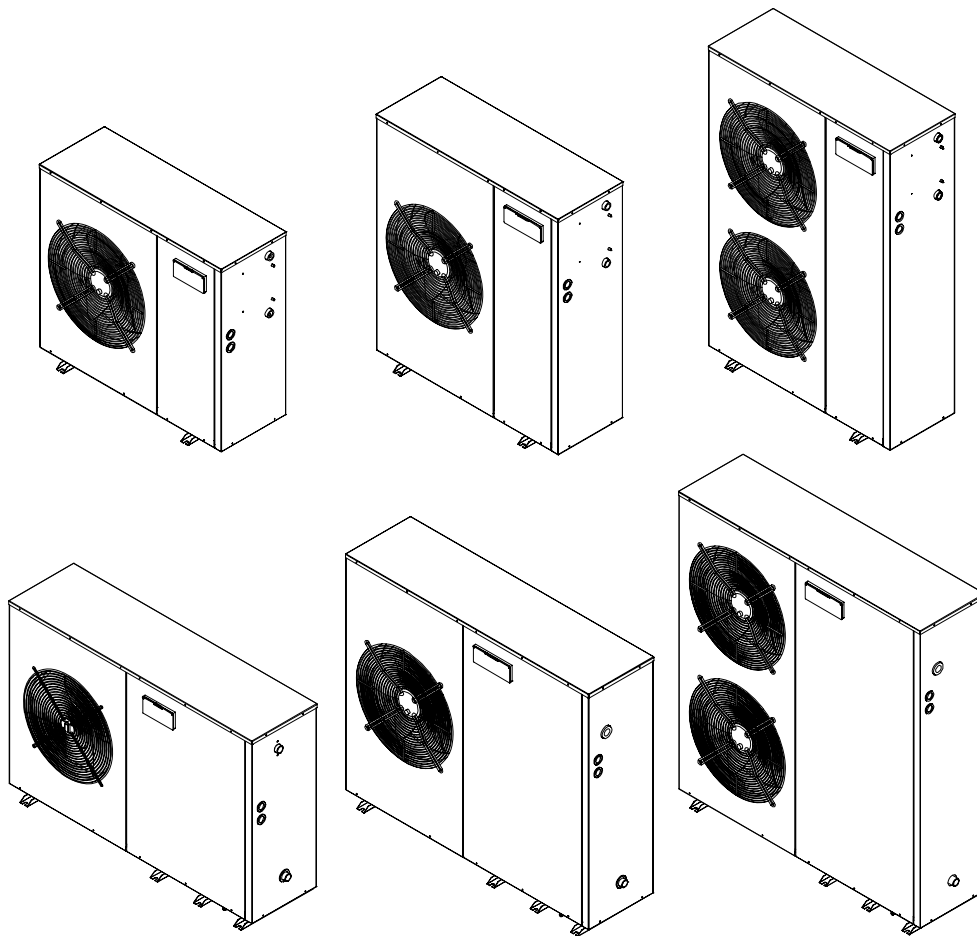


RXA - RVL - ONE LFP - WLA



EN

AIR-WATER CHILLERS AND HEAT PUMPS
WITH AXIAL FANS

Refrigerant: R410A

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MANAGEMENT AND CONTROL

MANAGEMENT AND CONTROL

Menu structure for technical service

The structure given below is visible only through password (the menu accessible without password is given in the installation and operation manual of the unit).

