



Géothermal

2008-04-23

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PRELIMINARY

1. General layout

1.1. GÉOTHERMAL-IO Board

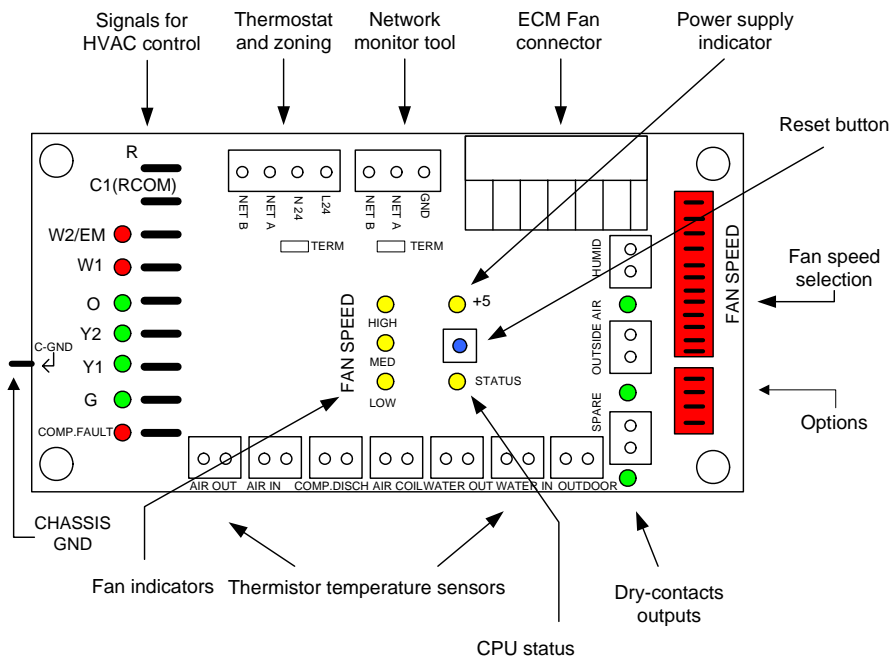


Figure 1 – GÉOTHERMAL-IO board layout

This card is the main unit controlling your HVAC system. It is getting some readings from the thermostat(s) and may also control an optional zoning board.

It has a yellow +5V power supply indicator which should be on at all times. The “status” LED displays the status of the microcontrollers. It is blinking at 1Hz during normal operation of the microcontroller. It may blink at 5 Hz if a condition

PRELIMINARY

prevents the use of the compressors like an alarm or emergency heating. If this is not the case, the card is not functioning properly.

1.2. Thermostat

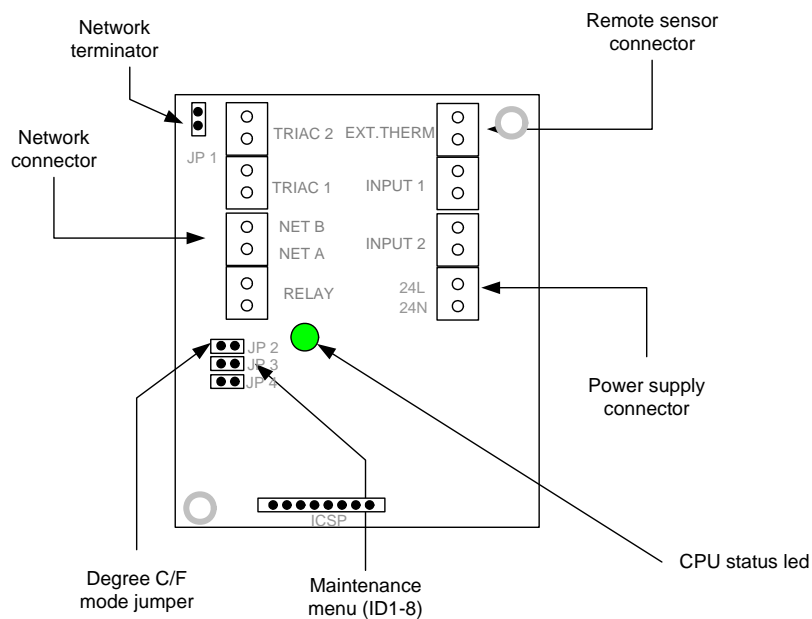


Figure 2 – Thermostat layout

This card takes care of temperature humidity and set points. The IO_BOARD communicates with the thermostat to receive its readings.

PRELIMINARY

The LED1 indicator displays the status of the microcontrollers. It is blinking at 1Hz during normal operation of the microcontroller. If this is not the case, the card is not functioning properly.

1.3. General Layout – Zoning Board

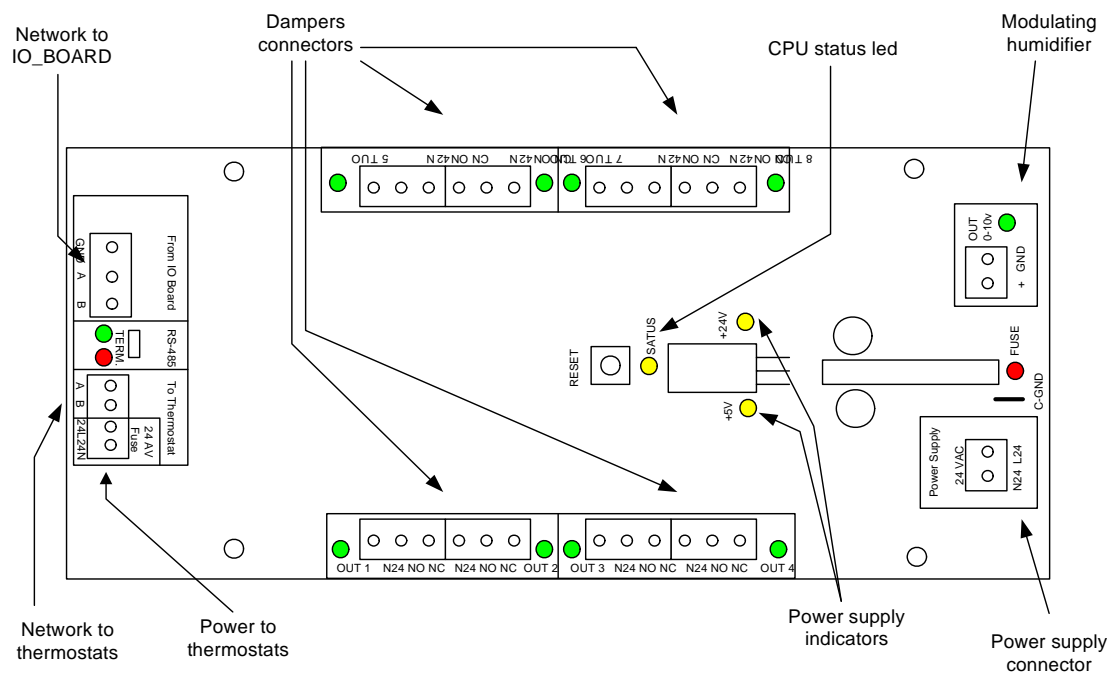


Figure 3 – Zoning Board Layout

This card is a dumb slave output card, to which the IO_BOARD sends commands when relays or 0-10V outputs are needed.

