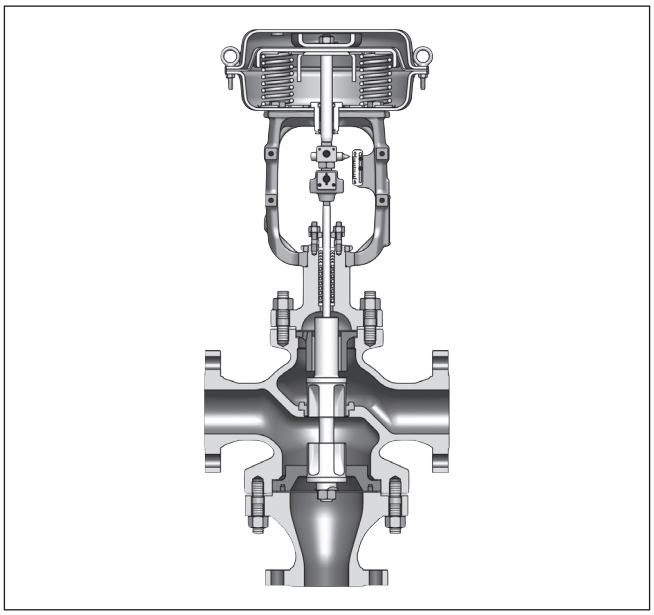
Three Way Control Valves

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 inches

Pressure rating and End connection

Flanged end;

Connection type	Pressure rating	Applicable standard
FF	JIS10K	JIS B2212-1972
	ANSI Class 150	ANSI B16.5-1968
	JPI Class 150	JPI-7S-15-1993
RF	JIS10K	JIS B2212-1972
	JIS20K	JIS B2214-1967
	JIS30K	JIS B2215-1967
	ANSI Class 150, 300	ANSI B16.5-1968
	JPI Class 150, 300	JPI-7S-15-1993

Material

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 graphite packing is used.

Note) PTFE: Polytetrafuloroethylene.

Gasket

Type; Flat type, Serrated type
Material; SUS316, SUS316L, Copper

Trim

Valve plug

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

Material

SUS316, SUS316L
SUS316 CoCr-A,
SUS316L CoCr-A

Note) For fluid conditions requiring CoCr-A, refer to Table 3.

Actuator

Type

Single acting diaphragm actuator (Model HA)

Action

Direct or reverse action

Diaphragm

Cloth embedded ethylene propylene rubber

Spring range

20 to 98 kPa {0.2 to 1.0 kgf/cm^2}
80 to 240 kPa {0.8 to 2.4 kgf/cm^2}

Supply pressure

120 to 340 kPa {1.2 to 3.5 kgf/cm^2}

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

Air fail bottom close (Direct action actuator is combined.)
Air fail bottom open (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, hand wheel*, limit switch, solenoid valve, motion transmitter, booster relay, lock-up valve, 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		Hand wheel	
	P/P	I/P	Top	Side
HA2 to 4	HTP_ _ _	AVP70_ AVP30_ AVP20_	Mounted	Mounted

Additional specification

- 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 (inch)	3	4	5	6
Port size (inch)	3	4	5	6
Rated Cv value	70	130	200	270
Rated travel (mm)	38		50	

Inherent rangeability

30 : 1

Allowable differential pressure

Refer to Table 5 and Table 6.

Leakage specification

IEC 60534-4:2006 or JIS B 2005-4:2008

- Metal seat

Standard

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

Hysteresis error

Without positioner: Within 3% 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.

Dimensions

Refer to Figure 4 and Table 7.

Weight

Refer to Table 8.

Actuator orientation

Refer to Figure 5.

Finish

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

Table 3. Body / trim material combinations and operating temperature ranges (°C)

Trim material \ Body Material		JIS	SCPH2	SCS 13A	SCS 14A
		ASTM	A216WCB	A351 CF8	A351 CF8M
JIS	SCS316 (SUS14)		0 to 300	0 to 300	0 to 300
JIS	SUS316L (SCS16A)			0 to 300	0 to 300
JIS	SUS316 CoCr-A (SCS14 CoCr-A)		0 to 425	0 to 425*	0 to 425*
JIS	SUS316L CoCr-A (SCS16A CoCr-A)			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.

