



CM0060 Series Control Valve



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CM0060 Series Pressure independent balancing and control valve for rooms, zones, ventilation and air-conditioning systems

- With integrated differential pressure controller
- DN 10...DN 32: Valve body made of dezincification resistant hot-pressed brass (DZR)
- DN 40...DN 50: Housing made of spheroidal graphite iron
- Volumetric flow 30... 11000 l/h,
- Differential pressure range 15...600 kPa
- Internally threaded Rp conforming to ISO 7-1
- Accessories for externally threaded G conforming to ISO 228-1(optional)
- Version with pressure test points for Δp measurement (optional)
- Can be equipped with multiples famous brand electro thermal or electromotive actuators

Use

- In ventilation and air conditioning plants for control on the water side and automatic hydraulic balancing of terminal units, such as fan coils, induction units, and in heat exchangers for heating or cooling
- In heating zones like self-contained heating systems, apartments, individual rooms, etc.
- For closed circuits

Type summary

| Product no. | DN | H100 [mm] | Connections [inch] | | Test points | vmin [l/h] | v100 [l/h] | Δpmin [kPa] |
|----------------|----|-----------|--------------------|---------------------|-------------------------------|------------|------------|-------------|
| CM0060.10L0.4 | 10 | 2.5 | G 1/2 | | | 60 | 400 | 15 |
| CM0060.15L0.8 | 15 | 2.5 | G 3/4 | | | 125 | 830 | 22 |
| CM0060.20F1.0 | 20 | 5.0 | G 3/4 | | | 150 | 1000 | 19 |
| CM0060.20F1.4 | 20 | 5.0 | G 3/4 | | - | 210 | 1400 | 29 |
| CM0060.25F1.7 | 25 | 5.0 | G 1 | | | 255 | 1700 | 39 |
| CM0060.32F4.5 | 32 | 5.0 | G 1 1/2 | | | 675 | 5400 | 28 |
| CM0060.10L0.4Q | 10 | 2.5 | G 1/2 | internally threaded | | 60 | 400 | 15 |
| CM0060.15L0.6Q | 15 | 2.5 | G 3/4 | | | 125 | 830 | 22 |
| CM0060.20F1.0Q | 20 | 5.0 | G 3/4 | | | 150 | 1000 | 19 |
| CM0060.20F1.4Q | 20 | 5.0 | G 3/4 | | with pressure test points P/T | 210 | 1400 | 29 |
| CM0060.25F1.7Q | 25 | 5.0 | G 1 | | | 255 | 1700 | 39 |
| CM0060.32F4.5Q | 32 | 5.0 | G 1 1/2 | | | 675 | 4500 | 28 |
| CM0060.40F9.5Q | 40 | 15 | Rp 1 1/2 | | | 1425 | 9500 | 35 |
| CM0060.50F11Q | 50 | 15 | Rp 2 | | | 1650 | 11000 | 35 |

CM0060P... is external thread connections, it is CM0060...+ accessories

DN = nominal size

H100 = nominal stroke

v100 = volumetric flow through fully open valve (H100)

vmin = smallest pre-settable volumetric flow through fully open valve (H100)

Δpmin = minimum differential pressure required across the valve's control path, so that the difference pressure regulator works reliably

Fittings

| Product no. | Description | Application |
|-------------|-------------|--|
| G 3/8" | Connector | |
| G 1/2" | Connector | |
| G 3/4" | Connector | Set of 2 fittings with threaded connections for 2-port valves, Convert valve from internal thread to external thread |
| G 1 | Connector | |
| G 1 1/2 | Connector | |

Ordering

| Product no. | Description |
|---------------|--|
| CM0060.20L0.4 | PICV valve, DN20 PN25, internally threaded |
| G 3/4 | G3/4 Connector |

Delivery PICV valves, actuators and accessories are packed and supplied separately.
Select preferred actuators depend on application