Menu	Access mode	Submenu	Parameters	Available functions
Operation modes	Press (prolonged) ESC button (<i>ESC button associated function</i>)	SEtBy	-	Operation mode change
		HEAt		
		COOL		
Status	Press SET button (<i>SET button direct function</i>)	AI	AI01	Input AI1 display
			AI02	Input AI2 display
			AI03	Input AI3 display
			AI04	Input AI4 display
		DI	DI01	Input DI1 display
			DI02	Input DI2 display
			DI03	Input DI3 display
			DI04	Input DI4 display
			DI05	Input DI5 display
		AO	TK1	Output TK1 display
			AO1	
			AO3	
		DO	DO01	Output DO1 display
			DO02	Output DO2 display
			DO03	Output DO3 display
			DO04	Output DO4 display
			DO05	Output DO5 display
		CL	HOuR	Clock adjustment : time
			DAte	Clock adjustment : date
			YEAr	Clock adjustment : year
		AL	-	Active alarms display
		SP	HEAt	Set point display and setting : heating
			COOL	Set point display and setting : cooling
		Sr	HEAt	Real set point display : heating
			COOL	Real set point display : cooling
		Hr	CPD1	Compressor operation hours display
			PUD1	Pump operation hours display

MANAGEMENT AND CONTROL

Programming	Press ESC + SET at the same time <i>(combined function buttons ESC + SET)</i>	PAR	CF	CF08	Probe SIW offset – input AI1
				CF09	Probe SUW offset – input AI2
				CF10	Probe SL offset – input AI3
				CF11	Probe STAE offset – input AI4
				CF19	Remote standby enable
				CF20	Remote cooling-heating enable
				CF63	Device address (Modbus protocol)
				CF64	Serial output baud rate
				CF65	Serial output parity
				CF66	Parameters programme number
				CF67	Parameters programme revision
			CF71	Device identification - map display	
			U1	U109	Main display selection
			Er	Er01	Heat pump enable
				Er06	Minimum set point in cooling mode
				Er07	Maximum set point in cooling mode
				Er08	Minimum set point in heating mode
				Er09	Maximum set point in heating mode
				Er10	Hysteresis in cooling mode
				Er11	Hysteresis in heating mode
			P1	Er17	Heat pump shutdown set point
				P116	Pump anti-sticking enable
				P117	Pump off time interval for anti-sticking
				P118	Pump on time interval for anti-sticking
				P119	Antifreeze with pump enable
			FE	P120	Antifreeze with pump set point
				P121	Antifreeze with pump hysteresis
			H1	FE01	Fan speed modulation enable
				H102	Integrative electrical heaters enable
				H106	Antifreeze with electrical heaters set point
				H109	Antifreeze with electrical heaters hysteresis
				H111	Integrative electrical heaters differential
				H113	Integrative electrical heaters hysteresis
			dF	H115	Integrative electrical heaters 2° step differential
				dF01	Defrost count start set point
				dF03	Defrost count cumulative time
			dS	dF08	Dynamic defrost enable
				dS00	Climate control enable
				dS01	Proportional band (cooling)
				dS02	Proportional band (heating)
				dS03	Maximum differential (cooling)
				dS04	Maximum differential (heating)
			AL	dS05	Control start set point (cooling)
				dS06	Control start set point (heating)
			FnC	AL12	Antifreeze alarm set point
AL13	Antifreeze alarm hysteresis				
EU	dEF	Manual defrost			
	CC	UL	Upload parameters programme		
		dL	Download parameters programme		
	EUR	Alarms history reset			
	-	Alarms history display			