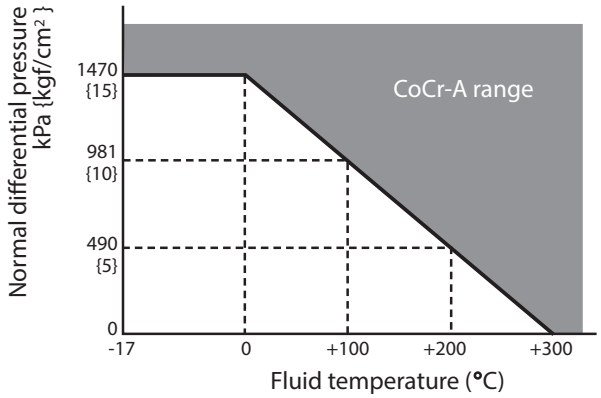


Figure 1. Temperature / normal differential pressure ranges requiring CoCr-A

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

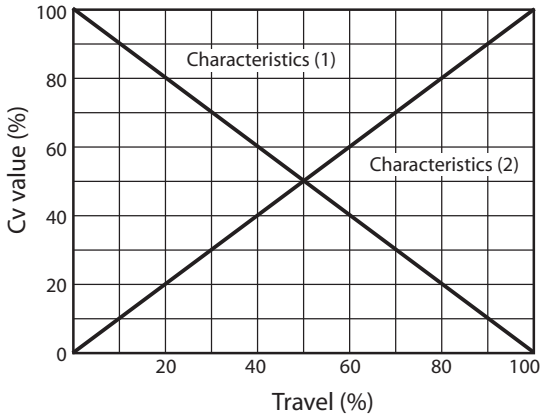


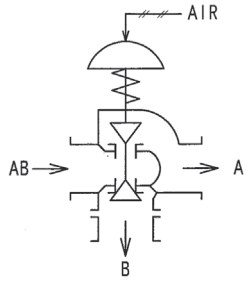
Figure 2. Flow characteristics

Note) This graph indicates ideal flow rate characteristics.

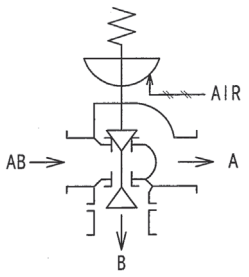
Table 4. Flow rate characteristics and flow direction

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

HDT diverting service



a. Valve with direct-action actuator
(Air fail bottom close)



b. Valve with reverse-action actuator
(Air fail bottom open)

Figure 3. Valve action

Allowable differential pressure

PTFE packing

Table 5. HDT (Diverting service)

Actuator model no.	Supply pressure kPa {kgf/cm²}	Spring range kPa {kgf/cm²}	Positioner	Differential pressure [by port size (inch)] kPa {kgf/cm²}			
				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) 1. ✓:Positioner is necessary. △: Can be operated either with or without positioner.

2. Take care not to cause the maximum allowable differential pressure to exceed the maximum operating pressure designated by ANSI B 16. 34-1981 or JIS B2201-1984.

Graphite packing “P6610CH+P6528” (+230 to +350 °C)

Table 6. HDT (Diverting service)

Actuator model no.	Supply pressure kPa {kgf/cm²}	Spring range kPa {kgf/cm²}	Positioner	Differential pressure [by port size (inch)] kPa {kgf/cm²}			
				3	4	5	6
HA2D, R	340 {3.5}	80 to 240 {0.8 to 2.4}	✓	470 {4.7}	260 {2.6}	——	——
HA3D,R				850 {8.6}	470 {4.7}	300 {3.0}	210 {2.1}
HA4D,R				1550 {15.8}	870 {8.8}	540 {5.5}	380 {3.8}

Note) 1. ✓:Positioner is necessary.

2. Take care not to cause the maximum allowable differential pressure to exceed the maximum operating pressure designated by ANSI B 16. 34-1981 or JIS B2201-1984.

DIMENSIONS

Table 7. Face-to-face and external dimensions (Unit: mm)

Nominal size (inch)	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

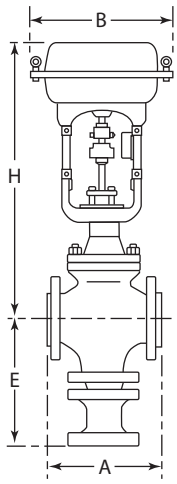


Figure 4. Face-to-face and external dimensions

Table 8. Weight (Unit: kg)

Nominal size (inch)	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

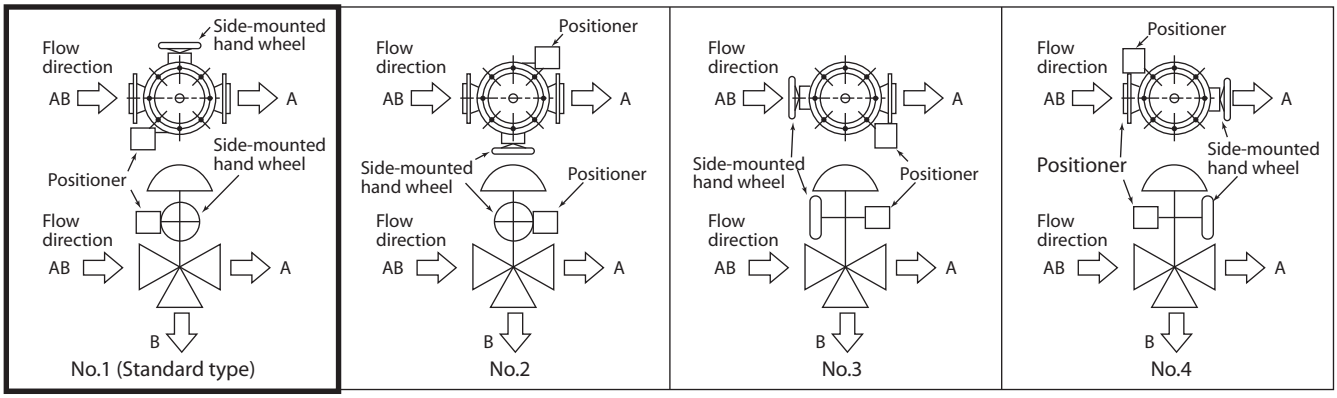


Figure 5. Actuator orientation

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

Note

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, hand wheel, 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

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