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GIACOMINI
Technology in Comfort

ICIM ISO 9001 0006/7
ICIM ISO 14001 0032A/2
ICIM OHSAS 18001 0064L/0

REGULATION MODULE

KPM20

Description

KPM20 regulation module is a Giacoklima series device, to be used in a Giacoklima bus system to control heating and/or cooling underfloor or ceiling radiant systems in combination with K481, K483 thermostats, KM203 Controller and KD200/KD300 Display Unit.

KPM20 enables a rapid connection to R478 or R473 electro-thermal actuators, to K481 or K483 thermostats and K485 room sensor without using auxiliary devices such as distribution boxes and/or interface relays. Furthermore, the intervention of a circulator and the starting of a mixing valve motor are automatically managed.

Main features

- 24 V~ 50 Hz power supply
- Possibility to handle up to 8 K481B, K483B ambient thermostats or K485 room sensors connected on secondary bus independently
- Possibility to control up to 8 R478 (N.O.) or R473 (N.C.) electro-thermal actuators at 24 V~ (8 zones)
- Possibility to connect to KM203 Controller via primary bus for advanced functions and teleprocessing
- Possibility to set the desired temperature for the mixing group (fixed point regulation) or the maximum temperature through rotating potentiometer on the front of the device
- 8 outputs independently controlled. Possibility to control max 2 R478 (N.O.) or R473 (N.C.) electro-thermal actuators at 24 V~ for each output directly
- Delayed start-up of the circulator (approx. 3 minutes) at the opening of one of the hydraulic circuits after a complete closing session
- Display, through LED indicators, of the control status of the actuators and of the conduction mode of the system (SUMMER/WINTER)
- 1 input for the connection of a K363P passive sensor to measure the inflow temperature
- 1 input for the connection of a K365P passive sensor to measure the outside temperature or, alternatively, of a K363P passive sensor to measure the return temperature
- 1 input for the connection of a K363P sensor to measure the inflow temperature
- 1 input for the connection of a K365P sensor to measure the outside temperature or of a K363P sensor to measure the return temperature
- 1 input for the connection of max 4 dew-point sensors in parallel
- 1 input (dry contact) dedicated to a device for the centralized switching of SUMMER/WINTER conduction mode for all the thermostats
- 1 input (dry contact) dedicated to a device for the SET BACK procedure (centralised switching of the temperature reduction when in NIGHT mode for all the thermostats connected to the secondary bus)
- Dip-switch for device addressing in applications with primary bus and KM203 Controller

Functioning

KPM20 can control R478 or R473 actuators depending on the status of the thermostats connected through secondary bus. R473 (N.C.) actuators are opened when the corresponding thermostats require flow. Then KPM20 regulation module will activate the circulator and switch on the corresponding LED. In case an actuator is activated, when all actuators are closed, the circulator is activated only after a delay of 3 minutes. In this way it allows the actuator to open the valve completely.

What is stated above also applies to R478 (N.O.) actuators, with the exception that the closing of the valve(s) takes place when the corresponding thermostat ends the flow request. The selection between R478 and R473 is made through software configuration.

Regulation

The following primary regulation modes can be set by combining connections and software configurations conveniently:

- **Fixed point with adjustable set.**

In this case the inflow temperature is adjusted through a PI (proportional/ integral) regulator. The desired temperature can be set through the rotary potentiometer according to the indicated scale.

- **With climatic compensation.**

In this case, the inflow temperature is adjusted through a PI regulator, but the desired value varies automatically according to a preconfigured compensation curve. In case of both heating and cooling system, KPM20 regulation module uses different compensation curves.
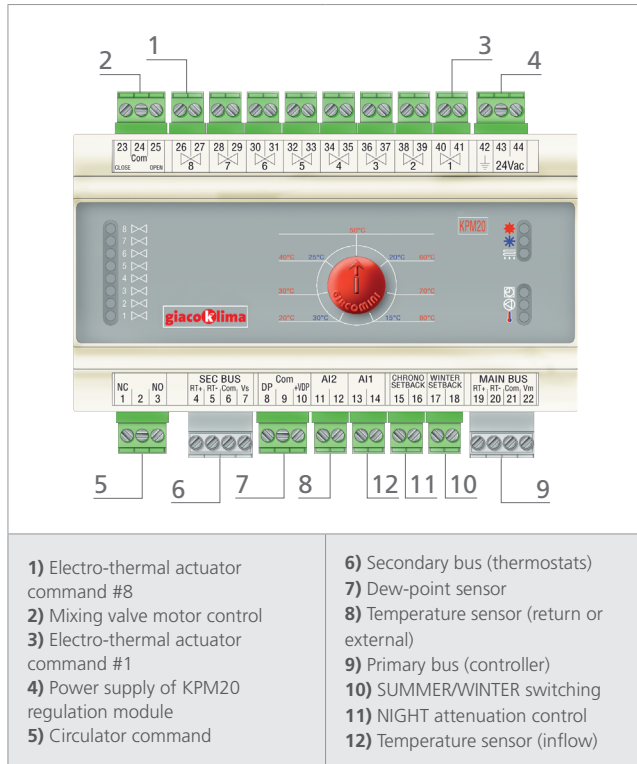
- **With climatic compensation and monitoring of temperature differential.**

