CH-DIN(/P) rel. 3/98 ing

chiller controller for water refrigerators and heat pumps

WHAT IT IS

CH-DIN is an electronic device designed to control water refrigerators and heat pumps (air-air, air-water and water-water). Its main feature is the capability to perform all functions that are usually assigned to external devices, thus eliminating additional electrical connections to anything other than the controlled devices

HOW IT IS MADE

• Main outputs: 4 relay outputs 4(2)A AC 250V for compressor, anti-frost resistors, water pump and inversion valve circuit 1
• Condenser fan output: 1 voltage digital output to drive the special fan modules
• Alarm output: 1 output on static relay (SSR) 12…48 Vac, maximum consumption 200 mA
• CH-DIN analogue inputs: 3 PTC probes for input water control, output water in circuit 1 and condensation circuit 1 (CH-DIN)
• CH-DIN/P analogue inputs: 2 PTC probes for input water control and output water control circuit 1 and one 4…20 mA / 0…30 bar for pressure probes (condensation control circuit 1)
• PTC probe display range: -50,0…99,9 °C
• Digital inputs: 6 ON/OFF inputs for flow switch, circuit 1 fan thermal system per, remote ON–OFF, maximum pressure switch circuit 1, minimum pressure switch circuit 1 and compressr thermal magnetic circuit 1
• Power supply : 12 Vac 3VA

PLUS PRODUCT

The functions can also be expanded through other elements of the CH-DIN Microtech system: the control modules for a second compressor, the remote keyboards, the fan control modules, and the interface modules to install a remote keyboard, the connection to a local PC and to a remote PC.

GENERAL DESCRIPTION

CH-DIN is an electronic device designed to control water refrigerators and heat pumps (air-air, air-water and water-water).
Its main feature is the capability to perform all functions that are usually assigned to external devices, thus eliminating additional electrical connections to anything other than the controlled devices.
It controls the temperature of the cooling and heating water, the defrost cycles, the activation of the anti frost resistors for the water circuit, the compressor activation timing and performs the continuous proportional regulation of the condensing fans.
The CH-DIN functions can also be expanded through other elements of the CH-DIN Microtech system: the control modules for a second compressor (C2-DIN, C2-DIN/P and C2-DIN/12/ID220), the remote keyboards (TS-DIN/S, TS-W and TS-W/OP), the fan control modules (CF-05, CF-15, CF-22 and CF-REL) and the interface modules to install a remote keyboard (CS-DIN/TTL-CL), the connection to a local PC (CS-DIN/232-TTL) and to a remote PC (CS-DIN/232-485 and CS-DIN/485-TTL).
CH-DIN is supplied in the 70x85 mm format (4 modules) for Din rail (Omega 3) or wall mount.
A range of numeric parameters allows instrument configuration according to the application.

GENERAL OPERATION

Machine states

Four different machine states are provided: ON, OFF, STAND-BY and VIRTUAL OFF.
In the ON state (machine on) both the front key and the remote input (parameter 90 = 2 and remote ON-OFF input closed) can be used to start the instrument.
The OFF state (machine off) is achieved through the front key only; the Line Led is on if the instrument is powered.
The STAND-BY state is accessed by pressing the “Mode” front key (only when parameter 68 = 2). In this case all the machine outputs are disabled save those controlling the anti frost resistors; the display of all alarms but the anti frost and the flow switch are active.
The machine can be set to VIRTUAL OFF by the remote input only (parameter 90 = 2 and remote ON-OFF input open). In this state the compressor, fan and pump outputs are disabled and the “E00” error message is displayed.

Selecting the type of regulation

The regulation type can be selected through the “Mode” front key or through the remote ON-OFF input in the terminal block.
In the first case parameter 68 allows to define the type of regulation performed by the machine at startup; the operation mode for the key can be selected through parameter 67.
In case the ON-OFF remote input is set as active for the selection of the regulation type (parameter 90 = 1, parameter 67 = 0 and parameter 68 = 2) the “Mode” front

key is ignored.

Displaying the state of the machine resources

The “states” key allows to access the display phase for the state of resources.

By pressing the key the “Indexes” display shows the codes related to resources (the “Up” and “Down” keys can be used to navigate through the codes), while the “Values” display shows the codes related to the state of resources.

For the meaning of codes related to resources and their states refer to table “Codes for states and resources”.

Operation time for the compressor and the water pump

The instrument automatically stores the hours the compressor (or the compressors, in case module C2-DIN is being driven) and the pump worked.

When entering the resource status display mode the display shows the values stored (they shall be multiplied by 100 in case the “Hoursx100” led is turned on).

During value display it is possible to reset the values by simultaneously pressing keys “Up” and “Down”.

Start and stop

The instrument is turned on and off by pressing the “On/Off” key.

In case no alarm conditions are present at startup, the display shows the value of the PTC probe referring to water in circuit input 1 (or of the condensation PTC probe for circuit 1 in case of water-water machine and “winter” operation - parameter 1 = 5); in case the probe was declared as “not present” three dashes (- - -) will be displayed.

When the instrument is turned off the manual alarms will be reset.

In case of power failure the instrument stores the type of regulation in progress and recovers it when power supply is restored. All timings in progress at power failure are zeroed, including defrost which is not restarted.

TEMPERATURE REGULATION

Setting the setpoint

We shall analyse two cases related to setpoint setting: single compressor (CH-DIN without C2-DIN) and double compressor (CH-DIN with C2-DIN) machine.

In case of single compressor machine the regulation setpoint is set through parameters 02 (“cooling”) and 03 (“heating”) while the intervention differential can be set through parameters 04 (“cooling”) and 05 (“heating”).

Please note that the differential is meant “over” the setpoint: e.g. in case of “heating” regulation the off point is setpoint plus half the value of the differential, while the intervention point is setpoint less the value of the differential.

In case of double compressor machines the regulation setpoint for the first compressor and the related intervention differential shall be set as for a single compressor machine. The setpoint of the second compressor (parameter 48) is not defined as absolute value but as distance from the first compressor’s setpoint (the intervention differential is the one set for the first compressor in case of “heating” regulation - parameter 5).

Parameter 55 defines the “sign” of the compressor differential, i.e. the number of active compressors when setpoint is reached (see parameter 55).

Controlling compressors

The thermal regulator controls power delivered by the compressor (or compressors, in case the C2-DIN module is used) to obtain the temperature value set by the User through parameters 02 (“cooling” regulation) and 03 (“heating” regulation).

• Compressors are inserted according to the following concepts:

a) the compressor with the lowest operation time is enabled;

b) in case of equal number of hours the compressor with the lowest safety time shall be selected (parameters 49 and 50);

c) in case of equal times priority is granted to compressor 1 (the one controlled by CH-DIN).

• Compressors are turned off according to the following logic:

a) the compressor with the most operating hours is disabled;

b) in case of equal times priority is granted to compressor 1 (the one controlled by CH-DIN).