PRELIMINARY

The "Status" indicator displays the status of the microcontrollers. It is blinking at 1Hz during normal operation of the microcontroller. If this is not the case, the card is not functioning properly.

2. Connections

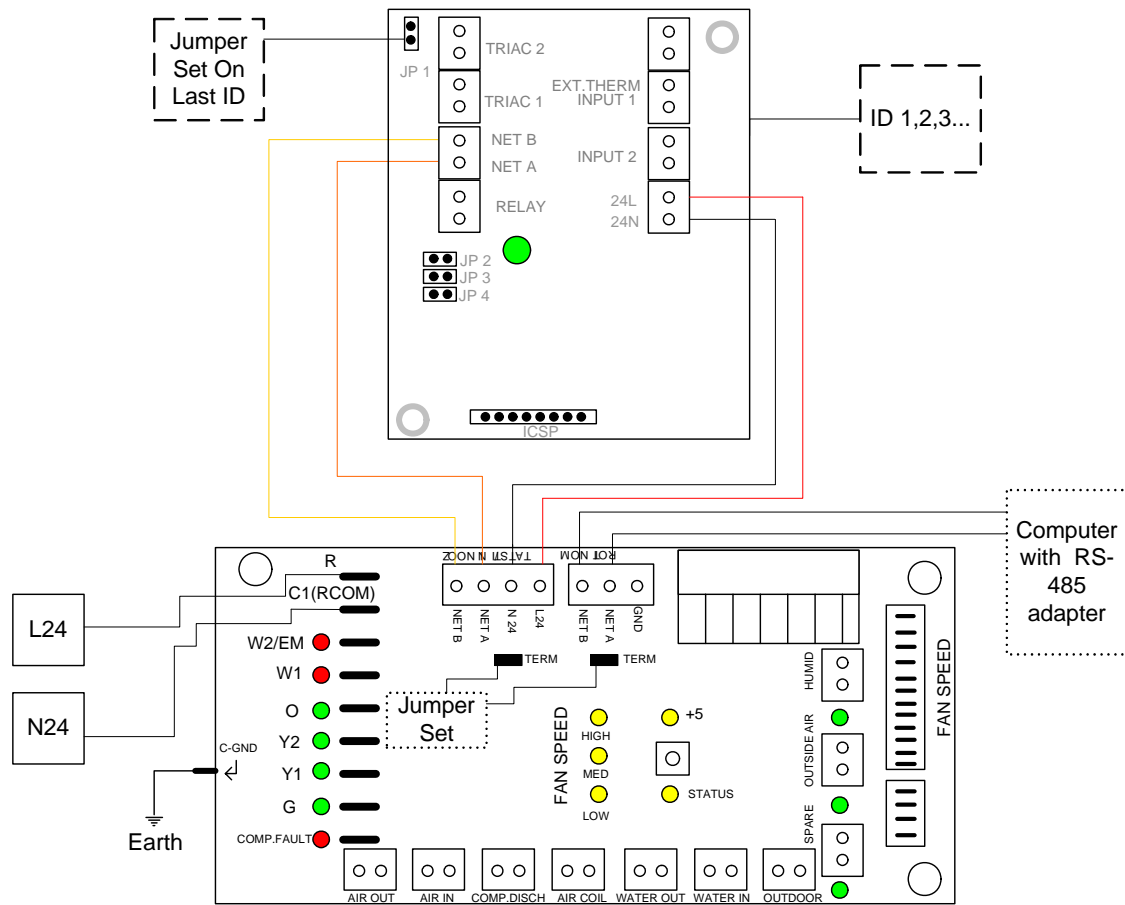


Figure 4 - IO Board With Zoning Thermostat

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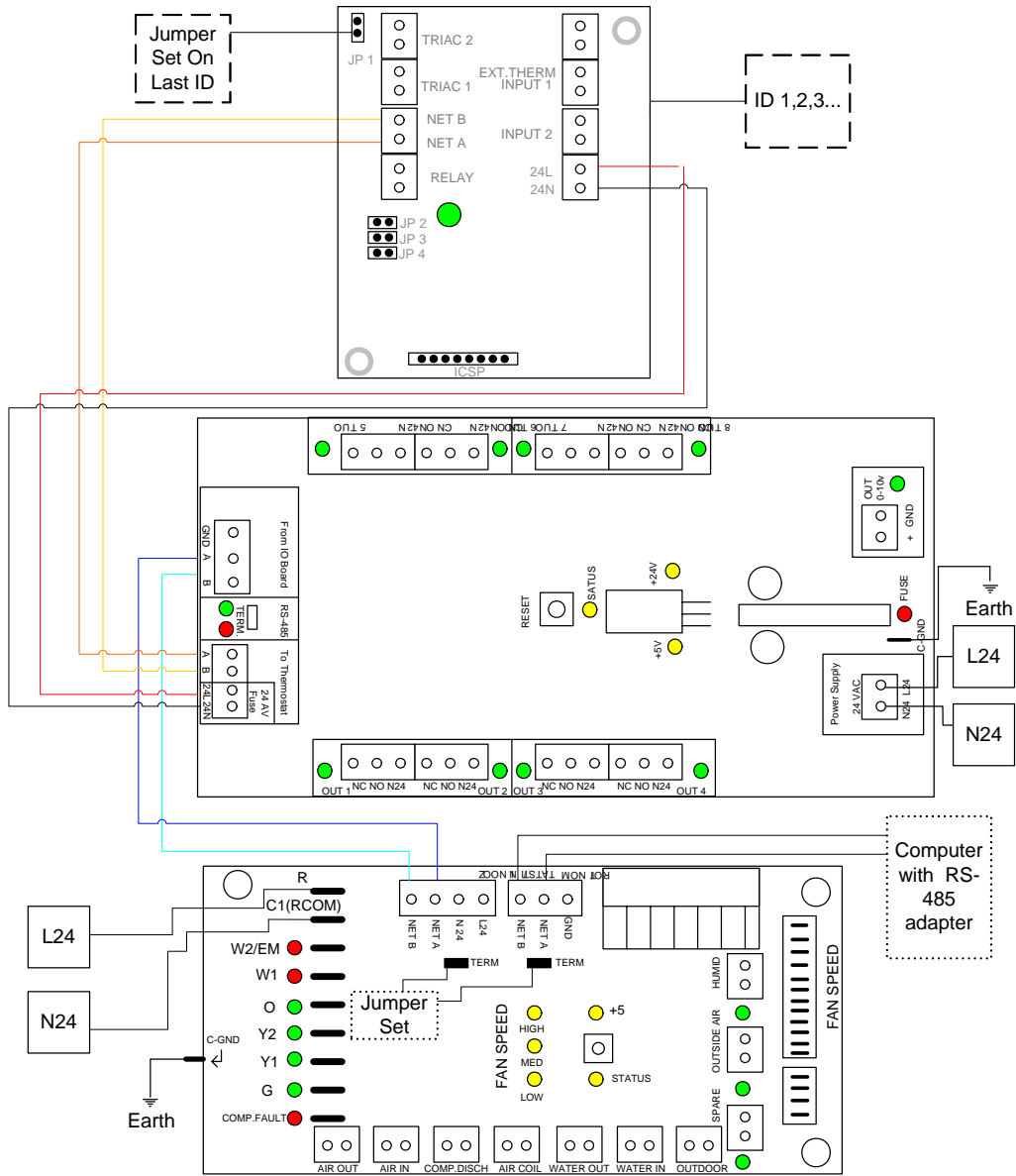


Figure 5 - IO Board With Zoning Board and Zoning Thermostat

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Install the proper power supply (24Vac) on the IO-BOARD between R and C1.

If applicable, install a proper supply on your zoning board. Do not forget that the zoning board will feed the signals to the dampers and to the Tstat.

If you have no zoning board and you are using a single thermostat, you may use L24 and N24 on the “Zoning/Tstat” connector on the IO-BOARD to supply the thermostat.

Connect your RS-485 network to the “Zoning/Tstat” connector on the IO-BOARD. Connect the other end to “Net A” and “Net B” of your thermostat(s) or to “A” and “B” of the RS-485 on the zoning board. Wire “A” must be connected to “A” and wire “B” must match connector “B” on all boards.

To avoid signals reflections on the RS-485 network, you need to properly terminate your network at each end. This can be done on the IO_BOARD controller by installing JP1 on the zoning board or on the thermostat. The IO_BOARD has a second independent network on the “Monitor” connector. This one also has a terminator which may be activated by JP2. You also need to daisy chain your cards on your network to achieve proper communication.

3. Operations

OFF (Rest)

- All the outputs are unenergized (except the valve of inversion).
- The fan is stopped.

Ventilation (Rest)

- All the outputs are unenergized (except the valve of inversion).
- The fan uses low speed.
- If the fan is in automatic mode, it stops 60 seconds after the stop of the heating or air-conditioning.

Heating, 1st stage

- The heating starts when at least 1% of the zones require heating.
- The fan uses the medium speed
- The valve of inversion is off.
- The 1st compressor starts.

Heating, 2nd stage

- The 2nd stage of heating starts when more than 49% of the zones require heating.
- The fan uses high speed.
- The valve of inversion is off.
- The 2nd compressor starts.

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- The 2nd stage of heat is activated at the same time as the 1st stage. If the "dip switch" #1 is off, it indicates that mode 1 compressor is ON. If the dip switch is at ON position, it indicates that 2 compressors are ON.

Auxiliary heating, 3rd stage

