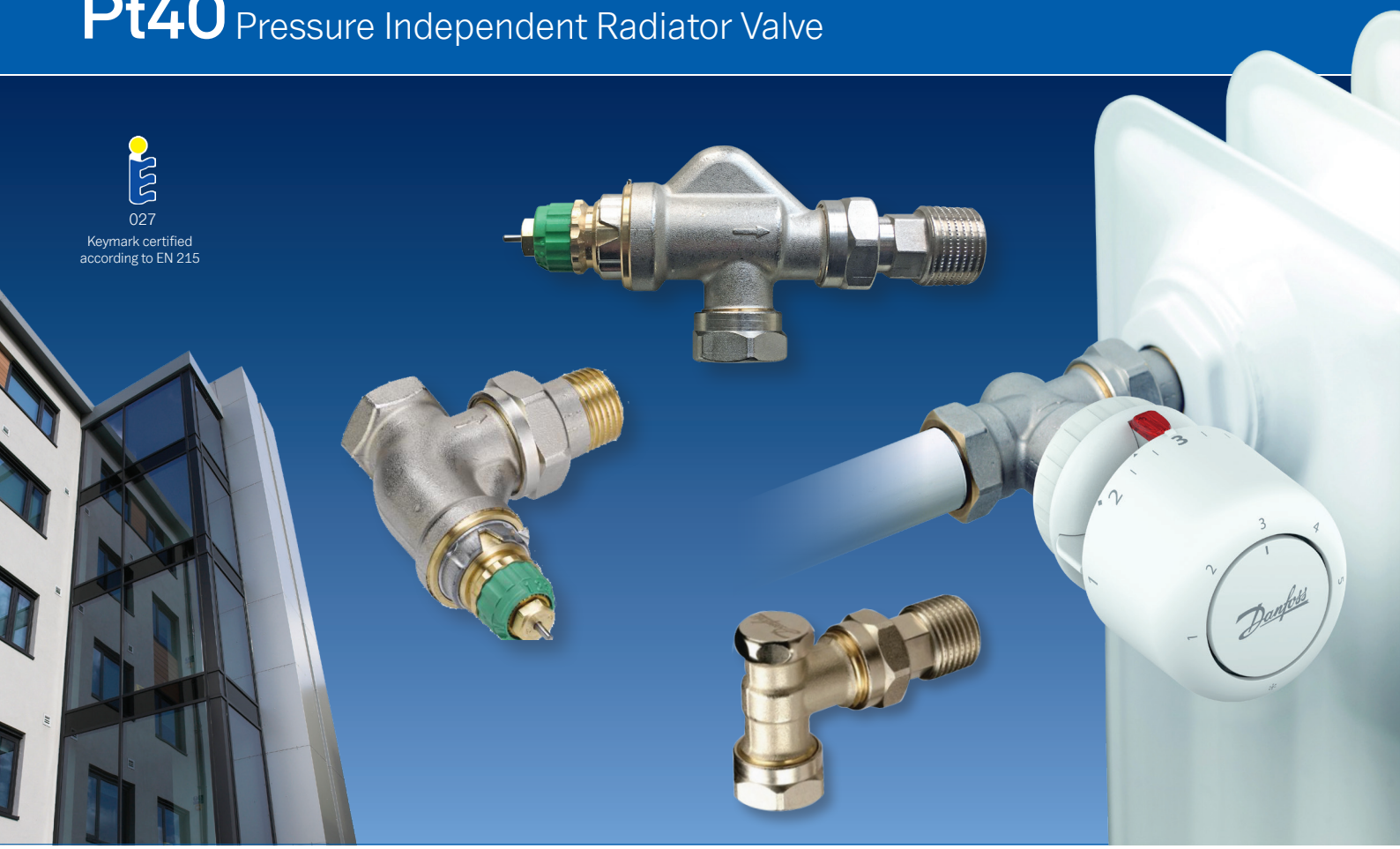
Pt40 Pressure Independent Radiator Valve



