

## Data Sheet

# Dynamic Valve™ Type RA-DV Pressure Independent Radiator Valve

### Application



*RA-DV straight version*



*RA-DV angle version*



*RA-DV angle Right & Left*



*RA-DV UK (Axial)*

RA-DV is a series of pressure independent radiator valves, designed for use in 2-pipe heating systems together with all types of thermostatic sensors with Danfoss RA coupling.

RA-DV dynamic valves are fitted with a flow limiting device for presetting of the maximum water flow. The valves are available with maximum water flow of 10 - 135 l/h.

RA-DV has a built-in pressure regulator, which keeps the differential pressure at a constant level of 0.1 bar, thus maintaining the set flow.

RA-DV is supplied with a protective cap, which can be used for manual regulation during the construction phase.

The protective cap must not be used as manual shut off device. A special manual shut off device (code no. 013G5002) should be used.

To be able to distinguish between other valve bodies of the Danfoss RA series the RA-DV protective cap and presetting ring are green.

RA-DV valve bodies are manufactured from brass with a nickel plating.

The gland seal pressure pin is chromium steel and works in a lifetime lubricated O-ring. The complete gland seal assembly can be replaced without draining down the system.

Should water treatment be used it is essential that the manufacturer's dosing instructions are strictly observed. Formulations containing mineral oil should be avoided.

In order to avoid deposition and corrosion the composition of the hot water must be in accordance with the VDI 2035.

### Quality



RA-DV Dynamic Valves™ with sensors RAW, RAE and RAS-C are certified according to the European standard EN 215.

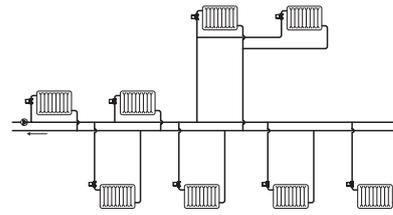
All Danfoss radiator thermostats are manufactured in factories, assessed and certified by BVC (Bureau Veritas Certification) against ISO 9001 and ISO 14001.

## Data Sheet

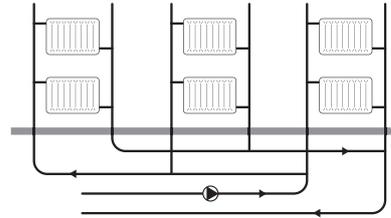
## Dynamic Valve™ Type RA-DV - Pressure Independent Radiator Valve

### Principles

Application example 1



Application example 2



### Ordering

| Valve Type                           | Size | Connection |        | Design     | Code no.   |
|--------------------------------------|------|------------|--------|------------|------------|
|                                      |      | Inlet      | Outlet |            |            |
| RA-DV                                | DN10 | Rp 3/8     | R 3/8  | Angle      | 013G772100 |
| RA-DV                                | DN10 | Rp 3/8     | R 3/8  | Straight   | 013G772200 |
| RA-DV                                | DN10 | Rp 3/8     | R 3/8  | UK (Axial) | 013G770900 |
| RA-DV                                | DN15 | Rp 1/2     | R 1/2  | Angle      | 013G772300 |
| RA-DV                                | DN15 | Rp 1/2     | R 1/2  | Straight   | 013G772400 |
| RA-DV                                | DN15 | Rp 1/2     | Rp 1/2 | UK (Axial) | 013G771000 |
| RA-DV                                | DN20 | Rp 3/4     | Rp 3/4 | Angle      | 013G772500 |
| RA-DV                                | DN20 | Rp 3/4     | Rp 3/4 | Straight   | 013G772600 |
| Accessories                          |      |            |        |            | Code no.   |
| Gland seal, 10 pcs.                  |      |            |        |            | 013G0290   |
| Δp tool for pump optimization        |      |            |        |            | 013G7861   |
| Valve insert with Regulator 5 pieces |      |            |        |            | 013G7831   |
| PFM100 measuring instrument          |      |            |        |            | 003L8260   |