MANAGEMENT AND CONTROL

Input and output configuration parameters

Analog inputs			Configuration	Offset
AI1	SIW	Water inlet probe	[F00] = 2 [F12] = 1	[F08]
AI2	SUW	Water outlet probe	[F01] = 2 [F13] = 2	[F09]
AI3	SL	Liquid line probe	[F02] = 2 [F14] = 3	[F10]
AI4	STAE	Outdoor air probe	[F03] = 2 [F15] = 6	[F11]
Digital inputs			Configuration	Polarity
ID1	PA	High pressure switch	[F16] = -3	Active input with open contact
	TVE	Fan thermal switch		
ID2	PB	Low pressure switch	[F17] = -2	
	SEQ	Phase sequence controller		
ID3	PD	Differential pressure switch	[F18] = -5	
ID4	ON-OFF	Remote standby	[F19] = -27	unit in standby mode with open contact
ID5	E-I	Remote cooling-heating	[F20] = 14	unit in heating mode with open contact
Analog outputs			Configuration	Polarity
TK1	VE	Fans	[F33] = 1 [F42] = 14	-
Digital outputs			Configuration	Polarity
DO1	ALL	Alarm	[F45] = 13	closed contact with active output
DO2	CP	Compressor	[F46] = 1	
DO3	VIC	Reversing cycle valve	[F47] = 5	
DO4	RSC	Plate heat exchanger antifreeze heater	[F48] = 7	
	RAG RE1	Tank antifreeze heater Integrative electrical heaters - 1° step		
DO5	P	Pump	[F49] = 3	
AO3	RE2	Integrative electrical heaters - 2° step	[F27] = 0 [F30] = 8	closed KA2 contact with active output

Available functions for technical service

Temperature probes offset

An offset can be set for all the temperature probes (AI1, AI2, AI3 and AI4) using the parameters given in the input and output configuration parameters table.

Serial communication

The serial line parameters can be modified, bearing in mind that all the devices connected to the same serial line MUST use the same settings.

Baud rate	
[F64]	
0	1200
1	2400
2	4800
3	9600
4	19200
5	38400
6	58600
7	115200

Parity	
[F65]	
0	STX
1	EVEN
2	NONE
3	ODD

MANAGEMENT AND CONTROL

Main display

The main display of the controller can be modified.

U,09	
0	AI1
1	AI2
2	AI3
3	AI4
4	Clock
5	Set point
6	Real set point

Thermoregulation

The maximum and minimum set point values in cooling and in heating mode and respective hysteresis can be modified using the parameters given in the section about compressor management.

Pump anti-sticking function

This function can be disabled setting the parameter $P,16 = 0$.

It is also possible to modify the off time interval ($P,17$ in hours) and the on time interval ($P,18$ in seconds).

Antifreeze with pump

This function can be disabled setting the parameter $P,19 = 0$.

It is also possible to modify the activation set point ($P,20$ in °C) and the hysteresis ($P,21$ in °C).

Fan management

The fans can be kept constantly at maximum speed setting the parameter $FED1 = 0$. To enable the fan speed modulation set the parameter $FED1 = 1$.

Antifreeze with electrical heaters

It is possible to modify the activation set point ($H,06$ in °C) and the hysteresis ($H,09$ in °C).

Integrative electrical heaters

It's possible to modify the differential with reference to the set point in heating mode ($H,11$ in °C), the hysteresis ($H,13$ in °C) and the second step activation differential with reference to the first step ($H,15$ in °C).

Defrost

It is possible to modify the start count set point ($dF01$ in °C) and the count cumulative time ($dF03$ in minutes)

Dynamic defrost can be disabled by setting the parameter $dF08 = 0$.

Manual defrost

Defrost can be forced through the parameter dEF associated function. Defrost start only if the temperature measured by SL probe (AI3 input) is below the count start set point ($dF01$).

Climate control in heating mode

It is possible to modify the control start set point ($d506$ in °C), the proportional band ($d502$ in °C) and the maximum differential with reference to the set point ($d504$ in °C).

Climate control in cooling mode

When climate control is enabled in heating mode ($d500 = 1$) such function is enabled also in cooling mode if the following parameters are set: control start set point ($d505$ in °C), proportional band ($d501$ in °C) and maximum differential with reference to the set point ($d503$ in °C).

Antifreeze alarm

It is possible to modify the activation set point ($RL12$ in °C) and the hysteresis ($RL13$ in °C).

Parameters programme

The number and revision of the parameters programme stored in the controller are indicated in the parameters $CF55$ and $CF57$ respectively.

The controller can be reprogrammed through the parameter dL (download) associated function if the programming key with the correct parameters programme is available.