Technical / mechanical design

1 Manual control knob

2 Dial for presetting

3 Pressure test point, blue ribbon,
P Pressure test point, red ribbon, P+

4 Plug for presetting opening

5 Flow control valve

6 Aperture for differential pressure
controller is

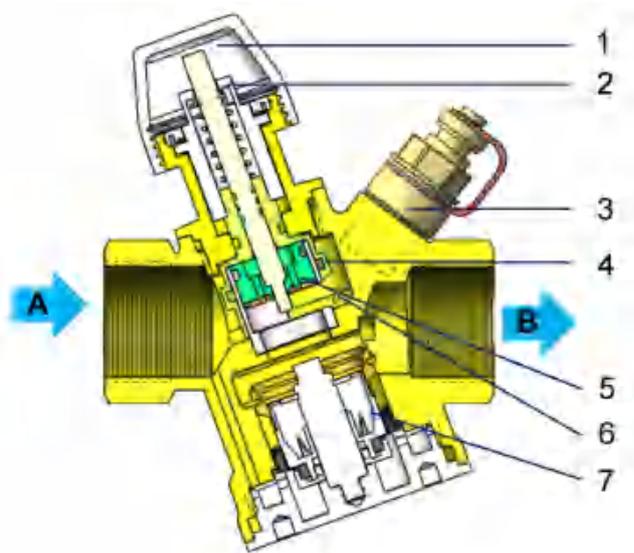
linked with outlet port B

7 Differential pressure controller

A Inlet port A

B Outlet port B

PICV valves CM0060..Q (shown here) are
additionally equipped with pressure test
points P/T.



Functional principle

The medium entering the valve (inlet port A) passes through the variable presetting opening (4) which is connected to the dial (2) for presetting the desired maximum volumetric flow. Then, the medium flows through the flow control valve (5) with a linear characteristic and a stroke of 2.5 mm (DN 10...15) respectively 5 mm (DN 20/DN25/DN32) and 15mm(DN40/DN50).

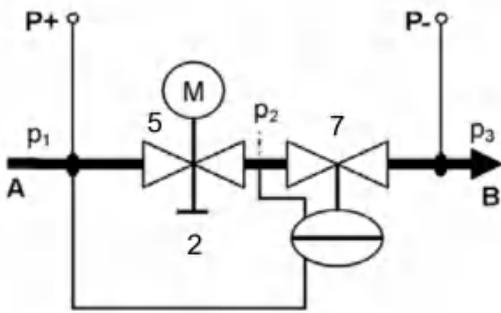


Dial for presetting (2)

The actuator (not shown here) opens and accurately positions the control valve (5). Before leaving the PICV valve, the medium passes through a built-in mechanical differential pressure controller (7). This differential pressure controller is

the heart of the PICV valve and ensures that the selected volumetric flow is maintained across the whole working range and independent of the inlet pressure p_l .

The PICV valves SIV50..Q are additionally equipped with two pressure test points (P+, P-), which allow measurement of the differential pressure across the Combi valve. For that purpose, the electronic manometer ALE10 can be used.



A Inlet medium (inlet port)
 B Outlet medium (outlet port)
 2 Ring with dial for presetting
 7 Differential pressure controller maintains the pressure $p_1 - p_2$ constant across the flow control valve (5) and the presetting (2)
 5 Control valve with mounted actuator

P- = P/T port, pressure test point with blue ribbon (3A)

P+ = P/T port, pressure test point with red ribbon (3B)

p_1 = pressure at inlet of Combi valve

p_2 = pressure at outlet of flow control valve

p_3 = pressure at outlet of PICV valve

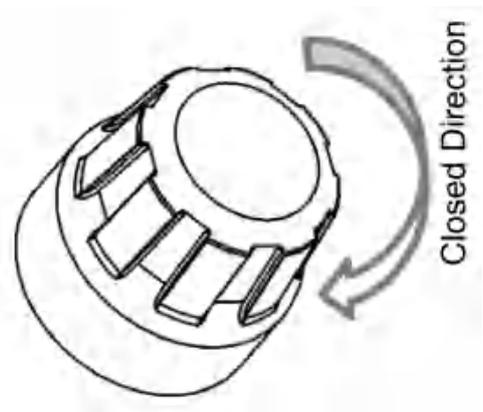
Manual control DN 10...32

The manual control knob (1) is ready fitted to protect valve stem and pre-set mechanism and facilitates manual control of the PICV valve during commissioning.

