

# NDV BALL VALVES



**NIPPON DAIYA VALVE Co., Ltd.**



## 1. 2-Way Ball Valve

Fire Safe Type Ball Valve: F100NB  
High Pressure / Large Bore Ball Valve: E(K)100S  
Jacketed Ball Valve: E100JNC  
Extension Stem Ball Valve: FEX100NB

2-Way Ball Valve

## 2. 3-Way Ball Valve

2 Seats 3-Way Ball Valve: E300NB-L2  
4 Seats 3-Way Ball Valve: E300NB-T4/L4  
3 Seats 3-Way Ball Valve: E300N-T3/L3

3-Way Ball Valve

## 3. V-Port Valve

V100ND(NC)

V-Port Valve

## 4. Pneumatically Operated Valve

Pneumatically Operated 2-Way Ball Valve  
Pneumatically Operated 3-Way Ball Valve  
Pneumatically Operated V-Port Valve

Pneumatically Operated Valve

## 5. Electrically Operated Valve

Electrically Operated 2-Way Ball Valve  
Electrically Operated 3-Way Ball Valve  
Electrically Operated V-Port Valve

Electrically Operated Valve

## 6. Special Purpose Ball Valve

High Temperature Ball Valve  
Y-Shaped 3-Way Ball Valve  
Ball Valve for Shield Tunneling Method  
Top Entry Ball Valve

Special Purpose Ball Valve

## 7. Safety Instructions

Safety Instructions

# Introduction

## 2-Way Ball Valve

### Fire Safe Ball Valve



Lever Operated  
Ball Valve  
F100NB



Gear Operated  
Ball Valve  
FG100NB



Pneumatically Operated  
ON-OFF Ball Valve  
FPN1100NB



Electrically Operated  
Ball Valve  
FMS4100NB

### High Pressure / Large Bore Valve



Gear Operated Ball Valve  
EKG100S

### Jacketed Ball Valve



Lever Operated Ball Valve  
E100JNC

### Extended Gland Ball Valve

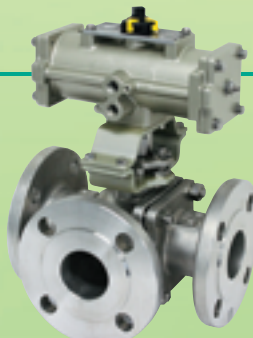


Lever Operated Ball Valve  
FEX100NB

## 3-Way Ball Valve



Lever Operated  
Ball Valve  
E300NB-L2



Pneumatically Operated  
ON-OFF Ball Valve  
EPN1300NB-L2



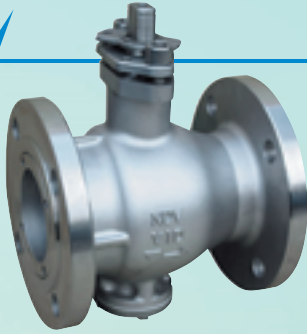
Pneumatically Operated  
ON-OFF Ball Valve  
EPN1300N-T3



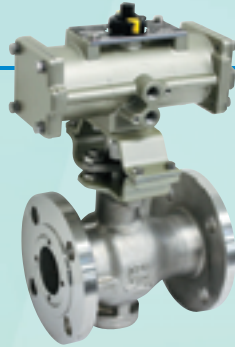
Electrically Operated  
Ball Valve  
EMS4300NB-T4

For further technical details and specifications, Please contact NDV or local representative.

## ***V-Port Valve***



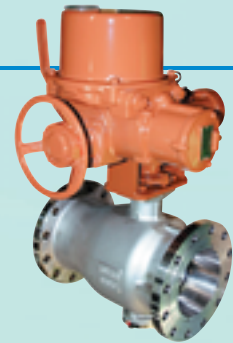
Lever Operated Valve  
V100ND (NC)



Pneumatically Operated ON-OFF Valve  
VPN1100ND (NC)



Pneumatically Operated Control Valve  
VPN3100ND (NC)



Electrically Operated Valve  
VMS4100ND (NC)

## ***Special Purpose Ball Valve***

### ***High Temperature Ball Valve***



Metal Seat Ball Valve  
F(H)100NB-ST

### ***Y-Shaped 3 Way Ball Valve***



Pneumatically Operated ON-OFF Ball Valve  
YWN1300

### ***Ball Valve for Shield Tunneling Method***



Hydraulically Operated Ball Valve  
EKTON1100N

### ***Top Entry Ball Valve***



Lever Operated Ball Valve  
T100S

# Contents

## 7 | 1. 2-Way Ball Valve

8	2-Way Ball Valve Structure and Features	12	1-1. Fire Safe Ball Valve: F100NB
9	Sealing Mechanism	15	1-2. High Pressure / Large Bore Ball Valve: E(K)100S
10	Reference for Seat Selection	16	1-3. Jacketed Ball Valve: E100JNC
		18	1-4. Extended Gland Ball Valve: FEX100NB

## 21 | 2. 3-Way Ball Valve

22	Flow Pattern and Number of Seats	24	2-1. 2 seats 3-Way Ball Valve: E300NB-L2
23	Changeover Form	25	2-2. 4 seats 3-Way Ball Valve: E300NB-T4/L4
23	Valve Code	26	2-3. 3 seats 3-Way Ball Valve: E300N-T3/L3

## 27 | 3. V-Port Valve

28	Structure and Features	31	3. V-Port Valve: V100ND(NC)
29	Reference for Seat Selection		

## 33 | 4. Pneumatically Operated Valve

34	Torque Actuator: 04DN to 12DN	43	4-2. Pneumatically Operated 3-Way Ball Valve
36	Torque Actuator for Large Bore: 13D to 25D	44	2 seats 3-Way Ball Valve:
37	Selection for Actuator		EPN(PO,PC)1300NB-L2
38	4-1. Pneumatically Operated 2 Way Ball Valve	46	4 seats 3-Way Ball Valve:
39	Fire Safe Ball Valve:		EPN(PO,PC)1300NB-T4/L4
	FPN(PO,PC)1100NB		3 seats 3-Way Ball Valve:
41	Jacketed Ball Valve:		EPN(PO,PC)1300N-T3/L3
	EPN(PO,PC)1100JNC	48	4-3. Pneumatically Operated V Port Valve:
42	Extended Gland Ball Valve:		VPN(PO,PC)1100ND(NC)
	FEXPN(PO,PC)1100NB	51	4-4. Data for Pneumatically Operated Valve

## 55 | 5. Electrically Operated Valve

56	Models and Features	65	5-2. Electrically Operated 3-Way Ball Valve
56	SRH Type		2 Seats 3-Way Ball Valve:
57	SRJ Type		E□4300NB-L2
58	SHA Type, SD# Type		4 Seats 3-Way Ball Valve:
59	PMK Type		E□4300NB-T4/L4
60	5-1. Electrically Operated 2-Way Ball Valve		3 Seats 3-Way Ball Valve:
	Fire Safe Type:		E□4300N-T3/L3
	F□4100NB	70	5-3. Electrically Operated V-Port Valve
			V□4100ND(NC)

## 73 | 6. Special Purpose Ball Valve

74	6-1. High Temperature Valve	81	6-3. Ball Valve for Shield Tunneling Method
	Metal Seat Ball Valve	82	6-4. Top Entry Ball Valve
76	6-2. Y-Shaped 3-Way Ball Valve		

## 83 | 7. Safety Instructions

## 2-Way Ball Valve

---

2-Way Ball Valve Structure and Features

Sealing Mechanism

Reference for Seat Selection

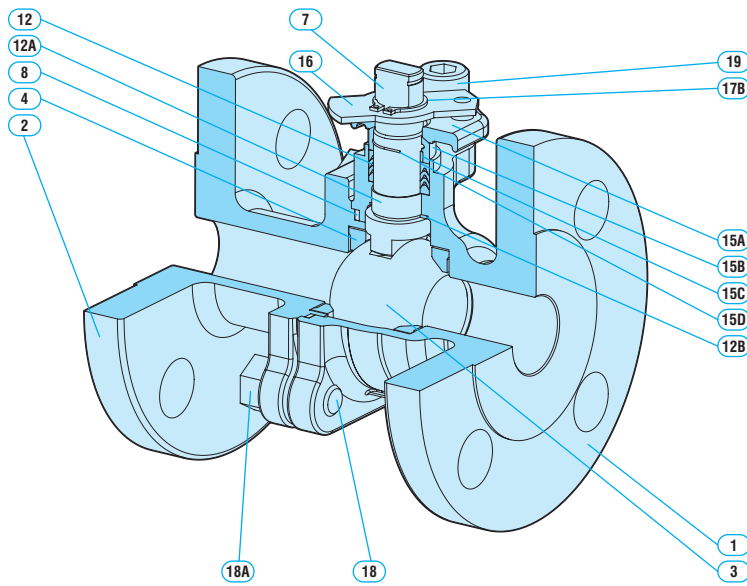
1-1. Fire Safe Ball Valve: F100NB

1-2. High Pressure / Large Bore Ball Valve: E(K)100S

1-3. Jacketed Ball Valve: E100JNC

1-4. Extended Gland Ball Valve: FEX100NB

2-Way Ball Valve Structure and Features



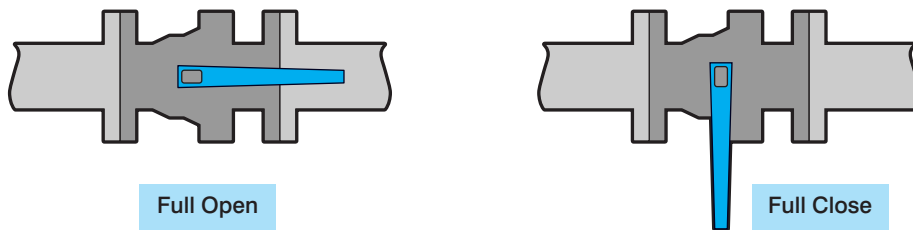
1	Body
2	Cap
3	Ball
4	Seat
7	Stem
8	Gasket
12	Packing
12A	Bearing
12B	Thrust Washer
15A	Gland Flange
15B	Gland
15C	Bearing
15D	Wire Spring
16	Travel Stop
17B	Retaining Ring
18	Stud Bolt
18A	Nut
19	Cap Screw

1 Flow with Minimum Pressure Loss

Pressure loss at full open is very small because flow path of valve is the same as piping and accordingly the flow resistance is very low.

2 Easy Operation

Quarter turn from full open/close to full close/open can be easily done. Lever position indicates open or close position clearly.



3 High Sealing Efficiency

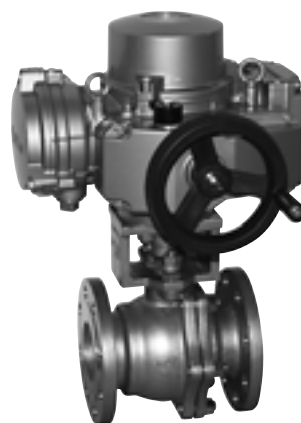
Since resins such as PTFE are used for valve seat, sealing is superior and fluid can be stopped easily.

4 Easy Attachment of Actuator

Various types of actuator can be mounted by Yoke and coupling.



Pneumatically Operated Valve



Electrically Operated Valve

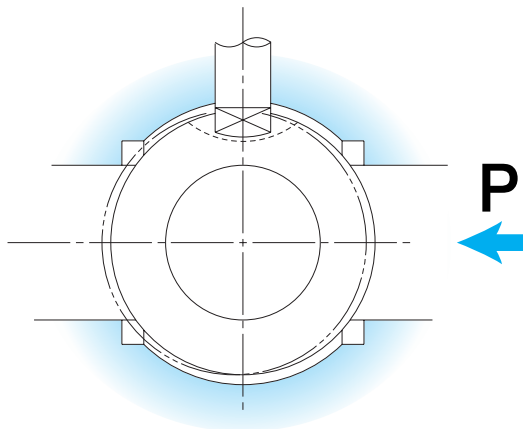


## Sealing Mechanism

### Floating Ball Type

Stem is only linked with ball at trench shaped slot at top of the ball. In this mechanism, self-sealing is secured by pushing ball against the outlet side seat by fluid pressure.

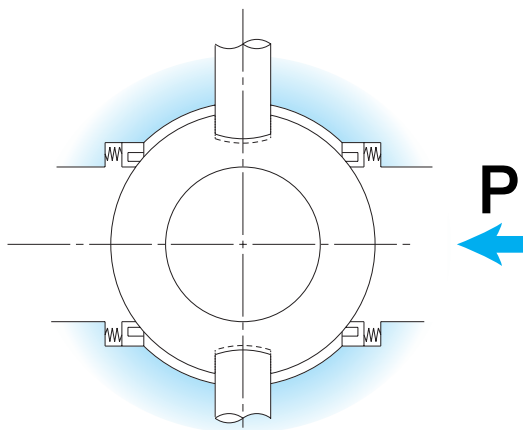
Floating Ball types are applicable for low pressure use (up to JIS 20K, CL300) and Smaller bore valves (up to DN200).



### Trunnion Ball Type

Both top and bottom of ball are supported by stem with trunnion. In this mechanism, sealing is secured by seat spring pressure and fluid pressure to rear side of inlet side seat. Since sealing is secured at inlet side only, the change of operation torque is smaller even if the change of fluid pressure is large.

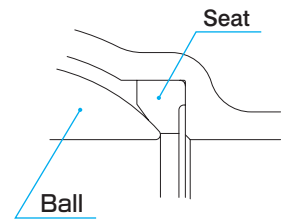
Trunnion types are applicable for high pressure use (JIS 30K, CL600 or more) or large bore valves (DN250 or more).



## Reference for Seat Selection

## Seat Specifications and Features

Main Products;

**NTF**

**Material:** New-PTFE (NDV Standard) **Features:** Heat resistance, Chemical resistance, Anti-viscosity, Less abrasion, High temperature creep resistance.

•Color: White •Max. Working Temperature: 240°C (may change by working condition) •Applications: Cleaning solutions, Solvent, Viscous fluid

**NCF**

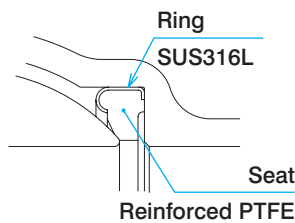
**Material:** Reinforced PTFE with Carbon Fiber **Features:** Superior in Less abrasion to PTFE

•Color: Black •Max. Working Temperature: 240°C (may change by working condition) •Applications: Sludge, Slurry, Powders

**NGR**

**Material:** Reinforced PTFE with Glass Fiber **Features:** Similar abrasion resistance as NCF.

•Color: White •Max. Working Temperature: 240°C (may change by working condition) •Applications: Food processing with fibers, where black color should be avoided.

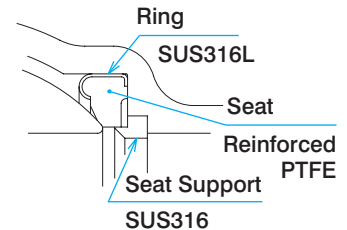
**CFM (GRM)**

**Material:** NCF (NGR) reinforced with outside metal ring (SUS316L Press molding)

**Features:**

Less seat damages at intermediate open position,  
Less seat damages by jam or being pinched at high temperature,  
Protection for seat damage or deformation by abnormal pressure rise

•Color: CFM Black (resin portion) / GRM White (resin portion)  
•Max. Working Temperature: 240°C (may change by working condition) •Applications: Steam, Sludge, Slurry, Powders

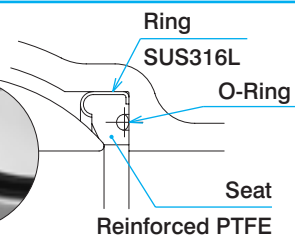
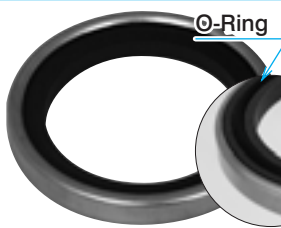
**CFMR (GRMR)**

**Material:** CFM (GRM) reinforced with inside metal ring

**Features:** Wider ranges of use than CFM (GRM)

Refer to page 11 for max working pressure and temperature range of use.

