

## Data Sheet

# RA-N Radiator Valves with Integrated Presetting

### Application



All RA-N valve bodies can be used together with all types of thermostatic elements in the RA 2000 series and with TWA-A thermal actuators.

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

RA-N valves are used in two-pipe heating systems and comes in series D, series F and series S to fit local standards.

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

RA-N valves are fitted with a  $k_v$  limiting device for pre-setting of max. water flow and are available with the following setting ranges:

In order to avoid deposition and corrosion the composition of the hot water must be in accordance with the VDI 2035 guideline (Verein Deutscher Ingenieure). It is recommended that formulations containing mineral oil are avoided.

RA-N 10:	$k_v = 0.04 - 0.56 \text{ m}^3/\text{h}$
RA-N 15:	$k_v = 0.04 - 0.73 \text{ m}^3/\text{h}$
RA-N 20/25:	$k_v = 0.10 - 1.04 \text{ m}^3/\text{h}$

A comprehensive range of compression fittings for PEX, AluPEX, copper and steel tubes are available - please require special data sheet for Danfoss compression fittings.

Each valve body is supplied with a red protective cap, which can be used for manual regulation during the construction phase.

The protective cap must not be used as a manual shut off device. A special manual shut off device is available as an accessory.

### Quality



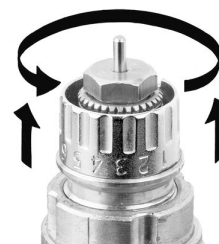
All Danfoss RA 2000 radiator thermostats are certified according to the European standard EN 215.

All Danfoss radiator thermostats are manufactured in factories, assessed and certified by BSI (British Standards Institution) against ISO 9000 and ISO14001.

## Presetting

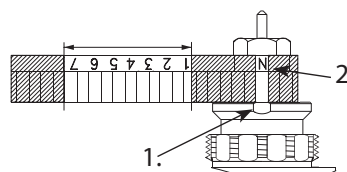
The presetting values of RA-N valves can be adjusted easily and accurately without the use of tools (factory setting = N). Presetting can be selected in steps from 1 to 7:

- Remove protective cap / thermostatic sensor
- Find reference mark
- Lift and 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. In one-pipe installations, the setting N must be used. Settings outside 1 to 7 and N should be avoided.

Presetting range



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

1. Reference mark
2. Factory setting and one-pipe system

## Data and Ordering

Type	Design	Connections		Pre-setting								
		Inlet	Outlet	$k_v\text{-max.}^{1)} \text{ (m}^3/\text{h at } \Delta p = 1 \text{ bar)}$								$k_{vs}$
		Rp	R	1	2	3	4	5	6	7	N	N
RA-N 10	Angle	3/8	3/8	0.04	0.08	0.12	0.19	0.25	0.33	0.38	0.56	0.65
	Straight	3/8	3/8	0.04	0.08	0.12	0.19	0.25	0.33	0.38	0.56	0.65
	Horiz. angle	3/8	3/8	0.04	0.08	0.12	0.19	0.25	0.33	0.38	0.56	0.65
	Right angle	3/8	3/8	0.04	0.08	0.12	0.19	0.25	0.33	0.38	0.56	0.65
	Left angle	3/8	3/8	0.04	0.08	0.12	0.19	0.25	0.33	0.38	0.56	0.65
RA-N 15	Angle	1/2	1/2	0.04	0.09	0.16	0.25	0.36	0.43	0.52	0.73	0.90
	Straight	1/2	1/2	0.04	0.09	0.16	0.25	0.36	0.43	0.52	0.73	0.90
	Horiz. angle	1/2	1/2	0.04	0.09	0.16	0.25	0.36	0.43	0.52	0.73	0.90
	Right angle	1/2	1/2	0.04	0.09	0.16	0.25	0.36	0.43	0.52	0.73	0.90
	Left angle	1/2	1/2	0.04	0.09	0.16	0.25	0.36	0.43	0.52	0.73	0.90
RA-N 20	Angle	3/4	3/4	0.10	0.15	0.17	0.26	0.35	0.46	0.73	1.04	1.40
	Straight	3/4	3/4	0.10	0.15	0.17	0.26	0.35	0.46	0.73	1.04	1.40
	Horiz. angle	3/4	3/4	0.10	0.20	0.25	0.35	0.47	0.60	0.73	0.80	1.00
RA-N 25	Angle	1	1	0.10	0.15	0.17	0.26	0.35	0.46	0.73	1.04	1.40
	Straight	1	1	0.10	0.15	0.17	0.26	0.35	0.46	0.73	1.04	1.40

<sup>1)</sup> The  $k_v$ -value indicates the water flow (Q) in m<sup>3</sup>/h at a pressure drop ( $\Delta p$ ) across the valve of 1 bar;

$K_v = Q : \sqrt{\Delta p}$  At setting N the  $k_v$ -value is stated according to EN 215, at  $X_p = 2K$  i.e. the valve is closed at 2°C higher room temperature. At lower settings the  $X_p$  value is reduced to 0.5K of the setting value. The  $k_{vs}$ -value states the flow Q at a maximum lift, i.e. at fully open valve at setting N.