• The start and stop of compressor are determined by some time rules:

a) a time interval (set by parameter 49) shall elapse between the stop and the start of the same compressor;

b) a time interval (set by parameter 50) shall elapse between two subsequent starts of the same compressor;

c) a time interval (set by parameter 53) shall elapse between the start of the first compressor and the start of the second;

d) a time interval (set by parameter 54) shall elapse between the stop of the first compressor and the stop of the second;

e) the activation of compressors is subject to a delay from the water pump start which can be selected through parameter 40;

f) when the machine is started the magneto-thermal compressor alarm is delayed for the time set through parameter 46.

CONTROLLING DEFROST

General information

CH-DIN can control single or double (using C2-DIN) compressor machines.

In the former case the reference input is the condensation probe for circuit 1 connected to CH-DIN.

In the latter case the reference input depends on the settings of parameter 66 (separate-simultaneous defrosts). When defrosts are separate the reference for circuit 2 is the circuit 2 condensation probe connected to C2-DIN. In case of simultaneous defrosts the reference input is the circuit 1 condensation probe if the circuit 2 probe was declared as “not present”; in case both probes are present the one reading the lowest value shall be considered.

Defrost is permitted only when the machine is in “heating” mode and its control is enabled (parameter 84).

Defrost input

To enable defrost the external exchanger probe (circuit 1 or circuit 2 condensation probe) shall have detected a temperature (pr pressure) lower than the defrost start temperature (parameter 20) for a time longer than the defrost calling time (parameter 22).

Count starts only when the compressor in the related circuit is working.

If the probe in the external exchanger detects a temperature (or a pressure) higher than the defrost start temperature time count is suspended, not zeroed.

The time count is zeroed after a defrost cycle, when the operation mode is changed at a new restart.

IMPORTANT

If defrost was enabled (parameter 84) the defrost call time (parameter 22) shall not be set to 0.

Control during defrost

During defrost the inversion valve switches to “cooling” mode.

Fans are disabled and are restarted at the maximum speed when the temperature (or pressure) exceeds the quantity at fan start in defrost (parameter 25).

In case of double compressor machines with separate defrosts, when a compressor circuit enters defrost the thermoregulator automatically balances it by activating the free compressor. If defrost is required also for the second compressor circuit, it can take place after a delay from the end of the first defrost (set by parameter 24 - defrost interval between circuits).

In case of simultaneous defrost double compressor machines both circuits enter defrost simultaneously.

Anti frost resistors (see parameter 86) can be enabled during defrost.

Exiting defrost

Defrost is exited when the end defrost temperature (or pressure) is reached (parameter 21). Once the defrost time-out is expired (parameter 23) the defrost end is forced even if the end defrost value has not been reached.

Defrost can be interrupted if an alarm condition which is not compatible with its prosecution occurs.

Defrost end always involves the stop of related compressors and therefore a delay in their activation (delay OFF-ON: parameter 49).

WATER PUMP REGULATION

Setpoint setting

The activation logic for the water pump can be set through parameter 39; it can be declared as absent or its continual opera-

tion can be selected or, more, a call activation can be chosen (pump working when compressor is ON, pump stopped when compressor is OFF).
In any case, parameter 40 allows the definition of a delay, in seconds, between the pump start and the following compressor start so as to allow the water circuit to reach its steady condition. Only in case of call activation will parameter 41 allow to set a delay, in seconds, between the compressor stop and the pump stop so that the machine is protected against physical stress due to sudden water shortage.

ANTI FROST RESISTORS REGULATION

Anti frost resistors are enabled when the anti frost resistor setpoint is reached (parameter 32) by one of the output water temperature probes (circuits 1 and 2) or by the circuit 2 condensation probe (only when parameter 86 = 2).
The intervention differential for resistors can be set through parameter 33.
This regulation is enabled in ON, STAND-BY and virtual OFF states (see parameter 90); it is not enabled in OFF state from keyboard.

FAN REGULATION

General information

CH-DIN is provided with an output port to control fans in circuit 1; fans in circuit 2 can be controlled through module C2-DIN, driven by CH-DIN.
Two regulation types are provided (can be set through parameters 10 and 11): phase cut proportional and On-Off.
Fans are controlled through special control modules directly connected to CH-DIN and C2-DIN: CF-05, CF-15 and CF-22 are designed to drive single phase motors with maximum powers of 500, 1500 and 2200 W respectively; CF-REL is designed to control On-Off single phase motors.
In case of double compressor machines the two outputs shall be configured for the same type of regulation.

Proportional regulation

This type of regulation provides fan speed modulation between a minimum and a maximum value that can be set as a percentage of the maximum supply voltage through parameters 12 and 13.
The temperature value related to the minimum speed can be set through parameters 06 (“cooling” regulation) and 08 (“heating” regulation). The temperature related to the maximum speed shall be set through parameters 07 (“cooling” regulation) and 09 (“heating” regulation).
The speed of fans is directly proportional to the temperature in case of “cooling” regulation, inversely proportional in case of “heating” regulation.
IMPORTANT
In case of proportional regulation the following rules on parameter settings shall be respected:
• parameter 14 shall be lower than parameter 6 and 6 shall be lower than 7;
• parameter 15 shall be greater than parameter 8 and 8 shall be greater than9.

On-Off regulation

On-Off regulation involves operation of fans at the maximum speed or their stop.
The temperature value related to stop is set through parameters 06 (“cooling” regulation) and 08 (“heating” regulation). The one related to start is set through parameters 07 (“cooling” regulation) and 09 (“heating” regulation).
This type of regulation requires to set parameters 16, 17 and 38 (fan start at the maximum speed, cut-off by-pass and phase displacement times) to 0. The minimum and maximum speed (parameters 12 and 13) shall be set to 0 and 100 respectively.
By declaring regulation probes as “not present” (parameters 76 and 77) a call operation for fans can be enabled: they shall start only when the compressor is enabled.
IMPORTANT
In case of On-Off regulation the following rules for parameters setting shall be respected:
• parameter 14 shall be lower than parameter 6;
• parameter 15 shall be greater than parameter 8.

Pickup at startup

In case of proportional regulation the fans start at the maximum speed can be selected (parameter 16); the pickup length can be set through parameter 18.
Please note that when the compressor is started for the first time fans start at the maximum speed

Cut-off function

In case of proportional regulation a temperature (or pressure) can be selected so that when it is reached fans are disabled to prevent unnecessary thermal exchanges. At machine start the cut-off function is suspended for a time set by parameter 17.
The intervention differential of the cut-off function is one tenth of the modulation band, i.e. the difference between the minimum and the maximum speed.
Dependent or independent activation
Parameter 19 determines whether fan activation shall be dependent or independent from the compressor state.
In case of dependent activation fans are enabled, according to the regulation probes, only when the compressor is working.
If independent mode is selected, fan activation shall be independent from the compressor state.

Fan synchrony

Parameter 89 determines whether fan activation (in case of double compressor machines) shall be independent or synchronised.
If an exchanger and an analogue input is related to each fan select option “independent fans”.
“Synchronised fans” shall be selected whenever fans are required to be controlled by the sole input declared as “present” or by the more influent of the two (the one reading the higher value in case of “cooling” regulation, the one reading the lower value in case of “heating” regulation).

