DESCRIPTION

MACON_C2 is a control device for chiller units or heat pumps with 2 circuits. The second circuit (**MACON_C2B**) has a plastic box for rail mounting and it is connected with the main device via three cables.

MACON_C2 (1st circuit) has the following specifications:	MACON_C2B (2nd circuit) has the following specifications:
3 analog inputs for measuring temperature with **range -50 - 150 °C**	**2 inputs** for measuring temperature with **range -50 - 150 °C**
SEN 1. Water input circuit 1. Operation thermostat HEATING - COOLING	SEN 4. Water output 2nd circuit Safety thermostat No2. Resistance No2
SEN 2. Water output. Safety thermostat No1. Resistance No1	SEN 5. Defrost C2 control (2nd compressor)
SEN 3. Defrost control C1 (Compressor 1st)	
6 digital inputs:	**3 digital outputs**:
1st input → Terminal block 11. ON-OFF device from a remote switch	7th Input → Terminal block 17 HP2. High pressure 2nd circuit
2nd input → Terminal block 12 HEAT-COOL from a remote switch	8th Input → Terminal block 16 LP2. Low pressure 2nd circuit
3rd input → Terminal block 13 HP1. High pressure 1st circuit	9th Input → Terminal block 15 C2. Thermal of 2nd circuit compressor
4th input → Terminal block 14 LP1. Low pressure 2nd circuit	
5th input → Terminal block 15 C1. Thermal of 1st circuit compressor	
6th input → Terminal block 16 FLOW SWITCH	
6 relay outputs 250 VAC 5 Amp: pump relay, compressor **C1**, valve **V1**, resistance **R1**, fan **FAN 1**, alarm.	**4 relay output** 250 VAC 5 Amp: compressor **C2,** valve **V2,** resistance **R2** and fan **FAN 2**
1 Analog output 0-10 Volt → Terminal block 22, 23.	

CONNECT TO NETWORK

Main device MACON_C2 can connect to a PC via network RS485 or to a Remote Control via four cables.
 ➢ Connect to a PC: CAMIN software can monitor all temperatures, compressors relays, alarm, parameters, while sending SMS and emails in case of an alarm. More than 250 devices can connect to this network.
 ➢ Connect to a Remote Control device: it displays on screen whatever is displayed on the main device and it has full access from the keyboard to the main device. It can be installed up to 500 meters away from the main device.

PARAMETERS

Parameters are separated in two groups: 67 main parameters and 8 secondary parameters (A1-A8). Two of the main and eight of the secondary parameters are easy accessible. The rest require an access code. Check relevant table page 2.

TECHNICAL SPECIFICATIONS

Power supply: 24 VAC/DC 50/60 Hz 5W
Connection with terminal blocks 28-16 AWG 1.5 mm^2
6 relays 250 VAC 5A Resistive Load στο MACON_C2
4 relays 250 VAC 5A Resistive Load στο MACON_C2B
Operation temperature: -10 – +50 °C

Storage temperature: -20 - +80 °C
MACON_C2 is mounted on a panel / Dimensions 28x70x75mm
MACON_C2B is mounted on a Ω rail / Dimensions 70x90x65mm
It is suggested using a safety switch 1A (not included)
Maximum consumption for each device 5 Watt

⏻ ON/OFF DEVICE

Press ▲ for 4 seconds to toggle the device between **ON/ OFF** state if the parameter is set to **Grc=0.**
If the input 11 ON/OFF is activated or the parameters are being programmed, this operation is cancelled.

HEATING – COOLING OPERATION

Press ▼ for 4 seconds to toggle the operation between heating and cooling mode if parameter is set to **GrH=0**.
If the input 10 Heating-Cooling is activated or the parameters are being programmed, this operation is cancelled.

RESET ALARMS

Press ▼ to reset the alarms: this feature is active even during programming the parameters.

PROGRAMMING PARAMETERS

Press ↵ to enter or exit the parameters menu.
The first parameter "**SCo"** is displayed and with the ▲, ▼ we scroll into the parameters menu.
Press **SET** to **display** the parameters value and adjust it with the ▲, ▼.
Press ↵ to **confirm** the new value and display the parameters name.
Press **SET** to **cancel** the new value and revert to the parameters name.
NOTE: for safety reasons all parameters as presented to the parameters table are not displayed. We must enter parameter Cod=22 to access full parameters menu.

