

- V221 is a flanged plug valve, designed for control of large flows in heating and air conditioning installations. The plug is balanced whereby only a low actuating force is required.
- V221 is available in sizes DN 65, DN 80, DN 100, DN 125, and DN 150.
- As standard the valve and actuator are delivered as an assembly. However, on request they can also be delivered as separate items for site assembly.

APPLICATIONS

V221 can be used in a large number of HVAC applications, including heating and air conditioning installations.

For use in other applications, please contact your nearest TAC sales office.

The valve can be used on the following types of fluids:

- Hot water and deaerated cooling water.
- Deaerated water with glycol-type freeze protection agents (max. 50% glycol), and brines.

TECHNICAL DATA

Valve type 2-way balanced plug valve
 Pressure rating PN 16
 Flow characteristic see figure 2
 Rangeability 30
 Leakage max. 0,1% of K_v
 Δp_m max. 250 kPa (water)
 Close-off pressure $\Delta p_c = \text{max. } 1,0 \text{ MPa}$
 (actuating force 750 N)
 Fluid temperature max. 150 °C, min. +20 °C
 Flange type according to SS 335 and ISO 2084
 Suitable mating weld flange, with collar SS 2033
 Materials:
 Body cast iron
 Bonnet and trim bronze
 Stem stainless steel
 Seals EPDM rubber, PTFE
 Packing box standard Type T
 Special packing box for max. 50% glycol Type Q

Size DN	K_v m ³ /h	h mm	Part number	$K_{v_{min}}$ m ³ /h
65	63	31,5	721-2154-000	2,2
80	100	41	721-2158-000	3,0
100	160	41	721-2162-000	5,6
125	250	41	721-2166-000	7,5
150	360	41	721-2170-000	12,0

Remarks

The rangeability is the ratio of K_v to $K_{v_{min}}$.

K_v is the valve flow at the max. lift and a pressure drop of 100 kPa across the valve.

$K_{v_{min}}$ is the minimum controllable flow at a pressure drop of 100 kPa, within the flow range where the characteristic meets the requirements on characteristic slope according to IEC 534-1.

h is the lift of the valve in mm.

Δp_m is max. pressure drop across a fully open valve.

FUNCTION AND FLOW CHARACTERISTIC

In the lower end position the plug seals against its seat and the valve is fully closed. In the plug there is a duct which balances the pressure drop across the valve. The required actuating force is therefore not affected by the pressure drop, but only by the friction forces caused by the seals.

As the valve moves upwards the plug slides on a guide rod which stabilizes the movement of the plug.

The flow characteristic initially is logarithmic (Eq%—equal percentage) but then gradually changes into a linear characteristic, see figure 2.

The valve is equipped with measuring nipples, which enable measurement of the pressure drop across the valve.

