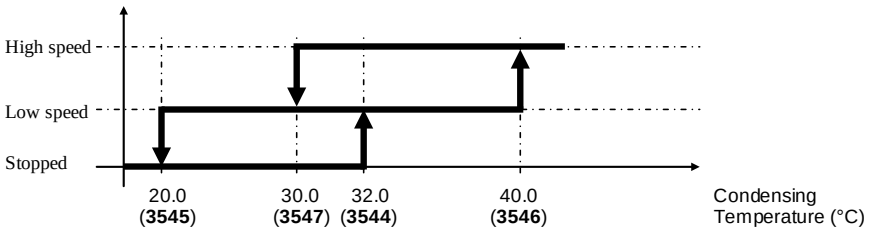


Figure 40

In heating mode, the eCLIMATIC™ starts the fan in terms of the compressor demand and manages the high speed according to the outside air temperature. The eCLIMATIC™ promotes the high speed to achieve the best performance of the unit.

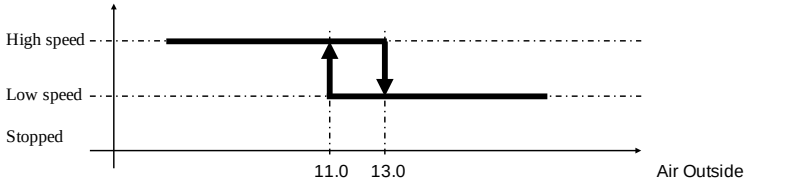


Figure 41

Note

The fan is stopped 5s after the compressor as well as in cooling and heating mode.

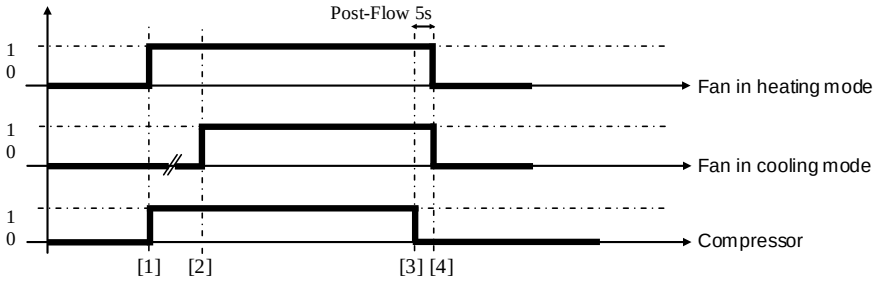


Figure 42

[1]: Compressor start + fan start (in heating)
[2]: Fan start (in cooling, when the condensing temperature reaches the setting (**3544**))
[3]: Compressor stop + post fan flow
[4]: Fan stop

Settings

(**3544**): Condensing temperature to start the low speed fan
(**3545**): Condensing temperature to stop the low speed fan
(**3546**): Condensing temperature to start the high speed fan
(**3547**): Condensing temperature to stop the high speed fan

CONDENSER/EVAPORATOR FAN MODULATING SPEED

Function

The fan is used as condenser in cooling mode to evacuate the heat outside to cool down the refrigerant. In heating mode, the coil is used as an evaporator to pick up the heat outside to warm up the refrigerant.

Description

The eCLIMATIC™ controls the condensing/evaporating temperature as stable as possible in order to reach the better performances of the unit.

In cooling mode, the eCLIMATIC™ modulates the fan in order to reach the higher performance of the unit and the best stability and precision. As consequence, the control calculates the condensing set point according to the outside air temperature as follow:

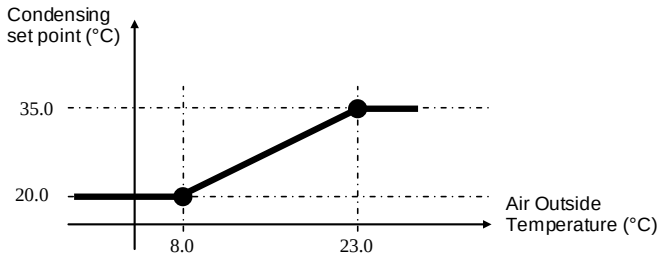


Figure 43

Once the set point defined, the control is based on a PID algorithm and could be customizing in terms of the response time of the unit.

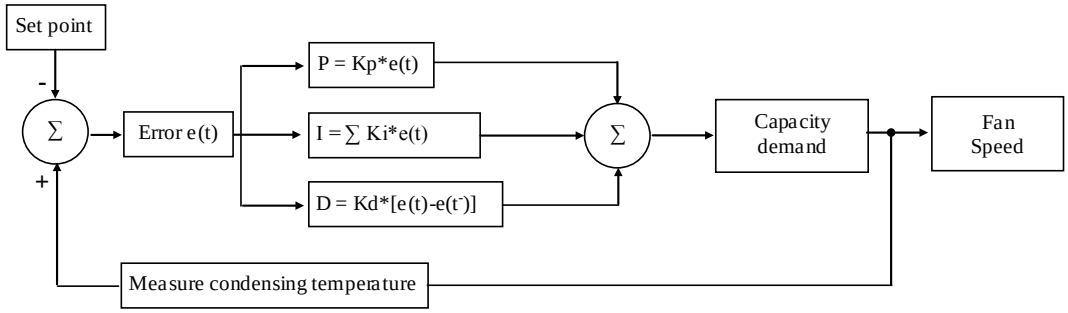


Figure 44

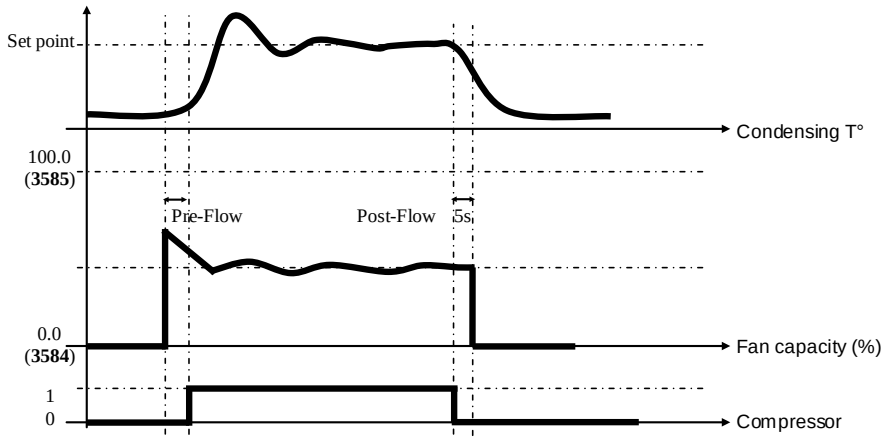


Figure 45

In heating mode, the eCLIMATIC™ calculates the evaporating set point according to the outside air temperature as follow:

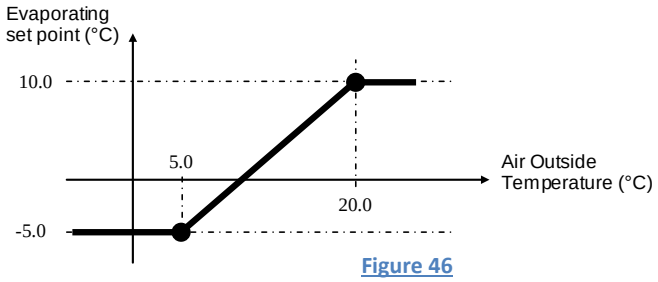


Figure 46

Once the set point defined, the control is based on a PID algorithm.

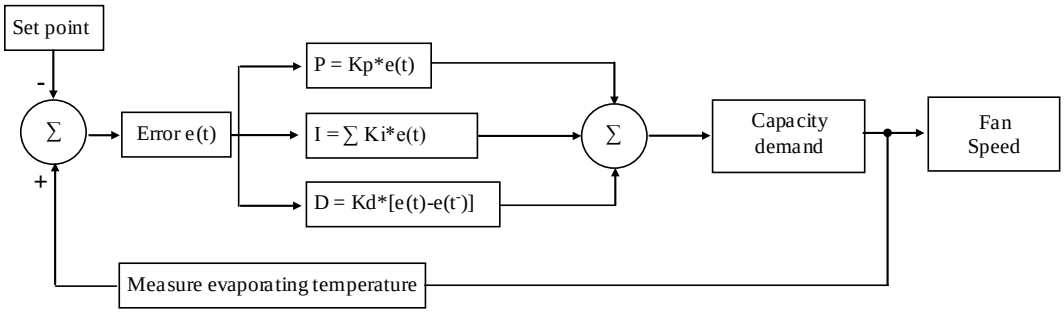


Figure 47

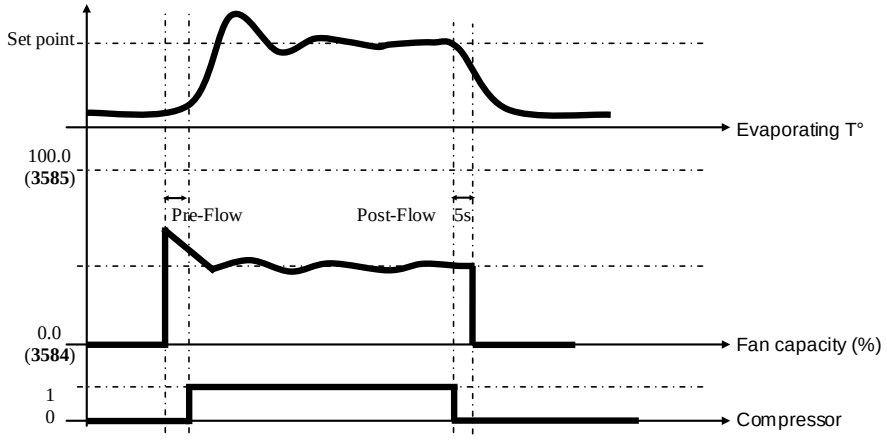


Figure 48

Note

The condensing / evaporating dynamic set point can be disabled in the menu (**3541**) by selecting "Fix" mode instead of "Dynamic" item. In this case the condensing set point is defined by the setting (**3543**) in cooling mode. In heating mode the fan runs at full speed (100%).

ITEM	SETTING (3541)	ACOUSTIC MODE	FAN MODE
0	Auto Fix	Auto	Fix
1	Auto Quiet Fix	Auto Quiet	Fix
2	Quiet Fix	Quiet	Fix
3	*Reserved*	***	***
4	Auto Dynamic	Auto	Dynamic
5	Auto Quiet Dynamic	Auto Quiet	Dynamic
6	Quiet Dynamic	Quiet	Dynamic

Note

The start/ stop fan is slave to the compressor. The fan starts 5s before the compressor and is stopped 5s after the compressor as well as in cooling and heating mode.

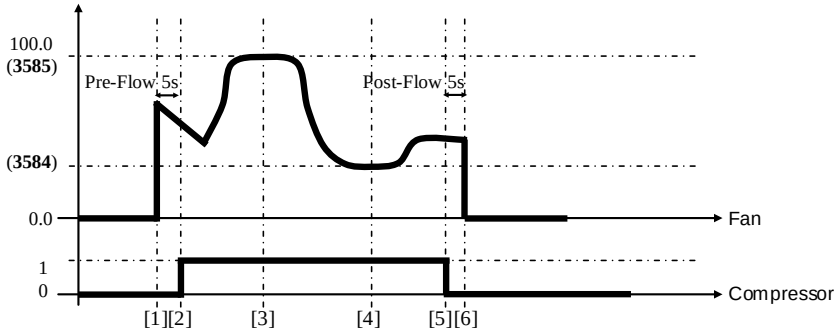


Figure 49

[1]: Fan start
[2]: Compressor start
[3]: Fan high speed limit (setting (**3585**))
[4]: Fan low speed limit (setting (**3584**))
[5]: Compressor stop + post fan flow
[6]: Fan stop

Settings

(**3541**): Condensing fan control mode
(**3543**): Condensing temperature set point
(**3581**): PID KP proportional coefficient setting
(**3582**): PID KI integral coefficient setting
(**3583**): PID KD derivate coefficient setting
(**3584**): Minimum fan speed setting
(**3585**): Maximum fan speed setting

FAN SMART ACCOUSTIC SYSTEM™

Function

The Smart Acoustic System™ allows progressive adaptation of the unit to the building load while respecting the noise level constraints and the operating limits.

Description

The eCLIMATIC™ controls the maximum sound level of the unit by limiting the fan speed. Different strategies can be selected according to the scheduling mode in order to benefit from the different modes “Auto”, “Auto Quiet” and “Quiet” operation as well as in heating or cooling mode.

‘Auto’

In this mode, the Smart Acoustic System™ function is disabled and the fan speed depend only on the condensing / evaporating temperature as described in the “CONDENSER/EVAPORATOR FAN …” paragraph. This mode allows achieving the best performance of the machine without considering the noise level.

‘Auto Quiet’

In this mode, the fan speed is limited so as to reduce the global noise of the unit. For unit including modulating fan, the maximum fan speed depends on the sound level desired in the menu (**3542**).
If the fan works in two speeds (L/H), the fan is locked in low speed and the sound level setting (**3542**) isn’t considerate.

In cooling mode, if the condensing temperature is too high, the eCLIMATIC™ unlocks this limit or the high speed to prevent from unloading a compressor.

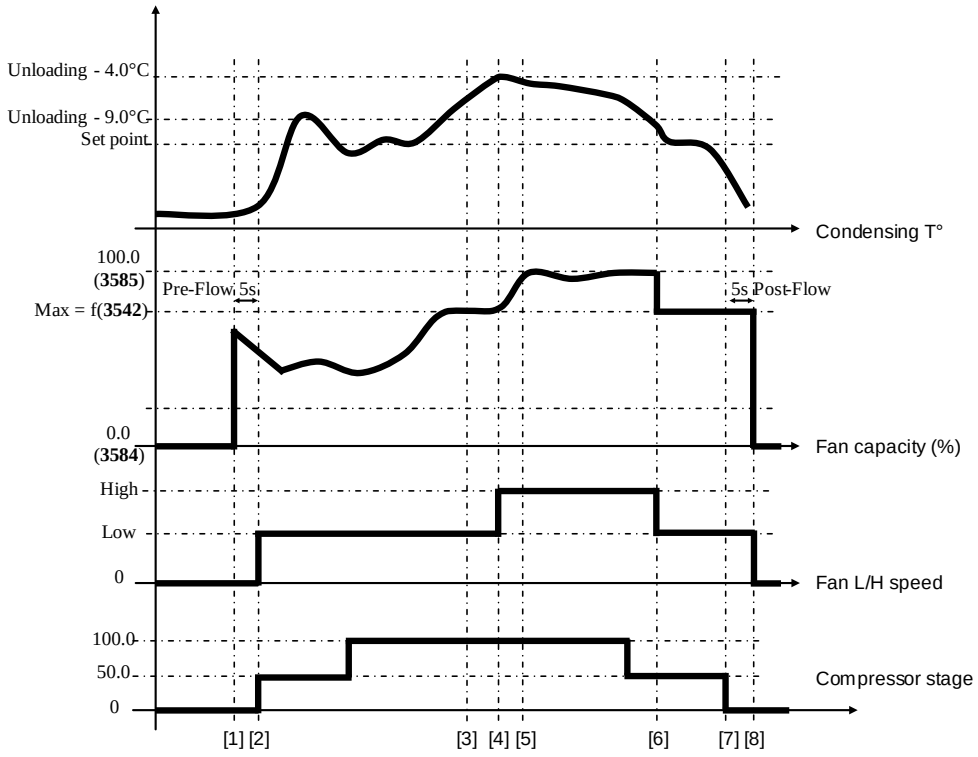


Figure 50

[1]: Fan start (anticipation pre-flow)
[2]: Compressor start
[3]: Fan capacity limited by the noise level
[4]: Condensing temperature closed to the unloading →Unlock the fan capacity
[5]: Fan capacity can increase up to the maximum setting (**3585**)

[6]: Condensing temperature below the unloading - 9°C → Lock the fan capacity
[7]: Compressor stop + fan post flow
[8]: Fan stop

In heating mode, the fan speed isn't boost except if the outside air temperature is closed to 5°C. At this range of temperature, the air humidity is important and favorable to quick ice accumulation. As consequence, the eCLIMATIC™ forces the high speed to prevent from too close defrosting procedures.

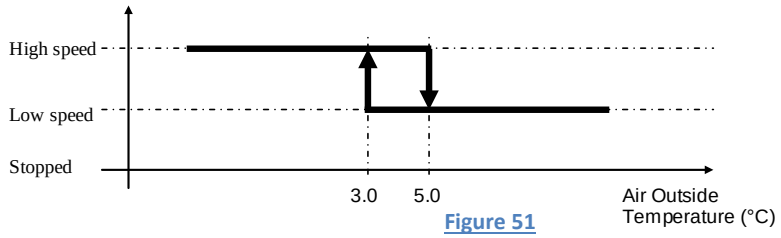


Figure 51

'Quiet'

This mode is similar to the "Auto Quiet" except that the fan speed limit or the high speed is never unlocked.

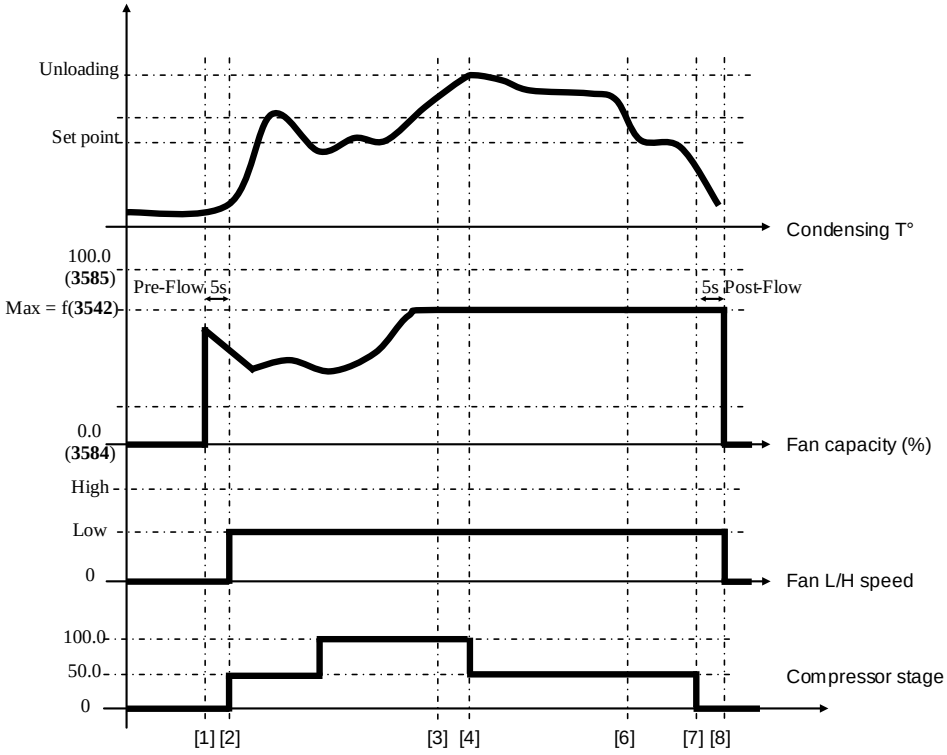


Figure 52

[1]: Fan start (anticipation pre-flow)
[2]: Compressor start
[3]: Fan capacity limited by the noise level
[4]: Condensing temperature reaches the unloading →Compressor unloading for 10min
[5]: Condensing temperature decreasing due to the unloading
[6]: Compressor stop + fan post flow
[7]: Fan stop

The Smart Acoustic System™ is customizable according to the scheduling.

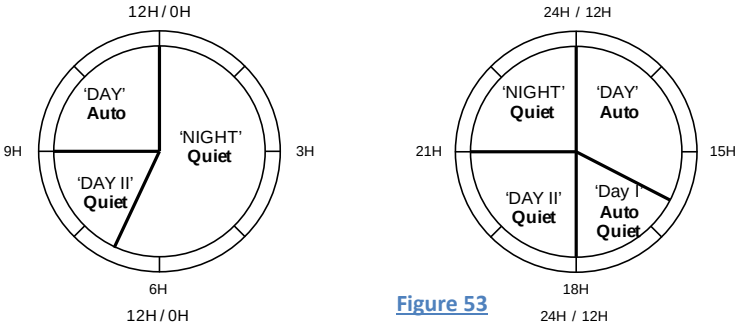


Figure 53

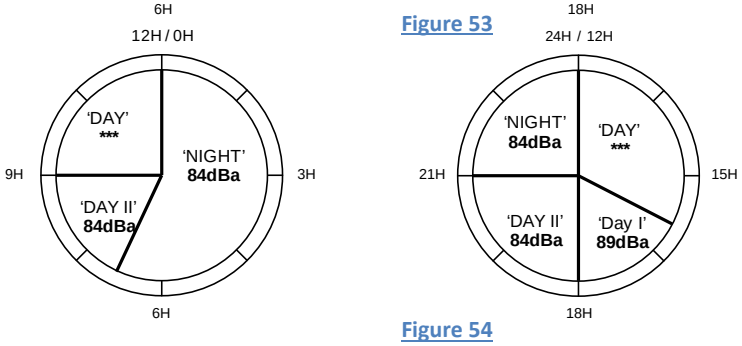


Figure 54

Settings

(**3541**): Condensing fan control mode

(**3542**): Sound level

DEFROSTING

Function

The defrosting is a necessary procedure to avoid ice on the evaporator coil in heat pump mode during the winter season.

Description

The eCLIMATIC™ is able to detect the ice accumulation and launch the defrosting procedure so as to always maintain the performance of the unit. The freezing is mainly detected by the evaporating temperature which is highly impacted when the coil is frozen. The outside air temperature is also a major condition to enable the freezing. This is why the defrosting can start only if the outside air temperature is lower than the setting (**3561**).

The eCLIMATIC™ saves the difference of temperature between the outside air temperature and the evaporating temperature, 3min after the starting of the compressor. This delta is considered as the reference and corresponding to a clean coil. In practice, the eCLIMATIC™ saves many delta reference temperatures depending on the different compressor stages. The saving is enabled only during the first 10min.

Then the eCLIMATIC™ measures the actual delta temperature and compares it to the delta reference corresponding to the same compressor stage. Once the rate is higher than the setting (**3564**) during 2min, the defrosting is launched.

This method requires to have stored the delta reference temperature. If this delta reference doesn't exist for the actual compressor stage, the defrosting is started if the evaporating temperature is lower than the setting (**3562**) during 2min and the time between the last defrost is passed since the setting (**3563**).

Note

In case any case, the defrosting is forced is the evaporating temperature is lower than the setting (**3569**) during 2min.
If none defrosting has been launched since 24h, a defrost procedure is automatically forced. This method secures the algorithm detection in case of slow fall of the outside air temperature over several days.

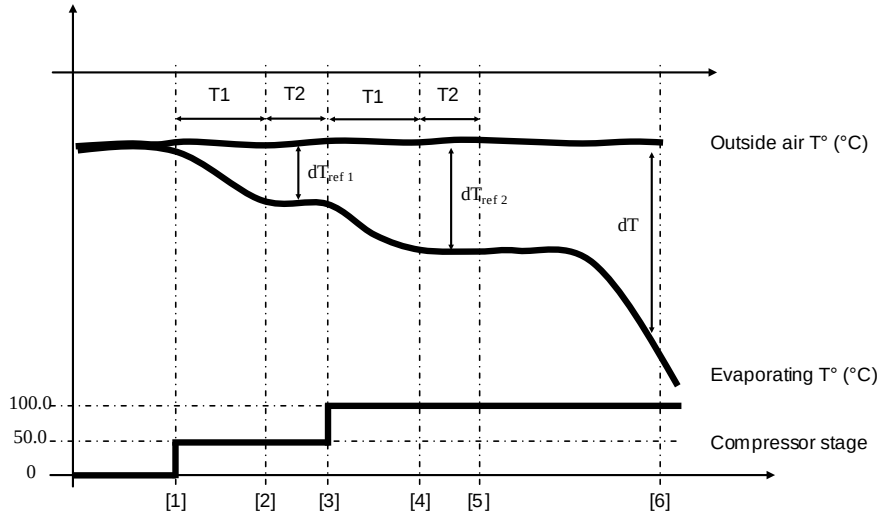


Figure 55

[1]: Compressor start (50%)
[2]: Start saving the reference (1) delta of temperature (T°air – T°LP)
[3]: Compressor start (100%)
[4]: Start saving the reference (2) delta of temperature (T°air – T°LP)
[5]: End saving the reference delta of temperature
[6]: High rate T°LP/T°LP_{ref}: starting the defrosting procedure

T1: Start delay
T2: Time delay to save the delta T reference 1 corresponding to 50% stage of compressor
T1: Start delay
T2: Time delay to save the delta T reference 2 corresponding to 100% stage of compressor

The complete algorithm is described in the following chart.

