

Temperature controlled, indirectly  
and directly actuated diaphragm valves / seat valves  
Port size G 3/8 to G 1  
DN 10 to DN 50

- Continuous regulation
- High accuracy
- No auxiliary energy required



## Technical data

### Fluid:

For neutral liquid fluids (pH-value 5 to 9)

### Nominal diameter:

DN 10 to 50

### Mounting position:

Optional, preferably vertical

### Port size:

G 3/8 to G 2

### Operating pressure:

0 to 10 bar (temp. dep. direct)

0,8 to 10 bar (temp. dep. indirect)

### Regulating temperature:

0 to +150 °C

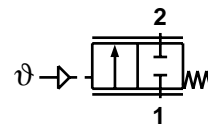
### Fluid temperature:

+1 to +80 °C

### Length of capillary tube:

1,5 m

Material:	Housing DN 10 + 15:	Brass
	Housing DN 20 to 50:	Gunmetal
	Seat seal:	NBR (Perbunan)
	Inner parts:	St. st. 1.4305



Switching function:  
Normally closed

## Options

Length of capillary tube 3 and 5 m  
Protection of capillary tube  
Electric signal transmitter  
Basic flow through bore hole



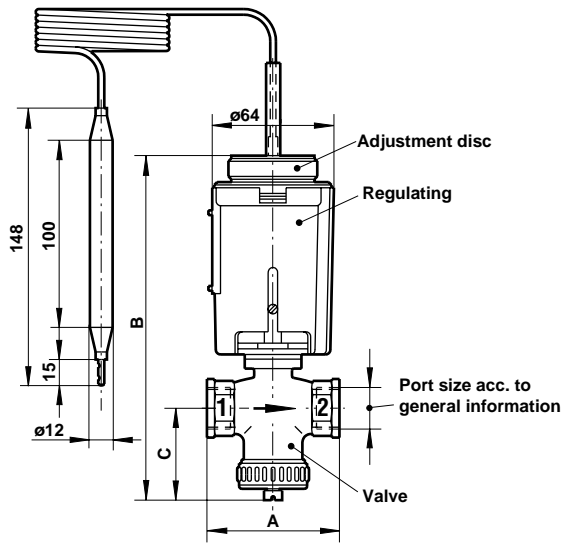
## General information

Symbol	Type	Port size	DN	Operating pressure (bar)		Regulating temperature difference between open and closed valve (K)		Regulating temperature, range in relation to opening point of valve (°C)		Sensor temperature (°C)	Total weight (kg)	Dimensional drawing (No.)
				Min.	Max.	Lower range	Upper range	Min.	Max.			
	<b>Temperature depending directly controlled seat valves</b>											
	0167500	G 3/8	10	0	10	16	10	0	+30	55	1,2	M01
	0177500	G 3/8	10	0	10	20	12	+20	+60	120	1,2	M02
	0187500	G 3/8	10	0	10	30	15	+40	+100	140	1,2	M02
	0197500	G 3/8	10	0	10	30	15	+80	+150	180	1,2	M02
	0167600	G 1/2	10	0	10	16	10	0	+30	55	1,2	M01
	0177600	G 1/2	10	0	10	20	12	+20	+60	120	1,2	M02
	0187600	G 1/2	10	0	10	30	15	+40	+100	140	1,2	M02
	0197600	G 1/2	10	0	10	30	15	+80	+150	180	1,2	M02
	0167700	G 3/4	15	0	10	16	10	0	+30	55	1,8	M01
