“MY RAC” CONTROL UNIT MANUAL

LCD DISPLAY CONTROL UNIT FOR MRAC

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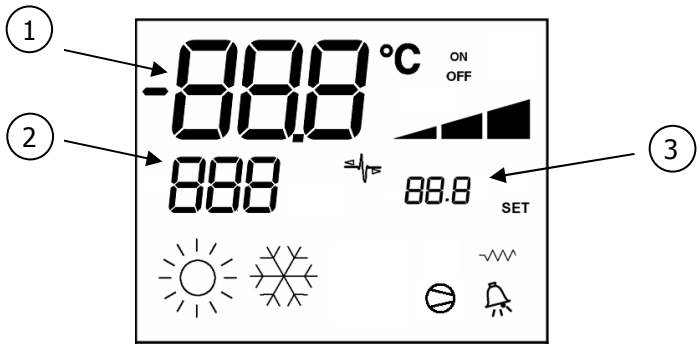
GENERAL FEATURES

The MY RAC control unit is designed to control the cooling units to control the temperature inside server racks. The control unit is supplied as part of a kit containing 2 NTC temperature probes to detect the intake and supply air temperature.

MAIN FUNCTIONS AND ACCESSORIES

- Air temperature control by activation of chilling circuit (evaporating fan, chiller compressor and condensing fan).
- Management of electrical heating elements for support in heating mode (not available)
- Serial Communication
- Dry contact for external ON/OFF (for example: door contact, fire/smoke sensor, presence sensor)
- Screw terminals for the connection of two air temperature, intake and supply probes.
- LCD screen
- Keyboard with seven silicon rubber buttons

LCD SCREEN



1 room temperature / password entry / parameter value

2 alarm messages / name of parameter

3 Active SET-POINT for cooling / brief description of parameters

ON
unit on; flashing if unit in forced block due to alarm

OFF
unit off

evaporating fan on

flashing with alarm: cooling alarm
flashing without alarm: forced switch-off of the compressor to control the minimum supply temperature

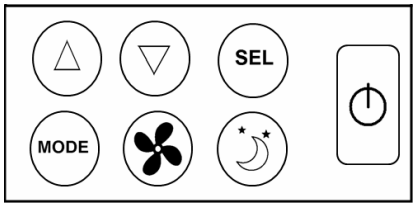
presence of an alarm (flashing)

compressor on

heating elements on (not available)

serial communication active; if flashing, it indicates that connection with the supervision system has been lost

KEYBOARD



ON/OFF: unit switch-on/off (only in standard display mode); it requires you to enter the password (**10**, non-modifiable)

UP and **DOWN**: modification of the adjustment and configuration parameters

SEL: confirms value entered; in normal display mode, pressing this key allows you to view in sequence, for a few seconds at most, the unit's supply air temperature (if present) and the outdoor air temperature (if present)

MODE: access to all parameters (adjustment and configuration) and to the output diagnostic procedure; you are requested to enter the password:

- password = **22** (modifiable): access to the adjustment parameters
- password = **44** (modifiable): access to the configuration parameters
- password = **88** (non-modifiable): access to the outlets' diagnostics procedure

FAN: alarm reset (only if there is an alarm with a manual reset); it requires you to enter the password (**10**, non-modifiable)

NIGHT: goes back to the normal display; the adjustment and configuration parameters are saved if you have entered the procedure to edit or read these parameters