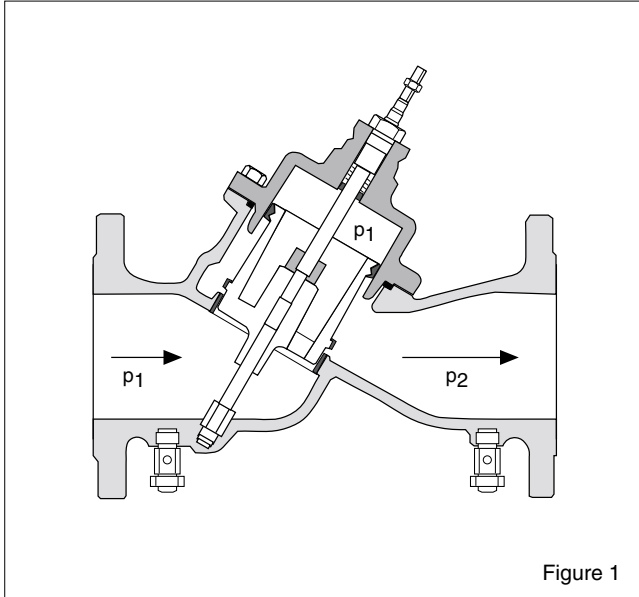


Figure 1

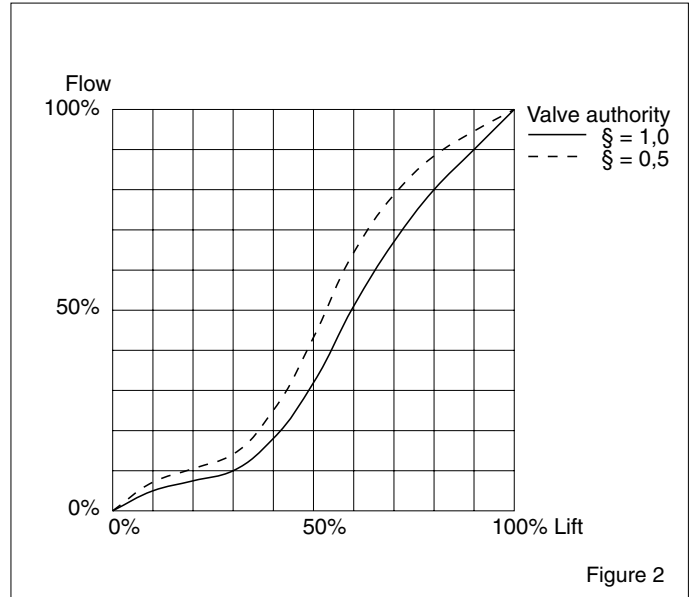


Figure 2

ACTUATOR AND LINKAGE SELECTION

Electric actuators

The M5C and M15C actuators are controlled by increase/decrease signals.

The EM5C actuator is controlled by a modulating 2–10 V DC signal.

The linkage need be ordered separately only if the valve and the actuator are delivered as separate items.

Size DN	M5C, M15C, EM5 part number	Δp_c (kPa)
65	911-1070-375	1000
80	911-1070-475	1000
100	911-1070-475	1000
125	911-1070-475	1000
150	911-1070-475	1000

Δp_c = Max. close-off pressure across the valve.

INSTALLATION

The valve is to be installed in the line so that the direction of flow coincides with the arrow on the valve body.

Whenever possible, the valve should be installed in the return line, to avoid exposing the valve to unnecessarily high temperatures. The valve must not be mounted with the actuator under the valve.

To prevent dirt from getting caught between plug and seat, it is recommended to install a strainer upstream of the valve. Also flush and rinse the piping system before installation of the valve.

A. Typical installation without local circulating pump.

To provide good function the pressure drop across the valve should be no less than half of the available pressure (Δp). This corresponds to a valve authority of 50%.

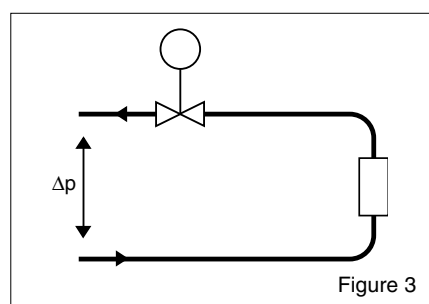


Figure 3

B. Typical installation with local circulating pump.

The K_v value of the valve to be selected so that the entire available pressure drop (Δp) falls across the control valve.

