



### Technical description

**Application:**

Central heating, cooling systems and in district heating substations, primary side.

**Function:**

Differential pressure control over the load and flow control. Closes at increasing  $\Delta p$ .

**Pressure class:**

PN 16 or PN 25

**Max. differential pressure:**

1600 kPa = 16 bar

**Temperature:**

Max. working temperature: 150°C

Min. working temperature: -10°C

**Setting range:**

$\Delta p$  over the presetting throttle is kept on 15 kPa (Fc=15) or 45 kPa (Fc=45).

Differential pressure adjustable 10-60, 50-150, 130-250 kPa.

**Media:**

Water and neutral fluids, water-glycol mixtures.

**Material:**

Valve body: Ductile iron EN-GJS-400-18LT

Actuator body: Ductile iron EN-GJS-400-18LT

Diaphragms and gaskets: EPDM

Valve plug: Stainless steel with EPDM insert.

Valve seat: Stainless steel.

**Surface treatment:**

Duasolid painting.

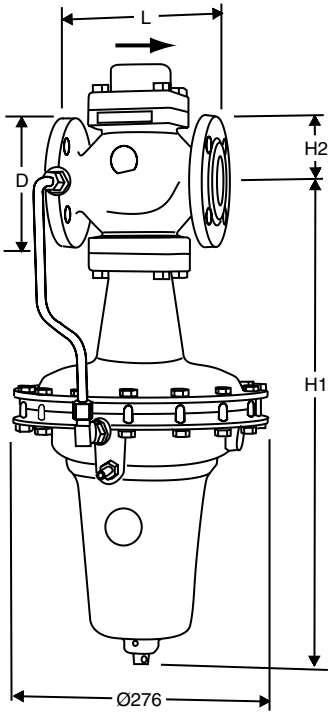
**Marking:**

TA, DN, PN, Fc and flow direction arrow.

**Flanges:**

According to EN-1092-2:1997, type 21.

**DK 50 (Fc=15)**



Capillary pipe (Ø6) included: 2 500 mm

→ = Flow direction

**10-60 kPa**

TA No	DN	D	L	H1	H2	Kvs	q <sub>min</sub> m <sup>3</sup> /h	q <sub>max</sub> m <sup>3</sup> /h	Kg
<b>PN 16</b>									
52 781-565	65	185	290	580	155	55	1,5	21	55
52 781-590	100	235	350	680	225	120	4,0	45	88
52 781-591	125	270	400	690	235	145	5,0	60	105
52 781-592	150	300	480	775	274	230	15	200	235
52 781-593	200	360	600	822	310	360	20	230	297
<b>PN 25 (DN 32-50 and DN 80 also fit PN 16 flanges)</b>									
52 781-132	32	140	180	535	124	21	0,8	8,5	38
52 781-140	40	150	200	535	124	25	0,8	9,5	39
52 781-150	50	165	230	560	135	32	1,0	13	46
52 781-165	65	185	290	580	155	55	1,5	21	55
52 781-180	80	200	310	592	172	70	2,5	24	66
52 781-190	100	235	350	680	225	120	4,0	45	88
52 781-191	125	270	400	690	235	145	5,0	60	105
52 781-192	150	300	480	775	274	230	15	200	235
52 781-193	200	360	600	822	310	360	20	230	297