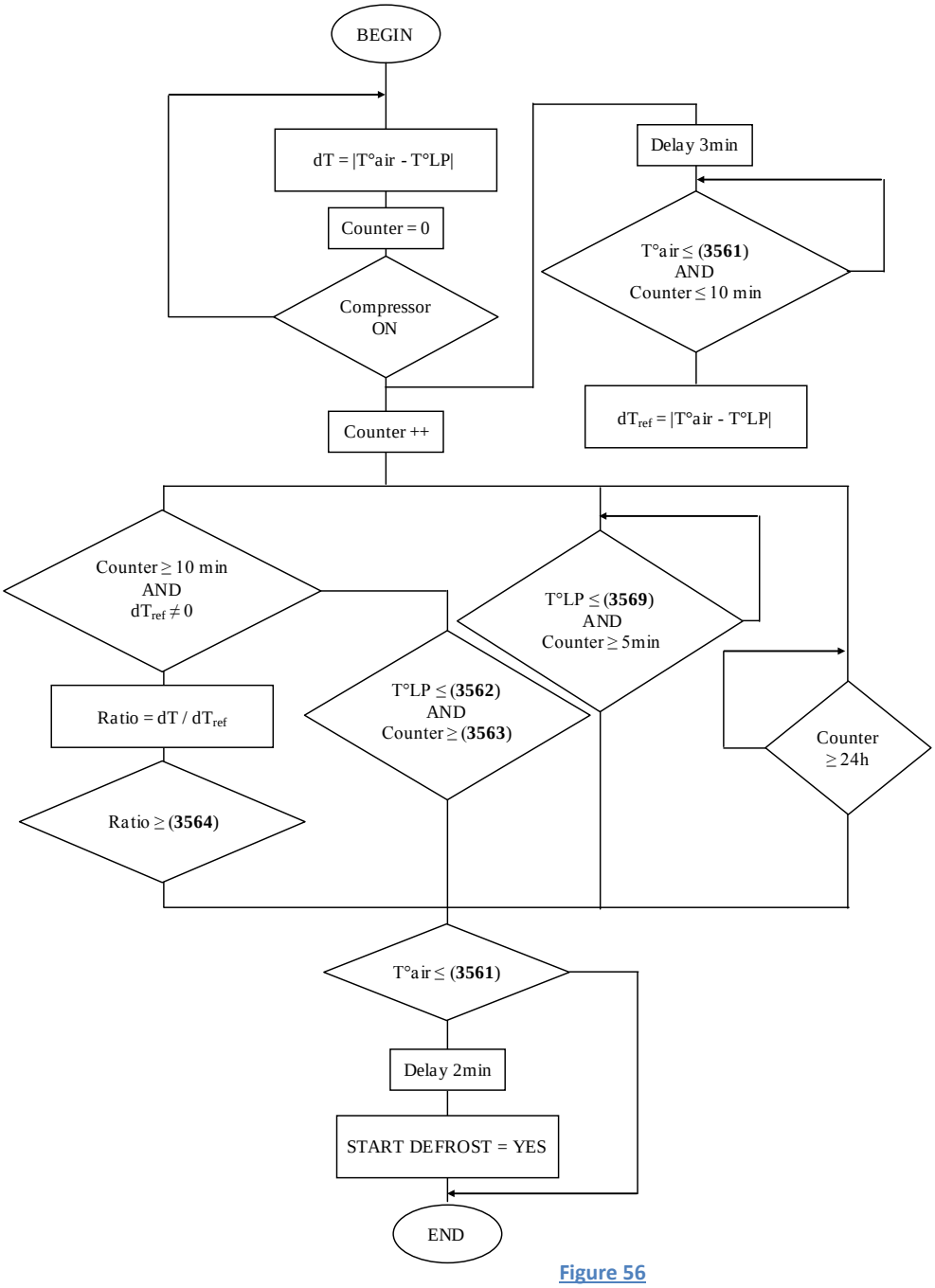


Figure 56

The defrosting procedure is easily configurable so as to optimize the procedure. When the eCLIMATIC™ detects ice accretion, the defrosting procedure is launched as the following chart:

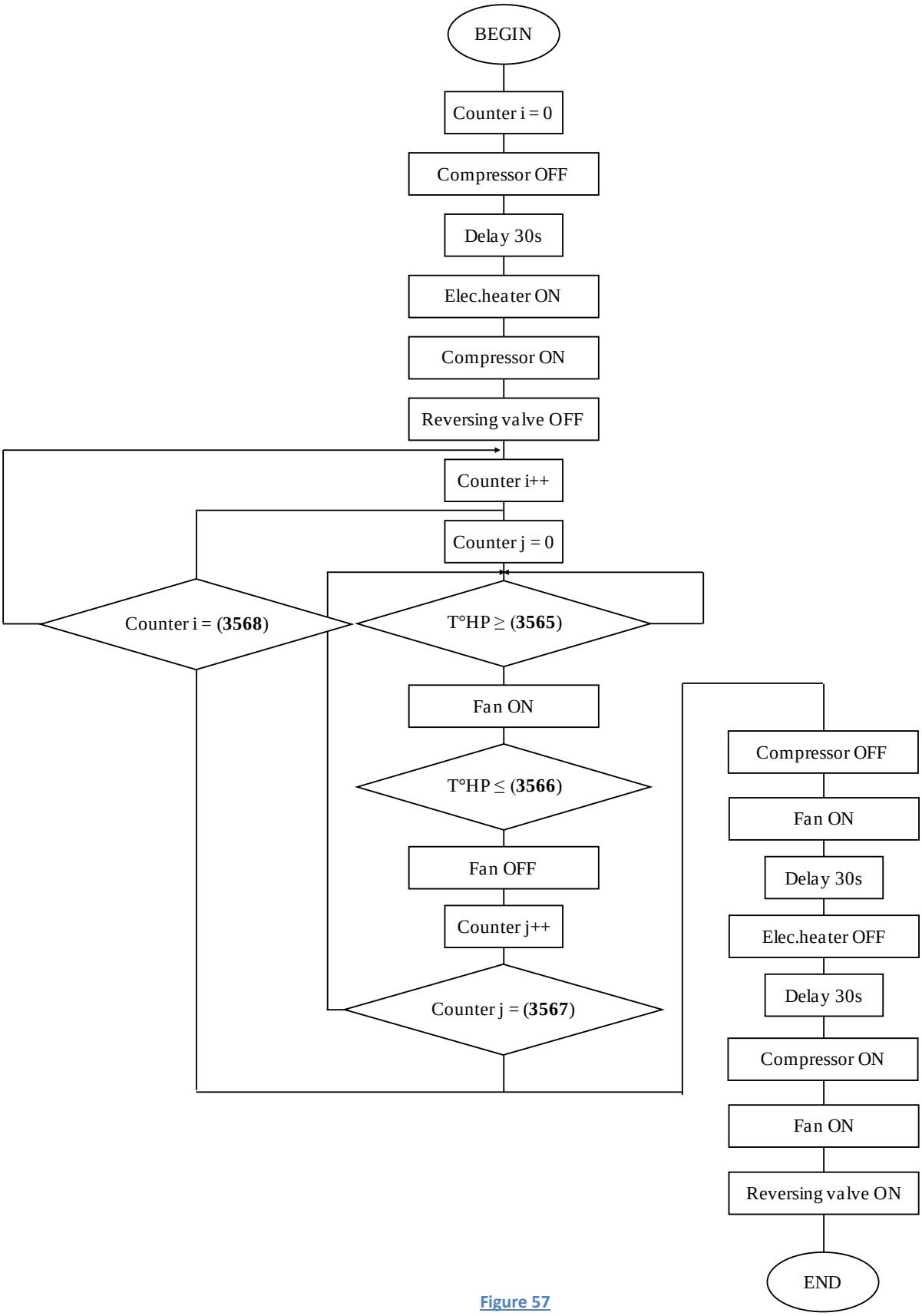


Figure 57

During the defrosting, the heat water temperature could decrease a lot especially in case of low water volume in the installation. To prevent from this, the eCLIMATIC™ manages the compressor taking account of the inlet temperature and could unload one of them if the temperature is reaching the limit as follow:

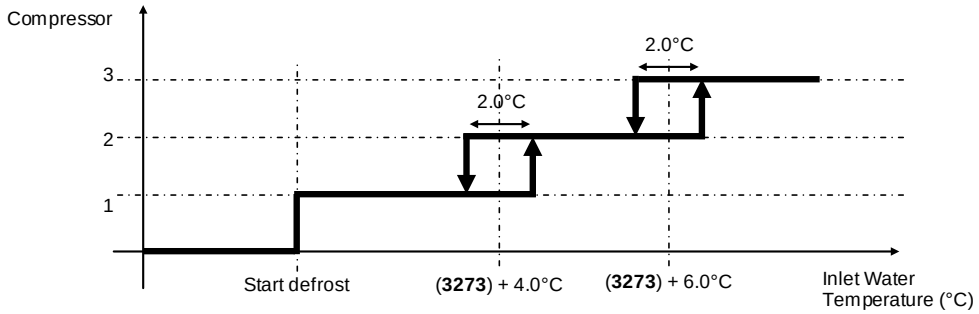


Figure 58

Settings

(**3561**): Outside air temperature to enable the defrosting,
(**3562**): Evaporating temperature to start the defrosting
(**3563**): Minimum time between 2 consecutives defrost
(**3564**): Ratio ($T°LP/T°LP_{ref}$) to start the defrosting
(**3565**): Condensing temperature to start the fan during the defrosting
(**3566**): Condensing temperature to stop the fan during the defrosting
(**3567**): Number of fan start during the defrosting
(**3568**): Defrosting timeout
(**3569**): Safety evaporating temperature to force the defrosting

REVERSING VALVE

Function

The reversing valve is a four ways valve which reverses the refrigerant sense so as to match with the chilled or heat water demand.

Description

The eCLIMATIC™ manages the reversing valve and needs a sufficient delta of pressure (HP-LP ≥ 2 bars) to swap correctly. This is why the reversing valve is reversed only at starting of the compressor.

Cooling to heating mode

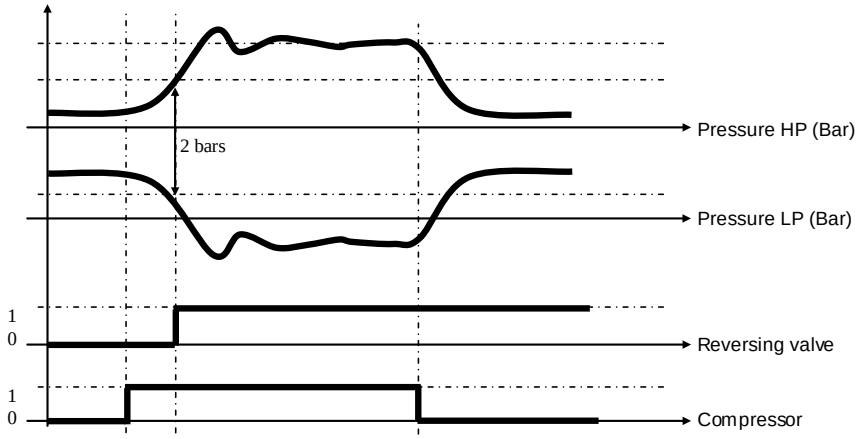


Figure 59

Heating to cooling mode

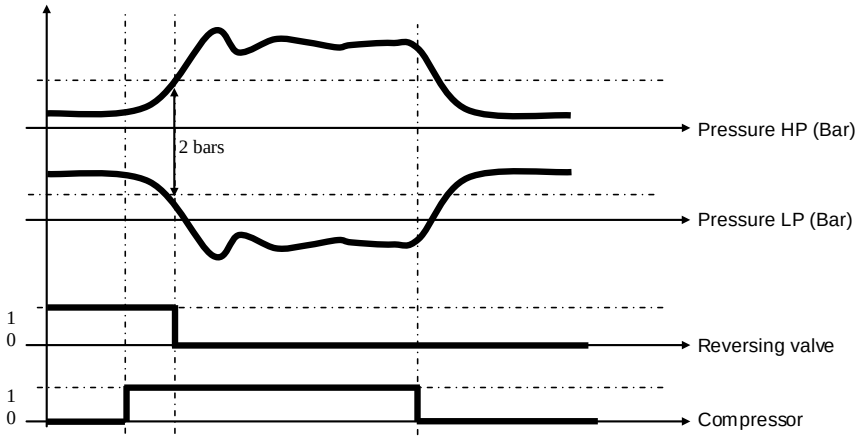


Figure 60

ELECTRONIC EXPANSION VALVE

Function

The Electronic Expansion Valve (EEV) drops the refrigerant pressure and temperature to allow it to vaporize in the evaporator.

Description

The eCLIMATIC™ manage the EEV directly by the controller for the small valve (unipolar motor) or through an external driver for the large valve (bipolar motor).

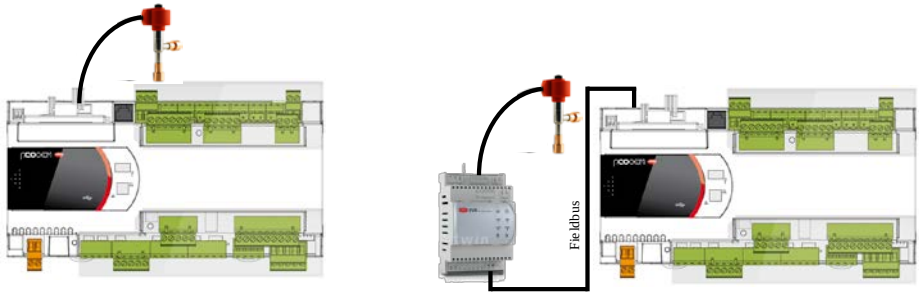


Figure 61

The eCLIMATIC™ controls the electronic expansion valve to obtain a complete vaporization of the refrigerant. For that, the eCLIMATIC™ maintains a constant superheating temperature by controlling the valve opening.

The eCLIMATIC™ controls the superheating temperature using a PID algorithm which could be customized.

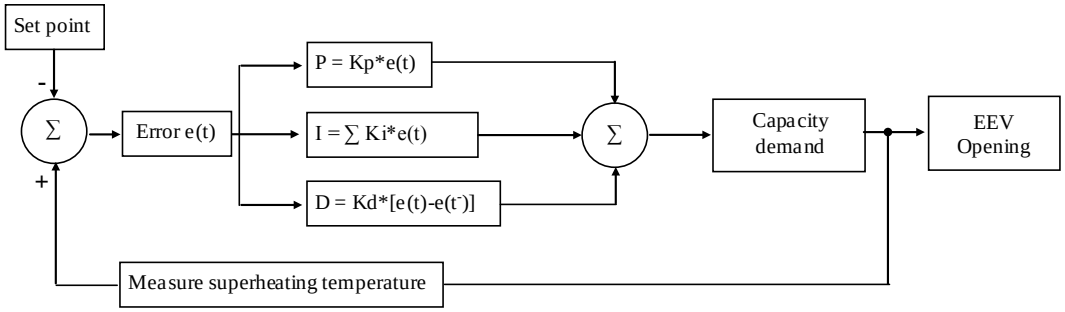


Figure 62

Note

At each compressor start, the PID coefficients are overrided during 2min so as to optimize the EEV speed as follow:

- KP = (**3632**) * 2,
- KI = (**3632**) * 4,
- KD = (**3632**).

To optimize the EEV management at starting, the eCLIMATIC™ anticipates the valve opening according to the capacity engaged. The pre-positioning value is based on the compressor demand and the valve starting opening rate (value fixed at 80%). The pre-positioning is send to the EEV 10s before the starting of the compressor. This time delay is defined in the menu (**3436**).
The following table summarizes the first pre-positioning value according to the number of compressor on the circuit.

Case 1: Number of compressor on the circuit = 1

Compressor demand (%)	Pre-positioning (1st stage) (%)
100.0	~80.0

Case 2: Number of compressor on the circuit = 2

Compressor demand (%)	Pre-positioning (1st stage) (%)	Pre-positioning (2nd stage) (%)
50.0	~50.0	***
100.0	***	EEV position x 1.50

Case 3: Number of compressor on the circuit = 3

Compressor demand (%)	Pre-positioning (1st stage) (%)	Pre-positioning (2nd stage) (%)	Pre-positioning (3rd stage) (%)
33.0	~33.0	***	***
66.0	***	EEV position x 1.33	***
99.0	***	***	EEV position x 1.33

The pre-positioning is maintained in fix position during 10s time delay. Then the PID algorithm is enabled and controls the superheating.

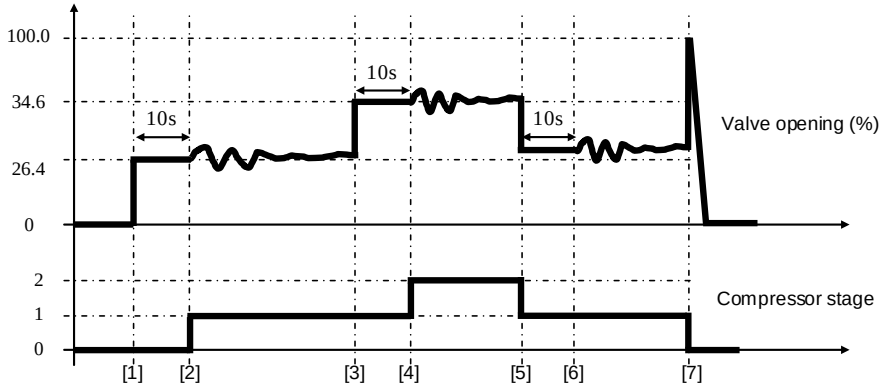


Figure 63

[1]: EEV pre-positioning + delay (10s)
[2]: Compressor stage 1 starts
[3]: EEV opening pre-positioning + delay (10s)
[4]: Compressor stage 2 starts
[5]: Compressor stage 2 stops
[6]: EEV pre-positioning + delay (10s)
[7]: Compressor stage 1 stops + EEV closing. (At stopping, the EEV is opening at 100% before closing, so as to synchronize the step motor).

The superheating control is associated to other protections which could take the hand on the PID algorithm like:

- LSH (Low Superheating): If the superheating temperature is ≤ 2.0°C, the eCLIMATIC™ accelerate the EEV closing.
- MOP (Maximum Operating Pressure): If the evaporating temperature is higher than the MOP threshold (dynamic value), the eCLIMATIC™ accelerate the EEV closing.

For maintenance reasons, the eCLIMATIC™ offers the possibility to manage manually the expansion valve using the settings (**3636**) / (**3638**). In this case, the EEV is opening according to the settings (**3637**) / (**3639**).

Note

In manually mode, the EEV is absolutely NOT synchronized with the compressor operating and the superheating control is disable. This mode could be used during a quick EEV diagnostic and it's essential to supervise the frigorific values to prevent from any damage on the unit.

Settings

(**3631**): Superheating set point
(**3632**): PID KP proportional coefficient setting
(**3633**): PID KI integral coefficient setting
(**3634**): PID KD derivate coefficient setting
(**3635**): EEV mode setting for circuit 1
(**3636**): EEV position setting for circuit 1 (only in manual mode)
(**3637**): EEV mode setting for circuit 2
(**3638**): EEV position setting for circuit 2 (only in manual mode)

ANTIFREEZE HEATER

Function

The antifreeze heater is an optional electrical heater which protects the heat plate exchanger from water freezing.

Description

The eCLIMATIC™ manage the antifreeze heater using a solid state relay (TRIAC) as a digital output. The antifreeze heater could be activated as well as in cooling or heating mode. The protection is based on the water temperature sensor (inlet or outlet) as follow:

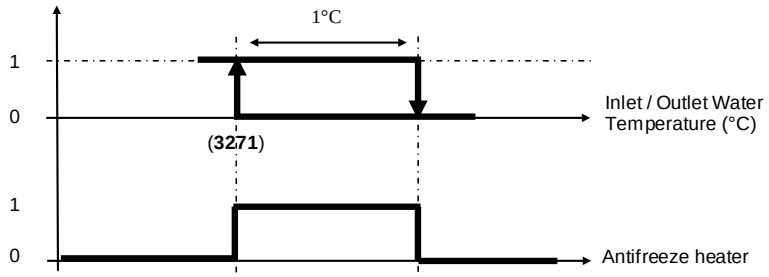


Figure 64

Note

The antifreeze heater operating hour counters are displayed in the menus (**2735**) and (**2736**). The counter is split in 2 bytes, the MSB (Most Significant Bits) and the LSB (Less Significant Bits) and the total is calculated as follows:

Total hour = MSB*1000 + LSB

Total hour = (**2735**)*1000 + (**2736**)

Example:

(**2735**) = 123,

(**2736**) = 456,

Total Hour = (**2735**)*1000 + (**2736**) = 123 456 Hours.

AUXILIARY HEATER

Function

The auxiliary heater is an optional electrical heater used as extra heater in heating mode during the winter season.

Description

The eCLIMATIC™ controls the auxiliary heater using a solid state relay (TRIAC) and modulates by this way the heater capacity. The electrical heater has a dual function and is used as well as for extra heating and antifreeze protection.

In heating mode, the electrical heater starts only if all compressor(s) available are running in order to boost the heating capacity. The eCLIMATIC™ modulates a PWM (Pulse Width Modulation) signal to control the electrical average capacity.

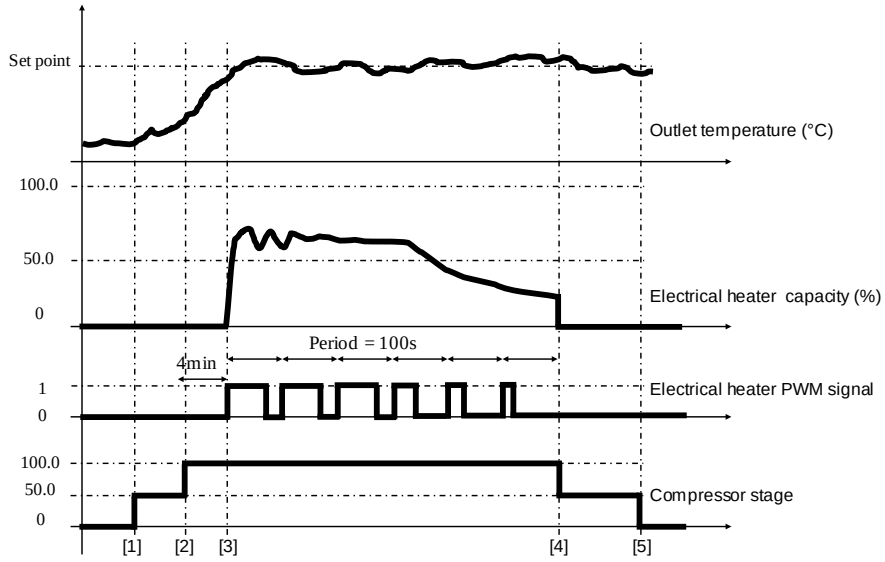


Figure 65

[1]: Compressor 1 start (50%)
[2]: Compressor 2 start (100%) + time delay 4min
[3]: Auxiliary heater enable (capacity demand evaluated + conversion in PWM signal)
[4]: Compressor 2 stop + auxiliary heater disable (compressor < 100%)
[5]: Compressor 1 stop (set point reached)

As well during the defrosting sequence, the electrical heater is start to so as to minimize the temperature drop. Finally, the electrical heater is activated in case of low water temperature as antifreeze protection as follow:

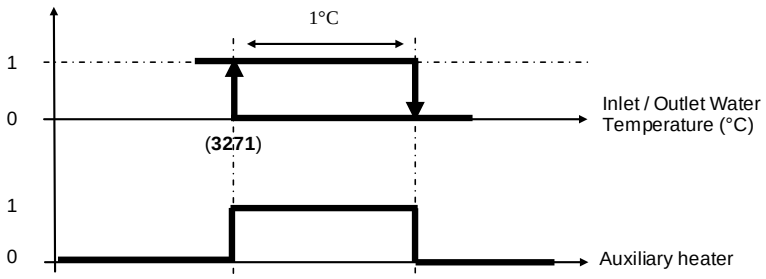


Figure 66

Note

The auxiliary heater operating hour counters are displayed in the menus (**2726**) and (**2727**). The counter is split in 2 bytes, the MSB (Most Significant Bits) and the LSB (Less Significant Bits) and the total is calculated as follows:

Total hour = MSB*1000 + LSB

Total hour = (**2726**)*1000 + (**2727**)

Example:

(**2726**) = 123,

(**2727**) = 456,

Total Hour = (**2726**)*1000 + (**2727**) = 123 456 Hours.

PHASE CONTROLLER

Function

The phase control is an optional module which is used to protect the unit in case of main electrical power failure.

Description

The phase controller is a multifunction device able to detect:

- Overvoltage
- Under voltage
- Phase failure detection

In case of trip of the phase controller, the failure is signaled to the eCLIMATIC™. The unit is completely stopped and the alarm is manually reset.

ENERGY METER

Function

The energy meter is an optional module which is used to monitor the energy consumption of the unit.

Description

The energy meter is a multifunction device able to measure:

- Current
- Active power
- Power factor
- Active energy

The data are directly readable on the energy meter device or displayed on the terminal display.
The energy's format is an integer 64bits (INT64) and the result is split in 4 words:

- Menu (**2556**) = BMS (**CH_217_I**), (@217): Active energy bits 63-48
- Menu (**2557**) = BMS (**CH_218_I**), (@218): Active energy bits 47-32
- Menu (**2558**) = BMS (**CH_219_I**), (@219): Active energy bits 31-16
- Menu (**2559**) = BMS (**CH_220_I**), (@220): Active energy bits 0-15

The conversion is described as follow:

Energy = (**2759**) + (**2758**)*65536 + (**2757**)* 4294967295 + (**2756**)* 281474976710656 Wh.

The power factor (PF) in the menu (**2755**) is multiplied by 100 for more precision. It's necessary to divide the value by 100 to obtain the right value. The power factor meaning is:

- -2 < PF < -1 = active power negative, capacitive
- -1 < PF < 0 = active power negative, inductive
- 0 < PF < 1 = active power positive, inductive
- 1 < PF < 2 = active power positive, capacitive

POWER FACTOR CORRECTION

Function

The power factor correction is an optional module which improves the electrical efficiency of the unit.

Description

The power factor correction compensates the angular phase between the voltage and the current using capacitor(s). The capacitor is activated at starting of the compressor.

In case of trip of the power factor capacitor, the failure is signaled to the eCLIMATIC™. The compressors are able to run and the alarm is manually reset.

MASTER / SLAVE

Function

The master/slave function is suitable for installations equipped several chillers or heat pumps on the same water loop and controlled by the eCLIMATIC™.

Description

The eCLIMATIC™ offers possibilities to connect up to **8 units** and allows relationship between each unit in order to synchronize the operating of the global installation.
Each unit is connected in serial on the master/salve bus (pLAN). A star connection is prohibited.
The cable length should not exceed 500m and must be used a 2 pairs with general shield like LiYCY-P (0.34 mm²).

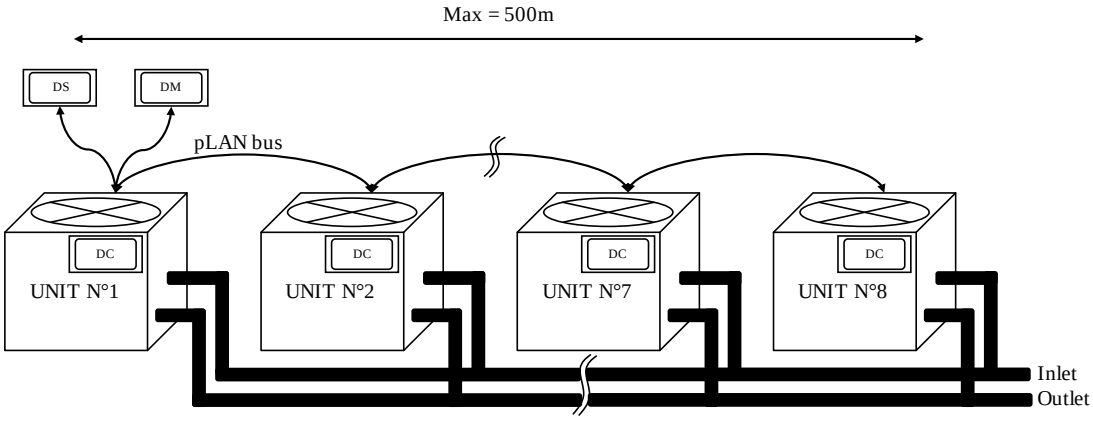


Figure 67

In master/slave mode, the unit n°1 is considered as the master and its pLAN address has to be set to '1' in the menu (**3815**). All others units are considered as slaves and their addresses must be consecutive. The synchronization of the master/salve mode is made by the master unit only. The master/slave function works with any ranges and sizes of chiller controlled by the eCLIMATIC™.
In case of link failure with the master, the slave units are enabled to run in standalone mode.

The eCLIMATIC™ manage two main modes:

- Cascade mode
- Backup mode

Each mode is split in two sub modes:

- 'Parallel' mode (//)
- 'Serial' mode (→→)

'Cascade //'

In this mode, all units are enabled running. All the evaporator pumps are running and the cooling/heating demand is split between all units. The master unit controls the slave units so as to equalize the compressor stages between all the units and most of time the circuits will run in part load. This method allows reaching the higher performance of the unit.