Type	Design	Max work press.	Max diff. <sup>2)</sup> press.	Test	Max work temp.	Code no.
		bar	bar	bar	°C	
RA-N 10	Angle	10	0.6	16	120	013G0011
	Straight	10	0.6	16	120	013G0012
	Horiz. angle	10	0.6	16	120	013G0151
	Right angle	10	0.6	16	120	013G0231
	Left angle	10	0.6	16	120	013G0232
RA-N 15	Angle	10	0.6	16	120	013G0013
	Straight	10	0.6	16	120	013G0014
	Horiz. angle	10	0.6	16	120	013G0153
	Right angle	10	0.6	16	120	013G0233
	Left angle	10	0.6	16	120	013G0234
RA-N 20	Angle	10	0.6	16	120	013G0015
	Straight	10	0.6	16	120	013G0016
	Horiz. angle	10	0.6	16	120	013G0155
RA-N 25	Angle	10	0.6	16	120	013G0037
	Straight	10	0.6	16	120	013G0038

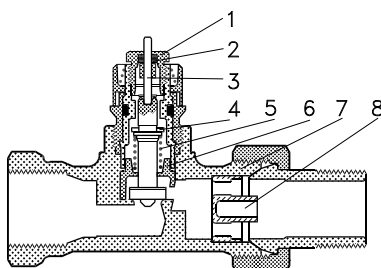
<sup>2)</sup> Working pressure = static + differential pressure. The maximum differential pressure specified is the maximum pressure at which the valves give satisfactory regulation. As with any device which imposes a pressure drop in the system, noise may occur under certain flow/pressure conditions. To ensure quiet operation, maximum pressure drop should not exceed 30 to 35 kPa. The differential pressure can be reduced by the use of the Danfoss differential pressure regulators types AVD, AVDL, AVDS, IVD or ASV-P.

## Accessories

Product	Dimension	For valve body	Code no.
Gland seal	-	All RA valves	013G0290
Compression fitting for steel and copper tubes	Rp 3/8 x Ø10 mm	RA-N 10	013G4100
	Rp 3/8 x Ø12 mm		013G4102
	Rp 1/2 x Ø10 mm	RA-N 15	013G4110
	Rp 1/2 x Ø12 mm		013G4112
	Rp 1/2 x Ø15 mm		013G4115

All accessories comes in boxes of 10 pcs.

## Operating Principle



1. Gland seal
2. O-Ring
3. Pressure pin
4. Seal
5. Regulation spring
6. Setting dial
7. Valve body
8.  $k_v$ -nozzle

The radiator thermostats consist of the thermostatic elements of the RA 2000 series and the valve body RA-N. The element and the valve body are ordered separately.

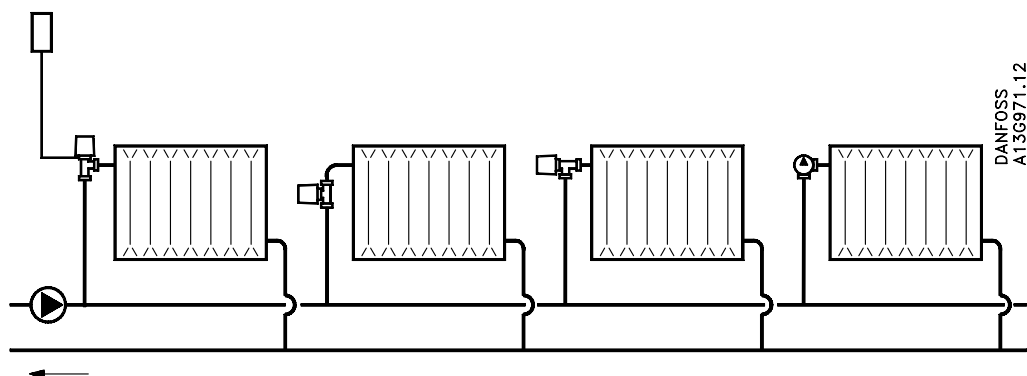
A clamping band with Allen screw ensures a simple, firm connection between element and valve body. The gland seal of the valve can be changed in operation, i.e. with water and pressure on the system.

