

## Data Sheet

# Radiator Valves Type RA-N with Integrated Pre-setting

### Application



*Straight valve pattern*



*Angle valve pattern*

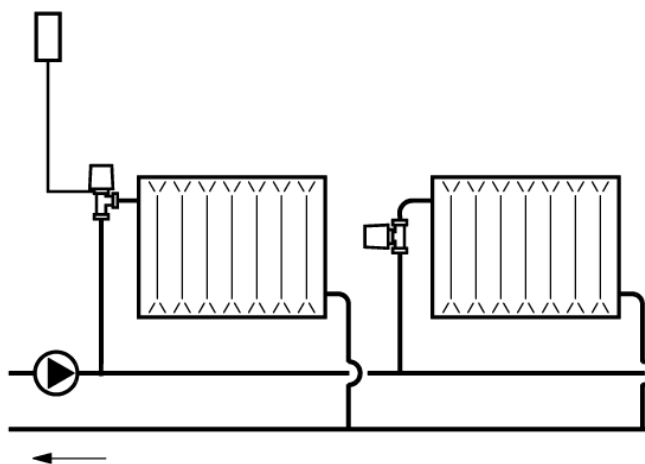
RA-N valves are used for two-pipe heating systems together with liquid filled RTW sensors or gas filled sensors in the RA 2000 range.

RA-N valves are fitted with a  $k_v$  limiting device for pre-setting of max. water flow. 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.

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

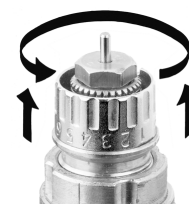
### System



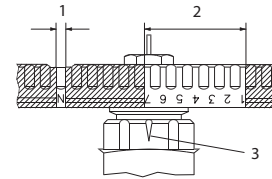
### Presetting

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

- Remove protective cap / thermostatic sensor
- Find reference mark
- Lift and turn setting ring until the required pre-setting aligns with the reference mark.



Presetting can be selected in steps from 1 to 7. At setting N the valve is fully open. This setting can be used as a flushing position, if the system has to be flushed because of dirt problems. Settings outside 1 to 7 and N should be avoided.



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

1. Factory setting
2. Presetting range
3. Reference mark

**Ordering and Specifications**

Type	Design	Connections		Max. work. press.	Max. diff. <sup>1)</sup> press.	Test	Max. work. temp.	Code no.
		Inlet	Outlet					
		R <sub>p</sub>	R	bar	bar	bar	°C	
RA-N 15	Angle	1/2	1/2	10	0.6	16	120	<b>013G3963</b>
	Straight	1/2	1/2	10	0.6	16	120	<b>013G3964</b>
RA-N 20	Angle	3/4	3/4	10	0.6	16	120	<b>013G0015</b>
	Straight	3/4	3/4	10	0.6	16	120	<b>013G3966</b>
RA-N 25	Angle	1	1	10	0.6	16	120	<b>013G0037</b>
	Straight	1	1	10	0.6	16	120	<b>013G0038</b>

**Data and k<sub>v</sub>-values in combination with RTW sensors**

Type	Design	Pre-setting									
		k <sub>v-max.</sub> <sup>2)</sup> (m <sup>3</sup> /h at Δp = 1 bar)									k <sub>vs</sub>
		1	2	3	4	5	6	7	N	N	
RA-N 15	Angle	0.04	0.08	0.14	0.21	0.31	0.37	0.47	0.53	1.00	
	Straight	0.04	0.08	0.14	0.21	0.31	0.37	0.47	0.53	1.00	
RA-N 20	Angle	0.09	0.14	0.17	0.25	0.31	0.40	0.51	0.71	1.40	
	Straight	0.09	0.14	0.21	0.32	0.43	0.52	0.61	0.73	1.42	
RA-N 25	Angle	0.09	0.14	0.17	0.25	0.31	0.40	0.51	0.71	1.40	
	Straight	0.09	0.14	0.17	0.25	0.31	0.40	0.51	0.71	1.40	