Overview

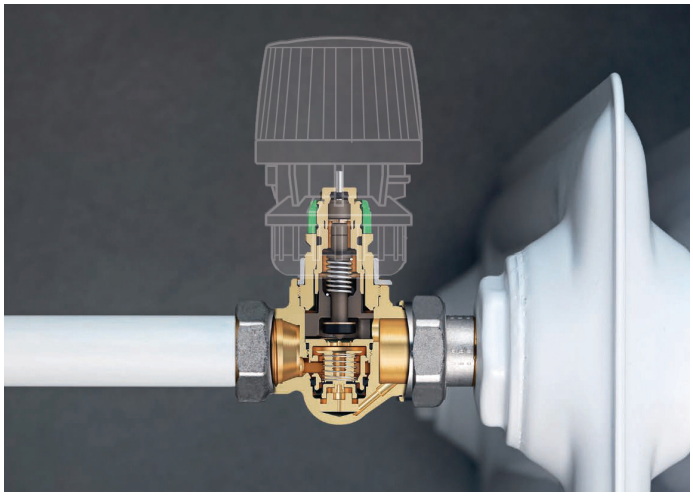
Accurate flow control using conventional TRVs is difficult because radiator circuits inevitably experience differential pressure variations as TRVs close. As TRVs close, the pressure differential across other circuits fed from the same branch will increase towards the pressure held constant by a central differential pressure control valve (DPCV). This will result in flow fluctuations (overflow & underflow) in the radiators that may increase system return temperatures.

To improve flow control through radiators and lower system return temperatures, localised control of differential pressure is essential. Pressure independent TRVs (or PITRVs), have been created that incorporate their own differential pressure controller. These valves maintain a constant pressure differential of 0.1 bar across the TRV with no need for a separate DPCV.

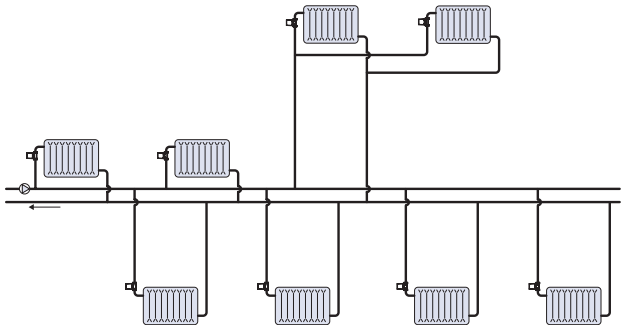
A further advantage of these valves is that design flow rates are settable. The valves are fitted with a K_v limiting device for pre-setting of the maximum water flow (10 - 135 l/h).

Conventional TRVs circuits have to be set using an accompanying lockshield valve either by a crude temperature balance or a simplistic valve setting technique. Circuits with PITRVs can be set to the correct peak design flow rate which should never be exceeded under all operating conditions.

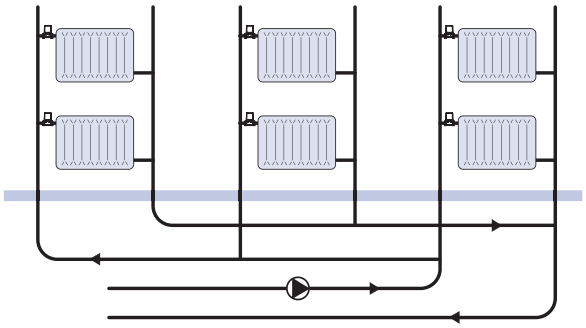
Pt40s are unidirectional and are designed for use in 2-pipe heating systems together with all types of thermostatic sensors with Danfoss RA coupling. Pt40s should always be placed on the inlet / flow.



Principles



Application Example 1



Application Example 2

Ordering

Valve Type	Size	Connection		Design
		Inlet	Outlet	
Pt40	DN15	Rp ½	Rp ½	Angle
Pt40	DN15	Rp ½	Rp ½	Straight
Pt40	DN15	Rp ½	Rp ½	Axial
Pt40	DN15	Rp ½	Rp ½	Axial (Compression)

Accessories	
Δp tool for pump optimization	DRL-013G7855

Technical Data

Max. working pressure[1]	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

[1] Working pressure = static + differential pressure. The maximum differential pressure specified is the maximum pressure at which the valves give satisfactory regulation.

[2] 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.

Heat Networks Code of Practice:

Objective 3.7 - To achieve a reliable network with a long life and low maintenance requirements:

BP3.7g Best practice would be to install strainers incorporating an automatic cleaning system to improve water quality, customer service and reduce maintenance costs.

