



Indirectly actuated diaphragm valve
Threaded connection G 3/4 to G 2
DN 20 - DN 50

- Continuous regulation
- High accuracy
- No auxiliary energy required



Technical data

Fluid:

Neutral liquid fluids (pH-value 5 to 9)

Flow direction:

Determined

Mounting position:

Optional, preferably vertical

Nominal size:

10 to 50 mm

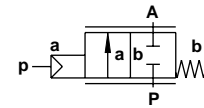
Threaded connection:

G 3/4 to G 2

Operating pressure:

0,8 to 10 bar

Material	Housing:	DN 10 Brass
		DN 20 - 50 Gunmetal
	Seat seal:	NBR (Perbunan)
	Inner parts:	St. st. 1.4104, Brass



Switching function:
Normally closed

For contaminated fluids insertion of a dirt trap is recommended



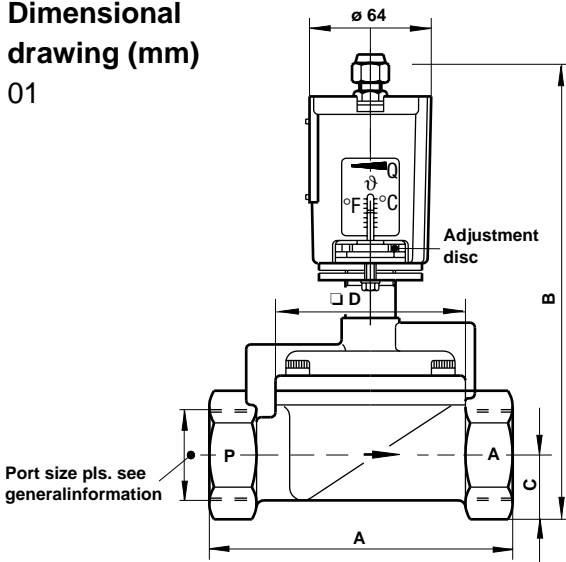
General Information

Type	ND	Port size	Pilot pressure Conn. size	Operating pressure (bar)		Difference of the regulating pressure between closed an open valve (bar)	Range of pressure related to the opening point of valve (bar)	Total weight (kg)	Dimensional drawing No.
				min. ¹⁾	max.				
0147300	10	G 3/8	7/16 UNF	0.8	10	approx. 2.5	4 ... 23	1.4	01
0147400	10	G 1/2	7/16 UNF	0.8	10	approx. 2.5	4 ... 23	1.4	01
0147900	20	G 3/4	7/16 UNF	0.8	10	approx. 2.5	4 ... 23	2.4	01
0148000	25	G 1	7/16 UNF	0.8	10	approx. 2.5	4 ... 23	2.4	01
0148100	32	G 1 1/4	7/16 UNF	0.8	10	approx. 2.5	4 ... 23	3.6	01
0148200	40	G 1 1/2	7/16 UNF	0.8	10	approx. 2.5	4 ... 23	3.3	01
0148300	50	G 2	7/16 UNF	0.8	10	approx. 2.5	4 ... 23	4.6	01

¹⁾ Minimum pressure difference, i.e. the necessary drop of static pressure required for any operating condition of the valve, here.

Dimensional drawing (mm)

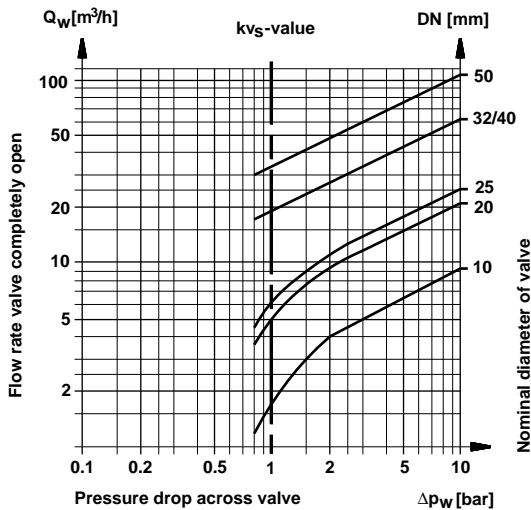
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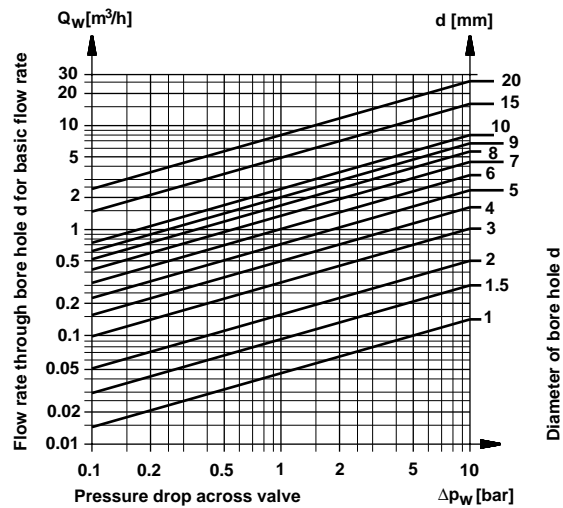
Dimensional drawing No.	A	B	C	D
01	55	195	14	-
01	120	225	24	70
01	158	248	33	96
01	178	268	40	112

Diagrams

Flow rate diagram for rated stroke H₁₀₀



Basic flow rate diagram





Installation

The temperature to be regulated should lie within the regulating range. Temperatures outside that range do not effect any regulation. The temperature may fall below the set closing temperature (lower limit appr. -5°). Depending on the application, regulating accuracy is

0.5 ... 1.5 K, based on a 50 % change of load.

