

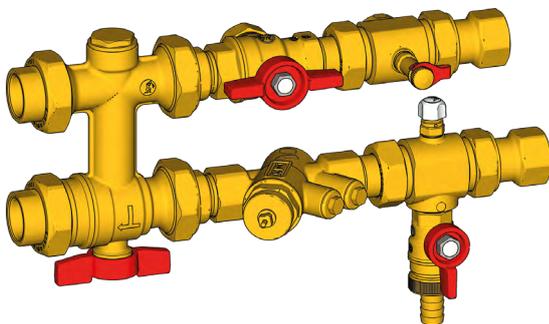
R280K



Energy
Management

Kit for terminal units (fan coil)

Datasheet
0960EN  07/2021



Compact preassembled kit combining the components required for regulation, flushing and commissioning of HVAC system terminal units (fan coils, chilled beams or ceiling air conditioning systems) with the main distribution line.

Kit R280K includes a diverging ball valve to by-pass the terminal unit, a full port ball valve with integrated filter, a pressure-independent control valve (PICV), a manual air vent valve and a drain cock.

The two ball valves enable to clean the filter and access the terminal unit without draining the entire system.

Installation requires only 4 connections thus reducing installation time and preventing possible errors.

Thanks to the PICV valve, the unit enables to set and maintain constant the terminal unit flow rate when the differential pressure of the main circuit changes.

It is also possible to isolate the terminal unit and bypass the flow through the integrated ball valves.

The inlet water of the terminal unit, and therefore also through the PICV, is filtered by the filter included in the shut-off ball valve. The drain cock drains the water when servicing and flushing the system.

Benefits

Benefits for installers

- Reduction of manpower, installation time and costs on site
- Quick connection (only 4 connections required)
- Reduced need of a preassembly area
- One single kit for both heating and cooling
- Limitation of installation errors

Benefits for planners

- Prompt sizing (only two product codes)
- Limitation of planning errors

➤ Versions and product codes

PRODUCT CODE	CONNECTIONS	DELIVERY-RETURN CENTER DISTANCE [mm]	UNIT Kv IN BY-PASS	WORKING FLOW RATE [l/h]	PICV WORKING PRESSURE Δp [kPa]	PICV ACTUATOR (optional)
R280KY003	G 1/2" F x G 1/2" F	40 (inlet) 50 (outlet)	2,4	37 - 575	16 - 400	K281X012 K281X022 K281EX001 K281EX002
R280KY004	G 3/4" F x G 3/4" F	80	3,7	64 - 1110	30 - 400	

Accessories and spare parts

PRODUCT CODE	DESCRIPTIONS AND TECHNICAL CHARACTERISTICS
 K281EX001	Thermo-electric actuator normally closed, ON/OFF. Power 230 Vac, 50/60 Hz. Power consumption 1,2 W. Working temperature range: 0÷60 °C. Opening time 4,5 minutes. Protection class IP54. Cable length 1 m. Valve connection M30 x 1,5 mm.
 K281EX002	Thermo-electric actuator normally closed, ON/OFF. Power 24 Vac, 50/60 Hz. Power consumption 1,2 W. Working temperature range: 0÷60 °C. Opening time 4,5 minutes. Protection class IP54. Cable length 1 m. Valve connection M30 x 1,5 mm.
 K281X012	Actuator 0÷10 V. Power 24 V, 50/60 Hz. Power consumption 2,5 VA. Working temperature range: 0÷50 °C. Opening time at max. speed 50 seconds. Protection class IP43. Cable length 1,5 m. Valve connection M30 x 1,5 mm.
 K281X022	Actuator ON/OFF. Power 24 V, 50/60 Hz. Power consumption 5 VA. Working temperature range: 0÷50 °C. Opening time at max. speed 85 seconds. Protection class IP40. Cable length 1,5 m. Valve connection M30 x 1,5 mm.
 P206Y001	Probe holder kit (n°2) for temperature and pressure measuring.
 R225EY001	Differential pressure gauge
 P206AMY001	Spare cartridge for the PICV valve of R280KY003 kit (1/2")
 P206AMY002	Spare cartridge for the PICV valve of R280KY004 kit (3/4")
 R280WY003	Polyethylene insulation for R280KY003
 R280WY004	Polyethylene insulation for R280KY004