| Compression fittings*                   | Tube dimension | For valve type | Code no.        |
|---|----------------|----------------|-----------------|
| For PEX plastic tubing,<br>10 pcs.      | 12 x 1.1 mm    | RA-DV 15       | <b>013G4143</b> |
|   | 12 x 2 mm      | RA-DV 15       | <b>013G4142</b> |
|   | 14 x 2 mm      | RA-DV 15       | <b>013G4144</b> |
|   | 15 x 2.5 mm    | RA-DV 15       | <b>013G4147</b> |
|   | 16 x 2 mm      | RA-DV 15       | <b>013G4146</b> |
| For Alupex tubing,<br>10 pcs.           | 12 x 2 mm      | RA-DV 15       | <b>013G4172</b> |
|   | 14 x 2 mm      | RA-DV 15       | <b>013G4174</b> |
|   | 16 x 2 mm      | RA-DV 15       | <b>013G4176</b> |
| For steel and copper tubing,<br>10 pcs. | 10 mm          | RA-DV 10       | <b>013G4100</b> |
|   | 12 mm          | RA-DV 10       | <b>013G4102</b> |
|   | 10 mm          | RA-DV 15       | <b>013G4110</b> |
|   | 12 mm          | RA-DV 15       | <b>013G4112</b> |
|   | 14 mm          | RA-DV 15       | <b>013G4114</b> |
|   | 15 mm          | RA-DV 15       | <b>013G4115</b> |

\* For more information on Danfoss compression fittings, please refer to the compression fittings data sheet.

## Technical Data

|   |          |          |          |          |          |          |          |          |
|---|----------|----------|----------|----------|----------|----------|----------|----------|
| Max. working pressure <sup>1)</sup>           | 10 bar   |          |          |          |          |          |          |          |
| Max. differential pressure                    | 0.6 bar  |          |          |          |          |          |          |          |
| Min. differential pressure                    | 0.1 bar  |          |          |          |          |          |          |          |
| Test pressure                                 | 16 bar   |          |          |          |          |          |          |          |
| Max. working temperature                      | 95° C    |          |          |          |          |          |          |          |
| Min. working temperature                      | 2° C     |          |          |          |          |          |          |          |
| Presetting                                    | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b> | <b>N</b> |
| • Max <sup>3)</sup>                           | 10 l/h   | 15 l/h   | 20 l/h   | 35 l/h   | 50 l/h   | 80 l/h   | 100 l/h  | 135 l/h  |
| • with RA 2000 sensor <sup>2)</sup>           | 9 l/h    | 14 l/h   | 18 l/h   | 30 l/h   | 45 l/h   | 70 l/h   | 90 l/h   | 130 l/h  |
| • with RAW, RAE or RAS-C sensor <sup>2)</sup> | 8 l/h    | 12 l/h   | 16 l/h   | 25 l/h   | 40 l/h   | 65 l/h   | 85 l/h   | 110 l/h  |

<sup>1)</sup> Working pressure = static + differential pressure. The maximum differential pressure specified is the maximum pressure at which the valves give satisfactory regulation.

<sup>2)</sup> At setting N the value is stated according to EN 215, at XP = 2K i.e. the valve is closed at 2° C higher room temperature. At lower settings the XP value is reduced to 0.5K of the setting value 1. All values are max. flow at 0.1 bar.

<sup>3)</sup> The value states the max. flow at maximum lift, i.e. at fully open valve at 0.1 bar.

## Presetting

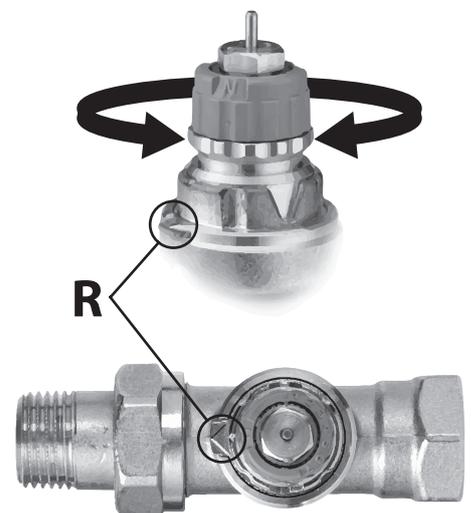
The presetting values of RA-DV valves can be adjusted easily and accurately without the use of tools (default setting = N).