If the temperature of the internal flow fluid is to be sensed, there must always be a small **basic flow rate** - (e.g. flowing through a by-pass line or a bore hole in the valve body). Otherwise temperature changes will not reach the sensor when the valve is closed. The diameter of the basic flow rate bore is determined by means of the **basic flow rate diagram** (page 1).

Avoid or keep to a minimum (not exceeding 2 bar) any back pressure or pressure drop on the outlet side to maintain a constant valve function (install valve as close as possible to the end of the line, respectively, behind the heat exchanger). The drain line must be in a higher position than the valve to prevent the valve from running without fluid (danger of calcifying).

Make sure valve is clean prior to installation. Any foreign matter at the valve seat may prevent a proper closure.

Installation of a water pressure reducing valve is not normally necessary.

Provide for protective earthing (in order to prevent stray currents which may lead to corrosion).

Protect valve from freezing, otherwise the valve will get damaged by the expanding ice. Drain the water by opening the valve union if valve is mounted at the lowest part of the piping system, otherwise by means of a special draining device installed in the system. Apply heat, if necessary.

When installing make sure capillary tube does not vibrate too much (risk of fracture) and that it cannot get damaged. Smallest possible bending radius is 10 mm. Tubes longer than 5 m are not recommended. Do not pass tube through any zone where temperature exceeds that of sensor.

Depending on the application, insert sensor cartridge into the fluid to be sensed as follows:

- a) without protective tube (in open tanks).
- b) with fitted union (for sealed insertion into pipes or tanks at pressures not exceeding 6 bar)
- c) with protective tube of either brass (up to 25 bar), or stainless steel (up to 60 bar) for pressure-tight installation in pipes or tank walls. The closed version containing the sensor cartridge may be filled with a contact liquid.

Without protective tube, of course, the temperature transmission is better and the regulation more sensitive than with a) and b) above.

Adjustment

Turn the dial by means of a screw-driver observing the flow direction indicated by an arrow on the valve body. Turning dial in direction of the arrow reduces, turning it in the opposite direction increases the rate of flow.

Numbers on the dial indicate the temperature values at which the valve starts to open. In order to reach the pre-set rated temperature value in the plant which is to be regulated, the regulat-

ing part must be adjusted to a rating that is appr. 5 to max. 10 K below the rated value, depending on the utilization factor of the regulator.

When using regulators equipped with an electrical signal transmitter (description on page 8) it must be checked, if the switching element breaks the control circuit when the water ceases to flow (upper switching point). After the water has returned and the machine has cooled down, the switching element must have closed the control circuit again (lower switching point) before the valve shuts off the passage of the water. Turning the dial in order to change the flow rate or the refrigerant pressure setting, automatically changes the point on which the electrical signal transmitter cuts out, too. A re-adjustment, of course, is possible.

Maintenance

Dirt traps installed upstream, have to be cleaned from time to time, the intervals depending on the degree of contamination. Indirectly actuated regulators are provided with a filter, fitted in the pilot valve channel, which also has to be checked at regular intervals. If the instructions given below „Installation“ and „Adjustment“ are observed, no further maintenance is necessary.

Sizing

In order to determine the correct nominal diameter of a cooling water flow regulator by means of the flow rate diagram (please see page 1) the following data of the plant to be cooled must be known:

1. The quantity of heat Q [kW] to be carried off under full load
 - usually corresponds to the power consumption of the plant minus the reflected quantity of heat.
Approximate value: 50 % of the power consumption.
2. Permissible cooling water temperature rise Δt_w [K]
 - usually 10 - 15 [K]
3. Pressure drop $D p_W$ [bar] across valve
 - Water inlet pressure minus pressure drop in pipes, valves, heat exchanger etc.

Based on these data the nominal diameter of the valve is determined as follows:

1. Calculation of the required cooling water quantity

$$Q_W [\text{m}^3/\text{h}]: 0.86 = \frac{Q [\text{kW}]}{t [\text{K}]}$$
2. Finding the point of intersection of the straight line by means of the determined values for $D p_W$ and Q_W in the flow diagram. The flow characteristic above it corresponds to the wanted nominal diameter DN [mm].

The max. permissible flow velocity v_{max} is decisive for the dimensioning of the connections (the common flow velocities average 5 m/s; higher flow velocities increase the flow noise).