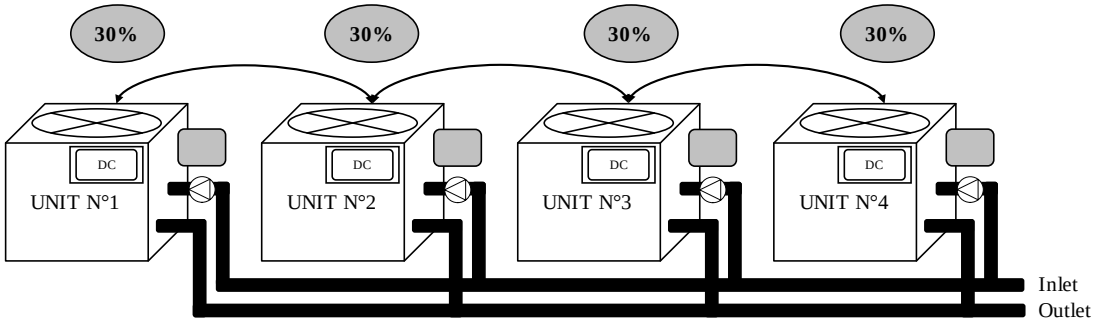


Figure 68

In practice, the master defines the first unit start and achieves it reach one compressor start (1er stage) before giving order to the second unit to start. During that time, the PID of the first is forced in pause and waits the compressor start on the second unit. The sequence goes on for other stages as describe in the following table.

Example

4 x units with 2 x compressors

STEP	Unit N°1	Unit N°2	Unit N°3	Unit N°4
1	CP1			
2	CP1	CP1		
3	CP1	CP1	CP1	
4	CP1	CP1	CP1	CP1
5	CP1 + CP2	CP1	CP1	CP1
6	CP1 + CP2	CP1 + CP2	CP1	CP1
7	CP1 + CP2	CP1 + CP2	CP1 + CP2	CP1
8	CP1 + CP2	CP1 + CP2	CP1 + CP2	CP1 + CP2

'Cascade →→'

In this mode the units are started one after the other. The first unit running must reach the full capacity (100%) before starting the second unit. As consequence only the units in operation start their pumps.

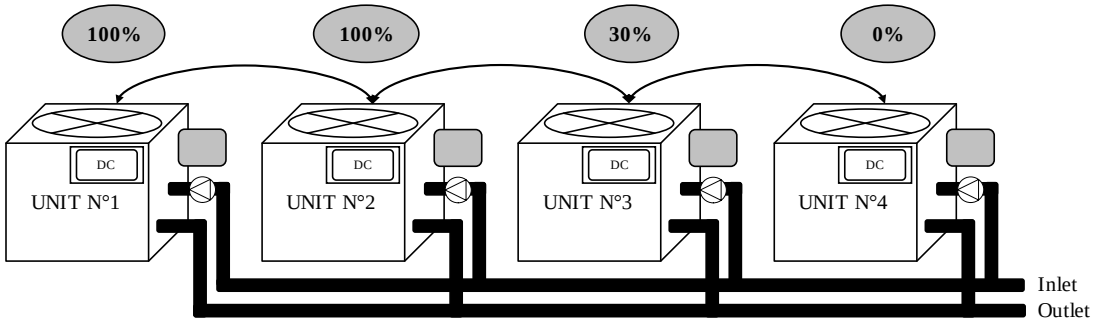


Figure 69

In practice the master defines the first unit start and achieves it reach the full capacity (100%). Until this moment all others units are set in standby (pump stopped). Then the master selects the second unit to start and so. Once the units are enabled each unit controls its own compressors.

When the capacity falls down, the units will decrease independently theirs stages. It's only when stopping the last compressor that the non-priority units will stopped their pump after the post-irrigation. The sequence goes on for other stages as describe in the following table.

Example

4 x units with 2 x compressors

STEP	Unit N°1	Unit N°2	Unit N°3	Unit N°4
1	CP1			
2	CP1 + CP2			
3	CP1 + CP2	CP1		
4	CP1 + CP2	CP1 + CP2		
5	CP1 + CP2	CP1 + CP2	CP1	
6	CP1 + CP2	CP1 + CP2	CP1 + CP2	
7	CP1 + CP2	CP1 + CP2	CP1 + CP2	CP1
8	CP1 + CP2	CP1 + CP2	CP1 + CP2	CP1 + CP2

Note

In case of alarm on one unit, it will be considered at 100% once all compressors available have been started. A time delay (4min) is started when all compressor have started before declaring a unit at 100%.

Backup

In this mode, one of the units is forced in standby. This unit is disabled and the evaporator pump is stopped. The backup unit is enabled to run only if an alarm is detected on the others units running.

Because the backup mode could be done with more than two units, it's necessary to define what type of method will be used for the other units in operation. This is why the backup mode is split in two sub-items (Backup Twin, Backup Chain). If the installation contains only 2 units, it could be select indifferently "Backup //" or "Backup→→".

'Backup //', 'Rol.Backup //'

In this mode, the eCLIMATIC™ mixes the "Backup" and "Cascade //" modes. That means one of the units is forced in standby and the others are in operating according to the "Cascade //" method.

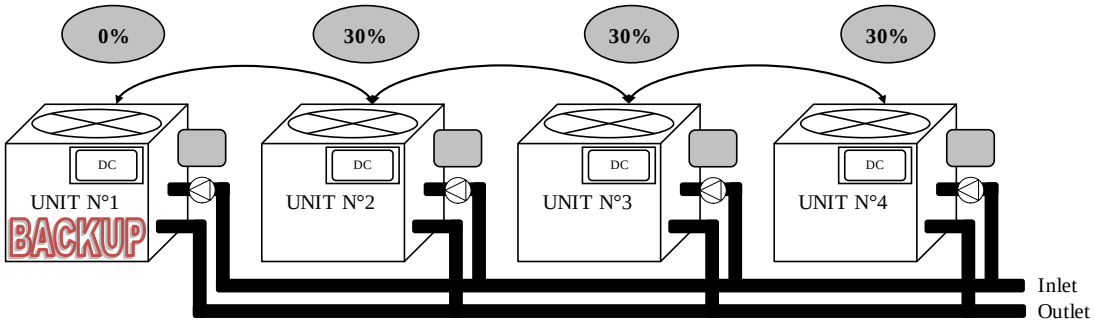


Figure 70

'Backup →→', 'Rol.Backup →→'

In this mode, the eCLIMATIC™ mixes the "Backup" and "Cascade→→" modes. That means one of the units is forced in standby and the others are in operating according to the "Cascade→→" method.

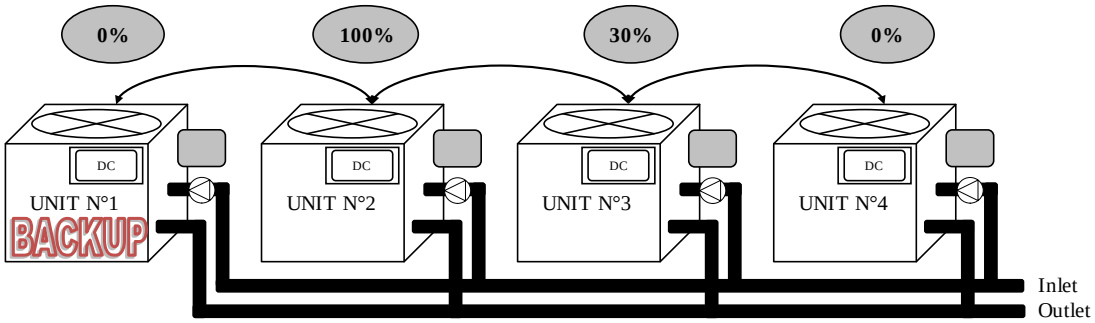


Figure 71

Example

4 x units with 2 x compressors without alarm

STEP	Unit N°1	Unit N°2	Unit N°3	Unit N°4	ALARME TRIP
1	STANDBY	CP1			No
2	STANDBY	CP1 + CP2			No
3	STANDBY	CP1 + CP2	CP1		No
4	STANDBY	CP1 + CP2	CP1 + CP2		No
5	STANDBY	CP1 + CP2	CP1 + CP2	CP1	No
6	STANDBY	CP1 + CP2	CP1 + CP2	CP1 + CP2	No
7	STANDBY	CP1 + CP2	CP1 + CP2	CP1 + CP2	No
8	STANDBY	CP1 + CP2	CP1 + CP2	CP1 + CP2	No

4 x units with 2 x compressors with alarm on one of units 2 / 3 / 4

STEP	Unit N°1	Unit N°2	Unit N°3	Unit N°4	ALARM TRIP
1	STANDBY	CP1			No
2	STANDBY	CP1 + CP2			No
3	STANDBY	CP1 + CP2	CP1		No
4	STANDBY	CP1 + CP2	CP1 + CP2		No
5		CP1 + CP2	CP1 + CP2	CP1	Yes, alarm trig on
6		CP1 + CP2	CP1 + CP2	CP1 + CP2	Yes
7	C1	CP1 + CP2	CP1 + CP2	CP1 + CP2	Yes
8	C1 + CP2	CP1 + CP2	CP1 + CP2	CP1 + CP2	Yes
9	STANDBY	CP1 + CP2	CP1 + CP2	CP1 + CP2	No, alarm trig off

Rotation

The eCLIMATIC™ manage a weekly rotation of the units as well as in cascade and backup mode. This procedure is mainly interesting in cascade chain to equalize the operating time of all units. As same in backup mode, the unit in standby is changed every week. Yet the eCLIMATIC™ offers the possibility to disable the weekly rotation for the backup mode. It could be interesting in case of different generation of the units (older and younger).

- Backup Twin / Backup Chain: The weekly rotation is enabled.
- Rol.Backup Twin / Rol.Backup Chain: The weekly rotation is disabled.

WEEK	EXAMPLE	UNIT ROTATION
Week (n modulo 5)	Week 1	….U1→ U2 → U3→ U4→….
Week (n+1 modulo 5)	Week 2	….U4→ U1 → U2→ U3→….
Week (n+2 modulo 5)	Week 3	….U3→ U4 → U1→ U2→….
Week (n+3 modulo 5)	Week 4	….U2→ U4 → U3→ U1→….

Settings

(**3815**): Unit address
(**3816**): Number of units connected on the pLAN network
(**3817**): Master/slave mode
(**3818**): Outside air temperature mode
(**3819**): Water temperature mode
(**3181**): Weekly rotation day
(**3182**): Weekly rotation hour

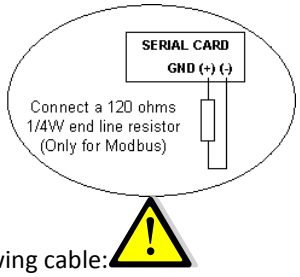
BMS

Function

BMS (Building Management Systems) are systems for the integrated management of all the technological functions of a building, including access control, safety, fire detection, lighting, intelligent elevators, and Air-Conditioning. The resulting advantages of such solutions as simpler and more efficient management of the building from a single control station, reduction in running costs, possibility of statistical analysis of all data, immediate identification of and response to faults and alarms, amply justify the little extra cost of the Air-Conditioning unit BMS connectable. Today not only the quality and the reliability of the instruments are important, but also the degree of external connectivity they can offer.

Description

The BMS bus is connected on the eCLIMATIC™'s serial card board. A star connection is not allowed, for an optimum operation it is advised to connect a maximum of two cables per unit. In case of RS485 bus, a resistance of 120Ω 1/4W can be connected on the last unit between the terminals "+" and " –".



The connection must be carried out by the following cable:
Cable length up to 1000m: LiYCY-P (0.34 mm ²), 2 pairs with general shield.

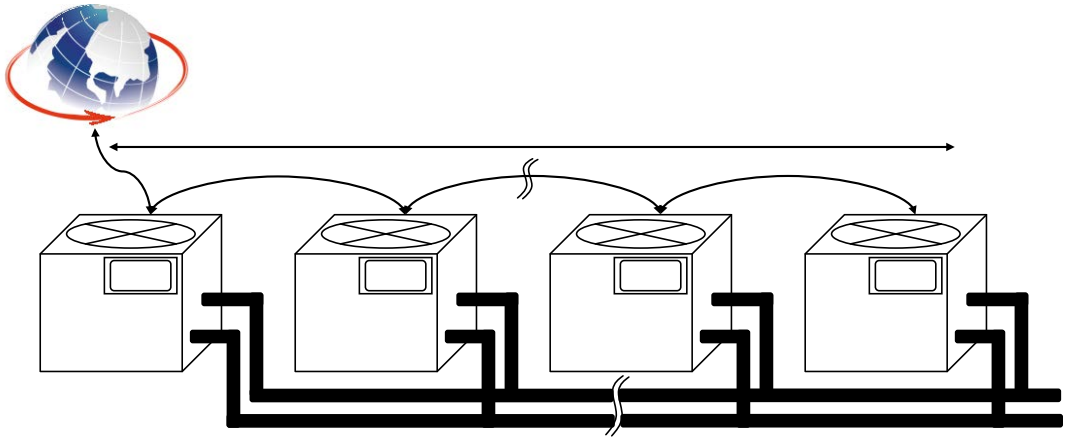


Figure 72

The eCLIMATIC™ support different BMS protocol configurable in the menu (**2827**) / (**3827**):

NAME	SERIAL CARD	COMMUNICATION MEDIA
MODBUS RTU		RS485
BACNET MS/TP		RS485
MODBUS TCP/IP BACNET TCP/IP		TCP/IP
TREND		Current loop
LON WORKS ECHELON		FTT10A
KONNEX		TP1

All the eCLIMATIC™ data are in a 16 bits integer format (INT16).
About the Modbus RTU, the protocol format is configurable in the menu (**2829**) / (**3829**):

ITEM	DATA BITS	PARITY	STOP BITS
0	8	NONE	2
1	8	NONE	1
2	8	EVEN	2
3	8	EVEN	1
4	8	ODD	2
5	8	ODD	1

The “BMS” mode of the unit is activated only by the BMS system using the watchdog. The watchdog is a timer automatically decreased every second. As consequence, it’s necessary to frequently overwriting the watchdog value to not let fall to ‘0’. If the watchdog reaches 0, the “BMS” mode is disabled and the unit comes back to the schedule mode (DAY, NIGHT, DAY I, DAY II).

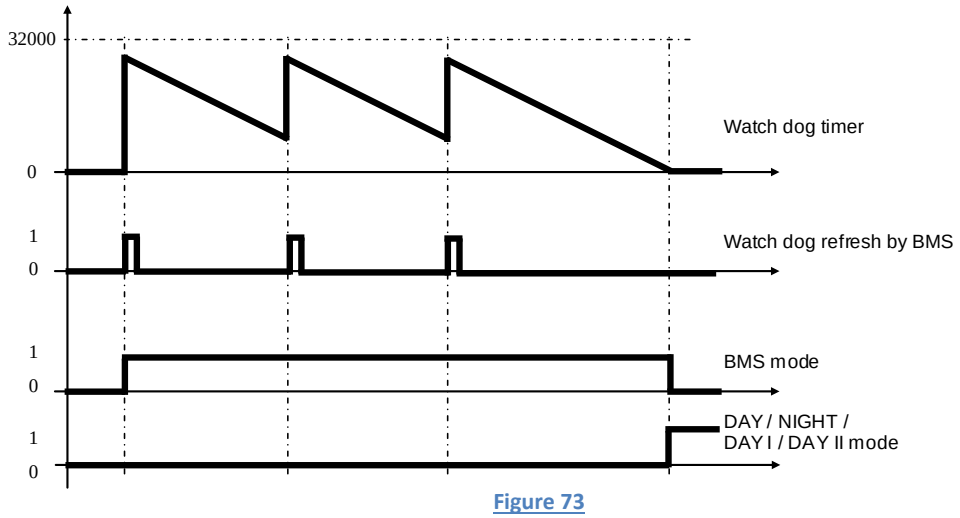


Figure 73

The baud rate defined the speed communication on the BMS bus and the values supported by the eCLIMATIC™ are:

- 1200 bit/s,
- 2400 bit/s,
- 4800 bit/s,
- 9600 bit/s,
- 19200 bit/s,
- 38400 bit/s,

About the Lon Works FTT10A, the data transmission on the network is fixed at 78 Kbps. In this case the eCLIMATIC™ baud rate defines the speed between the processor and the FTT10A board and must be set at 4800 bps.

The BMS could send its own temperatures measures on the installation. In this case the eCLIMATIC™ controls the unit according these values. This is the case for:

- Outside air temperature, menu (**2822**),
- Water inlet temperature, menu (**2823**),
- Water outlet temperature, menu (**2824**).

The value must be include [-40.0; +80.0] to be taken in consideration.

Settings

(**3825**): Watchdog for activation of the BMS mode
(**3826**): BMS address
(**3827**): BMS protocol
(**3828**): BMS baud rate
(**3829**): BMS Modbus RTU format

TERMINAL DISPLAY CONFIGURATION

Function

The terminal is the LCD plug and play display to visualize the data and access the unit's parameters.

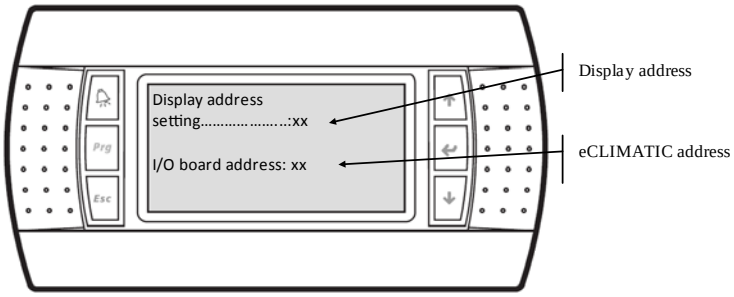
Description

The eCLIMATIC™ manages up to three different terminal displays:

- DC ADVANCED: Local display fixed on the unit with restricted access,
- DM MULTI: Remote display including the same functionalities as the DC ADVANCED,
- DS SERVICE: Local display reserved for maintenance people with full access to the parameters.

The terminal addresses are automatically set by the eCLIMATIC™ at the power on of the unit. Yet the address can be assigned manually to establish the communication. The procedure to assign the address is described hereafter:

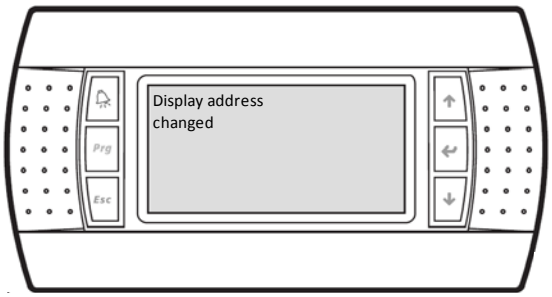
1. Press the buttons "↓", "↑", "←" in same time during 5 seconds,



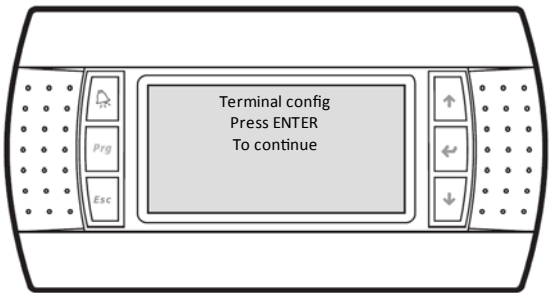
2. Press the "←" key to move the cursor on the display address number,
3. Press the "↓", "↑" keys to select the value and press the "←" key to confirm. (Refer to the following table)

eCLIMATIC ADDRESS	DC ADVANCED ADDRESS	DM ADDRESS	DS ADDRESS
1	11	31	32
2	12		
3	13		
4	14		
5	15		
6	16		
7	17		
8	18		

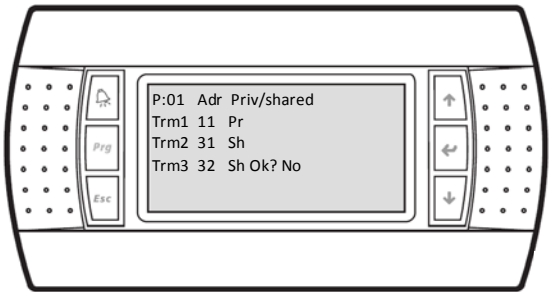
If the address has been modified, the following screen confirms the new address.



4. Repeat the steps 1) and move the cursor on the I/O board address
5. Press the "↓", "↑" keys to select the eClimatic address and press the "←" key to confirm.



6. Press the "←" key to continue. The configuration must be as show in the following picture (except the "Trm1" address)



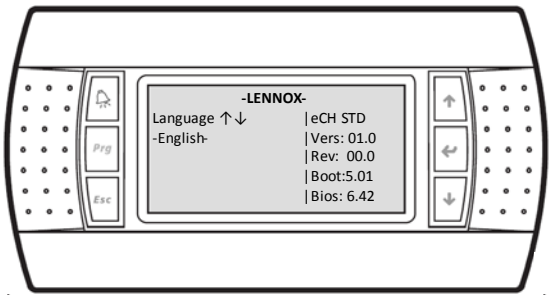
TERMINAL DISPLAY INTERFACE

Function

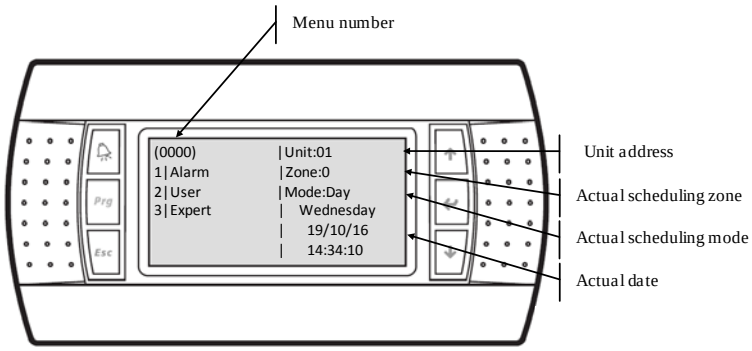
The terminal display constitutes the machine interface.

Description

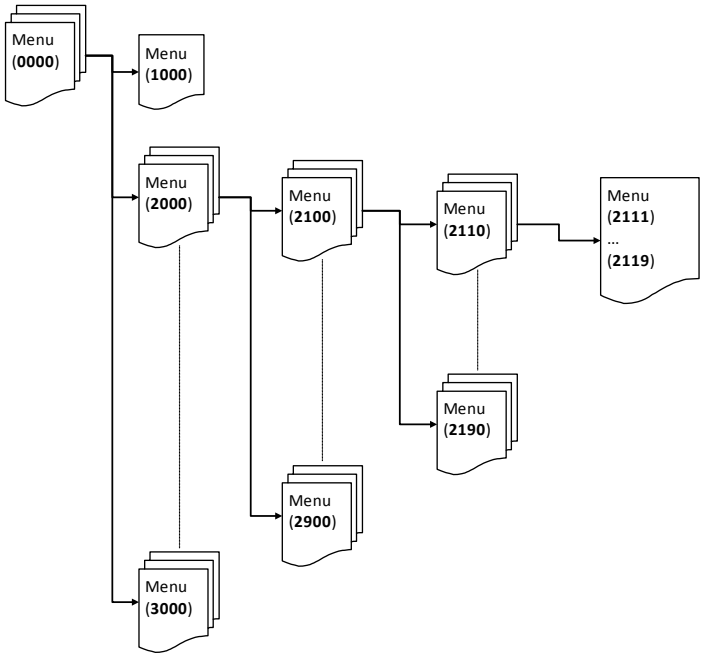
The terminal display is a multi-languages interface. The language could be changed in the first screen using the "↓", "↑" keys and after pressing the "←" key to confirm.



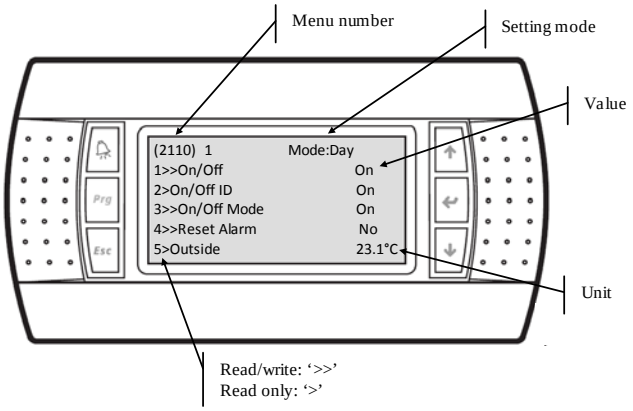
All displays (DC ADVANCED, DM and DS) are organized in the same way using scrolling sub menus. The "EXPERT" menu is only accessible with the DS terminal using a password.

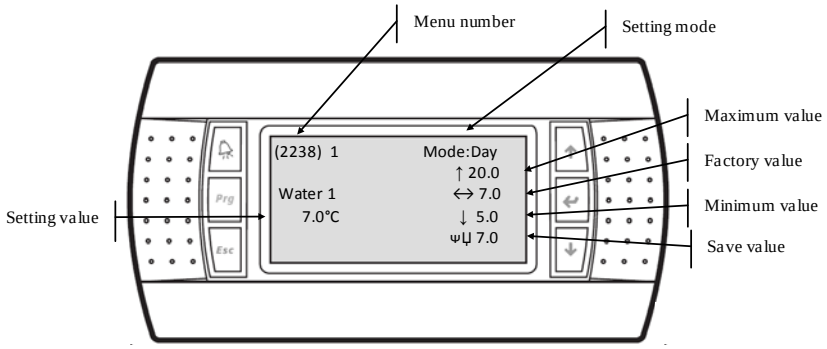


KEY	FUNCTION
"↓", "↑"	• Navigates in the menus • Increase/Decrease settings
"←"	• Enter in a sub-menu • Confirm the setting selected • And back to the menu
"Esc"	• Back to the sub-menu
"Prg"	• Access to quick monitoring screen • Change the scheduling mode during setting modification • Change the day of week during scheduling configuration
"🔔"	• Access to historic of alarm • Reset the alarms



The menu contains as well as setting (read/write) and data (read only). The settings are easy recognizable by the ">>" symbol when the cursor is on the line desired. If the setting is linked to the scheduling (DAY, NIGHT, DAY I, DAY II, BMS), the different values are visible by pressing the "←" key once the cursor is on the setting line.





ALARM / FAULT

Function

The alarms are dedicated to the protection of the unit. These can be trigged in case of device failure or a wiring issue. As same the eCLIMATIC™ detects any operating out of range to prevent from any risk for the unit.

Description

The eCLIMATIC™ manages two types of failure: the **alarm** and the **fault**.