The controller parameters programme can be read and stored in a programming key through the parameter uL (upload) associated function.

MANAGEMENT LOGICS

MANAGEMENT LOGICS

Compressor management

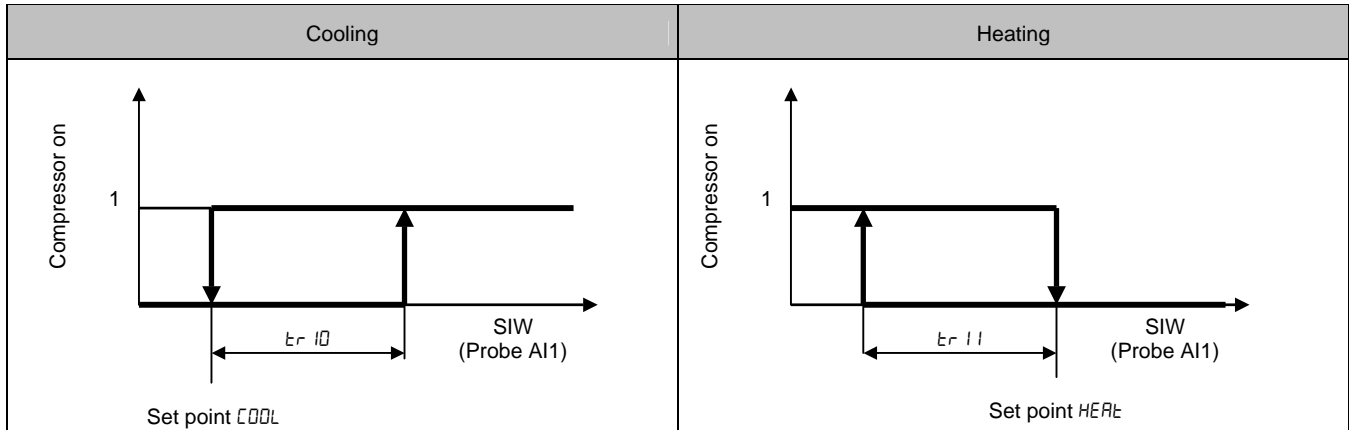
Thermoregulation

The controller keeps the inlet water temperature (probe AI1) as near as possible to the set point value by activating the compressors according to an on-off logic.

It is possible to set the set point value in cooling mode (COOL) e in heating mode (HEAT). Such values have to remain between fixed maximum and minimum values.

MINIMUM value	Set point	MAXIMUM value
Er06	COOL	Er07
Er08	HEAT	Er09

Compressors activation occurs according to the difference between the control probe temperature and the set point. The control band is defined by the parameter Er10 in cooling mode and by the parameter Er11 in heating mode.



Safety time intervals

The safety time intervals respected are :

- [P03] : minimum time interval between compressor shut down and activation (this time is also respected when the controller is turned on)
- [P04] : minimum time interval between two consecutive compressor activations (this time is also respected when the controller is turned on)
- [P07] : minimum compressor activation time interval

The safety time intervals are not respected during defrost.

Pump management

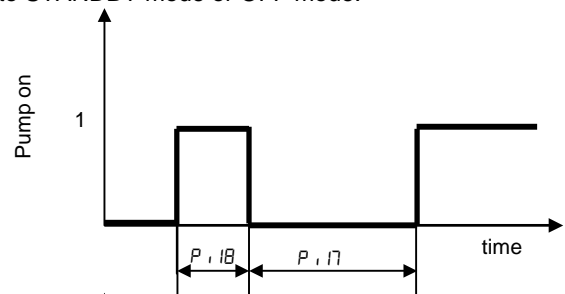
The pump is always active unless :

- one or more active alarms stop the pump
- controller in OFF mode (with anti-sticking function not active)
- controller in STANDBY mode (with anti-sticking and antifreeze with pump functions not active)

The pump is shut down with a short delay when the controller switches to STANDBY mode or OFF mode.