- The 3rd stage of heating starts when at least 70% of the zones require heating.
- The fan uses high speed.
- The valve of inversion is off.
- The W1 relay is energized in more of the compressors (Y1 and Y2).

Auxiliary heating, 4th stage

- The 4th training course of heating starts when at least 90% of the zones require heating.
- The fan uses high speed.
- The valve of inversion is off.
- Relays W1 and W2/EM are energized in more of the compressors (Y1 and Y2).

Emergency heating, 1st stage

- The emergency heating will be activated in the 1st stage if mode "EM Heat" was selected or if the geothermal pump is off because of an alarm.
- The heating starts when at least 1% of the zones require heating.
- The fan uses high speed.
- The W1 relay is energized.
- The DEL D13 indicator flickers more quickly.

PRELIMINARY

- The compressor will not re-start before the comfort level has been reached.

Emergency heating, 2nd stage

- The heating starts when more than 49% of the zones require heating.
- The fan uses high speed.
- Relays W1 and W2/EM are energized.

Air-conditioning, 1st stage

- Air-conditioning starts when at least 1% of the zones require air-conditioning.
- The fan uses the medium speed
- The valve of inversion is activated.
- The 1st compressor starts.

Air-conditioning, 2nd stage

- The 2nd step of air-conditioning starts when more than 49% of the zones require air-conditioning.
- The fan uses high speed.
- The valve of inversion is activated.
- The 2nd compressor starts.
- The 2nd stage of air-conditioning is activated at the same time as the 1st stage if the "dip switch" #1 is off to indicate mode 1 compressor.

PRELIMINARY

Characteristics

Alarm

- 1 entry of dry contact type will be added to detect the alarm signal of the GEOTHERMAL electronic board and to turn off the compressors.

Protection against cycling

- The controller uses minimum times of operation to protect the compressors.
- On first start up the compressor will go on after 5 minutes
- Once started a compressor will stay ON for 2 minutes
- Once stopped a compressor will stay OFF for 5 minutes

Dip Switch

- 1-12 Fan PWM

Options

1. 1-2 Compressors
2. Fan uses the mean velocity if there is only one thermostat.

Filter life

- 4 time options: 400, 800, 1200, and 1600 hours .
- Time decremented when the fan is in function.
- At time zero, the master thermostat posts "FILT" with the segments of its four numbers.
- To reset Time and stop display "FILT", press reset on master thermostat and hold %, select Filt, scroll to "F ch ", and press %.
- The fan operation time is calculated and stored into a non volatile memory.

