

THREE-WAY CONTROL VALVE

● Introduction

Three-way control valves are generally used either to mix flowing medium or to divert one medium into two outlet flows, and are often used when fluid temperature is to be adjusted through heat exchangers.

Mixing-type valves also can be used for diverting service when both the valve size and pressure differential are small.

However, the mixing type is more suitable when the valve size is larger than 3" and the pressure differential is also considerable.

The actuator employed is a multispring-type, small-sized, high-output diaphragm motor with an extremely simplified operating mechanism.



● Specifications

▷ **Type** : STM

▷ **Body**

Type: Three-way, cast globe valve

Nominal size: 1", 1½", 2", 2½", 3"

Pressure rating: · JIS 10K, 20K, 30K

· ANSI Class 150, 300

End connection: Flanged end: FF, RF

Material: FC20, SCPH2, SCS13, SCS14

Bonnet: · Plain bonnet (0°C to +200°C)

· Extension bonnet (0°C to -5°C and +200°C to +425°C)

Gland type: Bolted gland

Packing/grease

: Grease not provided: V-Teflon or Teflon yarn packing is used.

Grease provided: Asbestos yarn, Teflon-impregnated asbestos yarn, or graphite-

coated asbestos yarn is used.

Gasket: Type: Flat type, saw-tooth type

Material: S15C, SUS316, SUS316L, copper

▷ **Trim**

Valve plug: Three-way, V-port with linear characteristics(LV)

Material: SUS316(SCS14), SUS316L(SCS16A), SUS316(SCS14) stellite coating,
SUS316L(SCS16A) stellite coating

▷ **Actuator**

Type: Single-acting diaphragm actuator (Type SA)

Action: Direct or reverse action

Diaphragm: Ethylene propylene rubber

Spring range: 0.8~2.4 kg/cm²

Note) Spring range varies depending on allowable differential pressure and air supply pressure.

Air connection: Rc $\frac{1}{4}$ or $\frac{1}{4}$ NPT internal thread

Ambient temperature: -30°C to +70°C

▷ **Valve action**

Direct action (Direct-action actuator is combined.)

Reverse action (Reverse-action actuator is combined.)

▷ **Optional accessories (provided upon request)**

Positioner*, pressure regulator with filter, handwheel*, limit switch, solenoid valve, motion transmitter, volume booster, air lock relay, and others

Table 1. Body/trim material combinations and operating temperature ranges(°C)

	Body material	JIS	FC20	SCPH2	SCS13	SCS14
Trim material		ASTM	A126Gr.A	A216WCB	A351CF8	A351CF8M

ASTM	316 (A296CF8M)				
JIS	SUS316L (SCS16A)	-	-	-5~+300	-5~+300
ASTM	316L (A315CF3M)				
JIS	SUS316 stellite coating (SCS14 stellite coating)	-	-5~+425	-5~+425*	-5~+425*
ASTM	316 stellite coating (A296CF8M stellite coating)				
JIS	SUS316L stellite coating (SCS16A stellite coating)	-	-	-5~+425*	-5~+425*

Table 2. Cv valve and travel

Nominal size (Inch) (B)		1		1½	2	2½	3
Port size (inch) (B)		¾	1	1½	2	2½	3
Rated valve	Mixing service	6.3	10	23	40	63	90
	Diverting service	-	-	-	-	-	70
Rated travel(mm)		15		25		38	

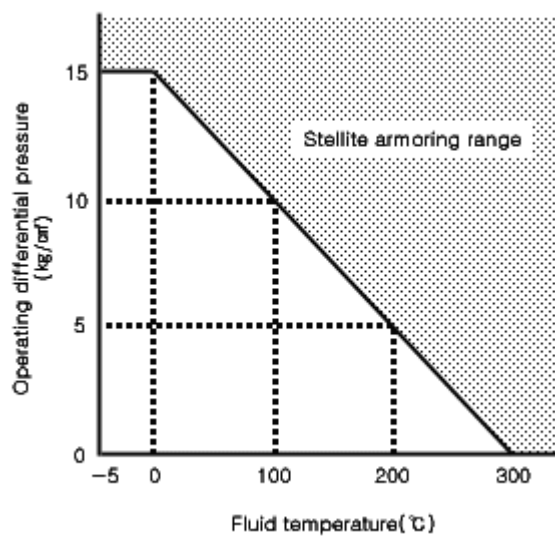
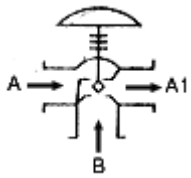


Fig. 1 Temperature/constant differential pressure ranges requiring Stellite armoring

Note) When cavitation, flushing service, oil prohibitive treatment service, or retention of valve closing performance is required, stellite armoring is recommended regardless of temperature and differential pressure.