Factory setting:

The valve is open. To close the valve, turn the manual knob clockwise.

The valve must be open to purge the system.



Accessories

| Product no. | Stock no. | | Description |
|----------------------|----------------|---|--|
| Electronic manometer | 0-200 kPa |  | Electronic manometer excluding measuring lines and measuring tips. Measuring range 0-700 kPa. A differential pressure of more than 200 kPa will destroy the pressure sensor. For measuring the differential pressure between P+ and P- of the Combi valves (refer to diagram under "Functional principle" on page 3). Functions of the manometer: · Start/stop · Automatic zero position · Backlit display · Display: Out · outside the measuring range · Holding function |
| Measuring lines | 2 x 40 mm |  | Measuring lines and straight measuring tips for use with Siemens PICV valves. Equipped with G 1/8" connection with 2 x 40 mm needles. |
| P/T port | G 1/4 P/T port |  | Spare nipples P/T port (set of 2) Set contains 1 piece each with a red and blue ribbon. Connection to valve body: G 1/4" to ISO 228, inclusive O-ring |
| Plug | G1/4 |  | Blanking plug for P/T ports Connection to valve body: G 1/4" to ISO 228, inclusive O-ring |
| Knob | manual knob |  | Spare black valve protection cap |

Sizing

Engineering example

Basis of calculation

1. Determine energy demand Q [kW]
2. Determine temperature differential ΔT [K]
3. Calculate volumetric flow

$$\dot{V} = \frac{Q [\text{kW}] \cdot 1000 \left[\frac{\text{l}}{\text{h}} \right]}{1,163 \cdot \Delta T [\text{K}]}$$

4. Select suitable Combi valve
 - pipe connections (internally or externally threaded)
 - with or without P/T ports
5. Determine dial setting using volumetric flow/dial presetting table, see the following page

Example

1. Given is a heat exchanger with $Q = 3.8$ kW
2. Temperature differential (supply - return) $\Delta T = 6$ K
3. Volumetric flow

$$\dot{V} = \frac{3,8 \text{ kW} \cdot 1000}{1,163 \cdot 6 \text{ K}} = 544,56 \text{ l/h}$$

Hint: You can also determine the volumetric flow using the valve slide rule.

4. The valve shall have connections with external threads to ISO 228-1 and size DN15.

5. PICV valve selection:

Ideally, PICV valves should be selected such that they operate at about 80% of their maximum flow, enabling them to deliver spare capacity, if required.

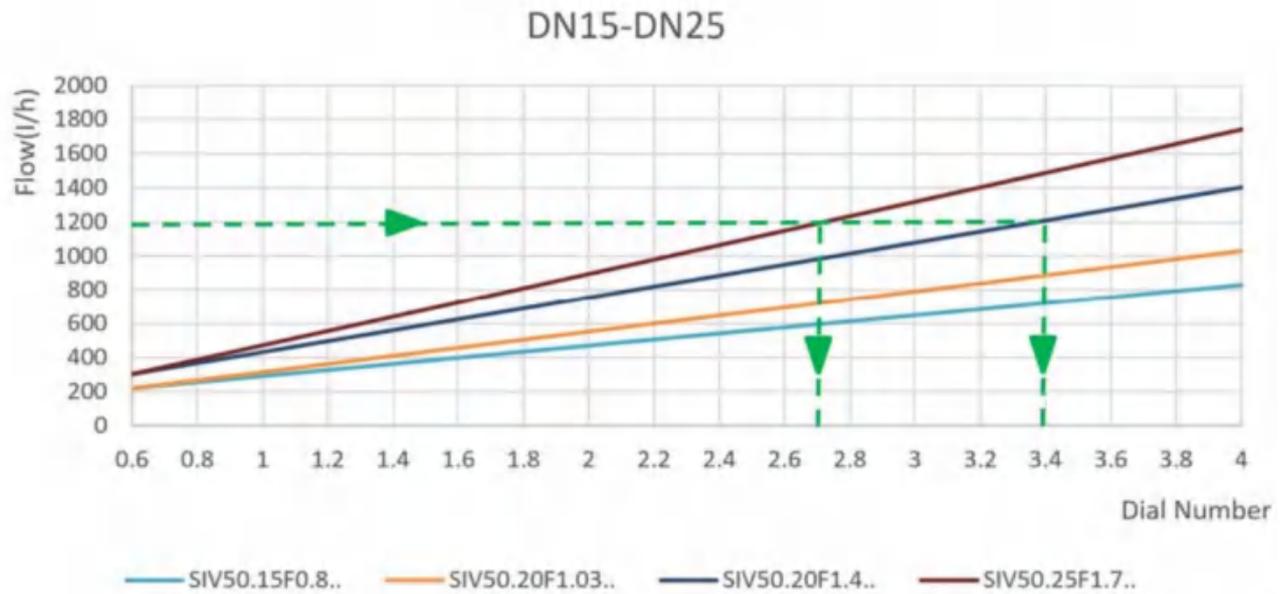
CM0060.15L0.6Q (internally threaded connections, with pressure test points P/T, nominal volumetric flow 830 l/h)