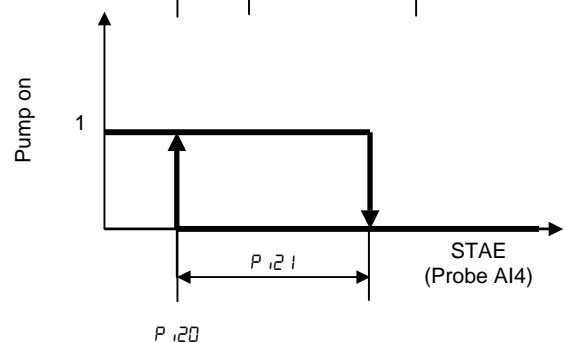
Pump anti-sticking function

The pump is switched on periodically for a short period of time to prevent mechanical faults due to its prolonged inactivity. The inactivity time interval count starts when the pump is turned off and is reset if the pump is turned on.



Antifreeze with pump

When the outside air temperature approaches 0°C, if the unit is not working, the pump is activated in any case to prevent excessive cooling of the water in the pipes.



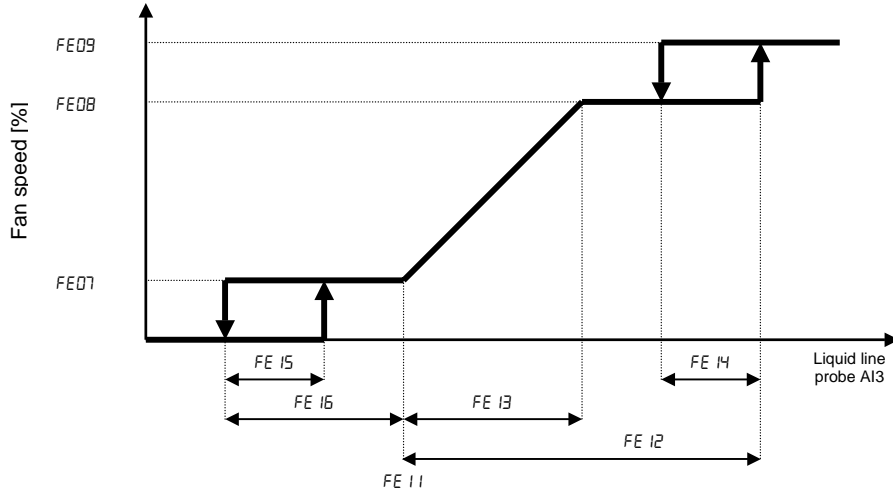
MANAGEMENT LOGICS

Fan management

Fan operation is related to compressor operation. If the compressor is off, the fans are off too. When the compressor is on, fan speed is adjusted according to the liquid line probe temperature (SL probe – A13 input). In order to avoid pickup problems, each time the fans are switched on, their supply voltage remains at the maximum value for a few seconds (FE02). After that time interval the fans are managed according to the speed set by the controller. When the compressor starts, if the controller requests fans to be switched off (cut off), the fans are in any case activated at the minimum speed for a few seconds (FE04) from the compressor activation.

