

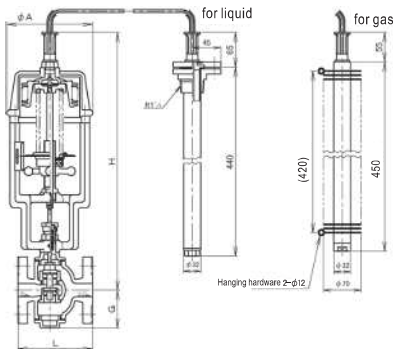
# TD-2 Type Series Temperature Regulating Valve

General purpose, flanged temperature regulating valves for heating of water tank, heat exchanger, heavy oil heater etc. The series also include valves using water or coolant for cooling purpose. And we have a suitable models applicable in place where ambient temperature is higher than set temperature or applicable for the lower temperature of 40°C or below.

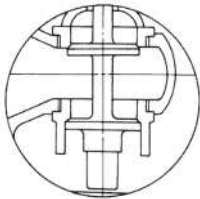


## CONSTRUCTION

TD-2 Type



Depending on size, the structure may vary. The bellows of TD-2L and TD-2AL Types have different structures.



TD-2A, 2AL Type

## LEAKAGE ALLOWANCE (g/min or mL/min)

| Size(mm)    | 15 | 20 | 25 | 32 | 40 | 50 |
|-------------|----|----|----|----|----|----|
| TD-2 Type   | 20 | 20 | 20 | 26 | 32 | 40 |
| TD-2A Type  | 20 | 20 | 20 | 26 | 32 | 40 |
| TD-2L Type  | 40 | 40 | 40 | 52 | 64 | 80 |
| TD-2AL Type | 40 | 40 | 40 | 52 | 64 | 80 |

| Size(mm)    | 65  | 80  | 100 | 125 | 150 |
|-------------|-----|-----|-----|-----|-----|
| TD-2 Type   | 52  | 64  | 80  | 100 | 120 |
| TD-2A Type  | 52  | 64  | 80  | 100 | 120 |
| TD-2L Type  | 104 | 128 | 160 | —   | —   |
| TD-2AL Type | 104 | 128 | 160 | —   | —   |

\* Reading in g/min for testing fluid STEAM.  
\* Reading in mL/min for testing fluid WATER.

## SPECIFICATIONS (Common use)

| Utility                  |            | Heating                                                              |       | Low temp heating |     | Cooling            |     | Low temp cooling |  |
|--------------------------|------------|----------------------------------------------------------------------|-------|------------------|-----|--------------------|-----|------------------|--|
| Model name               |            | TD-2                                                                 |       | TD-2L            |     | TD-2A              |     | TD-2AL           |  |
| Size                     |            | 15~150(½"~6")                                                        |       | 15~100(½"~4")    |     | 15~150(½"~6")      |     | 15~100(½"~4")    |  |
| Applicable fluid         |            | Steam & hot water                                                    |       |                  |     | Water & cold media |     |                  |  |
| Fluid temperature        |            | Max. 184℃                                                            |       |                  |     | Max. 60℃           |     |                  |  |
| Seat type                |            | Double seated                                                        |       |                  |     |                    |     |                  |  |
| Leakage allowance        |            | Refer to table of leakage allowance                                  |       |                  |     |                    |     |                  |  |
| End connection           |            | Flanged JIS 10KFF                                                    |       |                  |     |                    |     |                  |  |
| Materials                |            | Body(Cast iron), Disc & Seat(Cast bronze*), Bellows(Phosphor bronze) |       |                  |     |                    |     |                  |  |
| Pressure limit at inlet  | Size(mm)   | 15~40                                                                | 50~65 | 80               | 100 | 125                | 150 |                  |  |
|                          | Limit(MPa) | 1.0                                                                  | 0.7   | 0.5              | 0.4 | 0.35               | 0.2 |                  |  |
| Valve body pressure test |            | Hydraulic 1.5MPa                                                     |       |                  |     |                    |     |                  |  |

\* Disc and seat with stainless steel are available upon your request.

