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# INSTRUCTION MANUAL

## TC01 TEMP. REGULATING VALVE

Doc. No.	H-QAP-006
Rev. No.	0
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### 1. SAFETY GUARD

Please read carefully this manual before installation, and comply with following instruction.

**WARNING** – Handle with care, it may cause to burn

**CAUTION** – Handle with care, it may cause to burn and damage

#### 1) Before Installation

**WARNING**

- Do not use the valve for other purpose except temperature control

**CAUTION**

- Attention to not break and shall not be over bended the capillary tube.
- Washes inside pipe to remove foreign matters.
- Shall be installed properly to fluid direction.
- Shall be confirmed support and fixation for protecting from excessive stress.
- Shall be saved a space for maintenance.

#### 2) Operation

**WARNING**

- Do not touch the valve body during operation.

**CAUTION**

- Shall not be bypass state during operation.

#### 3) Disassembly and Inspection

**WARNING**

- Completely remove inner pressure of pipe line, and close the inlet and outlet stop valve to isolate the valve from the system.
- Fall donw the temperature to normal and recommend to use protective glove.

**CAUTION**

- Do not drop the part and keep away from damage.

## 2. OUTLINE

TC01 Temperature Regulating Control valve is self-acting type and does not require to other power to operate. Easy to install and can be applied to various field such as hot-water tank, heat exchanger and oil preheater.



Fig. 1 TC01 Temperature Regulating Valve

## 3. FEATURE

- 1) It can be easily adjusted the set point by turning handle.
- 2) It is possible to accurately control the temperature due to the proportional function.
- 3) Simple structure and easy to install and control.
- 4) Cooling unite of sensor can be provided according to customer's demand.
- 5) Screen (Filter) is installed inside valve and no need to install additional strainer on inlet side.

### 4. GENERAL SPECIFICATION

SPECIFICATION		MODEL NO. TC01
Applicable Fluid		STEAM
Operating Pressure		Max. 10Kgf/Cm <sup>2</sup>
Design Temperature		Max. 250 °C
Connection		JIS FF, RF Flanged
Temperature Range		10~60, 50~100, 80~100 °C
Variation of Temperature		± 2 °C
Capillary Size		3m, 5m, 7m
Connection of Sensor pocket		PT 1"
Sensor Size (mm)		320mm
Material	Body	BC6, SC, FCD
	Trim	SUS304

Table 1

### 5. PRINCIPLE OF OPERATION

The TC01 Temperature Regulating Valve operates according to the liquid expansion and condensation principle. The temperature sensor, capillary tube and operating elements are filled with an expansion liquid.

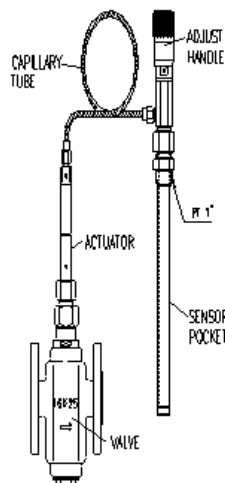


Fig 2. Composition

The temperature-dependent change in volume of this liquid causes the operating element to move and as a result also the plug stem of the control valve with the attached plug. The position of the plug determines the flow rate of the heat transfer medium across the free area between seat and plug the set point adjustable with an adjust handle to a value which can be read off from the graduation. The valve consists of a sensor, operating element and valve body. The TC01 is proportional device operated by the process medium. Each time the temperature sensed deviates from the adjusted set point, the valve plug position changes. The accuracy and stability of control process depend on the disturbances occurring in the controlled systems, such as changes in the upstream pressure and flow rate.

## 6. PIPING METHOD

- 1) It is recommended to install vertically on the horizontal pipe line. (Install it vertically in the above direction but if necessary, it also can be installed underside direction)
- 2) Shall be installed to the fluid direction and it shall be identical to arrow marks.
- 3) Clean all foreign matters before installation.
- 4) Install bypass line for remove the foreign matter, inspection and maintenance.
- 5) TC01 Temperature Regulating valve already has a screen (filter) for protecting from foreign matter and therefore additional strainer is not required (If necessary, strainer can be installed)