6. Determine dial setting using volumetric flow/dial presetting table below:

Volumetric flow 545 l/h

Dial setting 2.4 (from diagram)

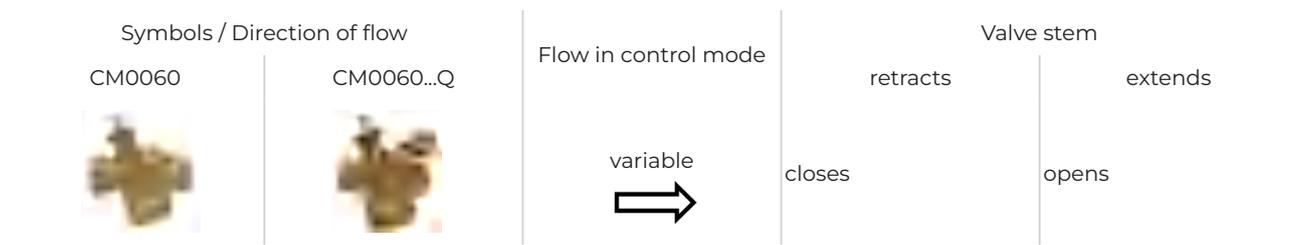
Volumetric flow/dial



Example

1. Design flow $Q = 1200$ l/h
2. Read the dial number from the diagram
 - CM0060.25F1.7 Dial number is 2.7
 - CM0060.20F1.4 Dial number is 3.4
3. In order to optimize the control function of the PICV select the smallest possible valve, in this case DN20 (CM0060.20F1.4) and dial number is 3.4.

Accessories



⚠ The direction of flow indicated (arrow on the valve body) is mandatory!

Recommendation

A strainer or dirt trap should be fitted upstream of the valve to enhance reliability.

Remove dirt, welding beads etc. from valves and pipes.

Do not insulate the actuator bracket, as air circulation must be ensured!

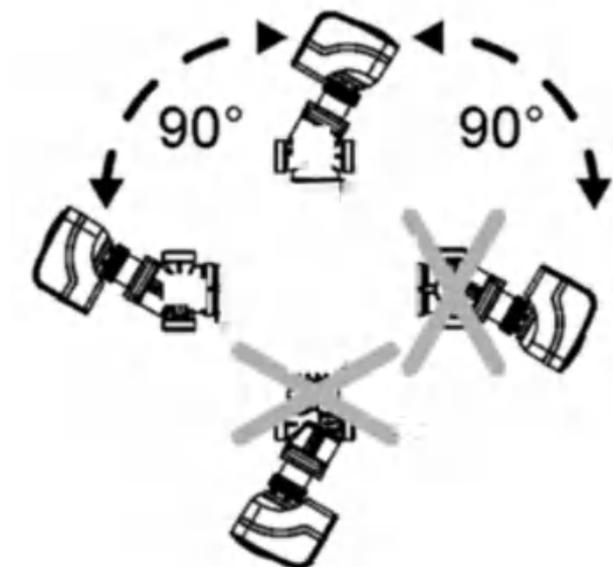
Mounting notes

PICV valve and actuator can be straightforwardly assembled on site. Special tools or adjustments are not required.