## SPECIFICATIONS TD-2 Type (Heating)、TD-2A Type (Cooling)

| Model name                          | TD-2(Heating)                                                      |                                                                | TD-2A(Cooling)       |                                             |
|-------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------------|----------------------|---------------------------------------------|
| Utility                             | Liquids                                                            | Gases                                                          | Liquids              | Gases                                       |
| Code name                           | TD2W-B □* <sup>1</sup>                                             | TD2G-B                                                         | TD2AW-B              | TD2AG-B                                     |
|                                     | ※ 1, 2 or 3 for adjustment temperature range is required in □.     |                                                                |                      |                                             |
| Adjustment temperature range        | 1:40~60°C<br>2:60~80°C* <sup>2,3</sup><br>3:80~100°C               | 40~60°C, 50~70°C, 60~80°C, 70~90°C, 80~100°C* <sup>2,3</sup> . |                      |                                             |
| Applicable ambient temperature      | Setting temperature - 10°C or below                                |                                                                |                      |                                             |
| Fluid to be heated or cooled        | Water, oil & liquids                                               | Gases                                                          | Water, oil & liquids | Gases                                       |
| Length of capillary tube            | Size 15~100mm:2m* <sup>5</sup> , Size 125~150mm:4m* <sup>5</sup> . |                                                                |                      |                                             |
| Thermo bulb materials               | Stainless steel                                                    | Stainless steel<br>with stainless steel fin                    | Stainless steel      | Stainless steel<br>with stainless steel fin |
| Applicable pressure for thermo bulb | Max. 1.0MPa                                                        |                                                                |                      |                                             |

## SPECIFICATIONS TD-2L Type (Low temp Heating), TD-2AL Type (Low temp Cooling)

| Model name                          | TD-2L(Low temp heating)                                          |                                          | TD-2AL(Low temp cooling) |                                          |
|-------------------------------------|------------------------------------------------------------------|------------------------------------------|--------------------------|------------------------------------------|
| Utility                             | Liquids                                                          | Gases                                    | Liquids                  | Gases                                    |
| Code name                           | TD2LW-B                                                          | TD2LG-B                                  | TD2ALW-B                 | TD2ALG-B                                 |
| Adjustment temperature range        | 15~35, 20~40, 35~55°C                                            |                                          |                          |                                          |
| Applicable ambient temperature      | Setting temperature +20°C or below                               |                                          |                          |                                          |
| Fluid to be heated or cooled        | Water, oil & liquids                                             | Gases                                    | Water, oil & liquids     | Gases                                    |
| Length of capillary tube            | Size 15~100mm:2m* <sup>5</sup> , Size 125~150mm:4m* <sup>5</sup> |                                          |                          |                                          |
| Thermo bulb materials               | Stainless steel                                                  | Stainless steel with stainless steel fin | Stainless steel          | Stainless steel with stainless steel fin |
| Applicable pressure for thermo bulb | Max. 1.0MPa                                                      |                                          |                          |                                          |

\* 1. In case of size 100mm or bigger, the code name is TD2W-B.

\* 2. Items other than the above adjustment temperature range are available upon your request.

\* 3. In case of liquid use, adjustable temperature range 100~120°C (With standing temperature 130°C) is available upon your request.

\* 4. Refer to Page 132 for adjustable temperature range.

\* 5. Length of capillary tube up to 5m is available upon your request.

