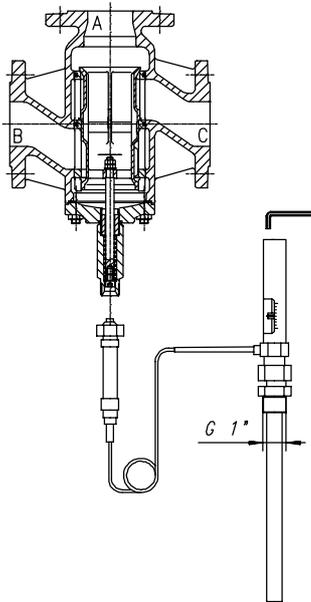




**AKO Three-Way-Temperature Regulator**  
Type Series 226.2309



**1. General**

The use of AKO Temperatureregler is applicable to all branches of industry in which it is necessary to control systems. AKO temperature regulators have proved to be not only extremely reliable but when maintenance is called for it can easily be carried out. The whole control equipment consists of the following components:

**heat sensor including actuator and three-way-control valve**

The temperature will be measured by a sensor (heat sensor) at the measuring point and in case of deviations from the assigned for desired-value, a corresponding signal will be given to the control valve. AKO regulators does not need auxiliary power supply.

The mode of operation is based on the liquid expansion. The sensor, the capillary tube connection and the actuator form a closed hydraulic system. When the temperature which has been measured by the thermostat exceeds the adjusted desired-value, the liquid volume within the thermostat will increase due to the thermal expansion and will develop pressure. This internal pressure of the thermostat continues over the capillary tube connection to the actuator and moves over the working piston the piston rod proportionally to the absorbed heat ballast. The piston rod does have

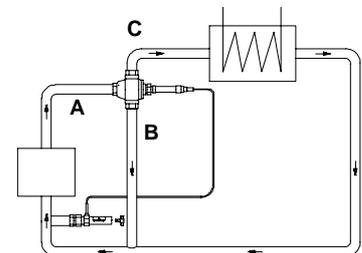
a frictional connection to the valve rod. Each motion of the piston rod does have also the effect of an adjustment of the valve cone within the control valve. The valve cone opens the path A/C (respectively C/A in case of the use as mixing valve) after having exceeded the opening start, adjusted at the heat sensor and colses at the same time proportionally the path A/B (B/A). By this, the plant will be regulated to the requested desired-value (adjustable at the heat sensor).

**2. Assembly**

- 2.1 Piping has to be washed well prior to assembly of regulating valve.
- 2.2 Plugs have to be removed from inlet and outlet flanges of the valve.
- 2.3 When connecting the valve with the piping system, avoid distrtion and deforming strain.
- 2.4 The valve cvan be used as follws (for example)

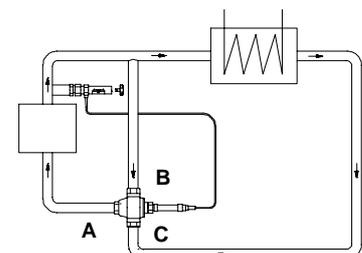
2.4.1 in order to control the medium, the regulator is splitting up or separating the coolant

- A from engine
- B to engine (by-pass)
- C to cooler



2.4.2 in order to control the medium, the regulator is mixing or combining the two incomming streams of the coolant

- C from cooler
- B from engine (by-pass)
- A to engine





- 2.5 Finally install heat sensor with the double nipple there in the pipe where the temperature of the cooling water or lubricating oil shall be measured.
- 2.6 After mounting of the valve and unscrewing of the lower protecting cap as well as after inserting the heat sensor screw down the actuator with a spigot nut at the valve at the measuring point.
- 2.7 Pipe the capillary connection between heat sensor and actuator carefully and protected from vibrations with the bending radii not falling below a minimum radius of 60 mm. On no account disconnect the capillary tube at the heat sensor or the actuator. The system immediately fails to operate.
- 2.8 Each heat sensor with capillary tube and actuator is equipped with a control scale attached to it (measuring point). On the control scale a temperature range is indicated. When exceeding the temperature adjusted, the rod of the actuator is projected.