DISPLAY AND RESET OPERATION HOUR OF COMPRESSORS

Press ↵ to display the first parameter **SCo**. Press ▲ to display parameter **H 2** which refers to operation hours of compressor 2. By pressing again ▲ the next parameter is displayed **H 1** which refers to operation hours of compressor 1. By pressing once more parameters **H P** is displayed which refers to pump hours operation.
Press **SET** to display the operation hours and press simultaneously ▲, ▼ to reset the timer. By pressing ↵ we **confirm** the reset.

DISPLAY OF THE TEMPERATURE SENSORS

After we reach parameter **HP**, by pressing ▲, the following parameters are displayed: t5, t4, ... up to t1. Press **SET** to display the temperature of the corresponding sensor (5, 4, 3, 2, 1).

LED OPERATION

ON	The system is activated.
C1	ON when the compressor **C1** operates. When it starts blinking then the compressor is set to ON but a timer is active and waits to elapsed.
C2	ON when the compressor **C2** operates. When it starts blinking then the compressor is set to ON but a timer is active and waits to elapsed.
C	Cool – system operates in cooling mode.
H	Heat – system operated in heating mode.
⚠	Blinks if an alarm is active.
x100	ON when the operation hours are x100.

RESET TO FACTORY DEFAULT SETTINGS

Enter Cod = 31 and press twice ←⏎ to restore all parameters value to the default ones.