ADJUSTMENT PARAMETERS

P	DESCRIPTION	DEF	MIN	MAX	U.M.
P00	Cooling SETPOINT	**28.0**	P17	P18	**°C**
P01	Heating SETPOINT (not managed)	**7.0**	P19	P20	**°C**
P02	Cooling DIFFERENTIAL	**2.5**	0.0	99.9	**°C**
P03	Heating DIFFERENTIAL (not managed)	**2.5**	0.0	99.9	**°C**
P04	Serial speed (0=2400;1=4800;2=9600;3=19200)	**2**	0	3	**-**
P05	MODBUS address	**0**	0	255	**-**
P06	Minimum supply temperature control enabling	**0**	0	1	**-**
P07	Minimum supply temperature SETPOINT	**10.0**	0.0	99.9	**°C**
P08	Minimum supply temperature DIFFERENTIAL	**5.0**	0.0	99.9	**°C**
P09	Minimum supply temperature intervention DELAY	**0**	0	999	**s**
P10	Adjustment start DELAY after unit switch-on	**90**	0	999	**s**
P11	High room temperature alarm SETPOINT	**38.0**	SET COOL	99.9	**°C**
P12	High room temperature alarm DIFFERENTIAL	**3.0**	0.0	99.9	**°C**
P13	High room temperature alarm DELAY	**180**	0	999	**s**
P14	Low room temperature alarm SETPOINT	**4.0**	-99.9	SET HEAT	**°C**
P15	Low room temperature alarm DIFFERENTIAL	**3.0**	0.0	99.9	**°C**
P16	Low room temperature alarm DELAY	**180**	0	999	**s**
P17	Lower cooling SETPOINT limit	**20.0**	0.0	99.9	**°C**
P18	Upper cooling SETPOINT limit	**40.0**	0.0	99.9	**°C**
P19	Lower heating SETPOINT limit (not managed)	**0.0**	0.0	99.9	**°C**
P20	Upper heating SETPOINT limit (not managed)	**15.0**	0.0	99.9	**°C**
P21	Ventilation standby enabling	**0**	0	1	**-**
P22	Digital input alarm delay	**20**	0	999	**s**
P23	Minimum interval between 2 compressor clicks	**360**	0	999	**s**
P24	Minimum time compressor ON	**60**	0	999	**s**
P25	Minimum time compressor OFF – SPLIT unit	**180**	0	999	**s**
P26	Minimum time compressor OFF – MONOBLOC unit	**60**	0	999	**s**
P27	Ventilation OFF DELAY (if P21=1) after heat elements OFF	**60**	0	999	**s**
P28	OFFSET due to room air temperature probe reading	**0.0**	-99.9	99.9	**°C**
P29	OFFSET due to outdoor air temperature probe reading	**0.0**	-99.9	99.9	**°C**
P30	OFFSET due to supply air temperature probe reading	**0.0**	-99.9	99.9	**°C**
P31	DELTA T after start-up due to cooling alarm	**3.5**	0	99.9	**°C**
P32	Interval after start-up due to cooling alarm	**300**	0	999	**s**
P33	DELTA T start-up due to heating alarm (not managed)	**3.0**	0	99.9	**°C**
P34	Interval after start-up due to heating alarm (not managed)	**480**	0	999	**s**
P35	DELTA T operation due to cooling alarm	**4.0**	0	99.9	**°C**
P36	DELTA T operation due to heating alarm (not managed)	**3.0**	0	99.9	**°C**
P37	Access PASSWORD	**22**	0	999	**-**

CONFIGURATION PARAMETERS

F	DESCRIPTION	DEF	MIN	MAX	U.M.
F00	TYPE OF UNIT: 0 = TELESPLIT 1 = MONOBLOC/HTS	**0**	0	1	**-**
F01	Infeed air temperature probe PRESENCE	**1**	0	1	**-**
F02	Supply air temperature probe PRESENCE	**1**	0	1	**-**
F03	not used	**0**	0	1	**-**
F04	ID2 CONTACT LOGIC (UNIT OFF) 0 = UNIT OFF if CONTACT OPEN 1 = UNIT OFF if CONTACT CLOSED	**0**	0	1	**-**
F05	not used	**0**	0	1	**-**
F06	not used	**0**	0	1	**-**
F07	not used	**0**	0	1	**-**
F08	not used	**0**	0	1	**-**
F09	ACCESS PASSWORD	**44**	0	255	**-**

ADJUSTMENT LOGIC

SWITCHING THE UNIT ON/OFF

There are three ways of switching the unit on/off:

- remote contact;
- control key;
- control from supervision serial line, only if parameter P05 (control serial address) is not 0 and there is actually communication

The OFF status of the remote contact immediately blocks operation of the unit.
The ON status of the remote contact assigns the task of determining the unit's status to the other two modes: the most recent request (both ON and OFF) always applies, regardless of whether it has been launched from the keyboard of the control unit or the remote supervision system.

