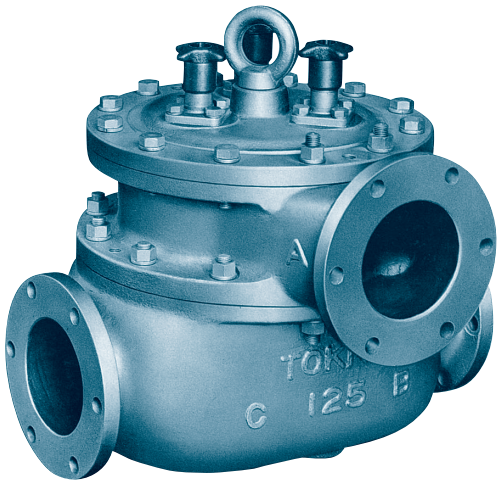
S(M)FH Type SFH・Type SMFH Wax Type Temperature Regulating Valves

- Three way temperature regulating valve acting by wax type thermostat ("element").
- Operating power like a electricity, hydraulic pressure and air pressure is not necessary.
- Operating characteristics are free from ambient temperature
- It is recommended, although position is free, to install upright due to maintenance.
- Disassembling and maintenance work for S(M)FH4, S(M)FH5A and S(M)FH6 can be done without separating from piping.



Specifications

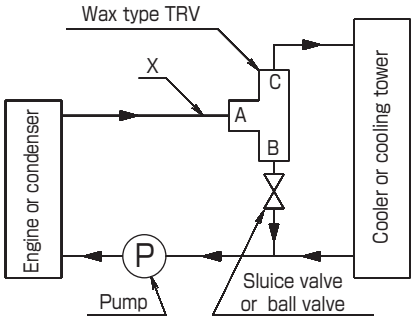
Fluid		Water, lubricant, fuel oil
Allowable max. pressure		1.0MPa
Permissible differential pressure		0.15MPa
Connection		Flanged JIS10K
Material	Body	Cast iron (Cast steel is available)
	Main parts	Bronze, stainless steel
Direction of ASSEMBLY (1)		STANDARD ASSEMBLY, REVERSE ASSEMBLY

Note (1): For SFH3A and SMFH3A, only STANDARD ASSEMBLY is available.

Control system

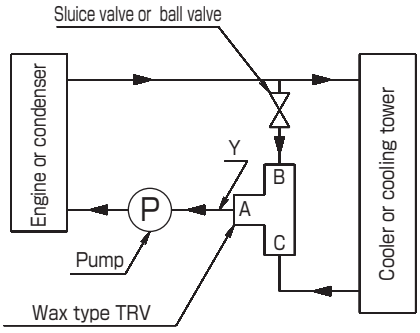
○ Diverting type

To make constant the temperature of point X.
The flow rate into cooler/cooling tower is controlled by the fluid temperature of A.



○ Mixing type

To make constant the temperature of point Y.
The flow rate into cooler/cooling tower is controlled by the fluid temperature of A.



Name of connection
A : Engine or condenser
B : Bypass line
C : Cooler or cooling tower

Remark : Control system shall be specified when ordering.

Model, control system and size

Diverting type	Mixing type	Size
SFH3A	SMFH3A	25—80
SFH4	SMFH4	100—50
SFH5A	SMFH5A	25・40—80
SFH6	SMFH6	200・250

Indication of Type

Example : S M F H 5 A R
- Direction of ASSEMBLY (S : STANDARD, R : REVERSE)
- Type

Standard set temperature

(℃)

Standard set temperature (2)	25	30	35	40	45	50	55	60	65	70	75	80	85	87
Operating temperature range	20/30	25/35	30/40	35/45	40/50	45/55	50/60	55/65	60/70	65/75	70/80	75/85	80/90	82/92

Note (2): Max. allowable temperature is standard set temperature +20℃.

Type SFH・Type SMFH Wax Type Temperature Regulating Valves

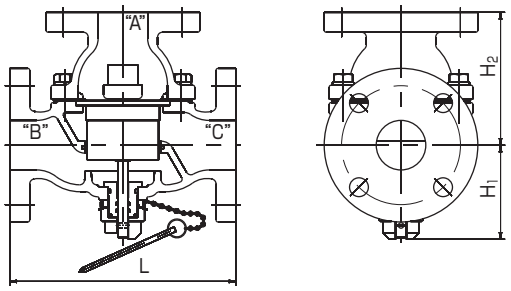
Construction and Cv values

○ SFH3A, SMFH3A

(mm, kg)

Class \ Size	25	32	40	50	65	80
H_1	88	93	93	96	103	115
H_2	117	134	134	134	167	177
L	188	228	228	228	298	318
Q'ty of element	1	1	1	1	2	2
Weight	10.5	14	15	18	33	42.5
Cv values	6.5	22	31.2	45.8	114	152