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Fan output linearization

Fan output linearization is available only in case proportional regulation (parameters 10 and 11) is selected and fans operate independently (parameter 89). It allows to drive fans at the best even with displacements between voltage and current that occur when a non purely ohmic load is connected.
To perform such linearization proceed as follows:
• set temperature (or pressure) values corresponding to the minimum and maximum speeds for fans (e.g. parameter 6 = 10 °C and parameter 7 = 20 °C);
• set the minimum and maximum speeds for fans (e.g.: parameter 12 = 0 %, parameter 13 = 100 %);
• set the cutoff temperature outside the regulation band (e.g.: parameter 14 = 5 °C);
• set parameter 38 (fan displacement) to 0;
• start the machine in “cooling” mode (the same operation can be performed when the machine is in “heating” mode by setting the related parameters) and select the central band temperature for the regulation (in this case: 15 °C);
• measure the voltage in parallel to the load and set this voltage to half the line voltage modifying parameter 38 (fan displacement).
Now the fan displacement is set and other parameters can be modified according to requirements.
IMPORTANT
In case of a mains frequency of 60 Hz abnormal situations might occur in fan control. Such situations can usually be solved by setting a minimum speed (parameter 12) below 10% and a maximum speed (parameter 13) below 90%.
However in case of 60 Hz mains, it is advisable to check correct fan operation as different adjustments according to the type of motor used might be necessary.

Fan voltage limitation

If the maximum fan speed shall be limited due to the line voltage exceeding the max-

imum allowed operate on parameter 13 to set a maximum driving voltage equal to the voltage for fans (e.g. on a 230 Vac network set parameter 13 = 96 to use fans originally designed for a 220 Vac supply).

COMMANDS ON FRONT PANEL

Value Display
It is the 3 digit plus "-" sign display located on the left of the front panel. It shows the values of parameters and resource conditions, the error codes and the temperature measured by the water probe temperature in circuit 1 input and condensation (condensation only when parameter 01 = 5 and "heating" regulation selected).

Index Display
It is the 2 digit display located on the right of the front panel. It shows the numeric code (parameter or state) to which the value shown by the "Value" display refers.

Hoursx100 led
This Led is located on the top left of the "Value" display. When on it indicates the value of hours of operation for compressors displayed by "Value" display shall be multiplied by 100.

Heating Led
When on indicates the instrument is operating in "heating" mode.

Cooling Led
When on indicates the instrument is operating in "cooling" mode.

Menu led
When on indicates the "Menu" key has been pressed and parameters programming mode has been entered.

Comp Led
When on indicates the compressor in circuit 1 is active; when blinking indicates temporization in progress.

Status Led
When on indicates the "Status" key has been pressed and resource state display mode has been entered.

Alarm Led
When on indicates alarm condition in progress.

Line Led
When on indicates the instrument is powered.

Up and Down keys
Keys used to increase values shown by displays "Index" and "Value". When pressed simultaneously they reset the operation hours for compressors and pump (only when displayed).

Mode Key
Allows to select the regulation type for the instrument (see parameters 67 and 68).

Menu key
Allows to enter parameters programming mode and exit it

Set key
In parameters programming mode it allows to select either "Index" or "Value" display mode.

Status key
Allows to display the state of the machine resources. In parameters programming

CODES FOR STATES AND RESOURCES

Resource code	Resource	State code	Meaning
01	compressor 1	01	"summer" operation
		02	"winter" operation
		03	operating on defrost
		04	timing in progress
		06	not active
02	hours compressor 1	valore	operating hours (since last reset)
03	fans circuit 1	01	operating
		02	off for defrost in progress
		04	timing in progress
		06	not active
04	defrost circuit 1	- - -	not enabled (parameter 84)
		01	in progress
		02	security count compressor 1
		03	defrost time count
		04	delay in defrost in progress
		06	not active
05	fans output circuit 1		number from 0 to 100%
21	compressor 2	- - -	not present
		01	"summer" operation
		02	"winter" operation
		03	operating on defrost
		04	timing in progress
		06	not active
22	hours compressor 2	- - -	not present
			operating hours (since last reset)
23	fans circuit 2	- - -	not present
		01	operating
		02	off for defrost in progress
		04	timing in progress
		06	not active
24	defrost circuit 2	- - -	not enabled (parameter 84)
		01	in progress
		02	security count compressor 2
		03	defrost time count
		04	delay in defrost in progress
		06	not active
25	fans output circuit 1	- - -	not present
		valore	power supplied (value from 0 to 100%)
40	temperature probe	- - -	not present
		valore	value in tenth of degree
		On	closed input
		Off	open input
		ERR	error in probe
41	On-Off remote input	- - -	not present
		On	closed input
		Off	open input
42	output water temperature	- - -	not present
	probe in circuit 1	valore	value in tenth of degree
		On	closed input
		Off	open input
		ERR	error in probe

CODES FOR STATES AND RESOURCES

Resource code	Resource	State code	Meaning
43	output water temperature	- - -	not present
	probe in circuit 2	value	value in tenth of degree
		On	closed input
		Off	open input
		ERR	error in probe
44	condensation input	- - -	not present
	circuit 1	valore	value in tenths of degree
		ERR	error in probe
45	condensation input	- - -	not present
	circuit 2	valore	value in tenths of degree
		ERR	error in probe
46	water pump	- - -	not present
		01	working
		06	not active
47	water pump hours	- - -	not present
			hours of operation (since last reset)
48	anti frost resistors	- - -	not present
		01	active
		06	not active
49	resource code not used	- - -	state code not used

mode brings the parameters of the second display level to the first display level.

On/Off key

Allows to turn the instrument ON and OFF; the key is enabled also in case the remote selection of ON and VIRTUAL OFF states are enabled (parameter 90 = 2).

PARAMETERS PROGRAMMING

For ease of use and safety reasons three different parameters access levels (display/change) are provided.

The first access level, the easiest, is suitable for parameters that shall be frequently displayed/changed.

The second level involves a password; it is therefore suitable for parameters that shall not be modified without the Servicing support.

The third level involves the use of a Personal computer connected to the instrument through special interface modules; this level is usually reserved to the manufacturers and allows to access all parameters and set the access level for each one of them.

Accessing first level parameters

First level parameters can be accessed by pressing the “Menu” key: the “Index” display shows the label of the first parameter (“01”), the “Value” display shows the related value.

The “Set” key can be used to skip from one display to the other, i.e. from the selection of the parameters to be displayed/modified to its actual change; the currently selected display blinks.

The “Up” and “Down” keys can be used to browse parameters (“Index” display active) or change the value of the currently selected one (“Value” display active); when both displays blink the parameter is out of range and cannot be stored.

To exit parameters programming mode press key “Menu”; in case of changes in parameters values the power supply shall be disconnected to store the set values properly.

Accessing second level parameters

Second level parameters can be accessed by accessing first level parameters and then entering the correct password into parameter 92.

Once the password has been entered, press the “Set” key until the “Index” display starts blinking; now also second level parameters are accessible and can be modified. When the Led in the lower part of the left digit in the “Index” display is on it confirms the currently displayed parameter belongs to the first level menu.

A second level parameter can be brought to first level; once the parameter to be modified has been selected press the “Status” until the Led in the lower part of the left digit in the “Index” display is turned on. The opposite operation (from the first to the second level) can only be achieved via PC programming.

In second level parameter programming also third level parameters can be displayed but they cannot be modified.