Presetting can be selected in steps from 1 to 7:

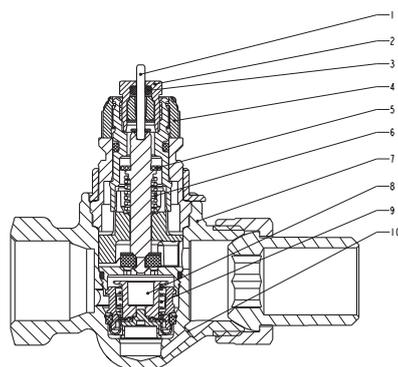
- Remove protective cap / thermostatic sensor.
- Find reference mark (R).
- Turn setting ring until the acquired presetting aligns with the reference mark.

At setting N the valve is fully open. This setting can be used as a flushing position, if the system has to be flushed out because of dirt problems.

When the thermostatic sensor has been installed, the presetting is protected against unintended regulation.



Design



1. Pressure pin
2. Gland seal
3. O-ring
4. Setting dial
5. Seal
6. Regulation spring
7. Valve body
8. Regulator
9. Spring
10. Impulse connection

The thermostatic radiator valve consist of a sensor and the valve body RA-DV. Sensor and valve body are ordered separately.

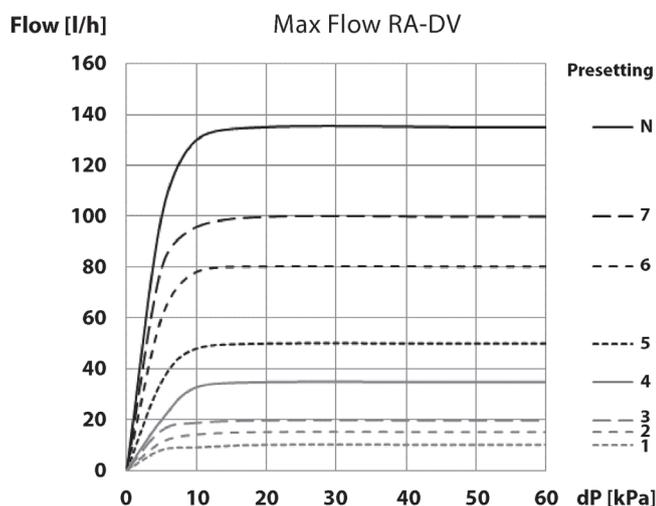
The gland seal of the valve can be changed in operation, i.e. with water and pressure on the system. Counter hold with star spanner number 17 and loosen the gland seal with spanner number 10.

Materials in contact with water

|                                  |                |
|----------------------------------|----------------|
| Valve body and other metal parts | Brass          |
| Valve body surface               | Nickle plated  |
| Flow-limiter                     | PPS            |
| O-ring                           | EPDM           |
| Valve cone                       | NBR            |
| Pressure pin and spring          | Chrome steel   |
| Regulator                        | Brass/PPS/EPDM |

