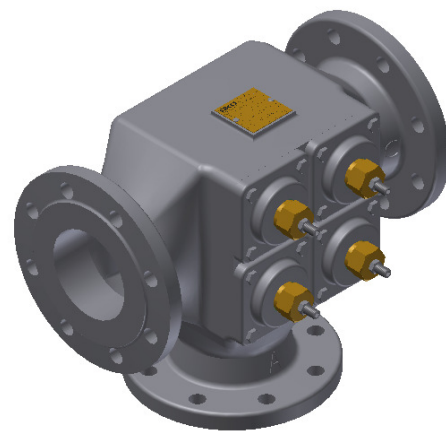
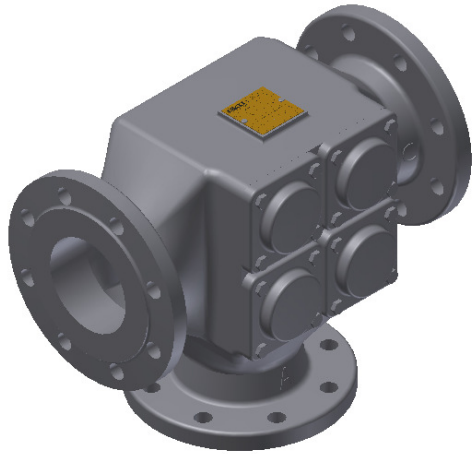


# Mounting and Servicing Instructions AKO Temperature Regulator selfactuated



## **AKO Three-Way Temperature Regulator with interior Thermostat**

Balanced, with flange connections  
Type Series 226.0120 - 226.0149, 226G0120 – 226G0149,  
226.0220 – 226.0239, 226.0320 – 226.0329,  
226.0420 - 226.0439, 227.0420 – 227.0439  
227.0520 – 227.0529

**Contents**

1. General information and Safety instructions.....	3
2. Notes on possible dangers.....	3
2.1 Significance of symbols.....	3
2.2 Explanatory notes on safety information.....	3
3. Scope of applications.....	4
4. Operation principles.....	5
5. Technical data.....	5
5.1 Regulating Valve.....	5
5.2 Wax-Thermostat .....	5
5.3 Dimensions.....	6
5.4 Marking.....	6
6. Transport and storage .....	6
7. Installation.....	7
7.1 General notes on installation.....	7
7.2 Installation of the Valve.....	8
8. Emergency manual adjustment.....	8
9. Operation of the emergency manual adjustment .....	8
10. Service and maintenance.....	9
11. Fault detective and corrective.....	9
12. Exchanging a thermostat .....	9
12.1 Dismantling of the thermostat.....	9
12.2 Installation of the thermostat .....	10
12.3 Control of the manual adjustment .....	10
13. REACH-Declaration .....	10

### 1. General Information and Safety Instructions

Regulations, guidelines, standards etc. listed in these mounting and servicing instructions correspond to the level of information available at the time of preparation and are not subject to an updating service. They must be applied by the user on his own responsibility in their respective latest valid version.

They are generally binding on transport, storage, installation, start-up, operation, maintenance and repair.

In case of any difficulties, which cannot be solved by means of these mounting and servicing instructions, please contact either the supplier or manufacturer.

Handling and all work must be carried out by expert personnel or all activities must be supervised and checked. It is the owner's responsibility to define areas of responsibility and competence and to monitor the personnel.

In addition, current regional safety requirements must be applied and observed when taking the fittings out of service as well as when maintaining and repairing them.

For appropriate operation, make sure that the temperature regulator is only used in applications where the operating pressure and temperatures do not exceed the operating values based on the valve sizing data submitted in the order.

Note that the manufacturer does not assume any responsibility for damage caused by external forces or any other external influences.

The manufacturer reserves the right to introduce technical modifications and improvements at any time.

The controllers meet the requirements of the EC Machinery Directives 2006/42EG. For regulators that are marked with a CE mark, declaration of conformity is the information about the applied conformity assessment procedures. The declaration is available on request

These mounting and servicing instructions comply with the requirements of EU Directives.

#### **Note!**

The non-electric actuators and valves do not have their own potential ignition source according to the ignition risk assessment stipulated in EN 13463-1:2001, Section 5.2, even in the rare incident of an operating fault. Therefore, they do not fall within the scope of Directive 94/9/EC.

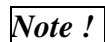
For connection to the equipotential bonding system, observe the requirements specified in EN 60079-14:1977 (VDE 0156 Part 1), section 6.3.

