



K481

Description

The K481 series of digital electronic thermostats is constituted of appliances manufactured for use in heating and/or cooling radiant underfloor or ceiling systems, alongside the KM203 controller, the KD200 and KD300 display units, the KPM20 control unit and other communicating devices with compatible protocols.

Versions and product codes

The K481 family of thermostats is designed to protrude from the wall on which it is installed.

- The K481A version is equipped with a relay for the direct control of an electrical actuator and can therefore operate in stand-alone configuration, alongside R478 (2) or R473 (1) electric actuators, with 230 V or 24 V power supply
- The K481B version is not equipped with integrated relay and can be used to control electric actuators indirectly, in combination with the KPM20 unit
- The K481D version is designed to be used for the control of dehumidification units, via the humidistat function additional to the basic thermostat function. This version has an integrated sensor for relative humidity measurement and controls the dehumidifier directly through the relay output; furthermore, it can be used for the indirect control of electric actuators, in combination with the KPM20 unit
- The K481A/B versions can be selected (codes K481AY002 and K481BY002) with an integrated capacitive-type sensor for accurate measurement of relative humidity of the ambient air mass

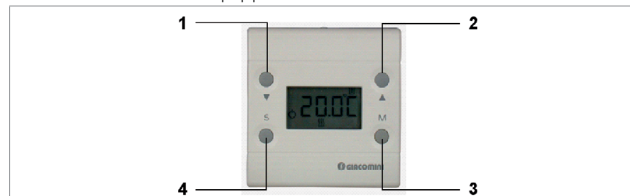
Product code	Signal bus connection	Direct control of zone actuators	Indirect control of zone actuators	Dehumidifier control	R.H. sensors
K481AY001	X	X			
K481AY002	X	X			X
K481BY001	X		X		
K481BY002	X		X		X
K481DY002	X		X	X	X

Technical data

FOR ALL VERSIONS	
Power supply voltage	from bus (when connected to primary or secondary bus) 8-12 V~, or 6-8 V~, 50 ÷ 60 Hz
Current	I nominal 30 mA I max 50 mA
Bus	Bidirectional, RS485, 9600 baud (bd)
Measuring range	12÷28 °C ± 1% of base scale
External temperature range	(when connected to bus) -40÷50 °C
Connections	- RS485 serial bus: 4-wire telephone cable (for distances < 200 m) (1) - relay: 17 AWG cable
EC compliance	Residential/industrial directive CE89/336/EEC, EN50081/1, EN50082/2
Protection degree	IP 20
Environmental conditions for operation	0÷55 °C up to 90% R.H. (relative humidity).
Environmental conditions for storage	-34÷55 °C
FOR K481A AND K481B VERSIONS	
Thermal number	1 S.P.D.T. (with exchange contact)
Resistive load	8 A, 230 V~
Inductive load	4 A, 230 V~
FOR K481AY002, K481BY002 AND K481DY002 VERSIONS	
Capacitive-type	sensor
Measuring range	10÷95%
Accuracy at 20 °C	± 3% of base scale

Control elements

The K481 thermostat is equipped with 4 buttons on the front of the device.



- 1) DECREASE button (▼)** Pressing this button decreases the value displayed
- 2) INCREASE button (▲)** Pressing this button increases the value displayed
- 3) MODE button (M)** Pressing this button allows the user to access the operation modes and to change the value of these
- 4) SET button (S)** Pressing this button allows the user to access the set temperature and change the value of this

Signalling elements

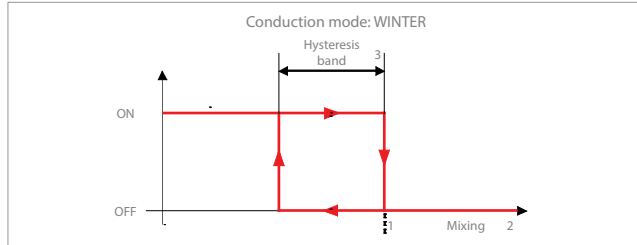
The K481 family of thermostats is equipped with a digital display which shows the ambient temperature and other information at all times, using appropriate symbols. Depending on which version of the thermostat is installed, some symbols may not be active.

1) Operation mode NIGHT/STAND-BY/COMFORT	6) Numerical characters
2) Operation mode OFF	7) Internal and external temperature display
3) Conduction mode WINTER	8) Condensation alarm
4) Conduction mode SUMMER	

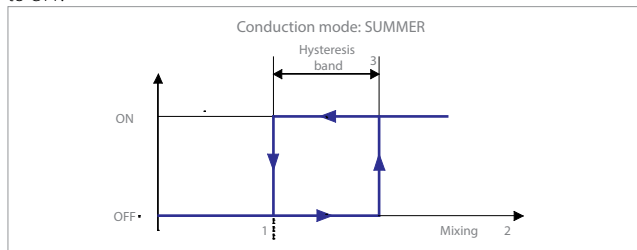


Operation

The K481 thermostat is pre-set for ON/OFF-type controls. The thermostat maintains the ambient temperature (Tamb) within a certain range of the temperature set by the user (Tset). This range is determined by the hysteresis band; the pre-set default value of this is equal to 1 °C. When the 'Tamb' temperature reaches the limits of the hysteresis band, the thermostat switches the current state of function (from ON to OFF, and viceversa).



