

Three Way Control Valves

Model HDT

OVERVIEW

The valve model HDT is a three-way control valve for diverting service. It has a small-sized, high-output diaphragm motor which is suitable for big port and high differential pressure services.

SPECIFICATIONS

Type

HDT (Diverting service three-way valve)

Body

Type

Three-way cast globe valve

Nominal size

3, 4, 5, 6 in.

Pressure rating

- JIS 10K, 20K, 30K
- ANSI Class 150, 300
- JPI Class 150, 300

End connection

Flanged end; FF, RF

Material

FC200, SCPH2, SCS13A, SCS14A

For body/trim material combinations and operating temperature ranges, refer to Table 3.

Bonnet

- Plain bonnet (0 to 230°C)
- Extension bonnet (0 to -5°C and 200 to 425°C)

Note) Take care not to exceed the operating temperature ranges specified for respective materials.

Gland type

Bolted gland

Packing/grease

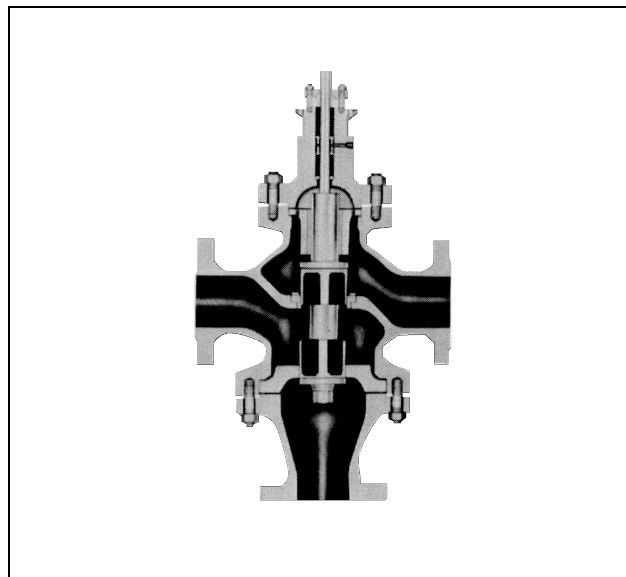
- Grease not provided; When V shaped PTFE packing or PTFE yarn packing is used.
- Grease provided; When asbestos yarn, PTFE-impregnated asbestos yarn, graphite-coated asbestos yarn is used.

Note) PTFE: Polytetrafluoroethylene.

Gasket

Type; Flat type, saw-tooth type

Material; S15C SUS316, SUS316L, copper



Trim

Valve plug

Three-way, V-port with linear characteristics (LV)
(For flow characteristics, refer to Table 4.)

Material

SUS316, SUS316L
SUS316 stellite,
SUS316L stellite

Note) For fluid conditions requiring stellite, refer to Table 3.

Actuator

Type

Single acting diaphragm actuator (Type HA)

Action

Direct or reverse action

Diaphragm

Ethylene propylene rubber

Spring range

20 to 98 kPa {0.2 to 1.0 kgf/cm²},
80 to 240 kPa {0.8 to 2.4 kgf/cm²}

Supply pressure

1.2 to 3.5 kgf/cm² {120 to 340 kPa}

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

Air connection

Rc1/4 or 1/4NPT internal thread

Ambient temperature

-30 to 70 °C

Valve action

Direct action (Direct action actuator is combined.)

Reverse action (Reverse action actuator is combined.)

For relations between the valve action and the flow direction, refer to Table 4.

Optional accessories (provided upon request)

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

Note) 1. For the optional items, refer to the specification sheets and installation drawings of respective accessories.

2. Accessories with the asterisk mark (*) are selected from among the following types depending on the actuators to be combined.

Table 1

Actuator	Positioner		Manual handwheel	
	P/P	I/P	Top	Side
HA2 to 4	HTP	HEP/AVP	THM	SHM

Additional specification (by special order)

- Special inspection
Flow characteristics inspection, material inspection (Material certificate), non-destructive inspection.
- Double gland
- Oil/water free treatment
- Copper free treatment
- Stainless steel (SUS304) atmosphere-exposed nuts and bolts.
- Special air piping and joints
- Sand-/dust preventive measure
- Saline damage countermeasures
- Cold-proof specifications
- Tropical proof specifications
- Vacuum service

Performance

Rated Cv value

Table 2 Cv value and travel

Nominal size (in.)	3	4	5	6
Port size (in.)	3	4	5	6
Rated Cv value	70	130	200	270
Rated travel (mm)	38		50	

Inherent rangeability

30 : 1

Permissible differential pressure

Refer to Table 5.

