

Data sheet

# RA-C valves for cooling and heating circuits

Description



Together with Danfoss selfacting and electronic controls, RA-C valves make up a perfect combination for control of cooling and heating circuits.

The RA-C valve is a normally open valve. In an application with self-acting sensors type FEK or FED it is ensured that the cooling valve opens when the room temperature is rising above the set temperature.

The RA-C valve has 4 presettings, thus the correct quantity of water is ensured for each cooling circuit and it is PN16 approved.

The valve has two external threads thus fittings for various pipe types may be mounted.

Moreover, Danfoss can also offer a comprehensive range of fittings (see back page).

Shut-off (for isolation during system maintenance) using manual shut off knob

Ordering and Specification

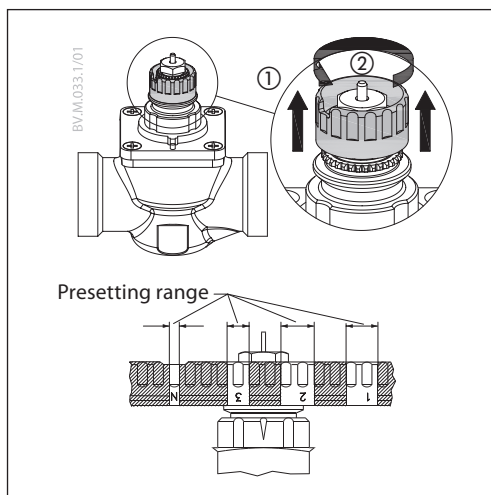
| Valve   | Connections | Presettings:<br>kv-value <sup>1)</sup> , m <sup>3</sup> /h |      |      |      | k <sub>v5</sub> | Max.<br>working<br>pressure <sup>3)</sup> | Max.<br>differential<br>pressure <sup>2)</sup> | Test<br>pressure | Water<br>temperature | Code No. |
|---------|-------------|--|------|------|------|-----------------|---|--|------------------|----------------------|----------|
|         |             | 1  | 2    | 3    | N    |                 |   |  |                  |                      |          |
| RA-C 15 | 2 × G 3/4 A | 0.30   | 0.55 | 0.75 | 0.90 | 1.20            | 10 bar                                    | 0.6 bar  | 16 bar           | 10 - 120°C           | 013G3094 |
| RA-C 20 | 2 × G 1 A   | 0.80   | 1.10 | 1.70 | 2.60 | 3.30            |   |  |                  |                      | 013G3096 |

<sup>1)</sup> The kv-values show the flow (Q) in m<sup>3</sup>/h at a differential pressure (Δp) of 1 bar through the valve. At presetting N the kv-value is shown at Xp = 3 K. The Xp-value decreases at lower presettings thus the kv-value at presetting 1 is shown at Xp = 1 K.

<sup>2)</sup> The max. differential pressure specified is the maximum pressure at which the valves give satisfactory regulation. As with any device which imposes a pressure drop on the system, noise may occur under certain flow/pressure conditions. A differential pressure between 0.1 and 0.3 bar across the valves is recommended. The differential pressure can be reduced using Danfoss differential pressure regulators.<sup>2)</sup>

<sup>3)</sup> Shut-off PN10 approved.

Presetting



With the valve body type RA-C the calculated setting can be set easily and exactly without using special tools:

- remove the protective cap or sensor element,
- raise the setting ring,
- turn the scale on the setting ring until the required scale value faces the reference mark,
- release the setting ring.

The presetting can be set at the values: 1- 2 - 3 and N. At setting N, the valve is completely open.

A setting in the shaded areas should be avoided. When the sensor element is mounted, the pre-setting is hidden, and is thus protected against alteration.

**Pressure and noise conditions**

Special demands are made on the various components of the system. This is due to water temperature conditions, the chosen pipe types and pipe dimensions of both chilled ceilings and fancoils/induction units and the structure of the cooling circuits.

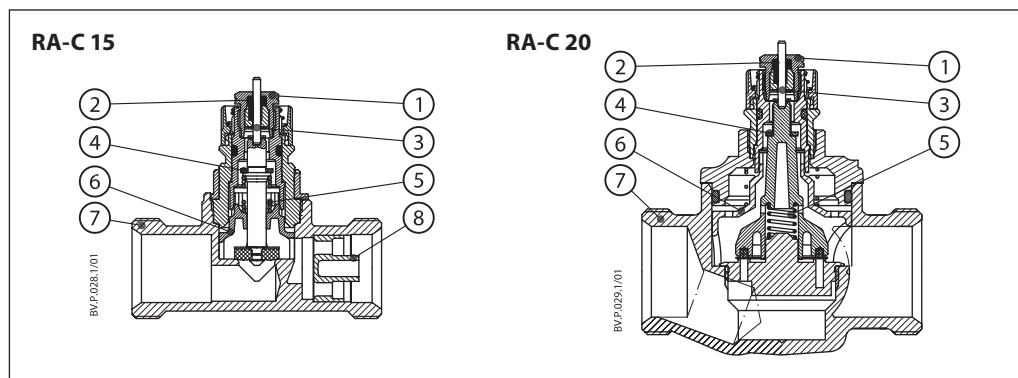
In chilled ceilings and fancoils/induction-units relatively large differential pressure and water flow are

often used compared to normal heating systems. This may lead to noise nuisance.

