ENGINEERING TOMORROW

Data Sheet

Thermostatic operated water valve Type **FJVA**

With built-in temperature sensor



Thermostatic operated water valves are used for the infinite, proportional regulation of flow quantity, depending on the setting and the sensor temperature.

The Danfoss range of thermostatic operated water valves includes a series of industrial products for both cooling and heating regulation. The valves are self-acting, i.e. they operate without the supply of auxiliary energy such as electricity or compressed air.

Because the valves constantly match flow quantity to demand they are especially suitable for temperature regulation.

The required temperature is maintained constant with no overconsumption of:

- Cooling water in cooling systems; hot water or steam in heating systems
- Thus operating economy is always reasonable

Features:

- Self-acting thermostatic operated water valve, which operates without auxiliary energy
- Opens on rising temperature of cooling water
- Valve opening degree is not affected by cooling water pressure differential
- Hand regulation - unique option on the market, which saves installation time
- Regulating range defined for the point at which the valve begins to open

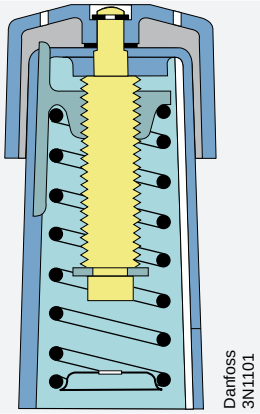
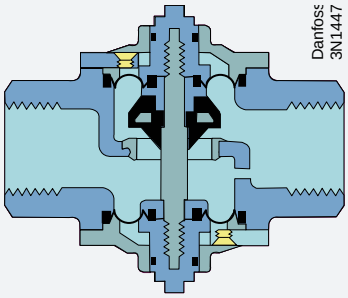
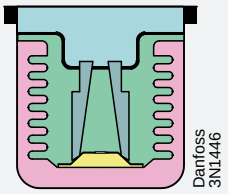
Functions

How it works?

When the three elements are built together and the valve is installed, the function sequence is as follows:

1. A temperature-dependent pressure - charge vapour pressure - builds up in the sensor.
2. This pressure is transferred to the valve via the bellows and acts as an opening or closing force.
3. The knob on the setting section and the spring exert a force that acts counter to the bellows.
4. When balance is created between the two opposing forces, the valve spindle remains in its position.
5. If the sensor temperature - or the setting - is changed, the point of balance becomes displaced and the valve spindle moves until balance is re-established, or the valve is fully open or closed.
6. On sensor temperature change the flow quantity change is approximately proportional.
7. The illustrations show an FJVA cooling water valve, but the function principle applies to all types of thermostatic valves.

Table 1: FJVA valves consist of three main elements

Setting section with knob, reference spring and setting scale.	Valve body with orifice, closing cone and sealing elements.	Sensor in hermetically sealed thermostatic element.
		

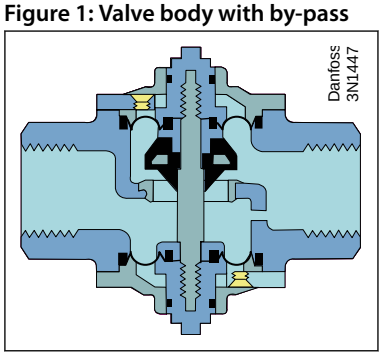
Applications

FJVA valves are for applications where, because of installation problems, etc., it is desirable to avoid using a capillary tube. This applies mainly where regulation accuracy requirements are more moderate and where an integral bypass can be accepted.

In FJVA the whole bellows element is used as the sensor. The valve reacts to the cooling water temperature and therefore it must always be installed in the return line. Thus, indirect regulation is involved.

To ensure the medium temperature to influence the thermostatic element, when the valve is closed, a by-pass in the valve (see Figure 1: Valve body with by-pass) provides a constant minimal flow through the valve.

Figure 1: Valve body with by-pass



Valves of this type operate with significantly longer time constants than AVTA valves where the sensor is located at the point at which the temperature is to be regulated. FJVA is mainly used in systems where large and sudden load changes do not occur.