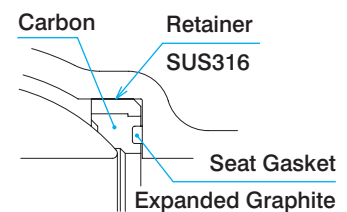
•Color: CFMR Black (resin portion) / GRMR White (resin portion) •Max. Working Temperature: 240°C (may change by working condition) •Applications: Steam, Sludge, Slurry, Powder

**CFMO (GRMO)**

**Material:** CFM (GRM) with O-ring in reverse.

**Features:** Inlet side sealing is expected for Floating Ball Valve.

•Color: CFMO Black (plastic portion) / GRMO White (plastic portion) •Size: DN40, 200 •Max. Working Temperature: 150°C (may change by working condition) •Applications: Sludge, Slurry

**CB**

**Material:** High temperature seat with thermal inserted Retainer (SUS316) outside impregnated Carbon graphite metal

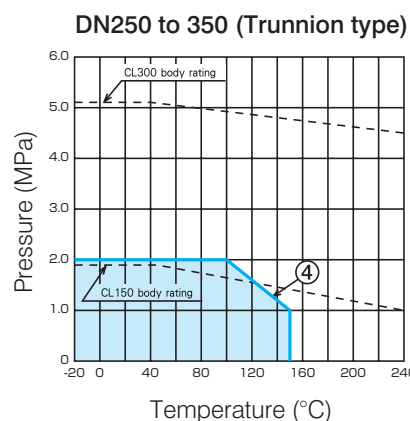
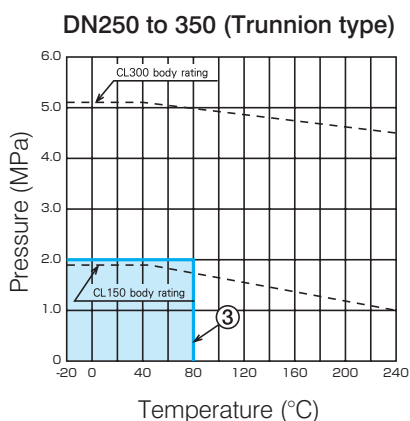
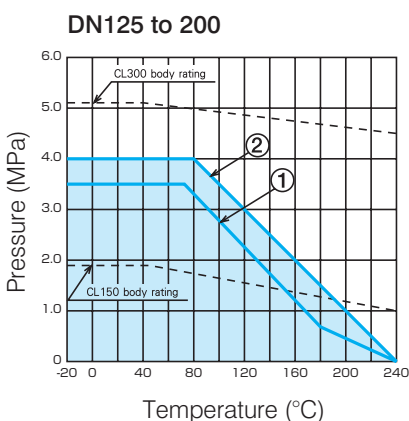
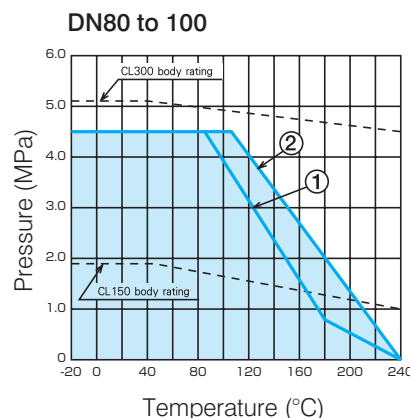
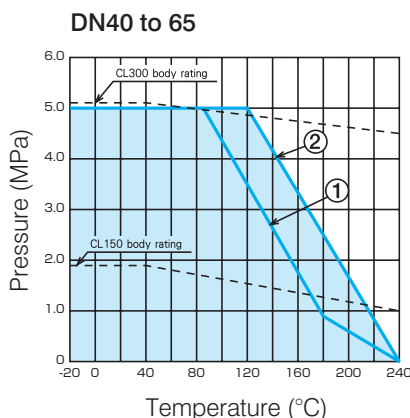
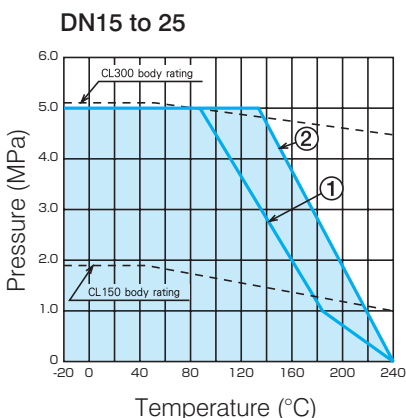
**Features:** Rigidity is high and suitable for use of valve with intermediate open and flow control.

•Color: Black •Max. Working Temperature: 450°C (may change by working condition) •Applications: Steam, Heat transfer oil Tolerable seat leak volume; as per JIS B2003 rate B

### Working Pressure and Temperature Range

Valve Code: F100NB, E100JNC, E300NB-L2, EK100N (Trunnion type)

No.	Code	Mechanism
①	NTF	Floating Ball Type
	NCF, NGR, CFM	
②	CFMR	Trunnion Ball Type
③	CFRS (O-Ring: NBR)	
④	CFRS (O-Ring: FKM)	



### Cv Value: F100NB

Size (DN)	15	20	25	40	50	65	80	100	125	150	200
Cv	22	44	85	240	430	740	1200	2100	3400	5000	9700

1-1 Fire Safe Ball Valve: F100NB

Structure and Features

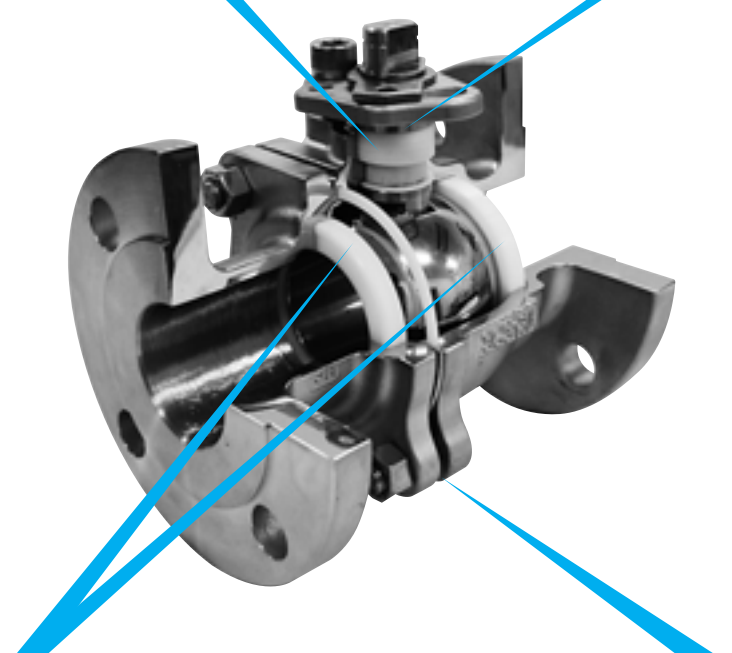
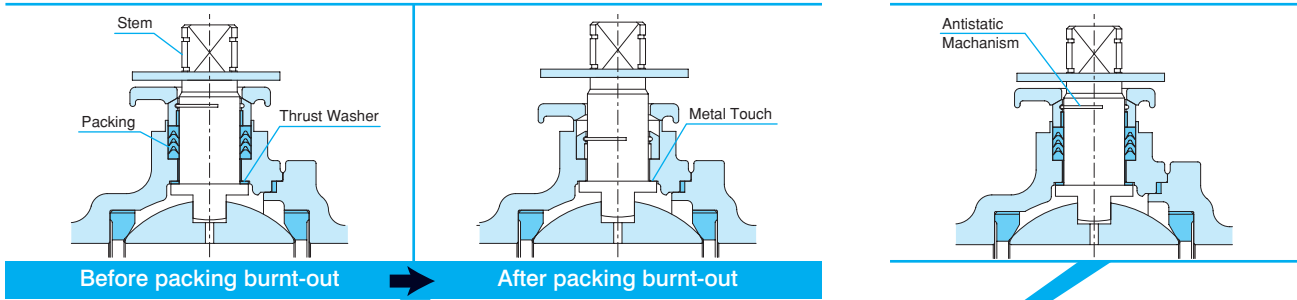
**Fire Safe type mechanism** is to minimize fluid leakage by producing metal shut-off when seal parts such as seats and packings are burned out by fire.

**Gland Packing**

A collar provided on a stem prevents the stem from popping out due to fluid pressure. Also, in the event that the gland packing is burned out by fire, the stem flange adheres outside of the valve. (Stem Guard Mechanism)

**Antistatic Mechanism**

An Antistatic Mechanism is provided to prevent the accumulation of static electricity (produced by friction between the ball and seat) at Ball, Seat and Stem.

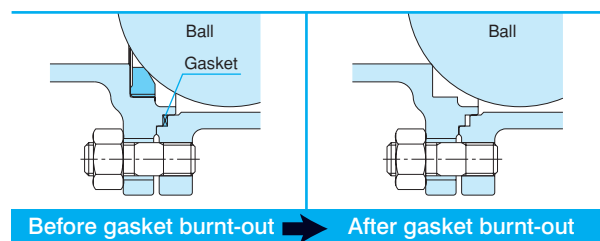
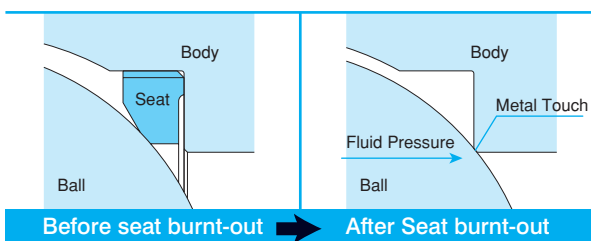


**Seat**

In the event that the seat is burned out by fire, the ball will come to rest firmly against metal seat, minimizing fluid leakage.

**Gasket**

The seals for the body and flange joints have a double-layer sealing mechanism made up of gasket and a metal-to-metal contact, which prevents leakage at the body joint in the event that the gasket is burned out by fire.



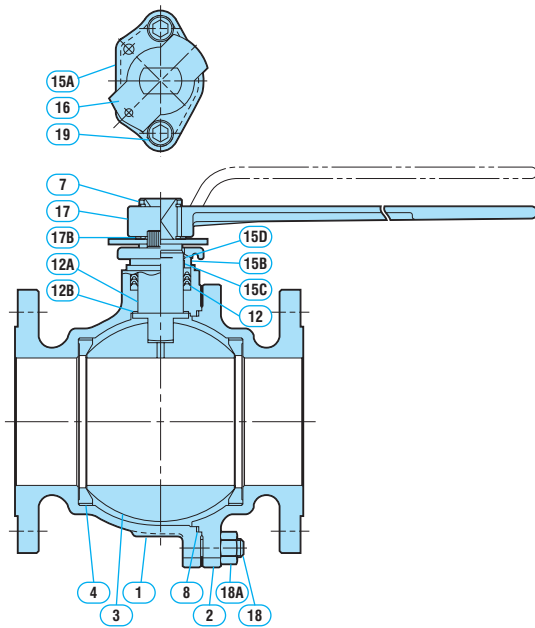
## Specification

### F100NB | Full Port | Floating Ball Valve

Nominal Size	DN15 to 200
Face to Face Dimension	Complied with ISO5752
Connection	Flanged type JIS10K, 20K (*1) Class (ASME, JPI) 150,300 (*2)
Body Material	FCD400, SCS13A (CF8), SCS14A (CF8M), SCS16A (CF3M)
Ball Material	SCS13A (SUS304), SCS14A (SUS316), SCS16A (SUS316L)
Seat Material	NTF, NCF, NGR, CFM, CFMR, CFMO (refer to page 10)
Operation Type	Lever, Gear, Pneumactical, Electrical
Paint (body)	Rust prevention paint (excluding stainless steel)

\*1: JIS B2220 \*2: ASME B16.5

## Parts and Materials



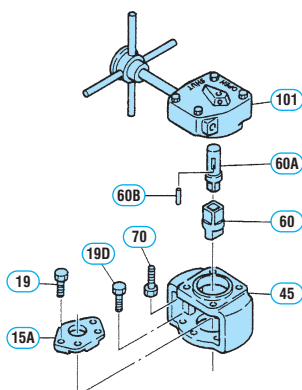
Parts	Material			
	F104NB	F107NB	F112NB	F113NB
1 Body	FCD400	SCS13A	SCS14A	SCS16A
2 Cap	FCD400	SCS13A	SCS14A	SCS16A
3 Ball	SCS13A or SUS304	SCS13A or SUS304	SCS14A or SUS316	SCS16A or SUS316L
4 Seat	NTF, NCF, etc.			
7 Stem	SUS304	SUS304	SUS316	SUS316L
8 Gasket	New-PTFE			
12 Packing	New-PTFE			
12A Bearing	New-PTFE			
12B Thrust Washer	New-PTFE			
15A Gland Flange	SCS13A			
15B Gland	SUS304			
15C Stem Bearing	New-PTFE			
15D Wire Spring	SUS304			
16 Travel Stop	SUS304			
17 Lever	SCPH2 (DN15/100), SCPH2 & STK490 (DN125/200)			
17B Retaining Ring	SUS304			
18 Stud Bolt	SNB7	SUS304	SUS304	SUS304
18A Nut	S45C	SUS303	SUS303	SUS303
19 Cap Screw	SUS304			
20 Set Screw	SUS304 (DN125 to 200 for lever)			

### Applicable Class (DN15 to 200)

Body Material	Class			
	JIS10K	CL150	JIS20K	CL300
FCD400	○	○	—	—
SCS13A	○	○	○	○
SCS14A	○	—	—	—
SCS16A	○	○	○	○

## Gear Operation

Gear operation types are available for DN100 or bigger one.



### Parts for Gear

15A Gland Flange	SCS13A
19 Bolt	SWCH
19D Bolt	SWCH
45 Yoke	FCD450
60 Joint	SCS13
60A Joint	S25C
60B Key	S45C
70 Cap Screw	SWCH
101 Gear Unit	—

## Optional items

Lever Lock Mechanism, Square Shank, Open-Close indicator, Limit Switch, etc.

Valve Codes

Valve Code for F100NB

**F 1 0 7 N B - N T F - 0 5 0 - J 1 0 K R F**



1 Body Material

04	FCD400
07	SCS13A
12	SCS14A
13	SCS16A

2 Seat Material (Refer to Page 10)

NTF, NCF, NGR, CFM, CFMR

3 Nominal Size (DN or A)

Conforming to ISO6708 and JIS B2001

4 Connection

J10KRF	JIS 10KRF
J20KRF	JIS 20KRF
A150RF	ASME CL150
A300RF	ASME CL300

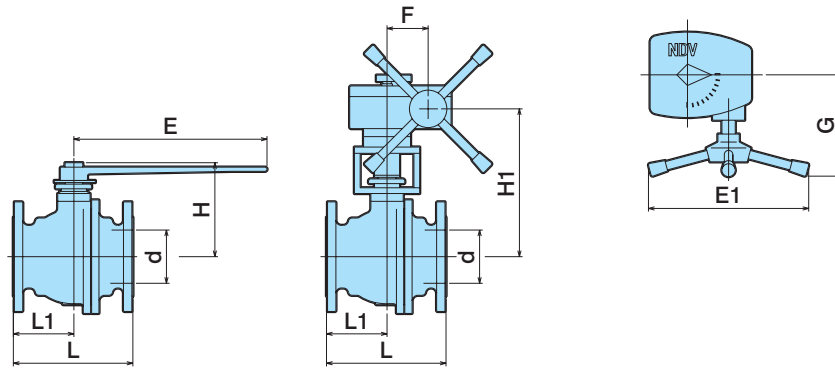
\* Improvement Identification Code

None	Original Design
N	First Improvement
NB	Second Improvement
NC	Third Improvement
ND	Fourth Improvement

• Those are standard products codes. The code may be different depending on the products specification.

Dimension

F100NB (Full Port)



Unit: mm

Nominal size DN						Lever Operated Valve		Gear Operated Valve								Mass (Approx. kg)				
	d	L		L1		H	E	H1		G		F		E1		Lever Operated		Gear Operated		
		10K CL150	20K CL300	10K CL150	20K CL300		10K CL150	20K CL300	10K CL150	20K CL300	10K CL150	20K CL300	10K CL150	20K CL300	10K CL150	20K CL300	10K CL150	20K CL300	10K CL150	20K CL300
15	13	108	140	45	63	80	130	130	—	—	—	—	—	—	—	—	1.9	2.3	—	—
20	19	117	152	50	70	85	—	—	—	—	—	—	—	—	—	—	2.5	3.0	—	—
25	25	127	165	51	71	100	160	160	—	—	—	—	—	—	—	—	4.0	4.7	—	—
40	38	165	190	70.5	76.5	115	230	230	—	—	—	—	—	—	—	—	6.5	7.3	—	—
50	51	178	216	80.5	86	120	—	—	—	—	—	—	—	—	—	—	8.5	10.1	—	—
65	64	190	241	87	103	135	—	—	—	—	—	—	—	—	—	—	13.5	17.0	—	—
80	76	203	283	97	124	145	350	350	—	—	—	—	—	—	—	—	16.5	23.0	—	—
100	102	229	305	116	135	180	450	450	280	285	165	190	62.5	77	240	300	27.0	38.5	41.0	57.5
125	127	356	381	148	158	260	650	800	342	342	190	230	77	90.5	300	460	46.0	59.0	73.0	92.0
150	152	394	403	173	178	280			362	362							61.0	75.0	88.0	108.0
200	203	457	502	207	235	350	800	1100	425	446	230	260	90.5	121	460	—	98.0	123.0	135.0	174.0

## 1-2 High Pressure / Large Bore Valve: E(K)100S

## Structure and Features

Trunnion Type Ball Valve is mainly used for high pressure fluid with sludge in addition to the other general use.