SFH3A・SMFH3A Size : 25—80

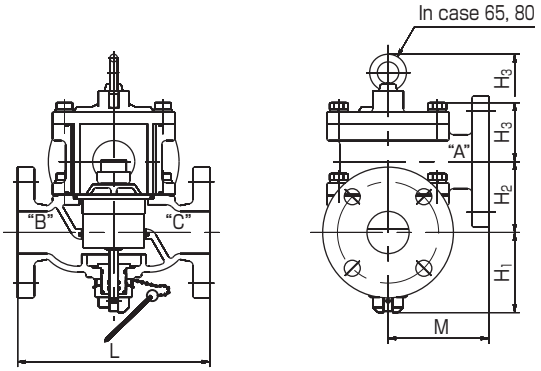


○ SFH5A, SMFH5A

(mm, kg)

Class \ Size	25	40	50	65	80
H_1	88	93	96	103	115
H_2	68	84	84	146.5	157.5
H_3	53.3	70	70	160	167.5
L	188	228	228	298	318
M	94	119.5	119.5	187	204
Q'ty of element	1	1	1	2	2
Weight	13	21	24	43	54
Cv values	6.5	31.2	45.8	114	152

SFH5A・SMFH5A Size : 25・40—80

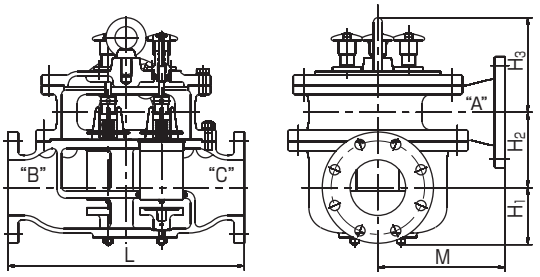


○ SFH4, SMFH4

(mm, kg)

Class \ Size	100	125	150
H_1	128	128	128
H_2	160	170	180
H_3	162	213	221
L	388	532	608
M	264	286	344
Q'ty of element	2	3	4
Weight	83	160	215
Cv values	230	330	433

SFH4・SMFH4 Size : 100—150

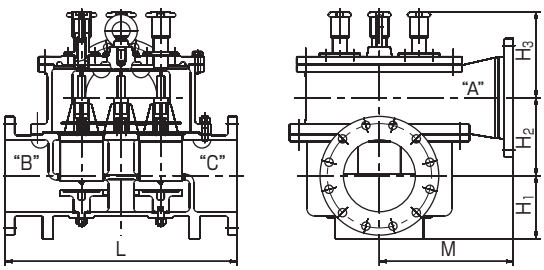


○ SFH6, SMFH6

(mm, kg)

Class \ Size	200	250
H_1	175	215
H_2	216	246.5
H_3	238	241
L	644	728
M	372	414
Q'ty of element	4	6
Weight	245	355
Cv values	768	1200

SFH6・SMFH6 Size : 200—250

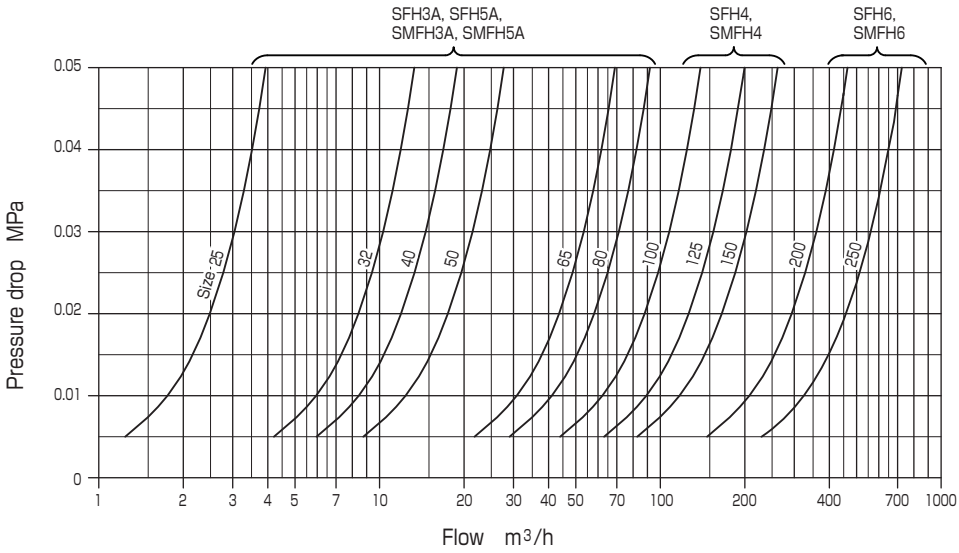


Type SFH・Type SMFH Wax Type Temperature Regulating Valves

Sizing

Use following chart to select the suitable valve size.

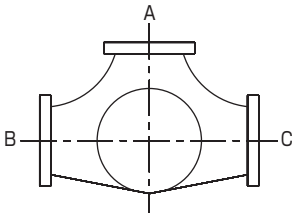
Flow—Pressure drop (Water)



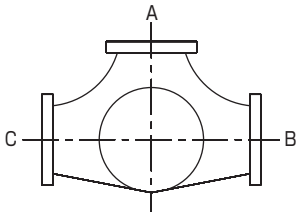
Direction of ASSEMBLY (view from top)

Direction of port B・C for port A of S(M)FH5A, S(M)FH4 and S(M)FH6 shall be specified at order.
STANDARD ASSEMBLY will be supplied in case of no specification.