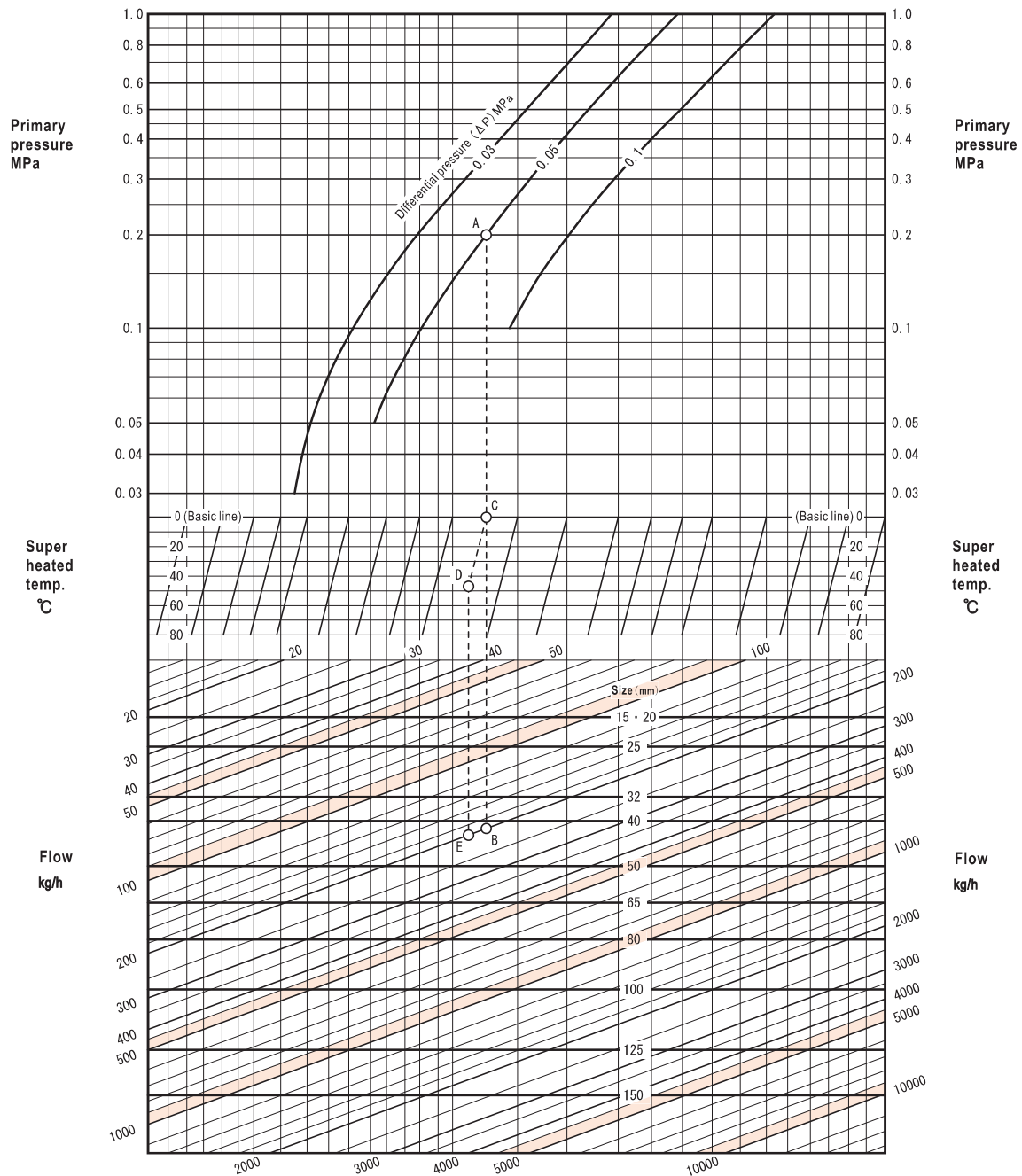
\* 6. In case of liquid use, for sizes 15~65mm (1/2"~2 1/2"), the protection cap for thermo bulb, with non-standard dimension is available upon your request.

## DIMENSIONS (mm)

| Size       | L   | G   | H   | A   | Cv value | Mass(kg) |
|------------|-----|-----|-----|-----|----------|----------|
| 15(1/2")   | 126 | 60  | 475 | 160 | 3        | 12.1     |
| 20(3/4")   | 130 | 60  | 475 | 160 | 3        | 12.4     |
| 25(1")     | 140 | 70  | 485 | 160 | 4        | 13.5     |
| 32(1 1/4") | 150 | 75  | 490 | 160 | 6.5      | 15       |
| 40(1 1/2") | 160 | 75  | 490 | 160 | 8        | 15.5     |
| 50(2")     | 180 | 100 | 525 | 160 | 12.5     | 22.5     |
| 65(2 1/2") | 215 | 115 | 535 | 160 | 18       | 29.2     |
| 80(3")     | 260 | 125 | 580 | 180 | 25       | 38       |
| 100(4")    | 300 | 150 | 605 | 180 | 40       | 57.5     |
| 125(5")    | 360 | 180 | 745 | 220 | 70       | 75.6     |
| 150(6")    | 382 | 205 | 770 | 220 | 110      | 125      |

Flange code JIS 10KFF

## SIZE SELECTION CHART (for Steam)



### ● HOW TO USE THE CHART

Select a valve with proper size for meeting the following requirements.