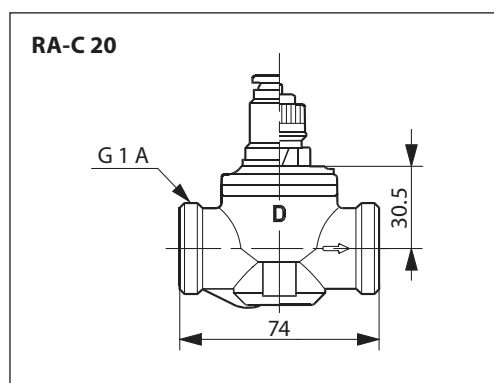
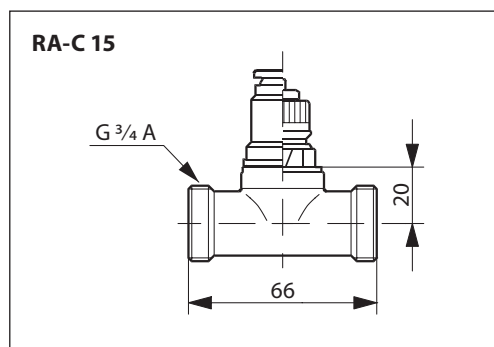
The RA-C valve has especially been designed to correspond to these demands, no matter whether selfacting or electronic controls are used.