B : Bypass
C : Cooling tower

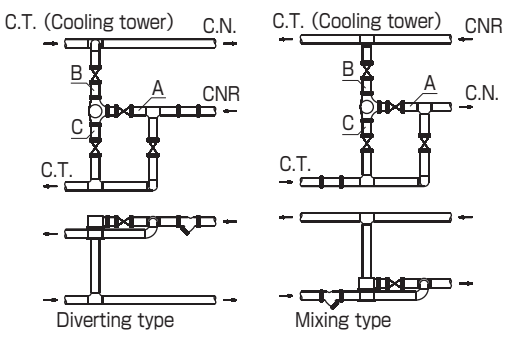


STANDARD ASSEMBLY

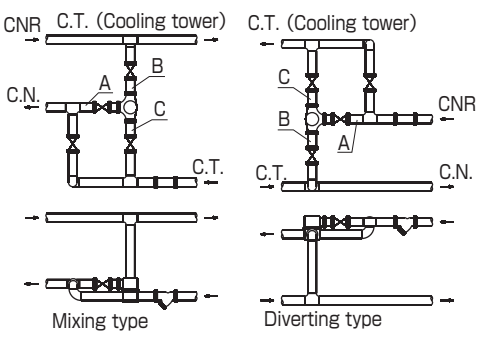


REVERSE ASSEMBLY

Installation example



STANDARD ASSEMBLY

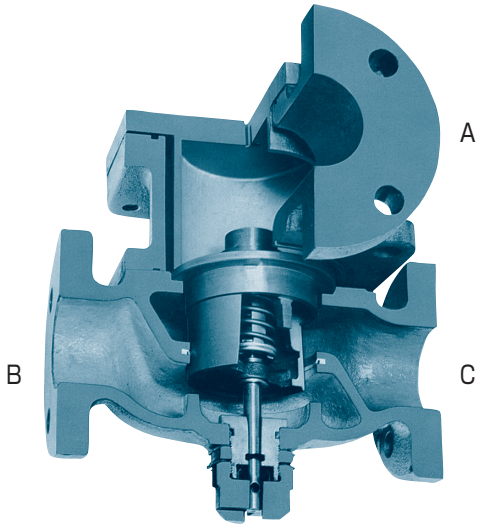


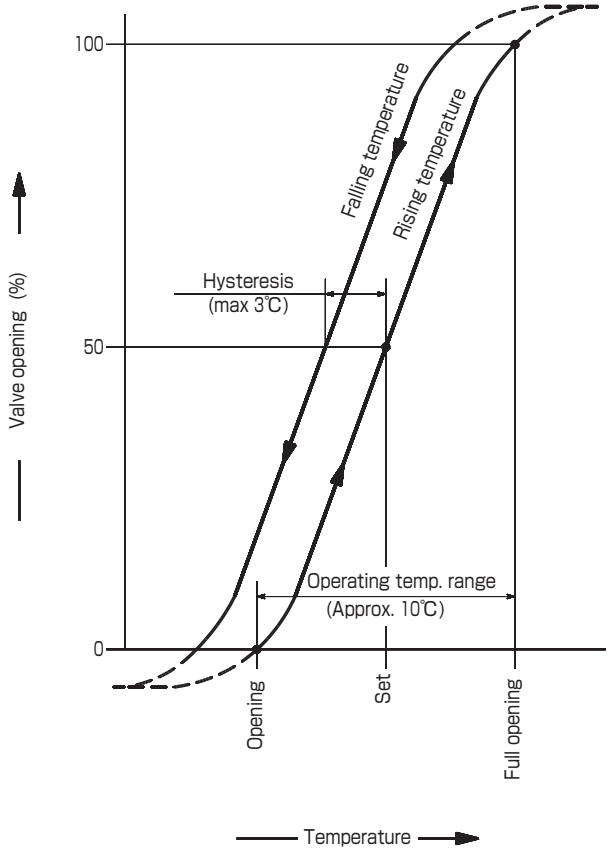
REVERSE ASSEMBLY

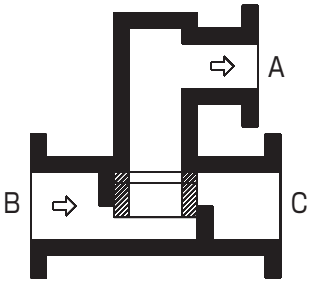
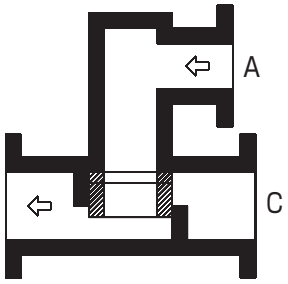
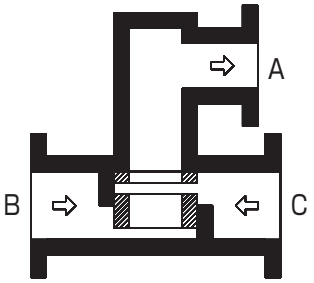
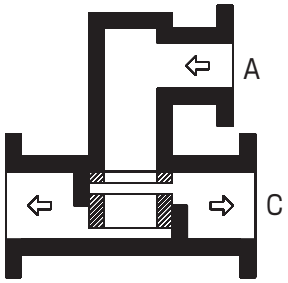
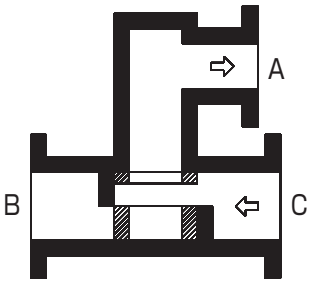
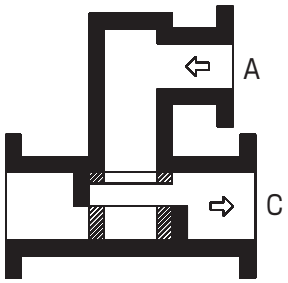
Type SFH・Type SMFH Wax Type Temperature Regulating Valves