High pressure valve: JIS30K(CL600) or more.

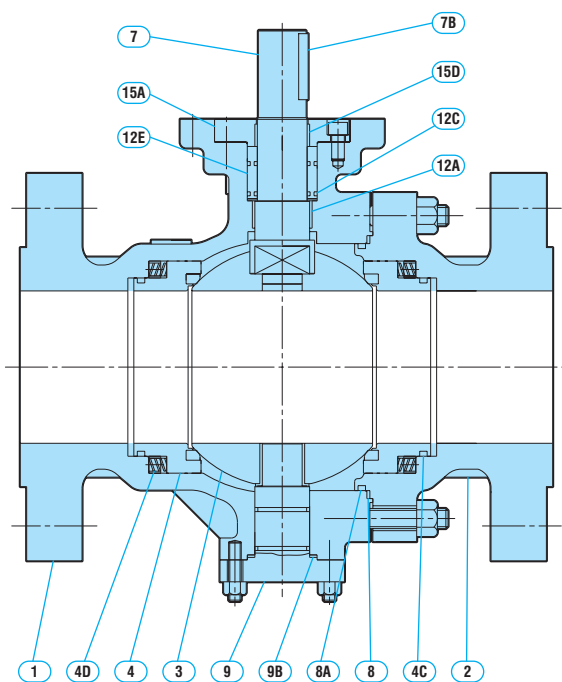
Large Bore valve: DN250 or more.



<b>Nominal Size</b>	DN15 to 500, (DN15 to 50: Floating Ball Type)
<b>Body Material</b>	SCPH2 (WCB), SCS13A (CF8), SCS14A (CF8), SCS16A (CF3M)
<b>Seat Material</b>	PTFE, Reinforced PTFE
<b>Connection</b>	Flange JIS10K, 20K, 30K, 40K, 63K (*1) Class (ASME, JPI) 150, 300, 600, 900 (*2)
<b>Operation Type</b>	Gear (DN50 or more of JIS40K, CL600) Pneumatical, Electrical

\*1: JIS B2220 \*2: ASME B16.5

## Parts and Materials (Reference)



Parts	Material			
<b>1 Body</b>	SCPH2	SCS13A	SCS14A	SCS16A
<b>2 Cap</b>	SCPH2	SCS13A	SCS14A	SCS16A
<b>3 Ball</b>	SCS13A		SCS14A	SCS16A
<b>4 Seat</b>	Carbon Reinforced PTFE			
<b>4C O-Ring</b>	NBR	FKM		
<b>4D Spring</b>	Alloy X750			
<b>7 Stem</b>	SUS304		SUS316	SUS316L
<b>7B Key</b>	S45C-H			
<b>8 Gasket</b>	SUS304 & Expanded Graphite		SUS316 & Expanded Graphite	
<b>8A O-Ring</b>	NBR	FKM		
<b>9 Trunnion</b>	SCS13A		SCS14A	SCS16A
<b>9B Gasket</b>	SUS304 & Expanded Graphite		SUS316 & Expanded Graphite	
<b>12A Bearing</b>	SPCC *	SUS316 & PTFE		
<b>12C O-Ring</b>	NBR	FKM		
<b>12E Sleeve</b>	SUS304		SUS316	SUS316L
<b>15A Gland</b>	S20C	SUS304		
<b>15D Bearing</b>	SPCC *			

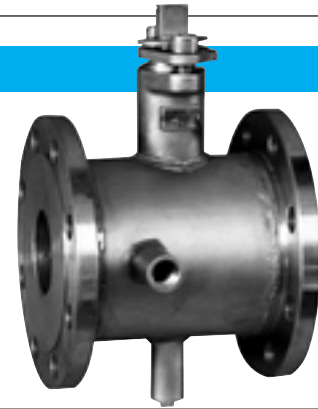
\* SPCC (Galvanized) & PTFE coating

For further technical details and specifications, Please contact NDV or local representative.

## 1-3 Jacketed Ball Valve: E100JNC

## Structure and Features

**Jacketed Ball Valve** contains a jacket that covers the body. The valve has space for flow media such as hot water, steam or water for heating or cooling the fluid and is suitable for high viscous or easily frozen fluid.



## Specification

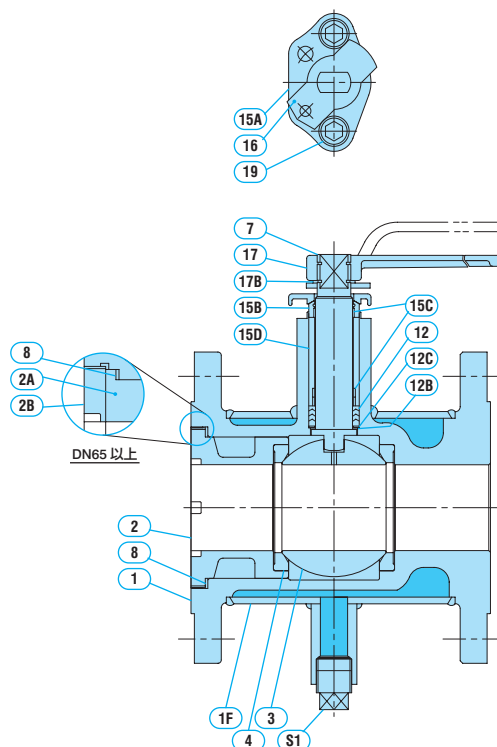
## E100JNC type | Full Port | Floating Ball Valve

<b>Nominal Size</b>	DN15 to 200	
<b>Connection</b>	Flange JIS10K, 20K (*1) Class (ASME, JPI) 150,300 (*2)	
<b>Body Material</b>	SCS14A (CF8M), SCS16A (CF3M) • Flange is oversized (refer to Dimension of E100JNC at page 17) • JIS20K, CL300 are available up to DN100.	
<b>Ball Material</b>	SCS14A (SUS316), SCS16A (SUS316L)	
<b>Seat Material</b>	NTF, NCF, NGR, CFM, CFMR, CFMO (refer to page 10)	
<b>Operation Type</b>	Lever, Gear, Pneumactical, Electrical	
<b>Jacket</b>	<b>Max. Pressure</b>	1.0MPa
	<b>Max. Temperature</b>	250°C
	<b>Connection</b>	2-Rp (Parallel pipe thread)
	<b>Discharge (Lower Plug)</b>	1-Rp (Parallel pipe thread)

The other special specifications are available upon request.

\*1: JIS B2220 \*2: ASME B16.5

## Parts and Materials

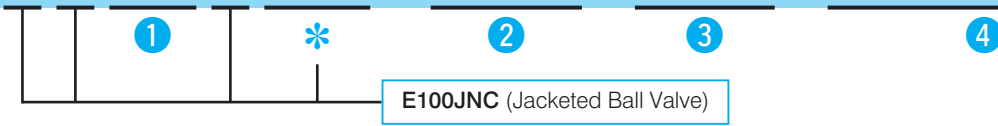


Parts		Material	
		E112JNC	E113JNC
<b>1</b>	<b>Body</b>	SCS14A	SCS16A
<b>1F</b>	<b>Jacket</b>	SUS304TP or SUS304	
<b>2</b>	<b>Insert</b>	SCS14A	SCS16A
<b>2A</b>	<b>Insert</b>	SCS14A	SCS16A
<b>2B</b>	<b>Insert Ring (DN65-200)</b>	SCS14A	SCS16A
<b>3</b>	<b>Ball</b>	SCS14A or SUS316	SCS16A or SUS316L
<b>4</b>	<b>Seat</b>	NTF, NCF, CFM, etc.	
<b>7</b>	<b>Stem</b>	SUS316	SUS316L
<b>8</b>	<b>Gasket</b>	PTFE	
<b>12</b>	<b>Packing</b>	Reinforced PTFE	
<b>12B</b>	<b>Thrust Washer</b>	New-PTFE	
<b>12C</b>	<b>Washer</b>	SUS316	SUS316L
<b>15A</b>	<b>Gland Flange</b>	SCS13A	
<b>15B</b>	<b>Gland</b>	SUS304	
<b>15C</b>	<b>Bearing</b>	Reinforced PTFE	
<b>15D</b>	<b>Spacer</b>	SUS304	
<b>16</b>	<b>Travel Stop</b>	SUS304	
<b>17</b>	<b>Lever</b>	SCPH2 (DN15 to 100) SCPH2 & STK490 (DN125 to 200)	
<b>17B</b>	<b>Retaining Ring</b>	SUS304	
<b>19</b>	<b>Cap Screw</b>	SUS304	
<b>S1</b>	<b>Plug</b>	SUS304	



## Valve Codes

Valve Code for E100JNC

**E 1 1 2 J N C - N T F - 0 5 0 - J 1 0 K R F**

## ① Body Material

<b>12</b>	SCS14A
<b>13</b>	SCS16A

## ② Seat Material (Refer to Page 10)

NTF, NCF, NGR, CFM, CFMR

## ③ Nominal Size (DN or A)

Conforming to ISO6708 and JIS B2001

## ④ Connection

<b>J10KRF</b>	JIS 10KRF
<b>J20KRF</b>	JIS 20KRF
<b>A150RF</b>	ASME CL150
<b>A300RF</b>	ASME CL300

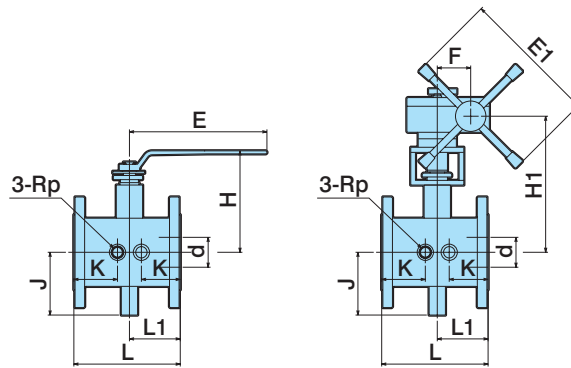
## \* Improvement Identification Code

<b>None</b>	Original Design
<b>N</b>	First Improvement
<b>NB</b>	Second Improvement
<b>NC</b>	Third Improvement
<b>ND</b>	Fourth Improvement

• Those are standard products codes. The code may be different depending on the products specification.

## Dimension

## E100JNC



Unit: mm

Nominal size DN							Lever Operated Valve		Gear Operated Valve			Connection Flange size DN	Mass (Approx. kg)		
	d	L	L1	K	J	Rp	H	E	H1	E1	F		Lever	Gear	
													10K CL150	10K CL150	
15	13	108	54	54	78	1/2	130	130	—	—	—	40	5.2	—	
20	19	117	58.5	58.5			134		—	—	—				
25	25	127	63.5	63.5	86		142	160	—	—	—	50	6.8	—	
40	38	165	82.5	60	99		160	230	—	—	—	65	11.2	—	
50	51	178	93	65	105		169		—	—	—	80	13.3	—	
65	64	190	100		118		188	350	—	—	—	100	20.0	—	
80	76	203	108	70	131		199		—	—	—	125	27.0	—	
100	102	229	119	75	148		210	450	314	240	62.5	150	43.0	57.0	
125	127	267	152	80	176		3/4	302	650	387	300	77	200	67.0	94.0
150	152	292		85	202			322		407				250	98.0
200	203	330	165	90	243	390		800	471	460	90.5	350	162.0	199.0	

## 1-4 Extended Gland Ball Valve

### Structure and Features

Extended Gland is designed for valve with insulation material or valve used for high or low temperature fluid which causes valve deterioration.

Since the stem is extended, operation (open/close), as well as additional screw tightening for gland packing, is easy.



### Specification

#### FEX100NB | Full Port | Floating Ball

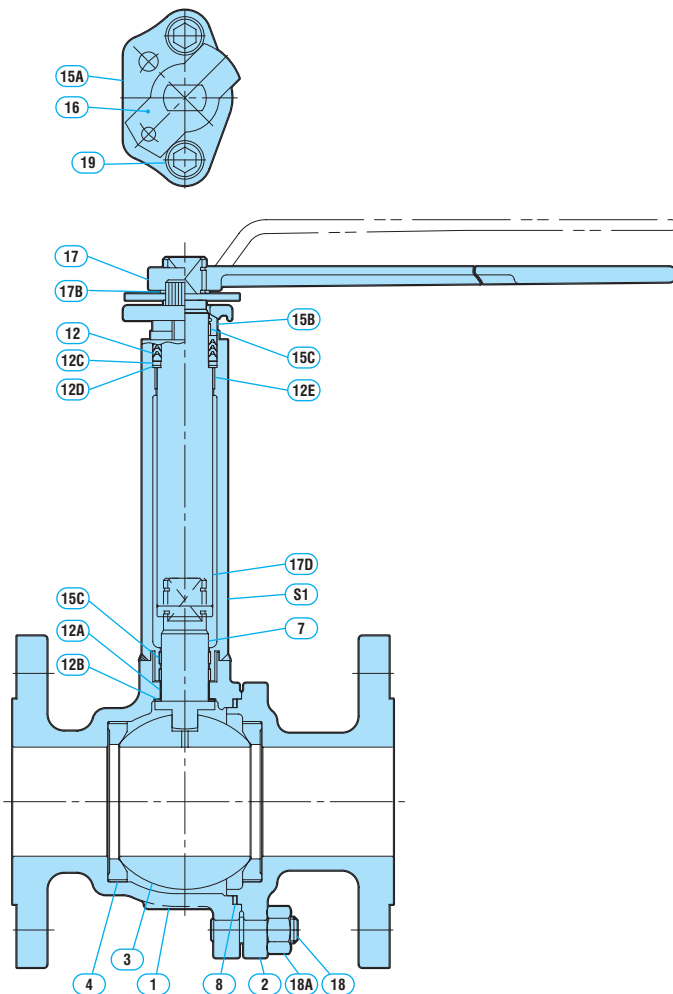
Nominal Size	DN15 to 150
Face to Face dimension	Conforming to ISO 5752
Connection	Flange JIS10K, 20K (*1), Class (ASME,JPI) 150,300 (*2)
Body Material	SCS13A (CF8), SCS14A (CF8M), SCS16A (CF3M)
Ball Material	SCS13A (SUS304), SCS14 (SUS316), SCS16A (SUS316L)
Seat Material	NTF, NCF, CFM, CFMR, CFMO (refer to page 10)
Operation Type	Lever, Gear, Pneumactical, Electrical

Note: Above specification is for fire safe type ball valve F100NB

Extended Gland for other types are available upon request.

\*1: JIS B2220 \*2: ASME B16.5

### Parts and Materials



Parts	Material		
	FEX107NB	FEX112NB	FEX113NB
1 Body	SCS13A	SCS14A	SCS16A
2 Cap	SCS13A	SCS14A	SCS16A
3 Ball	SCS13A or SUS304	SCS14A or SUS316	SCS16A or SUS316L
4 Seat	NTF, NCF, etc.		
7 Stem	SUS304	SUS316	SUS316L
8 Gasket	New-PTFE		
12 Packing	New-PTFE		
12A Bearing	New-PTFE		
12B Thrust Washer	New-PTFE		
12C Washer	SUS316	SUS316L	
12D Thrust Washer	New-PTFE		
12E Bearing	New-PTFE		
15A Gland Flange	SCS13A		
15B Gland	SUS304		
15C Bearing	New-PTFE		
16 Travel Stop	SUS304		
17 Lever	SCPH2		
17B Retaining Ring	SUS304		
17D Extended Rod	SUS304	SUS316	SUS316L
18 Stud Bolt	SUS304		
18A Nut	SUS303		
19 Cap Screw	SUS304		
S1 Extended Gland	SCS13A or SUS304	SCS14A or SUS316	SCS16A or SUS316L

## Valve Codes

## Valve Code for FEX100NB

# FEX107NB-NTF-050-J10KRF



## 1 Body Material

07	SCS13A
12	SCS14A
13	SCS16A

## 2 Seat Material (Refer to Page 10)

NTF, NCF, NGR, CFM, CFMR

## 3 Nominal Size (DN or A)

Conforming to ISO6708 and JIS B2001

## 4 Connection

J10KRF	JIS 10KRF
J20KRF	JIS 20KRF
A150RF	ASME CL150
A300RF	ASME CL300

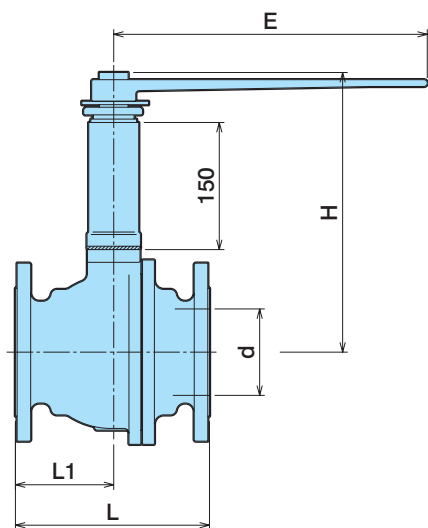
## \* Improvement Identification Code

None	Original Design
N	First Improvement
NB	Second Improvement
NC	Third Improvement
ND	Fourth Improvement

• Those are standard products codes. The code may be different depending on the products specification.