It is similar to the previous mode, but when the temperature differential is higher than a preconfigured value (default value: 6 °C), the climatic compensation is by-passed and the desired inflow temperature corresponds to the max permitted value. This regulation mode is possible only when the system has a controller to which an external temperature sensor is connected and the supervision mode is activated.

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Connections

KPM20 regulation module is equipped with terminals to connect the different input and output devices. The terminals include a fixed part, soldered to the printed circuit of the device, and a movable part that can be removed. A mechanical coding prevents from erroneously inserting the movable part in the fixed one. Electrical cables are connected to the movable part.

1) Electro-thermal actuator command #8
2) Mixing valve motor control
3) Electro-thermal actuator command #1
4) Power supply of KPM20 regulation module
5) Circulator command

6) Secondary bus (thermostats)
7) Dew-point sensor
8) Temperature sensor (return or external)
9) Primary bus (controller)
10) SUMMER/WINTER switching
11) NIGHT attenuation control
12) Temperature sensor (inflow)

One terminal (3 poles: DEC, com, INC) connects K280 motor to control R298 mixing valve.

Eight terminals (2 poles) connect R478 or R473 electro-thermal actuators. It is possible to connect max. 2 electro-thermal actuators to each terminal in parallel.

One terminal (3 poles: NC, C, NO) connects the circulator. The contact closes only three minutes after the opening of the first actuator. This allows the actuator to open completely avoiding that the circulator activates hydraulically closed circuits.

SEC BUS terminal (4 poles: RT+, RT-, com, Vs) connects the secondary bus. Up to 8 K481B, K483B thermostats or K485 room sensor can be arranged on the secondary bus.

One terminal (3 poles: DP, com, +VDP) connects K366A dew-point sensor. Up to 4 dew-point sensors can be connected in parallel to the terminal.
AI1 terminal (2 poles) connects a K363P temperature sensor placed on the inflow manifold.

AI2 terminal (2 poles) connects a K365P outdoor temperature sensor or, as an alternative, a K363P temperature sensor placed on the return manifold. The selection is made through software configuration.

CHRONO SET BACK terminal (2 poles) connects a possible device (dry contact) for the centralized control of the NIGHT temperature reduction for all the thermostats connected to the secondary bus (SET-BACK function). The open contact is in attenuation mode, while the closed contact is in normal functioning mode. In case a KM203 controller, that is via primary bus connected, is used, SET-BACK function can be configured in the controller itself and the corresponding input is no more available.

WINTER-SUMMER terminal (2 poles) connects a possible device (dry contact) for the centralized switching of the conduction mode of the system (not available in the heating only version) for all thermostats connected to the secondary bus. The open contact corresponds to the SUMMER conduction mode, while the closed contact corresponds to the WINTER mode. In case a KM203 controller, that is via primary bus connected, is used, the centralized switching function can be configured in the controller itself and the corresponding input is no more available.

MAIN BUS terminal (4 poles: RT+, RT-, com, Vm) connects the primary bus. A KM203 controller, dedicated to advanced functions and to system teleprocessing, can be placed on the primary bus.