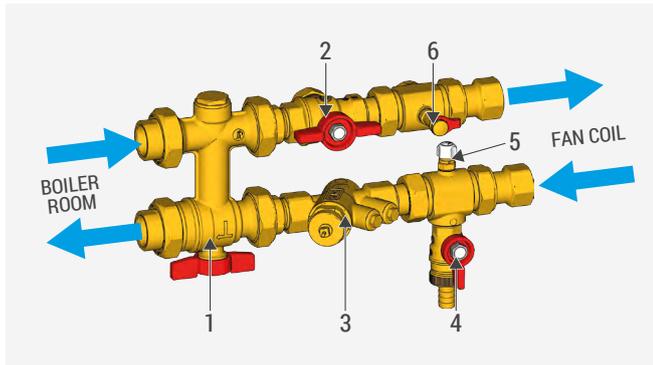
➤ Technical data

- Fluids: water, glycol-based solutions (max. 50 % of glycol)
- Working temperature range: -10÷120 °C
- Room temperature: 1÷50 °C
- Max. working pressure: 25 bar
- Max. differential pressure at the ends of the PICV valve: 4 bar (2 bar for R280KY003)
- Actuator connection: M30 x 1,5 mm
- Filtering capacity: 500 µm

Materials

- Main components: brass CW617N - UNI EN 12165
- Ball valve gaskets: PTFE
- Gaskets of other components: EPDM
- Filter: stainless steel AISI 304
- Cartridge of pressure-independent control valve (PICV):
 - Inset: glass-filled PSU/POM/PPS
 - Diaphragm: EPDM
 - Internal metal components: stainless steel
 - O-Rings: EPDM
 - Stopper: PPS

Components



- | | |
|---|---|
| 1 | Diverting ball valve to by-pass unit |
| 2 | Ball valve with integrated filter |
| 3 | Pressure-independent control valve (PICV) |
| 4 | Drain cock |
| 5 | Manual air vent valve |
| 6 | Probe holder |

Diverting ball valve to by-pass unit (1)

Diverting ball valve carries out by-pass operations thanks to the special shaped ball that confers a compact design. The two valves included increase the water flow to reduce losses of pressure in the terminal unit (fan coil).

Ball valve with integrated filter (2)

The valve includes a filter inside the ball to combine the functions of a filter and two shut-off valves in one single component.

The filter can be removed by closing the valve to clean it without draining the system.

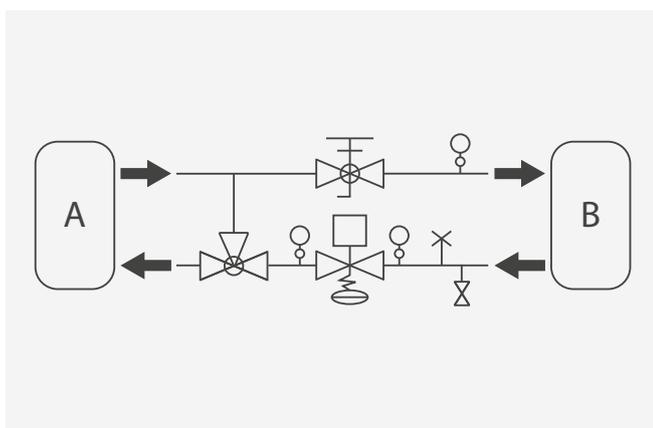
The filter has a filtering capacity of 500 µm, while the valve provides full port (DN20 for both kits) to guarantee the maximum flow rate.

Pressure-independent control valve (PICV) (3)

The valve included guarantees high energy efficiency and state-of-the-art control. It combines the function of three valves (DPCV, balancing and control) in one, it is easy and fast to start, saving planners time on verification calculations.

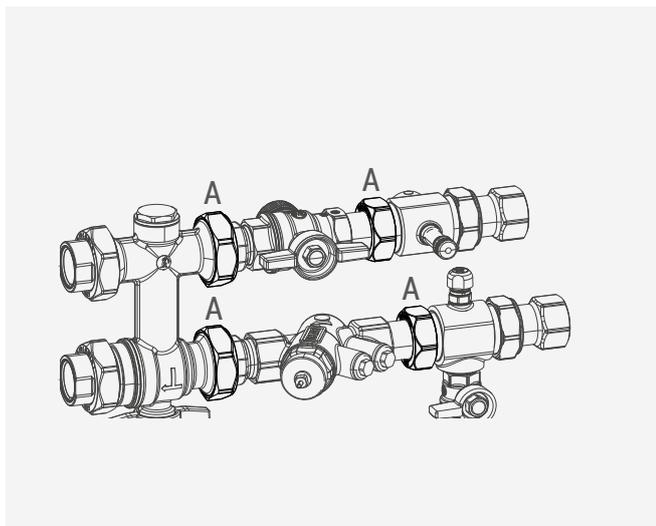
The valve can be controlled automatically, with a proportional actuator (0÷10 V) that sets the flow rate within the work range defined by the cartridge calibration or with an ON-OFF actuator that shuts off the circuit, to perfectly adapt it to the type of electronic setting required by the system.