Element characteristics

The valve is operated by utilizing the phase change of wax that is, “solid to liquid” or “liquid to solid”.
The valve working as mixing type or diverting type controls the fluid operating temperature within approx. 10℃.

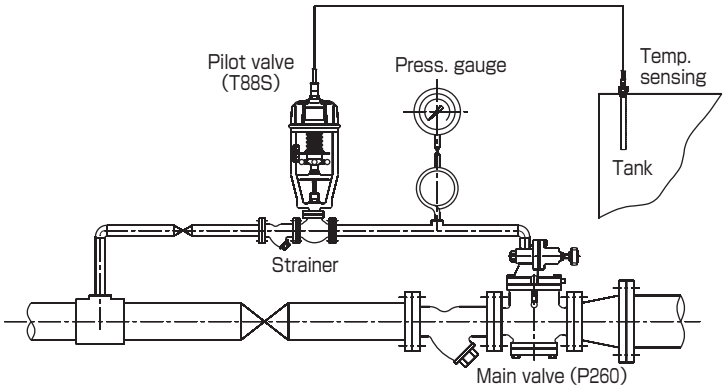


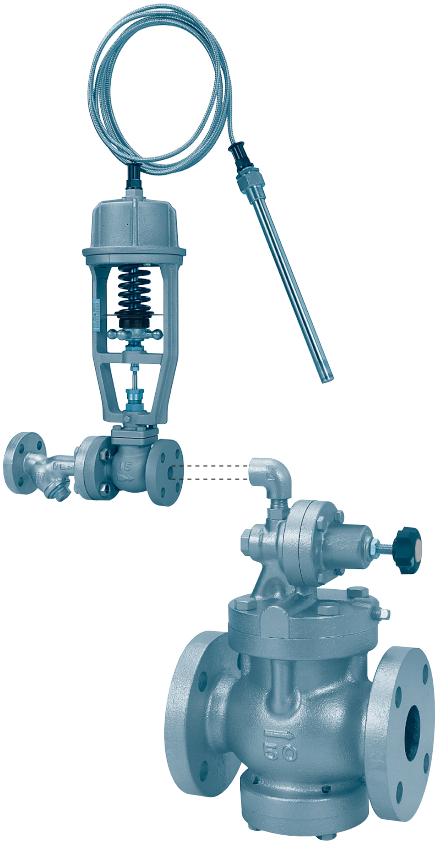


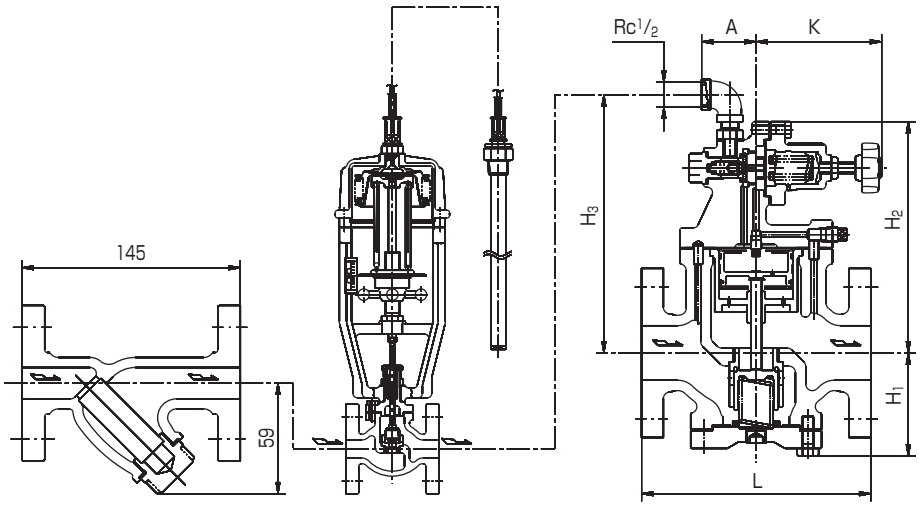
Mixing type	Diverting type
 Lower than set temperature range (Flow from bypass line)	 Lower than set temperature range (Flow into bypass line)
 Intermediate of set temperature range (Flow from bypass line and cooler)	 Intermediate of set temperature range (Flow into bypass line and cooler)
 Higher than set temperature range (Flow from cooler)	 Higher than set temperature range (Flow into cooler)

BW4

Type BW4 Temperature Regulating Valve







Type BW4 temperature regulating valve consist of P260 pressure reducing valve as main valve, T88S temperature regulating valve as pilot valve and Y strainer.