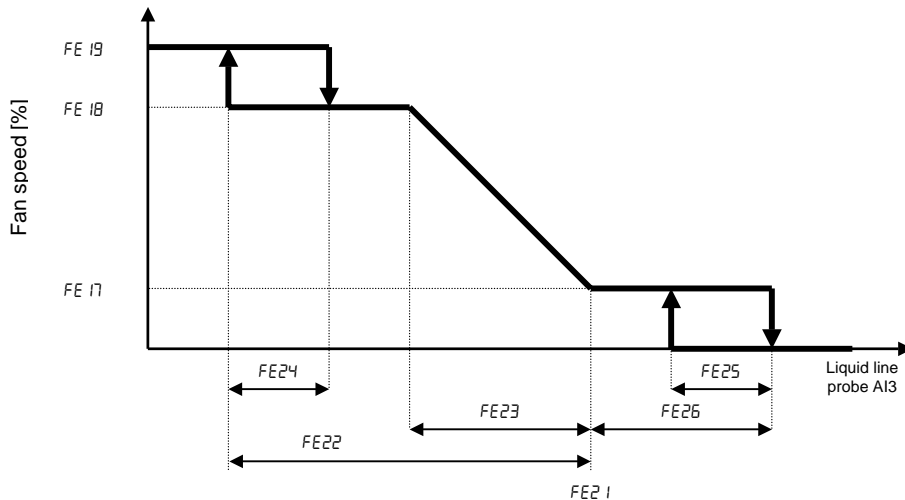
Fan management in cooling mode

It is possible to define a minimum speed (FE07), an intermediate speed (FE08) and a maximum speed (FE09) as a percentage of the maximum speed that the fans can get. Speed control is managed as indicated in the diagram below.



Fan management in heating mode

It is possible to define a minimum speed (FE17), an intermediate speed (FE18) and a maximum speed (FE19) as a percentage of the maximum speed that the fans can get. Speed control is managed as indicated in the diagram below.



Fan management during defrost

The fans are always off during defrost.

At the end of defrost, during the coil drainage stage, the fans are activated at maximum speed in order to drain quickly the condensate from the coil.

MANAGEMENT LOGICS

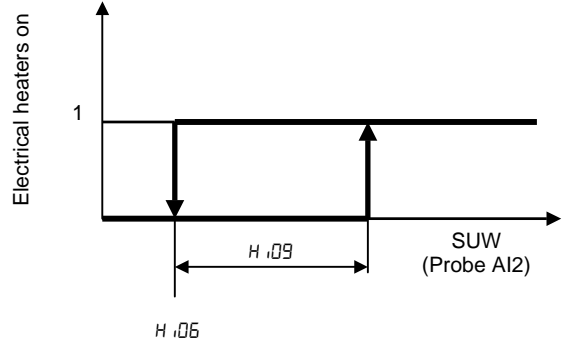
Antifreeze electrical heaters management

Each unit is fitted with an antifreeze electrical heater on the plate heat exchanger. If there is the tank, an antifreeze electrical heater can be fitted on the tank as an accessory.

When there are integrative electrical heaters, the first step of modulation also carries out an antifreeze function on the tank.

The antifreeze electrical heaters are activated according to the unit's outlet water temperature (SUW probe – AI2 input) as indicated in the diagram.

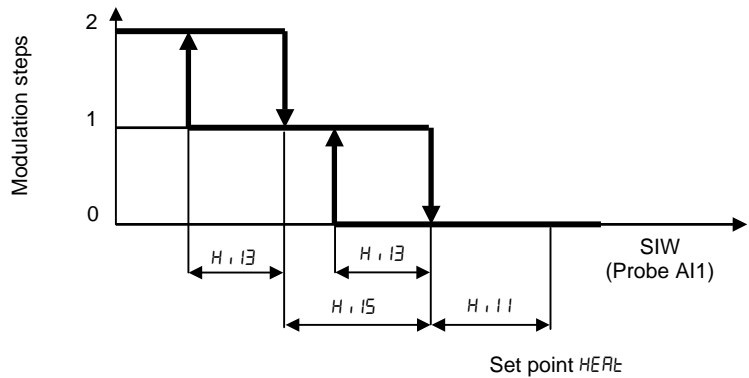
IMPORTANT. The antifreeze function is not active when the unit is in OFF mode.