Hydraulic diagram



- | | |
|---|---|
| | Diverting ball valve to by-pass the unit |
| | Ball valve with integrated filter |
| | Probe holder (optional) |
| | Pressure-independent control valve (PICV) |
| | Manual air vent valve |
| | Drain cock |
| A | Boiler room |
| B | Terminal unit (fan coil) |

Installation



Kit R280K must be installed upstream of the terminal unit (fan coil) and includes the main components required for its proper operation.

The kit can be installed in any direction by fitting the main components in the desired position and loosening the nuts (ref. A); however, the following components cannot be installed upside down:

Ball valve with integrated filter



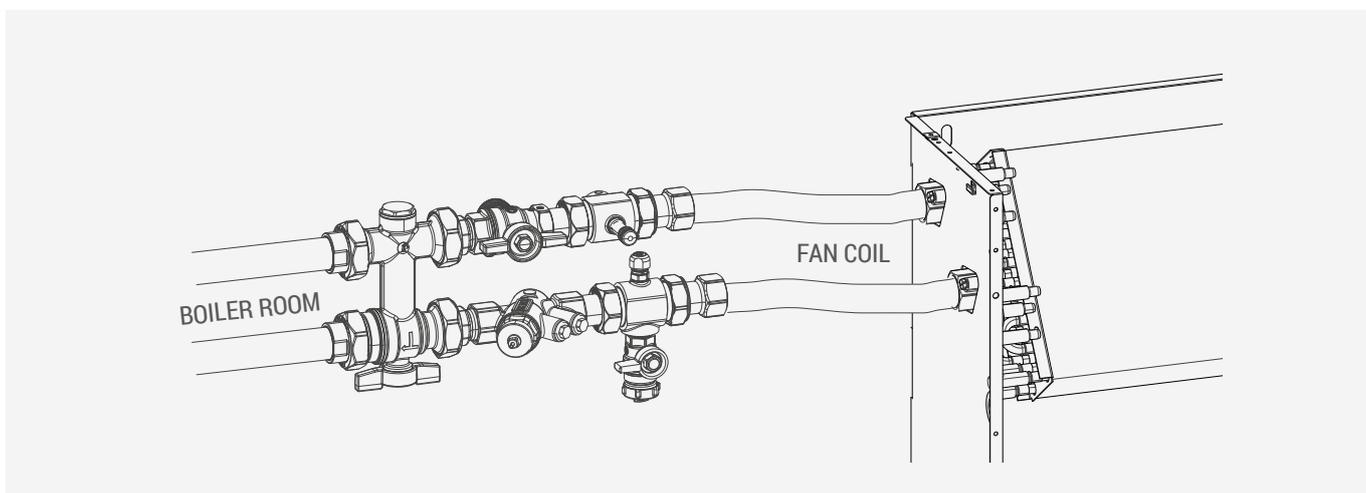
PICV valve and its actuator



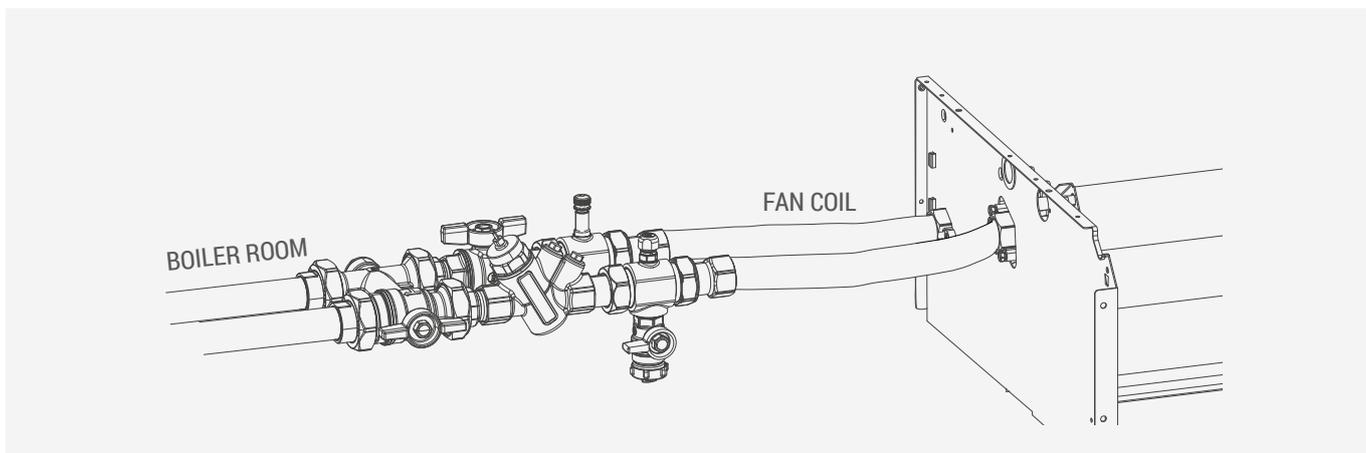
Air vent valve



Installation with floor fan coil

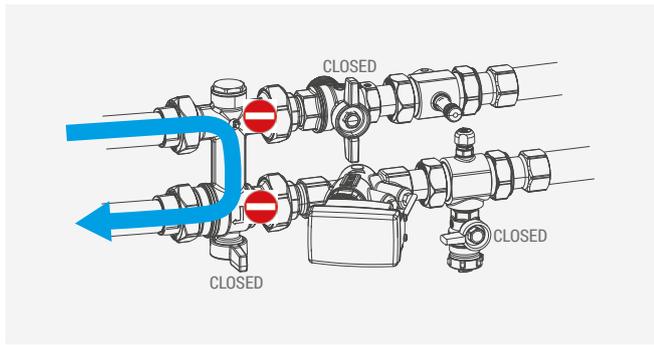


Installation with ceiling fan coil



➤ Operation

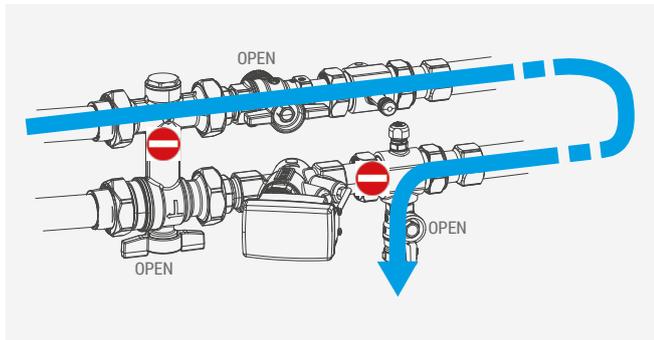