Specifications

Type		For heating										
Set temperature range		15—120℃ (Refer to standard set temperature range)										
Size		15	20	25	32	40	50	65	80	100	125	150
Valve	Main valve	Pilot valve acting, single seat										
	Pilot valve	T88S (single seat) temp. regulating valve, size:15										
Pressure (1)	Inlet of main valve	0.1—1.0MPa										
	Outlet of main valve	0.03—0.2, 0.1—0.8, 0.5—0.9MPa										
Connection		Flanged JIS10KFF										
Fluid through valve		Steam (max. 220℃)										
Bulb tube pressure (MPa)		Max. 1.0										
Bulb tube connection		Screwed										
Capillary tube		3m (max. 5m)										

Note (1) : Steam pressure shall be as followings.
(a) Outlet pressure shall be lower than 90% of inlet pressure (min. 0.03MPa).
(b) Max. pressure reducing ratio shall be 20 : 1.
(c) Min. differential pressure shall be 0.07MPa.

Type BW4 Temperature Regulating Valve

Main parts material for main valve

Part name	Material
Body, cover	Cast iron (*2)
Valve disc, seat	Stainless steel
Piston, cylinder	Stainless steel

Main parts material for strainer

Part name	Material
Body	Cast iron
Cap	Brass
Screen	Stainless steel

Note (*2) : Body material for size 15—40 is Spheroidal graphite cast iron.

Dimensions and weights for main valve

(mm, kg)

Class \ Size	15	20	25	32	40	50	65	80	100	125	150
L	145	150	160	175	190	210	235	265	310	360	400
H_1	81	76	74	79	85	95	112	123	150	174	202
H_2	171	176	178	188	198	212	231	248	305	337	367
H_3	196	201	203	213	223	237	256	273	320	352	382
K	115	115	115	115	111	111	111	111	162	162	162
A	46	46	46	45	50	50	50	50	58	58	58
Weight	8	8.5	10	12	14	18	26	32	51	71	105

Standard set temperature range

Category	Set temperature range	Max.allowable temperature
Low temperature	15℃ — 30℃ 20℃ — 40℃ 35℃ — 55℃	45℃ 50℃ 70℃
Standard temperature	40℃ — 60℃ 50℃ — 70℃ 60℃ — 80℃ 70℃ — 90℃ 80℃ — 100℃ 90℃ — 110℃ 100℃ — 120℃	70℃ 80℃ 90℃ 100℃ 110℃ 120℃ 130℃

Cv value for main valve

$$Cv = Ad^2$$

where : d = Nominal valve size (inch)

$$A = \frac{16.2 \times P_2^{0.52}}{P_1 + 0.101} \fallingdotseq \frac{16.2\sqrt{P_2}}{P_1 + 0.101} \quad \text{(But max. 4.5)}$$

where P_1 : Inlet pressure MPaG

P_2 : Outlet pressure MPaG

In case of A=4.5, Cv is as follows

Size	15	20	25	32	40	50	65	80	100	125	150
Cv	1.1	2.5	4.5	7.0	10.1	18	28.1	40.5	72	112.5	162