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Temperature: Air, in

- For reading by a technician only

Temperature: Air, Out

- For reading by a technician only.

Temperature: Air, Coil suction

- De-icing icing as low as -4°C (25°F) during 30 continuous seconds.
- The alarm forces the compressor to stop.
- Alarm goes off only when the temperature is higher than 18°C (65°F).
- If an alarm occurs more than 3 times in a 24 hours period, starting from the first alarm, the unit will go the Em mode.
- If an alarm happens when the unit is in dehumidifier mode, the unit will get out of this mode and will speed up the fan.
- For the other tests and in normal time, on a second or a third alarm, the compressor will be stopped for 5 minutes (Alarm).

Temperature: Discharge from the compressor

- Forces the compressors to be stopped if this temperature reaches more than 107°C (225°F) during one 15-minute continuous period.

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Temperature: External

- It is used to readjust the moisture instruction (humidistat mode).

10°C	55%
0°C	45%
-10°C	35%
-20°C	30%
- The moisture instruction is fixed between 10°C and -20°C.
- The moisture instruction is interpolated between the other temperatures.
- The automatic / manual mode is selected when "↑" and "↓" are pressed simultaneously in the "the Set Not Low %" menu.

Temperature: Coax Gas

- For reading by a technician only.

Temperature: Water in

- For reading by a technician only.

Temperature: Water out

- For reading by a technician only.

Temperature: Compressor suction

- For reading by a technician only.

Humidifier, Dehumidifier Mode, Reheat Valve

- The dehumidification mode starts 5% above set point and stops 5% below set point.

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- In air-conditioning only.
 - **Manual mode**
- Default set point : 75%
 - **Automatic mode**
- Set point: 50%
- On dehumidification mode the A/c set point is automatically deducted 1°C .
- For an optimal dehumidification performance, on dehumidification mode, the fan speed is lowered in order to pick up more water on the cooling coil.
- If the request for air-conditioning justifies the start of a 3rd step of air-conditioning, the fan takes again its high speed as it would have done normally.
- The reheat valve is activated if the fan and the compressor are on.

Humidifier, humidistat Mode

- Default set point : 35%
- An exit makes it possible to activate a humidifier.
- It is activated at 5% under the set point and stops at 5% over the setpoint .
- The exit of humidifier is stopped when a step of compressor starts in air-conditioning or when the last cycle was in air-conditioning.
- The fan must be ON to activate the humidifier.
- The modulating exit of the zoning board is activated under the same conditions as the humidifier relay.
- The modulating exit 0-10V expressed as a percentage takes a value equal to the sum of the zones.

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Fan

- The fan can function according to 3 designed speeds. These speeds are activated by a PWM (24Vdc) exit. It is possible to choose various speeds by activating 3 from the 12 "dip switch" defined for this purpose on the io board.
- Pulsates with 70Hz in 2.4k Ohms
- 3 leds indicate low, average, and high speeds.
 - o 1 led lights if the speed of the fan is equal to the speed of the "dip switch".
 - o 2 leds light if the real speed of the fan is between the speed required by 2 "dip switches".
- The fan can function as an automatic mode or ONE continuous. It is possible to independently configure this mode for the heating or air-conditioning.
- If no "dip switch" is selected, the fan will function at the fastest speed (# 12).
- When less than 3 "dip switches" are selected, missing speeds will be identical to that of the fastest "dip switch".
- If the system functions without zoning, the dip switch #2 makes it possible to force the state of the fan in recirculation mode. The fan thus functions at "medium" speed instead of "low".

Zoning

- 8 zones with a weight expressed as a percentage.
- If no request, all the shutters are open according to weights of zones and according to the "FAN" menus.
- The zones in request open their shutter at 100%; the other zones are closed.
- The speed of the fan is adjusted according to the addition of the percentages of zones in request.

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- The 100% speed of a fan corresponds to the dip switch fast speed.
- The 0% speed are 0, but the fan will always respect the minimum given by the dip switch low speed.
- In 2nd step, the speed of the fan will always respect the minimum given by the dip switch mean velocity.
- In dehumidification, one calculates the speed of the fan in the same way, but the 100% speed is calculated according to the dip switch mean velocity.
- An option of inoccupation (night set back) can be activated for a zone and a 1°C to 2.5°C temperature instruction offset can be applied to this zone. This option will be activated by maintaining the button "*" during 5 seconds. The thermostat will indicate "--" as the mode of inoccupation.
- When pressing on the button "*", the outside temperature is displayed for 5 seconds.
- The first zone, or the main zone, divides its request into two when the 1st step or the 2nd step is desired. This calculation does not decrease its demand for ventilation.
- The first step of heating or air-conditioning starts as soon as a zone requires it.
- The 2nd step can start only when a weight of 49% of the zones require it.
- The 3rd training course can start only when a weight of 70% of the zones require it.
- The 4th step can start only when a weight of 90% of the zones require it.
- In emergency mode, the 2nd step of auxiliary heating starts in 1st and 2nd step to 1% and 49%.
- At 70% of the zones in air-conditioning, we consider that one is in 2nd step and that one is unaware of the mode of dehumidification.

PRELIMINARY

- Even in zoning, the compressor must respect its minimum time ONE. During this period, the closing of the shutters is not allowed to prevent functioning of the fan with all the closed shutters.
- In the event of simultaneous request for heating and air-conditioning, that having the largest cumulative percentage will take precedence over the other. An active sequence can be seen granting a 5-minute additional deadline before going in priority mode if the temperature instruction is to be reached within 0.5°C.
- If a zone has 3°C (6°F) variation, it has priority no matter its weight expressed as a percentage.

3.1. *Login run time*

- Times of use of each step of the heating and air-conditioning are compiled once per day. Times are accessible by modBus (see Table 1).
- The time of use of the fan is compiled once per day and also when the time of the Filter life has expired.
- Before being compiled, an average time of usage is realized according to the % the fan operation (this average is used to calculate the time of use of the filter).