**Data and k<sub>v</sub>-values in combination with RA 2000 sensors**

Type	Design	Pre-setting									
		k <sub>v-max.</sub> <sup>2)</sup> (m <sup>3</sup> /h at Δp = 1 bar)									k <sub>vs</sub>
		1	2	3	4	5	6	7	N	N	
RA-N 15	Angle	0.04	0.09	0.16	0.24	0.36	0.43	0.62	0.75	1.00	
	Straight	0.04	0.09	0.16	0.24	0.36	0.43	0.62	0.75	1.00	
RA-N 20	Angle	0.10	0.15	0.18	0.26	0.35	0.46	0.73	1.04	1.40	
	Straight	0.10	0.15	0.22	0.37	0.52	0.68	0.83	1.14	1.42	
RA-N 25	Angle	0.10	0.15	0.18	0.26	0.35	0.46	0.73	1.04	1.40	
	Straight	0.10	0.15	0.18	0.26	0.35	0.46	0.73	1.04	1.40	

<sup>1)</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.

<sup>2)</sup> The k<sub>v</sub>-value indicates the water flow (Q) in m<sup>3</sup>/h at a pressure drop (Δp) across the valve of 1 bar;

$$k_v = \frac{Q}{\sqrt{\Delta p}}$$

At setting N the k<sub>v</sub>-value is stated according to EN 215, at X<sub>p</sub> = 2K i.e. the valve is closed at 2°C higher room temperature. At lower settings the X<sub>p</sub>-value is reduced to 0.5K of the setting value 1. The k<sub>vs</sub>-value states the flow Q at a maximum lift, i.e. at fully open valve at setting N.

Accessories

Product	Code no.
Gland seal, 10 pcs.	<b>013G0290</b>
Brass setting knob for manual adjustment of the valve (only for temporarily replacement of a thermostatic sensor)	<b>013G3300</b>
Demounting tool for changing valve inserts with system in operation	<b>013G3085</b>

Valve Sizing

Sizing example

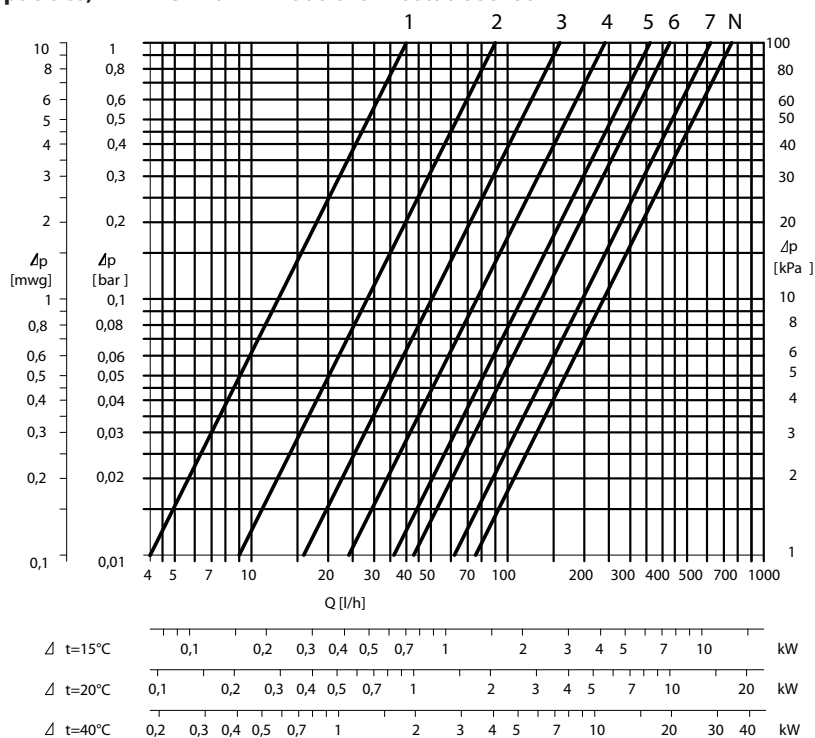
Required heat: 0.7 kW  
 Cooling across radiator: 20°C  
 Flow through radiator:  $Q = \frac{0.7}{20 \times 1.16} = 0.03 \text{ m}^3/\text{h} = 30 \text{ l/h}$   
 Pressure drop across valve:  $\Delta p = 1 \text{ mwg}$   
 Valve setting: RA-N 15 2  
 RA-N 20 / 25 1