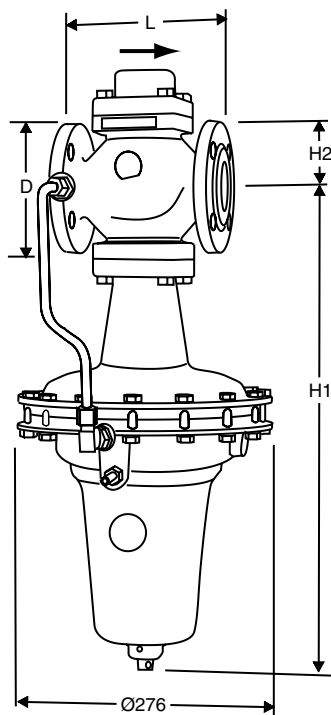
**50-150 kPa**

TA No	DN	D	L	H1	H2	Kvs	q <sub>min</sub> m <sup>3</sup> /h	q <sub>max</sub> m <sup>3</sup> /h	Kg
<b>PN 16</b>									
52 781-665	65	185	290	580	155	55	1,5	21	55
52 781-690	100	235	350	680	225	120	4,0	45	88
52 781-691	125	270	400	690	235	145	5,0	60	105
52 781-692	150	300	480	775	274	230	15	200	235
52 781-693	200	360	600	822	310	360	20	230	297
<b>PN 25 (DN 32-50 and DN 80 also fit PN 16 flanges)</b>									
52 781-232	32	140	180	535	124	21	0,8	8,5	38
52 781-240	40	150	200	535	124	25	0,8	9,5	39
52 781-250	50	165	230	560	135	32	1,0	13	46
52 781-265	65	185	290	580	155	55	1,5	21	55
52 781-280	80	200	310	592	172	70	2,5	24	66
52 781-290	100	235	350	680	225	120	4,0	45	88
52 781-291	125	270	400	690	235	145	5,0	60	105
52 781-292	150	300	480	775	274	230	15	200	235
52 781-293	200	360	600	822	310	360	20	230	297

**130-250 kPa**

TA No	DN	D	L	H1	H2	Kvs	q <sub>min</sub> m <sup>3</sup> /h	q <sub>max</sub> m <sup>3</sup> /h	Kg
<b>PN 16</b>									
52 781-765	65	185	290	580	155	55	1,5	21	55
52 781-790	100	235	350	680	225	120	4,0	45	88
52 781-791	125	270	400	690	235	145	5,0	60	105
52 781-792	150	300	480	775	274	230	15	200	235
52 781-793	200	360	600	822	310	360	20	230	297
<b>PN 25 (DN 32-50 and DN 80 also fit PN 16 flanges)</b>									
52 781-332	32	140	180	535	124	21	0,8	8,5	38
52 781-340	40	150	200	535	124	25	0,8	9,5	39
52 781-350	50	165	230	560	135	32	1,0	13	46
52 781-365	65	185	290	580	155	55	1,5	21	55
52 781-380	80	200	310	592	172	70	2,5	24	66
52 781-390	100	235	350	680	225	120	4,0	45	88
52 781-391	125	270	400	690	235	145	5,0	60	105
52 781-392	150	300	480	775	274	230	15	200	235
52 781-393	200	360	600	822	310	360	20	230	297

## DK 50 (Fc=45)



Capillary pipe (Ø6) included: 2 500 mm

→ = Flow direction

### 10-60 kPa

TA No	DN	D	L	H1	H2	Kvs	q <sub>min</sub> m <sup>3</sup> /h	q <sub>max</sub> m <sup>3</sup> /h	Kg
<b>PN 16</b>									
52 751-565	65	185	290	580	155	55	2,4	34	55
52 751-590	100	235	350	680	225	120	6,4	72	88
52 751-591	125	270	400	690	235	145	8,0	96	105
52 751-592	150	300	480	775	274	230	24	320	235
52 751-593	200	360	600	822	310	360	32	368	297
<b>PN 25 (DN 32-50 and DN 80 also fit PN 16 flanges)</b>									
52 754-732	32	140	180	535	124	21	1,3	14	38
52 754-740	40	150	200	535	124	25	1,3	15	39
52 754-750	50	165	230	560	135	32	1,6	21	46
52 754-765	65	185	290	580	155	55	2,4	34	55
52 754-780	80	200	310	592	172	70	4,0	38	66
52 754-790	100	235	350	680	225	120	6,4	72	88
52 754-791	125	270	400	690	235	145	8,0	96	105
52 754-792	150	300	480	775	274	230	24	320	235
52 754-793	200	360	600	822	310	360	32	368	297