### 2. Notes on possible dangers

#### 2.1 Significance of symbols



Warning of general danger



General mounting, start-up and maintenance information

#### 2.2 Explanatory notes on safety information

In these mounting and servicing instructions dangers, risks and items of safety information are highlighted to attract special attention.

Information marked with the above symbol and "ATTENTION" describe practices, a failure to comply with which can result in serious injury or danger of death for users or third parties or in material damage to the system or the environment. It is vital to comply with these practices and to monitor compliance.

### 3. Scope of Application

The use of AKO Temperature Regulators is applicable to all branches of industry in which it is necessary to control systems, i.e. cooling systems and can be used as divider or mixing valves. They are characterised by the fact that they are relatively maintenance free, are very service friendly and that they are not sensitive to pressure. The inner parts can be exchanged immediately without having to disassemble the regulating valve from the pipe. The AKO Thermostats require no auxiliary energy whatsoever.

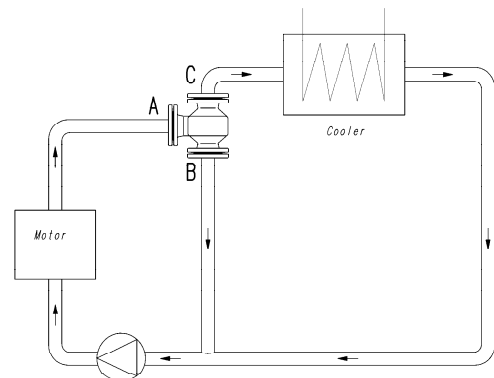
**ATTENTION**

- Refer to the data sheet for applications, limits on use and possibilities.
- Certain media require or preclude the use of special materials.
- The valves are designed for standard operating conditions. If conditions exceed these requirements, e.g. aggressive or abrasive media, the operator should state the higher requirements when ordering
- Valves made from grey cast iron are not authorized for the use in systems subject to TRD 110.

The Temperature Regulators can be used selectively as flow divider or mixing valve.

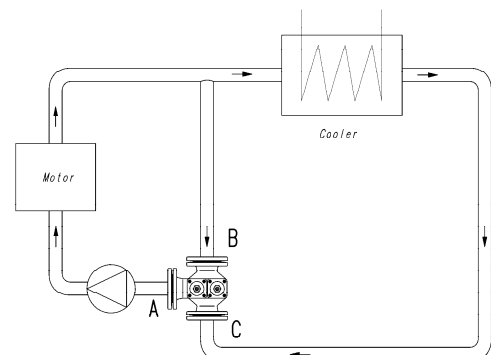
- Mounting of the temperature regulator for the regulation of the medium-inlet temperatures as flow divider, e.g.

- A from the motor
- B to the motor (by-pass)
- C to the cooler



- Mounting of the temperature regulator for the regulation of the medium-outlet temperatures as mixing valve, e.g.

- A to the motor
- B from the motor (by-pass)
- C from the cooler



The path descriptions A, B and C have been cast on the housing

#### 4. Operating principles

AKO Thermostats are equipped with interior, easily exchangeable thermostats which register the temperature of the medium surrounding them at the measuring point (point of installation) and convert it into another physical dimension, namely extension and therefore into a change in distance or length (the valve stroke). With increasing temperature and exceeding the opening start temperature, the tubular slider is lifted off the seat of the valve and opens the path from A to C, at the same time and in the same ratio the path from A to B is closed. The change in path occurs proportionally to the change in temperature of the medium flowing through. The descriptions A, B and C have been cast on the housing of the thermostat. The thermostats can be installed in every position.

#### 5. Technical Data

##### 5.1 Regulating Valve

Materials

- housing

EN-GJL-250, EN-GJS-400-15, CuSn10-C,  
 GP240GH, GX5CrNi19-10 (1.4308)

- inner parts

stainless steel, brass

Sealing kit

NBR

Operation temperature

max. 120 °C

Operation pressure

max. 16, 25, 40 bar

Admissible differential pressure

max. 40 bar

Nominal pressure

PN 16, 25, 40

Connection

Flange EN 1092-1

##### 5.2 Wax-Thermostat

Materials

**237.0120-xxx-0**

brass, bronze, stainless steel  
 (nickel, gilded)