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4. ModBus Registers list

Id	Parameters	Direction	Explication	Min	Max	Default	Units
1	Program Id	Constant					101
2	Version	Constant					Major Version * 100 + minor Version
3	External Temperature:	Out		-60.00 C	120.00 C	0x7FFF	0.01 C
4	Water In Temperature:	Out		-60.00 C	120.00 C	0x7FFF	0.01 C
5	Water Out Temperature:	Out		-60.00 C	120.00 C	0x7FFF	0.01 C
6	Air Coil Suction Temperature:	Out		-60.00 C	120.00 C	0x7FFF	0.01 C
7	Compressor Discharge Temperature:	Out		-60.00 C	120.00 C	0x7FFF	0.01 C
8	Air In Temperature:	Out		-60.00 C	120.00 C	0x7FFF	0.01 C
9	Air Out Temperature:	Out		-60.00 C	120.00 C	0x7FFF	0.01 C
10	Dip Switch Fan	Out					1 bit per switch

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11	Position Dip Switch Options	Out					1 bit per switch
12	Fan Speed	Out		0%	100%	0%	1%
13	Total Request	Out	Negative = air- conditioning	-100%	100%	0%	1%
14	Positions of the shutters	Out	bit field	0x00	0xFF	0x00	
15	Moisture	Out		0,00%	100,00%	0x7FFF	0,01%
16	Humidistat State	Out		0	1	0	
17	Dehumidification	Out		0	1	0	
18	Alarm State - Discharge of the compressor.	Read		0	1	0	
19	Zone 1 heat set point	Read		-60.00 C	120.00 C	21.00 C	0.01 C
20	Zone 2 heat set point	Read		-60.00 C	120.00 C	21.00 C	0.01 C
21	Zone 3 heat set point	Read		-60.00 C	120.00 C	21.00 C	0.01 C
22	Zone 4 heat set point	Read		-60.00 C	120.00 C	21.00 C	0.01 C
23	Zone 5 heat set point	Read		-60.00 C	120.00 C	21.00 C	0.01 C
24	Zone 6 heat set point	Read		-60.00 C	120.00 C	21.00 C	0.01 C

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25	Zone 7 heat set point	Read		-60.00 C	120.00 C	21.00 C	0.01 C
26	Zone 8 heat set point	Read		-60.00 C	120.00 C	21.00 C	0.01 C
27	Zone 1 Cool set point	Read		-60.00 C	120.00 C	24.00 C	0.01 C
28	Zone 2 Cool set point	Read		-60.00 C	120.00 C	24.00 C	0.01 C
29	Zone 3 Cool set point	Read		-60.00 C	120.00 C	24.00 C	0.01 C
30	Zone 4 Cool set point	Read		-60.00 C	120.00 C	24.00 C	0.01 C
31	Zone 5 Cool set point	Read		-60.00 C	120.00 C	24.00 C	0.01 C
32	Zone 6 Cool set point	Read		-60.00 C	120.00 C	24.00 C	0.01 C
33	Zone 7 Cool set point	Read		-60.00 C	120.00 C	24.00 C	0.01 C
34	Zone 8 Cool set point	Read		-60.00 C	120.00 C	24.00 C	0.01 C
35	Runtime Heat 1	Out		1 H	65535 H	0 H	1 H
36	Runtime Heat 2	Out		1 H	65535 H	0 H	1 H
37	Runtime Cool 1	Out		1 H	65535 H	0 H	1 H
38	Runtime Cool 2	Out		1 H	65535 H	0 H	1 H

PRELIMINARY

39	Runtime Heat Aux 1	Out		1 H	65535 H	0 H	1 H
40	Runtime Heat Aux 2	Out		1 H	65535 H	0 H	1 H
41	Runtime Fan	Out		1 H	65535 H	0 H	1 H
42	Alarm State - Coil Suction	Read	0-1 = OFF, 2-3 = ON	0	3	0	
43	Alarm - Count - Coil Suction	Read		0	3	0	
44	Alarm State - Contact input	Read	0-1 = OFF, 2-3 = ON	0	3	0	
46	Filter Life	Read		0	1	0	
47	Filter Life time	Read		400 H	1600H	800H	
10001	Address	Configuration		1	253	1	
10002	Reset	In (Order)	0 = Do noting, 1 = Reset	0	1	0	
10003	Wink	Entrée (Order)	0 = Do noting, 1 = Wink	0.0 S	6553.5 S	0.0 S	0.1 S
10004	Offset Temperature External	Configuration		-10.00 C	10.00 C	0 C	0.01 C
10005	Offset Temperature Water In	Configuration		-10.00 C	10.00 C	0 C	0.01 C
10006	Offset Temperature Water Out	Configuration		-10.00 C	10.00 C	0 C	0.01 C
10007	Offset	Configuration		-10.00 C	10.00 C	0 C	0.01 C

PRELIMINARY

	Temperature Air Coil Suction						
10008	Offset Temperature Compressor Discharge	Configuration		-10.00 C	10.00 C	0 C	0.01 C
10009	Offset Temperature Air In	Configuration		-10.00 C	10.00 C	0 C	0.01 C
10010	Offset Temperature Air Out	Configuration		-10.00 C	10.00 C	0 C	0.01 C
10011	Filter Temperature External	Configuration		0.0 S	60.0 S	5.0 S	0.1 S
10012	Filter Temperature Water In	Configuration		0.0 S	60.0 S	5.0 S	0.1 S
10013	Filter Temperature Water Out	Configuration		0.0 S	60.0 S	5.0 S	0.1 S
10014	Filter Temperature Air Coil Suction	Configuration		0.0 S	60.0 S	5.0 S	0.1 S
10015	Filter Temperature Compressor Discharge	Configuration		0.0 S	60.0 S	5.0 S	0.1 S

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10016	Filter Temperature Air In	Configuration		0.0 S	60.0 S	5.0 S	0.1 S
10017	Filter Temp Temperature Air Out	Configuration		0.0 S	60.0 S	5.0 S	0.1 S
10018	PWM1	Configuration	For Fan	0,00%	100,00%	1,00%	0,01%
10019	PWM2	Configuration	For Fan	0,00%	100,00%	10,00%	0,01%
10020	PWM3	Configuration	For Fan	0,00%	100,00%	19,00%	0,01%
10021	PWM4	Configuration	For Fan	0,00%	100,00%	28,00%	0,01%
10022	PWM5	Configuration	For Fan	0,00%	100,00%	37,00%	0,01%
10023	PWM6	Configuration	For Fan	0,00%	100,00%	46,00%	0,01%
10024	PWM7	Configuration	For Fan	0,00%	100,00%	55,00%	0,01%
10025	PWM8	Configuration	For Fan	0,00%	100,00%	64,00%	0,01%
10026	PWM9	Configuration	For Fan	0,00%	100,00%	73,00%	0,01%
10027	PWM10	Configuration	For Fan	0,00%	100,00%	82,00%	0,01%
10028	PWM11	Configuration	For Fan	0,00%	100,00%	91,00%	0,01%
10029	PWM12	Configuration	For Fan	0,00%	100,00%	99,00%	0,01%
10030	Relays position for tests	In (Order)	bit field	0x0000	0x01FF	0xFFFF	
10031	Fan speed for tests	In (Order)		0,00%	100,00%	655,35%	0,01%
10032	Time start	Configuration		0.0 S	1200.0 S	300.0 S	0.1 S
10033	Time Fan	Configuration	For auto mode	0.0 S	300.0 S	60.0 S	0.1 S
10034	Times Compressors Min On	Configuration	Protection against cycling	0.0 S	1200.0 S	300.0 S	0.1 S
10035	Times	Configuration	Protection	0.0 S	1200.0 S	300.0 S	0.1 S