Kit R280K enables the following operations:



1) System flushing / Maintenance

The user can fully isolate the fan coil by closing the two ball valves, flush the system and carry out a chemical treatment if desired, preventing debris from entering the fan coil and the pressure-independent control valve (PICV).

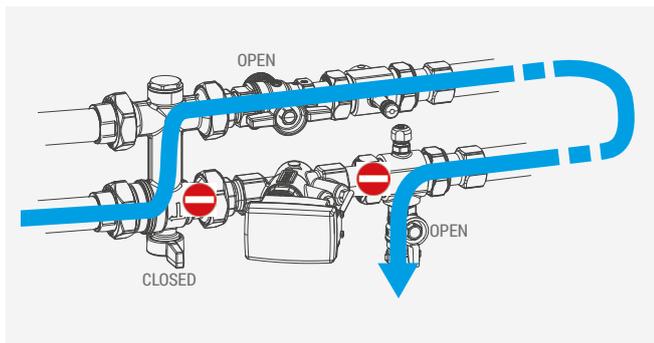
This setting also enables to clean the filter integrated in the delivery ball valve.



2) Fan coil flushing with delivery circuit flow

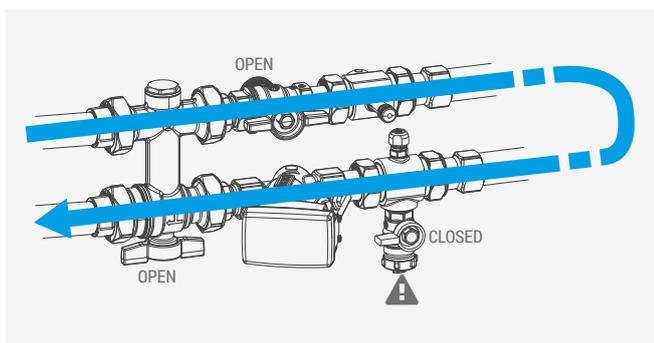
Ball valves and drain cock open.

This setting enables to flush the kit components and prevents debris from entering the pressure-independent control valve (PICV).



3) Fan coil flushing with return circuit flow

Ball valve on return circuit closed, ball valve on delivery circuit and drain cock both open.



4) Normal operation

Ball valves open and drain cock closed.

⚠ WARNING. In normal operation, make sure the drain cock is closed with the provided cap.