Prior to mounting the actuator, the required volumetric flow must be set.

The valve is supplied complete with Mounting Instructions (74 319 0649 0 b).

Mounting positions

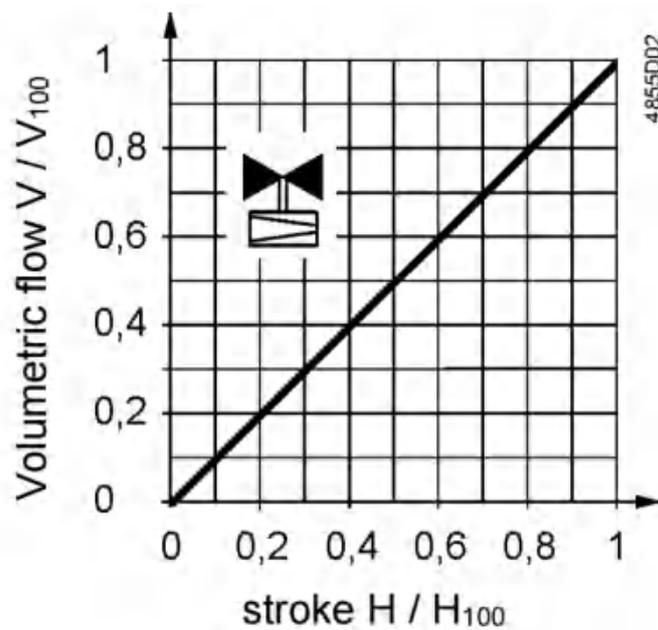


Installation notes

Prior to mounting the actuator, the presetting is to be made as follows:

| | | |
|---|---|---|
| <p>1. Remove control knob from Combi valve.</p> | <p>2. Adjust the desired dial setting with the white knob.</p> | <p>3. Pointer (laser line) align the number what desired setting</p> |
| <p>Presetting DN 10-32:</p> |  |  |
| <p>Presetting DN 40-50:</p> | <p>2. Adjust the desired dial setting with the white knob.</p>  |  |

Valve characteristic



Commissioning notes

- ⚠ The valves must be commissioned with the manual control knob or actuator correctly fitted. Strong pressure impacts can damage closed PICV valves.
- ⚠ The PICV valves have to be open when flushing or pressure testing the system. Flush only in correct flow direction. Strong pressure impacts can damage closed PICV valves.
- ⚠ Differential pressure Δp_{max} across the valve's control path is not allowed to exceed 600 kPa.

Manual control

When turning the manual control knob in counter-clockwise direction or manually operating the actuator, the valve opens. The actuator closes the valve. The valves are supplied fully open. The manual knob is not designed for permanent manual operation.

Maintenance notes

- ⚠ The PICV valves are maintenance-free without cartridge.
Valve plug, stem, presetting, diaphragm etc. may not be disassembled
When performing service work on the valve and / or actuator:
Switch off the pump and disconnect power supply.
Close the shut-off valves in the piping network.
Fully reduce pressure in the piping network and allow the pipes to cool down completely.
Remove the electrical connections only if necessary.

Sealing gland

The stem sealing gland cannot be exchanged. Should leakage occur, the whole valve must be replaced.

Warranty

Application-related technical data are guaranteed only when the valves are used in connection with the corrected actuators. When used with actuators of other manufacture, any warranty by manufacturing becomes void.