Alternatively the setting can be read in the table "Ordering and Specifications":

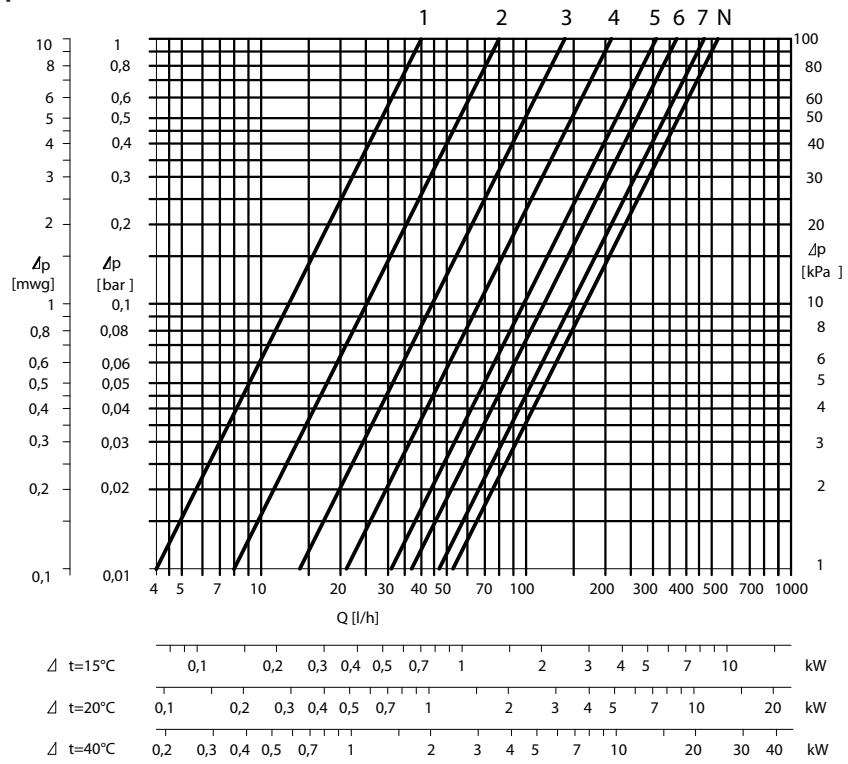
$$k_v = \frac{Q(\text{m}^3/\text{h})}{\sqrt{\Delta p (\text{bar})}}$$