Valve body and other metal parts	Ms 58, brass
O-ring	PPS
K <sub>v</sub> -limiter	EPDM
Valve cone	NBR
Pressure pin and valve spring	Chrome steel
Nozzle	PP

*The valve bodies are nickle-plated on the outside.*

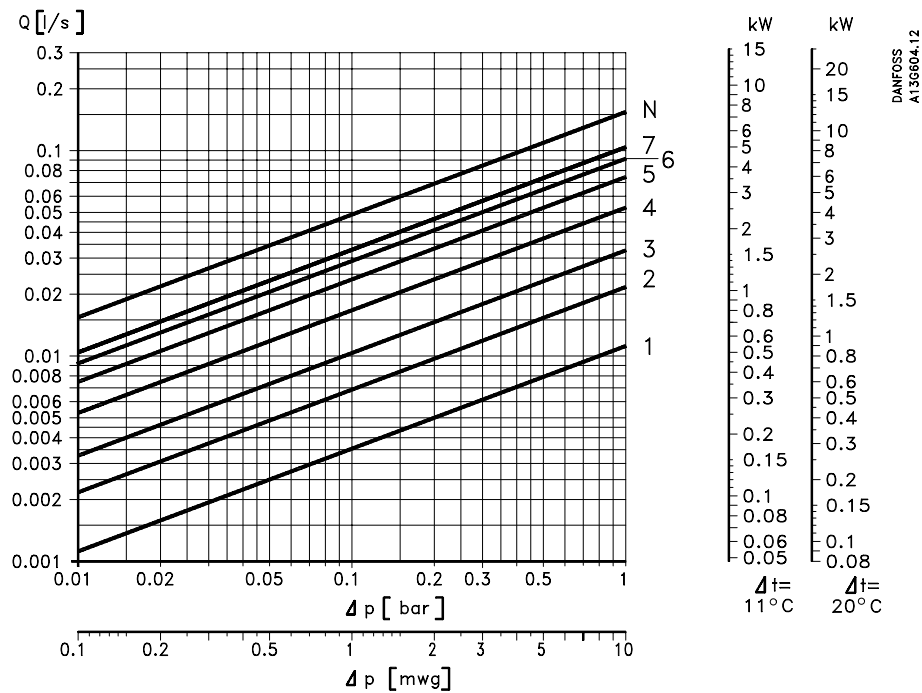
Max. ambient temperature	60 °C
Max. medium temperature	120 °C
Max. working pressure	10 bar
Test pressure	16 bar