PRELIMINARY

	Compressors Min Off		against cycling				
10036	Time of opening of a shutter	Configuration		0.0 S	1200.0 S	60.0 S	0.1 S
10037	Time of grace before passing in priority mode.	Configuration	Ref. 10038	0.0 S	1200.0 S	60.0 S	0.1 S
10038	Variation in temperature to allow a time of grace	Configuration	Ref. 10037	0.00 C	10.00 C	0.50 C	0.01 C
10039	Variation in temperature for priority zone	Configuration		0.00 C	10.00 C	3.00 C	0.01 C
10040	Differential for 2 nd Step (Zone 1)	Configuration		0.00 C	10.00 C	0.50 C	0.01 C
10041	Hysteresis between ON et OFF	Configuration		0.00 C	10.00 C	0.50 C	0.01 C
10042	Weight step 1	Configuration		0%	100%	1%	1%
10043	Weight step 2	Configuration		0%	100%	49%	1%
10044	Weight step 3	Configuration		0%	100%	70%	1%
10045	Weight step 4	Configuration		0%	100%	90%	1%
10046	Moisture Hysteresis	Configuration		0,00%	100,00%	5,00%	0,01%
10047	Moisture set point High Automatic Limit	Configuration		0,00%	100,00%	50,00%	0,01%
10048	Moisture, mode	Configuration	0 = Manuel,	0	1	0	0,01%

PRELIMINARY

	automatic or manual		1 = Auto				
10049	Moisture manual Set point	Configuration		0,00%	100,00%	50,00%	0,01%
10050	Moisture manual Set point dehumidifier	Configuration		0,00%	100,00%	50,00%	0,01%
10051	Curve of moisture - Outside temperature 1	Configuration		-60.00 C	120.00 C	-20.00 C	0.01 C
10052	Curve of moisture - Outside temperature 2	Configuration		-60.00 C	120.00 C	-10.00 C	0.01 C
10053	Curve of moisture - Outside temperature 3	Configuration		-60.00 C	120.00 C	0.00 C	0.01 C
10054	Curve of moisture - Outside temperature 4	Configuration		-60.00 C	120.00 C	10.00 C	0.01 C
10055	Curve of moisture – set point 1	Configuration		0,00%	100,00%	30,00%	0,01%
10056	Curve of moisture – set point 2	Configuration		0,00%	100,00%	35,00%	0,01%
10057	Curve of moisture – set	Configuration		0,00%	100,00%	45,00%	0,01%

PRELIMINARY

	point 3						
10058	Curve of moisture – set point 4	Configuration		0,00%	100,00%	55,00%	0,01%
10059	Alarm - High Limit - Discharge of the compressor.	Configuration		-60.00 C	120.00 C	107.00 C	0.01 C
10060	Alarm - Duration - Discharge of the compressor.	Configuration		0.0 S	6553.5 S	900.0 S	0.1 S
10061	Offset of temperature for unoccupied mode	Configuration		0.00 C	10.00 C	1.50 C	0.01 C
10062	Offset of temperature in air-conditioning for auto moisture .	Configuration		0.00 C	10.00 C	1.00 C	0.01 C
10063	Alarm - Low Limit - Coil Suction	Configuration		-60.00 C	120.00 C	-4.00 C	0.01 C
10064	Alarm – high Limit - Coil Suction	Configuration		-60.00 C	120.00 C	18.00 C	0.01 C
10065	Alarm - Time To On - Coil Suction	Configuration		0.0 S	6553.5 S	30.0 S	0.1 S