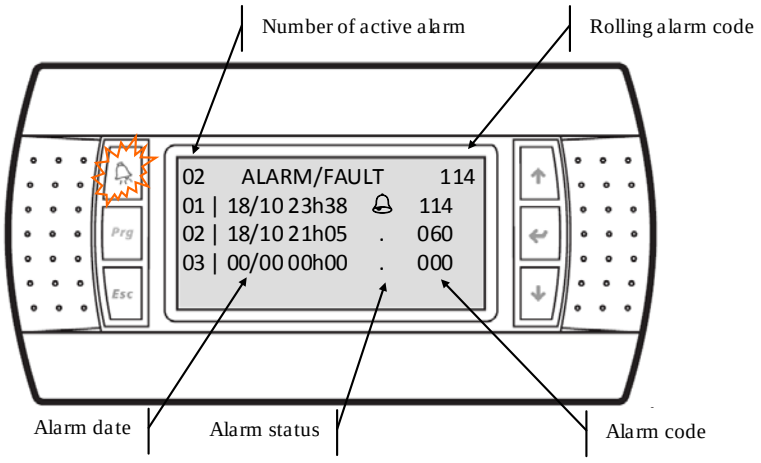
The alarm is a failure which is automatically reset to have a several attempts. The alarm can stops the unit or the circuit concerned or simply taking in consideration without stopping the operating.
If the alarm is still present one hour after its trip, the alarm becomes a fault.
If the trip's occurrences reach the maximum attempts authorized, the alarm becomes a fault.
The number of trips is automatically reset every day at 6h00.

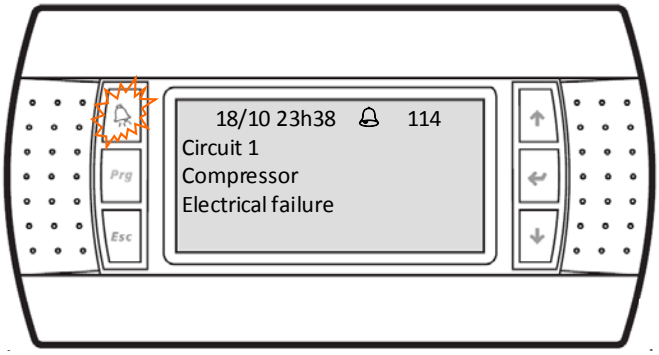
The fault is a failure which is manually reset. Only the fault are saved in the historic except if the DS terminal is connected. In this case all alarms are considered as fault and are signaled. This is why it's well advised to disconnect the DS display once the maintenance if finished.
As same the relay dedicated for remote failure is configured to signal the faults. Yet it could be customize to signal all alarms.

The eCLIMATIC™ saves the last 100 alarms in an historic of alarms. The red symbol "🔔" on the display DS, DM, DC ADVANCED means that at least one alarm is active

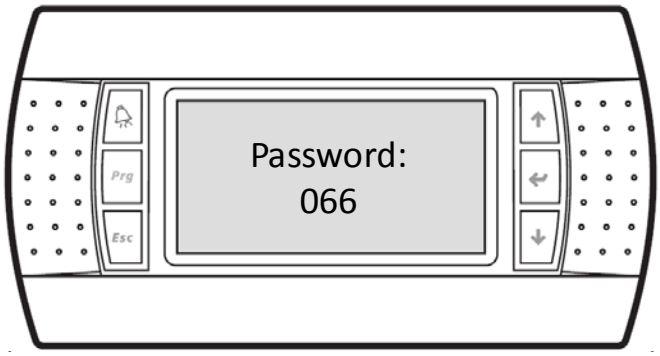
The historic of fault is directly accessible using the "🔔" key or by selecting the menu (**1000**). The historic summarize the following information:

- Date + hour of the event,
- Alarm status: the "🔔" symbol signal that the alarm is still active whereas the symbol "." means that the alarm is passed.
- Alarm code. The complete description of each alarm is available by pressing the "←" key.





The reset of fault is done by pressing the "🔔" key or using the setting (**2114**). A password is necessary to reset any fault with a DM or DC ADVANCED (for the DS). The password screen is automatically displayed after a reset request. The password is '66' and enable the fault reset is during one hour. If a wrong password is set, the symbol "⊗" signals a wrong selection.



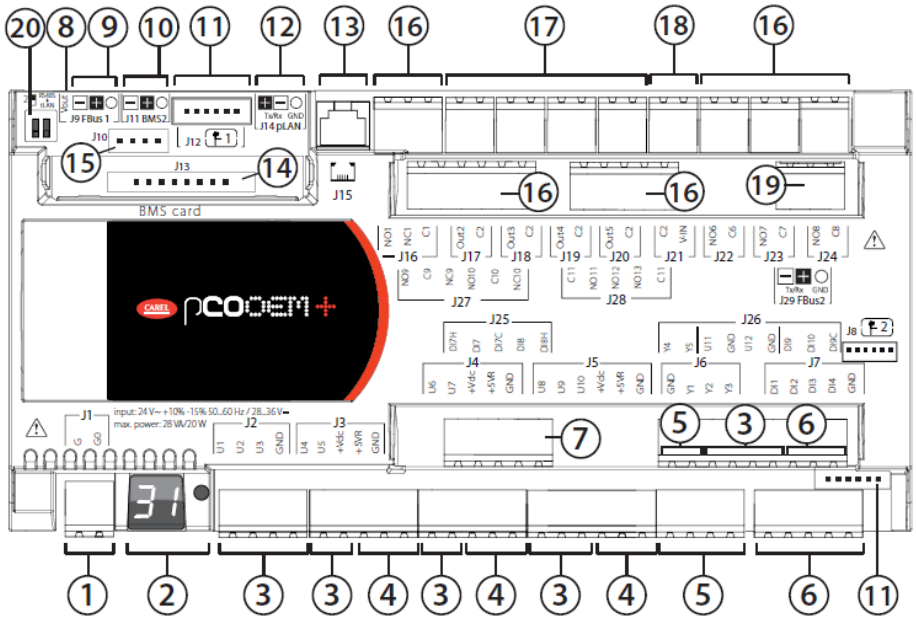
Note: If the fault is still present, it's impossible to reset it. (Example: if a sensor is failure, it's necessary to solve the issue before reset it).

Setting

The setting to reset the fault is available in the menu:
(**2114**): Fault reset setting

eCLIMATIC™ MAIN BOARD

CONNECTIONS



ITEM	DESCRIPTION
1	Main power supply
2	pLAN adress
3	Universal input/output
4	Power probes
5	Analogue output
6	Free contact digital input
7	Voltage digital input
8	Power for remote terminal
9	Fieldbus 1
10	BMS 2
11	Unipolar electronic expansion valve
12	pLAN plug-in
13	pLAN telephone for local terminal
14	BMS 1 slot for additional card
15	PLD terminal
16	Digital output relay
17	Powered on Digital output relay
18	Power supply for “Powered on Digital output relay”
19	Fieldbus 2
20	Micro switch to select RS485/tLAN on Fieldbus 1

APPENDIX 1: DISPLAY MENU

Description	Menu	1st digit	2nd digit	3rd digit	4th digit	R/W/Z	Unit	Min	Std	Max	List
General alarm status	1000	Alarm	Alarm	Alarm	Historic	R	###	0	0	1	0=No, 1=Yes.
General On/Off setpoint	2111	User	Unit	General	On/Off	R/W	###	0	0	1	0=Off, 1=On‹.
Remote On/Off status	2112				On/Off ID	R	###	0	0	1	0=Off, 1=On‹.
Enable unit setpoint	2113				On/Off Mode	R/W/Z	###	0	1	1	0=Off, 1=On‹.
Alarm reset setpoint	2114				Reset Alarm	R/W	###	0	0	1	0=No, 1=Yes.
Outside air temperature (probe)	2115				Outside	R	°C	-50	#	105	#
Outside air temperature (reference)	2116				Outside Ref.	R	°C	-50	#	105	#
General unit status	2117				Status	R	###	0	#	46	#
Setpoint hour	2121			Clock	Hour	R/W/C	h	0	#	23	#
Setpoint minute	2122				Minute	R/W/C	min	0	#	59	#
Setpoint day	2123				Day	R/W/C	###	1	#	31	#
Setpoint month	2124				Month	R/W/C	###	1	#	12	1=January, 2=February, 3=March, 4=April, 5=May, 6=June, 7=July, 8=August, 9=September, 10=October, 11=November, 12=December.
Setpoint year	2125				Year	R/W/C	###	1	#	99	#
Setpoint automatic clock update winter / summer	2126				Win/Sum	R/W	###	0	1	1	0=No, 1=Yes.
Actual day	2131		Unit	Time	Day	R	###	1	#	31	#
Actual month	2132				Month	R	###	1	#	12	1=January, 2=February, 3=March, 4=April, 5=May, 6=June, 7=July, 8=August, 9=September, 10=October, 11=November, 12=December.

Actual year	2133				Year	R	###	1	#	99	#
Actual hour	2134				Hour	R	h	0	#	23	#
Actual minute	2135				Minute	R	min	1	#	59	#
Actual zone	2136				Zone	R	###	0	#	6	#
Actual mode	2137				Mode	R	###	1	#	5	1=DayII, 2=DayI, 3=Day, 4=Night, 5=BMS.
Setpoint number of zone (Schedule)	2138				Nbr Zone	R/W	###	1	3	6	#
Setpoint number of mode (Schedule)	2139				Nbr Mode	R/W	###	1	1	4	#
Setpoint start time zone 0	2141			Schedule Time	Hour Z0	R/D	h	0	0	0	#
Setpoint start time zone 1	2142				Hour Z1	R/W/D	h	0	6	24	#
Setpoint start time zone 2	2143				Hour Z2	R/W/D	h	0	22	24	#
Setpoint start time zone 3	2144				Hour Z3	R/W/D	h	0	24	24	#
Setpoint start time zone 4	2145				Hour Z4	R/W/D	h	0	24	24	#
Setpoint start time zone 5	2146				Hour Z5	R/W/D	h	0	24	24	#
Setpoint start time zone 6	2147				Hour Z6	R/W/D	h	0	24	24	#
Setpoint mode zone 0	2151		Unit	Schedule Mode	Mode Z0	R/W/D	###	1	1	5	1=DayII, 2=DayI, 3=Day, 4=Night, 5=BMS.
Setpoint mode zone 1	2152				Mode Z1	R/W/D	###	1	1	5	#
Setpoint mode zone 2	2153				Mode Z2	R/W/D	###	1	1	5	#
Setpoint mode zone 3	2154				Mode Z3	R/W/D	###	1	1	5	#
Setpoint mode zone 4	2155				Mode Z4	R/W/D	###	1	1	5	#
Setpoint mode zone 5	2156				Mode Z5	R/W/D	###	1	1	5	#
Setpoint mode zone 6	2157				Mode Z6	R/W/D	###	1	1	5	#
Setpoint anticipation foot (anticipation zone 1)	2161			Anticipation	Onset	R/W	°C	-10	10	20	#
Setpoint anticipation grade (anticipation zone 1)	2162				Slope	R/W	°C	0	0	100	#
Status digital output BM-NO1	2171		Unit	Custom Output (DO)	BM-NO1	R	###	0	0	1	0=Open, 1=Closed.
Status digital output BE-NO1	2172				BE.1-NO1	R	###	0	0	1	#
Status digital output BE-NO2	2173				BE.1-NO2	R	###	0	0	1	#
Status digital output BE-NO3	2174				BE.1-NO3	R	###	0	0	1	#
Status digital output BE-NO4	2175				BE.1-NO4	R	###	0	0	1	#
Status digital output BE-NO5	2176				BE.1-NO5	R	###	0	0	1	#
Status digital output BE-NO6	2177				BE.1-NO6	R	###	0	0	1	#
Status digital input BM-ID3	2181			Custom Input (AI-DI)	BM-DI3	R	###	0	0	1	0=Open, 1=Closed.
Status digital input BM-ID4	2182				BM-DI4	R	###	0	0	1	#

Value input BE-U1	2183				BE.1-U1	R	###	-32768	0	32767	#
Value input BE-U2	2184				BE.1-U2	R	###	-32768	0	32767	#
Value input BE-U3	2185				BE.1-U3	R	###	-32768	0	32767	#
Value input BE-U4	2186				BE.1-U4	R	###	-32768	0	32767	#
Value input BE-U5	2187				BE.1-U5	R	###	-32768	0	32767	#
Value input BE-U6	2188				BE.1-U6	R	###	-32768	0	32767	#
Value input BE-U7	2189				BE.1-U7	R	###	-32768	0	32767	#
Value input BE-U8	2191	User	Unit	Custom Input (DI-AI)	BE.1-U8	R	###	-32768	0	32767	#
Value input BE-U9	2192				BE.1-U9	R	###	-32768	0	32767	#
Value input BE-U10	2193				BE.1-U10	R	###	-32768	0	32767	#
Evaporator water inlet temperature (probe)	2211		Water	General	Inlet	R	°C	-50	#	105	#
Evaporator water inlet temperature (reference)	2212				Inlet Ref.	R	°C	-50	#	105	#
Evaporator water outlet temperature (probe)	2213				Outlet	R	°C	-50	#	105	#
Evaporator water outlet temperature (reference)	2214				Outlet Ref.	R	°C	-50	#	105	#
Evaporator water delta T°	2215				Delta Tß	R	°C	0	#	105	#
Evaporator actual water setpoint	2216				Setpoint	R	°C	-10	#	50	#
Evaporator water outlet capacity demand	2217				Capacity	R	%	0	#	100	#
Evaporator water flow switch status	2218				Flow ID	R	###	0	0	1	0=Off, 1=On‹.
Changeover actual mode (cool / heat)	2221			Changeover	Status	R	###	1	1	4	1=Cooling, 2=Heating, 3=Auto, 4=DeadZone.
Outside air temperature (probe)	2222				Outside	R	°C	-50	#	105	#
Outside air temperature (reference)	2223				Outside Ref.	R	°C	-50	#	105	#
Changeover mode setpoint (cool / heat)	2224				Mode	R/W/Z	###	0	3	4	0=No, 1=Cooling, 2=Heating, 3=Auto, 4=DeadZone.
Changeover temperature setpoint in winter (auto mode)	2225				TßWinter	R/W	°C	-10	18	30	#
Changeover temperature setpoint in summer (auto mode)	2226				TßSummer	R/W	°C	19	23	30	#
Evaporator status	2231		Water	Cooling	Status	R	###	0	#	46	#
Evaporator water inlet temperature (reference)	2232				Inlet	R	°C	-50	#	105	#
Evaporator water outlet temperature (reference)	2233				Outlet	R	°C	-50	#	105	#
Evaporator actual water setpoint	2234				Setpoint	R	°C	-10	#	50	#
Evaporator water outlet capacity demand	2235				Capacity	R	%	0	#	100	#
Evaporator dynamic cooling setpoint - outside air T°1	2236				Air Set 1	R/W/Z	°C	-11	22	50	#
Evaporator dynamic cooling setpoint - outside air T°2	2237				Air Set 2	R/W/Z	°C	-11	30	50	#
Evaporator dynamic cooling setpoint - water T°1	2238				Water Set 1	R/W/Z	°C	5	7	20	#
Evaporator dynamic cooling setpoint - water T°2	2239				Water Set 2	R/W/Z	°C	5	7	20	#

Evaporator status	2241			Heating	Status	R	###	0	#	46	#
Evaporator water inlet temperature (reference)	2242				Inlet	R	°C	-50	#	105	#
Evaporator water outlet temperature (reference)	2243				Outlet	R	°C	-50	#	105	#
Evaporator actual water setpoint	2244				Setpoint	R	°C	-10	#	50	#
Evaporator water outlet capacity demand	2245				Capacity	R	%	0	#	100	#
Evaporator dynamic heating setpoint - outside air T°1	2246				Air Set 1	R/W/Z	°C	-11	1	50	#
Evaporator dynamic heating setpoint - outside air T°2	2247				Air Set 2	R/W/Z	°C	-11	19	50	#
Evaporator dynamic heating setpoint - water T°1	2248				Water Set 1	R/W/Z	°C	20	45	50	#
Evaporator dynamic heating setpoint - water T°2	2249				Water Set 2	R/W/Z	°C	20	45	50	#
Evaporator remote water setpoint signal	2251		Water	Custom	Signal4/20mA	R	###	4	#	20	#
Evaporator remote water setpoint offset signal	2252				Offset +/-1K	R	###	-1	#	1	#
Evaporator remote water 2nd setpoint status	2253				ID Nß2	R	###	0	0	1	0=Open, 1=Closed.
Evaporator pump 1 status	2311		Pump	Evaporator P1	Status	R	###	0	#	46	#
Evaporator pump 1 input status	2312				State ID	R	###	0	0	1	0=Off, 1=On‹.
Evaporator pump 1 output status	2313				Output	R	###	0	0	1	0=Off, 1=On‹.
Evaporator pump 1 MSB hour counter	2314				Hour H	R	h	0	#	999	#
Evaporator pump 1 LSB hour counter	2315				Hour L	R	h	0	#	999	#
Evaporator water flow switch status	2316				Flow ID	R	###	0	0	1	0=Off, 1=On‹.
Evaporator pump inverter alarm code	2317				Alarm	R	###	0	#	84	#
Evaporator pump 2 status	2321			Evaporator P2	Status	R	###	0	#	46	#
Evaporator pump 2 input status	2322				State ID	R	###	0	0	1	0=Off, 1=On‹.
Evaporator pump 2 output status	2323				Output	R	###	0	0	1	0=Off, 1=On‹.
Evaporator pump 2 MSB hour counter	2324				Hour H	R	h	0	#	999	#
Evaporator pump 2 LSB hour counter	2325				Hour L	R	h	0	#	999	#
Evaporator water flow switch status	2326				Flow ID	R	###	0	0	1	0=Off, 1=On‹.
Evaporator pump inverter alarm code	2327				Alarm	R	###	0	#	84	#
Evaporator water inlet temperature (probe)	2331		Pump	Evaporator Flow	T.In	R	°C	-50	#	105	#
Evaporator water outlet temperature (probe)	2332				T.Out	R	°C	-50	#	105	#
Evaporator water inlet pressure	2333				P.In	R	Bar	0	#	6	#
Evaporator water outlet pressure	2334				P.Out	R	Bar	0	#	6	#
Evaporator water delta T°	2335				Delta dT	R	°C	0	#	105	#
Evaporator water delta P	2336				Delta dP	R	Bar	0	#	6	#
Evaporator water flow	2337				Flow	R	m3/h	0	#	100	#
Evaporator pump capacity demand	2338				Pump	R	%	0	#	100	#
Evaporator bypass valve capacity demand	2339				Valve	R	%	0	#	100	#

Condenser pump 1 status	2341		Pump	Condenser P1	Status	R	###	0	#	46	#
Condenser pump 1 input status	2342				State ID	R	###	0	0	1	0=Off, 1=On‹.
Condenser pump 1 output status	2343				Output	R	###	0	0	1	0=Off, 1=On‹.
Condenser pump 1 MSB hour counter	2344				Hour H	R	h	0	#	999	#
Condenser pump 1 LSB hour counter	2345				Hour L	R	h	0	#	999	#
Condenser water flow switch status	2346				Flow ID	R	###	0	0	1	0=Off, 1=On‹.
Condenser pump inverter alarm code	2347				Alarm	R	###	0	#	84	#
Condenser pump 2 status	2351			Condenser P2	Status	R	###	0	#	46	#
Condenser pump 2 input status	2352				State ID	R	###	0	0	1	0=Off, 1=On‹.
Condenser pump 2 output status	2353				Output	R	###	0	0	1	0=Off, 1=On‹.
Condenser pump 2 MSB hour counter	2354				Hour H	R	h	0	#	999	#
Condenser pump 2 LSB hour counter	2355				Hour L	R	h	0	#	999	#
Condenser water flow switch status	2356				Flow ID	R	###	0	0	1	0=Off, 1=On‹.
Condenser pump inverter alarm code	2357				Alarm	R	###	0	#	84	#
Condenser water inlet temperature (probe)	2361			Condenser Flow	T.In	R	°C	-50	#	105	#
Condenser water outlet temperature (probe)	2362				T.Out	R	°C	-50	#	105	#
Condenser water inlet pressure	2363				P.In	R	Bar	0	#	6	#
Condenser water outlet pressure	2364				P.Out	R	Bar	0	#	6	#
Condenser water delta T°	2365				Delta dT	R	°C	0	#	105	#
Condenser water delta pressure	2366				Delta dP	R	Bar	0	#	6	#
Condenser water flow	2367				Flow	R	###	0	#	100	#
Condenser pump capacity demand	2368				Pump	R	###	0	#	100	#
Condenser bypass valve capacity demand	2369				Valve	R	###	0	#	100	#
Circuit 1 - condensing pressure	2411		Compressor	Circuit 1	P.HP	R	Bar	-1	#	45	#
Circuit 1 - condensing temperature	2412				T.HP	R	°C	-50	#	105	#
Circuit 1 - liquid temperature	2413				T.Liquid	R	°C	-50	#	105	#
Circuit 1 - evaporating pressure	2414				P.LP	R	Bar	-1	#	20	#
Circuit 1 - evaporating temperature	2415				T.LP	R	°C	-50	#	105	#
Circuit 1 - suction temperature	2416				T.Suction	R	°C	-50	#	105	#
Circuit 1 - dischage temperature	2417				T.Discharge	R	°C	-50	#	150	#
Circuit 1 - subcooling temperature	2418				T.Subcool	R	°C	-50	#	150	#
Circuit 1 - superheating temperature	2419				T.Superheat	R	°C	-50	#	150	#
Circuit 1 - compressor 1 configuration	2421			Circ.1 Comp.1	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 1 - compressor 1 status	2422				Status	R	###	0	#	46	#
Circuit 1 - compressor 1 input status	2423				State ID	R	###	0	0	1	0=Off,

											1=On‹.
Circuit 1 - compressor 1 output status	2424				Output	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1 - compressor 1 MSB hour counter	2425				Hour H	R	h	0	#	999	#
Circuit 1 - compressor 1 LSB hour counter	2426				Hour L	R	h	0	#	999	#
Circuit 1 - compressor 1 MSB starter counter	2427				Start H	R	###	0	#	999	#
Circuit 1 - compressor 1 LSB starter counter	2428				Start L	R	###	0	#	999	#
Circuit 1 - compressor 2 configuration	2431		Compressor	Circ.1 Comp.2	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 1 - compressor 2 status	2432				Status	R	###	0	#	46	#
Circuit 1 - compressor 2 input status	2433				State ID	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1 - compressor 2 output status	2434				Output	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1 - compressor 2 MSB hour counter	2435				Hour H	R	h	0	#	999	#
Circuit 1 - compressor 2 LSB hour counter	2436				Hour L	R	h	0	#	999	#
Circuit 1 - compressor 2 MSB starter counter	2437				Start H	R	###	0	#	999	#
Circuit 1 - compressor 2 LSB starter counter	2438				Start L	R	###	0	#	999	#
Circuit 1 - compressor 3 configuration	2441			Circ.1 Comp.3	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 1 - compressor 3 status	2442				Status	R	###	0	#	46	#
Circuit 1 - compressor 3 input status	2443				State ID	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1 - compressor 3 output status	2444				Output	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1 - compressor 3 MSB hour counter	2445				Hour H	R	h	0	#	999	#
Circuit 1 - compressor 3 LSB hour counter	2446				Hour L	R	h	0	#	999	#
Circuit 1 - compressor 3 MSB starter counter	2447				Start H	R	###	0	#	999	#
Circuit 1 - compressor 3 LSB starter counter	2448				Start L	R	###	0	#	999	#
Circuit 2 - condensing pressure	2451		Compressor	Circuit 2	P.HP	R	Bar	-1	#	45	#
Circuit 2 - condensing temperature	2452				T.HP	R	°C	-50	#	105	#
Circuit 2 - liquid temperature	2453				T.Liquid	R	°C	-50	#	105	#
Circuit 2 - evaporating pressure	2454				P.LP	R	Bar	-1	#	20	#
Circuit 2 - evaporating temperature	2455				T.LP	R	°C	-50	#	105	#
Circuit 2 - suction temperature	2456				T.Suction	R	°C	-50	#	105	#
Circuit 2 - dischage temperature	2457				T.Discharge	R	°C	-50	#	150	#
Circuit 2 - subcooling temperature	2458				T.Subcool	R	°C	-50	#	150	#
Circuit 2 - superheating temperature	2459				T.Superheat	R	°C	-50	#	150	#
Circuit 2 - compressor 1 configuration	2461	User		Circ.2 Comp.1	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 2 - compressor 1 status	2462				Status	R	###	0	#	46	#
Circuit 2 - compressor 1 input status	2463				State ID	R	###	0	0	1	0=Off, 1=On‹.