### **3. Controlling**

- 3.1 A heat sensor being adjusted to the temperature mark, when the motor is powered, does not affect controlling, if the temperature is below that engraved at the controller's top.
- 3.2 When starting, the cone slide closes the way to the cooler (C) as long as the medium in the short circuit (A/B respectively B/A) will reach the desired temperature adjusted at the heat sensor.
- 3.3 If necessary, readjust temperature by using a removable tommy spanner at the controller's top. Turning clockwise causes higher temperature and turning counter-clockwise results in lower temperature. If the temperature should be decreased, please do so in small steps of approx. 10 °K, so that the expansion medium in the heat sensor can be adjusted.

### **4. Mode of Operation**

- 4.1 The spring-loaded cone slide is connected (actuated locking) over its connecting pin with the working pin on the actuator.
- 4.2 The cone slide will be kept to its basic position (A/B respectively B/A) over its spring in case of temperatures below the adjusted working start.
- 4.3 The sensor is inserted in such a way that it will be influenced by the passing medium. Dependent on the temperature, the expansion fluid will expand or contract.
- 4.4 By the actuated locking of the actuator pin with the connecting pin of the cone slide, the cone slide will be lifted against the spring force of the counter-pressure spring in case of increases in temperature, which the sensor takes up within the medium and which exceeds the adjusted working start.

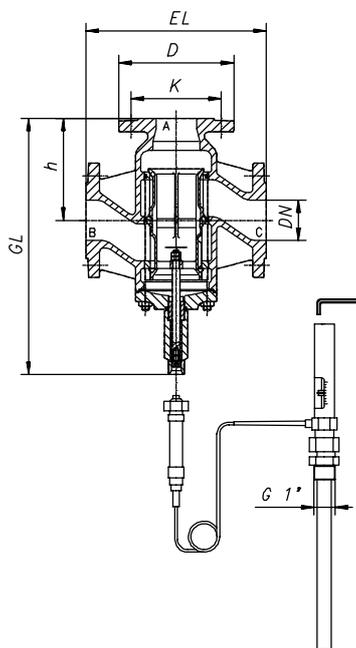
The cone slide opens the ways A/C (C/A) proportionally to the absorbed heat ballast. At the same time, way A/B (B/A) will be closed in the same ratio. There will be a division of the total quantity of medium according to the absorbed heat ballast on two ways (from A to B and C) respectively a mixing within the regulating valve (from B and C to A).

- 4.5 Should for some unexpected reason, the medium temperature exceeding the controlled working temperature, then the safety spring, installed in the controlling top of the heat sensor, will react. By this an excessive stroke of the sensor will be compensated and any damages will be avoided.
- 4.6 **Maintenance**  
AKO Temperature Regulators are normally without any maintenance. Due to impurities in the medium, you will have to clean from time to time the regulating valve.



5. Measuring Table

order.-no.	DN mm	EL mm	GH mm	h mm	D mm	K mm	L mm	KVs	$\Delta p$ bar	stroke mm	weight kg	heat sensor
226.2309-040	40.000	200.000	400.000	162.000	150.000	110.000	4x18	25.000	16.000	5	28.000	230.0300A000
226.2309-050	50.000	230.000	400.000	162.000	165.000	125.000	4x18	42.000	16.000	6	30.000	230.0300A000
226.2309-065	65.000	290.000	415.000	165.000	185.000	145.000	4x18	70.000	16.000	8	37.000	230.0300A000
226.2309-080	80.000	310.000	455.000	215.000	200.000	160.000	8x18	100.000	16.000	10	53.000	230.0300A000
226.2309-100	100.000	350.000	505.000	240.000	220.000	180.000	8x18	160.000	16.000	12,5	65.000	230.0400A001
226.2309-125	125.000	400.000	605.000	260.000	250.000	210.000	8x18	245.000	16.000	16	77.000	230.0400A001
226.2309-150	150.000	480.000	685.000	286.000	285.000	240.000	8x23	330.000	16.000	18	90.000	230.0400A001



In this list you will find the standard combination of valve and heat sensor. A combination of each other offered heat sensor with each valve is possible, however (see data sheet).

The indicated  $K_R$ -value indicates the stroke of the heat sensor at a temperature difference of 1°C.