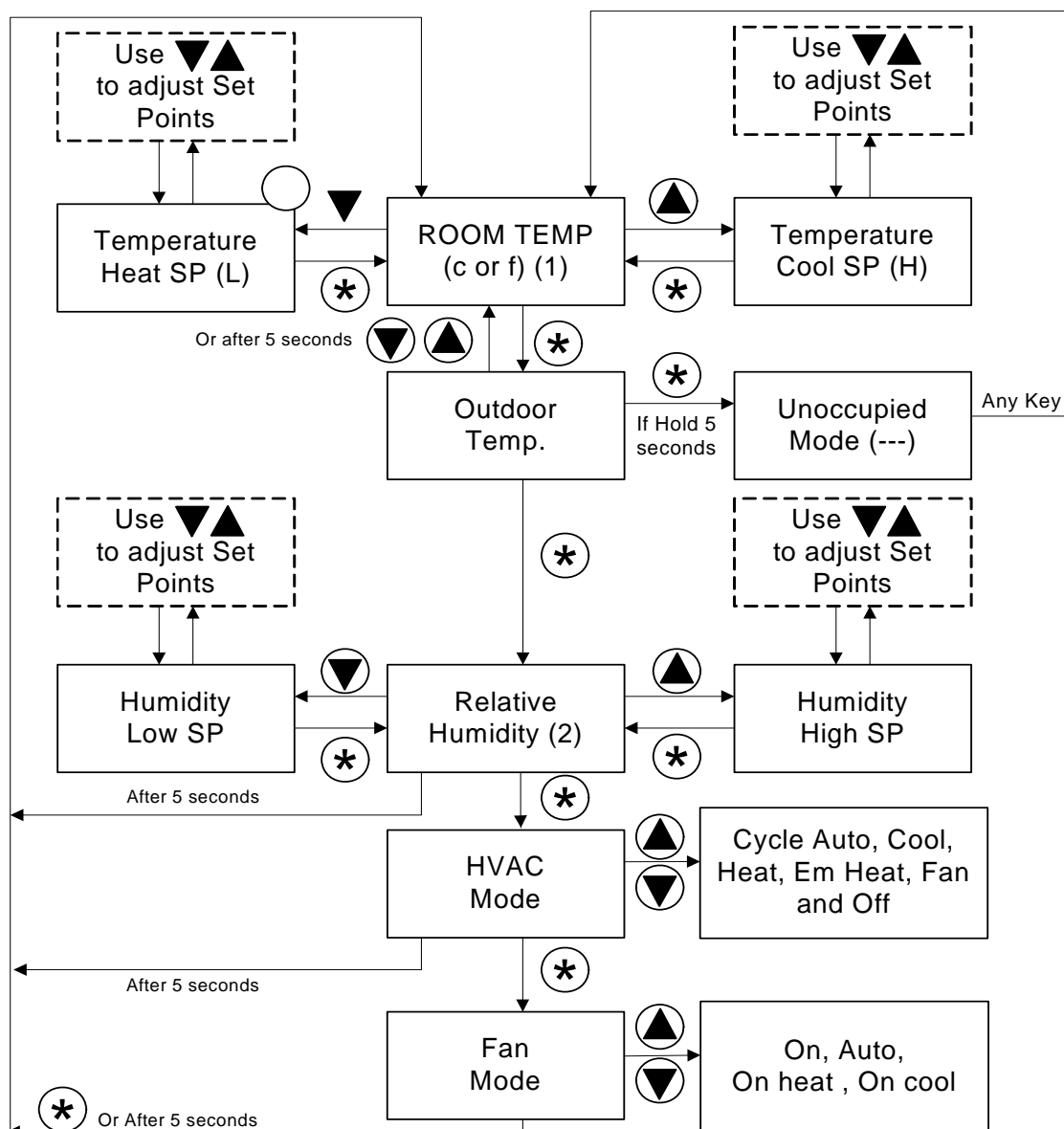
PRELIMINARY

10066	Alarm - Minimum On - Coil Suction	Configuration		0.0 S	6553.5 S	300.0 S	0.1 S
10067	Alarm - Duration – Contact input	Configuration		0.0 S	6553.5 S	900.0 S	0.1 S
11004	Weight Zone 1	Configuration		0%	100%	100%	1%
12004	Weight Zone 2	Configuration		0%	100%	0%	1%
13004	Weight Zone 3	Configuration		0%	100%	0%	1%
14004	Weight Zone 4	Configuration		0%	100%	0%	1%
15004	Weight Zone 5	Configuration		0%	100%	0%	1%
16004	Weight Zone 6	Configuration		0%	100%	0%	1%
17004	Weight Zone 7	Configuration		0%	100%	0%	1%
18004	Weight Zone 8	Configuration		0%	100%	0%	1%

Table 1 – Modbus Registers List

5. Thermostat Menu

5.1. Master

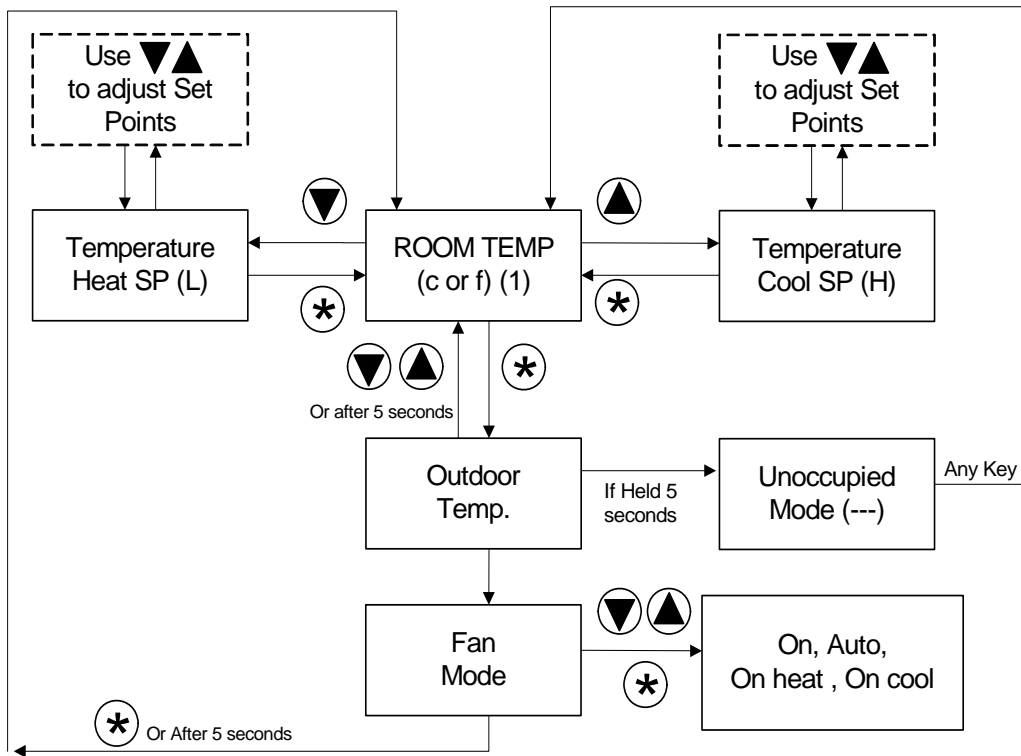


(1) Degree C if JP2 is removed. Degree F if JP2 is installed.