Product specification

Materials

Figure 2: Materials connected with FJVA

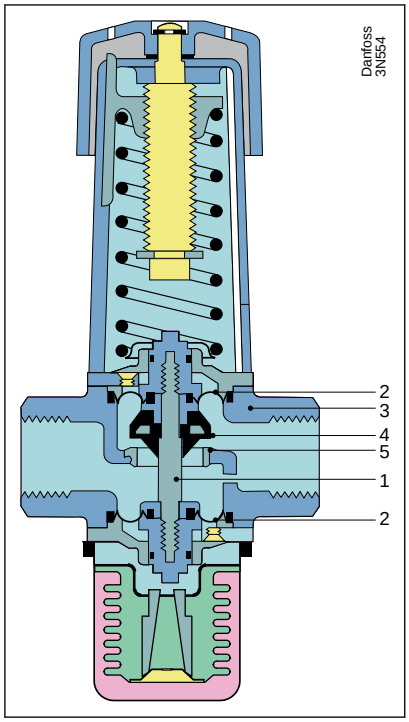
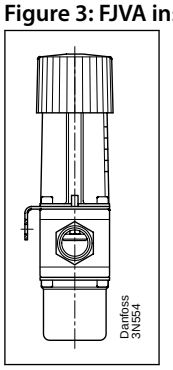


Table 2: Materials - parts in contact with the medium

No.	Description	Material
1	Spindle	Brass
2	Diaphragms	Rubber - ethylene - propylene (EPDM)
3	Valve body and other metal parts	Forged brass
4	Valve cone	Nitrile rubber (NBR)
5	Valve seat	Stainless steel

Installation

Figure 3: FJVA installation



The valves can be installed in any position. An arrow on the valve body indicates the direction of flow. FJVA valves are also marked so that the letters RA can be read straightforwardly. The installation of an FV filter ahead of the valve is recommended.

If a mounting bracket is used - see Spare parts and accessories - it must always be between valve body and setting section (see illustration).

Sizing

When sizing and selecting thermo. operated water valve, it is most important to ensure that the valve is able to give the necessary quantity of cooling water at any time, irrespective of the load. Therefore, to select a suitable size of valve, it is necessary to know the precise amount of cooling required. On the other hand, to avoid the risk of unstable regulation (hunting), the valve should not be oversized. The type of charge must be selected on the basis of the temperature to be maintained, and on an assessment of the characteristics of each type, as described in the foregoing.

In general the aim should be to select the smallest valve capable of giving the required flow.

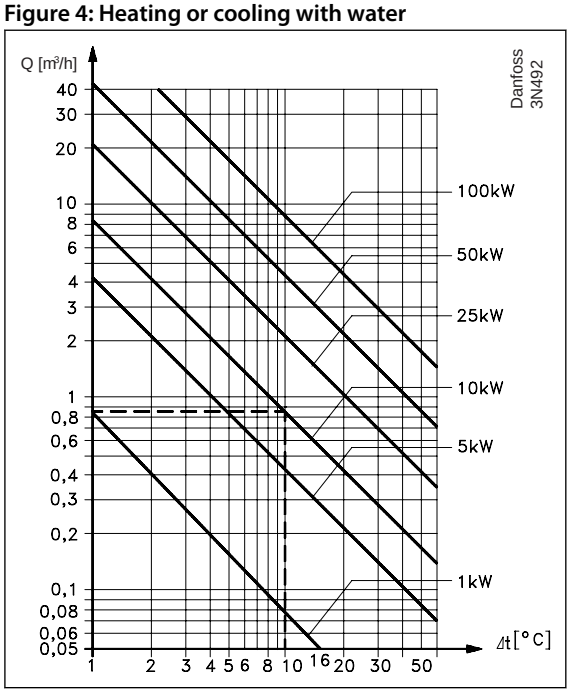
Valve size

The following data are used when selecting valve size:
- Required cooling water flow, Q [m^3/h]
- Temperature rise in cooling water, Δt [°C]
- Differential pressure across valve, Δp [bar]

With fully open valve the differential pressure should be around 50% of the total pressure drop across the cooling system.