Signalling elements
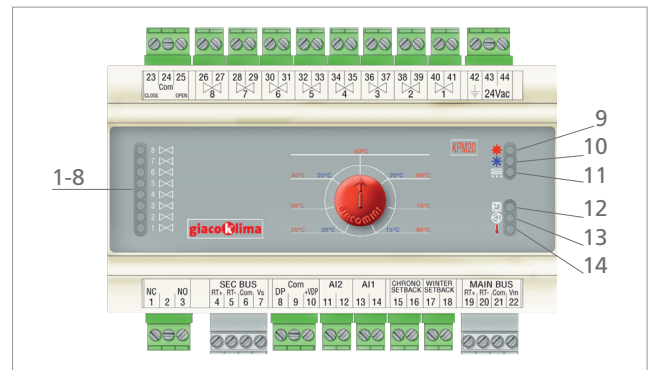
- 8 red LED (1-8) indicate the status of controlled electro-thermal actuators. If a LED switch on, it means that the corresponding actuator is being powered and furthermore:
- a LED on means absence of flow in the corresponding circuit for R478 (N.O.) actuators
- a LED on means flow in the corresponding circuit for R473 (N.C.) actuators
- 1 red LED on (9) indicates that the WINTER conduction mode is active
- 1 orange LED on (10) indicates that the SUMMER conduction mode is active
- 1 red LED on (11) indicates that there is a dew-point sensor alarm
- 1 orange LED (12) indicates:
- the activation of a CHRONO program (possible only with KM203 controller connected to the primary bus), if on and blinking;
- the local functioning at unreduced temperature (possible only without primary bus and KM203 controller), if off
- the activation of NIGHT mode (possible only without primary bus and KM203 controller) if permanently on
- 1 orange LED (13) indicates that the circulator is activated if on
- 1 red LED (14) indicates that the temperature sensor on the inflow manifold has triggered a high- or low-temperature alarm
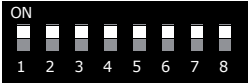
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Installation

KPM20 module is placed in a plastic housing with dimensions complying with DIN 43880 standard. It is suitable to be mounted on CEI EN 50022 standard profile guide.

Addressing

If KPM20 module is connected only to the secondary bus, it is not necessary to assign any address to it. On the contrary, if there is also a connection to the primary bus, it is necessary to assign an address to KPM20 module through the 8- way dip-switch placed inside the device, in order to have correct communication.

Dip-switch positioning								
Ind.	1	2	3	4	5	6	7	8
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
8	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
9	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
10	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
11	ON	ON	OFF	ON	OFF	OFF	OFF	OFF
12	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
13	ON	OFF	ON	ON	OFF	OFF	OFF	OFF
14	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
15	ON	ON	ON	ON	OFF	OFF	OFF	OFF
16	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
17	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
18	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
19	ON	ON	OFF	OFF	ON	OFF	OFF	OFF
20	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
21	ON	OFF	ON	OFF	ON	OFF	OFF	OFF
22	OFF	ON	ON	OFF	ON	OFF	OFF	OFF
23	ON	ON	ON	OFF	ON	OFF	OFF	OFF
24	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF
25	ON	OFF	OFF	ON	ON	OFF	OFF	OFF
26	OFF	ON	OFF	ON	ON	OFF	OFF	OFF
27	ON	ON	OFF	ON	ON	OFF	OFF	OFF
28	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
29	ON	OFF	ON	ON	ON	OFF	OFF	OFF
30	OFF	ON	ON	ON	ON	OFF	OFF	OFF
31	ON	ON	ON	ON	ON	OFF	OFF	OFF

To access the dip-switch:
• disconnect the device from power supply;
• rotate the potentiometer anti-clockwise until it stops (the notch must be placed on 20 °C - 30 °C);
• take the potentiometer out of its casing;
• remove the front part of the casing by levering with a screwdriver on the side tacks;
• set dip-switch cursors following the table above;
• close the casing;
• insert the potentiometer again being careful to place the notch on 20 °C - 30 °C.

On delivery, all dip-switch cursors are placed on "OFF" position (side numbered 1-8). KPM20 module can be programmed with an address from 0 to 31: check the address to assign in the project documentation of the system.

> **Caution!**
> Make sure that the assigned address is correct: two devices with the same address cannot be in the same system.