Capacities

RA-DV max. flow

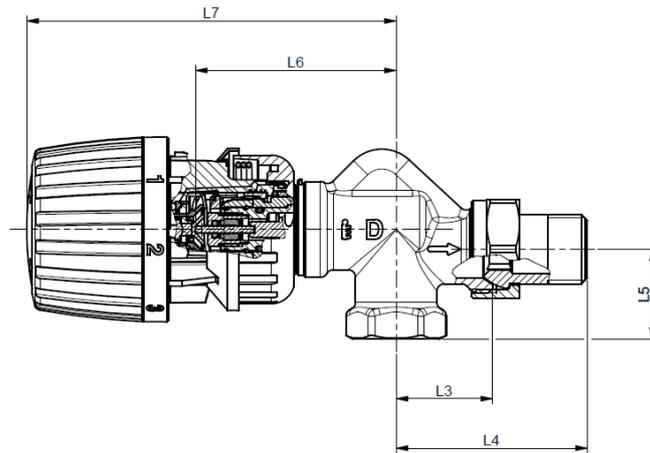


Sizing example

|                                 |   |
|---------------------------------|---|
| Required heat                   | 700 W   |
| Cooling across radiator         | 20 °C   |
| Flow through radiator           | $Q = \frac{700}{20 \times 1.16} = 30 \text{ l/h}$ |
| Min. pressure for constant flow | 0.1 bar   |
| Valve setting*                  | 4   |

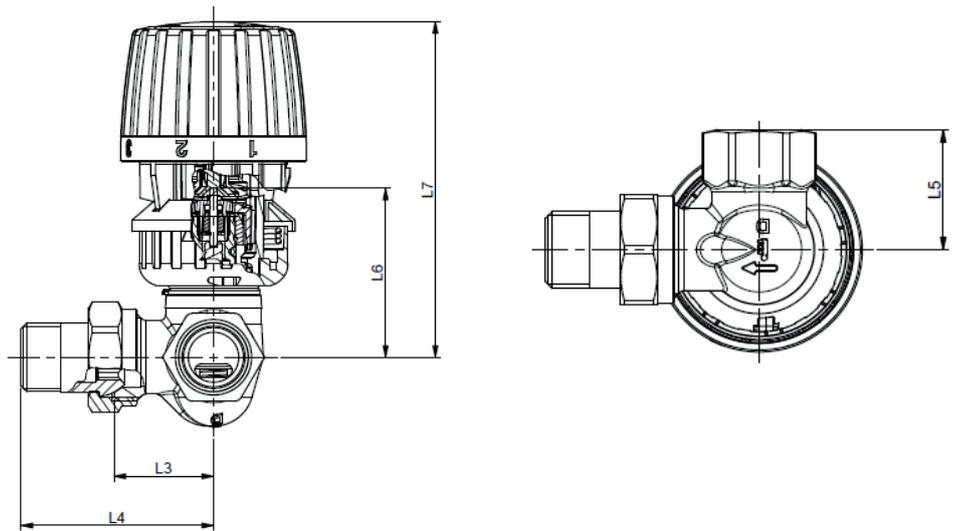
\*Alternatively the setting can be read directly in the table "Technical Data".

Dimensions



RA-DV UK Axial / RA2990 sensor

| Type        | Code no.   | ISO 7-1 |                    |                | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | L <sub>4</sub> | L <sub>5</sub> | L <sub>6</sub> | L <sub>7</sub> | Arc. flats     |                |
|-------------|------------|---------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|             |            | DN      | D                  | d <sub>2</sub> |                |                |                |                |                |                |                | S <sub>1</sub> | S <sub>2</sub> |
| RA-DV 10 UK | 013G770900 | 10      | R <sub>p</sub> 3/8 | R 3/8          | -              | -              | 26             | 51             | 22             | 61             | 112            | 22             | 27             |
| RA-DV 15 UK | 013G771000 | 15      | R <sub>p</sub> 1/2 | R 1/2          | -              | -              | 29             | 58             | 27             | 61             | 112            | 27             | 30             |