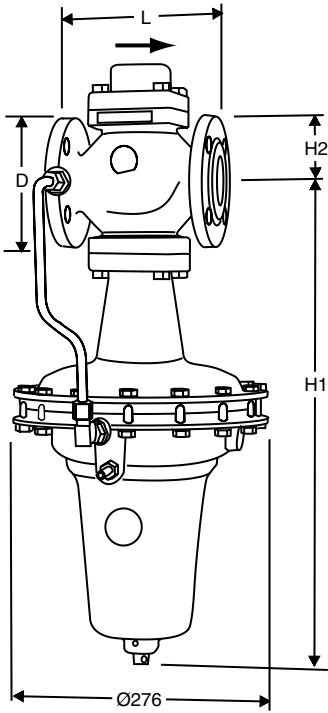
### 50-150 kPa

TA No	DN	D	L	H1	H2	Kvs	q <sub>min</sub> m <sup>3</sup> /h	q <sub>max</sub> m <sup>3</sup> /h	Kg
<b>PN 16</b>									
52 751-665	65	185	290	580	155	55	2,4	21	55
52 751-690	100	235	350	680	225	120	6,4	45	88
52 751-691	125	270	400	690	235	145	8,0	60	105
52 751-692	150	300	480	775	274	230	24	200	235
52 751-693	200	360	600	822	310	360	32	230	297
<b>PN 25 (DN 32-50 and DN 80 also fit PN 16 flanges)</b>									
52 754-832	32	140	180	535	124	21	1,3	14	38
52 754-840	40	150	200	535	124	25	1,3	15	39
52 754-850	50	165	230	560	135	32	1,6	21	46
52 754-865	65	185	290	580	155	55	2,4	34	55
52 754-880	80	200	310	592	172	70	4,0	38	66
52 754-890	100	235	350	680	225	120	6,4	72	88
52 754-891	125	270	400	690	235	145	8,0	96	105
52 754-892	150	300	480	775	274	230	24	320	235
52 754-893	200	360	600	822	310	360	32	368	297

### 130-250 kPa

TA No	DN	D	L	H1	H2	Kvs	q <sub>min</sub> m <sup>3</sup> /h	q <sub>max</sub> m <sup>3</sup> /h	Kg
<b>PN 16</b>									
52 751-765	65	185	290	580	155	55	2,4	34	55
52 751-790	100	235	350	680	225	120	6,4	72	88
52 751-791	125	270	400	690	235	145	8,0	96	105
52 751-792	150	300	480	775	274	230	24	320	235
52 751-793	200	360	600	822	310	360	32	368	297
<b>PN 25 (DN 32-50 and DN 80 also fit PN 16 flanges)</b>									
52 754-932	32	140	180	535	124	21	1,3	14	38
52 754-940	40	150	200	535	124	25	1,3	15	39
52 754-950	50	165	230	560	135	32	1,6	21	46
52 754-965	65	185	290	580	155	55	2,4	34	55
52 754-980	80	200	310	592	172	70	4,0	38	66
52 754-990	100	235	350	680	225	120	6,4	72	88
52 754-991	125	270	400	690	235	145	8,0	96	105
52 754-992	150	300	480	775	274	230	24	210	235
52 754-993	200	360	600	822	310	360	32	368	297

**DKF 50 (Fc=15)**



Capillary pipe (Ø6) included: 2 500 mm

→ = Flow direction

**10-60 kPa**

TA No	DN	D	L	H1	H2	Kvs	q <sub>min</sub> m <sup>3</sup> /h	q <sub>max</sub> m <sup>3</sup> /h	Kg
<b>PN 16</b>									
52 787-565	65	185	290	580	155	55	1,5	21	55
52 787-590	100	235	350	680	225	120	4,0	45	88
52 787-591	125	270	400	690	235	145	5,0	60	105
52 787-592	150	300	480	775	274	230	15	200	235
52 787-593	200	360	600	822	310	360	20	230	297
<b>PN 25 (DN 32-50 and DN 80 also fit PN 16 flanges)</b>									
52 787-132	32	140	180	535	124	21	0,8	8,5	38
52 787-140	40	150	200	535	124	25	0,8	9,5	39
52 787-150	50	165	230	560	135	32	1,0	13	46
52 787-165	65	185	290	580	155	55	1,5	21	55
52 787-180	80	200	310	592	172	70	2,5	24	66
52 787-190	100	235	350	680	225	120	4,0	45	88
52 787-191	125	270	400	690	235	145	5,0	60	105
52 787-192	150	300	480	775	274	230	15	200	235
52 787-193	200	360	600	822	310	360	20	230	297