TABLE 1

No	PARAMETERS – DESCRIPTION		min	max	DEFAULT	U.O.M.
A1	**t1**	Temperature sensor N 1 (Input)	-	-	-	°C
A2	**t2**	Temperature sensor N 2 (Water output 1)	-	-	-	°C
A3	**t3**	Temperature sensor N 3 (deFrost C1)	-	-	-	°C
A4	**t4**	Temperature sensor N 4 (Water output 2)	-	-	-	°C
A5	**t5**	Temperature sensor N 5 (deFrost 2)	-	-	-	°C
A6	**HP**	Pump operation hours	**Operation hours:** When the symbol **x100** is ON, the operation hours are x100.	-	-	-	hours
A7	**H1**	Compressor 1 operation hours		-	-	-	hours
A8	**H2**	Compressor 2 operation hours	To reset the timer, press simultaneously ▲ + ▼ and then ←⏎.	-	-	-	hours
1	**SCo**	SET POINT of compressor in Cooling mode	**LCL**	**LCH**	10	°C
2	**SHt**	SET POINT of compressor in Heating mode	**LHL**	**LHH**	20	°C
3	**Cod**	Access code: with **Cod=22** we access all the following parameters	0	255	0	-
4	**diS**	Adjust which sensor is displayed on screen, where 1 = sensor 1, etc.	1	5	1	-
5	**LCL**	minimum temperature limit of SCo in Cooling mode	-50	150	-10	°C
6	**LCH**	maximum temperature limit of SCo in Cooling mode	-50	150	40	°C
7	**LHL**	minimum temperature limit of SHt in Heating mode	-50	150	10	°C
8	**LHH**	maximum temperature limit of SHt in Heating mode	-50	150	60	°C
9	**FoP**	*Fan operation* **0 =** Fans are always OFF **1 =** Fans are ON when the device is ON. **2 =** Fan is ON when the corresponding compressor is ON **3 =** Fans are ON based on their heating **FSH** and cooling **FSC** set points and when the defrost sensor reaches a temperature for the fan to turn ON (in normal operation – not in defrost mode)	0	3	1	-
10	**FSC**	SET POINT of fan in Cooling mode. Operates when parameter **FoP=3.**	-50	150	15.7	°C
11	**FSH**	SET POINT of fan in Heating mode. Operates when parameter **FoP=3.**	-50	150	15.7	°C
12	**doP**	Defrost operation, where 0 = defrost operation is deactivated and 1 = defrost operation is activated	0	1	1	-
13	**dto**	0: defrost ends based only on parameter timer **dt3** 1: defrost ends when the temperature reaches temperature end deFrost. In the meantime, if timer **dt3** elapses, defrost ends and an indication **dF** appears on screen for a few minutes.	0	1	1	-
14	**dbE**	*Temperature starting defrost* When temperature is below **dbE** for a period of time greater than **dt1** with the compressor ON, the defrost starts.	-50	150	3.6	°C
15	**dEn**	*Temperature ending defrost* When parameter **dto = 1** defrost ends when it reaches **dEn** temperature in time smaller than the maximum defrost duration.	-50	150	15.6	°C
16	**dFA**	Over this temperature, the **fan** is ON during defrost	-50	150	16.4	°C
17	**dt1**	Time frame in which all defrost requirements must occur in order to start defrost	1	200	1	min
18	**dt2**	Minimum time defrost duration, where 1 unit = 10 sec	1	200	1	10sec
19	**dt3**	Maximum time defrost duration	1	200	1	min
20	**dt4**	Minimum time between two successive defrosts of the same circuit	1	200	1	min
21	**dt5**	Minimum time between two successive defrost of the two circuits	0	200	0	min
22	**ASP**	Antifreeze ALARM SET POINT, Safety thermostat	-50	60	4	°C
23	**ArE**	Antifreeze heater SET POINT, Resistance	-50	60	3.6	°C
24	**Adi**	Differential of safety thermostat	0.1	20.0	1.5	°C
25	**Adr**	Differential of resistance thermostat	0.1	20.0	1	°C
26	**SE2**	Sensor operation No 2, where 0 = sensor deactivated, 1 = sensor activated	0	1	1	-
27	**SE3**	Sensor operation No 3, where 0 = sensor deactivated, 1 = sensor activated	0	1	1	-
28	**SE4**	Sensor operation No 4, where 0 = sensor deactivated, 1 = sensor activated	0	1	1	-
29	**SE5**	Sensor operation No 5, where 0 = sensor deactivated, 1 = sensor activated	0	1	1	-
30	**AJ1**	Sensor 1 offset	-9	15	0	°C
31	**AJ2**	Sensor 2 offset	-9	15	0	°C
32	**AJ3**	Sensor 3 offset	-9	15	0	°C
33	**AJ4**	Sensor 4 offset	-9	15	0	°C
34	**AJ5**	Sensor 5 offset	-9	15	0	°C
35	**rCo**	Differential of SET POINT in Cooling mode	0.1	25	1	°C
36	**rHt**	Differential of SET POINT in Heating mode	0.1	25	1	°C
37	**rS2**	*Differential of the second SET POINT* When parameter **GSP=1** the second compressor operates as follows: cooling mode: SET POINT of 2nd compressor = set point **SCo** + **rS2** parameter heating mode: SET POINT of second compressor = set point **SHt** – **rS2** parameter	0.1	25	2	°C
38	**tPC**	Timer **Pump - Compressor**: when this timer elapses, the compressor starts after the pump	0	200	3	sec
39	**tCP**	Timer **Comp - Pump**: timer for the deactivation of the pump, after the deactivation of the compressor	0	200	0	min