Presetting

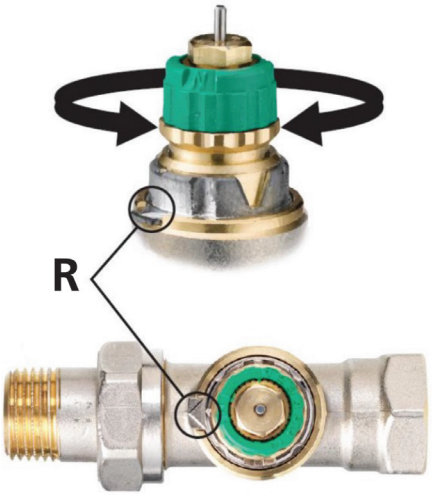
The K_v setting of Pt40 valves can be adjusted easily and accurately without the use of tools (default setting = N).

Presetting can be selected in steps from 1 to 7:

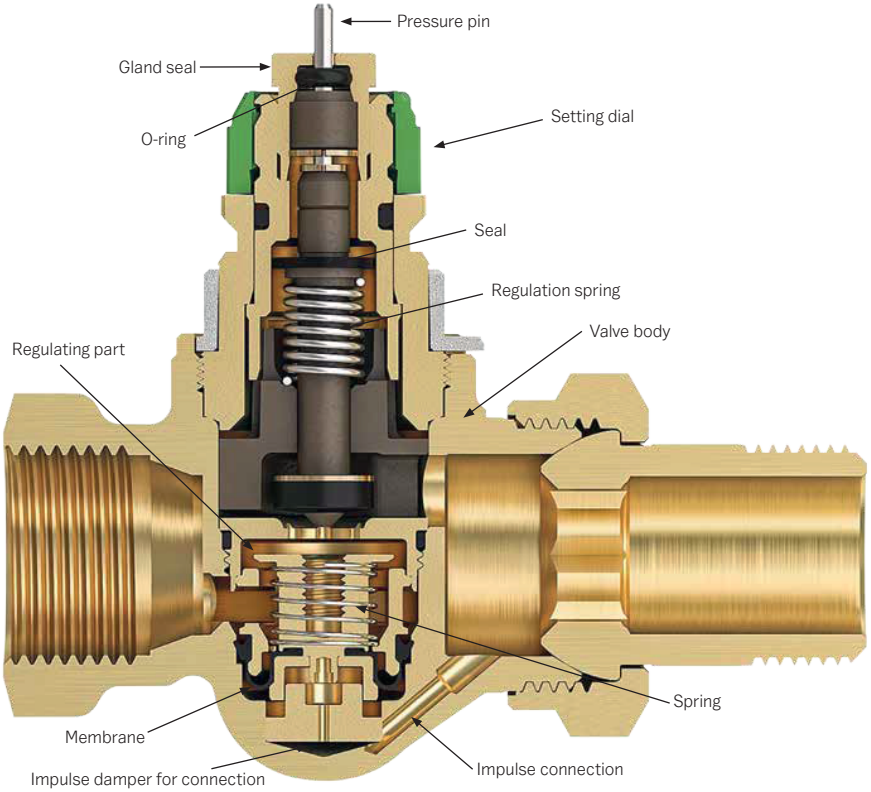
- Remove protective cap / thermostatic sensor.
- Find reference mark (R).
- Turn setting ring until the required presetting aligns with the reference mark.

At setting N the valve is fully open. This setting can be used as a flushing position, to remove debris from the system.

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



Working Principle

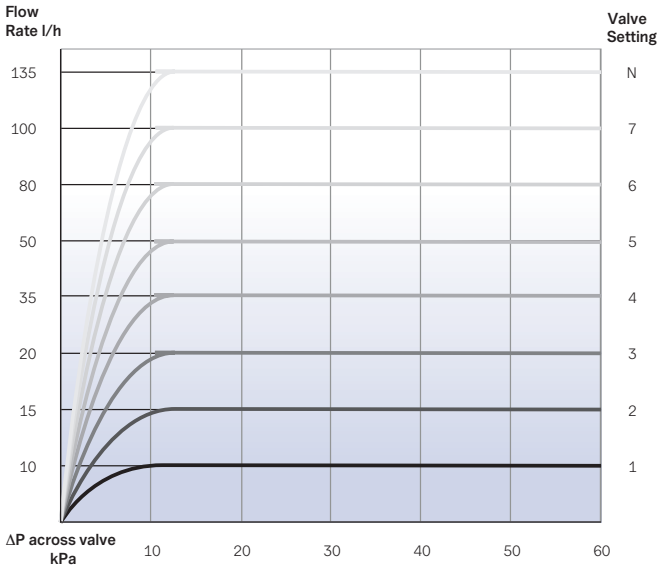


The thermostatic radiator valve consists of a sensor and the valve body Pt40.