Integrative electrical heaters management

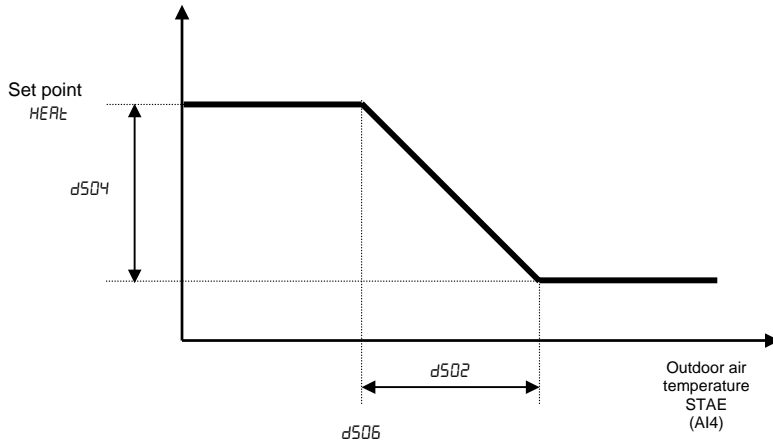
The integrative electrical heaters are active in heating mode and managed according to the unit's inlet water temperature (SIW probe – AI1 input) as indicated in the diagram.

Two modulation steps are always available.



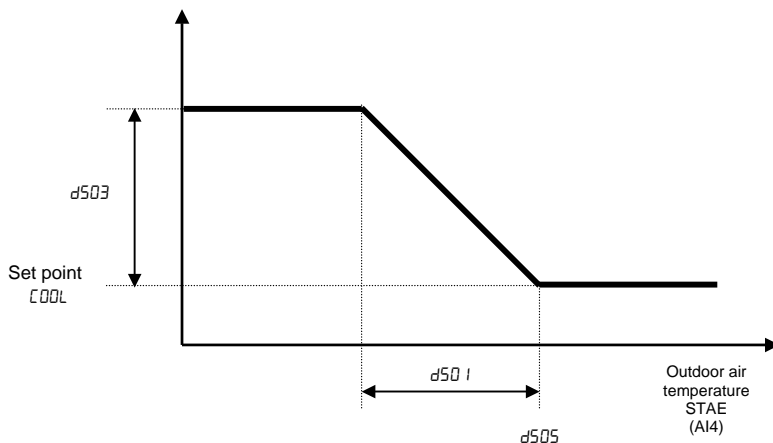
Climate control in heating and cooling mode

The set point (in heating or cooling mode) is modified by the controller according to the outdoor air temperature (STAE probe – AI4 input) as indicated in the diagram below.



Heating :

$d504$ negative
 $d502$ positive



Cooling :

$d503$ positive
 $d501$ negative

MANAGEMENT LOGICS

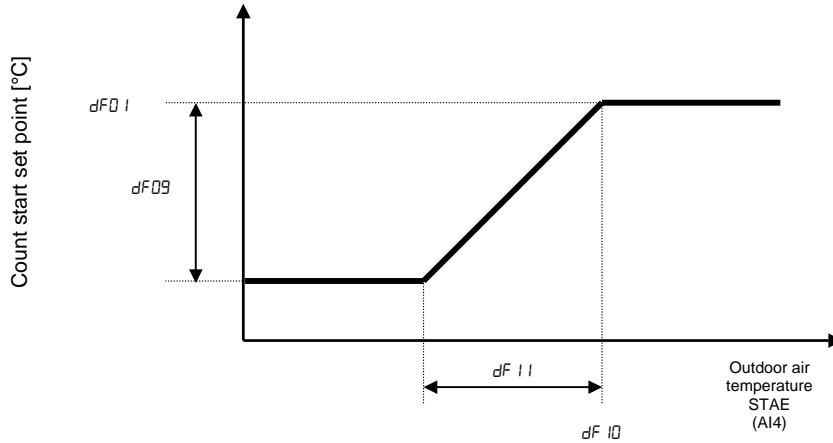
Defrost management

The defrost function is always activated in heating mode.

Defrost start

Defrost starts when, with compressor on, the control probe (SL probe – AI3 input) detects a temperature value below the count start set point for a cumulative time longer than the one indicated by the parameter $dF03$.