EVAPORATING FAN

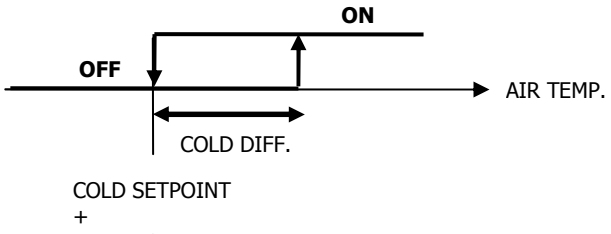
There are two ways for activating the evaporating fan determined by the value of parameter P21:

- evaporating fan always ON when unit is on (P21=0);
- evaporating ventilation on only when the compressor is on (cooling) (P21=1).

The fan immediately stops when the unit is switched off or when a serious alarm is triggered.

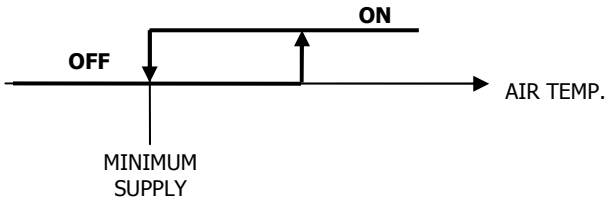
COOLING

Cooling logic (activation of compressor and fan of condensing section) reflects the following layout:



Besides adjustment logic, switching on and off of the compressor is subject to its safety timetable which is however bypassed if unit switch-off is forced or if a serious alarm is triggered.

If minimum supply temperature control has been enabled (P06=1), the compressor switches off according to the following logic:



ALARMS

LIST OF ALARMS

The MY RAC control unit manages the following alarms internally:

- room temperature probe alarm
- supply air temperature probe alarm
- outdoor air temperature probe alarm
- high room temperature alarm (settable threshold, differential and delay)
- low room temperature alarm (settable threshold, differential and delay)
- cooling alarm (disabled if P31=0)
- heating alarm (disabled if P33=0)
- general unit breakdown alarm

DISPLAYS

Should any alarm be triggered, the alarm icon at the bottom left of the display flashes and moreover:

- room temperature probe alarm: "**Err**" message flashing instead of the room temperature (area 1 on the display)
- supply air temperature alarm: "**SM**" starts flashing in area 2 on the display (see the "THE LCD DISPLAY" paragraph)
- high room temperature alarm: "**Ht**" starts flashing in area 2 on the display
- low room temperature alarm: "**Lt**" starts flashing in area 2 on the display
- cooling alarm: the cooling symbol flashes

UNIT BLOCKAGE

The alarms that cause an **immediate block of the unit** are:

- room temperature probe alarm
- supply air temperature probe alarm (only in SPLIT units)
- cooling alarm
- general unit breakdown alarm

Should the unit block, the following displays appear:

- the ON symbol flashes;
- the writing FAIL appears in area 3 of display

ALARM RESET

The alarms with an **automatic reset** are:

- room temperature probe alarm
- supply air temperature probe alarm
- high room temperature alarm
- low room temperature alarm

MODBUS

The protocol implemented on the MY RAC control unit is Modbus RTU (9600, N, 8, 1, no parity) on RS485

IMPLEMENTED FUNCTIONS

0x03: Read Holding Registers
0x04: Read Input Registers
0x10: Write Multiple registers

IMPLEMENTED EXCEPTIONS

Exception Code 02: Invalidate data address

LIST OF SUPERVISION PARAMETERS

ADDRESS	REGISTERS	TYPE	U.O.M.
	INPUT REGISTERS		
0	Statuses	R	-
1	not used	R	-
2	Room air temperature	R	[°C/10]
3	Supply air temperature	R	[°C/10]
4	not used	R	[°C/10]
5	not used	R	-
6	not used	R	-
7	not used	R	-
8	not used	R	-
9	not used	R	-
	HOLDING REGISTERS		
50	Controls	R/W	-
51	not used	R/W	-
52	Setpoint - Cooling	R/W	[°C/10]
53	Setpoint – Heating (not managed)	R/W	[°C/10]
54	not used	R/W	-
55	not used	R/W	-
56	not used	R/W	-
57	not used	R/W	-
58	not used	R/W	-
59	not used	R/W	-

"**Statuses**" register:

H (ALARM STATUS)							
Bit 15	*Bit 14*	*Bit 13*	*Bit 12*	*Bit 11*	*Bit 10*	*Bit 9*	*Bit 8*
Machine block	Heating alarm	Cooling alarm	Low temp. alarm	High temp. alarm	Outdoor probe al.	Supply probe al.	Room probe al.