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	Nickel plated
Flow-limiter	PPS
O-ring	EPDM
Valve cone	NBR
Pressure pin and spring	Chrome steel
Regulator	Brass/EPDM

Capacities



All flow rates are intended as guidance, please verify the space heating design flow rate on the energy meter if provided.

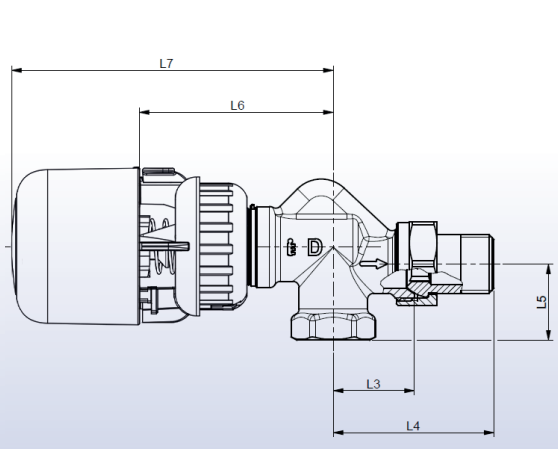
Sizing example	
Required heats	500 W
Cooling across radiator	25 °C
Flow through radiator	$Q = \frac{500}{25 \times 1.16} = 17$ l/h
Min. pressure for constant flow	0.1 bar
Valve setting*	3

*Alternatively the setting can be read directly from the table below:

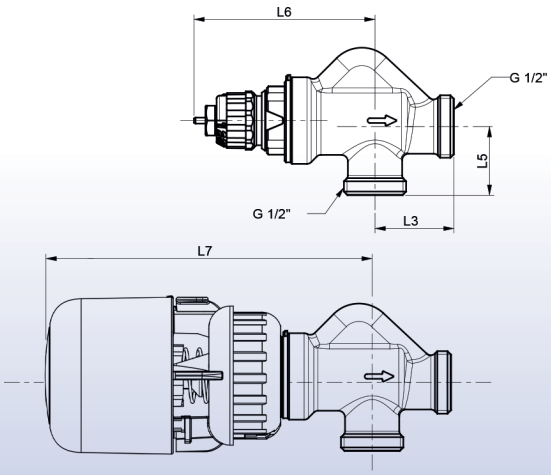
Presetting	1	2	3	4	5	6	7	N
No thermostatic head	10 l/h	15 l/h	20 l/h	35 l/h	50 l/h	80 l/h	100 l/h	135 l/h
With RA 2000 sensor[1]	9 l/h	14 l/h	18 l/h	30 l/h	45 l/h	70 l/h	90 l/h	130 l/h

[1] 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.