(2) Hold ▼ or ▲ to switch between «Auto» and manual mode

PRELIMINARY

5.2. Slave

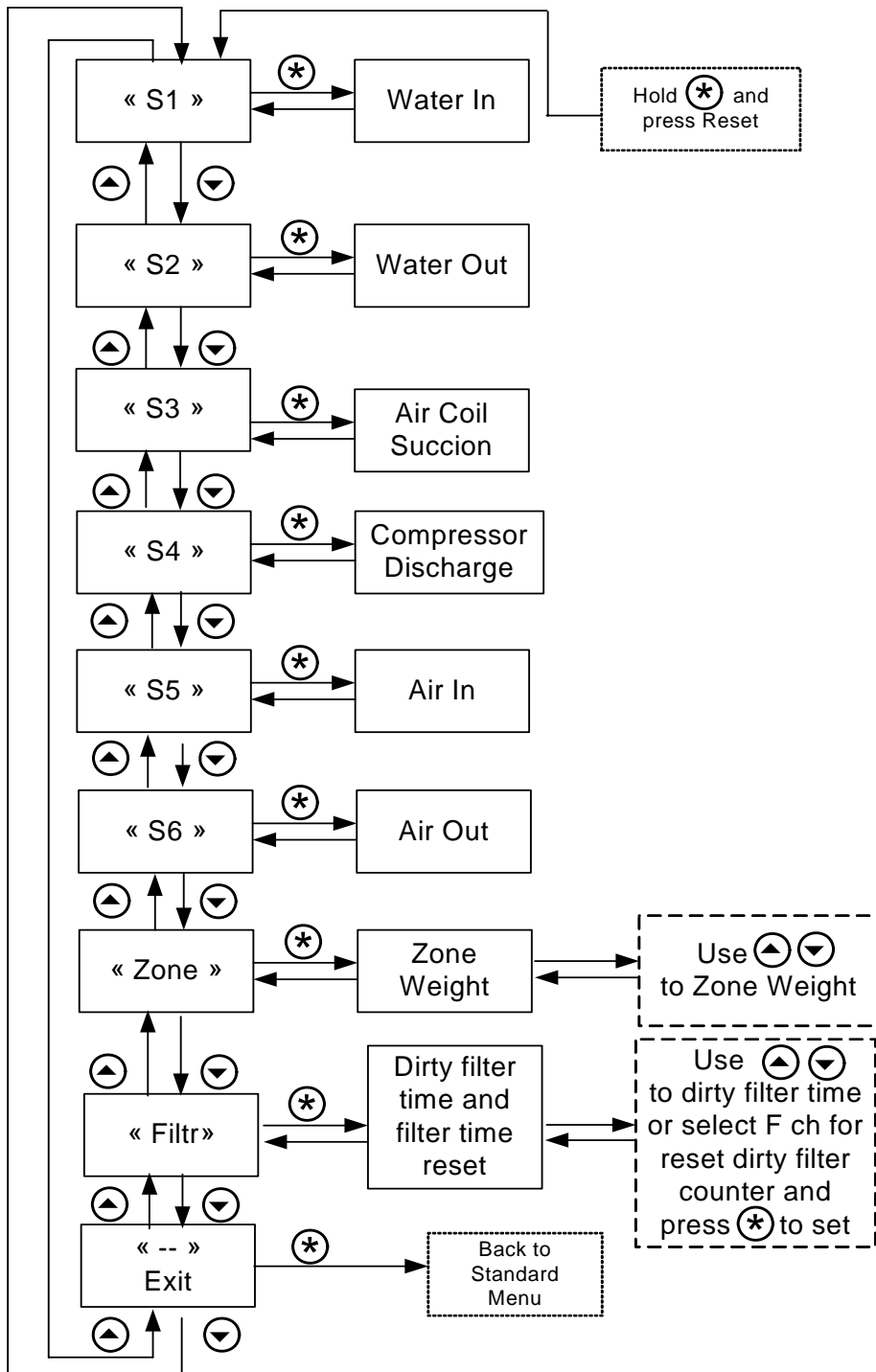


(1) Degree C if JP2 is removed. Degree F if JP2 is installed.

5.3. Maintenance



PRELIMINARY



6. Technical specifications

6.1. IO Board

- Model : IO_BOARD V1.1 top & V1.1 bottom
- Software : GÉOTHERMIE_IO_BOARD.hex
- Power Supply : 24 Vac, 8VA or 28-32Vdc, 9W
- Operating temperature : 0°C to 50°C or 32°F to 176°F
- Storage temperature : -40°C to 85°C or -40°F to 185°F
- Temperature precision: +/- 1°C or +/- 2°F (worst case)
+/- 0.1°C or +/- 0.2°F (best case)
- Dimensions : 132.7mm x 73.4mm or 5" 1/4 x 2" 15/16
- Relay outputs : (8x) 24Vac @ 1A fed from power supply
- Relay outputs : (3x) 24Vac @ 1A dry contact
- PWM output : 24Vdc @ 80Hz 1% through a 1.1k Ohms resistor

- Processor : PIC18F458 or PIC18F4580
- RAM memory : 1.5 kilo bytes
- Flash memory : 32 kilo bytes
- eeprom memory : 256 bytes
- Crystal clock : 10 MHz external, 40 MHz internal
- Communication # 1: RS-485 ModBus master @ 9600 Baud
(to thermostat and zoning board)
- Communication #2 : RS-485 ModBus slave @ 9600 Baud
(for a computer monitor)

PRELIMINARY

6.2. *Thermostat*

- Model : CCTH-100-RS485 V1.0
 - Software : CC-Trs485Master.hex
 - Power Supply : 24 Vac, 8VA or 28-32Vdc, 9W
 - Operating temperature : 15°C to 30°C or 59°F to 86°F
 - Storage temperature : -40°C to 85°C or -40°F to 185°F
 - Temperature precision: +/- 0.5°C or +/- 0.9°F
 - Temperature set point range : 15°C to 30°C or 59°F to 86°F
 - Humidity precision: +/- 5% RH
 - Humidity set point range : 0% to 100%, automatic or manual
 - Dimensions : 83.6mm x 109.3mm or 3" 5/16 x 4" 5/16
-
- Processor : PIC18F2520
 - RAM memory : 1536 bytes
 - Flash memory : 32 kilo bytes
 - eeprom memory : 256 bytes
 - Crystal clock : 4 MHz external
 - Communication : RS-485 ModBus slave @ 9600 Baud

PRELIMINARY

6.3. *Zoning Board*

- Model : Zoning Board V1.0
 - Software : GéothermieZone.hex
 - Power Supply : 24 Vac, 8VA or 28-32Vdc, 9W (Excluding dampers and Thermostat)
 - Operating temperature : 0°C to 50°C or 32°F to 176°F
 - Storage temperature : -40°C to 85°C or -40°F to 185°F
 - Dimensions : 160.9mm x 94.3mm or 6" 5/16 x 3" 3/4
 - Relay outputs : (8x) 24Vac @ 1A feeded from power supply
 - Analog output : 0-10Vdc (1%) @ 34mA
-
- Processor : PIC18F2520
 - RAM memory : 1.5 kilo bytes
 - Flash memory : 16 kilo bytes
 - eeprom memory : 256 bytes
 - Crystal clock : 10 MHz external
 - Communication : RS-485 ModBus slave @ 9600 Baud

PRELIMINARY

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