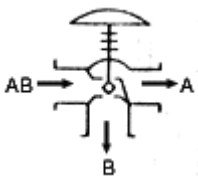
Table 3. Permissible differential pressure

Table 3-1. Mixing service by STM



Actuator model No.	Supply pressure (kg f/cm ²)	Spring range (kg f/cm ²)	Positioner	Differential pressure (by port size (inch)) (kg f/cm ²)					
				¾	1	1 ½	2	2 ½	3
SA1D, R	3.5	0.8~2.4	○	29.4	18.1	13.3	7.3	-	-
SA2D, R	3.5	0.8~2.4	○	40	35.5	23.5	14.2	8.8	6.3
SA3D, R	3.5	0.8~2.4	○	-	-	40	25.3	15.6	11.2
SA4D, R	3.5	0.8~2.4	○	-	-	-	-	27	19.4

Table 3-2. Diverting service by STM



Actuator model No.	Supply pressure (kg f/cm ²)	Spring range (kg f/cm ²)	Positioner	Differential pressure (by port size (inch)) (kg f/cm ²)					
				¾	1	1 ½	2	2 ½	3
SA1D, R	3.5	0.8~2.4	○	8.4	5.2	3.5	2.1	-	-
SA2D, R	3.5	0.8~2.4	○	16.3	10.1	6.8	4.0	2.5	1.8
SA3D, R	3.5	0.8~2.4	○	-	-	12.0	7.2	4.4	3.2
SA4D, R	3.5	0.8~2.4	○	-	-	-	-	7.7	5.5

Table 5. Flow rate characteristics and flow direction

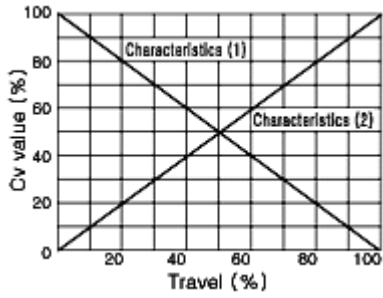


Fig. 3 Flow rate characteristics

Body structure	Service	Flow rate characteristics	Actuator	Valve action	Flow direction
STM	Mixing	Characteristics (1): A→AB	Direct action	Fig. 4-1-1	B→AB
		Characteristics (2): B→AB	Reverse action	Fig. 4-1-2	A→AB
	Diverting	Characteristics (1): A→AB	Direct action	Fig. 4-2-1	AB→B
		Characteristics (2): B→AB	Reverse action	Fig. 4-2-2	AB→A