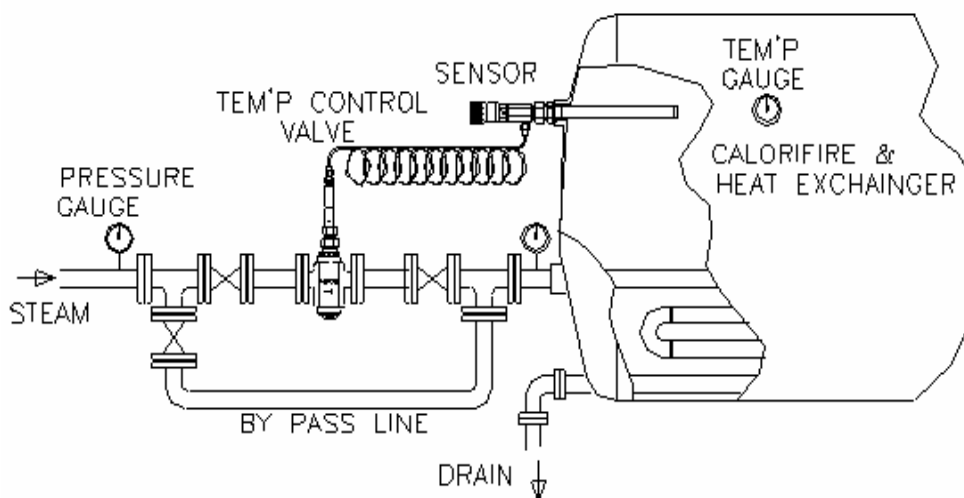


Fig. 3 Piping Diagram

### 7. INSTALLATION OF SENSOR

The valve and sensor are separately supplying, and shall install the valve first and install sensor then assemble the parts.

- 1) The capillary tube shall be handled with care and protect to over bend.
- 2) Sensor shall be installed nearest thermometer as much as possible.
- 3) Sensor shall be sunk into a medium deeply at 4/5. (See the Fig. 4)
- 4) It controls well if glycerin can be filled on the Pocket.
- 5) Keep the sensor in the direction of flow of stream horizontally all the time.

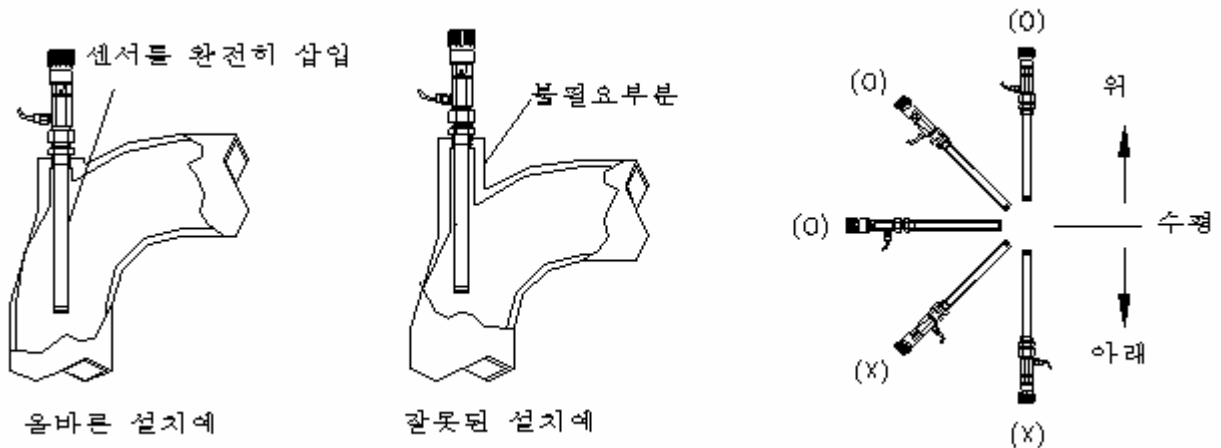


Fig. 4 Installation of Sensor

### 8. ADJUSTMENT

The TC01 Temperature Regulating Valve can be operated on any value of indicated graduation of sensor. Shall be hold set point at least 15~20 minutes till settled temperature and readjust the setting value. (Turn clockwise direction to raise and counterclockwise direction to drop the temp.)