Commissioning

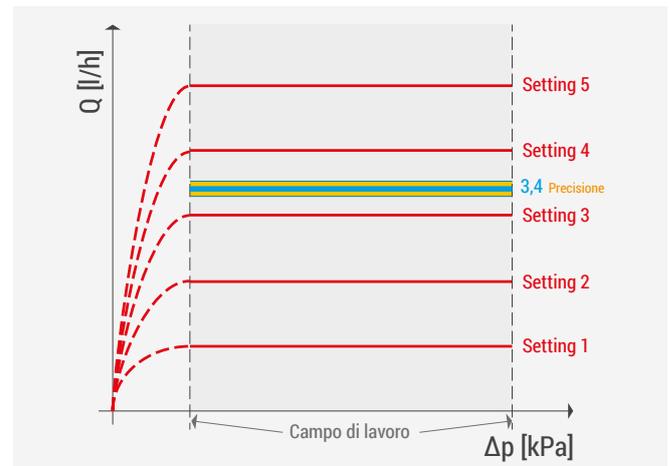
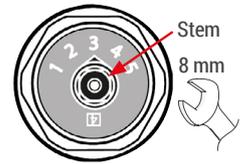
Setting of pressure-independent control valve (PICV)

Set the flow rate on the balancing valve according to the setting table.

Setting	R280KY0043 Δp: 16-400 kPa		R280KY004 Δp: 30-400 kPa	
	l/h	GPM	l/h	GPM
1.0	-	-	64	0,282
1.1	37	0,163	142	0,624
1.2	84	0,37	209	0,92
1.3	116	0,51	268	1,18
1.4	151	0,664	319	1,41
1.5	180	0,792	366	1,61
1.6	205	0,902	408	1,8
1.7	234	1,03	446	1,96
1.8	259	1,14	482	2,12
1.9	281	1,24	516	2,27
2.0	302	1,33	549	2,42
2.1	320	1,41	580	2,56
2.2	339	1,49	611	2,69
2.3	353	1,55	641	2,82
2.4	371	1,63	671	2,95
2.5	381	1,68	700	3,08
2.6	394	1,73	728	3,21
2.7	406	1,79	756	3,33
2.8	414	1,82	783	3,45
2.9	428	1,88	810	3,56
3.0	439	1,93	835	3,68
3.1	449	1,98	860	3,79
3.2	458	2,02	883	3,89
3.3	468	2,06	906	3,99
3.4	477	2,1	927	4,08
3.5	486	2,14	946	4,17
3.6	494	2,17	965	4,25
3.7	503	2,21	982	4,32
3.8	511	2,25	998	4,39
3.9	518	2,28	1010	4,46
4.0	526	2,31	1020	4,51
4.1	532	2,34	1040	4,57
4.2	538	2,37	1050	4,61
4.3	544	2,39	1060	4,66
4.4	549	2,42	1070	4,7
4.5	553	2,43	1080	4,73
4.6	559	2,46	1080	4,77
4.7	563	2,48	1090	4,8
4.8	567	2,5	1100	4,83
4.9	571	2,51	1100	4,86
5.0	575	2,53	1110	4,89

NOTE. Accuracy: max. value between $\pm 10\%$ of controlled flow rate and $\pm 5\%$ of max. flow rate.

To set the valve on the desired flow rate, use an 8 mm wrench, turn the valve stem clockwise to decrease the setting and anticlockwise to increase it.



EXAMPLE. The figure shows a 3,4 setting.

System flushing

Before start up, the system must be flushed following the operations described in section "Operation" (1, 2, 3).

System commissioning

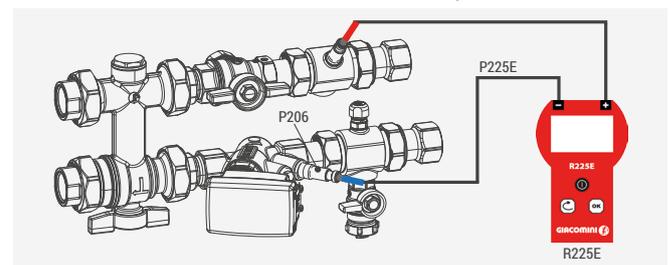
Open the shut-off valves and the air vent valve completely, then start the hydraulic system (4).

The air vent valve must be closed as soon as water comes out instead of air.

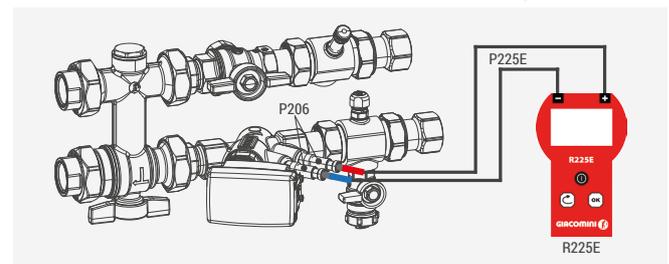
Verification of differential pressures

The difference of differential pressure may be verified by installing probe holders P206, the related probes and differential pressure gauge R225E.