**Design**

1. Gland seal
2. O-ring
3. Pressure pin
4. Seal
5. Regulation spring
6. Presetting bush
7. Valve body
8.  $K_v$ -nozzle



**Dimensions**

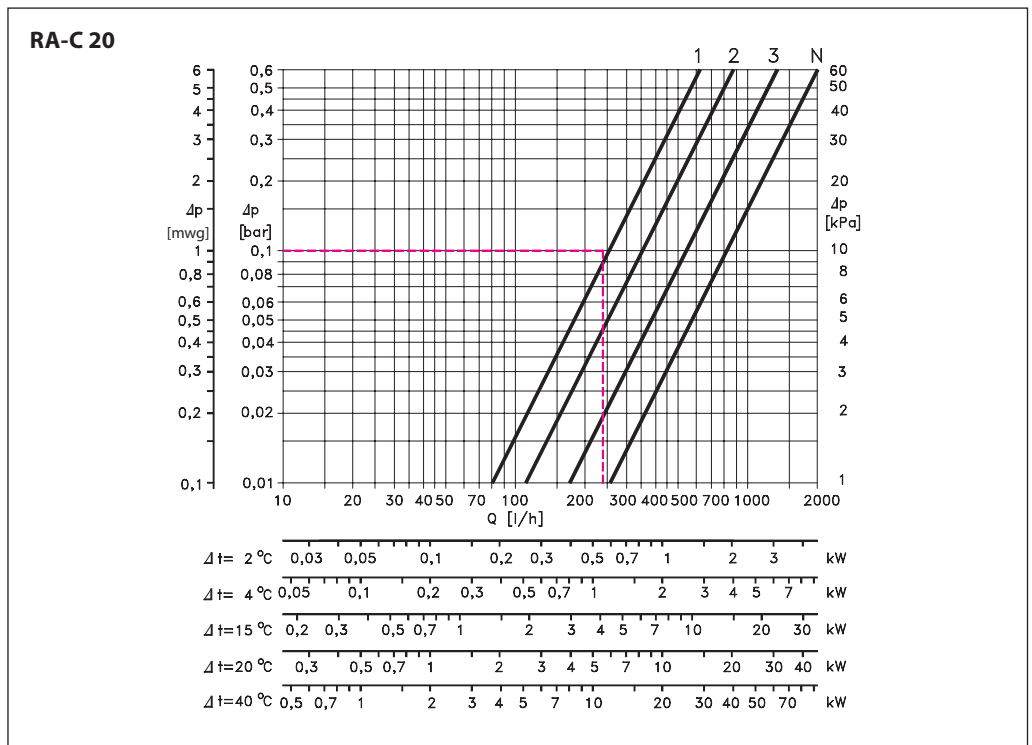
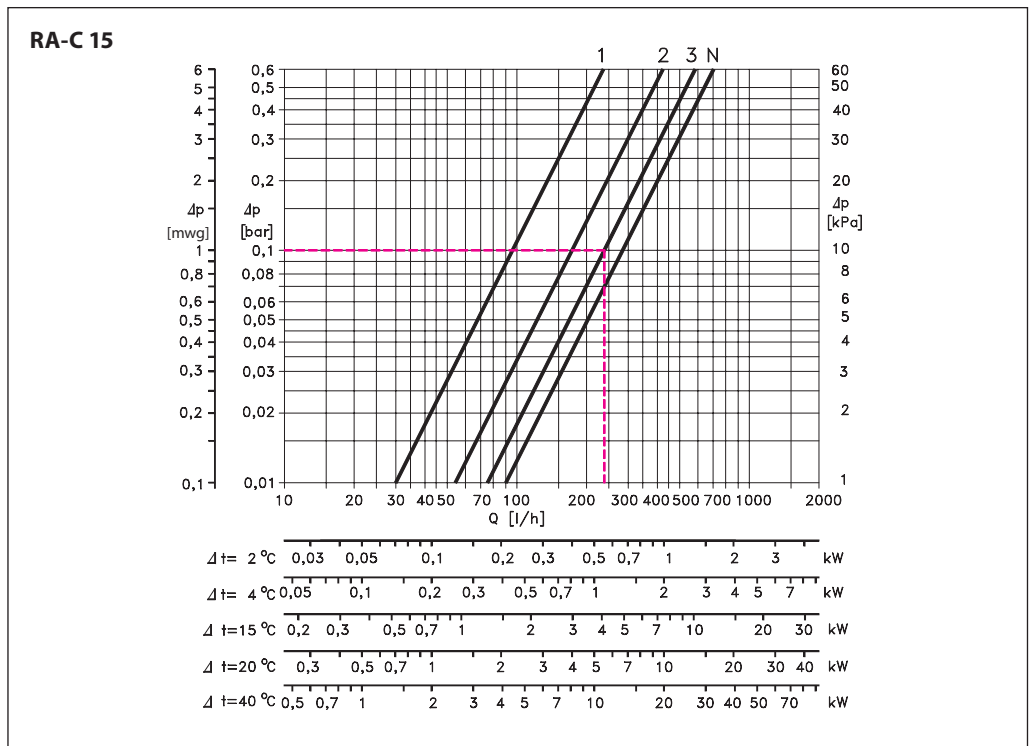


**Materials in contact with flow medium<sup>1)</sup>**

|                                  |                           |
|----------------------------------|---------------------------|
| Valve body and other metal parts | Corrosion resistant brass |
| Spindle                          | Corrosion resistant brass |
| Throttle nozzle                  | PPS                       |
| O-rings                          | EPDM                      |
| Valve cone                       | NBR                       |
| Gland seal pressure pin          | Chrome steel              |
| $k_v$ -nozzle                    | PP                        |

<sup>1)</sup> **Flow medium:** water and water mixtures with secondary coolants like glycols (regarding suitability and usage especially in not oxygen tight systems please see the instructions given by the coolant producer).

Capacities



Sizing example, chilled ceiling:

|                            |   |
|----------------------------|---|
| Cooling demand:            | $\Phi = 0.55 \text{ kW}$                          |
| System temperature rise:   | $\Delta t = 2^\circ\text{C}$                      |
| Differential pressure:     | $\Delta p = 0.1 \text{ bar}$                      |
| Calculated water quantity: | $Q = \frac{550}{2 \times 1.16} = 237 \text{ l/h}$ |

The setting is found in the capacity diagramme: RA-C 15: Presetting value 3  
RA-C 20: Presetting value 1

Capacities with P-band between 1 and 3 K

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Accessories:

**Compression fittings for PEX plastic tubing**

Compression fittings are for connecting Danfoss valves to circuits in heating systems only. Compression fittings are used for connecting PEX plastic tubings in accordance with DIN 16892/16893.

Maximum operating pressure and temperature are given by the tubing manufacturer. However, 10 bar and 95° C must not be exceeded.