The count start set point changes according to the outdoor air temperature (STAE probe – AI4 input) as indicated in the diagram below.



The count is stopped in the following cases :

- the temperature read by SL probe rises above the value indicated by parameter $dF02$
- the compressor is shut down

The count is reset in the following cases :

- defrost cycle complete execution
- phase voltage failure or controller shut down
- operation mode change
- the temperature read by SL probe rises above the value indicated by parameter $dF14$

When defrost starts, the compressor is kept on, the fans are switched off and the reversing cycle valve changes its position.

Defrost

During defrost :

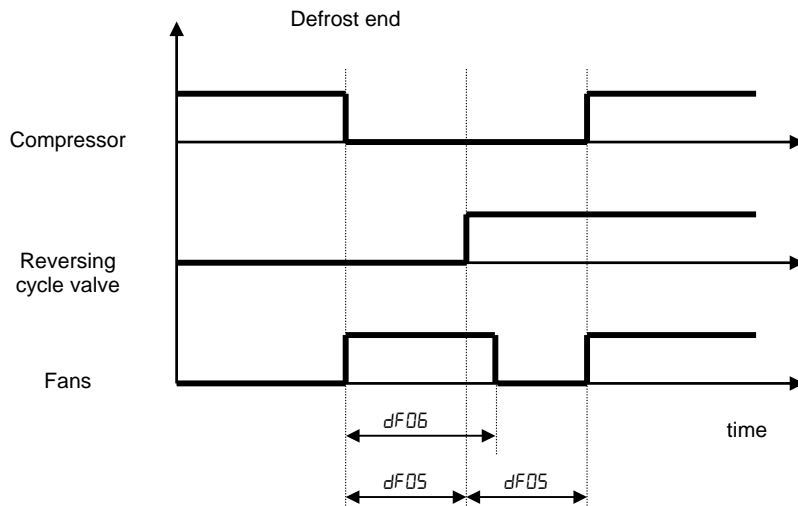
- the compressor is on
- the reversing cycle valve is in the position corresponding to cooling mode
- the fans are off

Defrost end

Defrost ends in the following cases :

- the temperature read by SL probe rises above the value indicated by parameter $dF02$
- defrost interval exceeds the time indicated by parameter $dF07$

At the defrost end, compressor, fans and reversing cycle valve are managed as indicated in the diagram below.



OPERATION DIAGRAMS

OPERATION DIAGRAMS

Operation diagram codes summary

Description	Version	Code	Validity end date	Model							
				6.1	7.1	9.1		11.1		14.1	17.1
				1~	1~	1~	3~	1~	3~	3~	3~
Refrigeration and hydraulic diagram	IR	3QE24670	-	x	x	x	x	x	x	x	x
	IP	3QE24680	-	x	x	x	x	x	x	x	x
Wiring diagram	-	3QE22261	-	x	x	x		x			
		3QE22271	-				x		x	x	x



Cod. 3QE24940

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01

02

03

04

05

06

07

08

09

A

B

C

D

E

F

	DATA/DATE 23-01-2008
	Disegnatore/Drawn by A. Tebaldi
	Verificato/Checked by
	Disegno n°/Drawing n° / Rev. 3QE2226 1 00
	Sostituisce il/Replaces the
Titolo/Title SCHEMA ELETTRICO / WIRING BOARD	
Commessa S.E. RXA F1-2 MONOFASE (6.1-7.1-9.1-11.1)	
	File 3QE22261_00-C

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	DATA/DATE 23-01-2008
	Disegnatore/Drawn by A. Tebaldi
	Verificato/Checked by
	Disegno n°/Drawing n° / Rev. 3QE2227 / 1 00
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Titolo/Title SCHEMA ELETTRICO / WIRING BOARD	
Commessa S.E. RXA F2-3 TRIFASE (9.1-11.1-14.1-17.1)	