Operation temperature

max. 120 °C

Deliverable temperature ranges

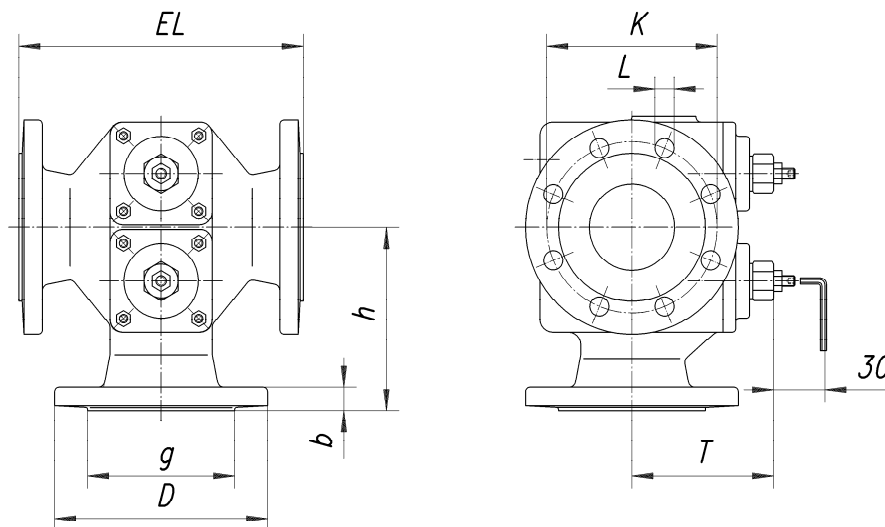
- Standard execution

Deliverable temperature ranges 237.0120-xxx-0			
05 – 15 °C	37 – 47 °C	62 – 71 °C	82 – 93 °C
14 – 26 °C	39 – 50 °C	66 – 74 °C	85 – 96 °C
20 – 30 °C	43 – 54 °C	68 – 78 °C	88 – 99 °C
27 – 37 °C	51 – 60 °C	71 – 79 °C	93 – 103 °C
29 – 40 °C	54 – 63 °C	74 – 82 °C	102 – 113 °C
32 – 41 °C	57 – 66 °C	77 – 85 °C	
35 – 43 °C	60 – 69 °C	79 – 88 °C	

- Sea water execution

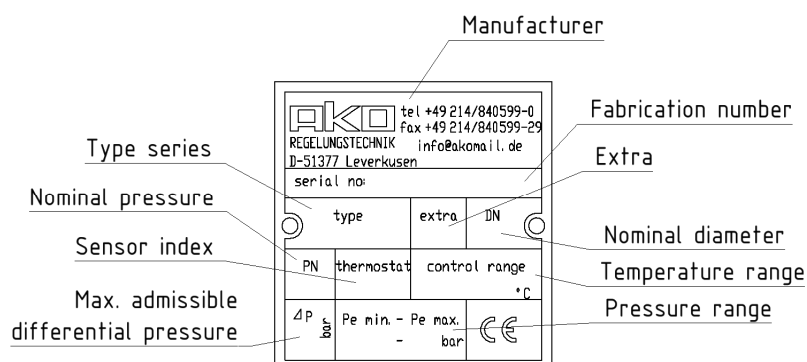
Deliverable temperature ranges 237.0520-xxx-0		
10 – 18 °C	32 – 41 °C	41 – 50 °C
20 – 30 °C	35 – 43 °C	
27 – 41 °C	38 – 47 °C	

### 5.3 Dimensions



order-nr.	DN	D [mm]	g [mm]	b [mm]	h [mm]	T [mm]	EL [mm]	K [mm]	L [mm]	pieces of thermostats	weight [kg]
226.0120-040 226.0121-040	40	150	88	18	102	142 172	178	110	4x18	1	13,0 13,0
226.0120-050 226.0121-050	50	165	102	20	150	135 165	225	125	4x18	1	17,0 17,0
226.0120-065 226.0121-065	65	185	122	20	165	116 146	254	145	4x18	2	25,0 26,0
226.0120-080 226.0121-080	80	200	138	22	171	108 138	267	160	8x18	2	29,0 30,0
226.0120-100 226.0121-100	100	254	158	32	217	125 155	403	180	8x18	4	43,0 45,0
226.0120-125 226.0121-125	125	250	188	26	241	182 212	489	210	8x18	6	65,0 67,0
226.0120-150 226.0121-150	150	285	212	26	254	182 212	489	240	8x22	8	79,0 83,0

### 5.4 Marking




### 6. Transport and storage

Proper shipping and appropriate storage of the control valves are provided.  
**Note the transport and storage temperature of -25 to 80 ° C.**