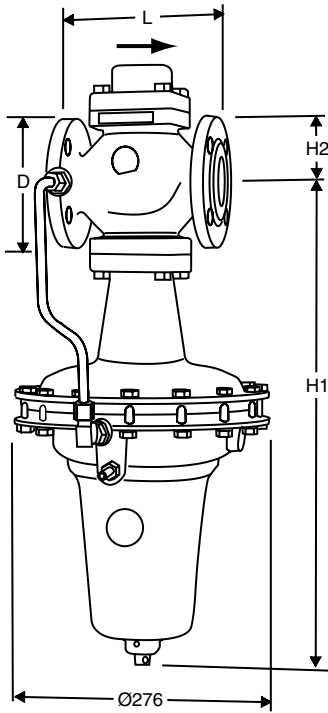
**50-150 kPa**

TA No	DN	D	L	H1	H2	Kvs	q <sub>min</sub> m <sup>3</sup> /h	q <sub>max</sub> m <sup>3</sup> /h	Kg
<b>PN 16</b>									
52 787-665	65	185	290	580	155	55	1,5	21	55
52 787-690	100	235	350	680	225	120	4,0	45	88
52 787-691	125	270	400	690	235	145	5,0	60	105
52 787-692	150	300	480	775	274	230	15	200	235
52 787-693	200	360	600	822	310	360	20	230	297
<b>PN 25 (DN 32-50 and DN 80 also fit PN 16 flanges)</b>									
52 787-232	32	140	180	535	124	21	0,8	8,5	38
52 787-240	40	150	200	535	124	25	0,8	9,5	39
52 787-250	50	165	230	560	135	32	1,0	13	46
52 787-265	65	185	290	580	155	55	1,5	21	55
52 787-280	80	200	310	592	172	70	2,5	24	66
52 787-290	100	235	350	680	225	120	4,0	45	88
52 787-291	125	270	400	690	235	145	5,0	60	105
52 787-292	150	300	480	775	274	230	15	200	235
52 787-293	200	360	600	822	310	360	20	230	297

**130-250 kPa**

TA No	DN	D	L	H1	H2	Kvs	q <sub>min</sub> m <sup>3</sup> /h	q <sub>max</sub> m <sup>3</sup> /h	Kg
<b>PN 16</b>									
52 787-765	65	185	290	580	155	55	1,5	21	55
52 787-790	100	235	350	680	225	120	4,0	45	88
52 787-791	125	270	400	690	235	145	5,0	60	105
52 787-792	150	300	480	775	274	230	15	200	235
52 787-793	200	360	600	822	310	360	20	230	297
<b>PN 25 (DN 32-50 and DN 80 also fit PN 16 flanges)</b>									
52 787-332	32	140	180	535	124	21	0,8	8,5	38
52 787-340	40	150	200	535	124	25	0,8	9,5	39
52 787-350	50	165	230	560	135	32	1,0	13	46
52 787-365	65	185	290	580	155	55	1,5	21	55
52 787-380	80	200	310	592	172	70	2,5	24	66
52 787-390	100	235	350	680	225	120	4,0	45	88
52 787-391	125	270	400	690	235	145	5,0	60	105
52 787-392	150	300	480	775	274	230	15	200	235
52 787-393	200	360	600	822	310	360	20	230	297