Circuit 2 - compressor 1 output status	2464				Output	R	###	0	0	1	0=Off, 1=On‹.
Circuit 2 - compressor 1 MSB hour counter	2465				Hour H	R	h	0	#	999	#
Circuit 2 - compressor 1 LSB hour counter	2466				Hour L	R	h	0	#	999	#
Circuit 2 - compressor 1 MSB starter counter	2467				Start H	R	###	0	#	999	#
Circuit 2 - compressor 1 LSB starter counter	2468				Start L	R	###	0	#	999	#
Circuit 2 - compressor 2 configuration	2471		Compressor	Circ.2 Comp.2	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 2 - compressor 2 status	2472				Status	R	###	0	#	46	#
Circuit 2 - compressor 2 input status	2473				State ID	R	###	0	0	1	0=Off, 1=On‹.
Circuit 2 - compressor 2 output status	2474				Output	R	###	0	0	1	0=Off, 1=On‹.
Circuit 2 - compressor 2 MSB hour counter	2475				Hour H	R	h	0	#	999	#
Circuit 2 - compressor 2 LSB hour counter	2476				Hour L	R	h	0	#	999	#
Circuit 2 - compressor 2 MSB starter counter	2477				Start H	R	###	0	#	999	#
Circuit 2 - compressor 2 LSB starter counter	2478				Start L	R	###	0	#	999	#
Circuit 2 - compressor 3 configuration	2481			Circ.2 Comp.3	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 2 - compressor 3 status	2482				Status	R	###	0	#	46	#
Circuit 2 - compressor 3 input status	2483				State ID	R	###	0	0	1	0=Off, 1=On‹.
Circuit 2 - compressor 3 output status	2484				Output	R	###	0	0	1	0=Off, 1=On‹.
Circuit 2 - compressor 3 MSB hour counter	2485				Hour H	R	h	0	#	999	#
Circuit 2 - compressor 3 LSB hour counter	2486				Hour L	R	h	0	#	999	#
Circuit 2 - compressor 3 MSB starter counter	2487				Start H	R	###	0	#	999	#
Circuit 2 - compressor 3 LSB starter counter	2488				Start L	R	###	0	#	999	#
Circuit 1 - high pressure switch input status	2491		Compressor	Other	HP ID C1	R	###	0	0	1	0=Off, 1=On‹.
Circuit 2 - high pressure switch input status	2492				HP ID C2	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1 - reversing valve status (4 ways valve)	2493				R.Valve C1	R	###	0	0	1	0=Off, 1=On‹.
Circuit 2 - reversing valve status (4 ways valve)	2494				R.Valve C2	R	###	0	0	1	0=Off, 1=On‹.
Electrical heater input status (compressor crankase + antifreeze heaters)	2495				Heater	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1 - condenser configuration	2511		Condenser	Circuit 1	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 1 - condenser status	2512				Status	R	###	0	#	46	#
Circuit 1 - condenser input status	2513				State ID	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1 - condensing temperature	2514				Condensing	R	°C	-50	#	105	#
Circuit 1 - condensing temperature setpoint	2515				Setpoint	R	°C	20	#	45	#
Circuit 1 - condenser capacity demand	2516				Capacity	R	%	0	#	100	#

Circuit 1 - condenser fan low speed status	2517				Speed Low	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1 - condenser fan high speed status	2518				Speed High	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1 - condenser fan inverter alarm code	2519				Alarm	R	###	0	#	84	#
Circuit 2 - condenser configuration	2521			Circuit 2	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 2 - condenser status	2522				Status	R	###	0	#	46	#
Circuit 2 - condenser input status	2523				State ID	R	###	0	0	1	0=Off, 1=On‹.
Circuit 2 - condensing temperature	2524				Condensing	R	°C	-50	#	105	#
Circuit 2 - condensing temperature setpoint	2525				Setpoint	R	°C	20	#	45	#
Circuit 2 - condenser capacity demand	2526				Capacity	R	%	0	#	100	#
Circuit 2 - condenser fan low speed status	2527				Speed Low	R	###	0	0	1	0=Off, 1=On‹.
Circuit 2 - condenser fan high speed status	2528				Speed High	R	###	0	0	1	0=Off, 1=On‹.
Circuit 2 - condenser fan inverter alarm code	2529				Alarm	R	###	0	#	84	#
Circuit 1/2 - condenser configuration	2531		Condenser	Circuit 1/2	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 1/2 - condenser status	2532				Status	R	###	0	#	46	#
Circuit 1/2 - condenser input status	2533				State ID	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1/2 - condenser capacity demand	2534				Capacity	R	%	0	#	100	#
Circuit 1/2 - condenser fan inverter alarm code	2535				Alarm	R	###	0	#	84	#
Condenser fan mode setpoint	2541			Fan	Mode	R/W/Z	###	0	0	6	0=Auto=, 1=AQuiet=, 2=Quiet=, 3=Reserved, 4=Auto%, 5=AQuiet%, 6=Quiet%.
Condenser fan noise setpoint	2542				Noise	R/W/Z	dBa	0	#	100	#
Circuit 1 - condenser water inlet temperature	2551	User	Condenser	Water	Inlet C1	R	°C	-50	#	105	#
Circuit 1 - condenser water outet temperature	2552				Outlet C1	R	°C	-50	#	105	#
Circuit 2 - condenser water inlet temperature	2553				Inlet C2	R	°C	-50	#	105	#
Circuit 2 - condenser water outet temperature	2554				Outlet C2	R	°C	-50	#	105	#
Circuit 1 - electronic expansion valve configuration	2611		Expansion Valve	Circuit 1	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 1 - electronic expansion valve status	2612				Status	R	###	0	#	46	#
Circuit 1 - evaporating pressure	2613				Saturated	R	Bar	-1	#	20	#
Circuit 1 - evaporating temperature	2614				Saturated	R	°C	-99,9	#	35	#
Circuit 1 - suction temperature	2615				Suction	R	°C	-50	#	105	#
Circuit 1 - superheating temperature	2616				Superheat	R	°C	-50	#	105	#
Circuit 1 - actual superheating setpoint	2617				Setpoint	R	°C	5	#	15	#

Circuit 1 - valve opening pourcentage	2618				Capacity	R	%	0	#	100	#
Circuit 1 - valve position step	2619				Step	R	Step	0	#	480	#
Circuit 2 - electronic expansion valve configuration	2621			Circuit 2	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 2 - electronic expansion valve status	2622				Status	R	###	0	#	46	#
Circuit 2 - evaporating pressure	2623				Saturated	R	Bar	-1	#	20	#
Circuit 2 - evaporating temperature	2624				Saturated	R	°C	-99,9	#	35	#
Circuit 2 - suction temperature	2625				Suction	R	°C	-50	#	105	#
Circuit 2 - superheating temperature	2626				Superheat	R	°C	-50	#	105	#
Circuit 2 - actual superheating setpoint	2627				Setpoint	R	°C	5	#	15	#
Circuit 2 - valve opening pourcentage	2628				Capacity	R	%	0	#	100	#
Circuit 2 - valve position step	2629				Step	R	Step	0	#	480	#
Freecooling configuration	2711		Option	Freecooling	Config	R	###	0	0	1	0=No, 1=Yes.
Freecooling status	2712				Status	R	###	0	#	46	#
Freecooling water inlet temperature (reference)	2713				Inlet	R	°C	-50	#	105	#
Freecooling water flow switch status	2714				Flow ID	R	###	0	0	1	0=Off, 1=On‹.
Freecooling pump input status	2715				Pump ID	R	###	0	0	1	0=Off, 1=On‹.
Freecooling fan input status	2716				Fan ID	R	###	0	0	1	0=Off, 1=On‹.
Freecooling pump output status	2717				Pump OD	R	###	0	0	1	0=Off, 1=On‹.
Freecooling fan output status	2718				Fan OD	R	###	0	0	1	0=Off, 1=On‹.
Freecooling valve demand	2719				Capacity	R	%	0	#	100	#
Electrical auxiliary heater configuration	2721			Auxiliary Heater	Config	R	###	0	0	1	0=No, 1=Yes.
Electrical auxiliary heater status	2722				Status	R	###	0	#	46	#
Electrical auxiliary heater input status	2723				State ID	R	###	0	0	1	0=Off, 1=On‹.
Electrical auxiliary heater capacity demand	2724				Capacity	R	%	0	#	100	#
Electrical auxiliary heater PWM signal	2725				Signal PWM	R	###	0	#	100	#
Electrical auxiliary heater MSB hour counter	2726				Hour H	R	h	0	#	999	#
Electrical auxiliary heater LSB hour counter	2727				Hour L	R	h	0	#	999	#
Electrical antifreeze heater configuration	2731	User	Option	Antifreeze Heater	Config	R	###	0	0	1	0=No, 1=Yes.
Electrical antifreeze heater status	2732				Status	R	###	0	#	46	#
Electrical antifreeze heater input status	2733				State ID	R	###	0	0	1	0=Off, 1=On‹.
Electrical antifreeze heater capacity demand	2734				Capacity	R	%	0	0	100	#
Electrical antifreeze heater MSB hour counter	2735				Hour H	R	h	0	#	999	#
Electrical antifreeze heater LSB hour counter	2736				Hour L	R	h	0	#	999	#

Total heat recovery configuration	2741				Heat Recovery	Config	R	###	0	0	1	0=No, 1=Yes.
Total heat recovery status	2742					Status	R	###	0	#	46	#
Total heat recovery remote on/off status	2743					On/Off	R	###	0	0	1	0=Off, 1=On‹.
Total heat recovery water flow switch status	2744					Flow ID	R	###	0	0	1	0=Off, 1=On‹.
Total heat recovery water inlet temperature	2745					Inlet	R	°C	-50	#	105	#
Total heat recovery water outlet temperature	2746					Outlet	R	°C	-50	#	105	#
Total heat recovery water capacity demand	2747					Capacity	R	%	0	#	100	#
Total heat recovery pump output status	2748					Pump	R	###	0	0	1	0=Off, 1=On‹.
Energy meter configuration	2751		Option		Energy Meter	Config	R	###	0	0	1	0=No, 1=Yes.
Energy meter input status	2752					State ID	R	###	0	0	1	0=Off, 1=On‹.
Energy meter total current	2753					Current	R	A	0	#	9999	#
Energy meter total active power	2754					Power	R	kW	0	#	9999	#
Energy meter power factor (x100)	2755					Pw.Fact.#100	R	###	-2	#	1	#
Energy meter active energy Bits 63-48	2756					Energy W4	R	kWh	-32768	#	32767	#
Energy meter active energy Bits 47-32	2757					Energy W3	R	kWh	-32768	#	32767	#
Energy meter active energy Bits 31-16	2758					Energy W2	R	kWh	-32768	#	32767	#
Energy meter active energy Bits 15-0	2759					Energy W1	R	kWh	-32768	#	32767	#
Power factor correction configuration	2761				Pw.Fact.Correct	Config	R	###	0	0	1	0=No, 1=Yes.
Power factor correction status	2762					Status	R	###	0	#	46	#
Power factor correction input status	2763					State ID	R	###	0	0	1	0=Off, 1=On‹.
Phase controller configuration	2771		Option		Phase controller	Config	R	###	0	0	1	0=No, 1=Yes.
Phase controller status	2772					Status	R	###	0	#	46	#
Phase controller input status	2773					State ID	R	###	0	0	1	0=Off, 1=On‹.
Evaporator water flow meter configuration	2781				Flow meter	Config	R	###	0	0	1	0=No, 1=Yes.
Evaporator water flow meter status	2782					Status	R	###	0	#	46	#
Evaporator water flow meter value	2783					Flow	R	m3/h	0	#	100	#
Remote display DC configuration	2791		Option		DC Remote	Config	R	###	0	0	1	0=No, 1=Yes.
Remote display DC water cooling setpoint saved	2792					Water cool	R	°C	5	#	20	#
Remote display DC water heating setpoint saved	2793					Water heat	R	°C	20	#	50	#
Remote display DC changeover setpoint saved	2794					Changeover	R	###	1	#	3	1=Cooling, 2=Heating, 3=Auto.
Master/slave configuration	2811		Link		Master/Slave	Config	R	###	0	0	1	0=No, 1=Yes.

Master/slave status	2812				Status	R	###	0	#	46	#
Master/slave unit adress	2813				Address	R	###	1	#	8	#
Outside air temperature (reference)	2814				Outside	R	°C	-50	#	105	#
Evaporator water inlet temperature (reference)	2815				Inlet	R	°C	-50	#	105	#
Evaporator water outlet temperature (reference)	2816				Outlet	R	°C	-50	#	105	#
Master/slave unit number priority	2817				Priority	R	###	1	#	8	#
Master/slave unit number in backup	2818				Standby	R	###	1	#	8	#
Master/slave unit number starting	2819				Next	R	###	1	#	8	#
BMS evaporator water set point temperature (BMS)	2821	User		BMS	Water Set	R/W	°C	-50	#	105	#
BMS outside air temperature (BMS)	2822				Outside	R/W	°C	-50	#	105	#
BMS evaporator water inlet temperature (BMS)	2823				Inlet	R/W	°C	-50	#	105	#
BMS evaporator water outlet temperature (BMS)	2824				Outlet	R/W	°C	-50	#	105	#
BMS enable the BMS mode setpoint (watchdog)	2825				Watchdog	R/W	###	0	#	32000	#
BMS network adress setpoint	2826				Address	R/W	###	1	#	199	#
BMS network protocol setpoint	2827				Protocol	R/W	###	0	9	9	0=AdaLink, 1=LnxVision, 2=ModBus, 3=LonWorks, 4=Trend, 5=Carel, 6=BACnetMS/TP, 7=BACnetIP, 8=Konnex, 9=Cloud.
BMS network bauderate setpoint	2828				Bauderate	R/W	###	0	#	4	0=1200, 1=2400, 2=4800, 3=9600, 4=19200.
BMS network MODBUS RTU format setpoint	2829				Format	R/W	###	0	0	5	0=8-NONE-2, 1=8-NONE-1, 2=8-EVEN-2, 3=8-EVEN-1, 4=8-ODD-2, 5=8-ODD-1.
Unit total MSB hour counter	2911	User	Other	Unit	Hour H Total	R	h	0	#	999	#
Unit total LSB hour counter	2912				Hour L Total	R	h	0	#	999	#
Unit MSB hour counter in cooling	2913				Hour H Cool	R	h	0	#	999	#
Unit LSB hour counter in cooling	2914				Hour L Cool	R	h	0	#	999	#
Unit MSB hour counter in heating	2915				Hour H Heat	R	h	0	#	999	#
Unit LSB hour counter in heating	2916				Hour L Heat	R	h	0	#	999	#
General On/Off setpoint	3111	Expert	Unit	General	On/Off	R/W	###	0	0	1	0=Off, 1=On‹.
Remote On/Off status	3112				On/Off ID	R	###	0	0	1	0=Off, 1=On‹.

Enable unit setpoint	3113				On/Off Mode	R/W/Z	###	0	1	1	0=Off, 1=On‹.
Test function setpoint	3114				Test	R/W	###	0	0	42	0=No, 1=Quickly, 2=Wizard, 3=Runtest, 4=C1.Cp.1.Cool, 5=C1.Cp.2.Cool, 6=C1.Cp.3.Cool, 7=C2.Cp.1.Cool, 8=C2.Cp.2.Cool, 9=C2.Cp.3.Cool, 10=C1.Cp.1.Heat, 11=C1.Cp.2.Heat, 12=C1.Cp.3.Heat, 13=C2.Cp.1.Heat, 14=C2.Cp.2.Heat, 15=C2.Cp.3.Heat, 16=C1.Cool, 17=C2.Cool, 18=C1&C2.Cool, 19=C1.Heat, 20=C2.Heat, 21=C1&C2.Heat, 22=Evap.Pump.1, 23=Evap.Pump.2, 24=Cond.Pump.1, 25=Cond.Pump.2, 26=C1.Fan.LS, 27=C1.Fan.HS, 28=C2.Fan.LS, 29=C2.Fan.HS, 30=C1.Fan.100%, 31=C2.Fan.100%, 32=C1/2.Fan.100%, 33=HPCut-OffC1, 34=HPCut-OffC2, 35=DefrostC1, 36=DefrostC2, 37=Freecooling, 38=AuxiliaryHeater, 39=AntifreezeHeater, 40=HeatRecoveryC1, 41=HeatRecoveryC2, 42=HeatRecoveryC1&C2.
Alarm reset setpoint	3115				Reset Alarm	R/W	###	0	0	1	#
Alarm clear setpoint	3116				Clear Alarm	R/W	###	0	0	1	0=No, 1=Yes.
Global hour counter reset setpoint	3117				Clear Count	R/W	###	0	0	1	0=No, 1=Yes.
General unit status	3118				Status	R	###	0	#	46	#
Unit range configuration setpoint	3121			Configuration	Range	R/W	###	0	0	2	0=No, 1=GACSTD,

											2=GAHSTD.
Unit size configuration setpoint	3122				Size	R/W	###	0	0	38	#
Terminal display configuration setpoint	3123				Display	R/W	###	0	0	3	0=No, 1=DC,..,.., 2=..,DM,.., 3=DC,DM,...
Evaporator glycol rate configuration setpoint	3124				Glycol	R/W	%	0	0	50	#
Restore setpoint to default settings	3125				Restore	R/W	###	0	0	6	0=No, 1=DC+BMS, 2=Schedule, 3=Factory, 4=Reboot, 5=Save, 6=Backup.
BM-NO1 output configuration setpoint	3131		Unit	Custom Output (DO)	BM-NO1	R/W	###	0	1	32	#
BE-NO1 output configuration setpoint	3132				BE.1-NO1	R/W	###	0	0	38	0=No, 1=Fault, 2=Alarm, 3=AlarmC1, 4=AlarmC2, 5=AlarmCond, 6=AlarmPumpEvap, 7=AlarmFlowEvap, 8=Enable, 9=Available, 10=Comp.On, 11=Comp.100%, 12=CoolingMode, 13=HeatingMode, 14=DeadZone, 15=ZoneZ0, 16=ZoneZ1, 17=ZoneZ2, 18=ZoneZ3, 19=ZoneZ4, 20=ZoneZ5, 21=ZoneZ6, 22=DayII, 23=DayI, 24=Day, 25=Night, 26=BMS, 27=Defrosting, 28=BMSBM.NO1, 29=BMSBE.NO1, 30=BMSBE.NO2, 31=BMSBE.NO3, 32=BMSBE.NO4, 33=BMSBE.NO5, 34=BMSBE.NO6, 35=*, 36=*,

											37=*, 38=*.
BE-NO2 output configuration setpoint	3133				BE.1-NO2	R/W	###	0	0	38	#
BE-NO3 output configuration setpoint	3134				BE.1-NO3	R/W	###	0	0	38	#
BE-NO4 output configuration setpoint	3135				BE.1-NO4	R/W	###	0	0	38	#
BE-NO5 output configuration setpoint	3136				BE.1-NO5	R/W	###	0	0	38	#
BE-NO6 output configuration setpoint	3137				BE.1-NO6	R/W	###	0	0	38	#
BM-DI3 input configuration setpoint	3141			Custom Input (AI-DI)	BM-DI3	R/W	###	0	1	29	0=No, 1=EvapSp, 2=THRSp, 3=OffsetEvapSp, 4=OffsetTHRSp, 5=FreeNTC1, 6=FreeNTC2, 7=FreeNTC3, 8=FreeNTC4, 9=Reserved, 10=On/Off, 11=ResetAlarm, 12=EvapSpN°2, 13=THRSpN°2, 14=Auto/Cool, 15=Auto/Heat, 16=Cool/Heat, 17=Heat/Cool, 18=DeadZone, 19=DelayDefrost, 20=DisableC1, 21=DisableC2, 22=DisableC1Cp1, 23=DisableC1Cp2, 24=DisableC1Cp3, 25=DisableC2Cp1, 26=DisableC2Cp2, 27=DisableC2Cp3, 28=DayII, 29=DayI.
BM-DI4 input configuration setpoint	3142				BM-DI4	R/W	###	0	0	29	#
BE-U1 input configuration setpoint	3143				BE.1-U1	R/W	###	0	0	49	#
BE-U2 input configuration setpoint	3144				BE.1-U2	R/W	###	0	0	49	#
BE-U3 input configuration setpoint	3145				BE.1-U3	R/W	###	0	0	49	#
BE-U4 input configuration setpoint	3146				BE.1-U4	R/W	###	0	0	49	#
BE-U5 input configuration setpoint	3147				BE.1-U5	R/W	###	0	0	49	#
BE-U6 input configuration setpoint	3148				BE.1-U6	R/W	###	0	0	49	#
BE-U7 input configuration setpoint	3149				BE.1-U7	R/W	###	0	0	49	#
BE-U8 input configuration setpoint	3151		Unit	Custom Input (DI-AI)	BE.1-U8	R/W	###	0	0	49	#
BE-U9 input configuration setpoint	3152				BE.1-U9	R/W	###	0	0	49	#

BE-U10 input configuration setpoint	3153				BE.1-U10	R/W	###	0	0	49	#
Evaportor pump type configuration setpoint	3161			Option	Pump Evap.	R/W	###	0	0	7	0=No, 1=1,.=, 2=1,.%, 3=1,.%+V2V, 4=Reserved, 5=1,2=, 6=1,2%, 7=1,2%+V2V.
Condenser pump type configuration setpoint	3162				Pump Cond.	R/W	###	0	0	7	0=No, 1=1,.=, 2=1,.%, 3=1,.%+V2V, 4=Reserved, 5=1,2=, 6=1,2%, 7=1,2%+V2V.
Electronic expansion valve configuration setpoint	3163				EEV	R/W	###	0	0	1	0=No, 1=Yes.
Condenser fan modulating configuration setpoint	3164				Fan %	R/W	###	0	0	1	0=No, 1=Yes.
Freecooling configuration setpoint	3165				Freecooling	R/W	###	0	0	1	0=No, 1=Yes.
Antifreeze electrical heater configuration setpoint	3166				Antifreeze H	R/W	###	0	0	1	0=No, 1=Yes.
Auxiliary electrical heater configuration setpoint	3167				Auxiliary H	R/W	###	0	0	1	0=No, 1=Yes.
Total heat recovery configuration setpoint	3168				Heat Recov	R/W	###	0	0	1	0=No, 1=Yes.
Compressor soft starter configuration setpoint	3169				Soft Starter	R/W	###	0	0	1	0=No, 1=Yes.
Power factor correction configuration setpoint	3171		Unit	Option (next)	Power Fact	R/W	###	0	0	1	0=No, 1=Yes.
Energy meter configuration setpoint	3172				Energy Meter	R/W	###	0	0	1	0=No, 1=Yes.
Phase controller configuration setpoint	3173				Phase Ctrl	R/W	###	0	0	1	0=No, 1=Yes.
Evaporator flow meter configuration setpoint	3174				Flow meter	R/W	###	0	0	1	0=No, 1=Yes.
Circuit leak detection configuration setpoint	3175				Leak Detect.	R/W	###	0	0	1	0=No, 1=Yes.
Weekly rotation day setpoint	3181			Weekly Rotation	Day	R/W	###	1	2	7	1=Monday, 2=Tuesday, 3=Wednesday, 4=Thursday, 5=Friday, 6=Saturday, 7=Sunday.
Weekly rotation hour setpoint	3182				Hour	R/W	h	0	2	24	#
Reserved	3191	Expert	Unit	Eur	Test	R/W	###	0	0	12	#
Evaporator water inlet temperature (probe)	3211		Water	Temperature	Inlet	R	°C	-50	#	105	#

Evaporator water inlet temperature (reference)	3212				Inlet Ref.	R	°C	-50	#	105	#
Evaporator water outlet temperature (probe)	3213				Outlet	R	°C	-50	#	105	#
Evaporator water outlet temperature (reference)	3214				Outlet Ref.	R	°C	-50	#	105	#
Evaporator water delta T°	3215				Delta Tß	R	°C	0	#	105	#
Evaporator actual water setpoint	3216				Setpoint	R	°C	-10	#	50	#
Evaporator water capacity demand	3217				Capacity	R	%	0	#	100	#
Evaporator water flow switch status	3218				Flow ID	R	###	0	0	1	0=Off, 1=On‹.
Changeover actual mode	3221			Changeover	Status	R	###	1	1	4	1=Cooling, 2=Heating, 3=Auto, 4=DeadZone.
Outside air temperature (probe)	3222				Outside	R	°C	-50	#	105	#
Outside air temperature (reference)	3223				Outside Ref.	R	°C	-50	#	105	#
Changeover mode setpoint (cool / heat)	3224				Mode	R/W/Z	###	0	3	4	0=No, 1=Cooling, 2=Heating, 3=Auto, 4=DeadZone.
Changeover temperature setpoint in winter (auto mode)	3225				TßWinter	R/W	°C	-10	18	30	#
Changeover temperature setpoint in summer (auto mode)	3226				TßSummer	R/W	°C	19	23	30	#
Evaporator status	3231		Water	Cooling	Status	R	###	0	#	46	#
Evaporator water inlet temperature (reference)	3232				Inlet	R	°C	-50	#	105	#
Evaporator water outlet temperature (reference)	3233				Outlet	R	°C	-50	#	105	#
Evaporator actual water setpoint	3234				Setpoint	R	°C	-10	#	50	#
Evaporator water outlet capacity demand	3235				Capacity	R	%	0	#	100	#
Evaporator dynamic cooling setpoint - outside air T°1	3236				Air Set 1	R/W/Z	°C	-11	22	50	#
Evaporator dynamic cooling setpoint - outside air T°2	3237				Air Set 2	R/W/Z	°C	-11	30	50	#
Evaporator dynamic cooling setpoint - water T°1	3238				Water Set 1	R/W/Z	°C	19	7	20	#
Evaporator dynamic cooling setpoint - water T°2	3239				Water Set 2	R/W/Z	°C	19	7	20	#
Evaporator status	3241			Heating	Status	R	###	0	#	46	#
Evaporator water inlet temperature (reference)	3242				Inlet	R	°C	-50	#	105	#
Evaporator water outlet temperature (reference)	3243				Outlet	R	°C	-50	#	105	#
Evaporator actual water setpoint	3244				Setpoint	R	°C	-10	#	50	#
Evaporator water outlet capacity demand	3245				Capacity	R	%	0	#	100	#
Evaporator dynamic heating setpoint - outside air T°1	3246				Air Set 1	R/W/Z	°C	-11	1	50	#
Evaporator dynamic heating setpoint - outside air T°2	3247				Air Set 2	R/W/Z	°C	-11	19	50	#
Evaporator dynamic heating setpoint - water T°1	3248				Water Set 1	R/W/Z	°C	40	45	50	#
Evaporator dynamic heating setpoint - water T°2	3249				Water Set 2	R/W/Z	°C	40	45	50	#
Evaporator remote water setpoint signal	3251		Water	Custom	Signal4/20mA	R	###	4	#	20	#
Evaporator remote water setpoint offset signal	3252				Offset +/-1K	R	###	-1	#	1	#

Evaporator remote water 2nd setpoint status	3253				ID Nß2	R	###	0	0	1	0=Open, 1=Closed.
Evaporator water cooling deltaT° setpoint	3261			Control	Cool dT	R/W	°C	1	5	20	#
Evaporator water heating deltaT° setpoint	3262				Heat dT	R/W	°C	1	5	20	#
Evaporator water PID reactivity setpoint	3263				Reactivity	R/W	s	1	15	120	#
Evaporator water PID Kp setpoint	3264				PID Kp	R/W	###	1	50	100	#
Evaporator water PID Ki setpoint	3265				PID Ki	R/W	###	1	30	100	#
Evaporator water PID Kd setpoint	3266				PID Kd	R/W	###	1	10	100	#
Evaporator water PID mode	3267				Mode	R/W	###	1	1	2	1=Comfort, 2=Process.
Evaporator water cooling low limit temperature setpoint	3271		Water	Safety	Cool Low	R/W	°C	-12	5	55	#
Evaporator water cooling high limit temperature setpoint	3272				Cool High	R/W	°C	-12	5	55	#
Evaporator water heating low limit temperature setpoint	3273				Heat Low	R/W	°C	10	12	55	#
Evaporator water heating high limit temperature setpoint	3274				Heat High	R/W	°C	10	60	65	#
Evaporator pump 1 status	3311		Pump	Evaporator P1	Status	R	###	0	#	46	#
Evaporator pump 1 input status	3312				State ID	R	###	0	0	1	0=Off, 1=On‹.
Evaporator pump 1 output status	3313				Output	R	###	0	0	1	0=Off, 1=On‹.
Evaporator pump 1 MSB hour counter	3314				Hour H	R	h	0	#	999	#
Evaporator pump 1 LSB hour counter	3315				Hour L	R	h	0	#	999	#
Evaporator water flow switch status	3316				Flow ID	R	###	0	0	1	#
Evaporator pump inverter alarm code	3317				Alarm	R	###	0	#	84	#
Evaporator pump 2 status	3321			Evaporator P2	Status	R	###	0	#	46	#
Evaporator pump 2 input status	3322				State ID	R	###	0	0	1	0=Off, 1=On‹.
Evaporator pump 2 output status	3323				Output	R	###	0	0	1	0=Off, 1=On‹.
Evaporator pump 2 MSB hour counter	3324				Hour H	R	h	0	#	999	#
Evaporator pump 2 LSB hour counter	3325				Hour L	R	h	0	#	999	#
Evaporator water flow switch status	3326				Flow ID	R	###	0	0	1	#
Evaporator pump inverter alarm code	3327				Alarm	R	###	0	#	84	#
Evaporator water inlet temperature (probe)	3331		Pump	Evaporator Flow	T.In	R	°C	-50	#	105	#
Evaporator water outlet temperature (probe)	3332				T.Out	R	°C	-50	#	105	#
Evaporator water inlet pressure	3333				P.In	R	Bar	0	#	6	#
Evaporator water outlet pressure	3334				P.Out	R	Bar	0	#	6	#
Evaporator water delta T°	3335				Delta dT	R	°C	-50	#	105	#
Evaporator water delta pressure	3336				Delta dP	R	Bar	0	#	6	#
Evaporator water flow	3337				Flow	R	m3/h	0	#	100	#
Evaporator pump capacity demand	3338				Pump	R	%	0	#	100	#
Evaporator bypass valve capacity demand	3339				Valve	R	%	0	#	100	#