Accessing third level parameters

Third level parameters can only be accessed through an IBM compatible PC once the special Microtech software has been installed.

PARAMETERS DESCRIPTION

Hereunder is a description for all parameters available in CH-DIN (including parameters accessible via PC only); please refer to the parameters table for their relationship with the correspondent access level.

01 • machine configuration

Allows the selection of the machine type to be controlled.

The correct setting of this parameter, while influencing keyboard and resource management, does not exclude a proper setting for all other machine regulation parameters.

00 = air-water chiller;
01 = water-water chiller;
02 = air-water heat pump without defrost;
03 = air-water heat pump with defrost;
04 = water-water heat pump with gas inversion;
05 = water-water heat pump with external manual inversion;
06 = air-air pump with or without inversion.

02 • “cooling” regulation setpoint

It is the temperature above which compressors are enabled in case of “summer” operation

03 • “heating” regulation setpoint

It is the temperature below which compressors are enabled in case of “winter” operation.

04 • “cooling” regulation differential

It allows to select the intervention differential (over the setpoint) in case of “summer” operation (see “Temperature regulation” section).

05 • “heating” regulation differential

Allows to select the intervention differential (over the setpoint) for “winter” operation (see “Temperature regulation” section).

06 • temperature (or pressure) for minimum speed in “cooling” regulation

Allows to select the temperature (or pressure) below which fans operate at the minimum speed.

07 • temperature (or pressure) for maximum speed in “cooling” regulation

Allows to select the temperature (or pressure) above which fans operate at the maximum speed.

08 • temperature (or pressure) for minimum speed in “heating” regulation temperature

Allows to select the temperature (or pressure) above which fans operate at the minimum speed.

09 • temperature (or pressure) for maximum speed in “heating” regulation temperature

Allows to select the temperature (or pressure) below which fans operate at the maximum speed

10 • fan output type circuit 1

Allows to select the output regulation type for circuit 1 fan control.

0 = proportional output 0…220 Vac (fan modules CF-05/15/22 only);
1 = ON/OFF output (fan module CF-REL only);
2 = disabled output.

11 • fan output type circuit 2 (C2-DIN

Allows to select the output regulation type for circuit 2 fan control. (set to 2 in case of single compressor machine).
0 = proportional output 0…220 Vac (fan modules CF-05/15/22 only);
1 = ON/OFF output(fan module CF-REL only);
2 = disabled output.

12 • minimum fan speed
Allows to select the supply voltage for fans corresponding to their minimum speed. Expressed in percentage, from 0 to 100%, of the maximum allowed speed.

13 • fan maximum speed
Allows to select the supply voltage for fans corresponding to their maximum speed. Expressed in percentage, from 0 to 100%, of the maximum allowed speed.

14 • "cooling" regulation cut-off set-point
Temperature (or pressure) below which fans are disabled to prevent unnecessary heat exchanges.

15 • "heating" regulation cut-off set-point
Temperature (or pressure) above which fans are disabled to prevent unnecessary heat exchanges.

16 • fans start at maximum speed
Allows to select fans startup at the maximum speed.
0 = restart without pickup;
1 = restart with pickup.

17 • cut-off by-pass time
Allows to select a delay in the activation of the cut-off function activation at fans start-up. In seconds.

18 • fan pickup time
Allows to select the length of the fan start pickup. In seconds.

19 • fan start logic
Allows to select the logic for fan start.
0 = dependent activation (fans enabled according to the regulation probes only for compressor ON, fans always disabled for compressor OFF);
1 = independent activation (according to regulation probes only).

20 • temperature (or pressure) for defrost start
È la temperature (or pressure) below which the defrost cycle is started.

21 • temperature (or pressure) for defrost end
It is the temperature (or pressure) above which defrost ends.

22 • defrost call time
It is the permanence time of the condensation probe below the temperature (or pressure) for defrost start to start the defrost cycle. In minutes.

23 • defrost time-out
It is the maximum time for defrost. In minutes.

24 • defrost interval between circuits
Allows to set the interval between the defrost end for a circuit and the defrost start for the other. In minutes.

25 • temperature (or pressure) for fan start in defrost
It is the temperature (or pressure) above which the start function for fans at maximum speed during defrost is enabled

26 • anti frost alarm setpoint
It is the temperature below which the anti frost alarm is enabled.

27 • anti frost alarm differential
Allows to select the intervention differential for the anti frost alarm.

28 • anti frost alarm restore mode
0 = automatic restore;
1 = manual restore (instrument on/off through the "on/off-reset" key).

29 • anti frost alarm configuration by-pass
Allows to set the activation mode for the anti frost alarm by-pass.
0 = not active;
1 = active in case of "heating" regulation;
2 = active in case of "cooling" regulation;
3 = always active

30 • not used

31 • by-pass time for anti frost alarm
Allows to set a delay in the anti frost alarm activation at machine start. In seconds.

32 • anti frost resistors setpoint
It is the temperature below which anti frost resistors are enabled.

33 • anti frost resistors differential
Allows to select the intervention differential for the anti frost resistors

34…37 • not used

38 • fans displacement
Allows to set a delay through which the different electrical features of the fan motors are compensated. Operates on both the fan outputs.

39 • water pump activation logic
Allows to set the activation logic for the water pump.
0 = pump not present;
1 = continual operation (pump always operating);
2 = call activation (water pump working when compressor ON, water pump idle when compressor OFF).

40 • delay in the activation of pump-compressor
Allows to set a delay between the pump and the compressor starts to allow the water circuit to reach steady condition. In seconds

41 • delay in compressor-pump disabling
Allows to set a delay between the stop of the compressor and the pump so as to preserve the machine from physical stress due to the sudden shortage of water (only when parameter 39 = 2). In seconds.

42 • flow switch alarm by-pass time from pump activation
Allows to set a delay in the activation of the flow switch alarm which starts from the activation of the water pump, in addition to the one starting from input opening (see parameter 70); this allows the water circuit to reach a constant flow condition. Expressed in seconds.

43 • by-pass time for flow switch alarm restore
It allows to set a delay in flow switch alarm deactivation, in order to avoid transients due to non constant flow.

44 • restore mode for compressor thermal magnetic alarm
0 = automatic restore;
1 = manual restore (instrument start/stop through the "on/off-reset" key).

45 • restore mode for fan thermal alarm
0 = automatic restore;
1 = manual restore (instrument start/stop through the "on/off-reset" key).

46 • by-pass time for the compressor thermal magnetic alarm
Allows to set a delay in the activation of the compressor thermal magnetic alarm at machine startup. In tens of seconds.

47 • measurement unit
Allows to select the measurement unit for temperature display. Please note that the instrument does not automatically re-calculate the values of previously set parameters.
0 = Celsius grades;
1 = Fahrenheit grades.

48 • intervention temperature differential for the second compressor
Allows to define the temperature differential between the activation of the first and the second compressor. In case of single compressor machine it shall be set to 0 (see section "Temperature regulation").

49 • OFF-ON delay
Minimum stop time for a compressor after it is turned off. In tens of seconds.

50 • ON-ON delay
Minimum time between two subsequent starts of the same compressor. In tens of seconds.