One set consists of one olive, one supporting bush and one union nut. Einbau im Vor- oder Rücklauf

| Picture  | For PEX plastic tubing Connection | Tube dimension | Max. working pressure | Test pressure | Max. flow | Code No. |
|--|-----------------------------------|----------------|-----------------------|---------------|-----------|----------|
|  External thread<br><br> Internal thread | G 3/4", internal thread           | 12 x 2 mm      | 6 bar                 | 10 bar        | 95 °C     | 013G4152 |
|  |                                   | 13 x 2 mm      | 6 bar                 | 10 bar        | 95 °C     | 013G4153 |
|  |                                   | 14 x 2 mm      | 6 bar                 | 10 bar        | 95 °C     | 013G4154 |
|  |                                   | 15 x 2.5 mm    | 6 bar                 | 10 bar        | 95 °C     | 013G4155 |
|  |                                   | 16 x 1.5 mm    | 6 bar                 | 10 bar        | 95 °C     | 013G4157 |
|  |                                   | 16 x 2 mm      | 6 bar                 | 10 bar        | 95 °C     | 013G4156 |
|  |                                   | 16 x 2.2 mm    | 6 bar                 | 10 bar        | 95 °C     | 013G4163 |
|  |                                   | 17 x 2 mm      | 6 bar                 | 10 bar        | 95 °C     | 013G4162 |
|  |                                   | 18 x 2 mm      | 6 bar                 | 10 bar        | 95 °C     | 013G4158 |
|  |                                   | 18 x 2.5 mm    | 6 bar                 | 10 bar        | 95 °C     | 013G4159 |
| 20 x 2 mm  | 6 bar                             | 10 bar         | 95 °C                 | 013G4160      |           |          |
| 20 x 2.5 mm  | 6 bar                             | 10 bar         | 95 °C                 | 013G4161      |           |          |

**Compression fittings for Alupex tubing**

Compression fittings are for connecting Danfoss valves to circuits in heating systems only. When connecting circuits with compression fittings for Alupex tubing, always observe the maximum operating pressure and temperature which are given by the tubing manufacturer. However, 10 bar and 95° C must not be exceeded.







One set consists of one olive, one supporting bush, one insulation washer and one union nut.

| Picture   | For PEX plastic tubing Connection | Tube dimension | Max. working pressure | Test pressure | Max. flow | Code No. |
|---|-----------------------------------|----------------|-----------------------|---------------|-----------|----------|
|  External thread<br><br> Internal thread | G 3/4", internal thread           | 12 x 2 mm      | 6 bar                 | 10 bar        | 95 °C     | 013G4182 |
|   |                                   | 14 x 2 mm      | 6 bar                 | 10 bar        | 95 °C     | 013G4184 |
|   |                                   | 15 x 2.5 mm    | 6 bar                 | 10 bar        | 95 °C     | 013G4185 |
|   |                                   | 16 x 2 mm      | 6 bar                 | 10 bar        | 95 °C     | 013G4186 |
|   |                                   | 16 x 2.25 mm   | 6 bar                 | 10 bar        | 95 °C     | 013G4187 |
|   |                                   | 18 x 2 mm      | 6 bar                 | 10 bar        | 95 °C     | 013G4188 |
|   |                                   | 20 x 2 mm      | 6 bar                 | 10 bar        | 95 °C     | 013G4190 |
|   |                                   | 20 x 2.5 mm    | 6 bar                 | 10 bar        | 95 °C     | 013G4191 |

**Compression fittings for steel and copper tubing**

Compression fittings are for connecting Danfoss valves to circuits in heating systems only. Compression fittings are used for connecting steel and copper pipes in accordance with DIN 1786/2391.

One set consists of one olive and one union nut. It is recommended to use supporting bushes with soft pipes.

| Picture  | For PEX plastic tubing Connection      | Tube dimension | Max. working pressure | Test pressure | Max. flow | Code No. |
|--|--|----------------|-----------------------|---------------|-----------|----------|
|  External thread<br><br> Internal thread | G 3/4", internal thread                | 10 mm          | 10 bar                | 16 bar        | 120 °C    | 013G4120 |
|  |  | 12 mm          | 10 bar                | 16 bar        | 120 °C    | 013G4122 |
|  |  | 14 mm          | 10 bar                | 16 bar        | 120 °C    | 013G4124 |
|  |  | 15 mm          | 10 bar                | 16 bar        | 120 °C    | 013G4125 |
|  |  | 16 mm          | 10 bar                | 16 bar        | 120 °C    | 013G4126 |
|  |  | 18 mm          | 10 bar                | 16 bar        | 120 °C    | 013G4128 |
|  | G 1"                                   | 18 mm          | 10 bar                | 16 bar        | 120 °C    | 013U0134 |
|  |  | 22 mm          | 10 bar                | 16 bar        | 120 °C    | 013U0135 |
|   | Manual shut off knob, high pressure    |                |                       |               |           | 013G3300 |
|   | Manual shut off knob                   |                |                       |               |           | 013G5002 |
|   | Raccords pour joints plats Pour RAC 15 |                |                       |               |           | 003L0294 |
|   | Raccords pour joints plats Pour RAC 20 |                |                       |               |           | 003Z4072 |