	0177700	G 3/4	15	0	10	20	12	+20	+60	120	1,8	M02
	0187700	G 3/4	15	0	10	30	15	+40	+100	140	1,8	M02
	0197700	G 3/4	15	0	10	30	15	+80	+150	180	1,8	M02
	0167800	G 1	15	0	10	16	10	0	+30	55	1,8	M01
	0177800	G 1	15	0	10	20	12	+20	+60	120	1,8	M02
	0187800	G 1	15	0	10	30	15	+40	+100	140	1,8	M02
0197800	G 1	15	0	10	30	15	+80	+150	180	1,8	M02	
	<b>Temperature depending indirectly controlled diaphragm valves</b>											
	0167300	G 3/8	10	0,8	10	10	6	0	+30	55	1,5	M03
	0177300	G 3/8	10	0,8	10	10	6	+20	+60	120	1,5	M04
	0187300	G 3/8	10	0,8	10	12	7	+40	+100	140	1,5	M04
	0197300	G 3/8	10	0,8	10	12	7	+80	+150	180	1,5	M04
	0167400	G 1/2	10	0,8	10	10	6	0	+30	55	1,5	M03
	0177400	G 1/2	10	0,8	10	10	6	+20	+60	120	1,5	M04
	0187400	G 1/2	10	0,8	10	12	7	+40	+100	140	1,5	M04
	0197400	G 1/2	10	0,8	10	12	7	+80	+150	180	1,5	M04
	0167900	G 3/4	20	0,8	10	10	6	0	+30	55	2,4	M05
	0177900	G 3/4	20	0,8	10	10	6	+20	+60	120	2,4	M06
	0187900	G 3/4	20	0,8	10	12	7	+40	+100	140	2,4	M06
	0197900	G 3/4	20	0,8	10	12	7	+80	+150	180	2,4	M06
	0168000	G 1	25	0,8	10	10	6	0	+30	55	2,4	M05
	0178000	G 1	25	0,8	10	10	6	+20	+60	120	2,4	M06
	0188000	G 1	25	0,8	10	12	7	+40	+100	140	2,4	M06
	0198000	G 1	25	0,8	10	12	7	+80	+150	180	2,4	M06
	0168100	G 1 1/4	32	0,8	10	10	6	0	+30	55	3,6	M05
	0178100	G 1 1/4	32	0,8	10	10	6	+20	+60	120	3,6	M06
	0188100	G 1 1/4	32	0,8	10	12	7	+40	+100	140	3,6	M06
	0198100	G 1 1/4	32	0,8	10	12	7	+80	+150	180	3,6	M06
	0168200	G 1 1/2	40	0,8	10	10	6	0	+30	55	3,3	M05
	0178200	G 1 1/2	40	0,8	10	10	6	+20	+60	120	3,3	M06
	0188200	G 1 1/2	40	0,8	10	12	7	+40	+100	140	3,3	M06
	0198200	G 1 1/2	40	0,8	10	12	7	+80	+150	180	3,3	M06
	0168300	G 2	50	0,8	10	10	6	0	+30	55	4,6	M05
	0178300	G 2	50	0,8	10	10	6	+20	+60	120	4,6	M06
	0188300	G 2	50	0,8	10	12	7	+40	+100	140	4,6	M06
0198300	G 2	50	0,8	10	12	7	+80	+150	180	4,6	M06	



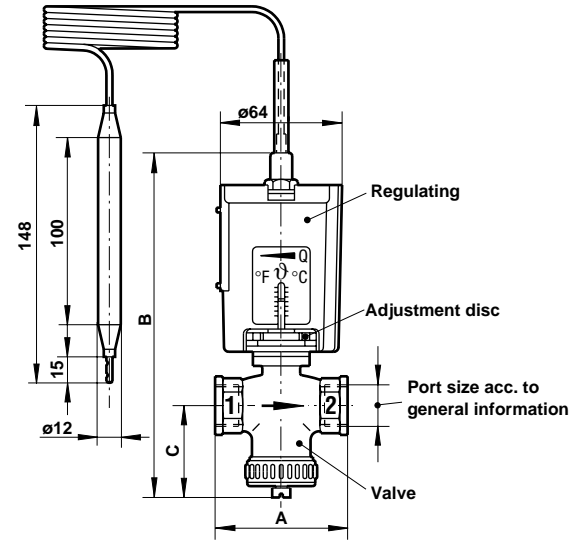
Dimensional drawings (mm)