## Dimension

## FEX100NB



Unit: mm

Nominal DN	d	L		L1		H	E		Mass (Approx. kg)	
		10K CL150	20K CL300	10K CL150	20K CL300		10K CL150	20K CL300	10K CL150	20K CL300
15	13	108	140	45	63	230	130	130	2.6	3.1
20	19	117	152	50	70	235			3.1	3.7
25	25	127	165	51	71	250	160	160	5.0	5.8
40	38	165	190	70.5	76.5	265	230	230	8.2	9.3
50	51	178	216	80.5	86	270			10.0	11.9
65	64	190	241	87	103	285	350	350	16.0	20.0
80	76	203	283	97	124	295			19.0	26.0
100	102	229	305	116	135	330	450	450	30.0	42.0
125	127	356	381	148	158	410			650	800
150	152	394	403	173	178	430	67.0	81.8		



# 2

## 3-Way Ball Valve

---

Seat Mechanism (Port Shape and Number of Seats)

Changeover Form

Valve Code for E300NB(N)

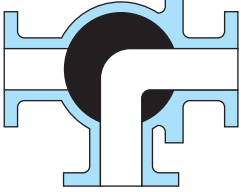
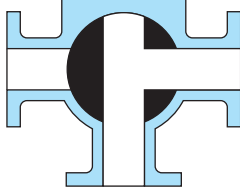
2-1. 2 seats 3-Way Ball Valve: E300NB-L2

2-2. 4 seats 3-Way Ball Valve: E300NB-T4/L4


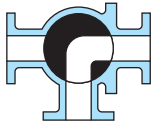





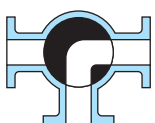

2-3. 3 seats 3-Way Ball Valve: E300N-T3/L3

Seat Mechanism (Port Shape and Number of Seats)


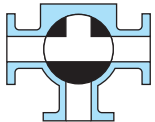


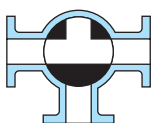

E300NB(N): L-Port/T-Port

L-Port (L2, L4, L3 )	T-Port (T4, T3)
For flow path switching	For fluid diverting and mixing
	

L-Port

Code	Flow Path and Number of Seats	Nominal Size	Notes
L2	 <p>2 seats</p>  	DN15 to 200	Seats are compatible with those of 2 way valve (F100NB). (L2 type has not a seat at the center. To prevent fluid deposit, L4 type will be applied.)
L4	 <p>4 seats</p>  	DN15 to 100	Seats are not compatible with those of 2 way valve (F100NB).
L3	 <p>3 seats</p>  	DN125 to 200	

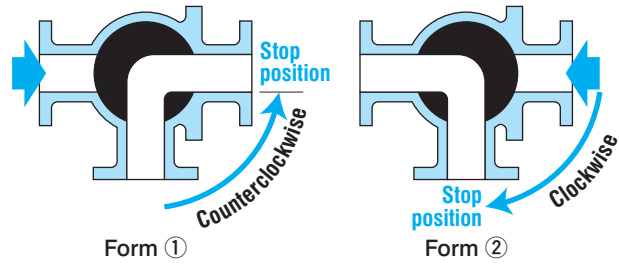
T-Port

Code	Flow Path and Number of Seats	Nominal Size	Notes
T4	 <p>4 seats</p>  	DN15 to 100	Seats are not compatible with those of 2 way valve (F100NB).
T3	 <p>3 seats</p>  	DN125 to 200	

Changeover Form

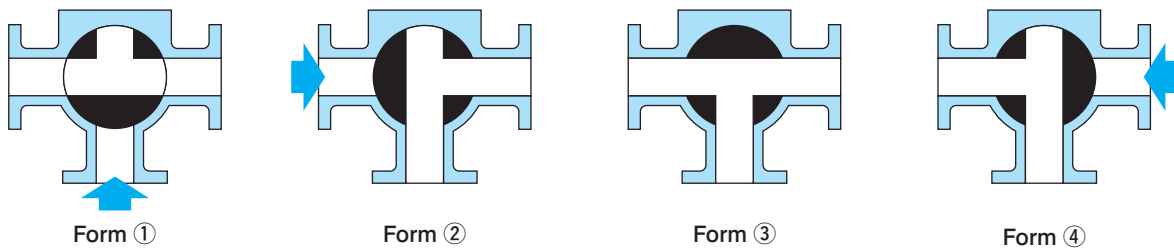
L-port

Right figure is the standard for L-Port type changeover form. If automatic valve is applied, please specify form ① or ② as its shut-down form of the operation when the power (air or electricity) is lost.



T-Port

For T-port, such ① & ② or ① & ④ of below figure will be selected as changeover form of 90° rotation. If automatic valve is applied, select and specify either of form ①, ②, ③ or ④ as its shut-down form when the operation power (air or electricity) is lost.

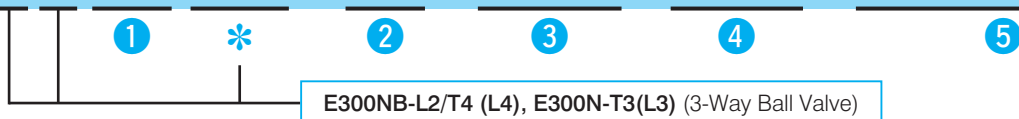


If a high pressure comes to a port as arrow mark in the above figure, a little leakage may occur to a low pressure side.

Valve Codes

Valve Code for E300NB(N)

**E 3 0 7 N B - L 2 - N T F - 0 5 0 - J 1 0 K R F**



① Body Material

04	FCD400
07	SCS13A
12	SCS14A
13	SCS16A

② Seat Mechanism

Port Shape	Number of Seats
L2	2
L3	3
L4	4
T3	3
T4	4

③ Seat Material (Refer to Page 10)

NTF, NCF, NGR, CFM, CFMR

④ Nominal Size (DN or A)

Conforming to ISO6708 and JIS B2001

⑤ Connection

J10KRF	JIS 10KRF
A150RF	ASME CL150

\* Improvement Identification Code

None	Original Design
N	First Improvement
NB	Second Improvement
NC	Third Improvement
ND	Fourth Improvement

• Those are standard products codes. The code may be different depending on the products specification.

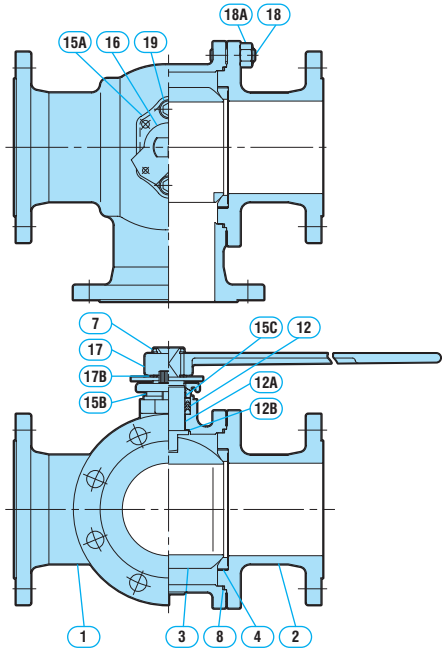
2-1 2 Seats 3-Way Ball Valve: E300NB-L2 Type

Structure and Features

The shape of the port is L Type. The valve is used for switching fluid.

Parts and Materials

The materials of the components are as below as far as there are no special requests.



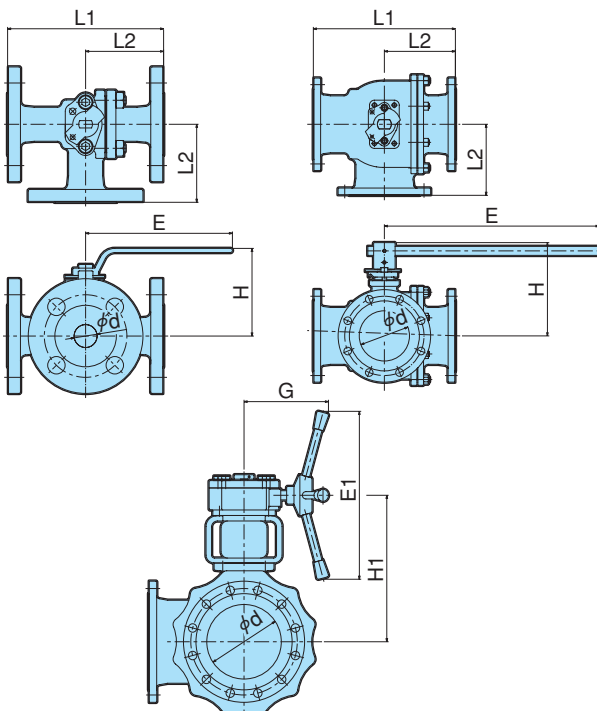
The above structure may have small differences according to the nominal size.

Applicable Class (DN15 to 200)

Body Material	Class
FCD400, SCS13A	JIS10K
SCS14A	JIS10K, CL150

Parts	Material		
	E304NB-L2	E307NB-L2	E312NB-L2
1 Body	FCD400	SCS13A	SCS14A
2 Cap	FCD400	SCS13A	SCS14A
3 Ball	SCS13A or SUS304		SCS14A or SUS316
4 Seat	NTF, NCF, NGR, CFM, CFMR, CFMO		
7 Stem	SUS304		SUS316
8 Gasket	New-PTFE		
12 Packing	New-PTFE		
12A Bearing	New-PTFE		
12B Thrust Washer	New-PTFE		
15A Gland Flange	SCS13A		
15B Gland	SUS304		
15C Bearing	New-PTFE		
16 Travel Stop	SUS304		
17 Lever	SCPH2 (DN15 to 100) SCPH2 & STK490 (DN125 to 200)		
17B Retaining Ring	SUS304		
18 Stud Bolt	SNB7	SUS304	
18A Nut	S45C	SUS303	
19 Cap Screw	SUS304		

Dimension



Unit: mm

Nominal size DN	d	L1	L2	H	E	H1	G	E1	Mass (Approx. kg)	
									Stainless Cast Steel	
									10K	Lever Operated
15	13	146	73	80	130	—	—	—	2.9	—
20	19	150	75	85		—	—	—	3.6	—
25	25	170	85	100	160	—	—	—	5.6	—
40	38	200	100	115		230	—	—	—	8.8
50	51	230	115	120	350		—	—	—	11.7
65	64	260	130	135		650	—	—	—	19.0
80	76	280	140	145	342		—	—	—	23.0
100	102	340	170	180		362	280	165	240	36.0
125	127	370	185	260	362		342	190	300	60.0
150	152	430	215	280		800	362	190	300	79.0
200	203	520	260	350	800		425	230	460	140.0



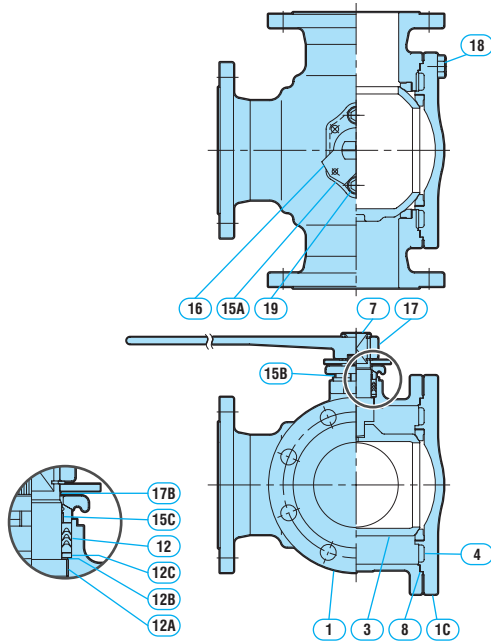
## 2-2 4 Seats 3-Way Ball Valve: E300NB-T4/L4

### Structure and Features

T-Port type is NDV standard but L-Port type is also available.  
The valve is used for switching, separating or mixing fluid.

### Parts and Materials

The materials of the components are as below as far as there are no special requests.



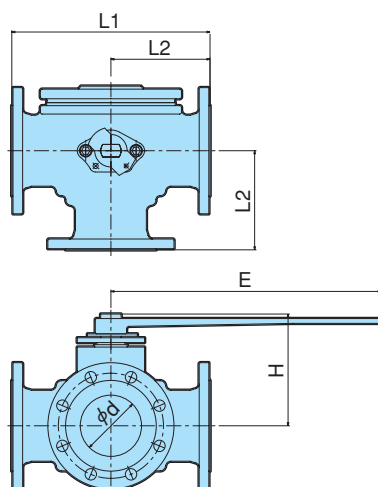
Parts	Material		
	E304NB-T4/L4	E307NB-T4/L4	E312NB-T4/L4
1 Body	FCD400	SCS13A	SCS14A
1C Side Cover	FCD400	SCS13A	SCS14A
3 Ball	SCS13A		SCS14A
4 Seat	NTF, NCF, NGR		
7 Stem	SUS304		SUS316
8 Gasket	New-PTFE		
12 Packing	New-PTFE		
12A Bearing	New-PTFE		
12B Thrust Washer	New-PTFE		
12C Washer	SUS316		
15A Gland Flange	SCS13A		
15B Gland	SUS304		
15C Bearing	New-PTFE		
16 Travel Stop	SUS304		
17 Lever	SCPH2		
17B Retaining Ring	SUS304		
18 Bolt	SUS304		
19 Cap Screw	SUS304		

Applicable Class (DN15 to 100)

Body Material	Class
FCD400, SCS13A	JIS10K
SCS14A	JIS10K, CL150

JIS20K (CL300) is also available.

### Dimension



Unit: mm

Nominal size DN	d	L1	L2	H	E	Mass (Approx. kg)
						Stainless Cast Steel 10K
15	19	140	70	95	160	3.7
20						4.2
25	25	160	80	105	230	6.6
40	38	180	90	119		9.0
50	51	200	100	129	350	13.7
65	64	240	120	140		19.5
80	76	260	130	167	450	28.0
100	102	330	165	182		35.0

This valve is not compatible with E300NB-L2 in face to face dimension and parts.

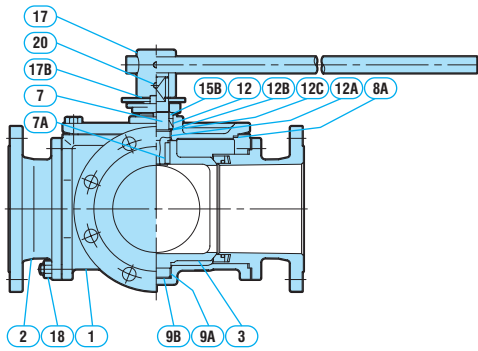
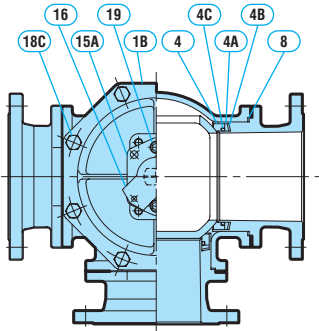
2-3 3 Seats 3-Way Ball Valve: E300N-T3/L3

Structure and Features

T-Port type is NDV standard but L-Port type is also available.  
The valve is used for switching, separating or mixing fluid.

Parts and Materials

The materials of the components are as below as far as there are no special requests.



This valve is not compatible with E300NB-L2 in face to face dimension and parts.