Dimensions



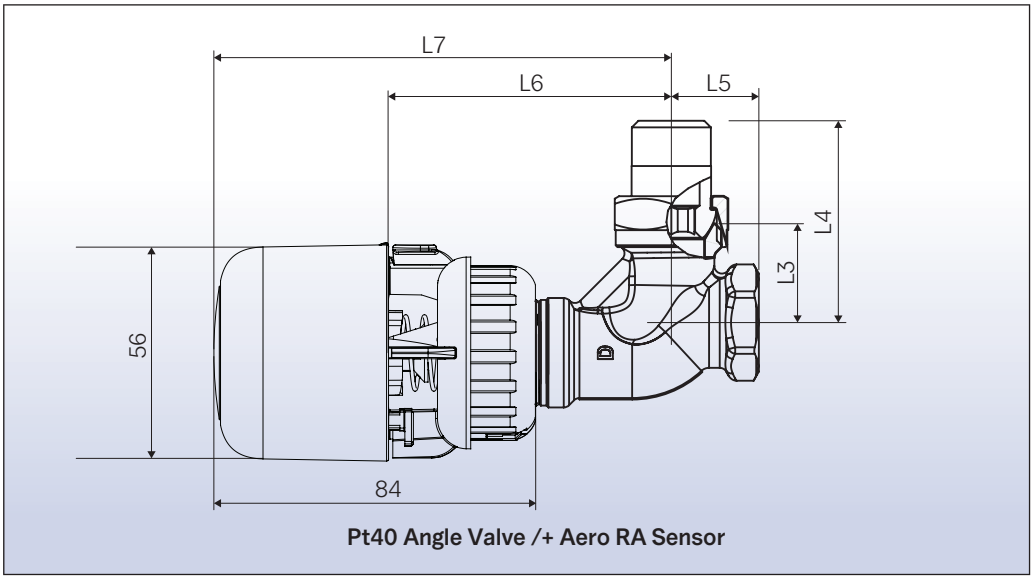
Pt40 Axial / Aero RA Sensor



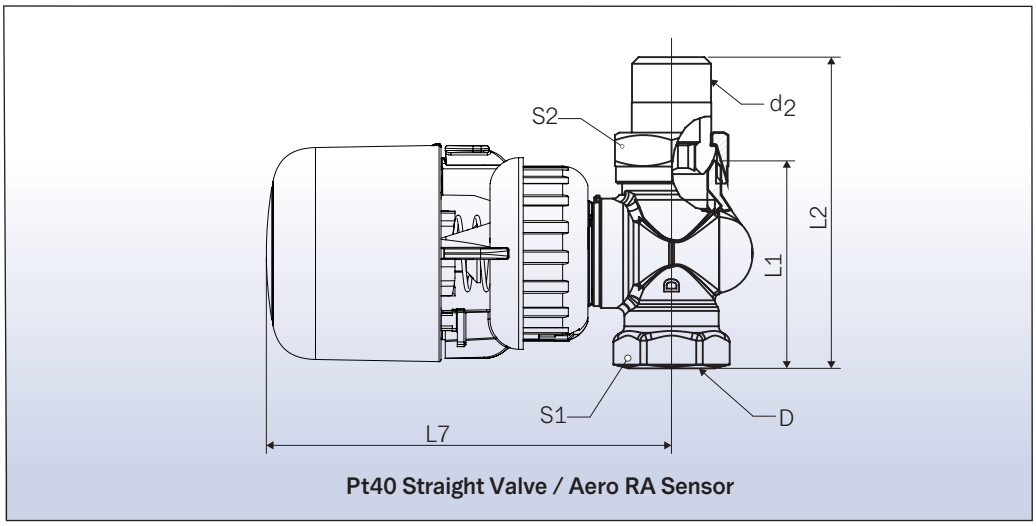
Pt40 Axial (Compression Body) / Aero RA Sensor

Type	ISO 7-1			L_1	L_2	L_3	L_4	L_5	L_6	L_7	Arc. flats	
	DN	D	d_2								S_1	S_2
RA-DV 15 UK	15	Rp ½	R ½	-	-	29	58	27	61	115	27	30
RA-DV 15 UK COMPRESSSION	15	Rp ½	R ½	-	-	26.5	-	23 -	61	115	-	-

Dimensions (continued)



Pt40 Angle Valve /+ Aero RA Sensor



Pt40 Straight Valve / Aero RA Sensor

Type	ISO 7-1			L_1	L_2	L_3	L_4	L_5	L_6	L_7	Arc. flats	
	DN	D	d_2								S_1	S_2
RA-DV 15 angle	15	R_p ½	R ½	-	-	26	53	23	66	120	27	30
RA-DV 15 straight	15	R_p ½	R ½	55	82	-	-	-	-	105	27	30

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.

Commissioning

The Pt40 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 a manual shut off device. A special manual shut off device should be used.

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.

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Pt40 Danfoss Aero Thermostatic Sensors

Danfoss Aero RA

Danfoss Aero RA

Overview

Danfoss Aero thermostatic sensors are high performance temperature sensors. The temperature sensor uses frictionless bellows charged with a small volume of liquified gas.

The sensor relies upon the state change from liquid to a gas as the temperature of the liquid increases to modulate the valve towards the closed position. When the temperature falls the gas condenses back to a liquid and the spring within the sensor allows the valve to modulate open until the bellows pressure and spring pressure are equal, and the valve cone is stationary.

This type of saturated vapour pressure sensor has many advantages including low thermal mass giving quick reaction times and a defined sensor location at coolest part of bellows system.

This latter feature gives the product a very low flow temperature dependence making it ideal for use in systems with weather compensated flow temperatures.

The range includes standard temperature range (5-26°C) and low temperature range (5-22°C) models. Both incorporate range locking and limiting features that allow the commissioning engineer to lock or limit the setting range of the sensor.

For best performance built-in temperature sensors should be mounted horizontally. Care should be taken not to cover the thermostat or to locate it where it may be influenced by heat from electrical appliances or cold draughts.

Quality

All Danfoss radiator thermostats are manufactured in factories, assessed and certified by BSI (British Standard Institution) against ISO 9000 and ISO 14001, and are approved to the European standard EN 215.