Capacities

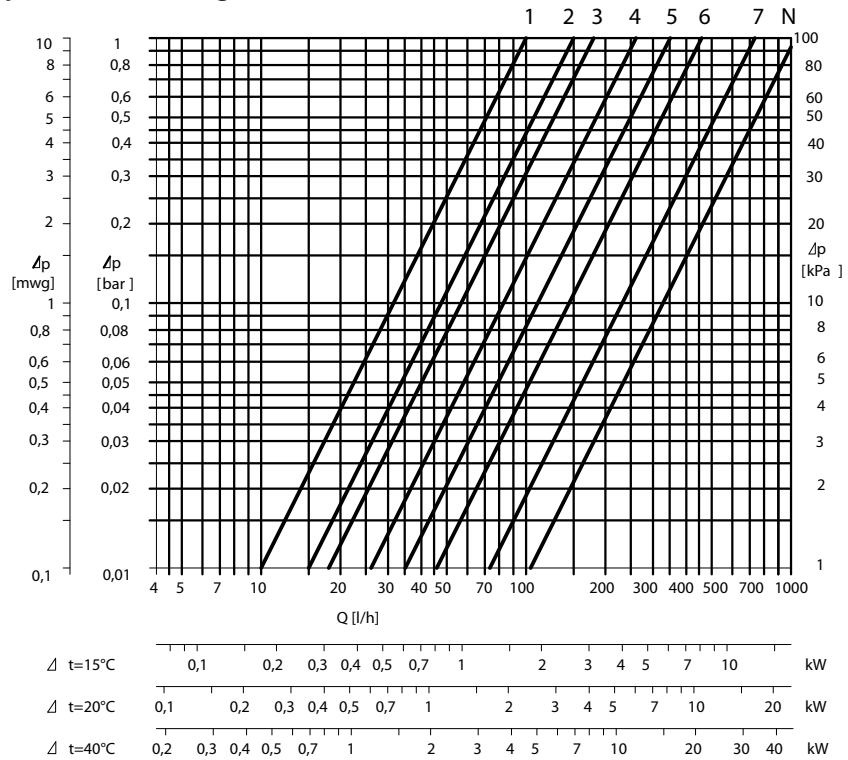
Valve capacities, RA-N 15 with RA 2000 thermostatic sensor



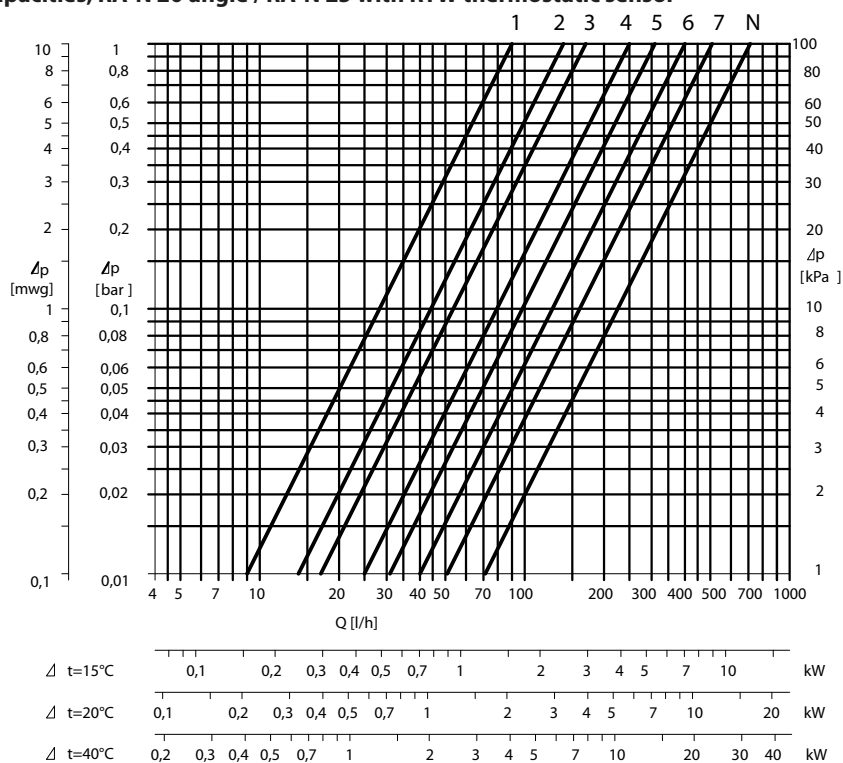
Valve capacities, RA-N 15 with RTW thermostatic sensor