Remarks

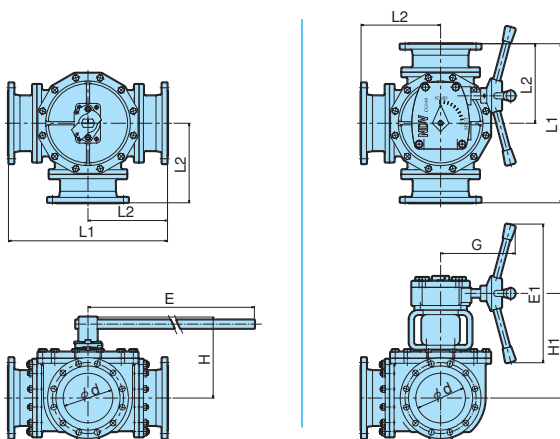
- (\*1) Fluid temperature is up to 80°C
  - (\*2) Fluid temperature is up to 150°C
- For (\*1) and (\*2), if the fluid is solvent, the materials may not be used.

Applicable Class (DN125 to 200)

Body Material	Class
FCD-S, SCS13	JIS10K, CL150
SCS14, SCS16	JIS10K, CL150

Parts	Material			
	E304N-T3/L3	E307N-T3/L3	E312N-T3/L3	E313N-T3/L3
1 Body	FCD-S	SCS13	SCS14	SCS16
1B Cover	FCD-S	SCS13	SCS14	SCS16
2 Body Connector	FCD-S	SCS13	SCS14	SCS16
3 Ball	SCS13		SCS14	SCS16
4 Seat	NTF, CF, GR			
4A Spacer	SUS304		SUS316	SUS316L
4B Spring	SUS329J3L			
4C O-Ring	NBR (*1)		FKM (*2)	
7 Stem	SUS420J2	SUS304	SUS316	SUS316L
7A Key	SUS304		SUS316	SUS316L
8 Gasket	PTFE			
8A Gasket	PTFE			
9A Bearing	PTFE			
9B Thrust Washer	PTFE			
12 Packing	PTFE			
12A Bearing	PTFE			
12B Thrust Washer	PTFE			
12C Washer	SUS304		SUS316	SUS316L
15A Gland Flange	FCD400		SCS13	
15B Gland	SUS304			
16 Travel Stop	SUS304			
17 Lever	FCD400 & STK50			
17B Retaining Ring	SUS304			
18 Stud Bolt/Nut	SS400		SUS304	
18C Bolt	SS400		SUS304	
19 Cap Screw	S45C		SUS304	
20 Set Screw	SUS304			

Dimension



Unit: mm

Nominal size DN	d	L1	L2	H	E	H1	G	E1	Mass (Approx. kg)	
									Stainless Cast Steel	
									Lever Operated	Gear Operated
125	127	430	215	260	800	340	230	460	82.5	110.0
150	152	500	250	275		352			104.0	132.0
200	203	650	325	335	1100	434	260		177.0	226.0

# 3

## V-Port Valve

---

Structure and Feature of V-Port Valve

Reference for Seat Selection

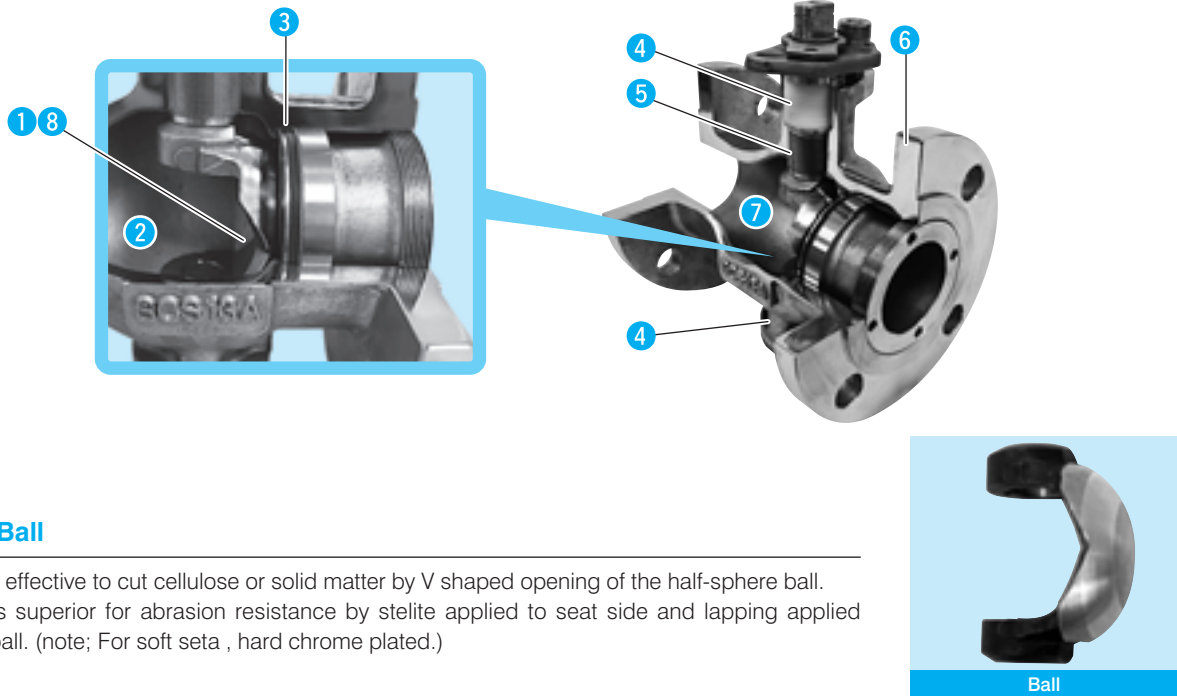
3. V-Port Valve: V100ND(NC)

**Structure and Feature of V-Port Valve**

**Structure and Features**

V-Port Valve is the most suitable for resin pellet (nylon etc.), powder (fly ash etc.), paper mill (pulp fluid), slurry (steel mill, muddy water, lime milk etc.) and any other high viscous fluid.

The valve has high performance for heat resistance, abrasion resistance and flow control.



**1 V-Cut Ball**

The valve is effective to cut cellulose or solid matter by V shaped opening of the half-sphere ball. The valve is superior for abrasion resistance by stellite applied to seat side and lapping applied surface of ball. (note; For soft seta , hard chrome plated.)

**2 Pocketless Structure**

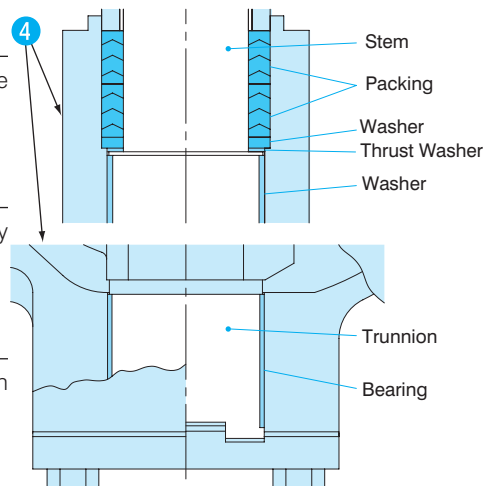
Since seat is located at inlet side only, congestion of fluid or clogging between ball and body will not occur. By this seal configuration, abnormal pressure rise will not occur too.

**3 Seat with Heat Resistance and Abrasion Resistance**

The seat has both rigidity and flexibility, therefore, it can seal from vacuum to high pressure without an influence by temperature and/or pressure difference. The valve is usable in high temperature if metal seat is applied. The seat has high abrasion resistance against abrasive fluid such as slurry and powder. (The details about the seat are described in the next page.)

**4 Stable Bearing Configuration**

Reinforced PTFE is applied to bearings for stem and trunnion and therefore, the operation torque is low and the frequent operation is possible.



**5 Gland Packing with Superior Sealing**

Perfect sealing is possible from vacuum condition to high pressure condition by applying V-Packing. (V100ND)

**6 Integrated Body**

The valve body is an all integrated body. Therefore, there are no fluctuations in torque by piping stress, no deterioration of sealing or no external leakage.

**7 Full Flow**

When the valve is fully opened, the flow passage is almost straight, minimizing pressure loss and ensuring a full capacity flow. Slurry or high viscous fluids can flow the passage smoothly without congestion or cavitation.

**8 Flow Control**

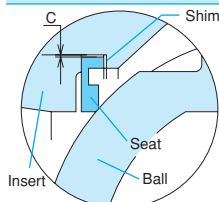
The V-shaped cut ball increases rangeability and enhance flow rate control ability. The flow characteristics are almost equal percentage.

Reference for Seat Selection

Seat Specification and Features (V100ND)

- Solid (thick) Seat, Thin Seat and Soft (Reinforced PTFE) Seat are available for wide range purposes.
- The above three kinds of seats are compatible.
- Outer diameter has a clearance C. By placing the seat on the spherical surface of the ball, seal surface of the seat becomes centripetal and equal contact can be obtained.

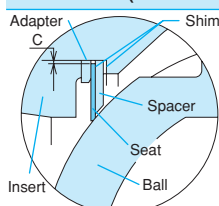
Solid (thick) Seat (Code: ST)



SUS316 (Stellite at seal surface). When the insert is tightened, a notch at the backside of the seat makes cantilever action and seal surface of the seat adheres to the surface of the ball.

**Application:** resin pellet, powder, slurry, high viscous fluid

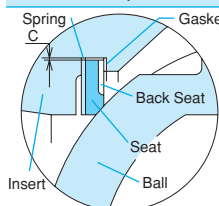
Thin Seat (Code: M)



Thin spring plate of SUS316H. The principle of the seal is cantilever as same as the solid seat. However, since the flexibility is better, the leakage tolerance and the torque of the valve can be minimized than the solid seat.

**Application:** cellulose fluid, viscous fluid, sludge

Soft Seat (Code: CF)



Carbonfiber reinforced PTFE. Since the seat spring acts as cantilever, more stable sealing than thin seat can be obtainable.

**Application:** water, oil, air, for on-off control of clean fluid

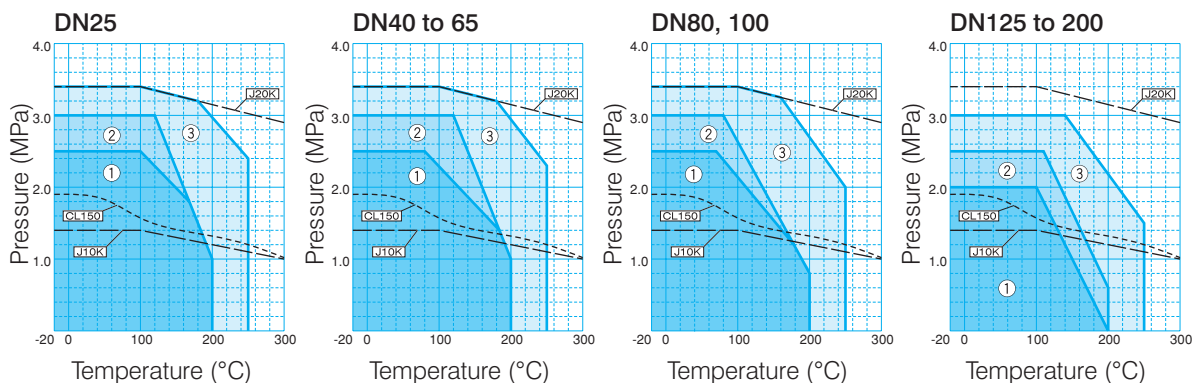
Allowable Seat Leakage

Kind of Seat	Allowable Leakage	Applicable Code
Solid Seat (ST)	0.5% of rated Cv	ANSI B16.104 Class II and IEC534-4 Class II
Thin Seat (M)	0.0005% of rated Cv	ANSI B16.104 Class IV 1/20 and IEC534-4 Class IV-S1
Soft Seat (CF)	Zero leakage	—

Remark: Solid seat with allowable leakage of 0.002% is also available.

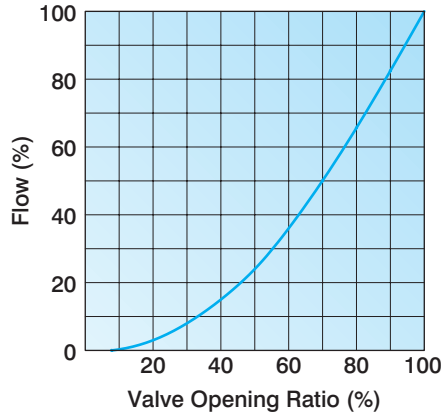
Working Pressure and Temperature Range

- CF: ①
- M: ②
- ST: ③



\* DN125 to 200 is V100NC.

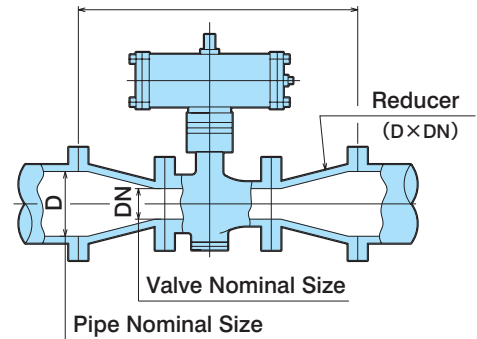
## Flow Characteristics



### Flow Coefficient Cv Value (Adjusted Cv value considering rated Cv and effects by reducer)

DN	Rated Cv	D×DN	Adjusted Cv	D×DN	Adjusted Cv	D×DN	Adjusted Cv
25	28	40×25	23	50×25	21	65×25	20
40	75	50×40	68	65×40	60	80×40	55
50	153	65×50	127	80×50	110	100×50	95
65	250	80×65	218	100×65	185	125×65	165
80	350	100×80	312	125×80	270	150×80	245
100	540	125×100	480	150×100	430	200×100	360
125	930	150×125	835	200×125	675	250×125	575
150	1320	200×150	1110	250×150	950	300×150	830
200	2000	250×200	1800	300×200	1620	350×200	1500

Adjusted Cv based on the reducer type



### Cv value Calculation

Fluid	Formula
Liquid	<b>General</b> $C_v = 11.56V \sqrt{\frac{G}{(P_1 - P_2)}}$
	<b>Viscous Fluid</b> $C_v = 11.56V \cdot R \cdot \sqrt{\frac{G}{(P_1 - P_2)}}$
Gas	$\Delta P < \frac{P_1}{2}$ $C_v = \frac{Q}{2.93} \sqrt{\frac{G(273+t)}{\Delta P(P_1 + P_2)}}$
	$\Delta P \geq \frac{P_1}{2}$ $C_v = \frac{Q \sqrt{G(273+t)}}{2.538 P_1}$
Steam	$\Delta P < \frac{P_1}{2}$ $C_v = \frac{WK}{0.1391 \sqrt{\Delta P(P_1 + P_2)}}$
	$\Delta P \geq \frac{P_1}{2}$ $C_v = \frac{WK}{0.1205 P_1}$

**V:** Maximum Flow (m<sup>3</sup>/hr)  
**G:** Gravity (water: 1, air: 1)  
**P1:** Valve inlet pressure (kPa-A)  
**P2:** Valve outlet pressure (kPa-A)  
**ΔP:** P1-P2 (kPa)  
**R:** Viscosity correction factor  
**t:** Temperature(°C)  
**Q:** Maximum Flow (15.6°C, 101.3 kPa)  
**W:** Maximum Flow (kg/hr)  
**K:** 1+(0.0013 x Superheated value°C)

**Superheated value:**  
 Temperature difference (t-t1) between saturate temperature (t) in absolute pressure at valve inlet and temperature at valve inlet (t1).  
 For saturated steam, superheated value is assumed to be zero.

### Pulp Density Correction Value

Density (%)	Correction Factor (K1)
1	1
2	1.1
3	1.2
4	1.4
5	1.9

**Remarks:**

1. Viscosity correction factor R will be applied when the fluid is more than 20cSt.
2. Pulp density correction will be calculated by multiplying Cv value with K1 (Viscous fluid formula to be used.)