Type BW4 Temperature Regulating Valve

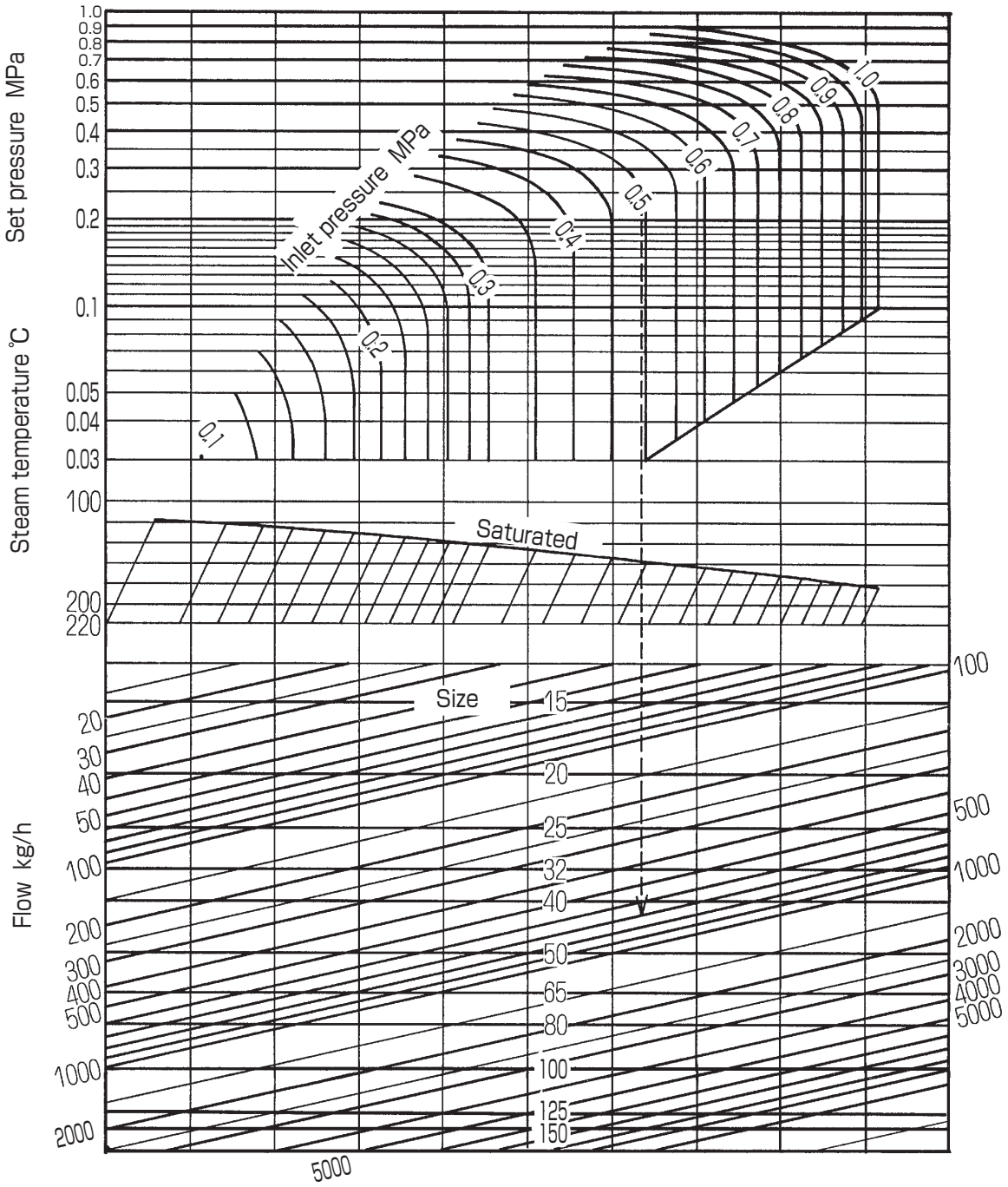
Sizing

Use the following chart to select the suitable valve size.

Example

Fluid : saturated steam
Inlet pressure : 0.5MPa
Set pressure : 0.25MPa
Flow : 700kg/h

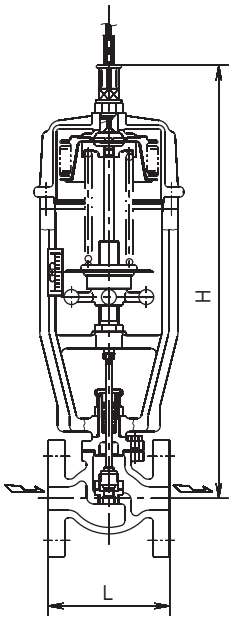
Draw a vertical line from intersecting point of 0.5MPa inlet pressure line and 0.25MPa set pressure line down to 700kg/h flow line.
As the intersecting point is between 40 line and 50 line, the required valve size is 50.



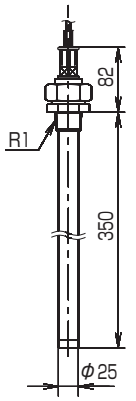
T88S

Type T88S Temperature Regulating Valve

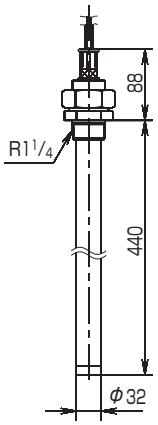
For liquid, gas



Bulb tube for liquid

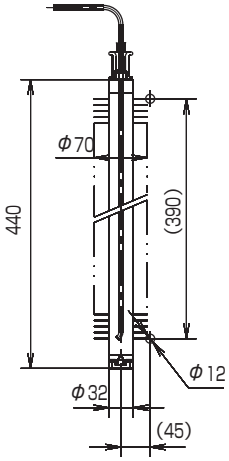


For standard temp.

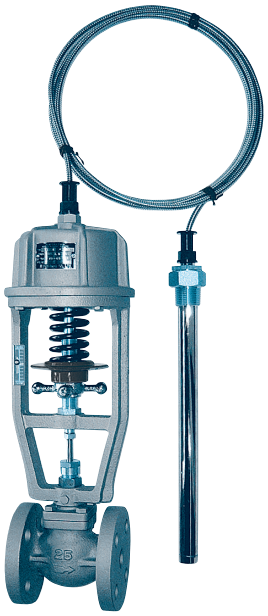


For low temp.

Bulb tube for gas



For standard and low temp.



Specifications

Type	For heating		
Set temperature range	15—120℃ (1)		
Size (2)	15	20	25
Valve	Single seat (Normal flow)		
Seat leakage	0.5 % of rated flow or less		
Max. allowable pressure (MPa)	1.0		
Connection	Flanged JIS10KFF		
Fluid through valve	Steam (max. 185℃)		
Bulb tube pressure (MPa)	Max. 1.0 (for liquid), Atmospheric (for gas)		
Bulb tube connection	Screwed		
Capillary tube	3m (max. 5m)		

Note (1) : Refer to table of standard set temperature range

Main parts material

Part name	Material
Body	Cast iron
Cover	Bronze
Valve disc	Stainless steel
Valve seat	Stainless steel
Bellows	Phosphor bronze
Capillary tube	Copper tube covered by bellows
Bulb tube	Stainless steel tube

Remarks 1. Bulb tube with flange connection is available
2. In case bulb tube for gas is pressurized, please specify it.