The required inside diameter d is determined as follows:

$$d [\text{mm}] = 18,8 \cdot \sqrt{\frac{Q_W [\text{m}^3/\text{h}]}{v_{\text{max}} [\text{m/s}]}}$$



Electric signal transmitter for cooling waterflow regulator

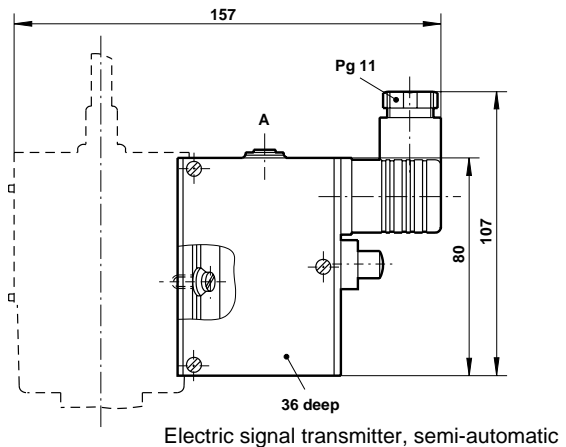
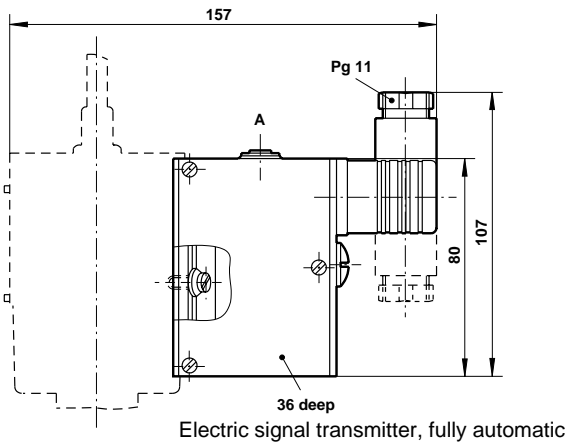
Plants, equipped with these regulators often need an electric impulse transmission under certain operating conditions. Thus it may be necessary to get an audible or visible signal in addition to the stopping of the plant in case the temperature has exceeded the maximum value. As the bellows within the regulating part of the regulator actuates as an expanding and contracting element, it suggests itself to use this feature to actuate an electric circuit element. This way the installation of an additional pressure- or temperature switch may no longer be necessary. The signal transmitter can also be installed later on by the customer himself. It consists of a micro-switch, an adjusting device and a plug connection assembled in a housing, which is fixed to one side of the regulating part by means of two screws. zwei Schrauben befestigt.

Operating description

Once the flow regulator is pressurized, the expanding bellows presses a lever which in turn actuates a micro-switch. This switch can be adjusted to give an electric impulse as soon as the maximum temperature has been reached. Depending on the way the plug connection is wired, the signal transmitter may either be energized or de-energized when the temperature is rising. It may also be used as a change-over switch.

Normally a micro-switch with automatic release is being used, i.e. it returns to the initial position as the temperature is falling. The switch-back difference amounts to appr. half of the regulating temperature difference between closed and open valve. Thus the switching element of such a fully automatic signal transmitter opens the circuit when the temperature is getting too high and closes it again when the temperature is falling. For special applications it may be of advantage to install a microswitch without automatic release. By means of this device it is possible to trip a continuous signal. Such a semi-automatic signal transmitter can only be reset to the initial position by hand and after the switching operation has been carried out. This facilitates the subsequent location of a breakdown, the tracing of its possible causes and the elimination of the defect. Rough adjustment by lifting or lowering the signal transmitter housing. For fine adjustment set micro-switch by turning excentric A. Also observe section „Adjustment“.

Electric signal transmitter, fully automatic	Type 0578121
Electric signal transmitter, semi-automatic	Type 0550124



Making and/or breaking capacity

Change-over switch silver spring contacts

Type of current	Type of load	Make and break current I (A)			
		24 V	60 V	110 V	220 V
AC	Resistive load	15	15	15	15
AC	Inductive load, $\cos \varphi \approx 0,7$	4	2,5	1,5	0,9
AC	Inductive load, spark quenching with RC-link	6	4	2,5	1,5
DC	Resistive load	2	0,9	0,45	0,2
DC	Inductive load, $L/R \approx 10 \text{ ms}$	1	0,3	0,09	0,02
DC	Inductive load, spark quenching with Diode	1,5	0,7	0,35	0,15

Reference number of switchings: 60/min.

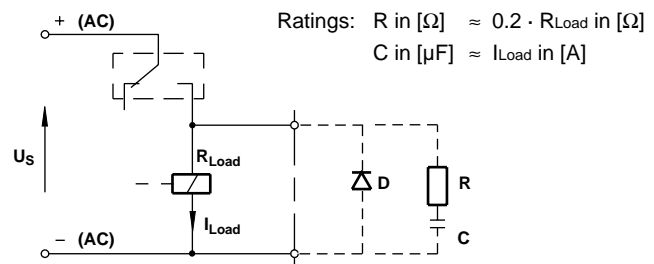
Reference temperature + 30 °C

(with a reference temperature of + 70 °C, I_{max} corresponds to 50% of the tabulated values only).

Spark quenching (direct current):

RC-link in parallel to load (or in parallel to switching contact).

Suited for direct and alternating current.



Creepage- and air paths correspond to VDE 0110 of insulation group B (Except contact clarence of microswitch).