| No	PARAMETERS – DESCRIPTION		min	max	DEFAULT	U.O.M.
40	tF1	Bypass timer of **FLOW SWITCH** during pump start-up	0	200	5	sec
41	tF2	Bypass timer of **FLOW SWITCH** during operation	0	200	5	sec
42	too	Timer from ON to ON of the same compressor, where 1 unit = 10 sec	0	200	1	10sec
43	tFo	Timer from OFF to ON of the same compressor, where 1 unit = 10 sec	0	200	1	10sec
44	tdC	Timer from ON to ON between the two compressors	0	200	5	sec
45	tFC	Timer from OFF to OFF between the two compressors	0	200	2	sec
46	Ton	Compressor minimum time ON	0	200	2	sec
47	tLP	Bypass timer for the low pressure of the compressor **(LP1)** during start-up	0	200	3	sec
48	tAF	Bypass timer of safety thermostat during start-up	0	200	2	sec
49	Gnc	Number of compressors, where 1 = one compressor, 2 = two compressors	1	2	2	-
50	Grc	Remote Control ON-OFF of the system, where 0=OFF, 1=ON	0	1	1	-
51	GrH	Remote Control for **heating/cooling** operation of the system, where 0=OFF, 1=ON	0	1	1	-
52	GSP	*Compressors operation with one SET POINT or two SET POINTs* **0 =** one SET POINT **1 =** two SET POINTs	0	1	1	-
53	GAL	*Alarm operation* **0 =** manual alarm reset of the following alarms: HP1, LP1, Safety thermostat 1, FLOW SWITCH, HP2, LP2, Safety thermostat 2 **1 =** automatic alarm reset	0	1	1	-
54	GSu	*Reverse Pumps* **0 =** in cooling mode pumps are OFF and in heating mode pumps are ON **1 =** in heating mode pumps are OFF and in cooling mode pumps are ON	0	1	0	-
55	GFr	*Pumps operation* **0 =** pump always ON **1 =** pump starts and stops with the compressors based on timers **tPC** and **tCP**.	0	1	0	-
56	GLE	out of order	0	255	0	-
57	GPo	Starting-up timer of the compressors during Power-Up	0	200	0	-
58	GLC	Compressors sequence **0=** compressor with the minimum operation hours precedes **1=** compressor 1 precedes **2=** compressor 2 precedes	0	2	0	-
59	GFP	*Pump operation with Safety thermostat alarm during OFF status of the machine* **0 =** Pump is OFF and the Safety thermostat relay is activated **1 =** Pump is ON and the Safety thermostat relay is activated	0	1	1	-
60	trE	Time response of the device on network	30	100	30	-
61	Add	**0 =** network is deactivated. **1=** Remote Control operation is activated. Address of the device on network from 1 – 255	0	255	1	-
62	nCo	0=SLAVE: PC operation 1=MASTER: REMOTE CONTROL operation and parameter **Add** = 1	0	1	0	-
63	LLo	*Minimum voltage level of the analog output* The analog output has a range between **HLo – LLo** for a temperature range adjusted by the parameters **ArH** or **ArC**. For example, if **HLo – Llo = 7** and **ArH** =3 and **SHt = 45 °C**, the voltage changes from 3-10 Volt for 42÷45 °C	0	5	3	Volt
64	HLo	Maximum voltage level of the analog output	6	10	10	Volt
65	ArH	Temperature range for the analog output voltage in heating mode	1.0	25.0	3.0	Volt
66	ArC	Temperature range for the analog output voltage in cooling mode	1.0	25.0	3.0	Volt
67	IAO	Reverse analog output signal	0	1	0	Units
68	dEr	Increasing the value reduces the 0-10 Volt signal change speed	1	40	1	Units
69	VtO	Με το σύστημα OFF. Τιμή= -1 => Valve ON. Τιμή=0-20 min.=> OFF η βαλβίδα μετά τα λεπτά που ορίζει η παράμετρος	-1	20	-1	miin
70	rOF	Με τιμή =0 => αντιστάσεις OFF με το σύστημα OFF.και σε συνθήκες παγετού.	0	1	1	Μονάδες