Verification of terminal unit differential pressure (fan coil)



Verification of PICV flow rate and functionality



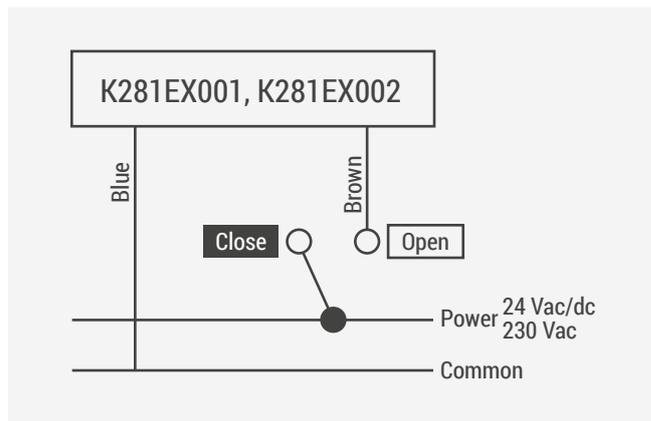
➤ Actuator installation and electric wiring

Actuator installation

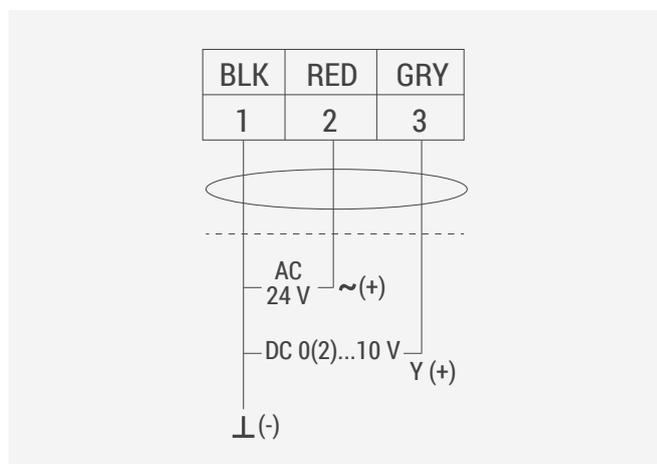
The PICV valve can be automatized by installing two different types of actuators; install the actuators by screwing the gasket on the threaded connection of the valve body.

PRODUCT CODE	POWER SUPPLY [V]	TYPE OF ACTUATOR
 K281EX001	230	ON/OFF
 K281EX002	24	ON/OFF
 K281X012	24	0÷10 V
 K281X022	24	ON/OFF

Electric wiring K281EX001, K281EX002

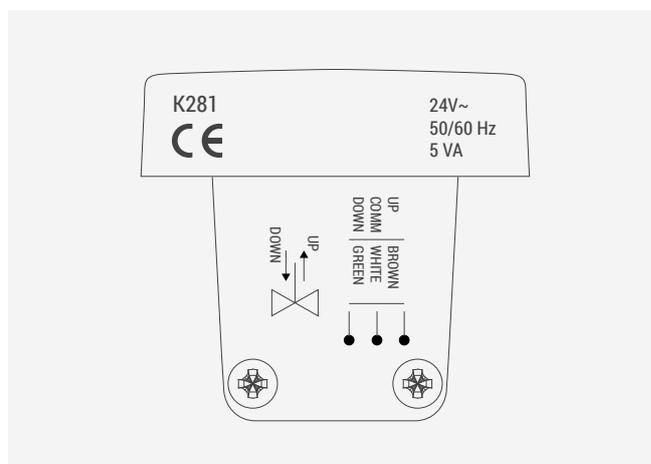


Electric wiring K281X012



WIRE COLOR	FUNCTION
Black (BLK)	Power supply 24 V
Red (RED)	
Grey (GRY)	Contact up/down 0-10 Vdc

Electric wiring K281X022



WIRE COLOR	FUNCTION
Brown	Contact stem "UP" (CLOSING of direct way with mixing valve in progress)
White	COMMON contact
Green	Contact stem "DOWN" (OPENING of direct way with mixing valve in progress)