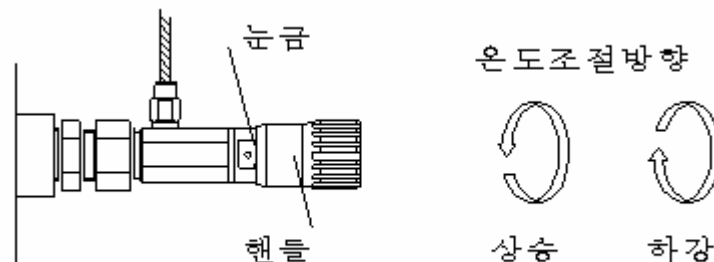


Fig. 5 Adjustment

### 9. DIMENSION AND PARTS

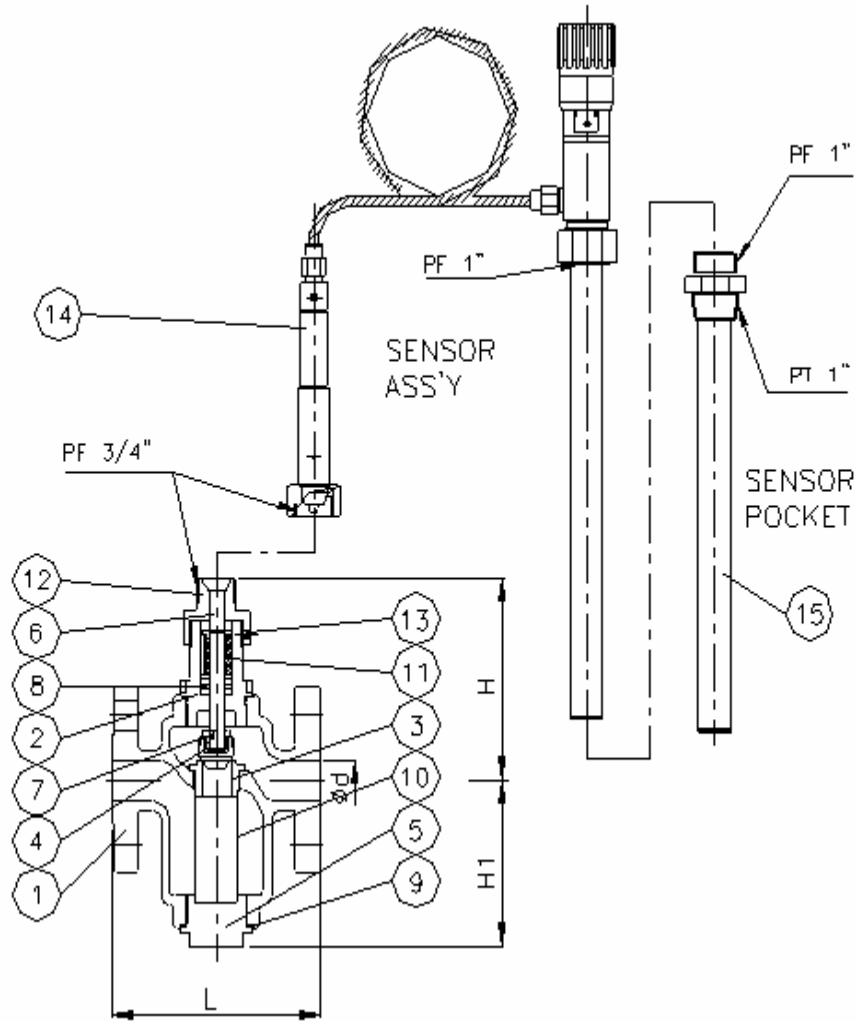


Fig. 6 Dimension & Parts

#### 1) Dimension

Unit - mm

Diameter	d	L	H1	H	Connection
15A	15	135	70	125	Flanged JIS 5K, 10K, 16K DIN PN6, PN10, PN16
20A	20	140	70	125	
25A	25	140	91	125	
32A	32	170	120	127	
40A	40	170	120	127	

Table 2

### 2) Parts

Part No.	Item Description	Q'ty	Supply Available	Remarks
1	BODY	1		
2	BONNET	1		
3	SEAT	1		
4	DISC	1		
5	CAP	1		
6	STEM	1		
7	DISC HOLDER	1		
8	PACKING	1 Set	○	
9	GASKET	1	○	
10	SCREEN	1	○	
11	SPRING	1		
12	GLAND	1		
13	SET SCREW	1		
14	SENSOR ASS'Y	1 set	○	
15	POCKET			

Table 3

## 10. TROUBLESHOOTING

Condition	Cause	Measures
Raise & Fall of Temperature	1. Error on Temp range adjustment	Readjust scale properly
	2. Fault valve install direction	Reinstall according to fluid direction
	3. Leakage of Sensor	Replace with new
	4. Error in working stem and disc	Figure the cause of sticking
	5. Different in direction between sensor and thermometer	Reinstall the sensor to same direction
	6. Wrong installation of sensor	Reinstall the sensor according to manual
	7. Incorrect of valve size	Replace with proper size

Table 4