## 7. Installation

### 7.1 General notes on installation

If the manufacturer of the aggregate or plant has issued specific installation instructions, make sure they are observed.  
The following items should be taken into account besides the general principles governing installation work:

 <b>ATTENTION</b> <ul style="list-style-type: none"><li>- <i>before installing please make sure that the plant will be pressure less and empty of any medium</i></li><li>- <i>in case of high temperatures, please wait for the cooling down to ambience temperature</i></li><li>- <i>purge piping system in case of caustic, inflammable, aggressive or toxic media</i></li></ul>
---

- Planners/construction companies or operator are responsible for positioning and installing products.
- For application outside or in adverse environments like corrosion-promoting conditions (sea-water, chemical vapours), special constructions or protective measures are recommended.
- Before installing the regulating valve, rinse and clean the system otherwise the cone/seat area will be damaged and the control hole will be blocked.
- The direction of flow must correspond with the arrow on the valve body.
- Insert thermometer to control the medium temperature.
- Install a strainer upstream of the temperature regulator to prevent that any sealing parts, welding spatter and other impurities carried along by the process medium impair the proper functioning of the valve, above all the tight shut-off.  
The filter element must be suspended downwards.

<p><b>Note!</b> <i>Remember to leave enough space to remove the filter element</i></p>
--

- The place of installation should be easily accessible and provide ample space for maintenance and extracting the thermostat out of the piping.
- Install a shut-off valve upstream and downstream of the temperature regulator to enable repair and maintenance work without emptying the system.

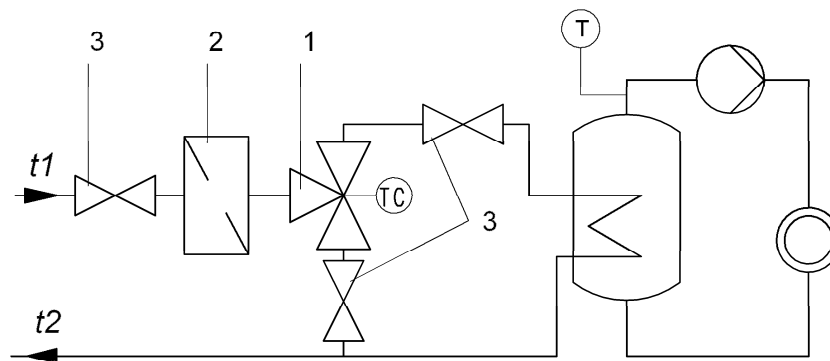
<p><b>Note!</b> <i>Do not install the temperature regulator between a pressure reducing valve and its control line connection</i></p>
---

Refer to the data sheet for applications, limits, limits on use and possibilities.

### 7.2 Installation of the Valve

Install the valve with the operating element connection suspended downwards. The connecting position of the flanges has to follow the function of the control valve. Below the opening temperature the way A-B is opened. Connection B is always connected to the bypass. Connection C is always connected to the heat exchanger.

Example of installation of a temperature valve at a heat exchanger



- 1 temperature regulator
- 2 strainer
- 3 shut-off valve

### 8. Emergency manual adjustment

The thermostats described here are partly equipped with an emergency manual adjustment in order to comply with the safety requirements - especially those of the classification companies. **This emergency manual adjustment is not to be used for adjustment during automatic operation.** If the thermostat fails, the control valve can be used as a manually operated three-way valve via the emergency manual adjustment and therefore can be set in any position until the thermostat can be repaired or replaced.

### 9. Operation of the emergency manual adjustment

On delivery, the adjusting screw of the manual adjustment is secured in the starting position with a counter nut. If the thermostat fails, this counter screw is released and the adjusting screw is adjusted in a clockwise direction using the offset screw driver DIN 911 which is included in delivery. In doing so the tubular slider above the pressure plate is opened to the cooling path (C), and at the same time the short circuit path (B) is throttled. Between both end positions any position of the tubular slider is possible so that whilst monitoring the thermometer the operating temperature can be reached. You must make sure that after every adjustment the counter nut is fastened tightly again. When installing a new thermostat the adjusting screw must be put back into its original position so that the path to the cooler (C) is not mechanically opened first, as this gap cannot be closed again by the automatic system.



### 10. Service and Maintenance

AKO temperature valves are virtually maintenance free. However, if the medium contains pollutants or deposits occur in the control valve, it may be necessary to clean the control valve at large intervals.