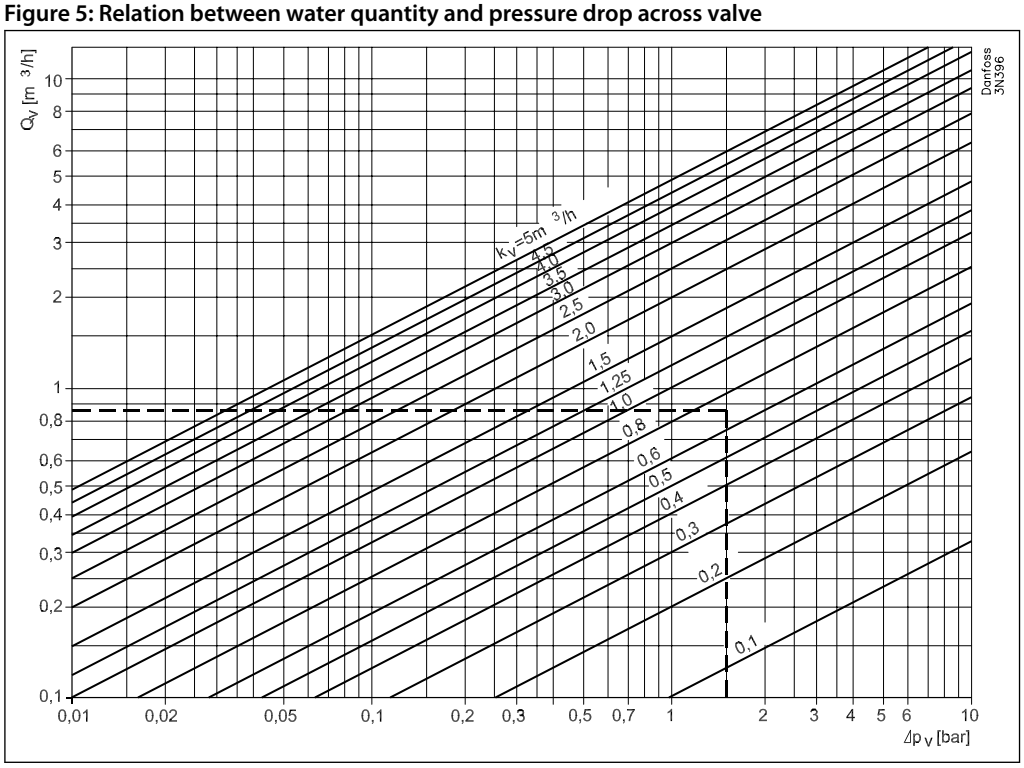
The following diagrams are intended to make valve sizing easier:
- Figure 4: Heating or cooling with water
- Figure 5: Relation between water quantity and pressure drop across valve
- Figure 6: Nomogram showing the valve k_v range
- Figure 7: Valve flow quantity in fully open position, as a function of pressure drop Δp.

Figure 4: Heating or cooling with water



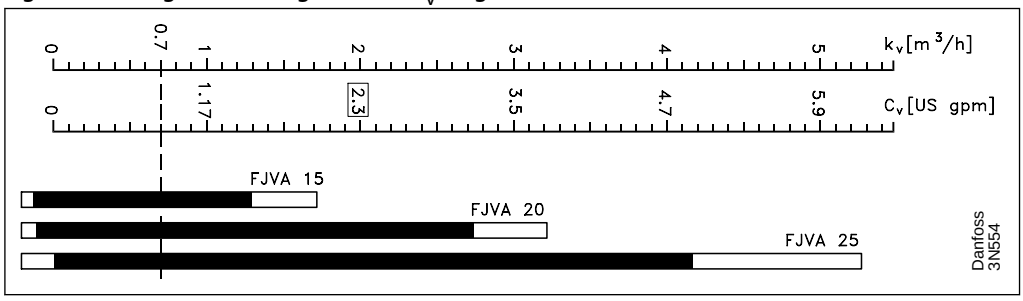
Example:
Necessary cooling output 10 kW with Δt = 10 °C
Required flow 0.85 m^3/h

Figure 5: Relation between water quantity and pressure drop across valve



Example:
Flow 0.85 m^3/h with a pressure drop of 1.5 bar.
The k_v value becomes 0.7 m^3/h.

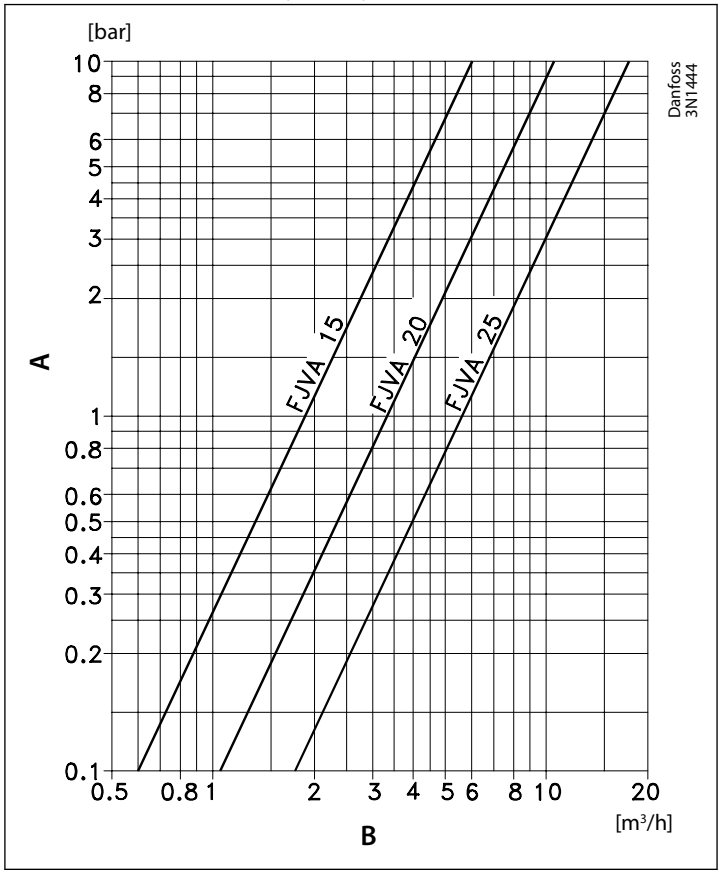
Figure 6: Nomogram showing the valve k_v range