ALARM TABLE

|		
1	HP1	ALARM HIGH PRESSURE C1: Stops the operation of compressor C1. By adjusting GAL = 0, alarm reset is manual.
2	LP1	ALARM COMPRESSOR C1: Stops the operation of compressor C1. Alarm is only automatically deactivated when the cause of the alarm disappears.
3	C1	ALARM COMPRESSOR C1: Stops the operation of compressor C1. Alarm is only automatically deactivated when the cause of the alarm disappears.
4	FLS	ALARM FLOW SWITCH: ALARM from the FLOW SWITCH. By adjusting GAL = 0, alarm reset is manual.
5	HP2	ALARM HIGH PRESSURE C2: Stops the operation of compressor C2. By adjusting GAL = 0, alarm reset is manual.
6	LP2	ALARM LOW PRESSURE C2: Stops the operation of compressor C2. By adjusting GAL = 0, alarm reset is manual.
7	C2	ALARM COMPRESSOR C2: Stops the operation of compressor C1. Alarm is only automatically deactivated when the cause of the alarm disappears.
8	Ar1	ALARM SENSOR 1: ALARM analog input No 1. Safety thermostat. (Water input). Sensor malfunction. Alarm is only automatically deactivated when the cause of the alarm disappears.
9	Ar2	ALARM SENSOR 2: ALARM analog input No 2. Safety thermostat. (Water output). Circuit 1. Sensor malfunction. Alarm is only automatically deactivated when the cause of the alarm disappears.
10	Ar3	ALARM SENSOR 3: ALARM analog input No 3. Defrost Sensor malfunction. Alarm is only automatically deactivated when the cause of the alarm disappears.
11	Ar4	ALARM SENSOR 4: ALARM analog input No 4. Safety thermostat. (Water output). Circuit 2. Sensor malfunction. Alarm is only automatically deactivated when the cause of the alarm disappears.
12	Ar5	ALARM SENSOR 5: ALARM analog input No 5. Defrost. Sensor malfunction. Alarm is only automatically deactivated when the cause of the alarm disappears.
13	At1	ALARM FROST: ALARM from the Safety Thermostat Circuit 1. At compressor's start-up, the thermostat is deactivated based on parameter timer tAF. By adjusting GAL = 0, alarm reset is manual.
14	At2	ALARM FROST: ALARM from the Safety Thermostat Circuit 2. At compressor's start-up, the thermostat is deactivated based on parameter timer tAF. By adjusting GAL = 0, alarm reset is manual.

The alarms are automatically deactivated when the cause of the alarm disappears.
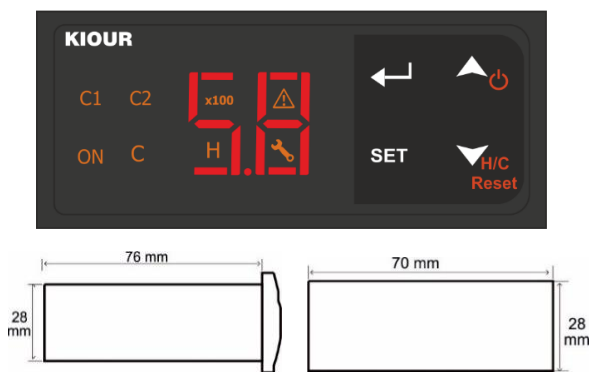
MACON_C2

MACON_C2B
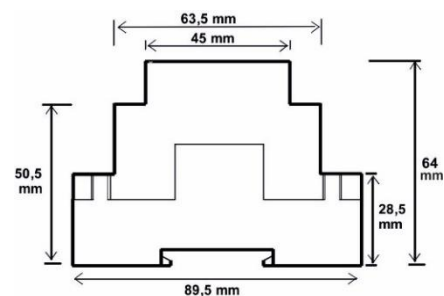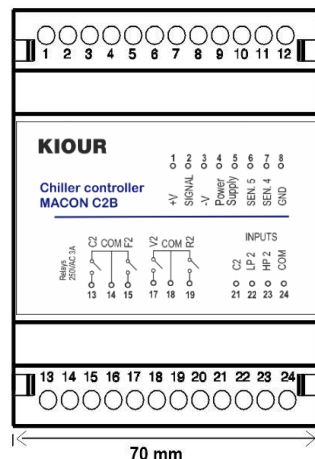
Secondary device model **MACON_C2B** has two **LEDs** with the following operations:

- when the LED on **terminal block No. 2** starts blinking, the secondary device is in communication with the main device
- when the LED on **terminal block No.11** is ON, then the secondary device is under power supply.

ANALOG OUTPUT OPERATION AND ADJUSTMENTS IN COOLING MODE

$13\ ^{\circ}C \longrightarrow$ Vmax

*1   *2

$SCo=10\ ^{\circ}C \longrightarrow$ Vmin
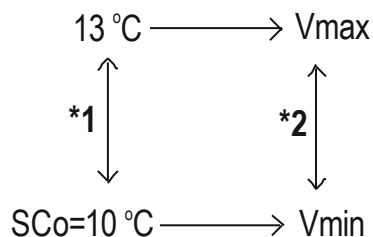
Parameter **IAO = 0:** $10^{\circ}C$ **correspond to Vmin,** while $13\ ^{\circ}C$ **correspond to Vmax**