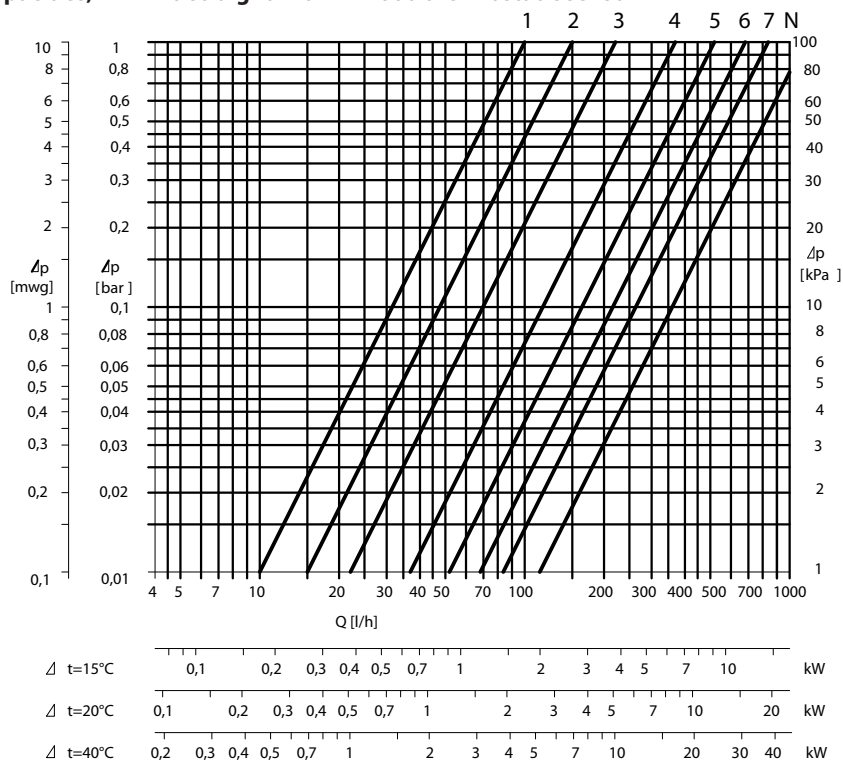
Valve capacities, RA-N 20 angle / RA-N 25 with RA 2000 thermostatic sensor



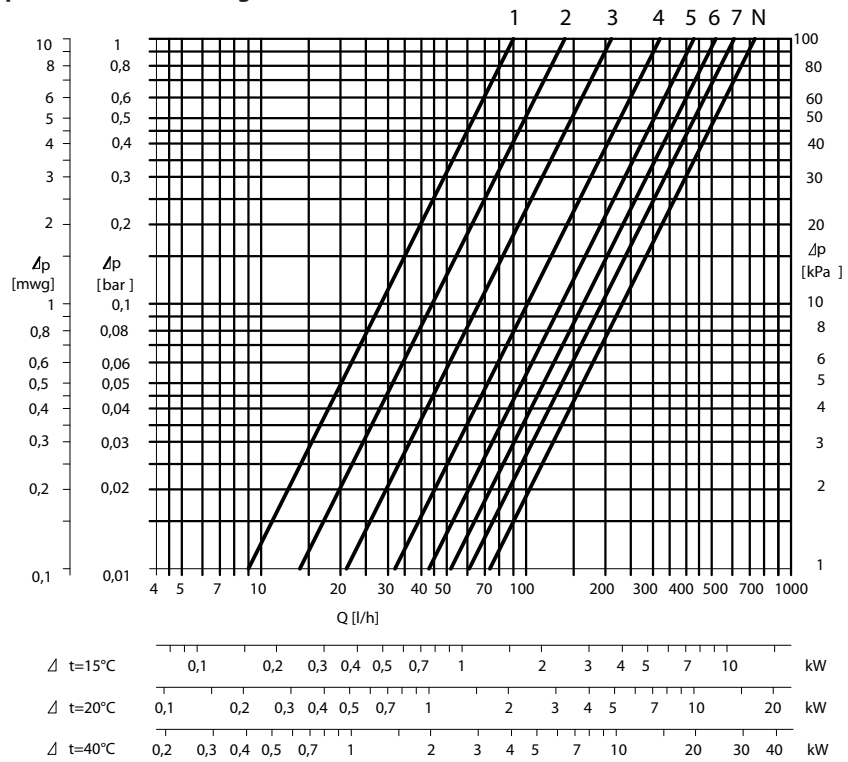
Valve capacities, RA-N 20 angle / RA-N 25 with RTW thermostatic sensor