Technical data

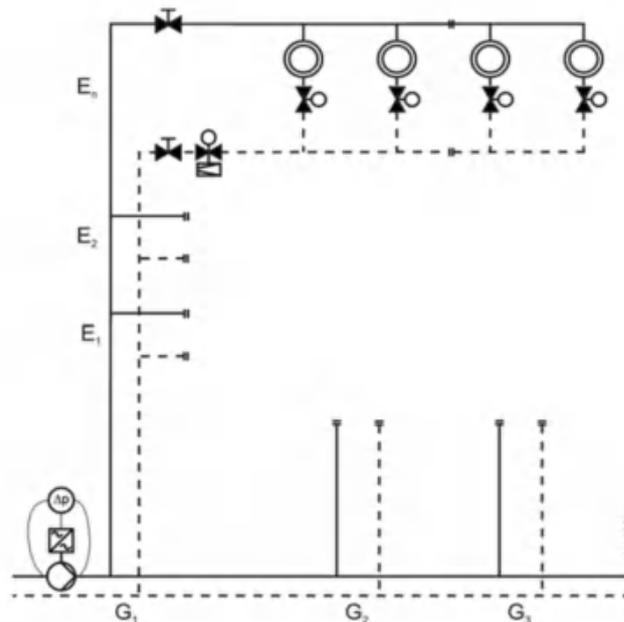
| | | | | | |
|-----------------|---|---|----------------------------------|---|--|
| Functional data | PN class | PN 25 as per EN 1333 | | | |
| | Permissible operating pressure | 2.500 kPa (25 bar) as per ISO 7628 / EN 33 | | | |
| | Max. differential pressure | 600 kPa | | | |
| | Min. differential pressure | See tables type summary | | | |
| | Valve characteristic | Linear as per VDI/VDE 2173 | | | |
| | Leakage rate in general | Class IV (0...0.01% of volumetric flow V100) to EN 1349 | | | |
| | Average flow accuracy | +/-10% | | | |
| | Permissible media | Low-temperature hot water, chilled water, water with antifreeze Recommendation: Water treatment to VDI 2035 | | | |
| | Medium temperature for Valve: | 1~120 °C | | | |
| | Permissible ambient temperature | 1~50 °C | | | |
| | Nominal stroke | DN 10-15 2.5 mm DN 20-32 5.0 mm DN 40-50 15 mm | | | |
| | Valve body, port, seat, sealing gland and test points | Dezincification resistant hot-pressed brass (DZR), CW602N | | | |
| | Valve body DN 40-50 | Nodular cast iron | | | |
| Materials | Stem, spring | Stainless steel | | | |
| | Presetting element | ABS or PA | | | |
| | Regulator | PPS + Brass(DZR), CW602N | | | |
| | Seals | EPDM (O-ring) | | | |
| | Dimensions | Refer to "Dimensions" on page 12 | | | |
| Materials | Threaded connections | G | to ISO 228-1 | (externally threaded) additional accessories | |
| | | Rp | to ISO 7-1 | (internally threaded) | |
| | Actuator connection | DN 10...32 | M30 x 1.5 mm | | |
| | | DN 40...50 | Ø40 standard connector interface | | |
| | Pressure test points (P/T-ports) | G ¼" (connection valve body) | | | |
| | Weight | Refer to "Dimensions" on page 12 | | | |
| | Pressure Equipment Directive Pressure-carrying accessories | PED 2014/68/EU Scope: Article 1, section 1 Definitions: Article 2, section 5 | | | |
| | Fluid group 2 | DN 10...40 Without CE-marking as per article 4, section 3 (sound engineering practice) Valves where PS x DN < 1000, do not require special testing and cannot carry the CE label. DN 50 Category I, Modul A, with CE-marking as per article 14, section 2 by self-declaration | | | |

Application examples

PICV valves in HVAC systems combined with variable speed pumps provide even higher energy efficiency. When sizing the pump, it must be made certain that the most critical branch or consumer in the system – usually the remotest from the pump – gets enough pressure (pump head). Thus, it is recommended to use a variable speed pump in constant-pressure mode with end-point feedback, to maintain a minimum differential pressure across the critical valve.