K_v values are always given for water flow in [m^3/h] with a pressure drop Δp of 1 bar.
The valve should be selected so that the necessary k_v value lies in the middle of the regulation range.

Example:
FJVA 15 are the most suitable for a k_v value of 0.7.

Figure 7: Valve flow quantity in fully open position, as a function of pressure drop Δp.



A	Pressure drop across valve
B	Capacity with fully open valve

Dimensions and Weights

Figure 8: Dimensions and Weights

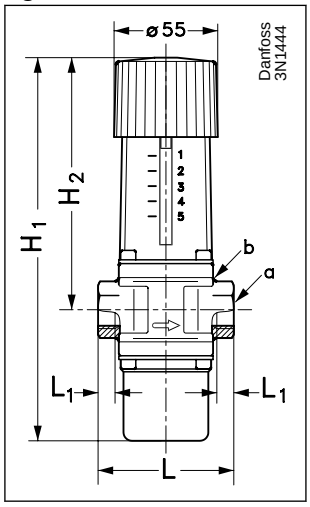


Table 3: Dimensions and Weights

Type	H_1	H_2	L	L_1	a	b	Net weight
FJVA 15	205	133	72	14	G 1/2	⬡27	0.9
FJVA 20	205	133	90	16	G 3/4	⬡32	1.0
FJVA 25	215	138	95	19	G 1	⬡41	1.1

Ordering

Regulation range: 0 – 30 °C
Media temperature: -25 – 55 °C
Differential pressure: 0 – 10 bar

Table 4: Ordering

Type	k_v value	Bypass[1]	Connection	Code no.
FJVA 15	1.9	ø2.0	G 1/2	003N8210
FJVA 20	3.4	ø2.0	G 3/4	003N8244
FJVA 25	5.5	ø2.5	G 1	003N8245

[1] Bypass k_v

ø2.0 mm: 0.11 m^3/h
ø1.5 mm: 0.06 m^3/h
ø2.5 mm: 0.16 m^3/h

Regulation range: 25 – 65 °C
Media temperature: -25 – 90 °C
Differential pressure: 0 – 10 bar

Table 5: Ordering

Type	k_v value	Bypass[2]	Connection	Code no.
FJVA 15	1.9	ø2.0	G 1/2	003N8211
FJVA 15	1.9	ø1.5	G 1/2	003N8247
FJVA 20	3.4	ø2.0	G 3/4	003N8215
FJVA 25	5.5	ø2.5	G 1	003N8216

[2] Bypass k_v

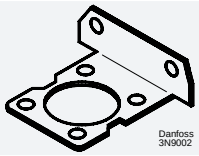
ø2.0 mm: 0.11 m^3/h
ø1.5 mm: 0.06 m^3/h
ø2.5 mm: 0.16 m^3/h

Spare parts and accessories

Table 6: Service elements

Temperature range [°C]	Code no.
0 – 30	003N0285
25 – 65	003N0084

Table 7: Accessories

	Designation	Description	Code no.
	Mounting bracket	For FJVA	003N0388
	Set of 3 nitrile (NBR) diaphragms sets for mineral oil	For FJVA 10 FJVA 15 FJVA 20 FJVA 25	003N0448
	Plastic hand knob	For FJVA	003N0520

Certificates, declarations, and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

Some approvals may change over time. You can check the most current status at danfoss.com or contact your local Danfoss representative if you have any questions.

Table 8: Certificates, declarations, and approvals

File name	Document type	Document topic	Approvals Authority
003N9613.AB	Manufacturers Declaration	PED/RoHS	Danfoss
003N9614.AA	Manufacturers Declaration	China RoHS	Danfoss
RU Д-DK.БЛ08.В.00191_18	EAC Declaration	EAC	EAC
UA.089.D.00188-17	UA Declaration	TYSK	TYSK

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