M01



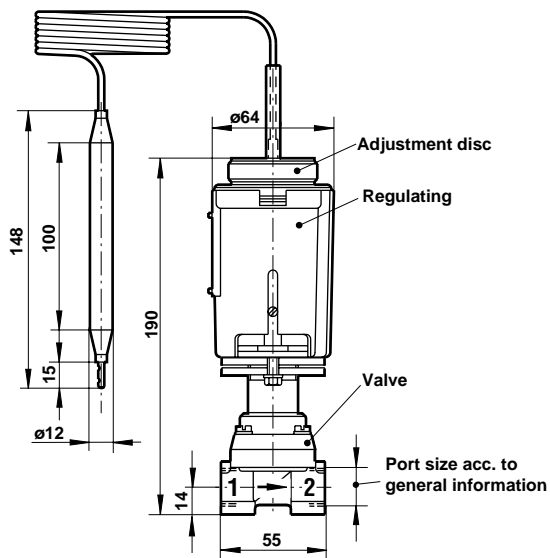
DN	A	B	C
10	70	183	55
15	98	198	52

M02

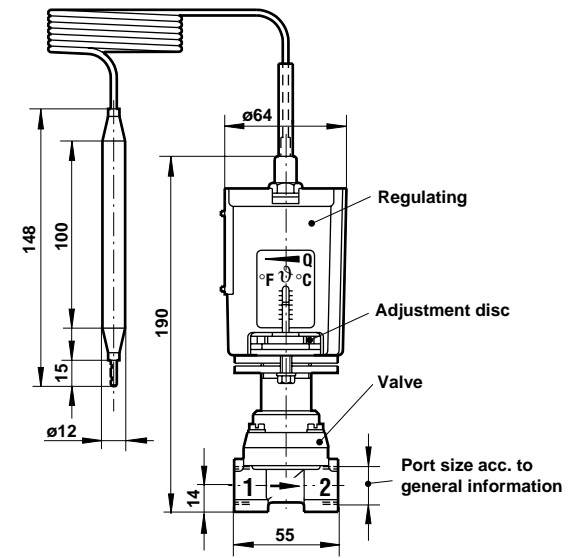


DN	A	B	C
10	70	183	55
15	98	198	52

M03



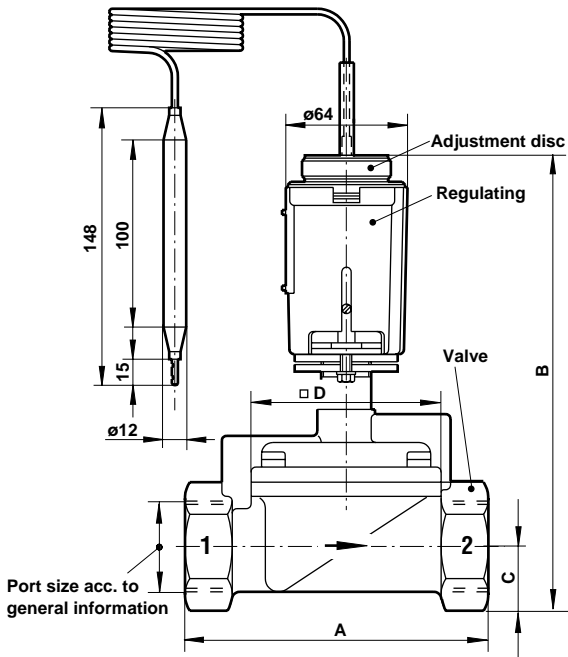
M04





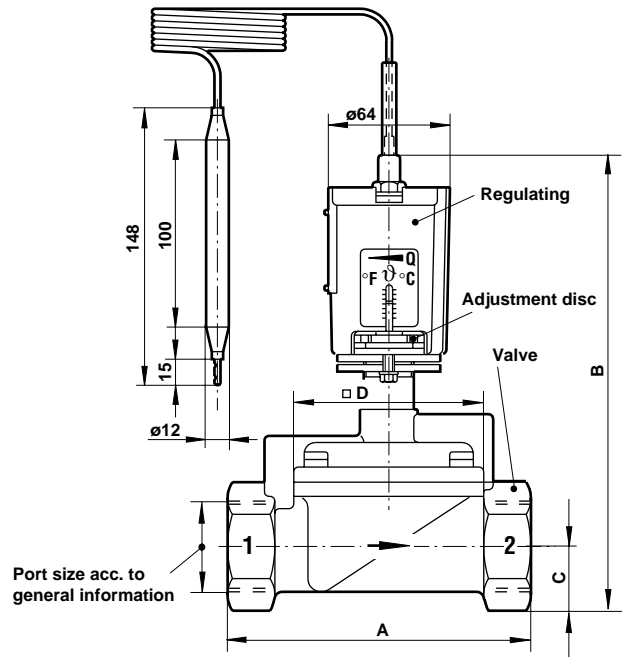
Dimensional drawings

M05



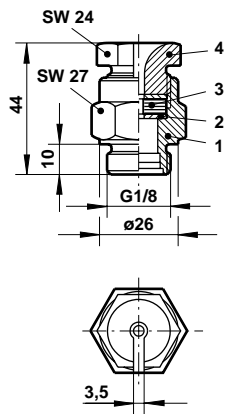
DN	A	B	C	D
20, 25	120	220	24	70
32, 40	158	243	33	96
50	178	263	40	112