Residential buildings

Residential buildings with for example self-contained flat heating systems:

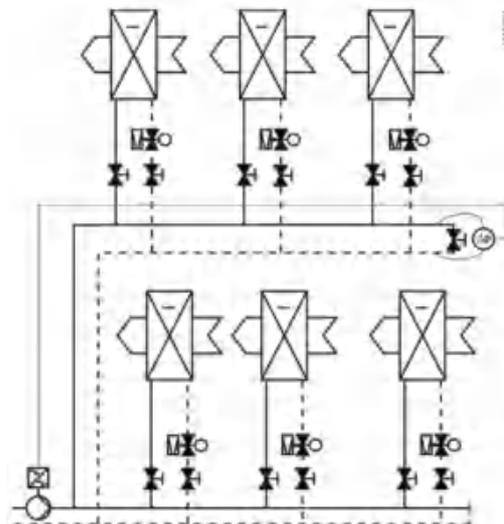


E = Floor

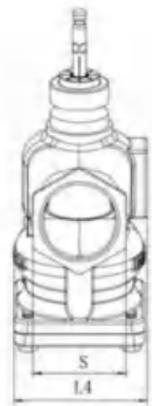
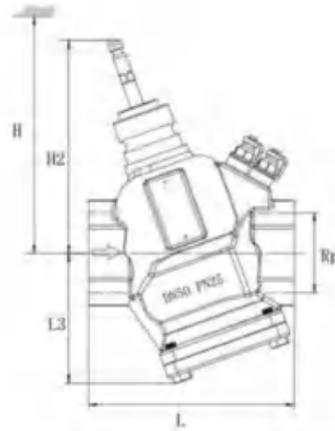
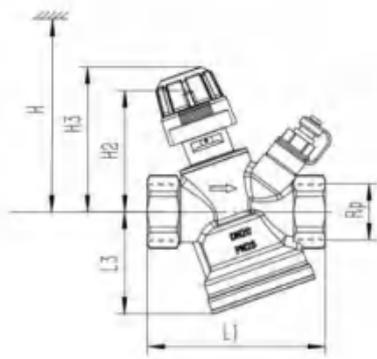
G = Group or zone

Non-residential buildings

Commercial buildings with for example Fan Coil Units or heat exchangers for heating or cooling:



Dimensions

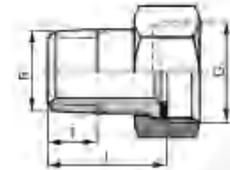


| DN | Rp | S | L1 | L3 | L4 | H2 | H3 | H1) | Weight |
|----|-------|----|-----|------|-----|-------|------|---------------------------------------|--------|
| 15 | 1/2 | 25 | 75 | 50.5 | 52 | 59.8 | 71.5 | | 0.73 |
| 20 | 3/4 | 32 | 85 | 50.5 | 52 | 59.8 | 71.5 | | 0.74 |
| 25 | 1 | 39 | 94 | 50.5 | 52 | 59.8 | 71.5 | H3+Hight (actuator) +H(install) | 0.91 |
| 32 | 1 1/4 | 46 | 120 | 70.5 | 70 | 68.4 | 80.1 | | 1.57 |
| 40 | 1 1/2 | 70 | 155 | 99.2 | 100 | 162.1 | | | 6.36 |
| 50 | 2 | 70 | 155 | 99.2 | 100 | 162.1 | | | 5.89 |

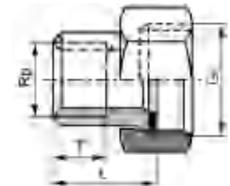
1) Total height including actuator

Sets of threaded fittings with flat seal
2: set of 2 threaded fittings

pipe side with external R threads



pipe side with internal Rp threads



| DN | G | R | Rp | L3 | L4 |
|----|---------|-------|--------|--------|------|
| 10 | G 1/2 | R 3/8 | | ≈ 24 | ≈ 9 |
| 15 | G 3/4 | R 1/2 | | ≈ 29.5 | ≈ 12 |
| 20 | G 1 | | Rp 1/2 | ≈ 23 | ≈ 13 |
| 25 | G 1 1/4 | | Rp 3/4 | | |
| 32 | G 1 1/2 | | Rp 1 | | |

1) Maximum medium temperature 100 °C

· On valve side: cylindrical thread to ISO 228-1, on pipe side: with cylindrical thread to ISO 7-1