51 • minimum pressure alarm by-pass time ("winter" operation)
It allows to set a delay in the activation of the minimum pressure alarm at compressor start ("heating" regulation only). Expressed in seconds.

52 • minimum pressure alarm by-pass time ("summer" operation)
It allows to set a delay in the activation of the minimum pressure alarm at compressor start or when entering defrost ("cooling" regulation only). Expressed in seconds.

53 • time interval between the interventions of the first and the second compressor
Allows to define the time interval between the activation of the first and the second compressor. In case of single compressor machine it shall be set to 0. Expressed in seconds.

54 • time interval between the stops of the first and the second compressor
Allows to define the time interval between the stop of the first and the second compressor. In case of single compressor machine it shall be set to 0. Expressed in seconds.

55 • compressors active when setpoint is reached

Allows to set the number of active compressors when the regulation setpoint is reached. In case of single compressor machine it shall be set to 0 (see "Temperature regulation" section).
0 = single compressor machine;
1 = only one compressor active (the value for parameter 48 is considered as negative referred to the setpoint in case of "winter" operation and positive in case of "summer" operation);
2 = two active compressors (the value for parameter 48 is considered as positive referred to the setpoint in case of "winter" operation and negative in case of "summer" operation).

56 • compressor presence circuit 1
Allows to set the presence of the compressor in the first circuit.
0 = compressor absent;
1 = compressor present.

57 • compressor presence circuit 2
Allows to set the presence of the compressor in the second circuit.
0 = compressor absent;
1 = compressor present.

58 • "cooling" regulation setpoint minimum limit
Allows to set the minimum limit for setpoint in "summer" operation

59 • "cooling" regulation setpoint maximum limit
Allows to set the maximum limit for setpoint in "summer" operation.

60 • "heating" regulation setpoint minimum limit
Allows to set the minimum limit for setpoint in "winter" operation.

61 • "heating" regulation setpoint maximum limit
Allows to set the maximum limit for setpoint in "winter" operation.

62 • minimum limit for anti frost alarm
Allows to set the minimum limit for the anti frost alarm.

63 • maximum limit for anti frost alarm
Allows to set the maximum limit for the anti frost alarm.

64 • inversion valve presence
Allows to set the presence of the inversion valve.
0 = valve absent;
1 = valve present.

65 • inversion valve configuration
Allows to define whether the valve is active in case of "winter" or "summer" operation.
0 = relay ON for "cooling" regulation;.
1 = relay ON for "heating" regulation.

66 • separate-simultaneous defrosts
Allows to define whether the defrosts in the two circuits shall be simultaneous or separated by a time interval (which can be set through parameter 24). In case of single compressor machine it shall be set to 0.
0 = separate defrosts;
1 = simultaneous defrosts.

67 • "mode" key configuration
Allows to define the operation mode for the "mode" front key.
0 = "cooling" regulation selected and "stand-by" state (only for parameter 68 = 2);
1 = "toggle" function ("heating", "cooling" and "stand-by" state regulations selection).

68 • configuration at machine startup
Allows to define the state of machine at startup.
0 = "cooling" regulation;
1 = "heating" regulations;
2 = "stand-by" state.

69 • not used

70 • flow switch alarm by-pass time when the related input is opened.
It allows to set a delay in the activation of the flow switch alarm from the opening of the related input. Value expressed in seconds.
Please note that the activation of this alarm is also subject to a by-pass time from the activation of the water pump (see parameter 42).

71 • not used (set to 0)

72 • input water PTC probe input configuration
Allows to configure the input of the input water PTC probe.
0 = probe absent;
1 = digital input (for the control of motor condensing machines only);
2 = analogue input (PTC probe).

73 • output water PTC probe input configuration circuit 1
Allows to configure the input of the output water PTC probe in circuit 1.
0 = probe absent;
1 = digital input (for the control of motor condensing machines only);
2 = analogue input (PTC probe).

74 • output water PTC probe input configuration circuit 2 (C2-DIN)
Allows to configure the input of the output water PTC probe in the circuit 2 on module C2-DIN. In case of single compressor machine it shall be set to 0.
0 = probe absent;
1 = digital input (for the control of motor condensing machines only);
2 = analogue input (PTC probe; not selectable in case module C2-DIN/12/ID220 is used).

75 • not used (set to 0)

76 • input configuration for condensation probe circuit 1
Allows to configure the condensation probe input circuit 1.
0 = probe absent;
1 = digital input (not selectable);
2 = analogue input (PTC probe in the CH-DIN or input 4…20 mA / 0…30 bar in the CH-DIN/P).

77 • input configuration for condensation probe circuit 2
Allows to configure the condensation probe input circuit 2 on the C2-DIN module. In case of single compressor machine it shall be set to 0.
0 = probe absent;
1 = digital input (not selectable);
2 = analogue input (PTC probe in the C2-DIN or input 4…20 mA / 0…30 bar in the C2-DIN/P).

78, 79, 80 • probe calibration referred to parameters 72, 73, 74 respectively
These parameters allow to compensate the error that might occur between the real temperature and the value read by the probes. The correction is performed by inputting a value equal to the error detected, but with opposite sign.

81 • not used

82, 83 • probe calibration referred to parameters 76 and 77 respectively
These parameters allow to compensate the error that might occur between the real temperature and the value read by the probes. The correction is performed by inputting a value equal to the error detected, but with opposite sign.

84 • defrost enable
Allows to enable or disable the start of defrost cycles.
0 = defrost disabled;
1 = defrost enabled.

85 • presence of anti frost resistors
Allows to set the presence of anti frost resistors.
0 = resistors absent;
1 = resistors present.

86 • configuration for anti frost resistors controller circuits 1 (CH-DIN) and 2 (C2-DIN)
Allows to define the activation mode for the anti frost resistors.
0 = thermally controlled operation with regulation on the output probe circ. 1 and on the output water probe 2 of C2-DIN;
1 = thermally controlled operation with regulation on the output water probe circ. 1 and on the output water probe 2 of C2-DIN - always On during defrost;
2 = thermally controlled operation (even during defrost) with regulation on the output probe circ. 1 and on the output water and condensation probes of circuit 2 (C2-DIN; usually in case of water-water machines with gas inversion).

87 • maximum pressure alarm restore mode
0 = automatic restore;
1 = manual restore (instrument stop/restart through the "on/off-reset" key).

88 • minimum pressure alarm restore mode
0 = automatic restore;
1 = manual restore (instrument stop/restart through the "on/off-reset" key).