Terminals legend

Upper part of the casing

Terminal abbreviation	N. of poles	Function
DEC com INC	3	Control output for mixing valve motor
1-8 ▷◁	2	Command output for 24 V~ electro-thermal actuators
24 V ~	3	KPM20 Power supply 24 V~

Lower part of casing

Terminal abbreviation	N. of poles	Function
NC C NO	3	Output command for circulator
SEC BUS	4	Input for secondary bus connection
DP com +VDP	3	Input for dew-point sensor connection
AI2	2	Input for temperature sensor connection (return or outside one)
AI1	2	Input for temperature sensor connection (inflow)
CHRONO SET BACK	2	Input for set back device
WINTER SUMMER	2	Input for device switching the conduction mode of the system (only for KPM20-Y002)
MAIN BUS	4	Input for primary bus connection

Installation

Layout in attachment n. 1 represents an example of use of a KPM20 module with 8 K481B thermostats placed on the secondary bus; these control 8 R478 electro-thermal actuators. In addition, the following devices are connected: a K363P temperature sensor to the inflow manifold, a K365P temperature sensor to outside, a K366A dew-point sensor, a device for the centralized switching of SUMMER/WINTER conduction mode, a device for the centralized control of NIGHT temperature reduction.
Layout in attachment n. 2 represents an example of use of a KPM20 module with 8 K481B thermostats placed on the secondary bus; these control 8 R478 electro-thermal actuators and a KM203 controller placed on the primary bus. In addition, the following devices are connected: a K363P temperature sensor to the inflow manifold, a K363P temperature sensor to the return manifold, a K366A dew-point sensor.

> **Caution!**
> Make sure that power supply is turned off while connecting.

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REGULATION MODULE

Technical data

Product code	KPM20Y001
Power supply	24 V ~ ± 10 % 50÷60 Hz
Functioning state	LED
Absorption	6 VA max
Digital inputs: - Set back[1] - Summer/winter [1]	dry contacts Normally closed/open configurable open = SUMMER closed = WINTER
Analog inputs AI1	Input for K363P inflow temperature sensor (NTC 30 KΩ at 25 ℃) measuring range: 0÷100 ℃
AI2	Input for K363P return temperature sensor (NTC 30 KΩ at 25 ℃) or (configurable) for K365P external temperature sensor (NTC 30 KΩ at 25 ℃), measuring range: -40÷100 ℃
Input of the dew-point sensor	K366A sensor ("open collector" contact for R.H. % > 85%)
Relay output contact for circulator control	type SPDT (8A max resistive load – 5A max capacitive load) at 230 V~
Control output for mixing valve motor	24 V~ 3 point floating, max 0,5 A
Outputs for actuators	N° 8 24 V~ TRIAC outputs, 1A max (for R478 or R473 electro-thermal actuators)
Communication ports: Primary bus	Optically isolated, RS485 a 9600 baud
Secondary bus	RS485 a 9600 baud
Terminal blocks	Screw terminals for 1,5 mm² wires
Protection degree	IP30 (IEC529)
Environmental working conditions	-0 ÷ 50 ℃ 10 ÷ 90 % R.H. without condensation
Environmental storage conditions	-20 ÷ 70 ℃ 10 ÷ 90 % R.H. without condensation

(1) Input not available in case KM203 Controller, configured for operating the corresponding functions, is used

Size

A [mm]	B [mm]	C [mm]
157	86	60
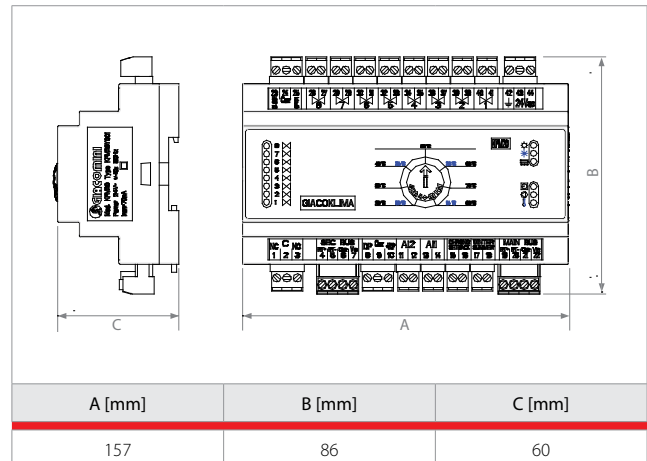
Technical specifications

KPM20

Regulation module for GIACOKLIMA® heating and cooling systems.

Possibility to control mixing valve, control valve of the circulator and R478 or R473 electro-thermal actuators powered at 24V~.

To be used in combination with K481B or K483B thermostats or with K485 room sensor, both of them connected through secondary bus.

Additional information

For additional information please check the Giacomini website at the following address: www.giacomini.com

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