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The RA sensor range includes:

- Aero RA: built-in sensor with frost protection, temperature range 5-26°C, facilities for limiting and locking the temperature set-point. A score on energy efficiency. The Aero RA sensors are equipped with a snap-lock mechanism which ensures quick, firm and long lasting mounting of the sensor.
- RA 5060 Series: remote temperature adjuster with frost protection. Temperature range 8-28°C, facilities for limiting and locking the temperature set-point.

  - RA 5062: length of capillary tube 2 m
- Aero RA: remote sensor with frost protection, temperature range 5-26°C, facilities for limiting and locking the temperature set-point.

Aero RA are equipped with 2m of ultrathin capillary tube, which is coiled up within the remote sensor housing.

After sensor mounting the capillary tube is pulled out to the required length.

The snap-lock sensors are easy to mount and requires no use of tools.

The sensor is fitted to the valve by applying a gentle pressure.

When the sensor is in place, the snap-on mechanism is activated and the sensor has been correctly mounted.

If mounting and dismounting are carried out again, the mechanism must be tightened manually by turning the tightening ring.

All thermostatic sensors can be combined with all RA 2000 valve bodies.

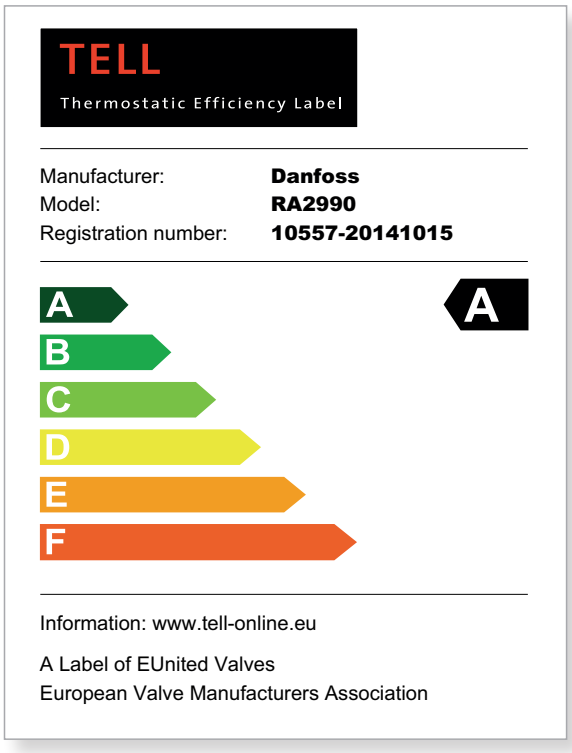
The technical data for RA valve bodies in combination with RA sensors meet Euronorm EN 215.

Ordering and Specifications

Type	Model	Cap. tube	Temp. range [2]
Aero RA	Standard, built-in sensor	-	5-26 °C
Aero RA	Standard, remote sensor	0-2 m[1]	5-26 °C
Aero RA	Low Temperature, Built-In Sensor	-	5-22 °C
RA 2916	Low Temperature, Remote Sensor	0-2 m[1]	5-22 °C
RA 5062	Remote Temperature Adjuster	2 m	8-28 °C

[1] The remote sensor is delivered with all of the capillary tube coiled up within the sensor. When mounting the sensor, only the capillary tube required is uncoiled.
[2] Temperatures stated for X_p = 2K, i.e. the valve is closed at 2 °C higher room temperature.

Thermostatic Efficiency Label



Accessories

Product
Manual setting knob for RA valves, plastic
Anti-theft plugs for RA 2997/2992

Setting the Temperature

The required room temperature is set by turning the setting dial. The temperature scales show the correlation between scale values and the room temperature. The temperature values stated are for guidance only as the obtained room temperature will often be influenced by installation conditions.

The temperature scales are stated according to European standards at X_p = 2°C. This means that the radiator thermostats close at a sensor temperature which is 2°C higher than stated on the temperature scales.

Locking and limitation of the temperature setpoint of RA sensors are carried out using the limiter pins placed at the back of the sensor.