Conduction mode WINTER. When the 'Tamb' temperature reaches the lower limit of the hysteresis band, the thermostat switches the current state of function to ON. When it reaches the upper limit, the function is switched to OFF.



Conduction mode SUMMER. When the 'Tamb' temperature reaches the upper limit of the hysteresis band, the thermostat switches the current state of function to ON. When it reaches the lower limit, the function is switched to OFF.

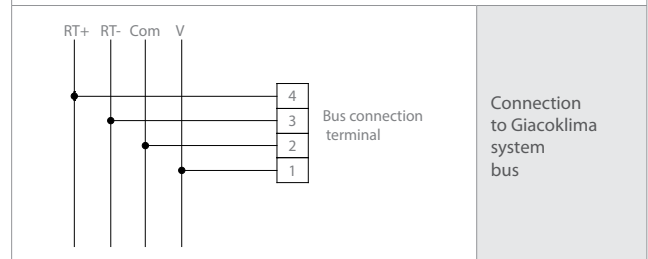
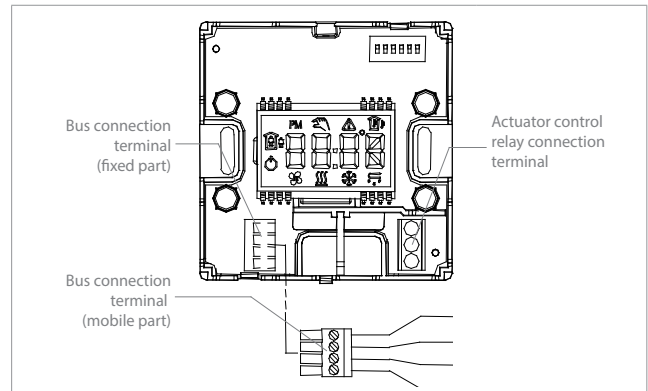
Anti-freeze protection

The K481 thermostat is equipped with an anti-freeze protection function to avoid damage resulting from excessively low temperatures within the space in which it is installed. This function is only active when the system conduction mode is set to WINTER, and automatically launches the heating function when the surrounding temperature drops below the anti-freeze minimum temperature limit, which is set at +5 °C.

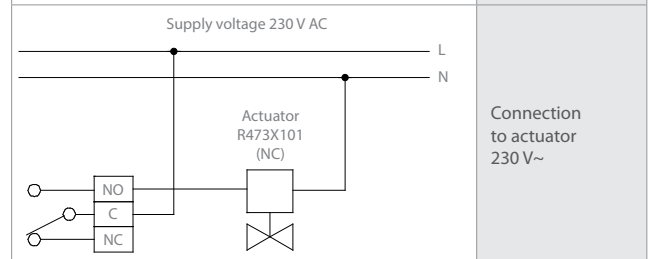
Connections

The K481 thermostat is equipped with screw terminals for connection to the bus cable. The terminal consists of a fixed part, soldered onto the PCB (printed circuit board) of the device, and a mobile part which can be removed; the mechanical keying prevents incorrect insertion of the mobile part into the fixed part. The electrical connection of the bus cable is carried out using the movable part. The K481A version is also equipped with a terminal for the connection of an electric actuator; in this case, the terminal is only equipped with a single fixed part. The Giacomini electric actuators listed in the following table can be used in this application.

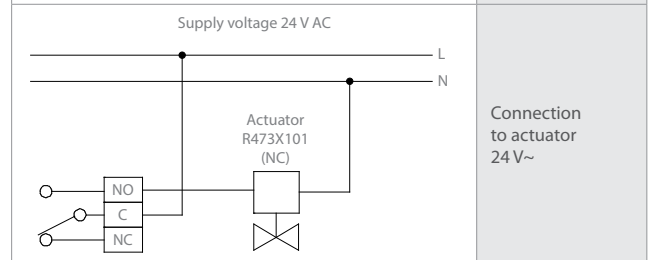
Series	Type	Power supply	Product code
R478	Normally open	24 V~ 50 Hz	R478X102
		230 V~ 50 Hz	R478X101
R473	Normally closed	24 V~ 50 Hz	R473X102
		230 V~ 50 Hz	R473X101