Evaporator pump enable setpoint	3341			Evaporator Control	Priority	R/W/Z	###	0	7	7	0=No, 1=Reserved, 2=P1On, 3=P1Auto, 4=P2On, 5=P2Auto, 6=P1P2On, 7=P1P2Auto.
Evaporator pump reset counter setpoint	3342				Clear Count	R/W	###	0	0	3	0=No, 1=1,.,., 2=.,2,., 3=1,2,..
Evaporator pump mode setpoint	3343				Mode	R/W	###	0	1	5	0=No, 1=Fix, 2=DeltaT, 3=DeltaP, 4=P.Out, 5=Flow.
Evaporator pump delta temperature setpoint	3344				Delta dT	R/W	°C	1	5	10	#
Evaporator pump delta pressure setpoint	3345				Delta dP	R/W	Bar	1	1	5	#
Evaporator pump outlet pressure setpoint	3346				P.Out	R/W	Bar	1	1	5	#
Evaporator pump flow setpoint	3347				Flow	R/W	m3/h	0	#	100	#
Evaporator pump minimum speed setpoint	3348				Flow Min	R/W	%	60	60	100	#
Evaporator pump maximum speed setpoint	3349				Flow Max	R/W	%	60	100	100	#
Condenser pump 1 status	3351		Pump	Condenser P1	Status	R	###	0	#	46	#
Condenser pump 1 input status	3352				State ID	R	###	0	0	1	0=Off, 1=On‹.
Condenser pump 1 output status	3353				Output	R	###	0	0	1	0=Off, 1=On‹.
Condenser pump 1 MSB hour counter	3354				Hour H	R	h	0	#	999	#
Condenser pump 1 LSB hour counter	3355				Hour L	R	h	0	#	999	#
Condenser water flow switch status	3356				Flow ID	R	###	0	0	1	0=Off, 1=On‹.
Condenser pump 2 status	3361			Condenser P2	Status	R	###	0	#	46	#
Condenser pump 2 input status	3362				State ID	R	###	0	0	1	0=Off, 1=On‹.
Condenser pump 2 output status	3363				Output	R	###	0	0	1	0=Off, 1=On‹.
Condenser pump 2 MSB hour counter	3364				Hour H	R	h	0	#	999	#
Condenser pump 2 LSB hour counter	3365				Hour L	R	h	0	#	999	#
Condenser water flow switch status	3366				Flow ID	R	###	0	0	1	0=Off, 1=On‹.
Condenser water inlet temperature (probe)	3371	Expert	Pump	Condenser Flow	T.In	R	°C	-50	#	105	#
Condenser water outlet temperature (probe)	3372				T.Out	R	°C	-50	#	105	#
Condenser water inlet pressure	3373				P.In	R	Bar	0	#	6	#
Condenser water outlet pressure	3374				P.Out	R	Bar	0	#	6	#

Condenser water delta T°	3375				Delta dT	R	°C	0	#	105	#
Condenser water delta pressure	3376				Delta dP	R	Bar	0	#	6	#
Condenser water flow	3377				Capacity	R	%	0	#	100	#
Condenser pump capacity demand	3378				Flow	R	m3/h	0	#	100	#
Condenser bypass valve capacity demand	3379				Flow ID	R	###	0	0	1	0=Off, 1=On‹.
Condenser pump enable setpoint	3381			Condenser Control	Priority	R/W/Z	###	0	7	7	#
Condenser pump reset counter setpoint	3382				Reset	R/W	###	0	0	3	0=No, 1=1,.,., 2=.,2,., 3=1,2,..
Condenser pump mode setpoint	3383				Mode	R/W	###	0	1	4	0=No, 1=Fix, 2=DeltaT, 3=DeltaP, 4=P.Out.
Condenser pump delta temperature setpoint	3384				Delta dT	R/W	°C	1	5	10	#
Condenser pump delta pressure setpoint	3385				Delta dP	R/W	Bar	1	1	5	#
Condenser pump outlet pressure setpoint	3386				P.Out	R/W	Bar	1	1	5	#
Condenser pump flow setpoint	3387				Flow	R/W	m3/h	1	10	100	#
Condenser pump minimum speed setpoint	3388				Flow Min	R/W	%	60	60	100	#
Condenser pump maximum speed setpoint	3389				Flow Max	R/W	%	60	100	100	#
Evaporator pump PID Kp setpoint	3391		Pump	Control PID	Pump PID Kp	R/W	###	1	20	50	#
Evaporator pump PID Ki setpoint	3392				Pump PID Ki	R/W	###	1	8	50	#
Evaporator pump PID Kd setpoint	3393				Pump PID Kd	R/W	###	1	1	10	#
Evaporator bypass valve PID Kp setpoint	3394				Valve PID Kp	R/W	###	1	30	50	#
Evaporator bypass valve PID Ki setpoint	3395				Valve PID Ki	R/W	###	1	8	50	#
Evaporator bypass valve PID Kd setpoint	3396				Valve PID Kd	R/W	###	1	0	10	#
Circuit 1 - condensing pressure	3411		Compressor	Circuit 1	P.HP	R	Bar	-1	#	45	#
Circuit 1 - condensing temperature	3412				T.HP	R	°C	-50	#	105	#
Circuit 1 - liquid temperature	3413				T.Liquid	R	°C	-50	#	105	#
Circuit 1 - evaporating pressure	3414				P.LP	R	Bar	-1	#	20	#
Circuit 1 - evaporating temperature	3415				T.LP	R	°C	-50	#	105	#
Circuit 1 - suction temperature	3416				T.Suction	R	°C	-50	#	105	#
Circuit 1 - dischage temperature	3417				T.Discharge	R	°C	-50	#	150	#
Circuit 1 - subcooling temperature	3418				T.Subcool	R	°C	-50	#	150	#
Circuit 1 - superheating temperature	3419				T.Superheat	R	°C	-50	#	150	#
Circuit 2 - condensing pressure	3421			Circuit 2	P.HP	R	Bar	-1	#	45	#
Circuit 2 - condensing temperature	3422				T.HP	R	°C	-50	#	105	#
Circuit 2 - liquid temperature	3423				T.Liquid	R	°C	-50	#	105	#
Circuit 2 - evaporating pressure	3424				P.LP	R	Bar	-1	#	20	#

Circuit 2 - evaporating temperature	3425				T.LP	R	°C	-50	#	105	#
Circuit 2 - suction temperature	3426				T.Suction	R	°C	-50	#	105	#
Circuit 2 - dischage temperature	3427				T.Discharge	R	°C	-50	#	150	#
Circuit 2 - subcooling temperature	3428				T.Subcool	R	°C	-50	#	150	#
Circuit 2 - superheating temperature	3429				T.Superheat	R	°C	-50	#	150	#
Circuit 1 - compressor enable setpoint	3431		Compressor	Enable	Enable C1	R/W/Z	###	0	7	7	0=No, 1=1,.,., 2=.,2,., 3=1,2,., 4=.,.,3, 5=1,.,3, 6=.,2,3, 7=1,2,3.
Circuit 2 - compressor enable setpoint	3432				Enable C2	R/W/Z	###	0	7	7	0=No, 1=1,.,., 2=.,2,., 3=1,2,., 4=.,.,3, 5=1,.,3, 6=.,2,3, 7=1,2,3.
Circuit 1 - compressor reset counter setpoint (hour + starter)	3433				Clear C1	R/W	###	0	7	7	0=No, 1=1,.,., 2=.,2,., 3=1,2,., 4=.,.,3, 5=1,.,3, 6=.,2,3, 7=1,2,3.
Circuit 2 - compressor reset counter setpoint (hour + starter)	3434				Clear C2	R/W	###	0	7	7	0=No, 1=1,.,., 2=.,2,., 3=1,2,., 4=.,.,3, 5=1,.,3, 6=.,2,3, 7=1,2,3.
Circuit priority setpoint	3435				Priority	R/W	###	0	3	3	#
Compressor starting delay setpoint (comp. <> EEV)	3436				Delay	R/W	s	1	10	300	#
Low evaporating temperature setpoint (Evaporator antifreeze)	3441			Safety	Saturation	R/W	°C	-12	-3	5	#
High condensing temperature setpoint	3442				Unloading	R/W	°C	50	63	65	#
High discharge temperature setpoint	3443				Discharge	R/W	°C	90	120	150	#
Electrical heater input status (compressor crankase + antifreeze heaters)	3444				Heater	R	###	0	0	1	#
Circuit 1 - compressor map zone	3451		Compressor	Advanced C1	Zone	R	###	0	#	9	#
Circuit 1 - low operating pressure value (LOP)	3452				LOP	R	°C	-50	#	150	#
Circuit 1 - most operating pressure value (MOP)	3453				MOP	R	°C	-50	#	150	#
Circuit 1 - low evaporating temperature value (antifreeze)	3454				Antifreeze	R	°C	-27	#	-3	#

Circuit 1 - compressor map zone when alarm 119 trip	3455				Alarm zone	R	###	0	#	9	#
Circuit 1 - compressor low pressure when alarm 119 trip	3456				Alarm LP	R	°C	-50	#	105	#
Circuit 1 - compressor high pressure when alarm 119 trip	3457				Alarm HP	R	°C	-50	#	105	#
Circuit 2 - compressor map zone	3461	Expert		Advanced C2	Zone	R	###	0	#	9	#
Circuit 2 - low operating pressure value (LOP)	3462				LOP	R	°C	-50	#	150	#
Circuit 2 - most operating pressure value (MOP)	3463				MOP	R	°C	-50	#	150	#
Circuit 2 - low evaporating temperature value	3464				Antifreeze	R	°C	-27	#	-3	#
Circuit 2 - compressor map zone when alarm 219 trip	3465				Alarm zone	R	###	0	#	9	#
Circuit 2 - compressor low pressure when alarm 219 trip	3466				Alarm LP	R	°C	-50	#	105	#
Circuit 2 - compressor high pressure when alarm 219 trip	3467				Alarm HP	R	°C	-50	#	105	#
Circuit 1 - condenser configuration	3511		Condenser	Circuit 1	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 1 - condenser status	3512				Status	R	###	0	#	46	#
Circuit 1 - condenser input status	3513				State ID	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1 - condensing temperature	3514				Condensing	R	°C	-50	#	105	#
Circuit 1 - condensing temperature setpoint	3515				Setpoint	R	°C	20	#	45	#
Circuit 1 - condenser capacity demand	3516				Capacity	R	%	0	#	100	#
Circuit 1 - condenser fan low speed status	3517				Speed Low	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1 - condenser fan high speed status	3518				Speed High	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1 - condenser fan inverter alarm code	3519				Alarm	R	###	0	#	84	#
Circuit 2 - condenser configuration	3521			Circuit 2	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 2 - condenser status	3522				Status	R	###	0	#	46	#
Circuit 2 - condenser input status	3523				State ID	R	###	0	0	1	0=Off, 1=On‹.
Circuit 2 - condensing temperature	3524				Condensing	R	°C	-50	#	105	#
Circuit 2 - condensing temperature setpoint	3525				Setpoint	R	°C	20	#	45	#
Circuit 2 - condenser capacity demand	3526				Capacity	R	%	0	#	100	#
Circuit 2 - condenser fan low speed status	3527				Speed Low	R	###	0	0	1	0=Off, 1=On‹.
Circuit 2 - condenser fan high speed status	3528				Speed High	R	###	0	0	1	0=Off, 1=On‹.
Circuit 2 - condenser fan inverter alarm code	3529				Alarm	R	###	0	#	84	#
Circuit 1/2 - condenser configuration	3531		Condenser	Circuit 1/2	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 1/2 - condenser status	3532				Status	R	###	0	#	46	#
Circuit 1/2 - condenser input status	3533				State ID	R	###	0	0	1	0=Off, 1=On‹.
Circuit 1/2 - condenser capacity demand	3534				Capacity	R	%	0	#	100	#
Circuit 1/2 - condenser fan inverter alarm code	3535				Alarm	R	###	0	#	84	#

Condenser fan mode setpoint	3541			Fan	Mode	R/W/Z	###	0	0	6	0=Auto=, 1=AQuiet=, 2=Quiet=, 3=Reserved, 4=Auto%, 5=AQuiet%, 6=Quiet%.
Condenser fan noise setpoint	3542				Noise	R/W/Z	dBa	0	#	100	#
Condensing temperature setpoint	3543				Setpoint	R/W	°C	25	40	45	#
Condensing temperature fan low speed ON setpoint	3544				Speed L.On	R/W	°C	25	32	45	#
Condensing temperature fan low speed OFF setpoint	3545				Speed L.Off	R/W	°C	10	22	35	#
Condensing temperature fan high speed ON setpoint	3546				Speed H.On	R/W	°C	30	40	55	#
Condensing temperature fan high speed OFF setpoint	3547				Speed H.Off	R/W	°C	20	30	50	#
Circuit 1 - condenser water inlet temperature	3551	Expert	Condenser	Water	Inlet C1	R	°C	-50	#	105	#
Circuit 1 - condenser water outet temperature	3552				Outlet C1	R	°C	-50	#	105	#
Circuit 2 - condenser water inlet temperature	3553				Inlet C2	R	°C	-50	#	105	#
Circuit 2 - condenser water outet temperature	3554				Outlet C2	R	°C	-50	#	105	#
Outside air temperature setpoint to enable defrost	3561			Defrost	Outside	R/W	°C	8	16	20	#
Evaporating temperature setpoint to enable defrosting	3562				Saturation	R/W	°C	-15	-10	-5	#
Minimum time bettween two defrosting setpoint	3563				Frequency	R/W	min	10	45	90	#
Defrost rate setpoint	3564				Ratio	R/W	###	1,2	1,4	1,6	#
Defrosting temperature fan ON setpoint	3565				Fan ON	R/W	°C	55	58	60	#
Defrosting temperature fan OFF setpoint	3566				Fan OFF	R/W	°C	35	45	50	#
Defrosting number fan start setpoint	3567				Fan NB	R/W	###	1	3	6	#
Maximum defrosting time setpoint	3568				Timeout	R/W	s	120	360	900	#
Evaporating temperature setpoint to force defrosting	3569				Limit	R/W	°C	-25	-20	-10	#
Water condenser water cooling low limit temperature setpoint	3571		Condenser	Safety	Cool Low	R/W	°C	3	5	55	#
Water condenser water cooling high limit temperature setpoint	3572				Cool High	R/W	°C	19	55	55	#
Water condenser water heating low limit temperature setpoint	3573				Heat Low	R/W	°C	3	5	55	#
Water condenser water heating high limit temperature setpoint	3574				Heat High	R/W	°C	19	55	55	#
Condenser fan PID Kp setpoint	3581			Control	PID Kp	R/W	###	1	2	100	#
Condenser fan PID Ki setpoint	3582				PID Ki	R/W	###	1	1	100	#
Condenser fan PID Kd setpoint	3583				PID Kd	R/W	###	1	2	100	#
Condenser fan minimum speed setpoint	3584				Flow Min	R/W	%	0	0	100	#
Condenser fan maximum speed setpoint	3585				Flow Max	R/W	%	0	100	100	#
Circuit 1 - electronic expansion valve configuration	3611		Expansion valve	Circuit 1	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 1 - electronic expansion valve status	3612				Status	R	###	0	#	46	#
Circuit 1 - evaporating pressure	3613				Saturated	R	°C	-1	#	20	#
Circuit 1 - evaporating temperature	3614				Saturated	R	°C	-99,9	#	35	#

Circuit 1 - suction temperature	3615				Suction	R	°C	-50	#	105	#
Circuit 1 - superheating temperature	3616				Superheat	R	°C	-50	#	105	#
Circuit 1 - actual superheating setpoint	3617				Setpoint	R	°C	5	#	15	#
Circuit 1 - valve opening pourcentage	3618				Capacity	R	%	0	#	100	#
Circuit 1 - valve position step	3619				Step	R	Step	0	#	480	#
Circuit 2 - electronic expansion valve configuration	3621			Circuit 2	Config	R	###	0	0	1	0=No, 1=Yes.
Circuit 2 - electronic expansion valve status	3622				Status	R	###	0	#	46	#
Circuit 2 - evaporating pressure	3623				Saturated	R	°C	-1	#	20	#
Circuit 2 - evaporating temperature	3624				Saturated	R	°C	-99,9	#	35	#
Circuit 2 - suction temperature	3625				Suction	R	°C	-50	#	105	#
Circuit 2 - superheating temperature	3626				Superheat	R	°C	-50	#	105	#
Circuit 2 - actual superheating setpoint	3627				Setpoint	R	°C	5	#	15	#
Circuit 2 - valve opening pourcentage	3628				Capacity	R	%	0	#	100	#
Circuit 2 - valve position step	3629				Step	R	Step	0	#	480	#
Superheating temperature setpoint	3631		Expansion valve	Control	Superheat	R/W	°C	5	7	20	#
Electronic expansion valve (EEV) PID Kp setpoint	3632				PID Kp	R/W	###	1	30	300	#
Electronic expansion valve (EEV) PID Ki setpoint	3633				PID Ki	R/W	###	1	80	300	#
Electronic expansion valve (EEV) PID Kd setpoint	3634				PID Kd	R/W	###	1	10	300	#
Electronic expansion valve (EEV) circuit 1 mode setpoint	3635				Mode C1	R/W	###	0	0	1	0=Auto, 1=Manual.
Electronic expansion valve (EEV) circuit 1 position setpoint	3636				Position C1	R/W	Step	0	0	480	#
Electronic expansion valve (EEV) circuit 2 mode setpoint	3637				Mode C2	R/W	###	0	0	1	0=Auto, 1=Manual.
Electronic expansion valve (EEV) circuit 2 position setpoint	3638				Position C2	R/W	Step	0	0	480	#
Freecooling configuration	3711		Option	Freecooling	Config	R	###	0	0	1	0=No, 1=Yes.
Freecooling status	3712				Status	R	###	0	#	46	#
Freecooling input fan status	3713				Air	R	°C	-50	#	150	#
Freecooling output pump status	3714				Pump	R	###	0	0	1	0=Off, 1=On‹.
Freecooling output fan status	3715				Fan	R	###	0	0	1	0=Off, 1=On‹.
Freecooling capacity demand	3716				Capacity	R	%	0	#	100	#
Freecooling MSB hour counter	3717				Hour H	R	h	0	#	999	#
Freecooling LSB hour counter	3718				Hour L	R	h	0	#	999	#
Freecooling reset hour counter setpoint	3719				Clear Count	R/W	###	0	#	1	0=No, 1=Yes.
Electrical auxiliary heater configuration	3721			Auxiliary Heater	Config	R	###	0	0	1	0=No, 1=Yes.
Electrical auxiliary heater status	3722				Status	R	###	0	#	46	#
Electrical auxiliary heater input status	3723				State ID	R	###	0	0	1	0=Off, 1=On‹.

Electrical auxiliary heater capacity demand	3724				Capacity	R	%	0	#	100	#
Electrical auxiliary heater PWM signal	3725				Signal PWM	R	###	0	#	100	#
Electrical auxiliary heater MSB hour counter	3726				Hour H	R	h	0	#	999	#
Electrical auxiliary heater LSB hour counter	3727				Hour L	R	h	0	#	999	#
Electrical auxiliary heater reset hour counter setpoint	3728				Clear Count	R/W	###	0	#	1	0=No, 1=Yes.
Electrical antifreeze heater configuration	3731	Expert	Option	Antifreeze Heater	Config	R	###	0	0	1	0=No, 1=Yes.
Electrical antifreeze heater status	3732				Status	R	###	0	#	46	#
Electrical antifreeze heater input status	3733				State ID	R	###	0	0	1	0=Off, 1=On‹.
Electrical antifreeze heater capacity demand	3734				Capacity	R	%	0	#	100	#
Electrical antifreeze heater MSB hour counter	3735				Hour H	R	h	0	#	999	#
Electrical antifreeze heater LSB hour counter	3736				Hour L	R	h	0	#	999	#
Electrical antifreeze heater reset hour counter setpoint	3737				Clear Count	R/W	###	0	#	1	0=No, 1=Yes.
Total heat recovery configuration	3741			Heat Recovery	Config	R	###	0	0	1	0=No, 1=Yes.
Total heat recovery status	3742				Status	R	###	0	#	46	#
Total heat recovery remote on/off status	3743				On/Off	R	###	0	0	1	0=Off, 1=On‹.
Total heat recovery water flow switch status	3744				Flow ID	R	###	0	0	1	0=Off, 1=On‹.
Total heat recovery water inlet temperature	3745				Inlet	R	°C	-50	#	105	#
Total heat recovery water outlet temperature	3746				Outlet	R	°C	-50	#	105	#
Total heat recovery water capacity demand	3747				Capacity	R	%	0	#	100	#
Total heat recovery pump output status	3748				Pump	R	###	0	0	1	0=Off, 1=On‹.
Total heat recovery reset hour counter setpoint	3749				Clear Count	R/W	###	0	#	1	0=No, 1=Yes.
Energy meter configuration	3751		Option	Energy Meter	Config	R	###	0	0	1	0=No, 1=Yes.
Energy meter input status	3752				State ID	R	###	0	0	1	0=On‹, 1=No.
Energy meter total current	3753				Current	R	A	0	#	9999	#
Energy meter total active power	3754				Real Pw	R	kW	0	#	9999	#
Energy meter power factor (x100)	3755				Pw.Fact.#100	R	###	-2	#	1	#
Energy meter active energy Bits 63-48	3756				Energy W4	R	kWh	-32768	#	32767	#
Energy meter active energy Bits 47-32	3757				Energy W3	R	kWh	-32768	#	32767	#
Energy meter active energy Bits 31-16	3758				Energy W2	R	kWh	-32768	#	32767	#
Energy meter active energy Bits 15-0	3759				Energy W1	R	kWh	-32768	#	32767	#
Power factor correction configuration	3761			Pw.Fact. Correct	Config	R	###	0	0	1	0=No, 1=Yes.
Power factor correction status	3762				Status	R	###	0	#	46	#

Power factor correction input status	3763				State ID	R	###	0	0	1	0=Off, 1=On‹.
Phase controller configuration	3771		Option	Phase controller	Config	R	###	0	0	1	0=No, 1=Yes.
Phase controller status	3772				Status	R	###	0	#	46	#
Phase controller input status	3773				State ID	R	###	0	0	1	0=Off, 1=On‹.
Evaporator flow meter configuration	3781			Flow meter	Config	R	###	0	0	1	0=No, 1=Yes.
Evaporator flow meter status	3782				Status	R	###	0	#	46	#
Evaporator flow meter value	3783				Flow	R	m3/h	0	#	100	#
Remote display DC configuration	3791		Option	DC Remote	Config	R	###	0	0	1	0=No, 1=Yes.
Remote display DC water cooling setpoint saved	3792				Water cool	R	°C	5	#	20	#
Remote display DC water heating setpoint saved	3793				Water heat	R	°C	20	#	50	#
Remote display DC changeover setpoint saved	3794				Changeover	R	###	1	#	3	1=Cooling, 2=Heating, 3=Auto.
Master/slave status	3811		Link	Master/Slave	Status	R	###	0	#	46	#
Master/slave outside air temperature (reference)	3812				Outside	R	°C	-50	#	105	#
Master/slave evaporator water inlet temperature (reference)	3813				Inlet	R	°C	-50	#	105	#
Master/slave evaporator water outlet temperature (reference)	3814				Outlet	R	°C	-50	#	105	#
Master/slave unit adress setpoint	3815				Address	R/W	###	1	1	8	#
Master/slave unit number setpoint	3816				Number	R/W	###	1	1	8	#
Master/slave operating mode setpoint	3817				Type	R/W	###	0	0	7	0=No, 1=Reserved, 2=Cascde//, 3=CsdeŠŠ, 4=Backup//, 5=BackupŠŠ, 6=R.Bck//, 7=R.BackŠŠ.
Master/slave outside air temperature mode setpoint	3818				TßAir	R/W	###	0	0	2	0=No, 1=Master, 2=Average.
Master/slave water temperature mode setpoint	3819				TßWater	R/W	###	0	0	2	0=No, 1=Master, 2=Average.
BMS evaporator water set point temperature (BMS)	3821	Expert		BMS	Water Set	R/W	°C	-50	#	105	#
BMS outside air temperature (BMS)	3822				Outside	R/W	°C	-50	#	105	#
BMS evaporator water inlet temperature (BMS)	3823				Inlet	R/W	°C	-50	#	105	#
BMS evaporator water outlet temperature (BMS)	3824				Outlet	R/W	°C	-50	#	105	#
BMS enable the BMS mode setpoint (watchdog)	3825				Watchdog	R/W	s	0	#	32000	#
BMS network adress setpoint	3826				Address	R/W	###	1	#	199	#
BMS network protocol setpoint	3827				Protocol	R/W	###	0	9	9	0=AdaLink, 1=LnxVision,

											2=ModBus, 3=LonWorks, 4=Trend, 5=Carel, 6=BACnetMS/TP, 7=BACnetIP, 8=Konnex, 9=Cloud.
BMS network bauderate setpoint	3828				Bauderate	R/W	###	0	#	4	0=1200, 1=2400, 2=4800, 3=9600, 4=19200.
BMS network MODBUS RTU format setpoint	3829				Format	R/W	###	0	0	5	0=8-NONE-2, 1=8-NONE-1, 2=8-EVEN-2, 3=8-EVEN-1, 4=8-ODD-2, 5=8-ODD-1.