Danfoss Aero RA

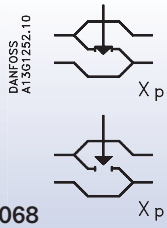
Setting position

❄	1	2	3	4	5	
7	14	17	20	23	26	°C

Room temperature

❄ = Frost protection setting

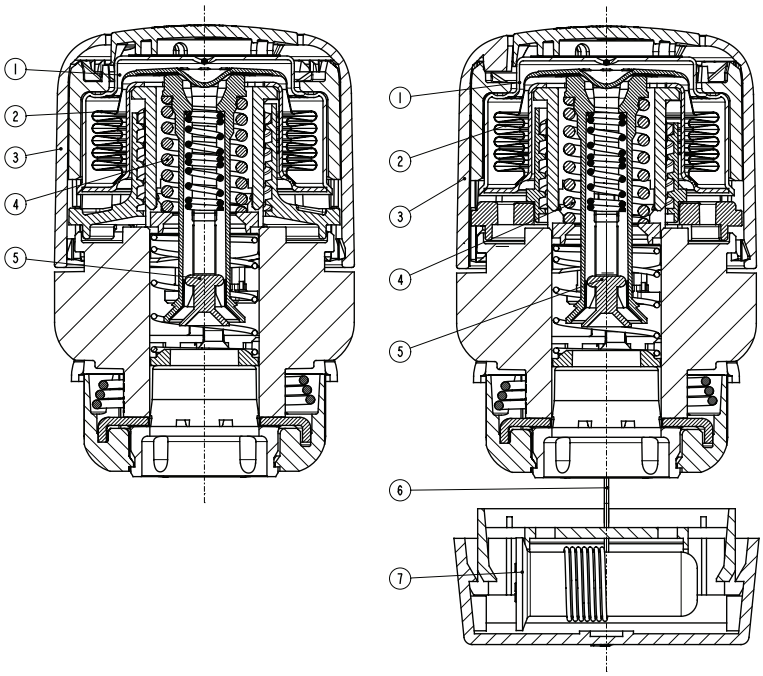
RA 5062, RA 5065, RA 5068



10	14	18	22	26	30	
❄	1	2	3	4	5	
8	12	16	20	24	28	°C

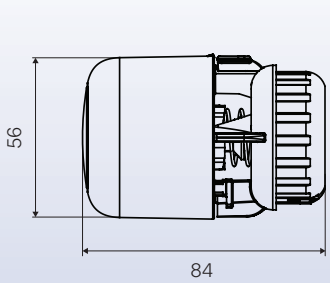
❄ = Frost protection setting

Sensor Operation Principle

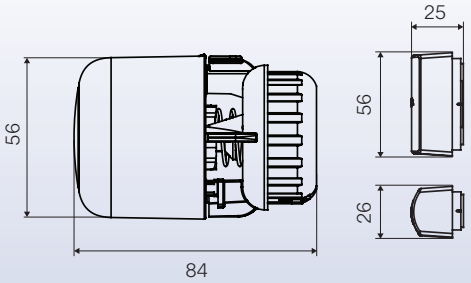


1. Actuator
2. Gas filled bellow
3. Setting handle
4. Setting spring
5. Pressure spindle
6. Capillary tube
7. Remote sensor

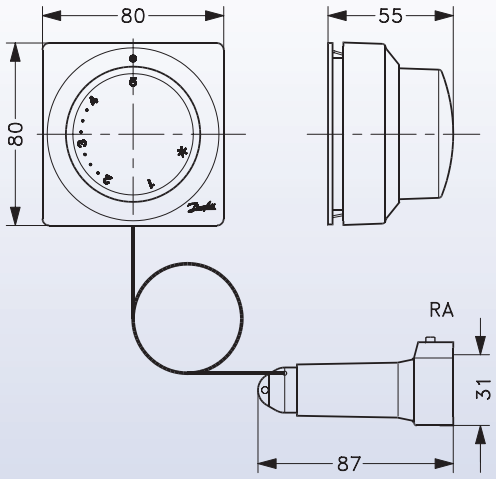
Dimensions



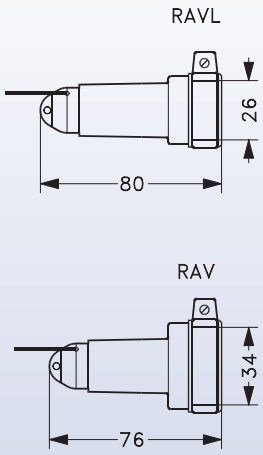
Standard model Aero RA



Model with remote sensor Aero RA



Remote temperature adjuster with adaptor for RA 2000



Adaptor for RAVL/RAV valve bodies (accessories)