Primary pressure: 0.2MPa  
Flow of saturated steam: 200kg/h  
Differential pressure: 0.05MPa

First, find out the point (A) where the primary pressure line (0.2MPa) intersects with the differential line (0.05MPa). Draw a vertical line from point A. This line intersects with flow curve (200kg/h). The intersection point is B. Since B is located between a nominal diameter range of 40mm~50mm. The larger value, which is 50mm, is taken as the nominal diameter that we are looking for.

If the steam temperature is 180°C, the first thing is to calculate the degree of superheat.

Since degree of superheat = temperature of superheat steam-temperature of saturated steam, Degree of superheat:  $180^{\circ}\text{C} - 132.9^{\circ}\text{C} = 47.1^{\circ}\text{C}$ . Draw a vertical line from point A until it intersects with the benchmark line. The intersection point is named C. Move from point C parallel along the superheat line ( $47.1^{\circ}\text{C}$ ) to decide point D.

Draw a vertical line from point D until it intersects with flow curve (200kg/h). the intersection point is named E. Since point E is located between a nominal diameter range of 40mm~50mm. The larger value, which is 50mm, is taken as the nominal diameter that we are looking for.

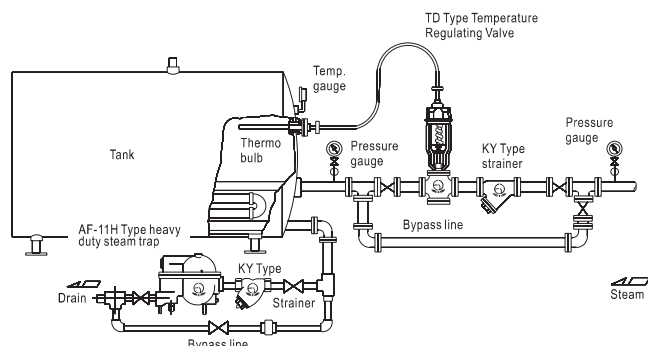
See Page 278 for temperature of saturated steam.

# DATA/Temperature Regulating Valve

## Key Points for Installation

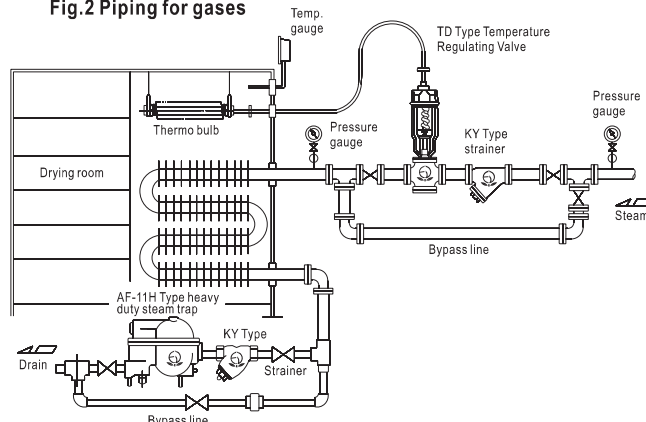
### PIPING EXAMPLE

Fig.1 Piping for liquids



Note: It's required that the safety relief valve should be installed on the tank side.