## Principles

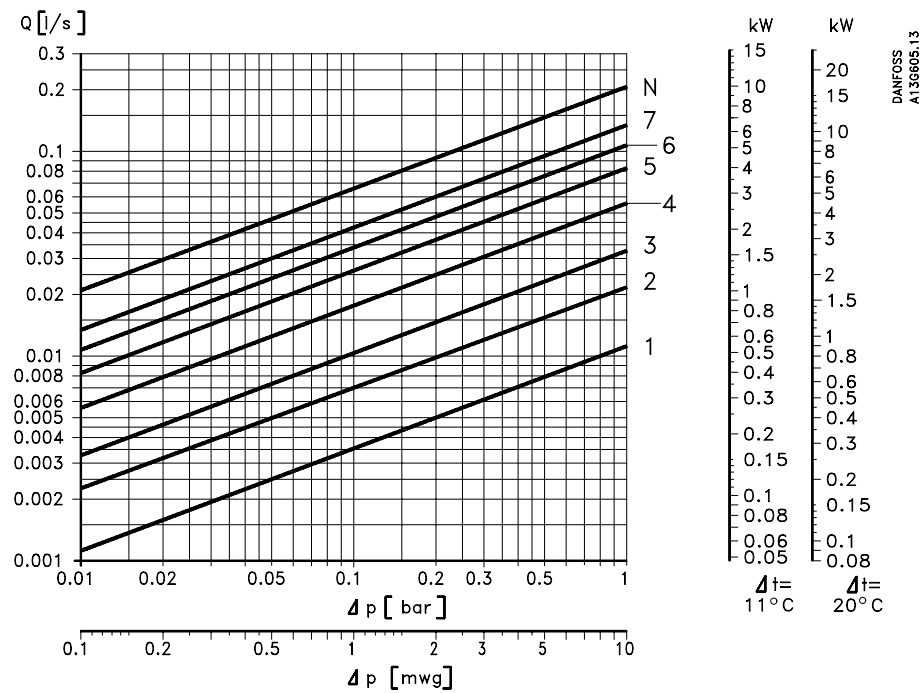


## Capacities

**RA-N 10, R<sub>p</sub> 3/8 connection**



RA-N 15,  $R_p$  1/2 connection

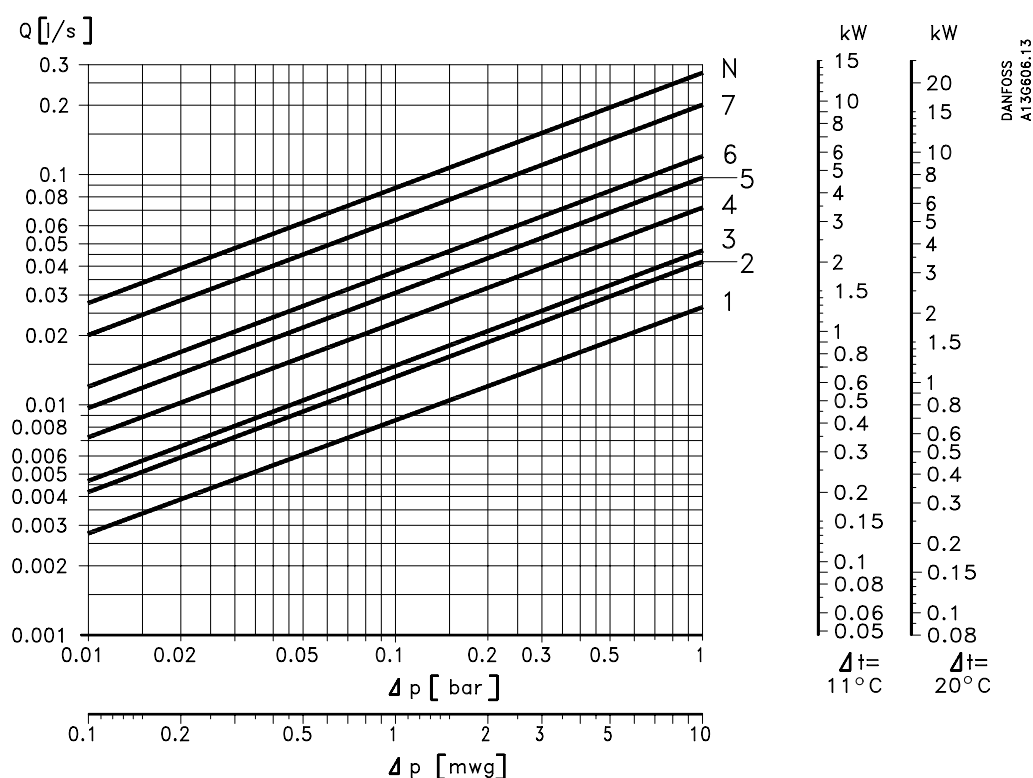


<b>Sizing example:</b>		
Required heat:		0.7 kW
Cooling across radiator:		20° C
Flow through radiator:	$Q = \frac{0.7}{20 \times 1.16} = 0.03 \text{ m}^3/\text{h} = 0.0083 \text{ l/s}$	
Pressure drop across valve:		$\Delta p = 1 \text{ mwg}$
Valve setting:	RA-N 10	2
	RA-N 15	2
	RA-N 20/25	1