## 3 V-Port Valve: V100ND

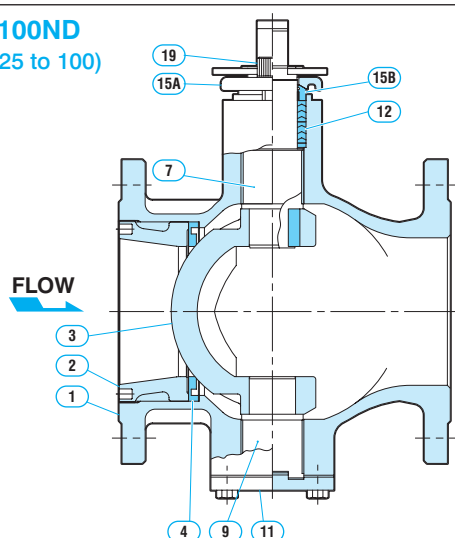
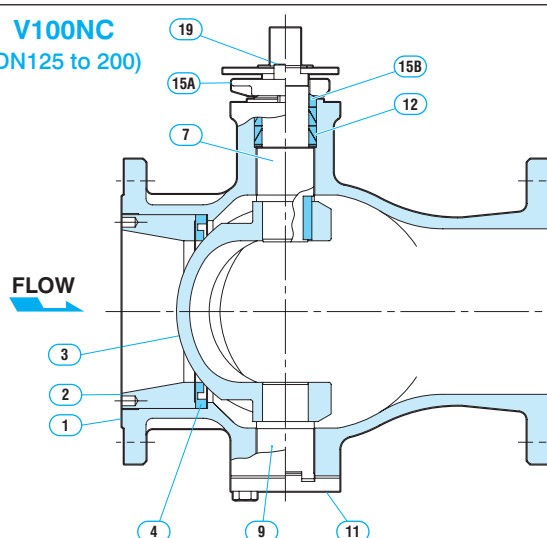
## Specification

Type	V100ND	V100NC
Nominal Size (*1)	DN25 to 100	DN125 to 200
Face to Face Dimension	According to ISO5752	
Connection type	Flange type: JIS10K, 20K • Class (ASME, JPI) 150, 300	
Body Material (*2)	SCS13A (CF8) SCS14A (CF8M)	SCS13 SCS14
Ball Material / Seat Material	According to the combination of Ball and Seat	
Operation type	Lever, Gear, Pneumactical, Electrical	

\*1: DN20 and over 250 are also available.

\*2: FCD is also available.

## Parts and Materials

V100ND  
(DN25 to 100)V100NC  
(DN125 to 200)

Parts	Material			
	V107ND	V107NC	V112ND	V112NC
1 Body	SCS13A	SCS13	SCS14A	SCS14
2 Insert	SCS13A	SUS304	SCS14A	SUS316
3 Ball	SCS11 (ST) SCS11 (Hcr.P)		SCS11 (ST) SCS11 (Hcr.P)	
4 Seat	SUS316 (ST) SUS316H (M) Reinforced PTFE (CF)		SUS316 (ST) SUS316H (M) Reinforced PTFE (CF)	
7 Stem	SUS316			
9 Trunnion	SUS316			
11 Trunnion Cover	SUS316			
12 Packing	New-PTFE	PTFE	New-PTFE	PTFE
15A Gland Flange	SCS13A	SCS13	SCS13A	SCS13
15B Gland	SUS304			
19 Cap Screw	SUS304			

## Combination of Ball and Seat

Type	V100ND, V100NC	
	Ball	Seat
Solid Seat (thick)	SCS11+ST	SUS316 + ST
Thin Seat	SCS11+Hcr.P	SUS316H
Soft Seat (Reinforced PTFE)		Reinforced PTFE(CF)

•ST: Stellite •Hcr.P: Hard chrome plating

Valve Codes

Valve Code for V100ND(NC)

**V 1 0 7 N D - C F - 0 5 0 - J 1 0 K R F**



1 Body Material

07	SCS13A
12	SCS14A

2 Seat Material (Refer to P 29)

ST	Solid Seat
M	Thin Seat
CF	Soft Seat

3 Nominal Size (DN or A)

Conforming to ISO6708 and JIS B2001

4 Connection

J10KRF	JIS 10KRF
J20KRF	JIS 20KRF
A150RF	ASME CL150

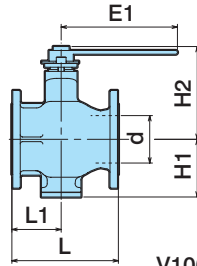
\* Improvement Identification Code

None	Original Design
N	First Improvement
NB	Second Improvement
NC	Third Improvement
ND	Fourth Improvement

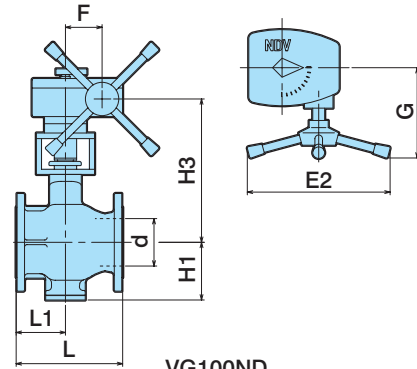
• Those are standard products codes. The code may be different depending on the products specification.

Dimension

V100ND (NC) · VG100ND (NC)



V100ND



VG100ND

Unit: mm

Nominal size DN					Lever Operated Valve		Gear Operated Valve								Mass (Approx. kg)						
	d	L		L1	H1	H2	E1		H3		G		F		E2		Lever Operated		Gear Operated		
		10K CL150	20K				10K CL150	20K	10K CL150	20K	10K CL150	20K	10K CL150	20K	10K CL150	20K	10K CL150	20K	10K CL150	20K	
25	25	127	165	55	48	108	160	160	—	—	—	—	—	—	—	—	—	3.8	5.0	—	—
40	38	165	190	70	71	135	230	230	—	—	—	—	—	—	—	—	—	6.8	8.5	—	—
50	51	178	216	75	77	140			—	—	—	—	—	—	—	—	—	—	8.1	10.5	—
65	64	190	241	80	96	163	350	350	—	—	—	—	—	—	—	—	—	13.0	15.5	—	—
80	76	203	283	90	101	168			—	—	—	—	—	—	—	—	—	—	14.0	17.0	—
100	102	229	305	106	131	209	450	450	311	316	165	190	62.5	77	240	300	21.0	26.5	38.0	49.0	
125	127	356	381	145	163	295	650	800	378	378	190	230	77.0	90.5	300	460	44.0	50.0	77.0	81.0	
150	152	394	403	150	173	307			388	388							55.0	64.0	90.0	95.0	
200	203	457	502	200	211	368	800	1000	446	464	230	260	90.5	121	460	86.0	98.0	135.0	150.0		



# 4

## Pneumatically Operated Valve

---

Torque Actuator: 04DN to 12DN

Torque Actuator for Large Bore: 13D to 25D

Selection for Actuator

### 4-1. Pneumatically Operated 2-Way Ball Valve

- Fire Safe Type Ball Valve: FPN(PO,PC)1100NB
- Jacketed Ball Valve: EPN(PO,PC)1100JNC
- Extended Gland Type Ball Valve: FEXPN(PO,PC)1100NB

### 4-2. Pneumatically Operated 3-Way Ball Valve

- 2 Seats 3-Way Ball Valve: EPN(PO,PC)1300NB-L2
- 4 Seats 3-Way Ball Valve: EPN(PO,PC)1300NB-T4/L4
- 3 Seats 3-Way Ball Valve: EPN(PO,PC)1300N-T3/L3

### 4-3. Pneumatically Operated V-Port Valve: VPN(PO,PC)1100ND(NC)

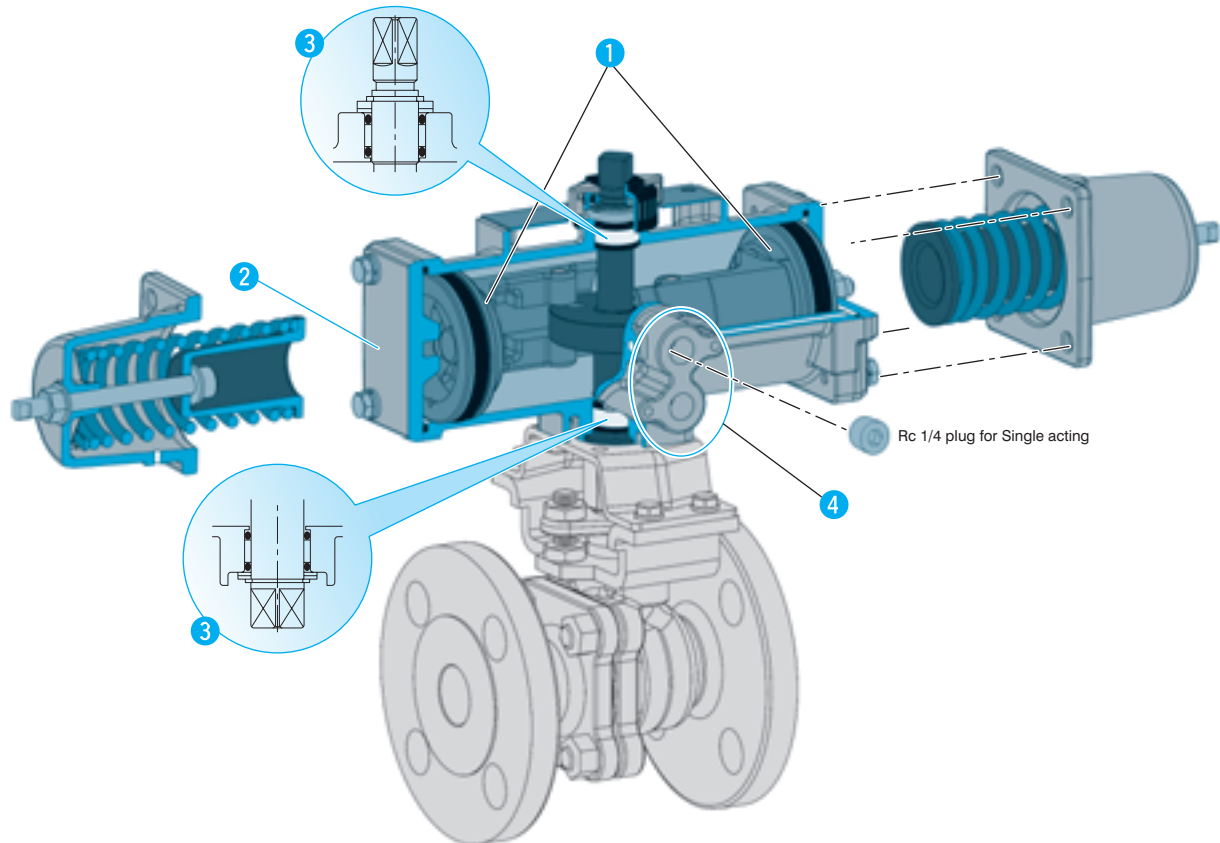
### 4-4. References for Pneumatically Operated Valve

## Torque Actuator: 04DN to 12DN

## Structure and Features

- ① Compact and light weight with double pistons type.
- ② Environment-conscious type paint is used.
- ③ Sealing capability has improved by increasing the number of O-Ring at upper and lower position of drive shaft from 1 to 2 each.
- ④ Air inlet connection conforms to NAMUR standard(\*).

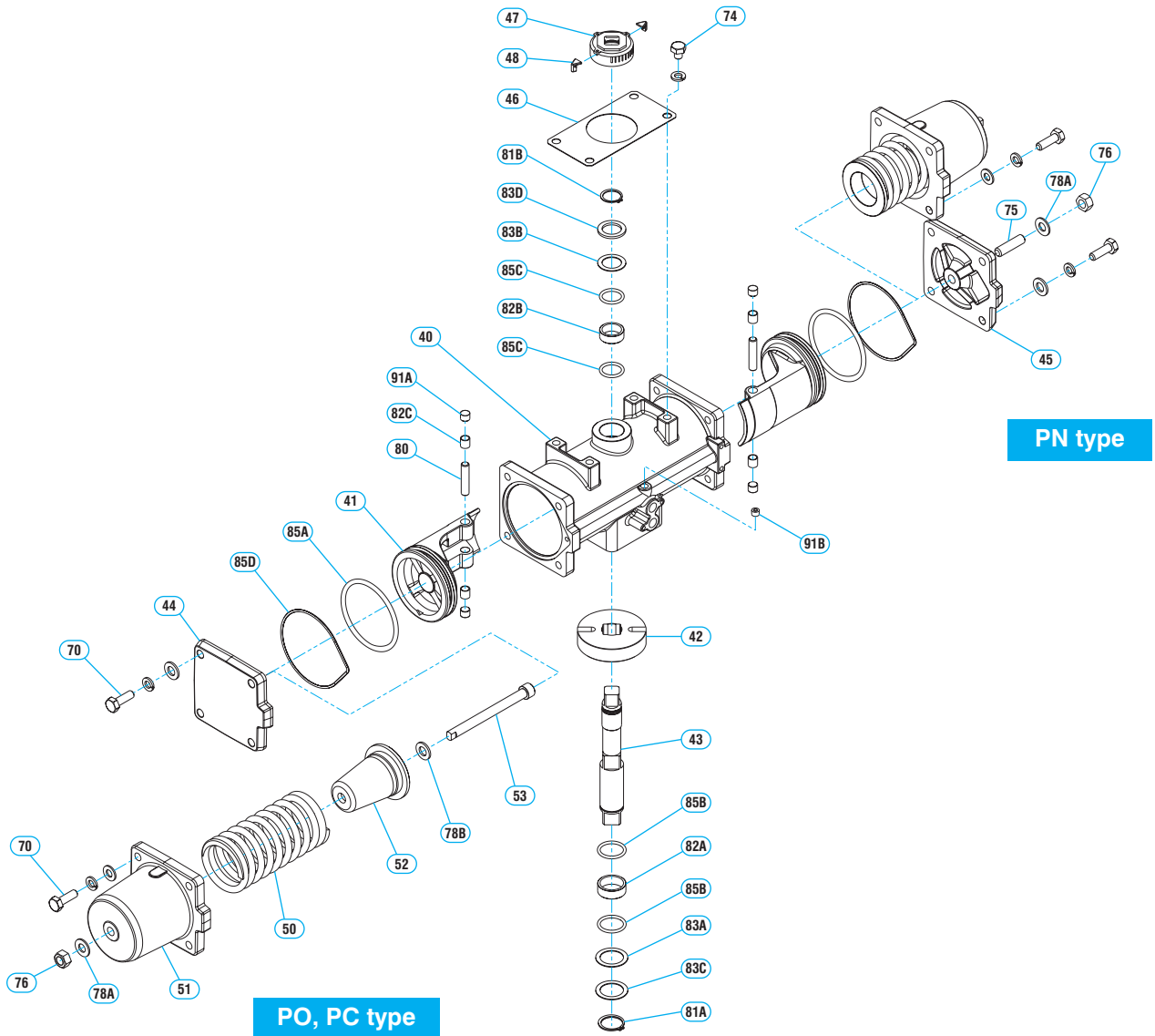
\*: The code VDI/VDE3845-2010 for the size of the attachments of actuators



## Specification

Operation Type	Double Acting: PN (Air to Open / Air to Close) Single Acting: Reverse Acting PO (Air to Open / Spring to Close) Direct Acting PC (Air to Close / Spring to Open)
Operating Pressure	0.4 to 0.7MPa (Option: 0.3MPa)
Materials	Cylinder: ADC12 (Aluminum Die-cast) Spring Cover: ADC12 Drive Shaft: SCM435
Ambient Temperature	-10 to 50°C *except frozen condition (Please consult with NDV if the ambient temperature is more than 50°C)
Rotation Angle	Partial turn 0 to 90°
Manual Operation	Manual operating device is installable. *In case of double acting, lever operation is possible by installing by-pass at air chambers or by atmospheric discharge.
Air Inlet Connection	Rc1/4 (Solenoid valve connection: NAMUR Standard)
Painting for Actuator	Platinum Silver (conforming to RoHS)
Lubricant Oil	Shell Arbania EP2 grease (conforming to RoHS)
Durability	More than 100,000 times (with load) *not guaranteed value

Parts and Materials



No.	Parts	Materials
40	Cylinder	ADC12
41	Piston	FCD400
42	Scotch York	SMF5030, S45C (*)
43	Drive Shaft	SCM435
44	Cover A	ADC12
45	Cover B	ADC12
46	Nameplate	A1100P
47	Cap	ABS
48	Indicator	Polypropylene
50	Coil Spring	Spring Steel
51	Spring Cover	ADC12
52	Spring Bearing	S20C, FCD400
53	Cap Screw	SUS304

No.	Parts	Materials
70	Bolt	SUS304
74	Pan Head Screw (dia.40, 50, 63, 80)	SUS304
	Bolt (dia.100, 125)	SUS304
75	Socket Screw	SUS304
76	Nut	SUS304
78A	Seal Washer	SS & NBR
78B	Washer	SPCC
80	Straight Pin	SUS630
81A	Snap Ring	SUS304
81B	Snap Ring	SUS304
82A	Bearing	Polyacetal