Seat leakage rate

IEC534-4-1982 or JIS B2007-1993

- Metal seat

Standard

Class IV: Leakage less than 0.01% of maximum valve capacity.

Hysteresis error

Without positioner: Within 3% F.S. (Within 5% F.S.)

With positioner: Within 1% F.S.

Linearity

Without positioner: Within ± 5% F.S.

With positioner: Within ± 1% F.S.

Note) When positioner is not provided, operating performance may vary depending on type of packings used. Refer to document No. ID2-8113-0040

Face-to-face dimensions

Refer to Figure 4 and Table 6.

External dimensions

Refer to Figure 4 and Table 6.

Weight

Refer to Table 7.

Installation position


Refer to Figure 5.

Finish

Blue (Munsell color 10B5/10) or silver, or other specified colors.

Table 3 Combining the valve body, trim material and operating temperature ranges (°C)

Body Material		JIS	FC200	SCPH2	SCS 13A	SCS 14A
		ASTM	A126Gr.B	A216WCB	A351 CF8	A351 CF8M
JIS	SCS316 (SUS14)		0 to 200	0 to 300	0 to 300	0 to 300
JIS	SUS316L (SCS16A)				0 to 300	0 to 300
JIS	SUS316 Stellite (SCS14 Stellite)			0 to 425	0 to 425*	0 to 425*
JIS	SUS316L Stellite (SCS16A Stellite)				0 to 425*	0 to 425*

Note) 1. "  " shows standard combination of valve body and trim materials.

2. When the high pressure gas control regulation is applicable, the maximum operating temperature of materials marked with an asterisk is up to 350°C.

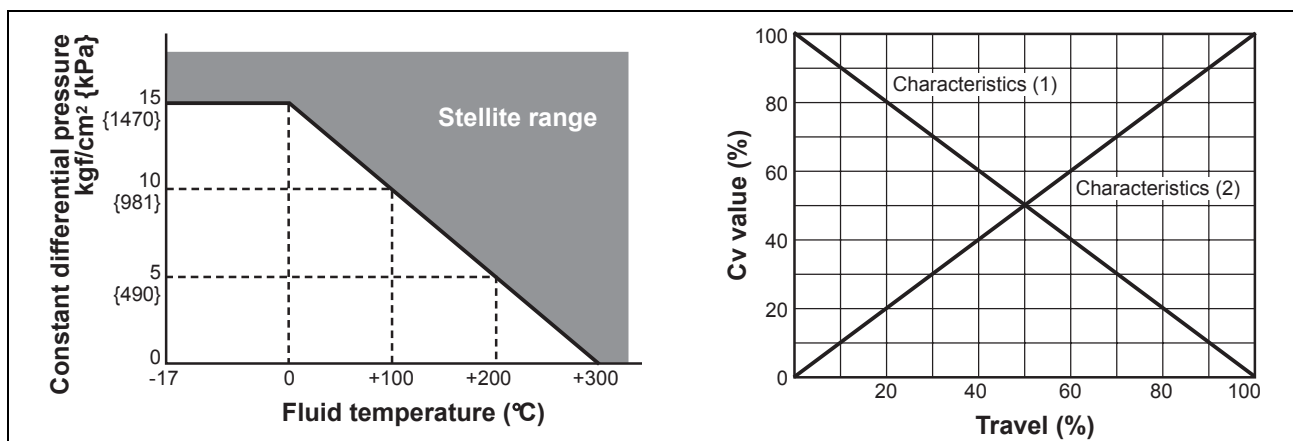


Figure 1 Temperature / constant differential pressure ranges requiring stellite

Figure 2 Flow rate characteristics

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

Note) This graph indicates ideal flow rate characteristics.