➤ Maintenance

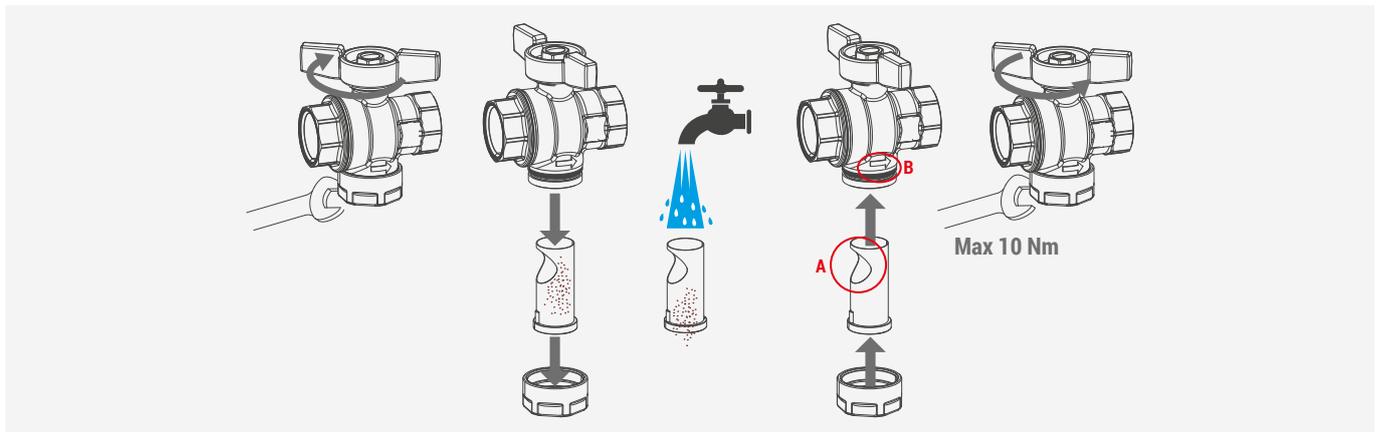
We recommend inspecting the unit at least once a year when shifting from heating/cooling. During inspection, the following components must be checked:

- Ball valve filter: rinse under running water (see "Cleaning the filter").
- Actuator: check proper operation; the actuator should be replaced when failing with correct wiring.
- Ball valves: check proper maneuvering of ball valves.

🔗 **NOTE.** Also refer to local regulations for programmed maintenance operations.

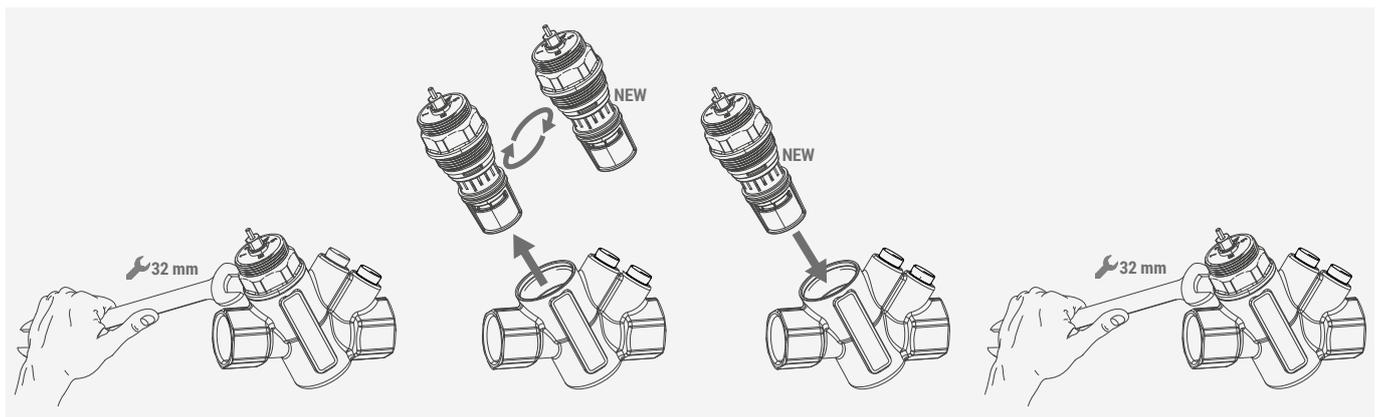
Cleaning the filter

- Close the kit delivery and return ball valves
- Unscrew the octagonal cap of the ball valve with filter using a 30 mm wrench
- Remove the filter and rinse it under running water
- Reinstall the filter inside the valve making sure the filter hole (ref. "A") is facing the direction opposite to the flow, marked by an arrow on the valve body (ref. "B")
- Close the octagonal cap and open the ball valves