STM mixing service

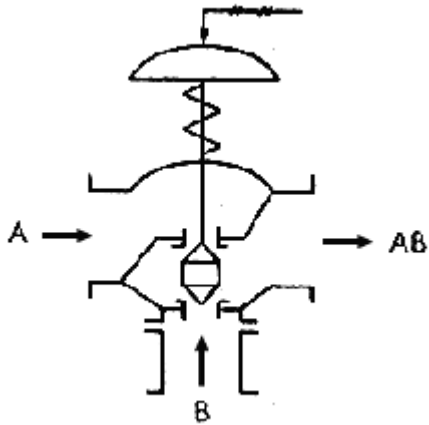


Fig. 4-1-1

Valve with direct-action actuator

STM mixing service

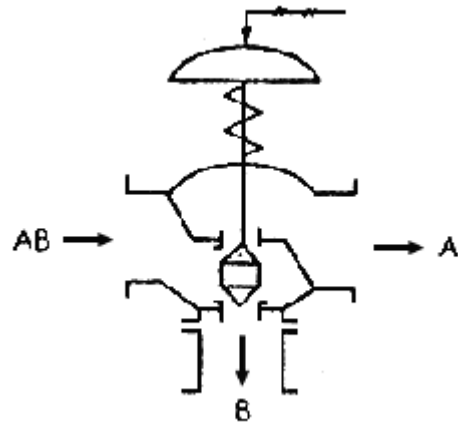


Fig. 4-2-1

Valve with direct-action actuator

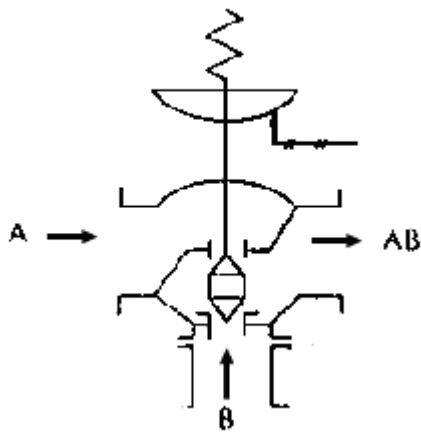


Fig. 4-1-2

Valve with reverse-action actuator

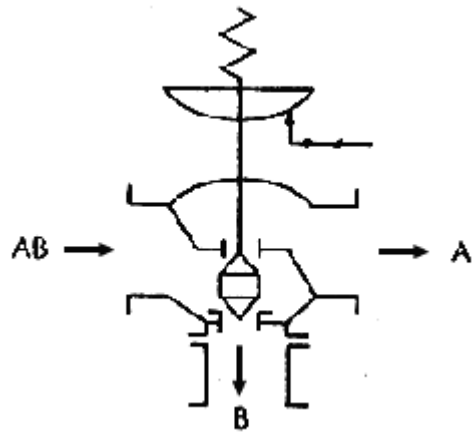
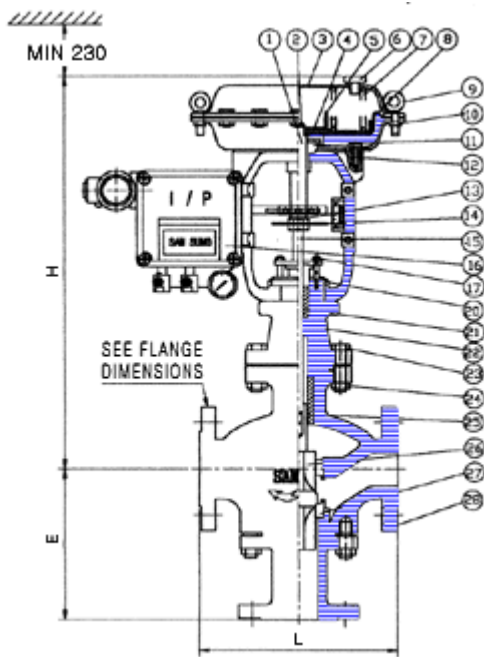


Fig. 4-2-2

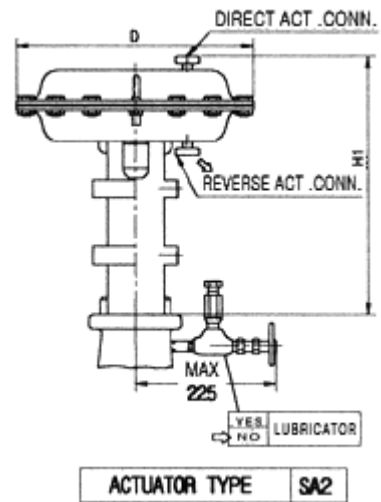
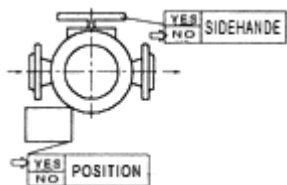
Valve with reverse-action actuator

Fig. 4 Valve action

1. THREE-WAY CONTROL VALVE



STANDARD MOUNTING POSITION



3. PART

28	Body	Scph2
27	Seat Ring	SUS316
26	Trim Plug	SUS316
25	Du Bushing	SUS316
24	Nut	SS41
23	Bolt	SS41

2. DIMENSIONS

SIZE (MM)	CONN. RATING	L								H	E	H1	D	L I F T
		FF RF		RF		RJ								
		ANSI	125	300	600	150	300	600						
		JPI	150											
JIS	10	16	20 30	40										
25A		184	193	197	210	197	210	210	375	145	348	280	15	
40A		222	231	235	251	235	248	251	435	205	348	280	25	
50A		254	263	267	286	267	283	289	471	230	348	280		
65A		276	288	292	311	289	308	314	551	260	348	280	38	
80A		298	313	318	337	311	333	340	581	280	348	280		

AIR PIPING CONN.: Rc ¼

22	Bonnet	Scph2
21	Gland Packing	V-TEFLON
20	Yoke	FC20
19	Yoke Nut	SS41
18	Facking Flange	SS41
17	Bolt	SS41
16	Positioner	SSP-500-L31A
15	TRIM	SUS316
14	Indicator	SUS304
13	Nut	SS41
12	Bolt	SS41
11	Stem Guide	SS41
10	Nut	SS41
9	I Bolt	SS41
8	Diaphragm	Epdm
7	Sping	Swp
6	Air Connection	PT ¼
5	Up Stopper	SS41
4	Down Stopper	SS41
3	Diaphragm Cover	SS41
2	Stem Nut	SUS304
1	Stem	SUS304
NO.	PART NAME	MATERIAL