Construction and Cv values (mm, kg)

Class \ Size	15	20	25
L	120	120	130
H	465	465	465
Weight	10	11	12
Cv	2	3	4

Temperature difference between valve opening and closing

Class	For liquid		For gas	
	Standard temp.	Low temp.	Standard temp.	Low temp.
Connecting tube : 3m	Max. 4.5℃	Max. 5℃	Max. 7.5℃	Max. 8℃

Type T88S Temperature Regulating Valve

Standard set temperature range

Category	Set temperature range	Max. allowable temperature
Low temperature	15℃ — 30℃ 20℃ — 40℃ 35℃ — 55℃	45℃ 50℃ 70℃
Standard temperature	40℃ — 60℃ 50℃ — 70℃ 60℃ — 80℃ 70℃ — 90℃ 80℃ — 100℃ 90℃ — 110℃ 100℃ — 120℃	70℃ 80℃ 90℃ 100℃ 110℃ 120℃ 130℃

Sizing

Use the following chart to select the suitable valve size.

Example

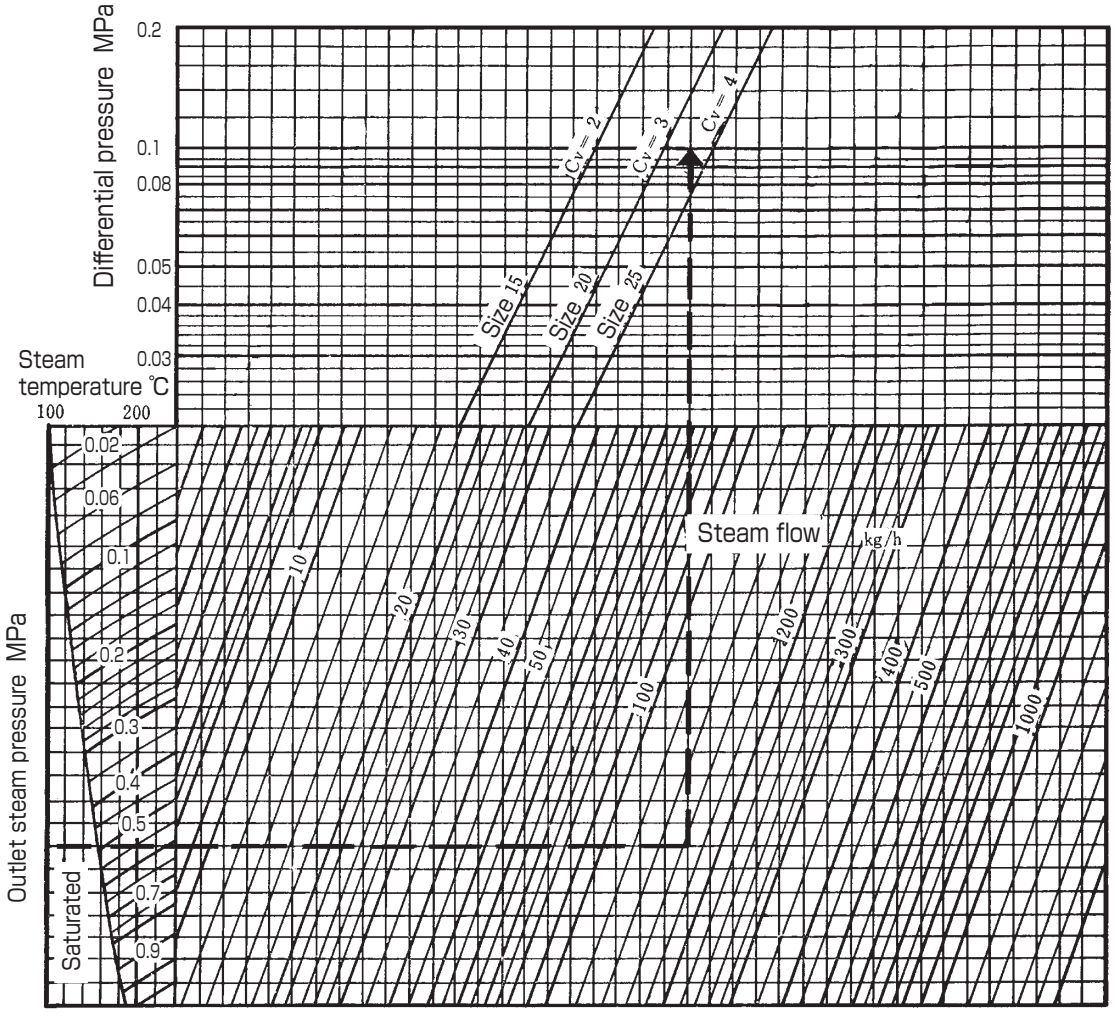
Fluid : saturated steam　　Inlet pressure : 0.6MPa

Flow : 160kg/h　　Allowable differential pressure : 0.1MPa

From saturated temperature of outlet pressure 0.6−0.1=0.5MPa, draw a horizontal line right to 160kg/h steam flow line.