89 • fan synchronism
Allows to define whether the fan activation (in case of double compressor machines) shall be independent or synchronised (set to 0 in case of single compressor machines).
0 = independent fans; an exchanger and an analogue input is related to each fan in the machine..
1 = synchronised fans; the fans are controlled by the only input declared as "present" or by the more influent between the two (the one reading the highest value in case of "cooling" regulation, the one read-

DEFAULT VALUES AND PARAMETERS ACCESSIBILITY FOR STANDARD MODELS

Parameter	Description	Range	Default	Unit	Accessibility
01	machine configuration	0…5	3	number	PC
02	“cooling” regulation setpoint	p. 58…p. 59	20	°C/10	1st level
03	“heating” regulation setpoint	p. 60…p. 61	400	°C/10	2nd level
04	“cooling” regulation differential	0…126	10	°C/10	1st level
05	“heating” regulation differential	0…126	20	°C/10	2nd level
06	“cooling” minimum speed temp. (press)	0…126 (0…30)	30	°C (bar)	2nd level
07	“cooling” maximum speed temp. (press)	0…126 (0…30)	40	°C (bar)	2nd level
08	“heating” minimum speed temp. (press)	0…126 (0…30)	10	°C (bar)	2nd level
09	“heating” maximum speed temp. (press)	0…126 (0…30)	7	°C (bar)	2nd level
10	circuit 1 fan output type	0…2	0	number	PC
11	circuit 2 fan output type (C2-DIN)	0…2	2	number	PC
12	minimum fan speed	0…100	45	max %	2nd level
13	maximum fan speed	0…100	100	max %	2nd level
14	“cooling” regulation cut-off setpoint	0…126 (0…30)	25	°C (bar)	2nd level
15	“heating” regulation cut-off setpoint	0…126 (0…30)	13	°C (bar)	2nd level
16	fan start at maximum speed	0 / 1	1	flag	2nd level
17	cut-off by-pass time	0…126	10	seconds	2nd level
18	fans pickup time	0…126	3	seconds	PC
19	fans activation logic	0 / 1	0	flag	PC
20	defrost start temperature (pressure)	-280…500 (0…300)	-50	°C/10 (bar/10)	2nd level
21	defrost end temperature (pressure)	-280…500 (0…300)	295	°C/10 (bar/10)	2nd level
22	defrost call time	0…126	20	minutes	2nd level
23	defrost time-out	0…126	8	minutes	2nd level
24	defrost interval between circuits	0…126	0	minutes	PC
25	fans start temp. (press.) in defrost	0…126 (0…30)	29	°C (bar)	2nd level
26	anti frost alarm setpoint	p. 62…p. 63	20	°C/10	1st level
27	anti frost alarm differential	0…126	20	°C/10	2nd level
28	anti frost alarm restore mode	0 / 1	0	flag	2nd level
29	anti frost alarm by-pass configuration	0..3	0	number	PC
30	not used				PC
31	anti frost alarm by-pass time	0…255	240	seconds	2nd level
32	anti frost resistors setpoint	-280…500	20	°C/10	2nd level
33	anti frost resistors differential	0…126	10	°C/10	2nd level
34…37	not used				PC
38	fans phase displacement	0…126	8	number	2nd level
39	water pump activation logic	0…2	1	number	PC
40	pump-compressor activation delay	0…126	0	seconds	PC
41	pump-compressor de-activation delay	0…126	5	seconds	2nd level
42	flow switch by-pass time at pump start	0…126	0	seconds	PC
43	flow switch alarm restore by-pass time	0…126	0	seconds	PC
44	compressor thermal magnetic alarm restore mode	0 / 1	0	flag	2nd level
45	fan thermal alarm restore mode	0 / 1	0	flag	2nd level
46	compressor thermal magnetic alarm by-pass time	0…126	10	seconds x 10	PC
47	measurement unit	0 / 1	0	flag	2nd level
48	second compressor intervention differential	0…126	0	°C/10	PC
49	OFF-ON delay	0…126	0	seconds x 10	PC
50	ON-ON delay	0…126	0	seconds x 10	2nd level
51	minimum press. Alarm by-pass time (“heating”)	0…255	0	seconds	2nd level
52	minimum press. Alarm by-pass time (“cooling”)	0…255	0	seconds	2nd level
53	first and second compressor intervention interval	0…126	0	seconds	PC
54	first and second compressor shutdown interval	0…126	0	seconds	PC
55	active compressors when setpoint is reached	0…2	0	number	PC

DEFAULT VALUES AND PARAMETERS ACCESSIBILITY FOR STANDARD MODELS

Parameter	Description	Range	Default	Unit	Accessibility
56	circuit 1 compressor presence	0…2	1	number	PC
57	circuit 2 compressor presence	0…2	0	number	PC
58	setpoint minimum limit “cooling” regulation	-20…p. 2	-5	°C	2nd level
59	setpoint maximum limit “cooling” regulation	p. 2…60	20	°C	2nd level
60	setpoint minimum limit “heating” regulation	-10…p. 3	25	°C	2nd level
61	setpoint maximum limit “heating” regulation	p. 3…60	45	°C	2nd level
62	setpoint minimum limit for anti frost alarm	-28…p. 26	-10	°C	2nd level
63	setpoint maximum limit for anti frost alarm	p. 26…60	10	°C	2nd level
64	inversion valve presence	0 / 1	1	flag	PC
65	inversion valve configuration	0 / 1	0	flag	PC
66	separate-simultaneous defrosts	0 / 1	1	flag	PC
67	“mode” key configuration	0 / 1	1	flag	PC
68	machine start configuration	0…2	2	number	2nd level
69	not used				PC
70	flow switch alarm by-pass time since input opening	0…126	1	seconds	PC
71	not used		leave at 0		PC
72	PTC probe input configuration for input water	0…2	2	number	PC
73	PTC probe input configuration for output water circ. 1	0…2	2	number	PC
74	PTC probe input configuration for output water circ. 2	0…2	0	number	PC
75	not used		leave at 0		PC
76	condensation probe input configuration circuit 1	0…2	2	number	PC
77	condensation probe input configuration circuit 2	0…2	0	number	PC
78…79	probes calibration as for parameters 72 and 73	-100…100	0	°C/10	2nd level
80	probe calibration as for parameter 74	-100…100	0	°C/10	PC
81	not used				PC
82	probe calibration as for parameter 76	-100…100	0	°C/10 (bar/10)	2nd level
83	probe calibration as for parameter 77	-100…100	0	°C/10 (bar/10)	PC
84	defrost enable	0 / 1	1	flag	PC
85	anti frost resistors presence	0 / 1	0	flag	PC
86	conf. for circuits 1 and 2 anti frost resistors regulator	0…2	1	number	PC
87	restore mode maximum pressure alarm	0 / 1	0	flag	2nd level
88	restore mode minimum pressure alarm	0 / 1	0	flag	2nd level
89	fans synchrony	0…2	0	number	PC
90	remote ON-OFF input	0…2	2	number	2nd level
91	not used				PC
92	password	0..126	0	number	1st level
93	not used				always visible

ing the lowest value in case of “heating” regulation).

90 • ON-OFF remote input

Allows to configure the operation mode for the remote ON-OFF input.

0 = input not used;

1 = “heating” (when close) and “cooling” (when open, for parameters 68 = 2 and 67 = 0 only) regulations selection;

2 = remote selection for ON (when close) - virtual OFF (when open; outputs for compressor, fans and pump are disabled as well as the displaying of error message “E00”) states.

91 • not used

92 • password

Allows to input the access password for second level parameters (its value is “47”).

93 • not used

Access to this parameters cannot be modified.

INSTALLATION

CH-DIN is designed for wall (extractable brackets) or Din rail (Omega 3) mount.

The operating temperature range for correct operation is between -5 and 60 °C; do not install the instrument in moist and/or dirty places.