APPENDIX 2: ALARM LIST

CODE	DESCRIPTION	CONDITION	EFFECT	RESET	POSSIBLE CAUSE	POSSIBLE REMEDIE	DS MENU
1	***Water Evaporator, Flow Switch, Cut-off*** The evaporator water flow switch has tripped	Delayed 5s Enabled 1min after unit ON	Full stop	Manually	Dirty filter Wrong connection	Clean filter Check the connection	[2218]
8	***Energy Meter, Power Supply, Electrical Fault*** The energy meter circuit breaker has tripped	Delayed 5s	Signalling	Manually	Device failure Wrong connection	Check the energy meter Check the connection	[2752]
9	***Phase controller, Power Supply, Electrical Fault*** The phase controller has detect a problem on the main power supply (undervoltage, overvoltage, phase inversion)	At power on	Full stop	Manually	Main power issue Wrong setting	Check the main power tension Adjust the phase controller	[2495]
10	***Compressor Cranckase, Electrical Heater, Electrical Fault*** The circuit breaker of the compressor cranckase heater has tripped	Delayed 5s	Stop all compressors	Manually	Heater failure Wrong circuit breaker additive connection	Check the heater Check the connection	[2495]
11	***Water Evaporator, Auxiliary Heater, Electrical Fault*** The circuit breaker of the electrical auxiliary heater has tripped	Delayed 5s	Stop the electrical heater	Manually	Heater failure Wrong circuit breaker additive connection	Check the heater Check the connection	[2723]
12	***Water Evaporator, Flow Meter, Probe Faulty*** The evaporator flow meter measure is out of range If a flow control has been configured (menu (3343)), the pump is still running at the maximum	Delayed 5s	Signalling	Manually	Flow meter failure Wrong setting Wrong connection	Check the flow meter Adjust the flow meter Check the connection	[2783]
21	***Water Evaporator, Outlet Water T°, Too High*** The evaporator water outlet temperature is too high (T°≥ (3274))	Delayed 5min Enabled in heating mode Disabled 15min after a changeover Disabled if unit off	Stop all compressors Stop the auxiliary heater	3/day	Wrong setting Temperature probe drift	Check the setting (3274) Check the sensor	[2213] [3274]
22	***Water Evaporator, Outlet Water T°, Too Low*** The evaporator water outlet temperature is too low (T°≤ (3271))	Delayed 5min Enabled in cooling mode Disabled 15min after a changeover Disabled if unit off	Stop all compressors Start the antifreeze heater	3/day	Wrong setting Temperature probe drift	Check the setting (3271) Check the sensor	[2213] [3271]

23	***Water Evaporator, Inlet Water T°, Too High*** The evaporator water inlet temperature is too high (T°≥ (3272))	Delayed 5min Enabled in cooling mode Disabled 15min after a changeover Disabled if unit off	Signalling	3/day	Wrong setting Temperature probe drift	Check the setting (3272) Check the sensor	[2211] [3272]
24	***Water Evaporator, Inlet Water T°, Too Low*** The evaporator water inlet temperature is too low (T°≤ (3273))	Delayed 5min Enabled in heating mode Disabled 15min after a changeover Disabled if unit off	Signalling	3/day	Wrong setting Temperature probe drift	Check the setting (3273) Check the sensor	[2211] [3273]
39	***Water Evaporator, Flow Switch, Cut-off (Pump N°1)*** The evaporator water flow switch has tripped	Delayed 5s Enabled 1min after pump 1 start	Full stop Start the pump 2 if available	Manually	Dirty filter Wrong connection Pump failure	Clean filter Check the connection Check the pump pressure drop	[2218]
40	***Water Evaporator, Flow Switch, Cut-off (Pump N°2)*** The evaporator water flow switch has tripped	Delayed 5s Enabled 1min after pump 2 start	Full stop Start the pump 1 if available	Manually	Dirty filter Wrong connection Pump failure	Clean filter Check the connection Check the pump pressure drop	[2218]
41	***Pump Evaporator, Pump N°1, Electrical Fault*** The evaporator pump 1 circuit breaker has tripped or the evaporator pump inverter has tripped (In this case, the alarm 49 has tripped also)	Enabled 5s after pump 1 start	Full stop Start the pump 2 if available	Manually	Pump failure Wrong connection	Check the pump Check the connection	[2312] [2313] [2317]
42	***Pump Evaporator, Pump N°2, Electrical Fault*** The evaporator pump 2 circuit breaker has tripped or the evaporator pump inverter has tripped (In this case, the alarm 49 has tripped also)	Enabled 5s after pump 2 start	Full stop Start the pump 1 if available	Manually	Pump failure Wrong connection	Check the pump Check the connection	[2322] [2323] [2327]
45	***Pump Evaporator, Pressure Inlet, Faulty Sensor*** The evaporator water inlet pressure measure is out of range [0.5;5.5]Bars	Enabled 1min after pump start Enabled if "delta P" control (menu (3343)) Disabled if the inverter is offline	Full stop	3/day	Sensor failure Wrong connection	Check the sensor Check the connection	[2333] [3343]
46	***Pump Evaporator, Pressure Outlet, Faulty Sensor*** The evaporator water outlet pressure measure is out of range [0.5;5.5]Bars	Enabled 1min after pump start Enabled if "delta P" control (menu (3343)) Disabled if the inverter is offline	Full stop	3/day	Sensor failure Wrong connection	Check the sensor Check the connection	[2334] [3343]
49	***Pump Evaporator, Inverter, Electrical Fault*** The evaporator pump inverter has tripped If the alarm has tripped while a pump was running, the alarm 41/42 has also tripped	Refer to the inverter list of alarms in annex Disabled if the inverter is offline	Full stop	1xPump: Manually 2xPumps: 1/day	Inverter failure Pump failure Wrong connection	Check the inverter Check the pump Check the connection	[2317]

60	***Elec. Expansion Valve, EEV Driver, Link Failure*** The electronic expansion valve (EEV) driver is disconnected from the Fieldbus network	Delayed 30s	Stop all compressors	6/day	Wrong setting Wrong connection	Adjust the EEV driver Check the connection	#
61	***Master/Slave, BM Master, Link Failure*** The master unit 1 is disconnected from the pLAN network	Delayed 1min	Unit 1 runs in standalone	6/day	Wrong setting Wrong connection Electromagnetic disturb	Adjust the settings Check the connection Seclude the network cable	[3816]
62	***Master/Slave, BM Slave 2, Link Failure*** The slave unit 2 is disconnected from the pLAN network	Delayed 1min	Unit 2 runs in standalone	6/day	Wrong setting Wrong connection Electromagnetic disturb	Adjust the settings Check the connection Seclude the network cable	[3816]
63	***Master/Slave, BM Slave 3, Link Failure*** The slave unit 3 is disconnected from the pLAN network	Delayed 1min	Unit 3 runs in standalone	6/day	Wrong setting Wrong connection Electromagnetic disturb	Adjust the settings Check the connection Seclude the network cable	[3816]
64	***Master/Slave, BM Slave 4, Link Failure*** The slave unit 4 is disconnected from the pLAN network	Delayed 1min	Unit 4 runs in standalone	6/day	Wrong setting Wrong connection Electromagnetic disturb	Adjust the settings Check the connection Seclude the network cable	[3816]
65	***Master/Slave, BM Slave 5, Link Failure*** The slave unit 5 is disconnected from the pLAN network	Delayed 1min	Unit 5 runs in standalone	6/day	Wrong setting Wrong connection Electromagnetic disturb	Adjust the settings Check the connection Seclude the network cable	[3816]
66	***Master/Slave, BM Slave 6, Link Failure*** The slave unit 6 is disconnected from the pLAN network	Delayed 1min	Unit 6 runs in standalone	6/day	Wrong setting Wrong connection Electromagnetic disturb	Adjust the settings Check the connection Seclude the network cable	[3816]
67	***Master/Slave, BM Slave 7, Link Failure*** The slave unit 7 is disconnected from the pLAN network	Delayed 1min	Unit 7 runs in standalone	6/day	Wrong setting Wrong connection Electromagnetic disturb	Adjust the settings Check the connection Seclude the network cable	[3816]
68	***Master/Slave, BM Slave 8, Link Failure*** The slave unit 8 is disconnected from the pLAN network	Delayed 1min	Unit 8 runs in standalone	6/day	Wrong setting Wrong connection Electromagnetic disturb	Adjust the settings Check the connection Seclude the network cable	[3816]
69	***Energy Meter, Board, Link Failure*** The energy meter is disconnected from the Fieldbus network	Delayed 30s	Signalling	6/day	Wrong setting Wrong connection	Adjust the settings Check the connection	#

70	***Expansion Board, BE N°1, Link Failure*** The expansion board 1 is disconnected from the Fieldbus network	Delayed 30s	Signalling	6/day	Wrong setting Wrong connection	Adjust the settings Check the connection	#
71	***Expansion Board, BE N°2, Link Failure*** The expansion board 2 is disconnected from the Fieldbus network	Delayed 30s	Signalling	6/day	Wrong setting Wrong connection	Adjust the settings Check the connection	#
72	***Expansion Board, BE N°3, Link Failure*** The expansion board 3 is disconnected from the Fieldbus network	Delayed 30s	Signalling	6/day	Wrong setting Wrong connection	Adjust the settings Check the connection	#
73	***Pump Evaporator, Inverter, Link Failure*** The evaporator pump inverter is disconnected from the Fieldbus network	Delayed 30s	Full stop	6/day	Wrong setting Wrong connection	Adjust the settings Check the connection	#
75	***Condenser Fan, Inverter Circuit 1, Link Failure*** The condenser fan inverter of circuit 1 is disconnected from the Fieldbus network or One of the modulating condenser fans of the circuit 1 is disconnected from the Fieldbus network	Delayed 30s	Stop the circuit 1	6/day	Wrong setting Wrong connection	Adjust the settings Check the connection	#
76	***Condenser Fan, Inverter Circuit 2, Link Failure*** The condenser fan inverter of circuit 2 is disconnected from the Fieldbus network or One of the modulating condenser fans of the circuit 2 is disconnected from the Fieldbus network	Delayed 30s	Stop the circuit 2	6/day	Wrong setting Wrong connection	Adjust the settings Check the connection	#
79	***DC Display, DC N°1, Link Failure*** The display DC 1 is diconnected from the Fieldbus N°2 network	Delayed 2min	Signalling	6/day	Wrong setting Wrong connection	Adjust the settings Check the connection	#
80	***DC Display, DC N°2, Link Failure*** The display DC 2 is diconnected from the Fieldbus N°2 network	Delayed 2min	Signalling	6/day	Wrong setting Wrong connection	Adjust the settings Check the connection	#
81	***Water Evaporator, Water Inlet T°, Probe Faulty*** The evaporator water inlet temperature measure is out of range [-50.0;+105.0]°C	Delayed 5s	Full stop	3/day	Sensor failure Wrong connection	Check the sensor Check the connection	[2211]
83	***Outside, Air T°, Probe Faulty*** The outside air measure temperature is out of range [-50.0;+105.0]°C	Delayed 5s	Full stop	3/day	Sensor failure Wrong connection	Check the sensor Check the connection	[2115]
85	***Water Evaporator, Water Outlet T°, Probe Faulty*** The evaporator water outlet temperature measure is out of range [-50.0;+105.0]°C	Delayed 5s	Full stop	3/day	Sensor failure Wrong connection	Check the sensor Check the connection	[2212]

97	***Elec. Expansion Valve, EEV Driver, EEPROM Faulty*** The EEPROM of the electronic expansion valve (EEV) driver is faulty	Delayed 5s Disable if the driver is offline	Signalling	Manually	EEPROM daamge	Replace the EEV driver	#
98	***CLIMATIC board, Real Time Clock, Battery Faulty*** The CLIMATIC™ real time clock battery is faulty	Delayed 5s	Signalling	Manually	Battery low voltage	Replace the clock battery	#
102	***Circuit 1, Fan Condenser, Electrical Failure*** The condenser fan circuit breaker of circuit 1 has tripped or the condenser fan internal protection of circuit 1 has tripped	Delayed 30s Enabled 10s after fan start Disabled if the EEV driver is offline	Stop the circuit 1	6/day	Fan failure Wrong connection	Check the fan Check the connection	[2513]
104	***Circuit 1, Fan Condenser Inverter, Failure*** The condenser fan inverter of circuit 1 has tripped (Enable for remote or embedded inverter)	Refer to the inverter list of alarms in annex Disabled if the inverter is offline	Stop the circuit 1	3/day	Inverter failure Fan failure	Check the inverter Check the fan	[2519]
108	***Power Factor Correct., (Cos phi), Electrical Failure*** The capacitor circuit breaker of the power factor correction has tripped	Delayed 5s	Signalling	Manually	Capacitor failure Wrong connection	Check the condenser Check the connection	[2763]
110	***Circuit 1, Leak Refrigerant, Detected*** The CLIMATIC™ has detect insuffisant Refrigerant charge in the circuit 1	Delayed 10s Enabled 5min after compressor start Enabled if EEV opening > 99% Enabled if SH > 15°C Enabled in cool if T°inlet < 15°C Enabled in heat if T°ext < 15°C	Stop the circuit 1	6/day	Refrigerant leakage	Check the circuit operating	#
111	***Circuit 1 Compressor, Discharge T°, Too High*** The discharge temperature on the circuit 1 is too high (T°≥ (3443))	Delayed 5min	Stop the circuit 1	6/day	Compressor failure	Check the compressor	[2417] [3443]
114	***Circuit 1, Compressor, Electrical Failure*** The compressor circuit breaker of circuit 1 has tripped or the compressor internal protection of circuit 1 has tripped	Delayed 5s	Stop the circuit 1	Manually	Compressor failure Wrong connection	Check the compressor Check the connection	[2423]
115	***Circuit 1, Safety High Pressure, Cut-off*** The high pressure switch on the circuit 1 has tripped or The condensing temperature on the circuit 1is too high (T°HP≥ 64°C)	Enabled 5s after compressor start	Stop the circuit 1	3/day	Too much Refrigerant charge Fan failure	Check the circuit operating	[2491]
116	***Circuit 1 Compressor, Delta Pressure (HP-LP), Too Low*** The compressor delta pressure (HP-LP) on the circuit 1 is too low (dP ≤ 1 bar)	Delayed 5s Enabled 2min after compressor start Disabled during defrosting	Stop the circuit 1	3/day	Reversing valve locked Compressor failure Compressor protection tripped	Check the reversing valve swap	#

117	***Circuit 1, Safety Low Pressure, Cut-off*** The evaporating temperature on the circuit 1 is too low (T°LP ≤ -27.0°C) or (T°LP ≤ -33.0°C)	(TLP ≤ -27.0°C) : Delayed 1min Enabled 2min after compressor start Disabled during defrosting (TLP ≤ -33.0°C) : Immediate	Stop the circuit 1	(< -27.0°C) : 3/day (< -33.0°C): Manually	Refrigerant charge	Check the circuit operating	#
118	***Circuit 1, Water Evaporator, Risk of Frosting*** The evaporating temperature on the circuit 1 is too low and may pose a freezing risk for the water evaporator	Delayed 60s Enabled 10s after compressor start Disabled during defrosting Enabled in cooling mode	Stop the circuit 1	2/day	Refrigerant charge	Check the circuit operating	[3454] [3441]
119	***Circuit 1 Compressor, Operating, Out of map*** The compressor on the circuit 1 has run out of range (map)	Delayed 6min Enabled 2min after compressor start Disabled during defrosting	Stop the circuit 1	3/day	Operating out of range	Check the circuit operating	[3451]
120	***Circuit 1 Compressor, Start Frequency, Too High*** The compressor start frequency on the circuit 1 is too high	Temps moyen de fonctionnement ≤ 3min	Signalling	Automatic	Wrong settings Insufisant water volume	Check the settings Check the water volume	#
121	***Circuit 1, Superheat T°, Too Low*** The superheat temperature on the circuit 1 is too low (T°superheat ≤ 0°C)	Delayed 6min Enabled 6min after compressor start Disabled 3min after high fan speed start	Stop the circuit 1	3/day	Refrigerant charge	Check the circuit operating	[2616]
122	***Circuit 1, Superheat T°, Too High*** The superheat temperature on the circuit 1 is too high (T°superheat ≥ 15°C if T°LP ≤ 5.0°C) (T°superheat ≥ 25°C if T°LP > 5.0°C)	Delayed 6min Enabled 6min after compressor start	Stop the circuit 1	3/day	Refrigerant charge	Check the circuit operating	[2616]
127	***Circuit 1 Compressor, MOP operating, (Max Operating Press.)*** The compressor on the circuit 1 is working at the maximum operating pressure (MOP)	Delayed 5min Enabled 2min after compressor start Disabled during defrosting	Stop the circuit 1	3/day	Refrigerant charge Operating conditions out of limits	Check the circuit operating	[3453]
128	***Circuit 1 Compressor, LOP operating, (Low Operating Press.)*** The compressor on the circuit 1 is working at the minimum operating pressure (LOP)	Delayed 5min Enabled 2min after compressor start Disabled during defrosting	Stop the circuit 1	3/day	Refrigerant charge Operating conditions out of limits	Check the circuit operating	[3462]
129	***Circuit 1 Compressor, Condensing T°, Too High*** The condensing temperature on the circuit 1 is too high (T°HP≥ MAP compressor)	Delayed 10s Enabled in cooling mode Enabled if DS connected	Circuit 1 compressor unloading	Automatic	Refrigerant charge Operating conditions out of limits	Check the circuit operating	[2412] [3442]

132	***Circuit 1, Elec. Expansion Valve, Motor Faulty*** The electronic expansion valve (EEV) on the circuit 1 is damage or wrong connected	Delayed 5s	Stop the circuit 1	Manually	EEV failure Wrong connection	Check the EEV Check the connection	#
141	***Circuit 1, High Pressure, Faulty Sensor*** The condensing pressure measure on the circuit 1 is out of range [-1.0;+45.0]Bar	Delayed 5s Enabled 1min after compressor start	Stop the circuit 1	3/day	Sensor failure Wrong connection	Check the sensor Check the connection	#
142	***Circuit 1, Low Pressure, Faulty Sensor*** The evaporating pressure measure on the circuit 1 is out of range [-1.0;+20.0]Bar	Delayed 5s Enabled 1min after compressor start	Stop the circuit 1	3/day	Sensor failure Wrong connection	Check the sensor Check the connection	#
144	***Circuit 1, Suction T°, Probe Faulty*** The suction temperature measure on the circuit 1 is out of range [-50.0;+105.0]°C	Delayed 5s	Stop the circuit 1	3/day	Sensor failure Wrong connection	Check the sensor Check the connection	#
145	***Circuit 1, Discharge T°, Probe Faulty*** The discharge temperature measure on the circuit 1 is out of range [-50.0;+150.0]°C	Delayed 5s	Stop the circuit 1	3/day	Sensor failure Wrong connection	Check the sensor Check the connection	#
202	***Circuit 2, Fan Condenser, Electrical Failure*** The condenser fan circuit breaker of circuit 2 has tripped or the condenser fan internal protection of circuit 2 has tripped	Delayed 30s Enabled 10s after fan start Disabled if the EEV driver is offline	Stop the circuit 2	6/day	Fan failure Wrong connection	Check the fan Check the connection	[2523]
204	***Circuit 2, Fan Condenser Inverter, Failure*** The condenser fan inverter of circuit 2 has tripped (Enable for remote or embedded inverter)	Refer to the inverter list of alarms in annex Disabled if the inverter is offline	Stop the circuit 2	3/day	Inverter failure Fan failure	Check the inverter Check the fan	[2529]
210	***Circuit 2, Leak Refrigerant, Detected*** The CLIMATIC™ has detect insuffisant Refrigerant charge in the circuit 2	Delayed 10s Enabled 5min after compressor start Enabled if EEV opening > 99% Enabled if SH > 15°C Enabled in cool if T°inlet < 15°C Enabled in heat if T°ext < 15°C	Stop the circuit 2	6/day	Refrigerant leakage	Check the circuit operating	#
211	***Circuit 2 Compressor, Discharge T°, Too High*** The discharge temperature on the circuit 2 is too high (T°≥ (3443))	Delayed 5min	Stop the circuit 2	6/day	Compressor failure	Check the compressor	[2457] [3443]

214	***Circuit 2, Compressor, Electrical Failure*** The compressor circuit breaker of circuit 2 has tripped or the compressor internal protection of circuit 2 has tripped	Delayed 5s	Stop the circuit 2	Manually	Compressor failure Wrong connection	Check the compressor Check the connection	[2423]
215	***Circuit 2, Safety High Pressure, Cut-off*** The high pressure switch on the circuit 2 has tripped or The condensing temperature on the circuit 2is too high (T°HP≥ 64°C)	Enabled 5s after compressor start	Stop the circuit 2	3/day	Too much Refrigerant charge Fan failure	Check the circuit operating	[2492]
216	***Circuit 2 Compressor, Delta Pressure (HP-LP), Too Low*** The compressor delta pressure (HP-LP) on the circuit 2 is too low (dP ≤ 1 bar)	Delayed 5s Enabled 2min after compressor start Disabled during defrosting	Stop the circuit 2	3/day	Reversing valve locked Compressor failure Compressor protection tripped	Check the reversing valve swap	#
217	***Circuit 2, Safety Low Pressure, Cut-off*** The evaporating temperature on the circuit 2 is too low (T°LP ≤ -27.0°C) or (T°LP ≤ -33.0°C)	(TLP ≤ -27.0°C) : Delayed 1min Enabled 2min after compressor start Disabled during defrosting (TLP ≤ -33.0°C) : Immediate	Stop the circuit 2	(< -27.0°C) : 3/day (< -33.0°C): Manually	Refrigerant charge	Check the circuit operating	#
218	***Circuit 2, Water Evaporator, Risk of Frosting*** The evaporating temperature on the circuit 2 is too low and may pose a freezing risk for the water evaporator	Delayed 60s Enabled 10s after compressor start Disabled during defrosting Enabled in cooling mode	Stop the circuit 2	2/day	Refrigerant charge	Check the circuit operating	[3464] [3441]
219	***Circuit 2 Compressor, Operating, Out of map*** The compressor on the circuit 2 has run out of range (map)	Delayed 6min Enabled 2min after compressor start Disabled during defrosting	Stop the circuit 2	3/day	Operating out of range	Check the circuit operating	[3461]
220	***Circuit 2 Compressor, Start Frequency, Too High*** The compressor start frequency on the circuit 2 is too high	Temps moyen de fonctionnement ≤ 3min	Signalling	Automatic	Wrong settings Insufisant water volume	Check the settings Check the water volume	#
221	***Circuit 2, Superheat T°, Too Low*** The superheat temperature on the circuit 2 is too low (T°superheat ≤ 0°C)	Delayed 6min Enabled 6min after compressor start Disabled 3min after high fan speed start	Stop the circuit 2	3/day	Refrigerant charge	Check the circuit operating	[2626]

222	***Circuit 2, Superheat T°, Too High*** The superheat temperature on the circuit 2 is too high (T°superheat ≥ 15°C if T°LP ≤ 5.0°C) (T°superheat ≥ 25°C if T°LP > 5.0°C)	Delayed 6min Enabled 6min after compressor start	Stop the circuit 2	3/day	Refrigerant charge	Check the circuit operating	[2626]
227	***Circuit 2 Compressor, MOP operating, (Max Operating Press.)*** The compressor on the circuit 2 is working at the maximum operating pressure (MOP)	Delayed 5min Enabled 2min after compressor start Disabled during defrosting	Stop the circuit 2	3/day	Refrigerant charge Operating conditions out of limits	Check the circuit operating	[3463]
228	***Circuit 2 Compressor, LOP operating, (Low Operating Press.)*** The compressor on the circuit 2 is working at the minimum operating pressure (LOP)	Delayed 5min Enabled 2min after compressor start Disabled during defrosting	Stop the circuit 2	3/day	Refrigerant charge Operating conditions out of limits	Check the circuit operating	[3462]
229	***Circuit 2 Compressor, Condensing T°, Too High*** The condensing temperature on the circuit 1 is too high (T°HP≥ MAP compressor)	Delayed 10s Enabled in cooling mode Enabled if DS connected	Circuit 2 compressor unloading	Automatic	Refrigerant charge Operating conditions out of limits	Check the circuit operating	[2452] [3442]
232	***Circuit 2, Elec. Expansion Valve, Motor Faulty*** The electronic expansion valve (EEV) on the circuit 2 is damage or wrong connected	Delayed 5s	Stop the circuit 2	Manually	EEV failure Wrong connection	Check the EEV Check the connection	#
241	***Circuit 2, High Pressure, Faulty Sensor*** The condensing pressure measure on the circuit 2 is out of range [-1.0;+45.0]Bar	Delayed 5s Enabled 1min after compressor start	Stop the circuit 2	3/day	Sensor failure Wrong connection	Check the sensor Check the connection	#
242	***Circuit 2, Low Pressure, Faulty Sensor*** The evaporating pressure measure on the circuit 2 is out of range [-1.0;+20.0]Bar	Delayed 5s Enabled 1min after compressor start	Stop the circuit 2	3/day	Sensor failure Wrong connection	Check the sensor Check the connection	#
244	***Circuit 2, Suction T°, Probe Faulty*** The suction temperature measure on the circuit 2 is out of range [-50.0;+105.0]°C	Delayed 5s	Stop the circuit 2	3/day	Sensor failure Wrong connection	Check the sensor Check the connection	#
245	***Circuit 2, Discharge T°, Probe Faulty*** The discharge temperature measure on the circuit 2 is out of range [-50.0;+150.0]°C	Delayed 5s	Stop the circuit 2	3/day	Sensor failure Wrong connection	Check the sensor Check the connection	#

APPENDIX 3: BMS LIST

NAME	DESCRIPTION	FORMAT	UNIT	R/W	MIN	STD	MAX	LIST	MENU
CH_1_D	(DS_1000) General alarm status	Digital	###	R	0	0	1	#	[1000]
CH_2_D	(DS_####) General fault status	Digital	###	R	0	0	1	0=No, 1=Yes‹.	#
CH_3_D	(DS_2112) Remote On/Off status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2112]
CH_4_D	(DS_2218) Evaporator water flow switch status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2218]
CH_5_D	(DS_2346) Condenser water flow switch status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2346]
CH_6_D	(DS_2312) Evaporator pump 1 input status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2312]
CH_7_D	(DS_2342) Condenser pump 1 input status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2342]
CH_8_D	(DS_2491) Circuit 1 - high pressure switch input status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2491]
CH_9_D	(DS_2492) Circuit 2 - high pressure switch input status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2492]
CH_10_D	(DS_2423) Circuit 1 - compressor 1 input status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2423]
CH_11_D	(DS_2463) Circuit 2 - compressor 1 input status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2463]
CH_12_D	(DS_2513) Circuit 1 - condenser input status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2513]
CH_13_D	(DS_2523) Circuit 2 - condenser input status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2523]
CH_14_D	(DS_2495) Electrical heater input status (compressor crankase + antifreeze heaters)	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2495]
CH_15_D	(DS_2723) Electrical auxiliary heater input status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2723]
CH_16_D	(DS_2716) Freecooling fan input status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2716]
CH_17_D	(DS_2715) Freecooling pump input status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2715]

CH_18_D	(DS_####) Heat recovery enable	Digital	###	R	0	0	1	0=No, 1=Yes‹.	#
CH_19_D	(DS_2744) Total heat recovery water flow switch status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2744]
CH_20_D	(DS_2743) Total heat recovery remote on/off status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2743]
CH_21_D	(DS_2763) Power factor correction input status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2763]
CH_22_D	(DS_2773) Phase controller input status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2773]
CH_23_D	(DS_2752) Energy meter input status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2752]
CH_24_D	(DS_2313) Evaporator pump 1 output status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2313]
CH_25_D	(DS_2323) Evaporator pump 2 output status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2323]
CH_26_D	(DS_####) Evaporator bypass valve status	Digital	###	R	0	0	1	0=No, 1=Yes‹.	#
CH_27_D	(DS_2343) Condenser pump 1 output status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2343]
CH_28_D	(DS_2353) Condenser pump 2 output status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2353]
CH_29_D	(DS_####) Condenser bypass valve status	Digital	###	R	0	0	1	0=No, 1=Yes‹.	#
CH_30_D	(DS_2424) Circuit 1 - compressor 1 output status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2424]
CH_31_D	(DS_2434) Circuit 1 - compressor 2 output status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2434]
CH_32_D	(DS_2444) Circuit 1 - compressor 3 output status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2444]
CH_33_D	(DS_2464) Circuit 2 - compressor 1 output status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2464]
CH_34_D	(DS_2474) Circuit 2 - compressor 2 output status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2474]
CH_35_D	(DS_2484) Circuit 2 - compressor 3 output status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2484]
CH_36_D	(DS_2517) Circuit 1 - condenser fan low speed status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2517]