Please check from time to time in order to recognize any possible malfunction.

### 11. Fault detective and corrective

In case of mal function it has to be checked, if installation and setting have been executed according to this operations manual.

Reasons for control temperature exceeds being too high

- thermostats soiled, limed up or sticking  
(clean valve and replace sealing kit)
- radiator capacity too low  
(clean radiator and check cooling capacity)
- temperature range of thermostats too high  
(fit thermostats with appropriate set point)
- heat source supplies too much heat, control valve underdimensioned  
(recalculate dimensioning of control valve)
- pressure loss of cooler too high  
(reduce pressure difference between port B and C)

Reasons for control temperature being too low

- the temperature range of the thermostats is too low  
(fit thermostats with appropriate set point)
- heat source supplies too few heat, control valve overdimensioned  
(recalculate dimensioning of control valve)
- control valve installed incorrectly. Ports B and C inverted. At low temperatures the complete flow of coolant runs through the cooler.  
(correct installation of the valve)
- thermostats have been overheated, sliders of the thermostats do not close properly  
(replace thermostat)

### 12. Exchanging a thermostat

 **ATTENTION**

*When repairing the following points must be overserved:*

- *pressureless pipe system*
- *medium must be cool*
- *plant must be drained*
- *purge piping systems in case of caustic, inflammable, aggressive or toxic media*

#### 12.1 Removing of the thermostat

- lock all pipes leading to the control valve, release remaining pressure
- open valve cover bolts M8 (pos.5) and remove valve cover (pos.2)
- extract thermostat (pos.4)
- check inside of valve body for soils and clean if necessary.
- check condition and proper seating of the thermostat slider.
- check and replace flat seal (pos.7) in the guiding ring (pos.3) and the o-ring (pos.6)

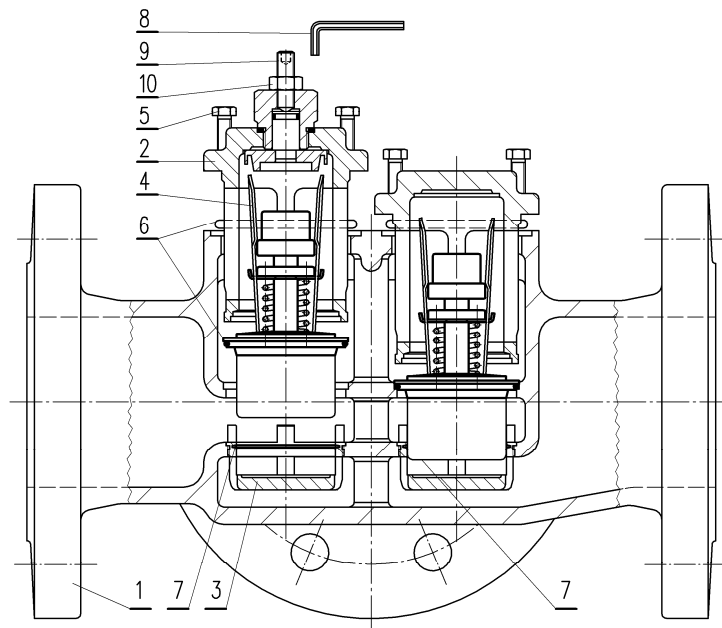
### 12.2 Installation of thermostat

Assembly is executed in vice versa order. In case of control valves with manual override, it has tube ensured that the tips of the thermostat fit in the groove of the pressure plate of the valve cover. If they do not fit, the plates have to be bent carefully in order to make the tips fit in the groove.

Fit the valve cover with new o-ring when necessary and tighten the bolts with torque wrench ca. 30 Nm.

 **ATTENTION**

*If a thermostat with different temperature range has been fitted, replace the type label by a new one showing the correct*



### 12.3 Testing the function of the manual override

- open lock nut (pos. 10)
- turn the adjustment bolt (pos.9 clockwise for 10 mm by means of the wrench (pos.8). In case the thermostat blocks or sticks, open the bolts (pos.5) and move the valve cover until the drag disappears.
- bring the adjustment bolt in its original position and fix the lock nut.

## 13. REACh-Declaration

### **Declaration to regulation EC 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACh)**

By the REACh-Regulation, the company AKO Regelungstechnik GmbH & Co. KG is only affected as a downstream user. Responsibilities due to the production and Marketing of substances / chemicals for pre-registration or registration are not applicable for us.

As a downstream user we will fulfil all requirements according to REACh.