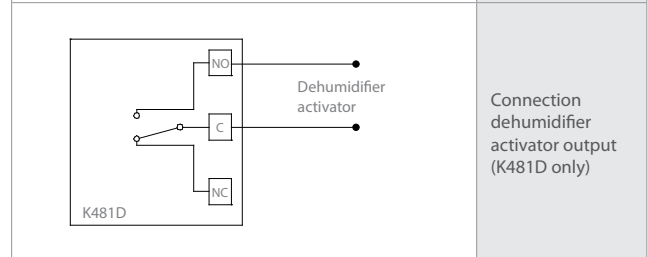
Connection to Giacoklima system bus



Connection to actuator 230 V~



Connection to actuator 24 V~



Connection dehumidifier activator output (K481D only)

Terminal identifier	Function
NO	Contact terminal normally open – the contact closes when it becomes necessary to dehumidify (RH. measured > RH set)
C	Common terminal
NC	Contact terminal normally closed – the contact opens when it becomes necessary to dehumidify (RH. measured > RH set)



Terminal legend

Terminal identifier	Function
1	Bus cable connection (RT+)
2	Bus cable connection (RT-)
3	Bus cable connection (com)
4	Bus cable connection (V)
5	Actuator control relay connection (NO)
6	Actuator control relay connection (C)
7	Actuator control relay connection (NC)



Warning.

Before proceeding with the connection to the system bus, ensure that the I/O KPM20 control module or KM20x control and supervision unit is not connected to the power supply, in order to avoid damage to the K481 probe. When connecting more than 4 K481 probes to the KM20x controller (via primary bus), separate device power supplies must be provided. With the K481 probe, the bus cable and the actuator connection cable cannot be placed in the same embedded channelling. It is advisable to use a chain connection in in-out mode between the various devices. In order to adapt the impedance of the cable, it may be necessary to insert the termination resistance of 120 Ohm on the last device in the chain, through the special jumper that is located on the printed circuit of the appliance. The installation and initial start-up of the device must only be carried out by qualified personnel.

To access the microswitch:

- switch off the power supply to the device;
- remove the front part of the housing by loosening the screw on top;
- set the microswitch slider following the table provided below;
- re-close the housing.

On delivery, all microswitch sliders are set to "OFF" (the side displaying numbers 1-6). On the K481 thermostat, it is possible to set the address to a value between 0 and 31: check the design documentation for the address to be assigned.

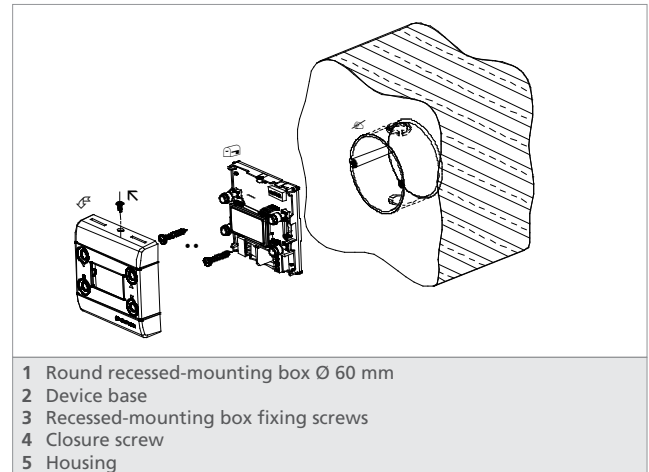


Warning.

Ensure that the right address has been assigned: two devices with the same address can't be present in the same system.

Installation

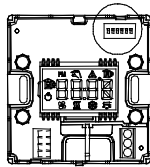
The K481 thermostat is a device designed for protruding wall-mounting. The base is equipped with slotted holes for fastening to a round recessed-mounting box with a diameter of 60 mm, with holes for screw fixing.



- 1 Round recessed-mounting box Ø 60 mm
- 2 Device base
- 3 Recessed-mounting box fixing screws
- 4 Closure screw
- 5 Housing

Addressing

If the K481 thermostat is used as a stand-alone device, it is not necessary to assign an address to it. If, however, it is to be used in combination with the KPM20 control unit and/or the KM20x controller, an address must be assigned to the KPM20 unit through the six-way microswitch located inside the device, in order to allow proper communication on the bus.