**DKF 50 (Fc=45)**



Capillary pipe (Ø6) included: 2 500 mm

→ = Flow direction

**10-60 kPa**

TA No	DN	D	L	H1	H2	Kvs	q <sub>min</sub> m <sup>3</sup> /h	q <sub>max</sub> m <sup>3</sup> /h	Kg
<b>PN 16</b>									
52 790-065	65	185	290	580	155	55	2,4	34	55
52 790-090	100	235	350	680	225	120	6,4	72	88
52 790-091	125	270	400	690	235	145	8,0	96	105
52 790-092	150	300	480	775	274	230	24	320	235
52 790-093	200	360	600	822	310	360	32	368	297
<b>PN 25 (DN 32-50 and DN 80 also fit PN 16 flanges)</b>									
52 790-132	32	140	180	535	124	21	1,3	14	38
52 790-140	40	150	200	535	124	25	1,3	15	39
52 790-150	50	165	230	560	135	32	1,6	21	46
52 790-165	65	185	290	580	155	55	2,4	34	55
52 790-180	80	200	310	592	172	70	4,0	38	66
52 790-190	100	235	350	680	225	120	6,4	72	88
52 790-191	125	270	400	690	235	145	8,0	96	105
52 790-192	150	300	480	775	274	230	24	320	235
52 790-193	200	360	600	822	310	360	32	368	297

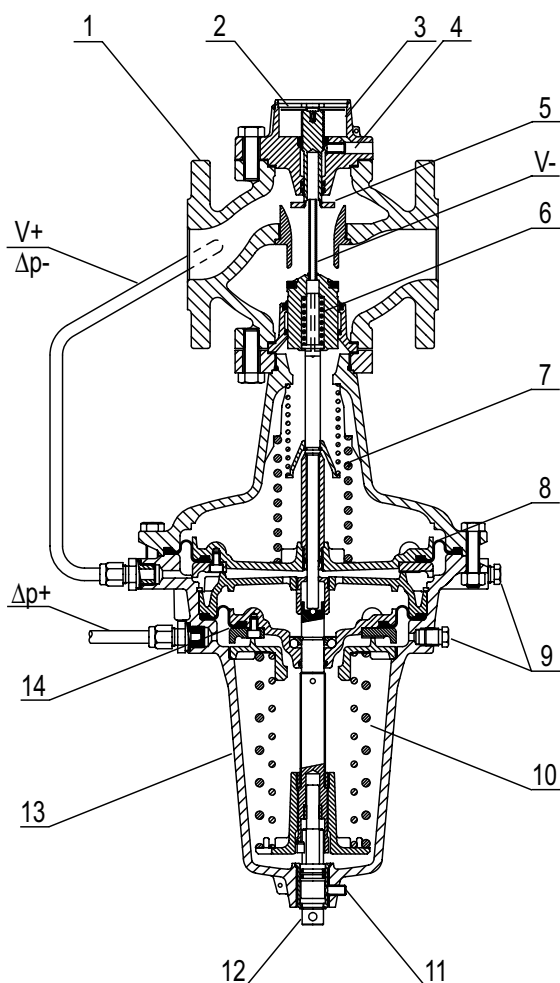
**50-150 kPa**

TA No	DN	D	L	H1	H2	Kvs	q <sub>min</sub> m <sup>3</sup> /h	q <sub>max</sub> m <sup>3</sup> /h	Kg
<b>PN 16</b>									
52 790-465	65	185	290	580	155	55	2,4	34	55
52 790-490	100	235	350	680	225	120	6,4	72	88
52 790-491	125	270	400	690	235	145	8,0	96	105
52 790-492	150	300	480	775	274	230	24	320	235
52 790-493	200	360	600	822	310	360	32	368	297
<b>PN 25 (DN 32-50 and DN 80 also fit PN 16 flanges)</b>									
52 790-232	32	140	180	535	124	21	1,3	14	38
52 790-240	40	150	200	535	124	25	1,3	15	39
52 790-250	50	165	230	560	135	32	1,6	21	46
52 790-265	65	185	290	580	155	55	2,4	34	55
52 790-280	80	200	310	592	172	70	4,0	38	66
52 790-290	100	235	350	680	225	120	6,4	72	88
52 790-291	125	270	400	690	235	145	8,0	96	105
52 790-292	150	300	480	775	274	230	24	320	235
52 790-293	200	360	600	822	310	360	32	368	297