M06

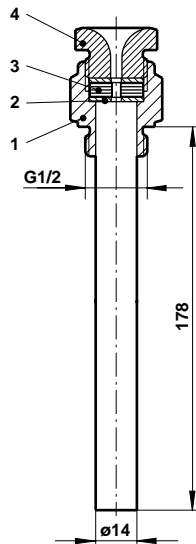


DN	A	B	C	D
20, 25	120	220	24	70
32, 40	158	243	33	96
50	178	263	40	112

Accessories



- 1 Threaded section
- 2 Disc
- 3 Seal
- 4 Threaded section



Union G 1/2  
(without protective tube up to max. 6 bar)  
Type **0574755**

Closed protective tube G 1/2 for sensor cartridge  
Type **0574758** (Brass)  
Type **0574760** (Stainless steel)  
(Plug, item 4, of brass)



**Cat. Nos. for separate order of main valve and regulating part.**

(Main valves and regulating parts can be combined at will)

**Main valves (2-way valves)**

DN	Port size	Type
<b>Seat valve</b>		
10	G 3/8	0574626
10	G 1/2	0574655
15	G 3/4	0572880
15	G 1	0572758
<b>Diaphragm valve</b>		
10	G 3/8	0579869
10	G 1/2	0579870
20	G 3/4	0578485
25	G 1	0578486
32	G 1 1/4	0578487
40	G 1 1/2	0578488
50	G 2	0578489

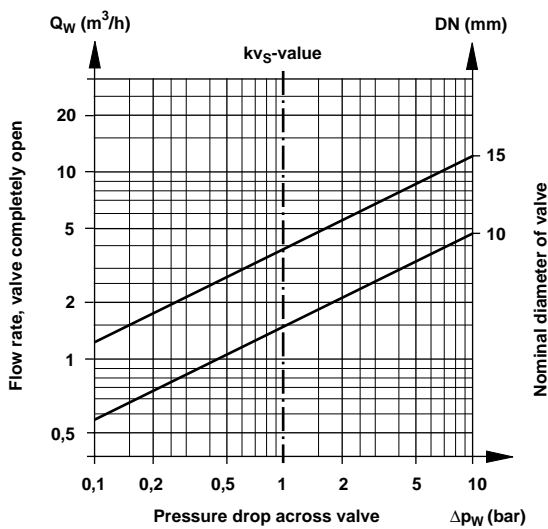
**Regulating parts**

(Regulating device cpl. with sensor)

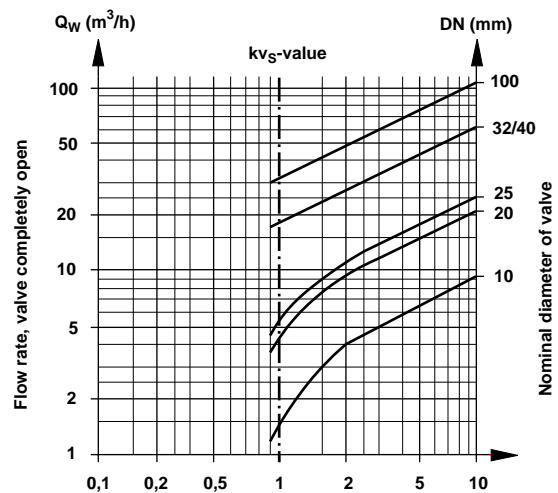
Regulating range	Type
0 to +60 °C	0578483
+20 to +60 °C	0578370
+40 to +100 °C	0578371
+80 to +150 °C	0578420

**Diagrams**

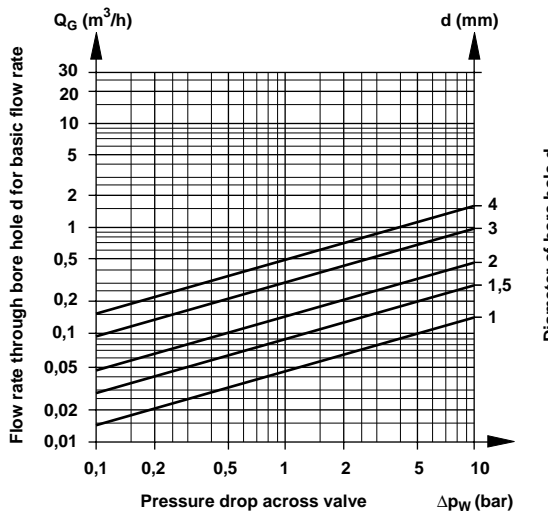
Flow rate diagram at rated stroke H100  
Directly controlled seat valve