L (UNIT STATUS)							
Bit 7	*Bit 6*	*Bit 5*	*Bit 4*	*Bit 3*	*Bit 2*	*Bit 1*	*Bit 0*
Probes al.	-	-	-	HEATERS STATUS	COMPR STATUS	FAN STATUS	ON/OFF STATUS

"**Controls**" register:

H							
Bit 15	*Bit 14*	*Bit 13*	*Bit 12*	*Bit 11*	*Bit 10*	*Bit 9*	*Bit 8*

L							
Bit 7	*Bit 6*	*Bit 5*	*Bit 4*	*Bit 3*	*Bit 2*	*Bit 1*	*Bit 0*
					FAN OFF STDBY	RES AL	ON/OFF

DIAGNOSIS PROCEDURE

This procedure makes it possible to check the individual resources of the MY RAC control unit, namely the correct wiring between the MY RAC control unit and the controlled resources.

Once you have entered the procedure (MODE key and password 88), pressing the SEL key activates in sequence:

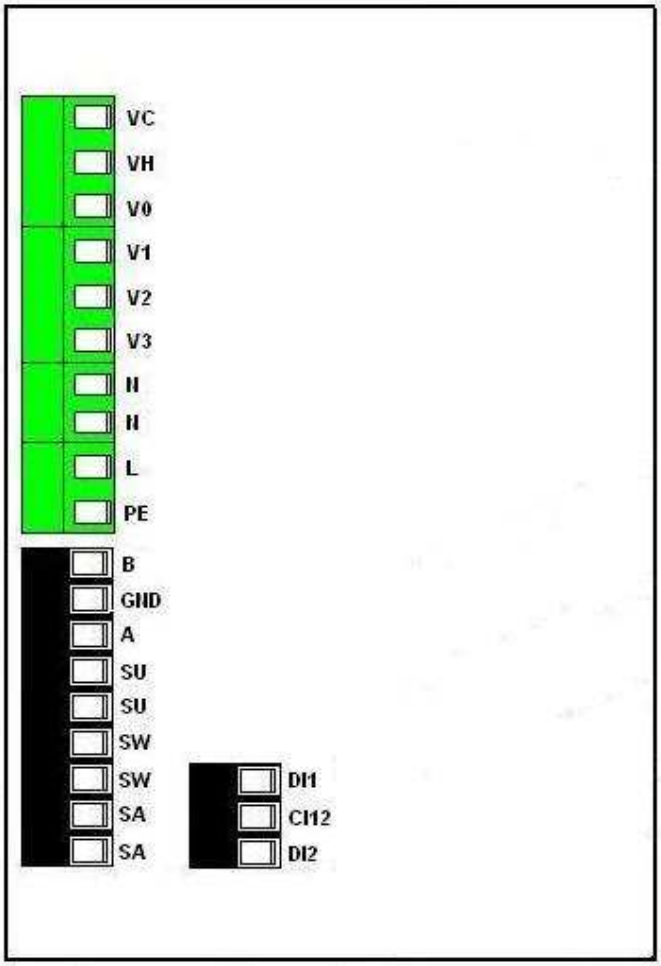
- no resource
- evaporating fan
- evaporating fan + compressor

TECHNICAL DATA OF THE CONTROL UNIT

Power supply	90-250Vac 50/60Hz Power 8W Protection fuse: 500mA delayed
Operating temp.	Range 0-50°C
Storage temp.	Range -10-60°C
Relay	Normal Open 5A @ 240V (Resistive) Insulation: coil-contacts distance 8mm 4000V dielectric coil-relay Max room temperature: 105°C
Connectors	250V 10A
Digital inputs	Dry contact Closing current 2mA Max closing resistance 50 Ohm
Analogue inputs	NTC Temperature Probes
Power outputs	Relay (see above)
Temperature Probes	NTC probes 10K Ohm @25°C Range -25-100°C
Protection rating	IP30

ELECTRONIC BOARD

Rear of control unit:



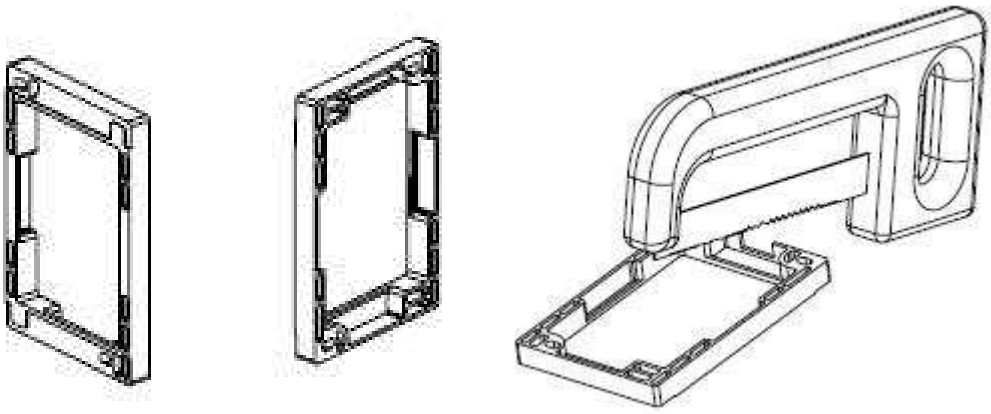
where:

Vc	Compressor and condensing fan		**A-B-GND**	RS 485
Vh	Electric heating elements (not managed)		**SU**	not used
V0	Evaporating fan		**SW**	supply air temp. probe
V1	not used		**SA**	infeed air temp. probe
V2	not used		**DI1**	Digital input 1
V3	not used		**CI12**	Common digital inputs
N	Neutral		**DI2**	Digital input 2 – ON/OFF
L	Phase			
PE	Earth			

WALL INSTALLATION OF CONTROL UNIT

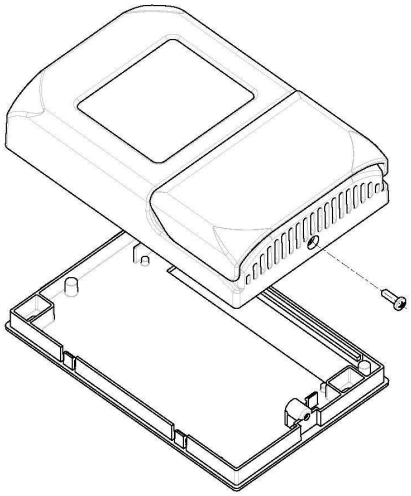
Before installing the unit, carefully remove the protective film from the display; removing this film could cause dark spots to appear which will disappear after a few seconds and do not mean that the control unit is faulty.

To install the control unit on the wall we recommend requesting the special spacer in order to make it easier to place the cables behind the control unit itself.

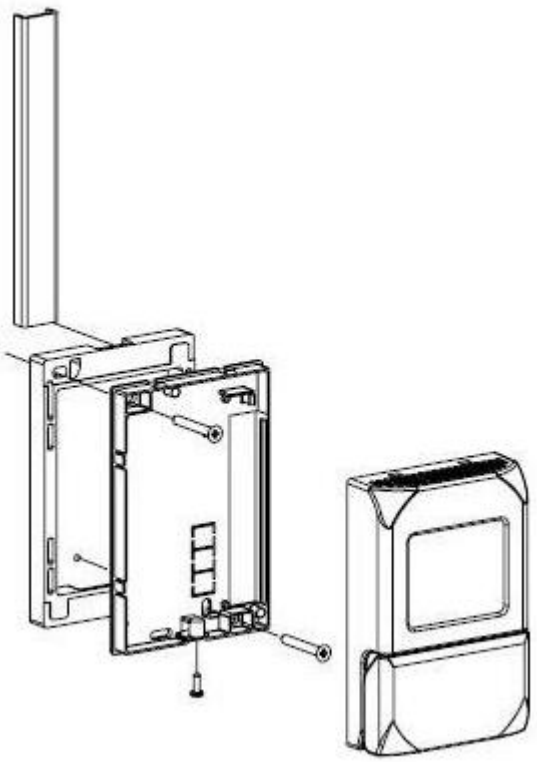


Wall installation instructions:

1. Remove the screw which closes the control unit.



2. Pass the wires through the slot at the base of the control unit and of the spacer and use the specific holes to fix the spacer and the base of the control unit to the wall.



3. Perform the electrical connections on the terminal board based on the relative electrical layout.

4. Close the control unit using the screw removed in point 1.