ELECTRICAL WIRING

CH-DIN is provided with a telephone connector for the connection to the TS-DIN/S keyboard or to interface modules, a comb connector for the connection to the C2-DIN module, a screw terminal block for ≤ 2.5 mm^2 wires for the connection to fans modules, a screw terminal block for ≤ 1 mm^2 wires for alarm output and digital inputs for flow switch, fan thermal control circuit 1 and ON–OFF (remote), and Faston 6.3 mm terminal block for other connections.

Check the supply voltage complies with what required by the instrument. If the CH-DIN module is used in a three phase system the phase powering the instrument shall be different from the one supplying loads.

In case the fan module is used the phase powering it shall be the same as the one powering the CH-DIN module.

The three PTC probes (two in CH-DIN/P) do not require polarised insertion and can

be lengthened using a standard bipolar cable. CE regulations states that low voltage signals (probe cables, digital inputs and connections to expansion modules) shall be kept far from power cables (compressor control cables, resistors, etc.).
The probes should be fixed so that the cable exits downward to prevent liquid spilling into the metallic bulb containing the sensor.
The compressor relay output is free from voltage and can drive a direct load up to 1 Hp at 220 Vac (please note the common terminal of relays - terminal 22 - can bear a maximum load of 4.5A). For heavier loads use a suitable contactor.

ERROR SIGNALS

The presence of an error condition is indicated by the related Led and the display of the relevant code on the "Value" display.
In case of error signal a partial or total block of users takes place together with the activation of special output SSR 12…48 Vac.
In case of automatic restore alarm the removal of the event causing the alarm determines immediate restart of normal operation of the instrument and the connected machine. In case of manual restore alarm the alarm condition and the block of users remain after the cause of the alarm has been removed; normal operation can be restored only by turning the instrument off and then on using the On/Off front key.
For some alarms (anti-frost, thermal-magnetic compressor, minimum and maximum pressures) it is possible to select the restore mode through parameters; for others (anti-frost, thermal magnetic compressor and minimum pressure) it is possible to set a by-pass time at startup.

E00 • virtual OFF alarm selection
Code E00 appears in case the virtual OFF state is selected, i.e. when the remote ON-OFF input is opened with parameter 90 = 2.
This alarm disables compressor, fan and pump alarms. The pump goes off after the parameter 41 delay.
NOTE
When error code E00 is displayed the "Alarm" led is not turned on and the SSR 12…48 Vac output is not enabled

E01 • maximum pressure alarm circuit 1
Code E01 appears when the digital input for the maximum pressure switch in circuit 1 is opened.
This alarm disables the compressor in circuit 1, lights the "Alarm" led and enables the special SSR 12…48 Vac output.
Restore mode can be selected through parameter 87.

E02 • minimum pressure alarm in circuit 1
Code E02 appears when the digital input for the minimum pressure switch in circuit 1 is opened.
This alarm disables the compressor and fans in circuit 1 (fans remain active in case synchronised activation is selected through parameter 89), turns the "Alarm" led on and enables output SSR 12…48 Vac.
Restore mode can be selected through parameter 88.

E03 • compressor alarm circuit 1
Code E03 appears when the digital input for the compressor thermal magnetic system in circuit 1 is opened.
This alarm disables the compressor in circuit 1, turns the "Alarm" led on and enables output SSR 12…48 Vac.
Restore mode can be selected through parameter 44.
At startup the alarm is subject to a delay whose length can be selected through parameter 46. In case of activation request for the compressor during such delay the compressor does not start if the alarm is present and the related led blinks.

E04 • fan alarm circuit 1
Code E04 appears when the digital input for the fan thermal magnetic system in circuit 1 is opened.
This alarm disables the compressor and the fans in circuit 1 (in circuit 2 too in case fan synchronised activation is selected through parameter 89), turns the "Alarm" led on and enables output SSR 12…48 Vac.
Restore mode can be selected through parameter 45.

E05 • anti frost alarm circuit 1
Code E05 appears when the anti frost alarm setpoint (parameter 26) is reached in the output water temperature probe in circuit 1.
This alarm disables the compressor and the fans, turns the "Alarm" led on and enables output SSR 12…48 Vac.
The intervention differential can be set through parameter 27. Restore mode can be selected through parameter 28.

E06 • output water temperature PTC probe alarm in circuit 1
Code E06 appears in case of shorted, disconnected or interrupted probe.
The same message appears in case of "under range", i.e. in case the lower display limit is exceeded or in case of "over range", i.e. in case the upper display limit is exceeded.
This alarm disables the compressor and the fans and the fans in circuit 1, turns the "Alarm" led on and enables output SSR 12…48 Vac.
Check connections before replacing the probe.

E07 • PTC condensation probe in circuit 1
Code E07 appears in case of shorted, disconnected or interrupted probe.
The same message appears in case of "under range", i.e. in case the lower display limit is exceeded or in case of "over range", i.e. in case the upper display limit is exceeded.
This alarm disables the compressor and the fans and the fans in circuit 1 (in circuit 2 too in case fan synchronised activation is selected through parameter 89), turns the "Alarm" led on and enables output SSR 12…48 Vac. Relay outputs are not disabled in case of "cooling" regulation and when the water-water pump is configured with external manual inversion (parameter 1 = 5).
Check connections before replacing the probe.

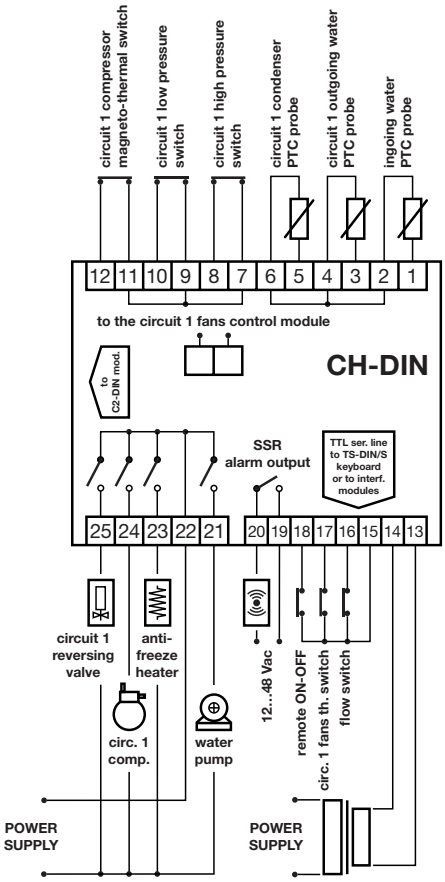
E21 • maximum pressure alarm circuit 2 (C2-DIN)
Code E21 appears when opening the digital input for the maximum pressure switch in circuit 2 provided by module C2-DIN.
This alarm disables the compressor in circuit 1, turns the "Alarm" led on and enables output SSR 12…48 Vac.
Restore mode can be selected through parameter 87.