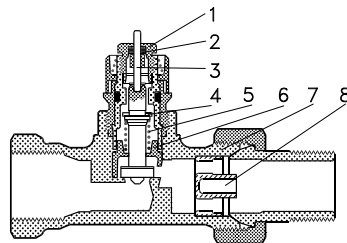
Valve capacities, RA-N 20 straight with RA 2000 thermostatic sensor



Valve capacities, RA-N 20 straight with RTW thermostatic sensor



Design

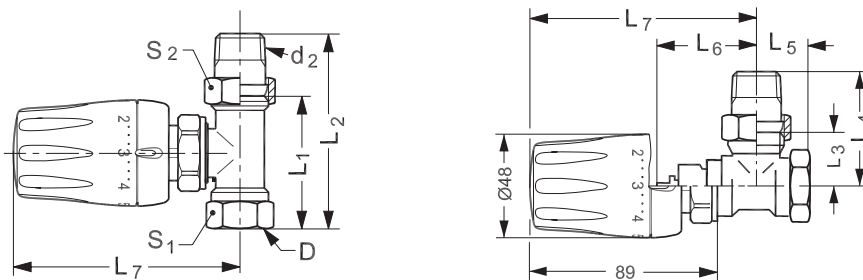


1. Gland seal (can be changed during operation, i.e. with water and pressure on the system)
2. O-Ring
3. Pressure pin
4. Seal
5. Regulation spring
6. Throttle bush
7. Valve body
8.  $k_v$ -nozzle

RA-N valve bodies are nickel-plated on the outside.

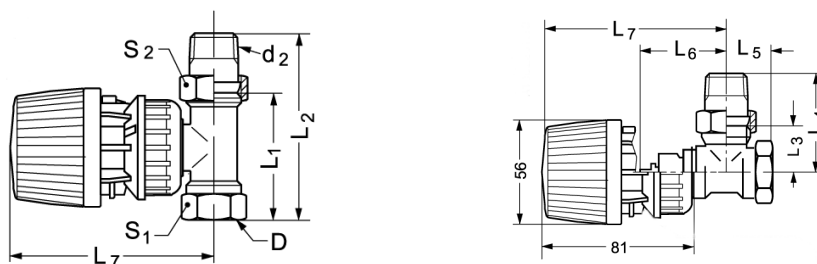
Valve body and other metal parts	Ms 58, brass
Throttle bush	PPS
O-ring	EPDM
Valve cone	NBR
Pressure pin and valve spring	Chrome steel
$k_v$ -Nozzle* (only 013G0015, 013G0037 and 013G0038)	PP

Dimensions



Dimensions are for RA-N valves in combination with RTW thermostatic sensor.

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>	Arc. flats	
	D	d <sub>2</sub>	S <sub>1</sub>								S <sub>2</sub>	
RA-N 15	R <sub>p</sub> 1/2	R 1/2	55	82	26	53	23	47	104	27	30	
RA-N 20	R <sub>p</sub> 3/4	R 3/4	65	98	30	63	26	52	109	32	37	
RA-N 25	R <sub>p</sub> 1	R 1	90	125	40	75	34	52	109	41	46	



Dimensions are for RA-N valves in combination with RA2000 thermostatic sensor

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>	Arc. flats	
	DN	D	d <sub>2</sub>								S <sub>1</sub>	S <sub>2</sub>
RA-N 15	15	R <sub>p</sub> 1/2	R 1/2	55	82	26	53	23	47	96	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 25	20	R <sub>p</sub> 1	R 1	90	125	40	75	34	52	101	41	46

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