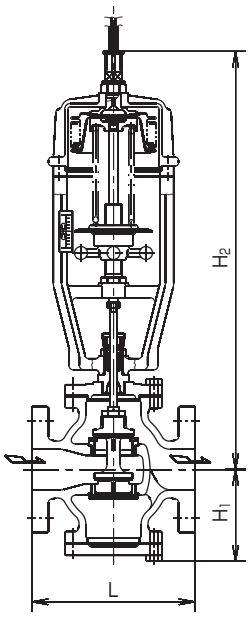
From there, draw a vertical line upward to 0.1MPa differential pressure.

As the final intersecting point is between 20 line and 25 line, the required valve size is 25.

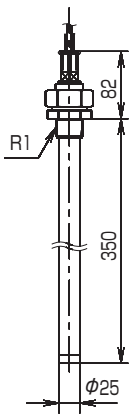


T88 Type T88(R) Temperature Regulating Valves

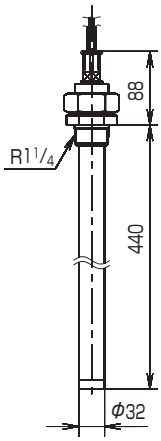
For liquid, gas



Bulb tube for liquid

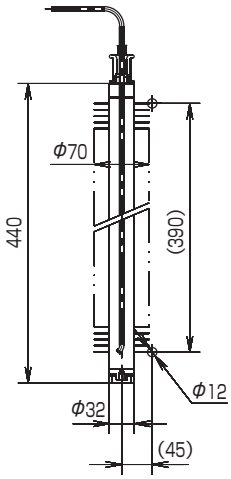


For standard temp.
Size 15—40



For low temp.
Size 15—150
For standard temp.
Size 50—150

Bulb tube for gas



For standard
and low temp.

Specifications

Type	For heating : T88 For cooling : T88R										
Set temperature range	15—120℃ (1)										
Size (2)	15	20	25	32	40	50	65	80	100	125	150
Valve	Double seat (Normal flow : for heating, Reverse flow : for cooling)										
Seat leakage	0.5 % of rated flow or less										
Max. allowable pressure (MPa)	1.0					0.7		0.5		0.2	
Connection	Flanged JIS10K FF										
Fluid through valve	Steam (max. 185℃), Water (min. 0℃)										
Bulb tube pressure (MPa)	Max. 1.0 (for liquid), Atmospheric (for gas)										
Bulb tube connection	Screwed										
Capillary tube	3m (max. 5m)										

Note (1) : Refer to table of standard set temperature range.
(2) : T88S is recommended for size 15—25.

Main parts material

Part name	Material
Body	Cast iron (3)
Cover	Bronze, brass for size 15—40, cast iron for size 50—150
Valve disc	Stainless steel
Valve seat	Stainless steel
Yoke	Cast iron
Bellows	Phosphor bronze
Capillary tube	Copper tube covered by bellows
Bulb tube	Stainless steel tube

Note (3) : Cast steel body and stainless cast steel body (Type 888A for Heating, Type 888R for Cooling) are available on request.
Remarks 1. Flange connection for bulb tube is available
2. In case bulb tube for gas is pressurized, please specify it.

Construction and Cv values

(mm, kg)

Class \ Size	15	20	25	32	40	50	65	80	100	125	150
L	140	145	160	180	195	200	220	240	280	370	450
H_1	73	73	78	86	98	113	118	138	151	178	208
H_2	465	465	475	480	490	515	521	568	581	607	637
Top diameter	160	160	160	160	160	160	160	180	180	180	180
Weight	12	13	15	19	21	30	32	40	57	98	130
Cv	4	4	7	10	13	20	22	32	47	100	110

Type T88(R) Temperature Regulating Valves

Standard set temperature range

Category	Set temperature range	Max. allowable temperature
Low temperature	15℃ — 30℃ 20℃ — 40℃ 35℃ — 55℃	45℃ 50℃ 70℃
Standard temperature	40℃ — 60℃ 50℃ — 70℃ 60℃ — 80℃ 70℃ — 90℃ 80℃ — 100℃ 90℃ — 110℃ 100℃ — 120℃	70℃ 80℃ 90℃ 100℃ 110℃ 120℃ 130℃

Temperature difference between valve opening and closing

Class	For liquid		For gas	
	Standard temp.	Low temp.	Standard temp.	Low temp.
Connecting tube : 3m	Max. 4.5℃	Max. 5℃	Max. 7.5℃	Max. 8℃

Sizing

Use the following chart to select the suitable valve size.

Example

Fluid : saturated steam　　Inlet pressure : 0.53MPa

Flow : 300kg/h　　Allowable differential pressure : 0.1MPa

From saturated temperature of outlet pressure 0.53−0.1=0.43MPa, draw a horizontal line right to 300kg/h steam flow line.

From there, draw a vertical line upward to 0.1MPa differential pressure.

As the final intersecting point is between 20 line and 25 line, the required valve size is 25.