**130-250 kPa**

TA No	DN	D	L	H1	H2	Kvs	q <sub>min</sub> m <sup>3</sup> /h	q <sub>max</sub> m <sup>3</sup> /h	Kg
<b>PN 16</b>									
52 790-565	65	185	290	580	155	55	2,4	34	55
52 790-590	100	235	350	680	225	120	6,4	72	88
52 790-591	125	270	400	690	235	145	8,0	96	105
52 790-592	150	300	480	775	274	230	24	320	235
52 790-593	200	360	600	822	310	360	32	368	297
<b>PN 25 (DN 32-50 and DN 80 also fit PN 16 flanges)</b>									
52 790-332	32	140	180	535	124	21	1,3	14	38
52 790-340	40	150	200	535	124	25	1,3	15	39
52 790-350	50	165	230	560	135	32	1,6	21	46
52 790-365	65	185	290	580	155	55	2,4	34	55
52 790-380	80	200	310	592	172	70	4,0	38	66
52 790-390	100	235	350	680	225	120	6,4	72	88
52 790-391	125	270	400	690	235	145	8,0	96	105
52 790-392	150	300	480	775	274	230	24	320	235
52 790-393	200	360	600	822	310	360	32	368	297

## Operating function



### DK 50

Installation in the return pipe. The controller consists of the valve (1) and the actuator (13). The valve body has the built-in throttle (5) with a flow adjustment scale (2). Inside the actuator there are two diaphragms: for flow (8) and for differential pressure (14) control.

The differential pressure on the diaphragms acts against the forces of their springs (10). The springs attempt to open, and the differential pressure attempts to close the valve. Both diaphragms act parallelly, totally independent one from another. The pressure upstream the throttle acts through an external copper impulse pipe  $\text{Ø}10$ , as plus pressure (V+) to the bottom side of the flow diaphragm and simultaneously as minus pressure ( $\Delta p$ -) to the top side of the differential pressure diaphragm.

The pressure downstream the throttle acts through an internal impulse pipe as minus pressure (V-) to the top side of the flow diaphragm. The pressure upstream the consumer acts through an external copper impulse pipe,  $\text{Ø}6 \times 2500$  mm, as plus pressure ( $\Delta p$ +) to the bottom side of the differential pressure diaphragm.

Increased flow or more closed throttle means increased pressure drop on the throttle (5). That means increase of differential pressure on flow control diaphragm (8) and therefore stronger closing force on the flow diaphragm (8). The diaphragm (8) moves the valve plug (6) until it is stopped by the spring force (7).

There is only one value of the flow for one throttle position when the forces, that act on the diaphragm, are in balance. Constant flow, maintained by the controller, depends only on the throttle position and not on the pressure drop on the valve. Increased differential pressure across the consumer due to closing of control valves means increase of differential pressure on the differential pressure control diaphragm and therefore stronger closing force on the flow diaphragm. The diaphragm (14) moves the valve plug (6) until it is stopped by the spring force (10).

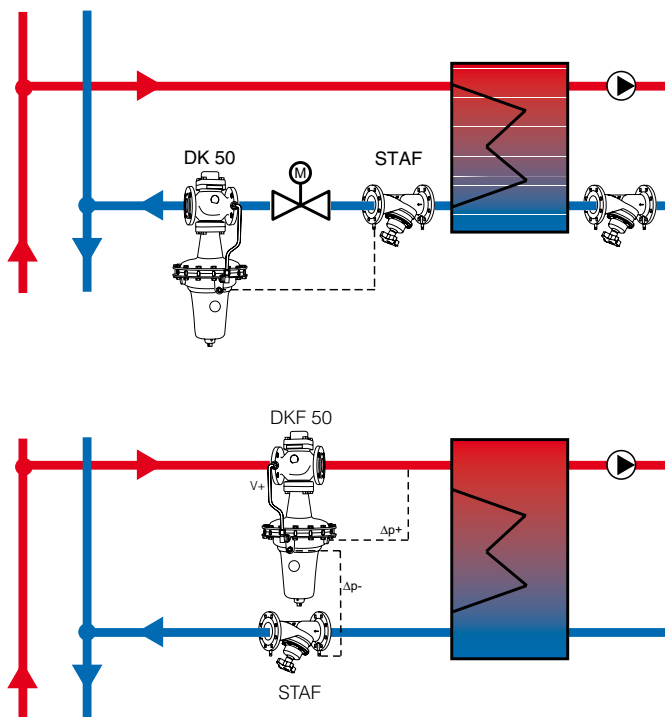
### DKF 50

Installation in the inlet pipe. Function is the same as DK 50, except that the chambers for (V+) and ( $\Delta p$ -) in the diaphragm actuator are separated.