No.	Parts	Materials
82B	Bearing	Polyacetal
82C	Bearing	SS & fluorocarbon
83A	Thrust Bearing	Polyacetal
83B	Thrust Bearing	Polyacetal
83C	Thrust Bearing	SUS304
83D	Thrust Bearing	SUS304
85A	O-Ring	NBR
85B	O-Ring	NBR
85C	O-Ring	NBR
85D	O-Ring	NBR
91A	Plug	C3602
91B	Plug (dia.40,100,125)	SUS304

\*: 10DN, 12DN

2-Way Ball Valve

3-Way Ball Valve

V-Port Valve

Pneumatically Operated Valve  
Torque Actuator

Electrically Operated Valve

Special Purpose Ball Valve

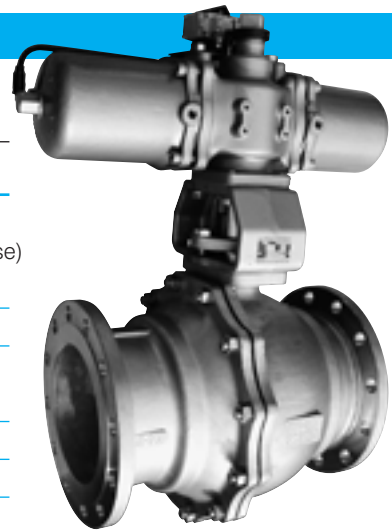
Safety Instructions

**Torque Actuator for Large Bore: 13D to 25D**

**Structure and Features**

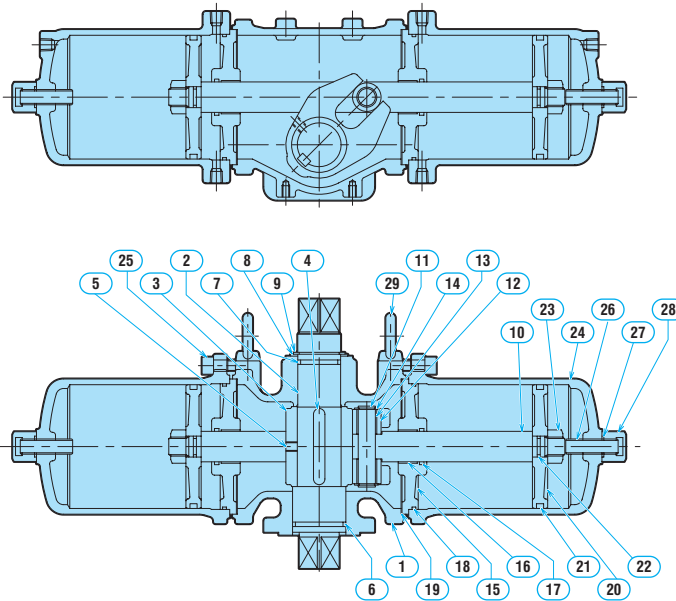
Double Cylinder 90° Rotation Piston type Actuator with Scotch York.

<b>Operation Type</b>	Double Acting: PN (Air to Open / Air to Close) Single Acting: Reverse Acting PO (Air to Open / Spring to Close) Direct Acting PC (Air to Close / Spring to Open)
<b>Operating Pressure</b>	0.4 to 0.7MPa (Option: 0.3MPa)
<b>Ambient Temperature</b>	-10 to 50°C *except frozen condition (Please consult with NDV if the ambient temperature is more than 50°C)
<b>Rotation Angle</b>	Part turn 0 to 90°
<b>Manual Operation</b>	Manual operating device is installable.
<b>Painting for Actuator</b>	Silver (conforming to RoHS)

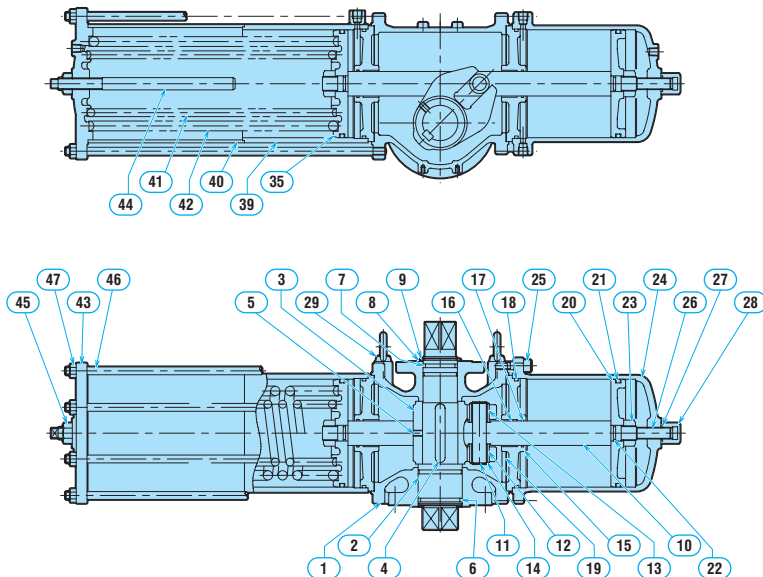


**Parts and Materials**

**Double Acting Type**



**Single Acting Type**



No.	Parts	Materials
1	Bracket	FC200
2	Shaft	S45C
3	Parallel Arm	FCD450
4	Key	S45C
5	Nut	SCM435
6	O-Ring	NBR
7	O-Ring	NBR
8	Thrust Bearing	NYLON
9	Stop Ring	SK5
10	Piston Rod	S45C
11	Pin	S45C
12	Roller	S45C
13	Bearing	SS & POM
14	Stop Ring	SK5
15	Distance	FC200
16	Bearing	SS & POM
17	O-Ring	NBR
18	O-Ring	NBR
19	Gasket	T#1995
20	Piston	FC200
21	O-Ring	NBR
22	O-Ring	NBR
23	Nut	SS400
24	Cylinder	FCD450
25	Cap Screw	SCM435
26	Stopper Bolt	SCM435
27	O-Ring	NBR
28	Cap Nut	SS400
29	Eye Bolt	SS400
35	Piston	FCD450
39	Cylinder	STKM
40	Spring Case	SGP
41	Spring (inside)	SUP9
42	Spring (outside)	SUP9
43	Cover	FCD450
44	Stopper Bolt	SS400
45	Nut	SS400
46	Long Bolt	S45C
47	Nut	SS400

## Selection of Actuator

### Selection by Operating Condition

A required torque to operate a valve is different by the fluid condition, the fluid temperature, the seat material or the shutoff differential pressure even if the valve diameter is the same. Therefore, an appropriate actuator must be selected considering conditions to affect the valve torque.

**Valve Type:** F100NB, E100JNC, E300NB, E300N

Condition		Factor
Seat Material	NTF	a
	NCF	b
	NGR	c
Fluid State	Clean (less than 100cP)	a
	Solvent, Viscous (100 to 500cP)	b
	Sludge, Contamination (Slurry, Iron Powder), Powder, High Viscous Fluid	c
Fluid Temp.	-20 to 150°C	a
	-100 to -21°C, 151 to 200°C	b

Combination of Factor	Rank
3a	A
2a+b, a+2b	B
2a+c, 2b+c, a+b+c, 3b, 2c+a, 2c+b	C

**Valve Type:** V100ND (NC)

Category	Used Condition (Note 1)	Selection (Note 2)			
		Seat	Operation		Rank
			ON-OFF	Control	
1	Clean Fluid	CF	☉	△	A
		M	○	☉	B
2	Sludge, Viscous Fluid (less than 500CP), Fluid with Fiber, Powder (Soft not including solid matter)	CF	□	△	B
		M	☉	☉	B
		ST	○	○	B
3	Powder (Soft including solid matter)	M	☉	□	B
		ST	○	☉	B
4	High Viscous Fluid (Gum)	M	□	□	C
		ST	☉	☉	C
5	Slurry, Powder (Hard)	ST	☉	☉	C

#### Note 1: Examples of fluid

##### Category 1:

Water, Gas, Solvent

##### Category 2:

Sludge (not including solid matter), Sugar solution, Pulp liquor, Food powder

##### Category 3:

Food powder, Resin powder (not abrasive)

##### Category 4:

Latex, Viscose

##### Category 5:

Coal ash, Coke powder, Resin powder

#### Note 2

☉: Recommendable to use

○: Possible to use

□: Not recommendable to use

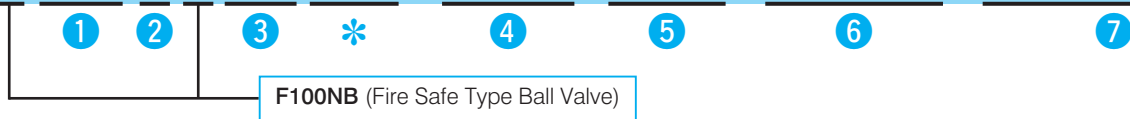
△: Not suitable to use

## 4-1 Pneumatically Operated 2-Way Ball Valve

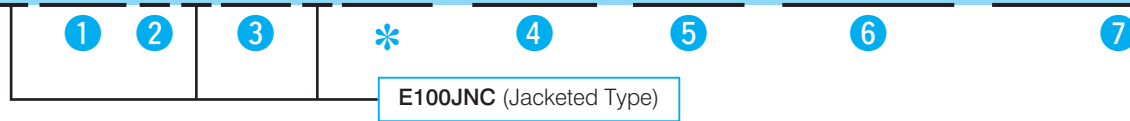
### Valve Codes

Valve Code for FPN(PO,PC)1100NB, EPN(PC,PO)1100NB

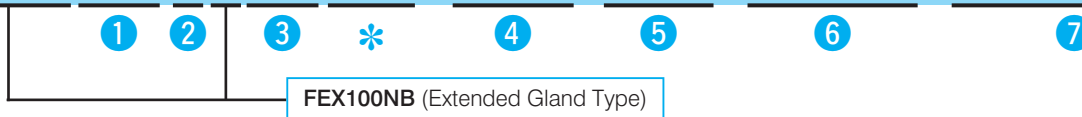
**FPN1107NB-NTF-050-06DN-J10KRF**



**EPN1112JNC-NTF-050-06DN-J10KRF**



**FEXPN1107NB-NTF-050-06DN-J10KRF**



#### 1 Operation Type

<b>PN</b>	Double Acting Type
<b>PO</b>	Reverse Acting Type (Air to Open)
<b>PC</b>	Direct Acting Type (Air to Close)

#### 2 1

Pneumatically Operated On-Off Valve
-------------------------------------

#### 3 Body Material

<b>04</b>	FCD400
<b>07</b>	SCS13A
<b>12</b>	SCS14A
<b>13</b>	SCS16A

#### 4 Seat Material (refer to P10)

NTF, NCF, NGR, CFM, CFMR
--------------------------

#### 5 Nominal Size (DN or A)

Conforming to ISO 6708 and JIS B 2001

#### 7 Connection

<b>J10KRF</b>	JIS 10KRF
<b>J20KRF</b>	JIS 20KRF
<b>A150RF</b>	ASME CL150
<b>A300RF</b>	ASME CL300

#### \* Improvement Identification Code

<b>None</b>	Original Design
<b>N</b>	First Improvement
<b>NB</b>	Second Improvement
<b>NC</b>	Third Improvement
<b>ND</b>	Fourth Improvement

#### 6 Actuator Type (04DN to 12DN, 13D to 25D)

• Those are standard products codes. The code may be different depending on the products specification.

4-1 Pneumatically Operated 2-Way Ball Valve Fire Safe Type: FPN(PO, PC)1100NB

Actuator Selection Table

Valve Type: FPN1100NB-15/200, EPN1100JNC-15/200, FEXPN1100NB-15/150 (Double Acting Type)

Operating Pressure: 0.4MPa

DN	Rank	Double Acting Type									Rank	DN
		Shutoff Differential Pressure: MPa										
		0.2	0.6	1.0	1.4	1.8	2.2	2.6	3.0			
15	A										A	15
	B										B	
	C										C	
20	A										A	20
	B										B	
	C										C	
25	A										A	25
	B										B	
	C										C	
40	A										A	40
	B										B	
	C										C	
50	A										A	50
	B										B	
	C										C	
65	A										A	65
	B										B	
	C										C	
80	A										A	80
	B										B	
	C										C	
100	A										A	100
	B										B	
	C										C	
125	A										A	125
	B										B	
	C										C	
150	A										A	150
	B										B	
	C										C	
200	A										A	200
	B										B	
	C										C	

Valve Type: FPO1100NB-15/200, EPO1100JNC-15/200, FEXPO1100NB-15/150 (Single Acting Type)

Operating Pressure: 0.4MPa

DN	Rank	Single Acting Type									Rank	DN
		Shutoff Differential Pressure: MPa										
		0.2	0.6	1.0	1.4	1.8	2.2	2.6	3.0			
15	A										A	15
	B										B	
	C										C	
20	A										A	20
	B										B	
	C										C	
25	A										A	25
	B										B	
	C										C	
40	A										A	40
	B										B	
	C										C	
50	A										A	50
	B										B	
	C										C	
65	A										A	65
	B										B	
	C										C	
80	A										A	80
	B										B	
	C										C	
100	A										A	100
	B										B	
	C										C	
125	A										A	125
	B										B	
	C										C	
150	A										A	150
	B										B	
	C										C	
200	A										A	200
	B										B	
	C										C	

2-Way Ball Valve

3-Way Ball Valve

V-Port Valve

Pneumatically Operated Valve  
2-Way Ball Valve

Electrically Operated Valve

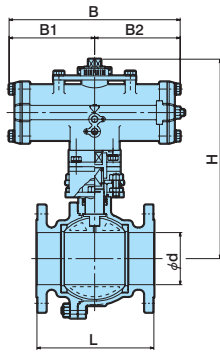
Special Purpose Ball Valve

Safety Instructions

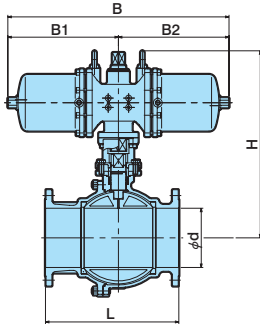
**Dimension**

Valve Type: FPN1100NB (Double Acting Type, Full-Port)

Unit: mm



FPN1100NB (04DN to 12DN)

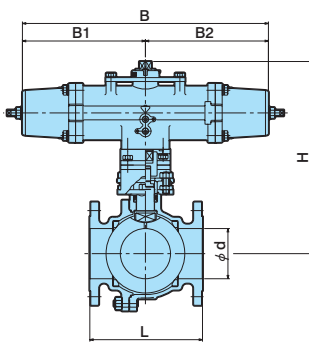


FPN1100NB (13D to 22D)

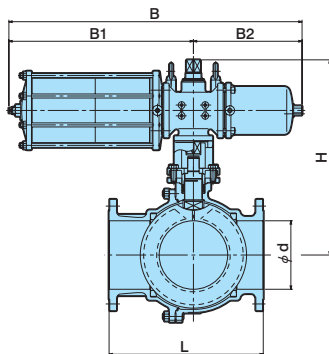
Nominal size DN	d	L		Actuator Code	B	B1	B2	H	Mass (Approx. kg) Stainless Cast Steel	
		10K CL150	20K CL300						10K CL150	20K CL300
		15	13						108	140
20	19	117	152	PN-05DN	172	B/2	B/2	179	3.6	4.1
				PN-04DN	144			192	4.0	4.5
25	25	127	165	PN-05DN	172			193	5.0	5.7
				PN-06DN	214			206	5.5	6.2
40	38	165	190	PN-08DN	266			224	8.9	9.7
				PN-06DN	214			240	9.9	10.7
50	51	178	216	PN-08DN	266			248	11.8	13.4
				PN-06DN	214			269	15.8	17.4
65	64	190	241	PN-08DN	266			276	17.3	20.8
				PN-10DN	336			297	19.8	23.3
				PN-08DN	266	345	28.0	31.5		
80	76	203	283	PN-10DN	336	307	22.9	29.4		
				PN-12DN	420	355	28.6	35.1		
100	102	229	305	PN-10DN	336	390	39.0	50.5		
				PN-12DN	420	420	49.0	60.5		
125	127	356	381	PN-10DN	336	426	52.5	65.5		
				PN-12DN	420	459	69.5	82.5		
				PN-13D	644	505	86.0	99.0		
150	152	394	403	PN-12DN	420	479	84.5	98.5		
				PN-13D	644	525	101.0	115.0		
				PN-18D	758	596	138.0	152.0		
200	203	457	502	PN-13D	644	579	143.0	168.0		
				PN-18D	758	641	180.0	205.0		
				PN-22D	988	752	260.0	285.0		

Valve Type: FPO1100NB (Single Acting Type, Full-Port)

Unit: mm



FPO1100NB (04DN to 12DN)