Table 4 Flow rate characteristics and flow direction

service	Flow rate characteristics	Actuator	Valve action	Flow direction
Diverting	Characteristics (1) : AB→B	Direct action	Figure 3. a	AB→A
	Characteristics (2) : AB→A	Reverse action	Figure 3. b	AB→B

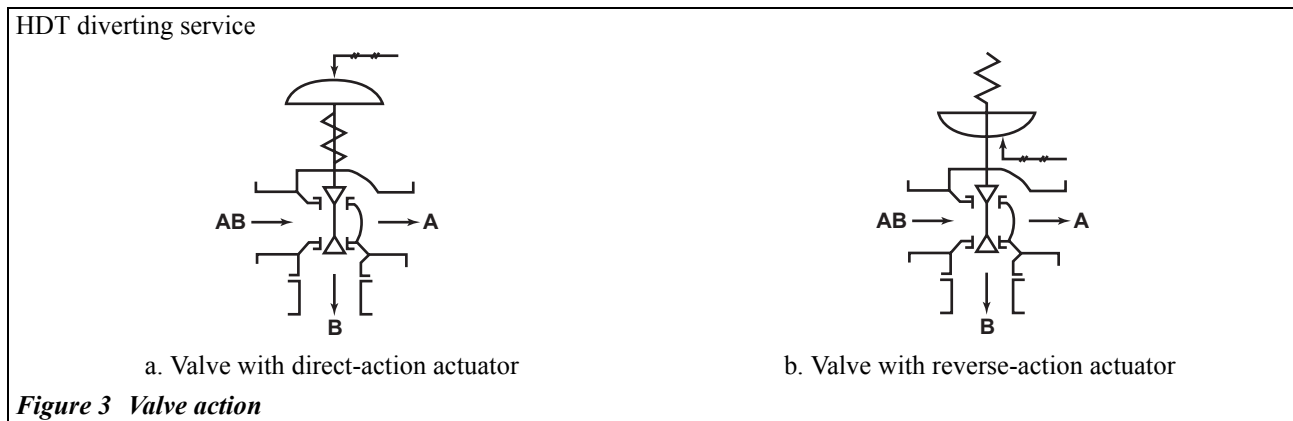
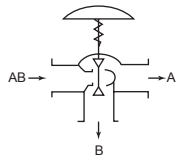


Figure 3 Valve action

Permissible differential pressure

Table 5 HDT (Diverting service)



Actuator model no.	Supply air pressure kPa {kgf/cm ² }	Spring range kPa {kgf/cm ² }	Positioner	Differential pressure [by port size (in.)] kPa {kgf/cm ² }			
				3	4	5	6
HA2D, R	140 {1.4}	20 to 98 {0.2 to 1.0}	△	90 {0.9}	50 {0.5}		
	340 {3.5}	80 to 240 {0.8 to 2.4}	✓	620 {6.3}	340 {3.5}		
HA3D,R	140 {1.4}	20 to 98 {0.2 to 1.0}	△	160 {1.6}	90 {0.9}	50 {0.5}	40 {0.4}
	340 {3.5}	80 to 240 {0.8 to 2.4}	✓	1100 {11.2}	620 {6.3}	390 {4.0}	270 {2.8}
HA4D, R	140 {1.4}	20 to 98 {0.2 to 1.0}	△	260 {2.7}	150 {1.5}	98 {1.0}	60 {0.6}
	340 {3.5}	80 to 240 {0.8 to 2.4}	✓	1900 {19.4}	1070 {10.9}	690 {7.0}	470 {4.8}

Note) ✓: Positioner is necessary △: Can be operated either with or without positioner.

DIMENSIONS

Table 6 Face-to-face and external dimensions

(Unit: mm)

Nominal size (in.)	Actuator model no.	A		E	H		B
		JIS 10K FF, RF ANSI 150RF	JIS 20K RF JIS 30K RF ANSI 300RF	JIS 10K FF, RF JIS 20K RF JIS 30K RF ANSI 150 RF ANSI 300 RF	Plain bonnet	Extension bonnet	
3	HA2D, R	370	420	300	585	735	267
	HA3D, R				705	886	350
	HA4D, R				910	1060	470
4	HA2D, R	400	460	330	625	775	261
	HA3D, R				745	893	350
	HA4D, R				950	1010	470
5	HA3D, R	460	500	370	740	890	350
	HA4D, R				970	1120	470
6	HA3D, R	530	570	450	725	875	350
	HA4D, R				955	1105	470