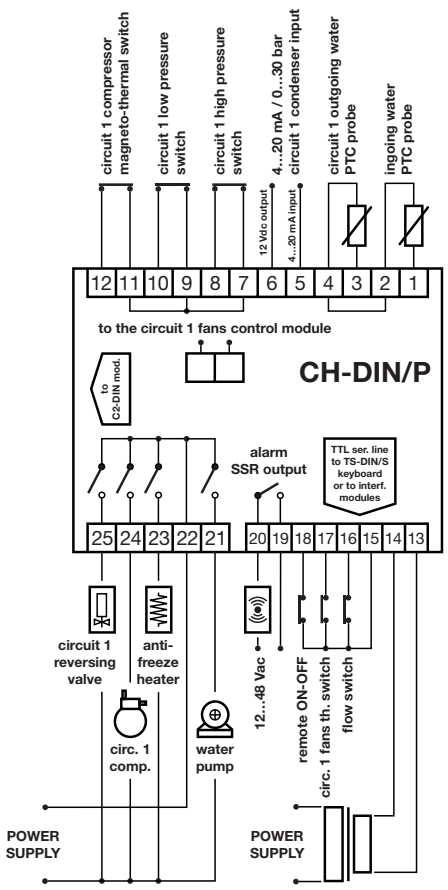
E22 • minimum pressure alarm circuit 2 (C2-DIN)
Code E22 appears when opening the digital input for the minimum pressure switch in circuit 2 provided by module C2-DIN.
This alarm disables the compressor and the fans in circuit 2 (fans remain active in case synchronised activation is selected through parameter 89), turns the "Alarm" led on and enables output SSR 12…48 Vac.
Restore mode can be selected through parameter 88.

E23 • compressor alarm circuit 2
Code E23 appears when opening the digital input for the compressor thermal magnetic system in circuit 2 provided by module C2-DIN.
This alarm disables the compressor in circuit 2, turns the "Comp. al" led (in the C2-DIN module) on and enables output SSR 12…48 Vac.
Restore mode can be selected through parameter 44.
At startup the alarm is subject to a delay whose length can be selected through parameter 46. In case of activation request for the compressor during such delay the compressor does not start if the alarm is present and the related led blinks.

E24 • fan alarm circuit 2
Code E24 appears when opening the digital input for the fan thermal magnetic system in circuit 2 provided by module C2-DIN.
This alarm disables the compressor and the fans in circuit 2 (in circuit 1 too in case fan synchronised activation is selected through parameter 89), turns the "Fan Al." led (in module C2-DIN) on and enables output SSR 12…48 Vac.
Restore mode can be selected through parameter 45.

E25 • anti-frost alarm circuit 2 (output water temperature probe)
Code E25 appears when the anti frost alarm setpoint (parameter 26) is reached in the output water temperature probe in circuit 2.





This alarm disables the compressor and the fans, turns the “Alarm” led on and enables output SSR 12…48 Vac.
The intervention differential can be set through parameter 27. Restore mode can be selected through parameter 28.

E26 • output water temperature PTC probe alarm in circuit 2 (C2-DIN)

Code E26 appears in case of shorted, disconnected or interrupted probe.
The same message appears in case of “under range”, i.e. in case the lower display limit is exceeded or in case of “over range”, i.e. in case the upper display limit is exceeded.
This alarm disables the compressor and the fans in circuit 2, turns the “Alarm” led on and enables output SSR 12…48 Vac.
Check connections before replacing the probe.

E27 • PTC condensation probe in circuit 2 (C2-DIN) or output water circuit 2 (C2-DIN)

Code E27 appears in case of shorted, disconnected or interrupted probe.
The same message appears in case of “under range”, i.e. in case the lower display limit is exceeded or in case of “over range”, i.e. in case the upper display limit is exceeded.
This alarm disables the compressor and the fans in circuit 2 (in circuit 1 too in case fan synchronised activation is selected through parameter 89), turns the “Alarm” led on and enables output SSR 12…48 Vac.
Check connections before replacing the probe.

E28 • parameter 75 alarm

Code E28 appears in case of wrong setting for parameter 75 (its value shall be set to 0).

E40 • input water temperature PTC probe alarm

Code E40 appears in case of shorted, disconnected or interrupted probe.
The same message appears in case of “under range”, i.e. in case the lower display limit is exceeded or in case of “over range”, i.e. in case the upper display limit is exceeded.
This alarm disables the compressors and the fans, turns the “Alarm” led on and enables output SSR 12…48 Vac. Relay outputs are not disabled in case of “heating” regulation and when the water-water pump is configured with external manual inversion (parameter 1 = 5).
Check connections before replacing the probe.

E41 • flow switch alarm

Code E41 appears in case the flow switch alarm is activated. This is subject to two conditions: the flow switch input shall have been opened for a time selectable through parameter 70 and the water pump shall have been working for a time selectable through parameter 42.
This alarm disables the compressors and the fans and turns the “Alarm” led on. Restore is automatic.
Alarm stop is subject to a delay whose length can be set through parameter 43.

E42 • hardware failure alarm

Code E42 appears in case of wrong connection between CH-DIN and C2-DIN. Check the connections between the modules and in case the error persists call the Service Centre.

E43 • anti frost alarm circuit 2 (condensation probe)

Code E43 appears when the anti frost alarm setpoint (parameter 26) is reached in the condensation probe in circuit 2 (only for water-water heat pump with gas inversion - parameter 1 = 4).
This alarm disables the compressors and the fans, turns the “Alarm” led on and enables output SSR 12…48 Vac.
The intervention differential can be set through parameter 27. Restore mode can be selected through parameter 28.

TECHNICAL DATA

Housing: plastic 4 Din modules 70x85 mm.
Depth: 61 mm.
Mount: on Din rail (Omega 3) or wall.
Protection grade: IP54 front.

Serial connections: a telephone connector for the connection to the TS-DIN/S keyboard or to the interface modules and a comb connector for the connection to the C2-DIN module,
Connections: a screw terminal block for ≤ 2.5 mm^2 wires (connection to fan modules), a screw terminal block for ≤ 1 mm^2 wires (alarm output connection and digital inputs for flow switch, fan thermal control in circuit 1 and remote ON-OFF), Faston terminal block 6.3 mm for other connections.
Display: on 10 mm high digits
Parameters storage: on non volatile memory (EEPROM).
Operating temperature: -5…60 °C.
Storage temperature: -30…75 °C.
Main outputs: 4 relay outputs 4(2)A AC 250V for compressor, anti-frost resistors, water pump and inversion valve circuit 1; terminal 22 can bear a load up to 4,5A.
Condenser fan output: 1 voltage digital output to drive the special fan modules.
Alarm output: 1 output on static relay (SSR) 12…48 Vac, maximum consumption 200 mA.
CH-DIN analogue inputs: 3 PTC probes for input water control, output water in circuit 1 and condensation circuit 1 (CH-DIN).
CH-DIN/P analogue inputs: 2 PTC probes for input water control and output water control circuit 1 and one 4…20 mA / 0…30 bar for pressure probes (condensation control circuit 1).
PTC probe display range:
–50,0…99,9 °C.
Digital inputs: 6 ON/OFF inputs for flow switch, circuit 1 fan thermal system per, remote ON–OFF, maximum pressure switch circuit 1, minimum pressure switch circuit 1 and compressr thermal magnetic circuit 1.
Resolution: 0.1 °C.
Accuracy:
• 0,5 % end of scale within reading range from -15…80 °C.
• 1 % end of scale within reading range from –50…–15 °C and from 80…99,9 °C.
Power supply: 12 Vac 3VA.

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