The pressure upstream the throttle (5) acts as plus pressure (V+) on the bottom and the pressure downstream the throttle as minus pressure (V-) on the top side of the flow diaphragm (8).

The pressure upstream the consumer acts as plus pressure ( $\Delta p$ +) on the bottom side, and the pressure downstream the consumer as minus pressure ( $\Delta p$ -) on the top side of the differential pressure diaphragm (14).

## Installation



The controller has to be installed in the return pipe, downstream the consumer (DK 50) or in the inlet pipe, upstream the consumer (DKF 50). The direction of the flow is shown by the arrow on the valve body. It is recommended to install the controller in horizontal pipeline with actuator body below. Installation of the strainer in front of the controller is recommended.

Connect copper impulse pipe ( $\Delta p+$ ) to the pipeline upstream the consumer. In case of DKF 50, connect another copper impulse pipe ( $\Delta p-$ ) downstream the consumer (from behind the controller). In case of a horizontal pipeline connect the copper impulse pipe laterally to prevent air and dirt from entering. It is important to ensure that working temperature and pressure do not exceed allowed values.

Before you mount the controller, check the fitting length of the controller, pitch diameter and the diameter of the holes for the screws.

When the pipeline and the controller are full of water and the pressure is stabilized, vent the controller by vent screws (9).

### Keeping the differential pressure over a control valve constant

#### Heat exchanger

The controller should be mounted downstream the control valve and STAF upstream the control valve, but downstream the heat exchanger.

STAF can be mounted in the supply pipe, but with a decreased valve authority as a consequence.

Installation of balancing valve STAF is recommended to enable flow measurement, commissioning and troubleshooting with balancing instrument TA-CBI or measuring instrument TA-CMI.

## Setting

### Flow adjustment

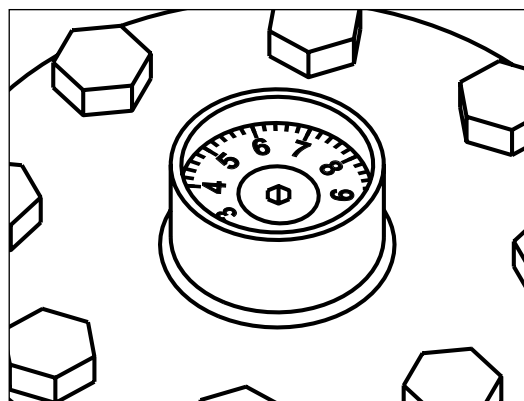
1. Release the fixing screw (4).
2. Turn the throttle (5) clockwise down to the start position (the point 0,0 on the adjustment scale (2) of the throttle and on the scale (3) of the cover should be aligned).
3. Then adjust the corresponding number of the adjustment scale turns according to flow chart and the scale of the cover.
4. At the end, tighten the fixing screw.

The water flow has been measured on each individual valve in all positions of adjustment scale. Each valve has its own identity number and individual flow chart included in the scope of supply. The copy of the chart can be provided by supplier. Provide next data: type, DN, Fc, serial number.

Accuracy of the flow adjustment:  $\pm 2\%$ .

### Differential pressure adjustment

1. Release the fixing screw (11).
2. Adjust differential pressure by turning the adjustment screw (12).
3. To increase the differential pressure, turn the adjustment screw clockwise (bottom view of the screw).
4. At the end, tighten the fixing screw back.
5. The pressures can be controlled through pressure gauges on the pipeline.



## Sizing

Select the size according to maximal speed. Control the pressure drop in valve by formula:  $\Delta p = 100 \times q^2 / Kvs^2$  [kPa], where q is flow in  $m^3/h$ . Constant pressure drop in throttle 15 kPa must be added to pressure drop calculated by the Kvs.