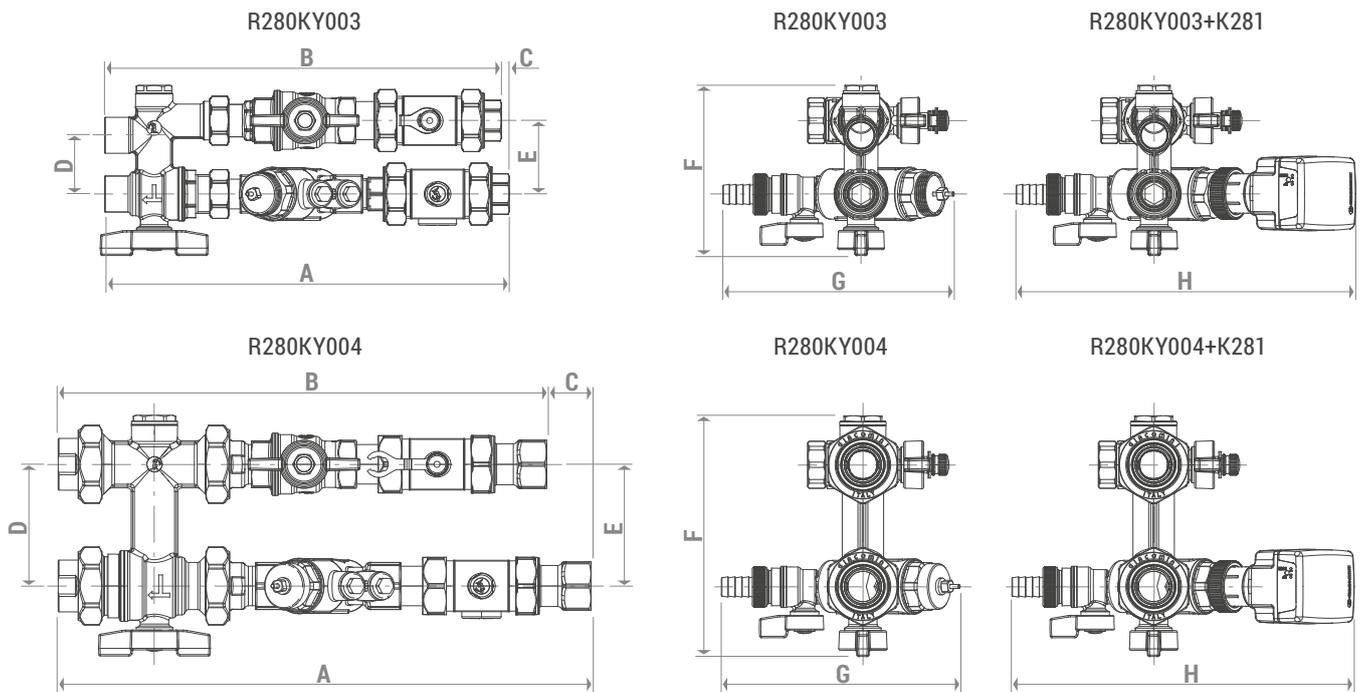


Replacing the balancing valve cartridge

- Close the kit delivery and return ball valves
- Unscrew the valve cartridge with a 32 mm wrench
- Remove the cartridge and replace it with a new one
- Install the new cartridge and screw it on the valve body
- Preset the new cartridge



Dimensions



PRODUCT CODE	CONNECTIONS	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]
R280KY003	G 1/2" F	274	268	6	40	50	116	163	231
R280KY004	G 3/4" F	348	319	29	80	80	158	163	231

Product specifications

R280K

Connection and setting kit for terminal units of heating and cooling systems. Included: Pressure-independent control valve (PICV), shut-off ball valves with integrated filter, diverting ball valve for by-pass, drain cock, manual air vent valve and pressure outlet. Available in two dimensions: DN15 and DN20. System main connections 1/2" F (1/2" to 1"); terminal unit connections 1/2" F (3/4" to 1-1/4"). Connection center distance: 40/50 mm (inlet/outlet for 1/2" version), 80/80 mm (inlet/outlet for 3/4" version). Pressure outlet connections 1/4" F (ISO 228) with cap (for dedicated versions only). Actuator connection M30 x 1,5 mm. Setting range of unit flow rate: 37÷575 L/h (1/2"); 64÷1110 L/h (3/4"). Max. working pressure: 25 bar. Range of operation nominal Δp 25÷400 kPa. Working temperature range -10÷120 °C. Room temperature range 1÷50 °C. Filtering capacity of filter: 500 μ m. Fluids: water and glycol-based solutions (max. 50 % of glycol). Main brass components CW617N - UNI EN 12165. Ball valve gaskets PTFE. Gaskets of other components EPDM. AISI 304 stainless steel filter. Cartridge of pressure-independent control valve (PICV) techno-polymer.

⚠ Safety Warning. Installation, commissioning and periodical maintenance of the product must be carried out by qualified operators in compliance with national regulations and/or local standards. A qualified installer must take all required measures, including use of Individual Protection Devices, for his and others' safety. An improper installation may damage people, animals or objects towards which Giacomini S.p.A. may not be held liable.

♻ Package Disposal. Carton boxes: paper recycling. Plastic bags and bubble wrap: plastic recycling.

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