Addr.	Microswitch way position					
	1	2	3	4	5	6
0	OFF	OFF	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF
8	OFF	OFF	OFF	ON	OFF	OFF
9	ON	OFF	OFF	ON	OFF	OFF
10	OFF	ON	OFF	ON	OFF	OFF
11	ON	ON	OFF	ON	OFF	OFF
12	OFF	OFF	ON	ON	OFF	OFF
13	ON	OFF	ON	ON	OFF	OFF
14	OFF	ON	ON	ON	OFF	OFF
15	ON	ON	ON	ON	OFF	OFF
16	OFF	OFF	OFF	OFF	ON	OFF
17	ON	OFF	OFF	OFF	ON	OFF
18	OFF	ON	OFF	OFF	ON	OFF
19	ON	ON	OFF	OFF	ON	OFF
20	OFF	OFF	ON	OFF	ON	OFF
21	ON	OFF	ON	OFF	ON	OFF
22	OFF	ON	ON	OFF	ON	OFF
23	ON	ON	ON	OFF	ON	OFF
24	OFF	OFF	OFF	ON	ON	OFF
25	ON	OFF	OFF	ON	ON	OFF
26	OFF	ON	OFF	ON	ON	OFF
27	ON	ON	OFF	ON	ON	OFF
28	OFF	OFF	ON	ON	ON	OFF
29	ON	OFF	ON	ON	ON	OFF
30	OFF	ON	ON	ON	ON	OFF
31	ON	ON	ON	ON	ON	OFF

Users are advised to mount the K481 thermostat on an internal wall, about 1,5 metres from the floor, in a position which is representative of the average temperature of the environment to be controlled. Do not mount the thermostat on external walls, close to doors or windows or positions which see significant exposure to solar radiation. Install the thermostat away from steam, water conduits, areas with no air circulation or sources of electrical interference. To fix the thermostat to the wall:

1. loosen and extract the screw located on the top and remove the housing from the base. Take care not to damage the electronic devices inside;
2. position the base on the recessed-mounting box, insert the fixing screws provided into the holes on the box and tighten;
3. using the slotted holes, adjust the horizontal alignment;
4. set the device address using the multi-way microswitch;
5. slide the end of the bus cable through the opening in the base;
6. prepare the bus cable for connection (unshoothing: ca. 10 mm, stripping: ca. 4 mm) and attach to the detachable part of the 4-pole terminal;
7. for the K481A version, carry out the wiring of the connection cable to the electric actuator; pay attention to the type of actuator (normally closed or normally open);
8. position the housing on the base and tighten the screw located on the top. Take care not to force the buttons if they are not properly aligned.

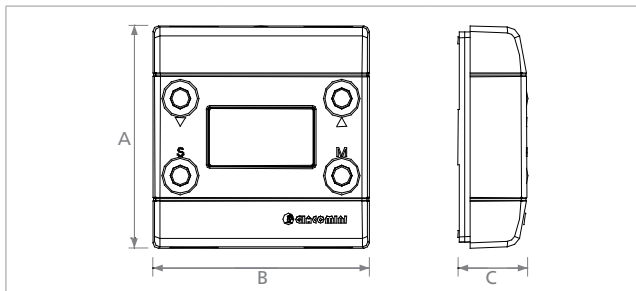


Warning.

Ensure that the 230 V~ power supply is suspended while the connections are being carried out. The installation of the device must only be carried out by qualified personnel.



Dimensions



A	B	C
80	80	20

Product specifications

K481A

Digital electronic thermostat for controlling the ambient temperature, protruding wall installation on round recessed-mounting box (Ø 60 mm). SELV (Separated Extra-Low Voltage) power supply, for use with system bus. Measuring range 12÷28 °C. Environmental operating conditions 0÷55 °C. Anti-freeze function, summer/winter switchover and stand-by, night and off power save settings. With control relay with exchange contact, for direct control of electric actuators or servo-motors for zone valve. Also available with integrated relative humidity probe. CE marked.

K481B

Digital electronic thermostat for controlling the ambient temperature, protruding wall installation on round recessed-mounting box (Ø 60 mm). SELV (Separated Extra-Low Voltage) power supply, for use with system bus. Measuring range 12÷28 °C. Environmental operating conditions 0÷55 °C. Anti-freeze function, summer/winter switchover and stand-by, night and off power save settings. Without control relay, for the indirect control of electric actuators in combination with the KPM20 control unit. Also available with integrated relative humidity probe. CE marked.

K481D

Digital electronic thermostat for controlling the ambient temperature, protruding wall installation on round recessed-mounting box (Ø 60 mm). SELV (Separated Extra-Low Voltage) power supply, for use with system bus. Measuring range 12÷28 °C. Environmental operating conditions 0÷55 °C. Anti-freeze function, summer/winter switchover and stand-by, night and off power save settings. For use with dehumidification unit with humidistat function. Supplied with integrated relative humidity probe. The control relay with exchange contact activates the dehumidification unit. In addition, the thermostat can indirectly control electrothermal zone actuators in combination with the KPM20 control unit. CE marked.

Additional information

For further information, visit the website www.giacomini.com or contact the technical service: ☎ +39 0322 923372 📠 +39 0322 923255 ✉ consulenza.prodotti@giacomini.com
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