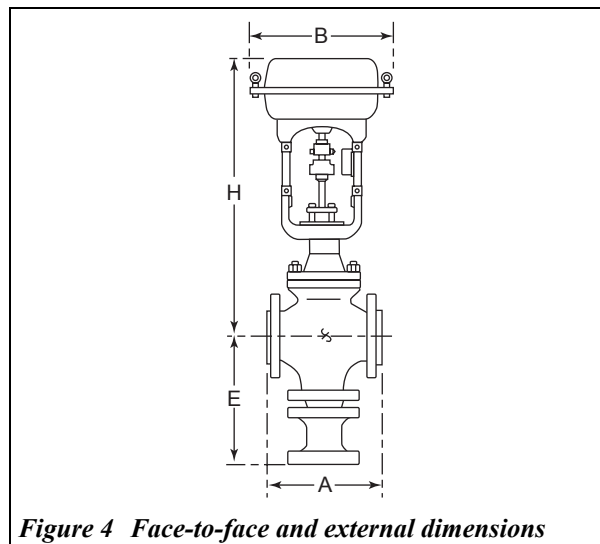


Figure 4 Face-to-face and external dimensions

Table 7 Weight

(Unit: kg)

Nominal size (in.)	Actuator model no.	FF, RF			
		JIS 10K, ANSI 125, 150, JPI 125, 150		JIS 16, 20, 30K, ANSI 300, JPI 300	
		Plain bonnet	Extension bonnet	Plain bonnet	Extension bonnet
3	HA2D, R	90	96	115	121
	HA3D, R	105	111	130	136
	HA4D, R	142	220	167	173
4	HA2D, R	130	140	157	167
	HA3D, R	145	155	172	182
	HA4D, R	182	192	209	219
5	HA3D, R	232	245	159	272
	HA4D, R	268	281	295	308
6	HA3D, R	312	327	395	410
	HA4D, R	348	363	431	446

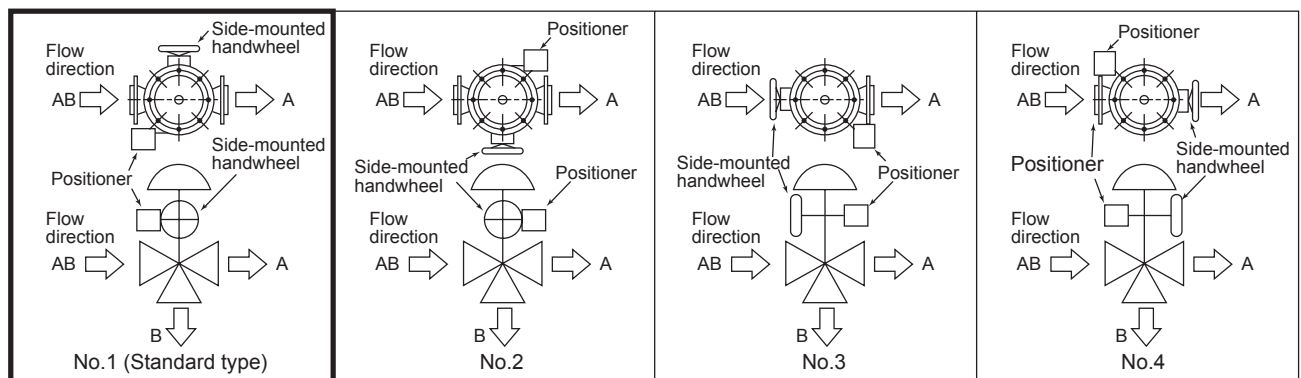


Figure 5 Pipe installation positions

Note) Indicated by position number when installation other than by the standard type is required.

Ordering Information

When ordering, please specify;

- 1) Model Number: HDT
- 2) Nominal size X Port size or Cv required
- 3) Type and rating of end connections
- 4) Body and trim material, necessity of hardening
- 5) Type of bonnet
- 6) Type of actuator, air to diaphragm
- 7) Valve action (direct or reverse)
- 8) Accessories (positioner, handwheel, pressure regulator etc.)
- 9) Special requirement of oil/water or copper free treatment, etc.
- 10) Name of flow medium
- 11) Normal flow and maximum required flow
- 12) Pressure of flow medium, upstream and downstream pressure at maximum required flow
- 13) Temperature and specific gravity of flow medium
- 14) Viscosity of flow medium, inclusive or exclusive of slurry

Note

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