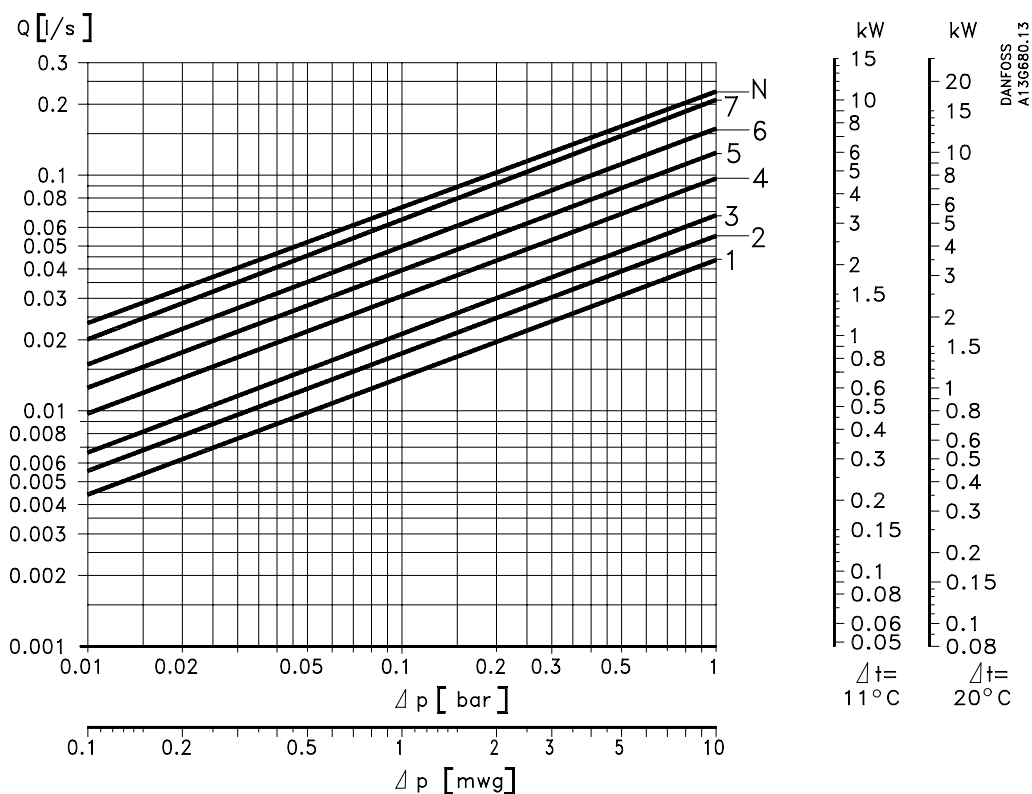
Alternatively the setting can be read directly in the table "Data and Ordering".

$$K_v = \frac{Q \text{ (m}^3/\text{h)}}{\sqrt{\Delta p \text{ (bar)}}}$$

RA-N 20/25, R<sub>p</sub> 3/4 - R<sub>p</sub> 1 connection



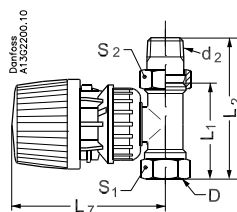
RA-N 20 UK, R<sub>p</sub> 3/4 connection



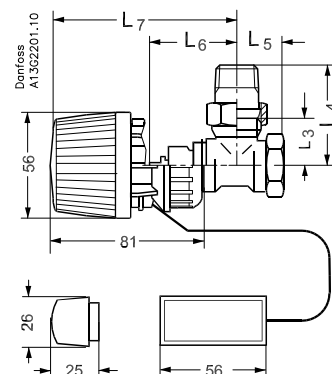
**Note:**

As with any device which imposes a pressure drop in the system, noise may occur under certain flow/pressure conditions. To ensure quiet operation, maximum pressure drop should not exceed 30-35kPa (3-3.5 mwg).

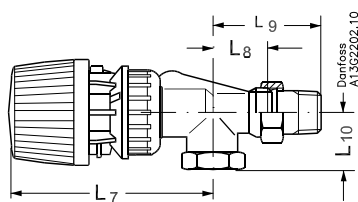
**Dimensions**



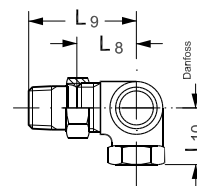
Straight valve with sensor RA 2990



Angle valve with sensor RA 2992



Horizontal angle valve with sensor RA 2990



Side angle valve

Type	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>	L <sub>8</sub>	L <sub>9</sub>	L <sub>10</sub>	Arc. flats	
	DN	D	d <sub>2</sub>											S <sub>1</sub>	S <sub>2</sub>
RA-N 10	10	R <sub>p</sub> 3/8	R 3/8	50	75	24	49	20	47	96	27	52	22	22	27
RA-N 10 UK	10	R <sub>p</sub> 3/8	R 3/8						59	108	26	51	22	22	27
RA-N 15	15	R <sub>p</sub> 1/2	R 1/2	55	82	26	53	23	47	96	30	58	26	27	30
RA-N 15 UK	15	R <sub>p</sub> 1/2	R 1/2						60	109	29	57	27	27	30
RA-N 20	20	R <sub>p</sub> 3/4	R 3/4	65	98	30	63	26	52	101				32	37
RA-N 20 UK	20	R <sub>p</sub> 3/4	R 3/4						61	110	34	66	30	32	37
RA-N 25	20	R <sub>p</sub> 1	R 1	90	125	40	75	34	52	101				41	46

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