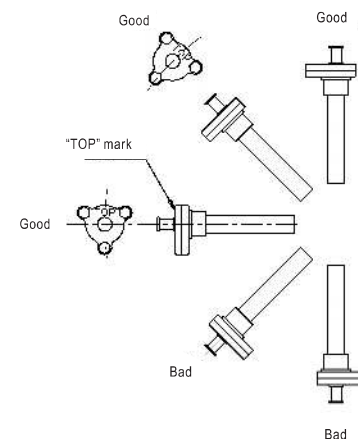
Fig.2 Piping for gases



### KEY POINTS FOR SELECTION AND INSTALLATION

- Temperature regulating may not be possible if ambient temperature is very high due to direct sunlight or heat accumulated in the place where the valve is installed. The following is the allowed ambient temperature for different types of valves.  
※Allowed ambient temperature:  
TD-□ Type (for heating), TD-□A Type (for cooling): Atmosphere temperature  $-10^{\circ}\text{C}$  or below against set temperature.  
TD-□L Type (for low temperature heating), TD-□AL Type (low temperature cooling): Atmosphere temperature  $+20^{\circ}\text{C}$  or below against set temperature.
- Generally, for the purpose of selecting size of valve, the differential pressure before and after valve should be 0.05MPa. In addition, the inlet pressure of temperature regulating valve should be 0.2~0.3MPa. Such a pressure can help ensuring stable temperature regulating performance and expanding the service life of the valve.
- For ideal controllability, take the median of the temperature regulating range as set temperature.
- For applications with low capacity and risk of leakage, select single seat TD-8 or TD-4 Type series that have less leakage.
- Install strainer at the primary side of temperature regulating valve.
- For equipments whose operation cannot be stopped, install bypass piping (with stop valve) between the primary and secondary sides of temperature regulating valve (see Fig.1, 2). If such a bypass piping is not installed, install blowing stop valve, which is branched from the main pipe, right before the primary stop valve of temperature regulating valve to make flushing possible.
- The temperature may exceed set temperature due to leakage of temperature regulating valve. To avoid such increase of temperature, install electric valve or other blocking devices at the outlet side of temperature regulating valve.
- Make sure the direction of flow of fluid is the same as the direction marked on the product and install temperature regulating valve vertically to horizontal pipes.
- Install stop valve and pressure gauge before and after temperature regulating valve (see Fig.1, 2).
- The thermo bulb should be installed in a manner so that the head faces horizontally or slightly downwardly (but not upwardly). In addition, the "TOP" mark must face upwardly (see Fig.3).
- The thermo bulb must have at least 3/4 of its total length submerged into the flowing fluid. The thermometer must be installed near and at the same height of the thermo bulb.
- Do not bend the capillary tube to an acute angle.
- If the fluid is steam, install steam trap for discharging drain generated by heat exchanger.
- Leave sufficient space for dismantling and maintenance purpose.
- Temperature regulating valve should be supported and fixed properly to avoid impact due to the weight of piping, bending force or vibration.
- In case of any freezing possibility, insulate or drain out.
- Deviation of temperature setting and range of temperature regulating are as below:

Fig.3 Direction for installation of thermo bulb



### TEMPERATURE SET ERROR (TD-8, 8A Type, TD-2 Type Series)

| Length of capillary tube | Heating & cooling         |                           | Low temp heating & cooling                                                     |
|--------------------------|---------------------------|---------------------------|--------------------------------------------------------------------------------|
|                          | A                         | B                         |                                                                                |
| 2m                       | $\pm 2^{\circ}\text{C}$   | $\pm 3^{\circ}\text{C}$   | $\pm 3.5^{\circ}\text{C}$<br>2m or longer add $\pm 0.5^{\circ}\text{C}$ per 1m |
| 2~3.5m                   | $\pm 2.5^{\circ}\text{C}$ | $\pm 3.5^{\circ}\text{C}$ |                                                                                |
| 3.5~5m                   | $\pm 3^{\circ}\text{C}$   | $\pm 4^{\circ}\text{C}$   |                                                                                |

\* 1. A: In case of Max.  $100^{\circ}\text{C}$  or less for adjustable temperature range.

B: In case of exceeding  $100^{\circ}\text{C}$  in all or part of adjustable temperature range.

\* 2. In case of gases service,  $\pm 1^{\circ}\text{C}$  is added.

### ADJUSTABLE TEMPERATURE RANGE (TD-8, 8A Type, TD-2 Type Series)

| Heating & cooling |                           |                          | Low temp heating & cooling |                          |
|-------------------|---------------------------|--------------------------|----------------------------|--------------------------|
| Code No.          | Adjustable temp. range    | Withstanding temperature | Adjustable temp. range     | Withstanding temperature |
| 1                 | 40~60 $^{\circ}\text{C}$  | 70 $^{\circ}\text{C}$    | 15~35 $^{\circ}\text{C}$   | 50 $^{\circ}\text{C}$    |
|                   | 50~70 $^{\circ}\text{C}$  | 80 $^{\circ}\text{C}$    | 20~40 $^{\circ}\text{C}$   |                          |
|                   | 60~80 $^{\circ}\text{C}$  | 90 $^{\circ}\text{C}$    | 35~55 $^{\circ}\text{C}$   | 70 $^{\circ}\text{C}$    |
| 2                 | 70~90 $^{\circ}\text{C}$  | 100 $^{\circ}\text{C}$   |                            |                          |
|                   | 80~100 $^{\circ}\text{C}$ | 110 $^{\circ}\text{C}$   |                            |                          |

\* Other than the above temperature range items are available upon your request.