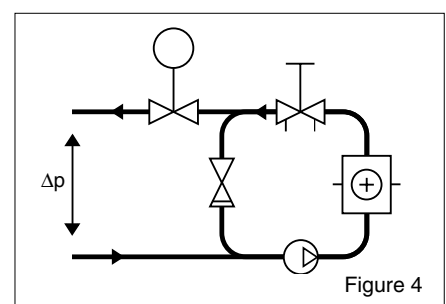
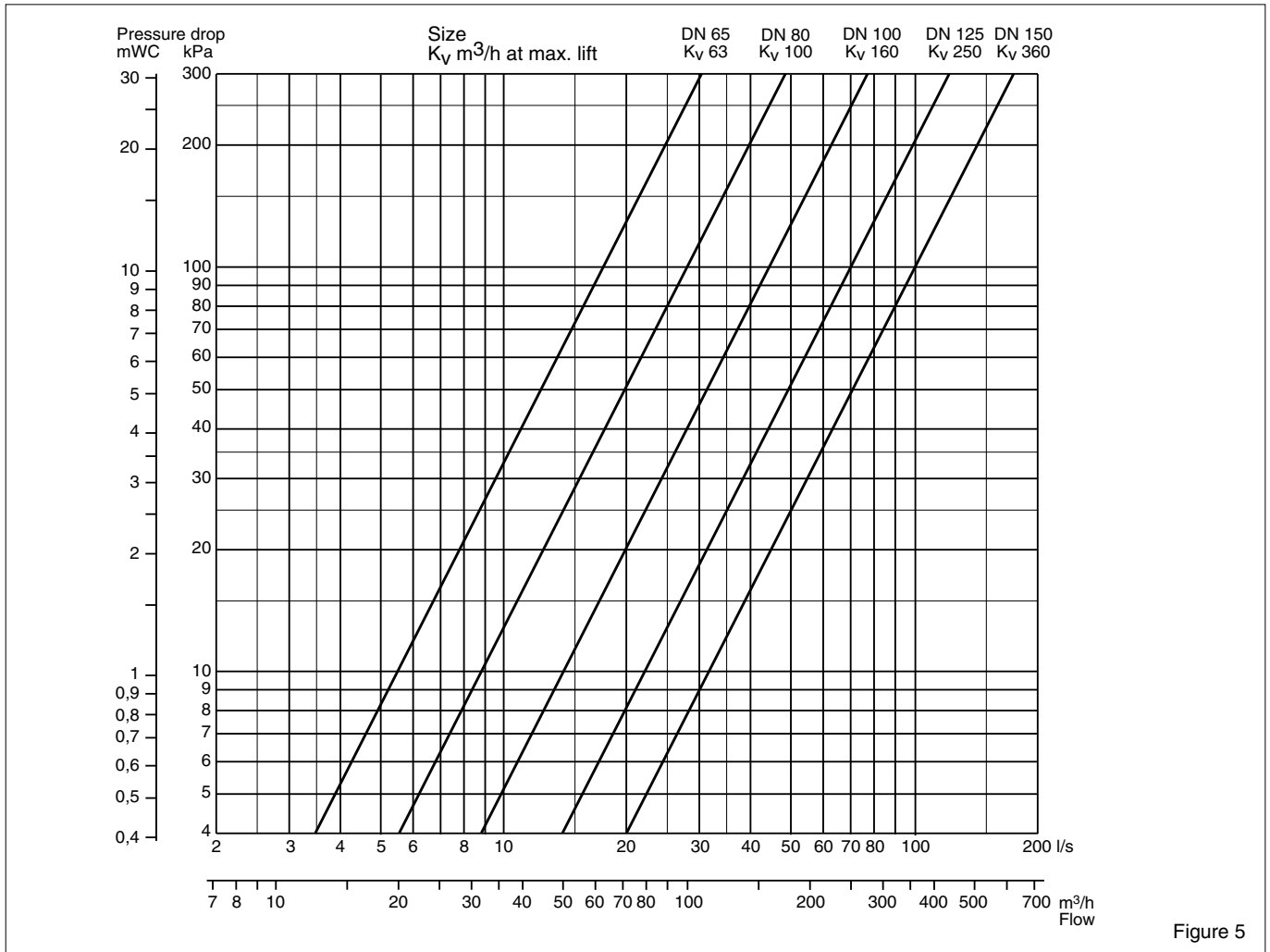