Parameter **IAO =1:** the analog output signal is reversed as follows:
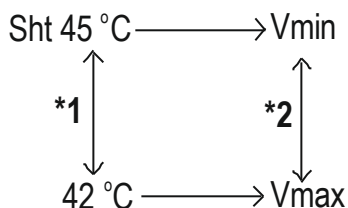$10^{\circ}C$ **correspond to Vmax,** while $13\ ^{\circ}C$ **correspond to Vmin**

Note 1.   The range is set from the parameter **ArC = 3ºC**
Note 2.   Analog output voltage **(terminal blocks 22, 23, Analog Out)** which corresponds to **10 ÷13ºC**
Vmin.   Minimum level of analog output voltage to **10ºC**, **0 ÷ 5 Volt**, which is set from parameter **LLo**.
Vmax.   Maximum level of analog output voltage to **13ºC, (6 ÷ 10 Volt),** which is set from parameter **HLo.**

ANALOG OUTPUT OPERATION AND ADJUSTMENTS IN HEATING MODE

$Sht\ 45\ ^{\circ}C \longrightarrow$ Vmin

*1   *2

$42\ ^{\circ}C \longrightarrow$ Vmax

Parameter **IAO = 0:** $45^{\circ}C$ **corresponds to Vmin,** while $42\ ^{\circ}C$ corresponds to **Vmax**

Parameter **IAO =1:** the analog output signal is reversed as follows:
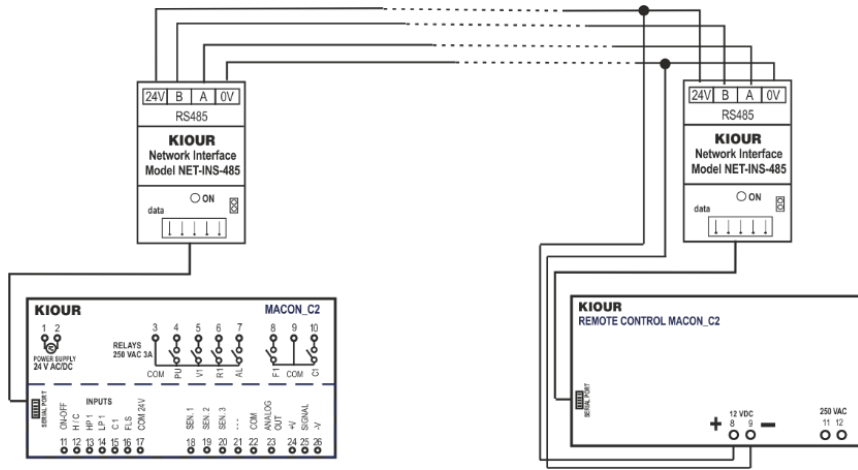$45\ ^{\circ}C$ **correspond to Vmax,** while $42\ ^{\circ}C$ **correspond to Vmin**