CH_37_D	(DS_2527) Circuit 2 - condenser fan low speed status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2527]
CH_38_D	(DS_2518) Circuit 1 - condenser fan high speed status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2518]
CH_39_D	(DS_2528) Circuit 2 - condenser fan high speed status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2528]
CH_40_D	(DS_2493) Circuit 1 - reversing valve status (4 ways valve)	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2493]
CH_41_D	(DS_2494) Circuit 2 - reversing valve status (4 ways valve)	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2494]
CH_42_D	(DS_####) Electrical antifreeze heater status	Digital	###	R	0	0	1	0=No, 1=Yes‹.	#
CH_43_D	(DS_####) Electrical auxiliary heater status	Digital	###	R	0	0	1	0=No, 1=Yes‹.	#
CH_44_D	(DS_2718) Freecooling fan output status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2718]
CH_45_D	(DS_2717) Freecooling pump output status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2717]
CH_46_D	(DS_2748) Total heat recovery pump output status	Digital	###	R	0	0	1	0=Off, 1=On‹.	[2748]
CH_47_D	(DS_####) Unit satus 'enabled'	Digital	###	R	0	0	1	0=No, 1=Yes‹.	#
CH_48_D	(DS_####) Unit satus 'availabled'	Digital	###	R	0	0	1	0=No, 1=Yes‹.	#
CH_49_D	(DS_####) Unit - Compressor running status (≥1)	Digital	###	R	0	0	1	0=No, 1=Yes □.	#
CH_50_D	(DS_####) Circuit 1 - Compressor running status (≥1)	Digital	###	R	0	0	1	0=No, 1=Yes □.	#
CH_51_D	(DS_####) Circuit 2 - Compressor running status (≥1)	Digital	###	R	0	0	1	0=No, 1=Yes‹.	#
CH_52_D	(DS_####) Unit - Compressor full running status (all compressor available running)	Digital	###	R	0	0	1	0=No, 1=Yes‹.	#
CH_53_D	(DS_####) Circuit 1 - Compressor full running status (all compressor available running)	Digital	###	R	0	0	1	0=No, 1=Yes‹.	#
CH_54_D	(DS_####) Circuit 2 - Compressor full running status (all compressor available running)	Digital	###	R	0	0	1	0=No, 1=Yes‹.	#
CH_55_D	(DS_####) Circuit 1 - defrosting status	Digital	###	R	0	0	1	0=No, 1=Yes‹.	#

CH_56_D	(DS_####) Circuit 2 - defrosting status	Digital	###	R	0	0	1	0=No, 1=Yes‹.	#
CH_1_A	(DS_2825) BMS enable the BMS mode setpoint (watchdog)	Integer	###	R/W	0	#	####	#	[2825]
CH_2_A	(DS_2111) General On/Off setpoint	Integer	###	R/W	0	0	1	0=Off, 1=On‹.	[2111]
CH_3_A	(DS_2113) [DAY]: Setpoint activation unit	Integer	###	R/W	-32768	0	####	#	[2113]
CH_4_A	(DS_2113) [Night]: Setpoint activation unit	Integer	###	R/W	-32768	0	####	#	[2113]
CH_5_A	(DS_2113) [BMS]: Setpoint activation unit	Integer	###	R/W	-32768	0	####	#	[2113]
CH_6_A	(DS_####) Changeover mode setpoint (cool / heat) send bt the BMS (Value NOT saved after power off)	Integer	###	R/W	-32768	0	####	#	#
CH_7_A	(DS_2224) [DAY] : Setpoint changover cool / heat	Integer	###	R/W	-32768	0	####	#	[2224]
CH_8_A	(DS_2224) [Night]: Setpoint changover cool / heat	Integer	###	R/W	-32768	0	####	#	[2224]
CH_9_A	(DS_####) [BMS]: Setpoint changover cool / heat	Integer	###	R/W	-32768	0	####	#	#
CH_10_A	(DS_2821) BMS evaporator water set point temperature (BMS)	Analog	°C	R/W	-50	#	105	#	[2821]
CH_11_A	(DS_2236) [DAY] Cooling dynamic setpoint outside air T°1	Analog	###	R/W	-32768	0	####	#	[2236]
CH_12_A	(DS_2237) [DAY] Cooling dynamic setpoint outside air T°2	Analog	###	R/W	-32768	0	####	#	[2237]
CH_13_A	(DS_2238) [DAY] Cooling dynamic setpoint water air T°1	Analog	###	R/W	-32768	0	####	#	[2238]
CH_14_A	(DS_2239) [DAY] Cooling dynamic setpoint water air T°2	Analog	###	R/W	-32768	0	####	#	[2239]
CH_15_A	(DS_2236) [Night] Cooling dynamic setpoint outside air T°1	Analog	###	R/W	-32768	0	####	#	[2236]
CH_16_A	(DS_2237) [Night] Cooling dynamic setpoint outside air T°2	Analog	###	R/W	-32768	0	####	#	[2237]
CH_17_A	(DS_2238) [Night] Cooling dynamic setpoint water air T°1	Analog	###	R/W	-32768	0	####	#	[2238]
CH_18_A	(DS_####) [Night] Cooling dynamic setpoint water air T°2	Analog	###	R/W	-32768	0	####	#	#
CH_19_A	(DS_2238) [BMS] Cooling dynamic setpoint water air T°1	Analog	###	R/W	-32768	0	####	#	[2238]
CH_20_A	(DS_2246) [DAY] Heating dynamic setpoint outside air T°1	Analog	###	R/W	-32768	0	####	#	[2246]
CH_21_A	(DS_2247) [DAY] Heating dynamic setpoint outside air T°2	Analog	###	R/W	-32768	0	####	#	[2247]
CH_22_A	(DS_2239) [DAY] Heating dynamic setpoint water air T°1	Analog	###	R/W	-32768	0	####	#	[2239]
CH_23_A	(DS_2249) [DAY] Heating dynamic setpoint water air T°2	Analog	###	R/W	-32768	0	####	#	[2249]
CH_24_A	(DS_2246) [Night] Heating dynamic setpoint outside air T°1	Analog	###	R/W	-32768	0	####	#	[2246]
CH_25_A	(DS_2247) [Night] Heating dynamic setpoint outside air T°2	Analog	###	R/W	-32768	0	####	#	[2247]
CH_26_A	(DS_2239) [Night] Heating dynamic setpoint water air T°1	Analog	###	R/W	-32768	0	####	#	[2239]
CH_27_A	(DS_2249) [Night] Heating dynamic setpoint water air T°2	Analog	###	R/W	-32768	0	####	#	[2249]
CH_28_A	(DS_2239) [BMS] Heating dynamic setpoint water air T°1	Analog	###	R/W	-32768	0	####	#	[2239]
CH_29_A	(DS_2541) [DAY] Setpoint fan condenser mode	Integer	###	R/W	-32768	0	####	#	[2541]
CH_30_A	(DS_2541) [Night] Setpoint fan condenser mode	Integer	###	R/W	-32768	0	####	#	[2541]
CH_31_A	(DS_####) [BMS] Setpoint fan condenser mode	Integer	###	R/W	-32768	0	####	#	#
CH_32_A	(DS_2542) [DAY] Setpoint accoustic noise level	Analog	###	R/W	-32768	0	####	#	[2542]
CH_33_A	(DS_2542) [Night] Setpoint accoustic noise level	Analog	###	R/W	-32768	0	####	#	[2542]
CH_34_A	(DS_2541) [BMS] Setpoint accoustic noise level	Analog	###	R/W	-32768	0	####	#	[2541]

CH_35_A	(DS_3431) [DAY] Setpoint enable compressor(s) circuit 1	Integer	###	R/W	-32768	0	####	#	[3431]
CH_36_A	(DS_3431) [Night] Setpoint enable compressor(s) circuit 1	Integer	###	R/W	-32768	0	####	#	[3431]
CH_37_A	(DS_3431) [BMS] Setpoint enable compressor(s) circuit 1	Integer	###	R/W	-32768	0	####	#	[3431]
CH_38_A	(DS_3432) [DAY] Setpoint enable compressor(s) circuit 2	Integer	###	R/W	-32768	0	####	#	[3432]
CH_39_A	(DS_3432) [Night] Setpoint enable compressor(s) circuit 2	Integer	###	R/W	-32768	0	####	#	[3432]
CH_40_A	(DS_3432) [BMS] Setpoint enable compressor(s) circuit 2	Integer	###	R/W	-32768	0	####	#	[3432]
CH_41_A	(DS_2823) BMS evaporator water inlet temperature (BMS)	Analog	°C	R/W	-50	#	105	#	[2823]
CH_42_A	(DS_2824) BMS evaporator water outlet temperature (BMS)	Analog	°C	R/W	-50	#	105	#	[2824]
CH_43_A	(DS_2822) BMS outside air temperature (BMS)	Analog	°C	R/W	-50	#	105	#	[2822]
CH_44_A	(DS_####) Free output relay BM NO1 command setpoint (Value NOT saved after power off)	Integer	###	R/W	-32768	0	####	#	#
CH_45_A	(DS_####) Free output relay BE NO1 command setpoint (Value NOT saved after power off)	Integer	###	R/W	-32768	0	####	#	#
CH_46_A	(DS_####) Free output relay BE NO2 command setpoint (Value NOT saved after power off)	Integer	###	R/W	-32768	0	####	#	#
CH_47_A	(DS_####) Free output relay BE NO3 command setpoint (Value NOT saved after power off)	Integer	###	R/W	-32768	0	####	#	#
CH_48_A	(DS_####) Free output relay BE NO4 command setpoint (Value NOT saved after power off)	Integer	###	R/W	-32768	0	####	#	#
CH_49_A	(DS_####) Free output relay BE NO5 command setpoint (Value NOT saved after power off)	Integer	###	R/W	-32768	0	####	#	#
CH_50_A	(DS_####) Free output relay BE NO6 command setpoint (Value NOT saved after power off)	Integer	###	R/W	-32768	0	####	#	#
CH_51_A	(DS_####) Clock update setpoint : 1) Set to '1' the register, 2) Send the new hour + date, 3) Reset to '0' the register.	Integer	###	R/W	-32768	0	####	#	#
CH_52_A	(DS_2121) Setpoint hour	Integer	h	R/W/C	0	#	23	#	[2121]
CH_53_A	(DS_2122) Setpoint minute	Integer	min	R/W/C	0	#	59	#	[2122]
CH_54_A	(DS_2123) Setpoint day	Integer	###	R/W/C	1	#	31	#	[2123]

CH_55_A	(DS_2124) Setpoint month	Integer	###	R/W/C	1	#	12	1=January, 2=February, 3=March, 4=April, 5=May, 6=June, 7=July, 8=August, 9=September, 10=October, 11=November, 12=December.	[2124]
CH_56_A	(DS_2125) Setpoint year	Integer	###	R/W/C	1	#	99	#	[2125]
CH_57_A	(DS_2826) BMS network adress setpoint	Integer	###	R/W	1	#	199	#	[2826]
CH_58_A	(DS_2828) BMS network bauderate setpoint	Integer	###	R/W	0	#	4	0=1200, 1=2400, 2=4800, 3=9600, 4=19200.	[2828]
CH_59_A	(DS_2829) BMS network MODBUS RTU format setpoint	Integer	###	R/W	0	0	5	0=RTU-8-NONE-2, 1=RTU-8-NONE-1, 2=RTU-8-EVEN-2, 3=RTU-8-EVEN-1, 4=RTU-8-ODD-2, 5=RTU-8-ODD-1.	[2829]
CH_60_A	(DS_####) Setpoint BMS reset alarm	Integer	###	R/W	-32768	0	####	#	#
CH_100_A	(DS_####) Rolling code of active alarms	Integer	###	R	0	#	254	#	#
CH_101_A	(DS_####) Alarm bits synthesis 1	Integer	###	R	-32768	0	####	#	#
CH_102_A	(DS_####) Alarm bits synthesis 2	Integer	###	R	-32768	0	####	#	#
CH_103_A	(DS_####) Alarm bits synthesis 3	Integer	###	R	-32768	0	####	#	#
CH_104_A	(DS_####) Alarm bits synthesis 4	Integer	###	R	-32768	0	####	#	#
CH_105_A	(DS_####) Alarm bits synthesis 5	Integer	###	R	-32768	0	####	#	#
CH_106_A	(DS_####) Alarm bits synthesis 6	Integer	###	R	-32768	0	####	#	#
CH_107_A	(DS_####) Alarm bits synthesis 7	Integer	###	R	-32768	0	####	#	#
CH_108_A	(DS_####) Alarm bits synthesis 8	Integer	###	R	-32768	0	####	#	#
CH_109_A	(DS_####) Alarm bits synthesis 9	Integer	###	R	-32768	0	####	#	#
CH_110_A	(DS_####) Alarm bits synthesis 10	Integer	###	R	-32768	0	####	#	#
CH_111_A	(DS_####) Alarm bits synthesis 11	Integer	###	R	-32768	0	####	#	#

CH_112_A	(DS_####) Alarm bits synthesis 12	Integer	###	R	-32768	0	####	#	#
CH_113_A	(DS_####) Alarm bits synthesis 13	Integer	###	R	-32768	0	####	#	#
CH_114_A	(DS_####) Alarm bits synthesis 14	Integer	###	R	-32768	0	####	#	#
CH_115_A	(DS_####) Alarm bits synthesis 15	Integer	###	R	-32768	0	####	#	#
CH_116_A	(DS_####) Alarm bits synthesis 16	Integer	###	R	-32768	0	####	#	#
CH_117_A	(DS_####) Fault bits synthesis 1	Integer	###	R	-32768	0	####	#	#
CH_118_A	(DS_####) Fault bits synthesis 2	Integer	###	R	-32768	0	####	#	#
CH_119_A	(DS_####) Fault bits synthesis 3	Integer	###	R	-32768	0	####	#	#
CH_120_A	(DS_####) Fault bits synthesis 4	Integer	###	R	-32768	0	####	#	#
CH_121_A	(DS_####) Fault bits synthesis 5	Integer	###	R	-32768	0	####	#	#
CH_122_A	(DS_####) Fault bits synthesis 6	Integer	###	R	-32768	0	####	#	#
CH_123_A	(DS_####) Fault bits synthesis 7	Integer	###	R	-32768	0	####	#	#
CH_124_A	(DS_####) Fault bits synthesis 8	Integer	###	R	-32768	0	####	#	#
CH_125_A	(DS_####) Fault bits synthesis 9	Integer	###	R	-32768	0	####	#	#
CH_126_A	(DS_####) Fault bits synthesis 10	Integer	###	R	-32768	0	####	#	#
CH_127_A	(DS_####) Fault bits synthesis 11	Integer	###	R	-32768	0	####	#	#
CH_128_A	(DS_####) Fault bits synthesis 12	Integer	###	R	-32768	0	####	#	#
CH_129_A	(DS_####) Fault bits synthesis 13	Integer	###	R	-32768	0	####	#	#
CH_130_A	(DS_####) Fault bits synthesis 14	Integer	###	R	-32768	0	####	#	#
CH_131_A	(DS_####) Fault bits synthesis 15	Integer	###	R	-32768	0	####	#	#
CH_132_A	(DS_####) Fault bits synthesis 16	Integer	###	R	-32768	0	####	#	#
CH_133_A	(DS_2131) Actual day	Integer	###	R	1	#	31	#	[2131]
CH_134_A	(DS_2132) Actual month	Integer	###	R	1	#	12	1=January, 2=February, 3=March, 4=April, 5=May, 6=June, 7=July, 8=August, 9=September, 10=October, 11=November, 12=December.	[2132]
CH_135_A	(DS_2133) Actual year	Integer	###	R	1	#	99	#	[2133]
CH_136_A	(DS_2134) Actual hour	Integer	h	R	0	#	23	#	[2134]
CH_137_A	(DS_2135) Actual minute	Integer	min	R	1	#	59	#	[2135]
CH_138_A	(DS_2136) Actual zone	Integer	###	R	0	#	6	#	[2136]

CH_139_A	(DS_2137) Actual mode	Integer	###	R	1	#	5	1=DayII, 2=DayI, 3=Day, 4=Night, 5=BMS.	[2137]
CH_140_A	(DS_2911) Unit total MSB hour counter	Integer	h	R	0	#	999	#	[2911]
CH_141_A	(DS_2912) Unit total LSB hour counter	Integer	h	R	0	#	999	#	[2912]
CH_142_A	(DS_2913) Unit MSB hour counter in cooling	Integer	h	R	0	#	999	#	[2913]
CH_143_A	(DS_2914) Unit LSB hour counter in cooling	Integer	h	R	0	#	999	#	[2914]
CH_144_A	(DS_2915) Unit MSB hour counter in heating	Integer	h	R	0	#	999	#	[2915]
CH_145_A	(DS_2916) Unit LSB hour counter in heating	Integer	h	R	0	#	999	#	[2916]
CH_146_A	(DS_2337) Evaporator water flow	Analog	m3/h	R	0	#	100	#	[2337]
CH_147_A	(DS_2116) Outside air temperature (reference)	Analog	°C	R	-50	#	105	#	[2116]
CH_148_A	(DS_2212) Evaporator water inlet temperature (reference)	Analog	°C	R	-50	#	105	#	[2212]
CH_149_A	(DS_2214) Evaporator water outlet temperature (reference)	Analog	°C	R	-50	#	105	#	[2214]
CH_150_A	(DS_2215) Evaporator water delta T°	Analog	°C	R	0	#	105	#	[2215]
CH_151_A	(DS_2333) Evaporator water inlet pressure	Analog	Bar	R	0	#	6	#	[2333]
CH_152_A	(DS_2334) Evaporator water outlet pressure	Analog	Bar	R	0	#	6	#	[2334]
CH_153_A	(DS_2336) Evaporator water delta P	Analog	Bar	R	0	#	6	#	[2336]
CH_154_A	(DS_2216) Evaporator actual water setpoint	Analog	°C	R	-10	#	50	#	[2216]
CH_155_A	(DS_2217) Evaporator water outlet capacity demand	Analog	%	R	0	#	100	#	[2217]
CH_156_A	(DS_2338) Evaporator pump capacity demand	Analog	%	R	0	#	100	#	[2338]
CH_157_A	(DS_2339) Evaporator bypass valve capacity demand	Analog	%	R	0	#	100	#	[2339]
CH_158_A	(DS_2363) Condenser water inlet pressure	Analog	Bar	R	0	#	6	#	[2363]
CH_159_A	(DS_2364) Condenser water outlet pressure	Analog	Bar	R	0	#	6	#	[2364]
CH_160_A	(DS_2366) Condenser water delta pressure	Analog	Bar	R	0	#	6	#	[2366]
CH_161_A	(DS_2367) Condenser water flow	Analog	###	R	0	#	100	#	[2367]
CH_162_A	(DS_2369) Condenser bypass valve capacity demand	Analog	###	R	0	#	100	#	[2369]
CH_163_A	(DS_2315) Evaporator pump 1 LSB hour counter	Integer	h	R	0	#	999	#	[2315]
CH_164_A	(DS_2314) Evaporator pump 1 MSB hour counter	Integer	h	R	0	#	999	#	[2314]
CH_165_A	(DS_2325) Evaporator pump 2 LSB hour counter	Integer	h	R	0	#	999	#	[2325]
CH_166_A	(DS_2324) Evaporator pump 2 MSB hour counter	Integer	h	R	0	#	999	#	[2324]
CH_167_A	(DS_2345) Condenser pump 1 LSB hour counter	Integer	h	R	0	#	999	#	[2345]
CH_168_A	(DS_2344) Condenser pump 1 MSB hour counter	Integer	h	R	0	#	999	#	[2344]
CH_169_A	(DS_2355) Condenser pump 2 LSB hour counter	Integer	h	R	0	#	999	#	[2355]
CH_170_A	(DS_2354) Condenser pump 2 MSB hour counter	Integer	h	R	0	#	999	#	[2354]
CH_171_A	(DS_2411) Circuit 1 - condensing pressure	Analog	Bar	R	-1	#	45	#	[2411]
CH_172_A	(DS_2412) Circuit 1 - condensing temperature	Analog	°C	R	-50	#	105	#	[2412]

CH_173_A	(DS_2413) Circuit 1 - liquid temperature	Analog	°C	R	-50	#	105	#	[2413]
CH_174_A	(DS_2414) Circuit 1 - evaporating pressure	Analog	Bar	R	-1	#	20	#	[2414]
CH_175_A	(DS_2415) Circuit 1 - evaporating temperature	Analog	°C	R	-50	#	105	#	[2415]
CH_176_A	(DS_2416) Circuit 1 - suction temperature	Analog	°C	R	-50	#	105	#	[2416]
CH_177_A	(DS_2417) Circuit 1 - dischage temperature	Analog	°C	R	-50	#	150	#	[2417]
CH_178_A	(DS_2419) Circuit 1 - superheating temperature	Analog	°C	R	-50	#	150	#	[2419]
CH_179_A	(DS_2451) Circuit 2 - condensing pressure	Analog	Bar	R	-1	#	45	#	[2451]
CH_180_A	(DS_2452) Circuit 2 - condensing temperature	Analog	°C	R	-50	#	105	#	[2452]
CH_181_A	(DS_2453) Circuit 2 - liquid temperature	Analog	°C	R	-50	#	105	#	[2453]
CH_182_A	(DS_2454) Circuit 2 - evaporating pressure	Analog	Bar	R	-1	#	20	#	[2454]
CH_183_A	(DS_2455) Circuit 2 - evaporating temperature	Analog	°C	R	-50	#	105	#	[2455]
CH_184_A	(DS_2456) Circuit 2 - suction temperature	Analog	°C	R	-50	#	105	#	[2456]
CH_185_A	(DS_2457) Circuit 2 - dischage temperature	Analog	°C	R	-50	#	150	#	[2457]
CH_186_A	(DS_2459) Circuit 2 - superheating temperature	Analog	°C	R	-50	#	150	#	[2459]
CH_187_A	(DS_2516) Circuit 1 - condenser capacity demand	Analog	%	R	0	#	100	#	[2516]
CH_188_A	(DS_2526) Circuit 2 - condenser capacity demand	Analog	%	R	0	#	100	#	[2526]
CH_189_A	(DS_2618) Circuit 1 - valve opening pourcentage	Analog	%	R	0	#	100	#	[2618]
CH_190_A	(DS_2628) Circuit 2 - valve opening pourcentage	Analog	%	R	0	#	100	#	[2628]
CH_191_A	(DS_2426) Circuit 1 - compressor 1 LSB hour counter	Integer	h	R	0	#	999	#	[2426]
CH_192_A	(DS_2425) Circuit 1 - compressor 1 MSB hour counter	Integer	h	R	0	#	999	#	[2425]
CH_193_A	(DS_2436) Circuit 1 - compressor 2 LSB hour counter	Integer	h	R	0	#	999	#	[2436]
CH_194_A	(DS_2435) Circuit 1 - compressor 2 MSB hour counter	Integer	h	R	0	#	999	#	[2435]
CH_195_A	(DS_2446) Circuit 1 - compressor 3 LSB hour counter	Integer	h	R	0	#	999	#	[2446]
CH_196_A	(DS_2445) Circuit 1 - compressor 3 MSB hour counter	Integer	h	R	0	#	999	#	[2445]
CH_197_A	(DS_2466) Circuit 2 - compressor 1 LSB hour counter	Integer	h	R	0	#	999	#	[2466]
CH_198_A	(DS_2465) Circuit 2 - compressor 1 MSB hour counter	Integer	h	R	0	#	999	#	[2465]
CH_199_A	(DS_2476) Circuit 2 - compressor 2 LSB hour counter	Integer	h	R	0	#	999	#	[2476]
CH_200_A	(DS_2475) Circuit 2 - compressor 2 MSB hour counter	Integer	h	R	0	#	999	#	[2475]
CH_201_A	(DS_2486) Circuit 2 - compressor 3 LSB hour counter	Integer	h	R	0	#	999	#	[2486]
CH_202_A	(DS_2485) Circuit 2 - compressor 3 MSB hour counter	Integer	h	R	0	#	999	#	[2485]
CH_203_A	(DS_2713) Freecooling water inlet temperature (reference)	Analog	°C	R	-50	#	105	#	[2713]
CH_204_A	(DS_2719) Freecooling water capacity demand	Analog	###	R	0	0	100	#	[2719]
CH_205_A	(DS_####) Freecooling fan capacity demand	Analog	###	R	0	0	100	#	#
CH_206_A	(DS_3717) Freecooling MSB hour counter	Integer	h	R	0	#	999	#	[3717]
CH_207_A	(DS_3718) Freecooling LSB hour counter	Integer	h	R	0	#	999	#	[3718]
CH_208_A	(DS_2724) Electrical auxiliary heater capacity demand	Analog	%	R	0	#	100	#	[2724]
CH_209_A	(DS_2726) Electrical auxiliary heater MSB hour counter	Integer	h	R	0	#	999	#	[2726]
CH_210_A	(DS_2727) Electrical auxiliary heater LSB hour counter	Integer	h	R	0	#	999	#	[2727]

CH_211_A	(DS_2734) Electrical antifreeze heater capacity demand	Analog	%	R	0	0	100	#	[2734]
CH_212_A	(DS_2735) Electrical antifreeze heater MSB hour counter	Integer	h	R	0	#	999	#	[2735]
CH_213_A	(DS_2736) Electrical antifreeze heater LSB hour counter	Integer	h	R	0	#	999	#	[2736]
CH_214_A	(DS_2745) Total heat recovery water inlet temperature	Analog	°C	R	-50	#	105	#	[2745]
CH_215_A	(DS_2746) Total heat recovery water outlet temperature	Analog	°C	R	-50	#	105	#	[2746]
CH_216_A	(DS_2747) Total heat recovery water capacity demand	Analog	%	R	0	#	100	#	[2747]
CH_217_A	(DS_2756) Energy meter active energy Bits 63-48	Integer	kWh	R	-32768	#	####	#	[2756]
CH_218_A	(DS_2757) Energy meter active energy Bits 47-32	Integer	kWh	R	-32768	#	####	#	[2757]
CH_219_A	(DS_2758) Energy meter active energy Bits 31-16	Integer	kWh	R	-32768	#	####	#	[2758]
CH_220_A	(DS_2759) Energy meter active energy Bits 15-0	Integer	kWh	R	-32768	#	####	#	[2759]
CH_221_A	(DS_####) Free input temperature BE-U1	Analog	°C	R	-50	0	105	#	#
CH_222_A	(DS_####) Free input temperature BE-U2	Analog	°C	R	-50	0	105	#	#
CH_223_A	(DS_####) Free input temperature BE-U3	Analog	°C	R	-50	0	105	#	#
CH_224_A	(DS_####) Free input temperature BE-U4	Analog	°C	R	-50	0	105	#	#

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