Figure 4

PRESSURE DROP DIAGRAM

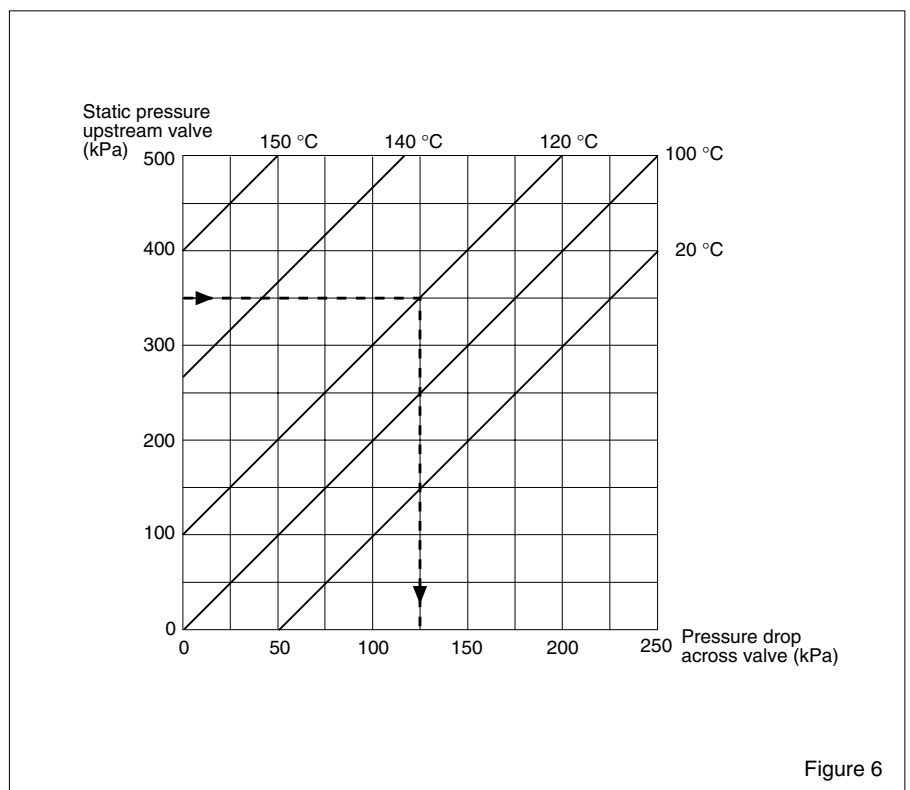


CAVITATION

Cavitation takes place in a valve when the velocity of the flow between the plug and seat increases to the extent that gas bubbles are created in the water. When, after the plug and seat, the velocity decreases, the gas bubbles collapse (implode), generating considerable noise and causing considerable wear on the valve.

By means of the cavitation diagram shown in figure 6 it can be checked if risk of cavitation exists with the working conditions in the pertinent installation. Proceed as follows:

Using the static pressure before the valve (e.g. 350 kPa), plot a horizontal line to the line for the temperature of the liquid (e.g. 120 °C). From the intersection point, plot a vertical line downwards and read off the max. permissible pressure drop across the valve (125 kPa). If the computed pressure drop exceeds the value read from the diagram there is risk of cavitation.



ORDERING EXAMPLE

The valve can be ordered in the following ways:

1. Valve only

V221 / DN 65/ Kv 63

Valve type Size K_v value

2. Complete control valve with fitted actuator, adjusted and ready for use.

M5C/24 V/180° / V221/ DN 65 / Kv 63

Actuator designation Valve type Size K_v value

3. Valve and actuator delivered as separate items.

Actuator designation M5C/24 V/180°
 Valve designation V221/DN 65/Kv 63
 Linkage, part number 911-1070-375

Note that the linkage for the electric actuator must also be ordered as a separate item.

MEASUREMENTS AND WEIGHTS

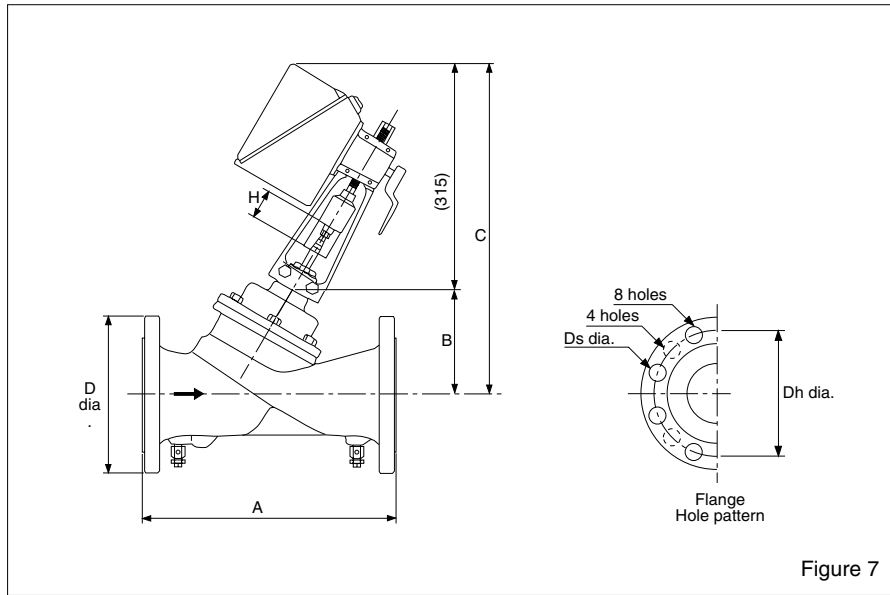


Figure 7

SPARE PARTS

Standard packing box

Type T: max 180 °C
 Part number: 080-2064-005.

Special packing box for max. 50% glycol

Type Q: -20 to +30 °C
 Part number: 080-4724-005.

Size DN	Measurements in mm				dia. D	dia. Dh	dia. ds	No. holes	Weight*) kg
	A	B	C	H					
65	290	119	434	31,5	185	145	18	4	13,8
80	310	142,5	457,5	41	200	160	18	8	18,8
100	350	150	465	41	220	180	18	8	23,8
125	400	162	477	41	250	210	18	8	33,8
150	480	177	492	41	285	240	22	8	45,4

*) less actuator