Note 1.   The range is set from the parameter **ArH = 3ºC**
Note 2.   Analog output voltage **(terminal blocks 22, 23, Analog Out)** which corresponds to **45 ÷ 42ºC**
Vmin.   Minimum level of analog output voltage to **45ºC, 0 ÷ 4 Volt**, which is set from parameter **LLo**.
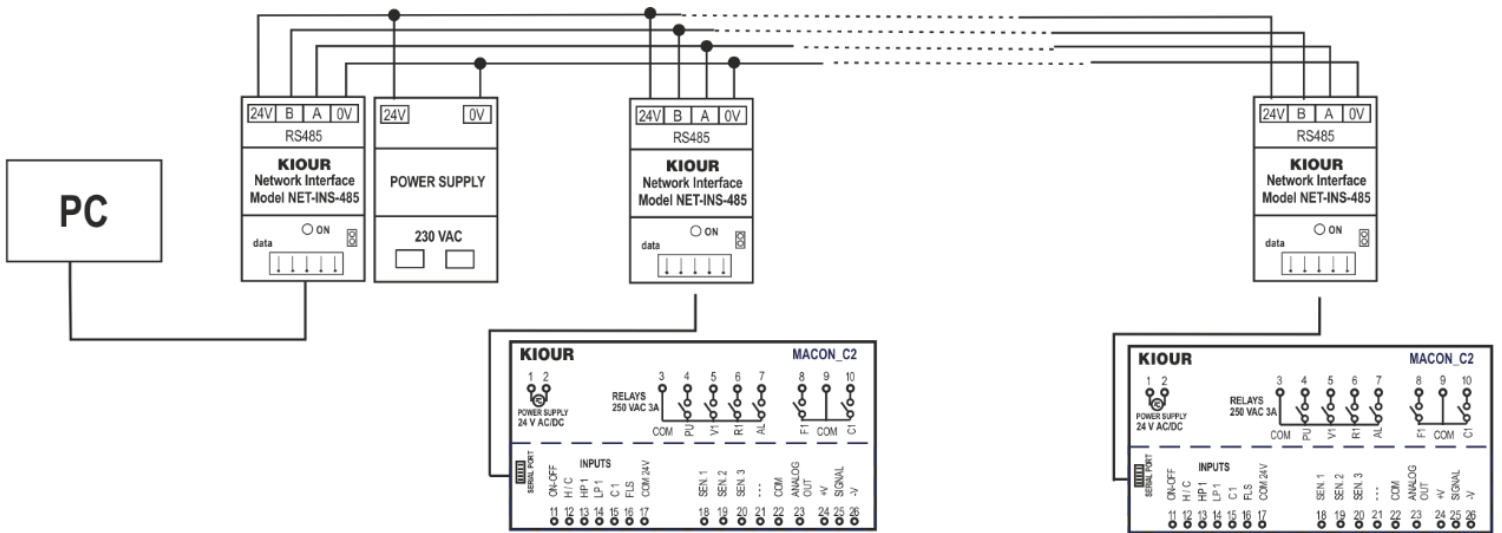**Vmax**.   Maximum level of analog output voltage to **42ºC, (6 ÷ 10 Volt)**, which is set from parameter **HLo.**
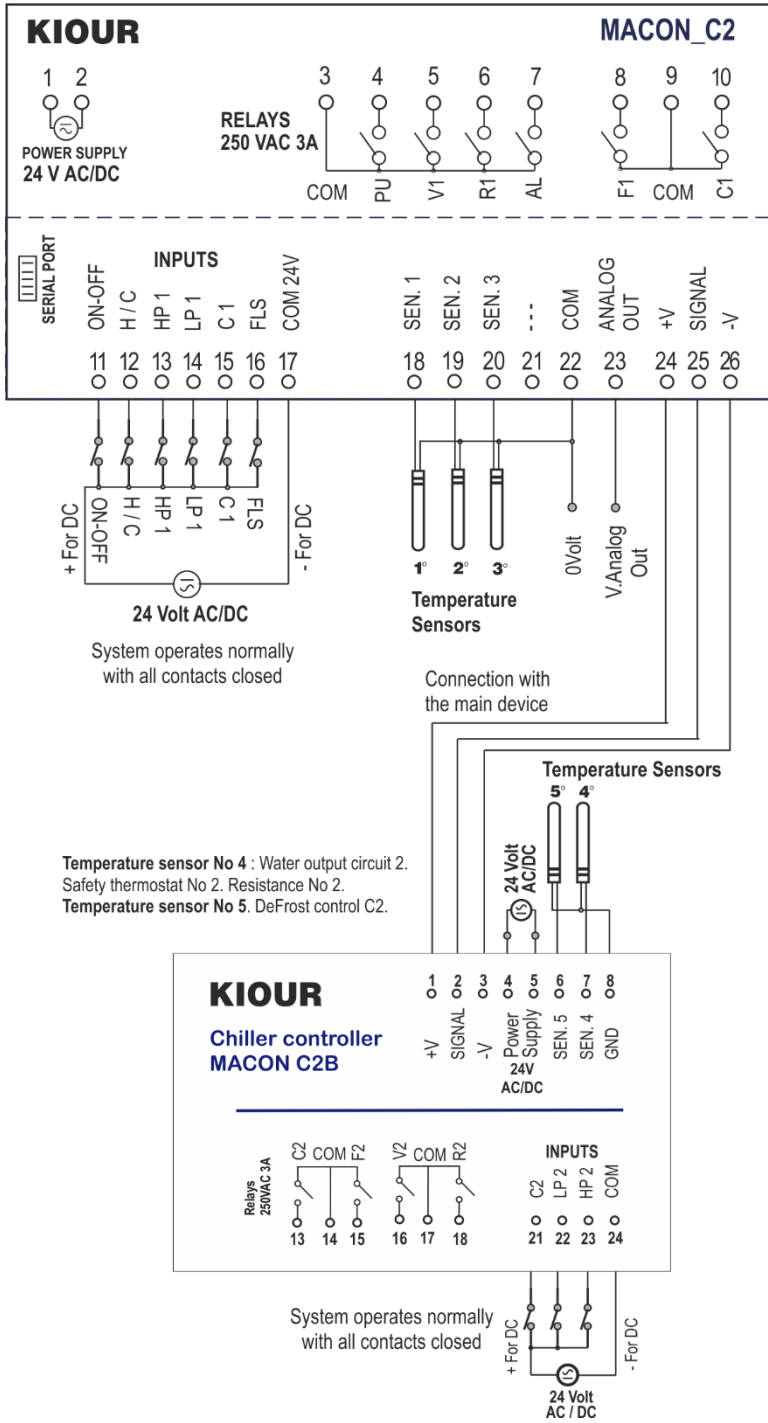
CONNECTING TO THE REMOTE CONTROL