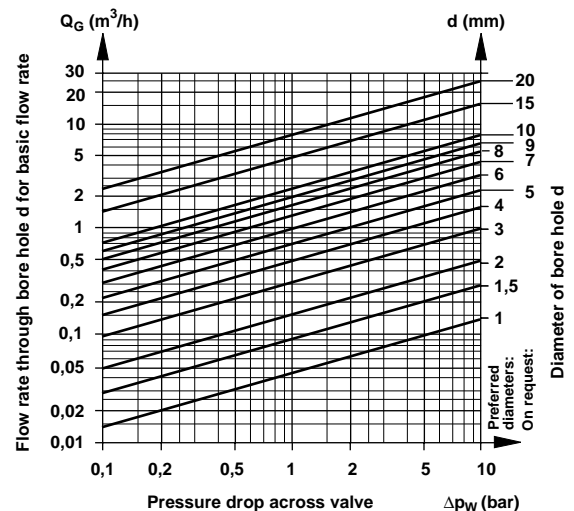
Flow rate diagram at rated stroke H100  
Indirectly controlled diaphragm valve



Basic flow rate diagram



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  $\Delta t_w$  [K]
  - usually 10 - 15 [K]
3. Pressure drop D pW [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  $QW [m^3/h]: 0.86 = \frac{Q [kW]}{t [K]}$
2. Finding the point of intersection of the straight line by means of the determined values for D pW and QW 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:

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



### Electric signal transmitter for cooling waterflow regulator <sup>1)</sup>

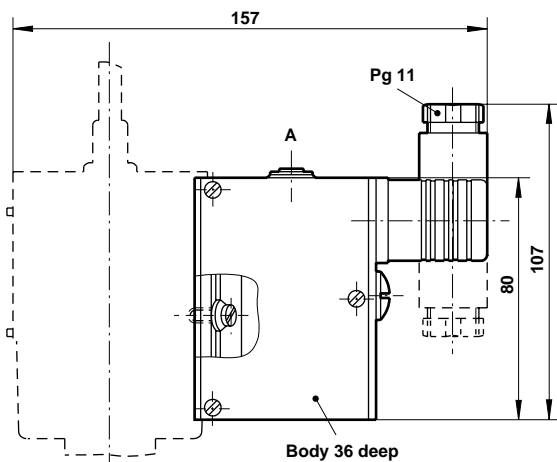
Plants, equipped with these regulators often need an electric impulse transmission under certain operating conditions. Thus it may be necessary to get an audible or visible signal in addition to the stopping of the plant in case the temperature has exceeded the maximum value. As the bellows within the 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.

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“.

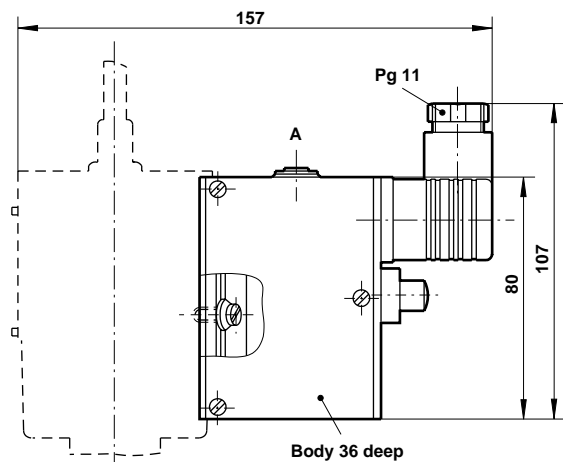
### Operating description

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.

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



Electric signal transmitter, fully automatic



Electric signal indicator, semi-automatic



## Making and/or breaking capacity. Change-over switch silver spring contacts.

Type of current	Type of load	Voltage $U_s$ (V)			
		24	60	110	230
		Make and break current I (A)			
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, $L/R \approx 10$ 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).

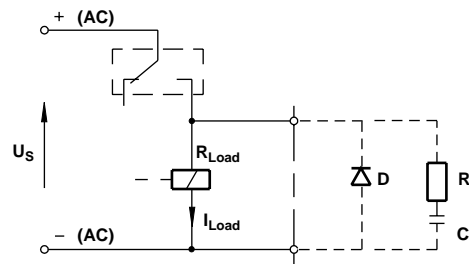
### Spark quenching (direct current):

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

Suited for direct and alternating current.

$$\text{Ratings: } R \text{ in } [\Omega] \approx 0.2 \cdot R_{\text{Load}} \text{ in } [\Omega]$$

$$C \text{ in } [\mu\text{F}] \approx I_{\text{Load}} \text{ in } [\text{A}]$$



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