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Pt40 Lockshield Valves

027
Keymark certified
according to EN 215

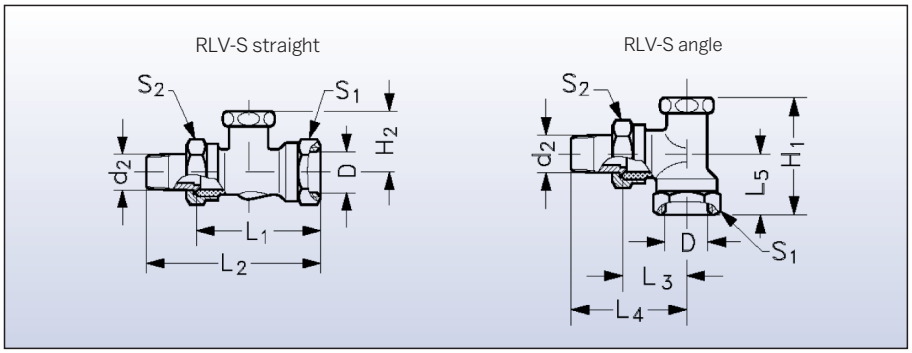
RLV-S / RLV-D 15

- Straight or angled versions
- Use in 2-pipe systems
- Maximum flow temperature 120°C
- Maximum working pressure 10 bar

Technical Data

Max. working pressure	10 bar
Max. working temperature	120 °C
Test pressure	16 bar
Valve body finish	Nickel Plated
Gland seal type	Double O-ring
Supplied with LSV cap (nickel plated brass)	Yes
Supplied with wheel head cap	No

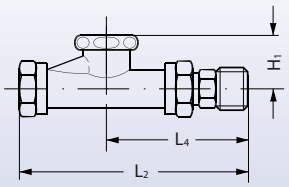
Dimensions



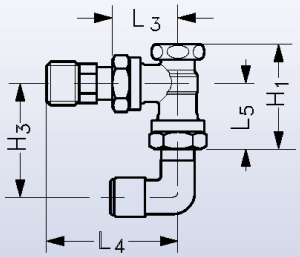
Type	D	d_2	H_1	H_2	L_1	L_2	L_3	L_4	L_5	S_1	S_2
RLV-S 15	GP½	RP½	52	28	53	80	30	57	27	27	30

Dimensions (continued)

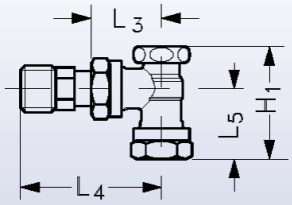
RLV-D straight



RLV-D with push-fit elbow



RLV-D with compression fitting



Type	D	d_2	H_1	H_3	L_1	L_2	L_3	L_4	L_5	S_1	S_2
RLV-D 15 straight	GP½	RP½	25	-	-	108	-	60	-	-	-
RLV-D 15 pushfit elbow	-	-	48	49-55	-	-	30	60	30	-	-
RLV-D 15 compression fitting	-	-	48	-	-	-	30	60	30	-	-

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Pt40 Manual setting knob

Manual setting knob

Overview

The setting knob is used to manually open and shut radiator valves. Setting knobs are available in white.

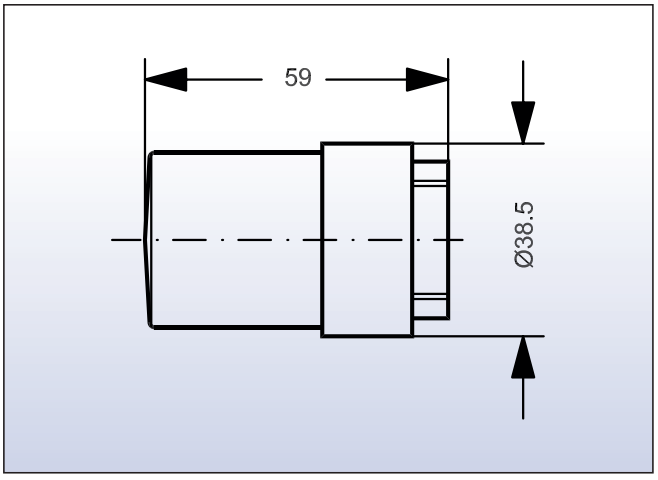
Materials	
Knob	PBT
Socket	Polyamide

Ordering and Specifications

Product type	Valve connection	Colour	Max. diff. pressure	Max. water temp.
Manual Wheel Head	Danfoss RA 2000	White, RAL 9010	0.6 bar	90 °C

Note! Manual setting knobs offer no frost protection to the radiator. In order to control room temperature a radiator thermostat is required.

Dimensions



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