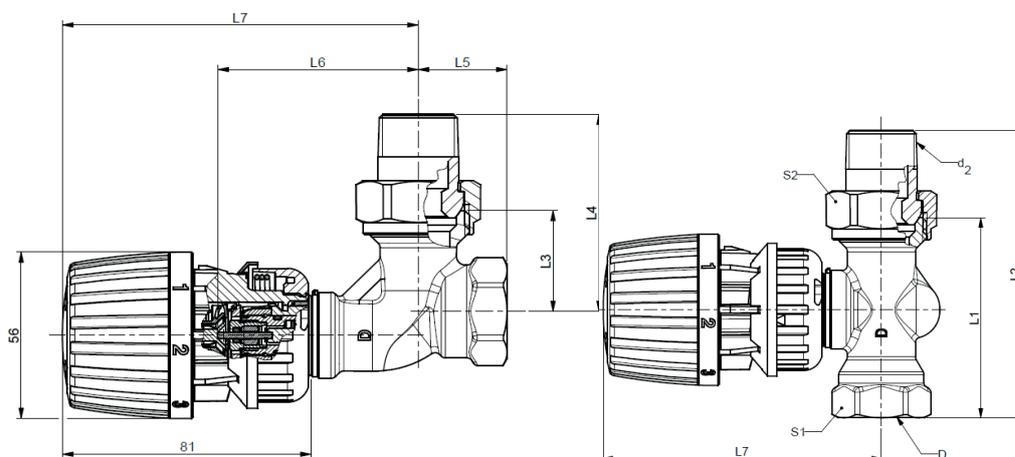
RA-DV right /left valve + RA 2990 sensor

| Type           | Code no.   | ISO 7-1 |                    |                | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | L <sub>4</sub> | L <sub>5</sub> | L <sub>6</sub> | L <sub>7</sub> | Arc. flats     |                |
|----------------|------------|---------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                |            | DN      | D                  | d <sub>2</sub> |                |                |                |                |                |                |                | S <sub>1</sub> | S <sub>2</sub> |
| RA-DV 10 right | 013G771700 | 10      | R <sub>p</sub> 3/8 | R 3/8          | -              | -              | 27             | 52             | 27             | 52             | 103            | 22             | 27             |
| RA-DV 10 left  | 013G771800 | 10      | R <sub>p</sub> 3/8 | R 3/8          | -              | -              | 27             | 52             | 27             | 52             | 103            | 22             | 27             |
| RA-DV 15 right | 013G771900 | 15      | R <sub>p</sub> 1/2 | R 1/2          | -              | -              | 30             | 58             | 33             | 52             | 103            | 27             | 30             |
| RA-DV 15 left  | 013G772000 | 15      | R <sub>p</sub> 1/2 | R 1/2          | -              | -              | 30             | 58             | 33             | 52             | 103            | 27             | 30             |

## Data Sheet

## Dynamic Valve™ Type RA-DV - Pressure Independent Radiator Valve

## Dimensions



RA-DV DN20 Straight &amp; Angle valve / RA 2990 sensor

| Type              | Code no.   | ISO 7-1 |                    |                | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | L <sub>4</sub> | L <sub>5</sub> | L <sub>6</sub> | L <sub>7</sub> | Arc. flats     |                |
|-------------------|------------|---------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                   |            | DN      | D                  | d <sub>2</sub> |                |                |                |                |                |                |                | S <sub>1</sub> | S <sub>2</sub> |
| RA-DV 10 angle    | 013G772100 | 10      | R <sub>p</sub> 3/8 | R 3/8          | -              | -              | 26             | 51             | 22             | 64             | 114            | 22             | 27             |
| RA-DV 10 straight | 013G772200 | 10      | R <sub>p</sub> 3/8 | R 3/8          | 58             | 84             | -              | -              | -              | -              | 102            | 22             | 27             |
| RA-DV 15 angle    | 013G772300 | 15      | R <sub>p</sub> 1/2 | R 1/2          | -              | -              | 29             | 57             | 26             | 66             | 117            | 27             | 30             |
| RA-DV 15 straight | 013G772400 | 15      | R <sub>p</sub> 1/2 | R 1/2          | 65             | 94             | -              | -              | -              | -              | 102            | 27             | 30             |
| RA-DV 20 angle    | 013G772500 | 20      | R <sub>p</sub> 3/4 | R 3/4          | -              | -              | 34             | 67             | 29             | 66             | 117            | 32             | 37             |
| RA-DV 20 straight | 013G772600 | 20      | R <sub>p</sub> 3/4 | R 3/4          | 74             | 107            | -              | -              | -              | -              | 103            | 32             | 37             |

Note! If RAW, RAE or RAS-C sensors are used instead of sensors from the RA2000 series the L7 measurement is extended with 12 mm.

## Danfoss Limited

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