Network power supply: +12-24VDC

CONNECTION TO A PC

KIOUR — MACON_C2

| 1 2 | | 3 4 5 6 7 | 8 9 10 |
POWER SUPPLY 24 V AC/DC

RELAYS 250 VAC 3A

COM PU V1 R1 AL F1 COM C1

SERIAL PORT

INPUTS

ON-OFF H/C HP 1 LP 1 C 1 FLS COM 24V   SEN. 1 SEN. 2 SEN. 3 - - - COM ANALOG OUT +V SIGNAL -V

11 12 13 14 15 16 17   18 19 20 21 22 23 24 25 26

+ For DC   ON-OFF H/C HP1 LP 1 C 1 FLS   - For DC

24 Volt AC/DC

System operates normally with all contacts closed

Temperature Sensors
1° 2° 3°

0Volt   V.Analog Out

Connection with the main device

Temperature Sensors
5° 4°

24 Volt AC/DC

Temperature sensor No 4 : Water output circuit 2.
Safety thermostat No 2. Resistance No 2.
Temperature sensor No 5. DeFrost control C2.

KIOUR — Chiller controller MACON C2B

1 2 3 4 5 6 7 8
+V SIGNAL -V Power Supply 24V AC/DC SEN. 5 SEN. 4 GND

Relays 250VAC 3A

C2 COM F2   V2 COM R2   INPUTS   C2 LP 2 HP 2 COM

13 14 15   16 17 18   21 22 23 24

System operates normally with all contacts closed

+ For DC   - For DC

24 Volt AC / DC

Temperature Sensor No 1. *Water input circuit 1. Operation thermostat HEATING-COOLING.*
Temperature Sensor No 2. *Water output. Safety thermostat No 1. Resistance No 1.*
Temperature Sensor No 3. *DeFrost control.*

RoHS   TÜV AUSTRIA HELLAS ISO 9001:2008 No. 01013192   CE

Made in Greece.

ATTENTION: according to safety standards, the device must be properly positioned and protected from any contact with electrical parts. The device must be fastened in such a way that it cannot be removed without the use of tools. Disconnect the main safety switch of the installation before proceeding to any maintenance. Disconnect the power supply of the device before proceeding to any maintenance. Do not place the device near heat sources, equipment containing strong magnets, in areas affected by direct sunlight or rain. Prevent electrostatic discharges and sharp objects from been inserted to the device. Separate signal cables from power supply cables to prevent electromagnetic disorders. Signal cables must never be in the same pipe with the power supply cables.
The device is under two year's guarantee. The guarantee is valid only if the manual instructions have been applied. The control and service of the device must be done by an authorized technician. The guarantee covers only the replacement or the service of the device. KIOUR preserves the right to adjust its products without further notice.