FPO1100NB (13D to 25D)

Nominal size DN	d	L		Actuator Code	B	B1	B2	H	Mass (Approx. kg) Stainless Cast Steel	
		10K CL150	20K CL300						10K CL150	20K CL300
		15	13						108	140
20	19	117	152	PO-05DN	268	188	4.4	4.8		
				PO-06DN	314	192	5.2	5.7		
25	25	127	165	PO-08DN	392	208	6.7	7.2		
				PO-10DN	214	222	8.3	9.0		
40	38	165	190	PO-08DN	392	261	15.4	15.8		
				PO-10DN	214	309	24.0	24.8		
50	51	178	216	PO-08DN	392	269	17.3	18.9		
				PO-10DN	500	317	26.0	27.6		
65	64	190	241	PO-12DN	634	345	33.0	36.5		
				PO-10DN	500	376	45.0	48.5		
80	76	203	283	PO-10DN	500	355	36.1	42.6		
				PO-12DN	634	386	48.1	54.6		
100	102	229	305	PO-13D	869	420	59.5	71.0		
				PO-18D	1013	466	97.0	109.0		
125	127	356	381	PO-18D	1013	505	118.0	131.0		
				PO-13D	869	576	178.0	191.0		
				PO-22D	1272	525	133.0	147.0		
150	152	394	403	PO-18D	1013	596	193.0	207.0		
				PO-22D	1272	673	253.0	267.0		
				PO-18D	1013	641	235.0	260.0		
200	203	457	502	PO-22D	1272	752	333.0	358.0		
				PO-25D	1671	789	467.0	492.0		
				PO-18D	1013	634	193.0	207.0		

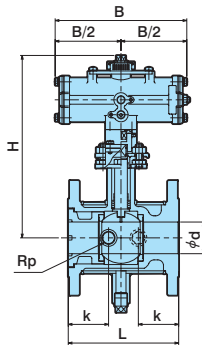


**4-1 Pneumatically Operated 2-Way Ball Valve Jacketed Type: EPN(PO, PC)1100JNC**

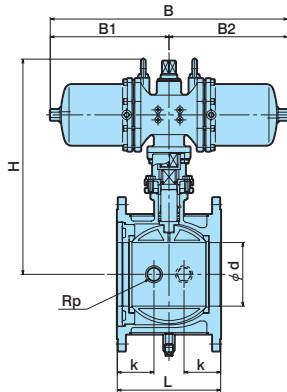
**Dimension**

Valve Type: EPN1100JNC (Double Acting Jacketed Type)

Unit: mm



EPN1100JNC (04DN to 12DN)

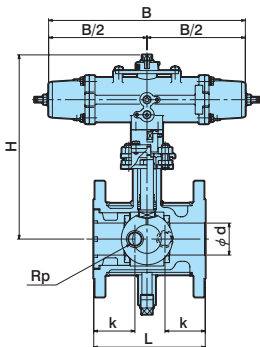


EPN1100JNC (13D to 18D)

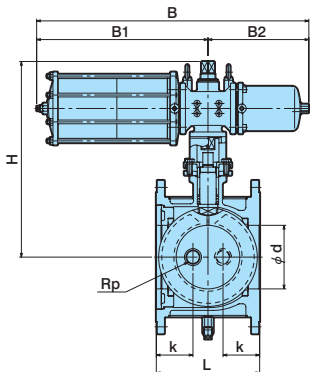
Nominal size DN	d	L	k	Rp	Flange Nominal Size DN	Actuator Code	B	B1	B2	H	Mass (Approx. kg)	
											Stainless Cast Steel	
											10K CL150	
15	13	108	54	1/2	40	PN-04DN	144	B/2	B/2	223	6.4	
20	19	117	58.5			PN-05DN	172			227	6.6	
25	25	127	63.5		50	PN-04DN	144			238	7.8	
						PN-05DN	172			251	8.3	
40	38	165	60		65	PN-06DN	214			270	13.6	
											286	14.6
50	51	178	65		80	PN-08DN	266			295	16.5	
											316	20.5
65	64	190	70		100	PN-06DN	214			331	23.8	
											352	26.3
80	76	203	70		125	PN-08DN	266			362	33.4	
											408	39.1
100	102	229	75	150	PN-10DN	336	421	55.0				
								454	65.0			
125	127	267	80	200	PN-10DN	336	471	73.5				
					PN-12DN	420		504	90.5			
					PN-13D	644		550	107.0			
150	152	292	85	3/4	250	PN-12DN	420	524	121.5			
						PN-13D	644		570	138.0		
						PN-18D	758		641	175.0		
200	203	330	90	350	PN-13D	644	625	207.0				
					PN-18D	758		687	244.0			

Valve Type: EPO1100JNC (Single Acting Jacketed Type)

Unit: mm



EPO1100JNC (04DN to 12DN)



EPO1100JNC (13D to 22D)

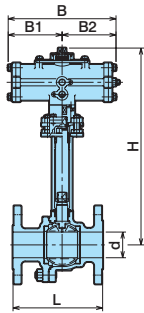
Nominal size DN	d	L	k	Rp	Flange Nominal Size DN	Actuator Code	B	B1	B2	H	Mass (Approx. kg)	
											Stainless Cast Steel	
											10K CL150	
15	13	108	54	1/2	40	PO-04DN	212	B/2	B/2	223	6.9	
						PO-05DN	268			236	7.8	
20	19	117	58.5		50	PO-06DN	314			240	8.2	
						PO-08DN	392				256	9.7
25	25	127	63.5		65	PO-10DN	500			267	11.1	
											306	18.2
40	38	165	60		80	PO-12DN	634			308	20.1	
											316	22.0
50	51	178	65		100	PO-10DN	500			364	30.7	
											400	39.5
65	64	190	70		125	PO-12DN	634			410	46.6	
											441	58.6
80	76	203	70	150	PO-12DN	634	454	75.5				
								500	113.0			
100	102	229	75	200	PO-13D	869	547	322	500	113.0		
					PO-18D	1013			634	379	621	199.0
125	127	267	80	3/4	250	PO-13D	869	547	322	570	170.0	
						PO-18D	1013			634	379	641
150	152	292	85	350	PO-18D	1013	634	379	687	299.0		
										PO-22D	1272	778

4-1 Pneumatically Operated 2-Way Ball Valve Extended Gland Type: FEXPN(PO, PC)1100NB

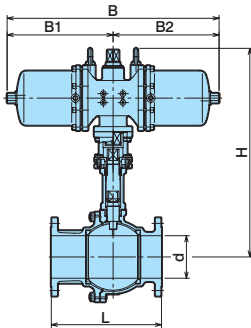
Dimension

Valve Type: FEXPN1100NB (Double Acting Extended Gland Type)

Unit: mm



FEXPN1100NB (04DN to 12DN)

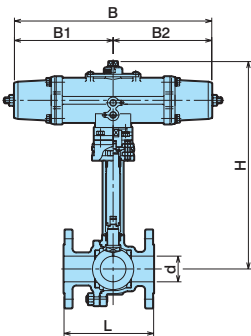


FEXPN1100NB (13D to 18D)

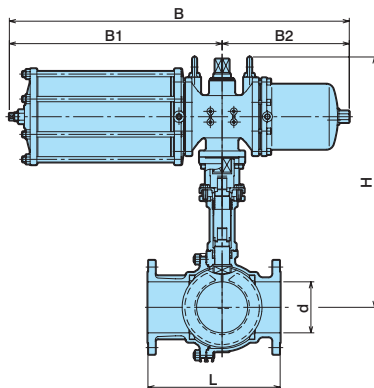
Nominal size DN	d	L		Actuator Code	B	B1	B2	H	Mass (Approx. kg)			
		10K CL150	20K CL300						Stainless Cast Steel			
									10K CL150	20K CL300		
15	13	108	140	PN-04DN	144			325	3.7	4.2		
									4.3	4.9		
20	19	117	152	PN-05DN	172			342	4.7	5.3		
									6.0	6.8		
25	25	127	165	PN-04DN	144			343	6.0	6.8		
									6.5	7.3		
40	38	165	190	PN-05DN	172			374	10.6	11.7		
									11.6	12.7		
50	51	178	216	PN-06DN	214			390	13.3	15.2		
									17.3	19.2		
65	64	190	241	PN-06DN	214	B/2	B/2	426	19.8	23.8		
				PN-08DN					266	447	22.3	26.3
				PN-10DN					336	495	30.5	34.0
80	76	203	283	PN-08DN	266			457	25.4	32.4		
									505	31.1	38.1	
100	102	229	305	PN-10DN	336			540	42.0	54.0		
									570	52.0	64.0	
125	127	356	381	PN-10DN	336			576	59.5	73.3		
				PN-12DN					420	609	76.5	90.3
				PN-13D					644	655	95.0	108.8
150	152	394	403	PN-12DN	420			629	91.5	106.3		
				PN-13D					644	675	109.0	123.8
									758	746	145.0	159.8

Valve Type: FEXPO1100NB (Single Acting Extended Gland Type)

Unit: mm



FEXPO1100NB (04DN to 12DN)



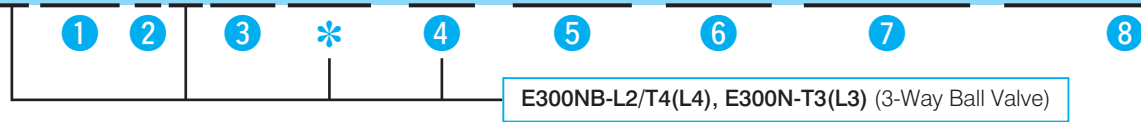
FEXPO1100NB (13D to 18D)

Nominal size DN	d	L		Actuator Code	B	B1	B2	H	Mass (Approx. kg)					
		10K CL150	20K CL300						Stainless Cast Steel					
									10K CL150	20K CL300				
15	13	108	140	PO-04DN	212			325	4.2	4.7				
									5.1	5.6				
20	19	117	152	PO-05DN	268			342	5.9	6.5				
									7.4	8.0				
25	25	127	165	PO-06DN	314			372	9.3	10.1				
									16.4	17.1				
40	38	165	190	PO-08DN	392			411	17.1	18.2				
									459	24.0	25.7			
50	51	178	216	PO-10DN	214	B/2	B/2	419	18.8	20.7				
									467	27.8	29.7			
65	64	190	241	PO-10DN	500			495	35.5	39.5				
									526	47.5	51.5			
80	76	203	283	PO-10DN	500			505	38.6	45.6				
									536	50.6	57.6			
100	102	229	305	PO-12DN	634			570	63.0	74.5				
									616	100.0	112.0			
125	127	356	381	PO-13D	869	547	322	655	130.0	143.8				
									726	190.0	203.8			
150	152	394	403	PO-13D	869	547	322	675	149.0	163.8				
				PO-18D					1013	634	379	746	209.0	223.8
				PO-22D					1272	778	494	823	259.0	273.8

## 4-2 Pneumatically Operated 3-Way Ball Valve

## Valve Codes

Valve Code for EPN(PO, PC)1300NB(N)

**EPN1307NB-L2-NTF-050-06DN-J10KRF****1 Operation Type**

<b>PN</b>	Double Acting Type
<b>PO</b>	Reverse Acting Type (CCW Action)
<b>PC</b>	Direct Acting Type (CW Action)

**5 Seat Material (refer to P10)**

NTF, NCF, NGR, CFM, CFMR

**6 Nominal Size (DN or A)**

Conforming to ISO 6708 and JIS B 2001

**7 Actuator Code (04DN to 12DN, 13D to 25D)****2 1**

Pneumatically Operated On-Off Valve

**3 Body Material**

<b>04</b>	FCD400	<b>12</b>	SCS14A
<b>07</b>	SCS13A	<b>13</b>	SCS16A

**8 Connection**

<b>J10KRF</b>	JIS 10KRF
<b>J20KRF</b>	JIS 20KRF
<b>A150RF</b>	ASME CL150
<b>A300RF</b>	ASME CL300

**4 Seat Mechanism**

Code	Port Shape	Number of Seats
<b>L2</b>	L-Port	2
<b>L3</b>		3
<b>L4</b>		4
<b>T3</b>	T-Port	3
<b>T4</b>		4

**\* Improvement Identification Code**

<b>None</b>	Original Design
<b>N</b>	First Improvement
<b>NB</b>	Second Improvement
<b>NC</b>	Third Improvement
<b>ND</b>	Fourth Improvement

- Those are standard products codes. The code may be different depending on the products specification.

4-2 Pneumatically Operated 3-Way Ball Valve 2 Seats 3-Way Type: EPN(PO,PC)1300NB-L2

Actuator Selection Table

Valve Type: EPN1300NB-L2-15/200 (Double Acting Type)

Operating Pressure: 0.4MPa

DN	Rank	Double Acting										Rank	DN
		Shutoff Deferential Pressure: MPa											
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0		
15	A											A	15
	B											B	
	C											C	
20	A											A	20
	B											B	
	C											C	
25	A											A	25
	B											B	
	C											C	
40	A											A	40
	B											B	
	C											C	
50	A											A	50
	B											B	
	C											C	
65	A											A	65
	B											B	
	C											C	
80	A											A	80
	B											B	
	C											C	
100	A											A	100
	B											B	
	C											C	
125	A											A	125
	B											B	
	C											C	
150	A											A	150
	B											B	
	C											C	
200	A											A	200
	B											B	
	C											C	

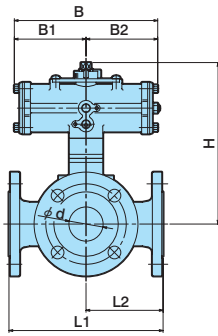
Valve Type: EPO1300NB-L2-15/200 (Single Acting Type)

Operating Pressure: 0.4MPa

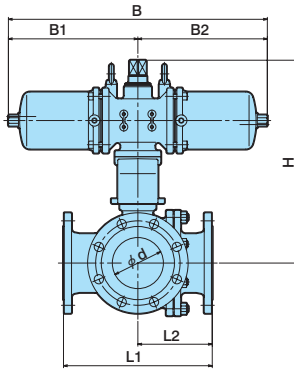
DN	Rank	Single Acting										Rank	DN
		Shutoff Deferential Pressure: MPa											
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0		
15	A											A	15
	B											B	
	C											C	
20	A											A	20
	B											B	
	C											C	
25	A											A	25
	B											B	
	C											C	
40	A											A	40
	B											B	
	C											C	
50	A											A	50
	B											B	
	C											C	
65	A											A	65
	B											B	
	C											C	
80	A											A	80
	B											B	
	C											C	
100	A											A	100
	B											B	
	C											C	
125	A											A	125
	B											B	
	C											C	
150	A											A	150
	B											B	
	C											C	
200	A											A	200
	B											B	
	C											C	

Dimension

Valve Type: EPN1300NB-L2 (Double Acting Type)



EPN1300NB-L2 (04DN to 12DN)

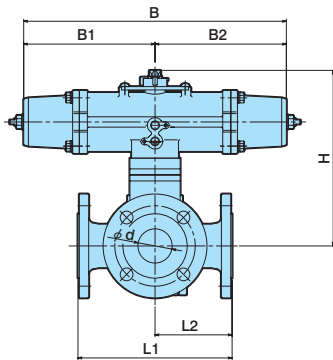


EPN1300NB-L2 (13D to 22D)

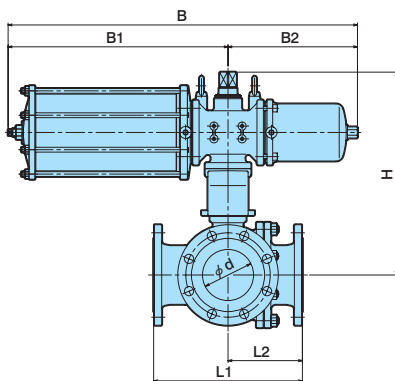
Unit: mm

Nominal size DN	d	L1	L2	Actuator Code	B	B1	B2	H	Mass (Approx. kg)
									Stainless Cast Steel 10K, CL150
15	13	146	73	PN-04DN	144	B/2	B/2	175	4.0
				PN-05DN	172			179	4.7
20	19	150	75	PN-04DN	144			192	5.1
				PN-05DN	172			193	6.6
25	25	170	85	PN-04DN	144			206	7.1
				PN-05DN	172			224	11.2
40	38	200	100	PN-06DN	214			240	12.2
				PN-08DN	266			248	15.0
50	51	230	115	PN-08DN	266			269	19.0
				PN-06DN	214			276	22.8
65	64	260	130	PN-06DN	214			297	25.3
				PN-08DN	266			307	29.4
80	76	280	140	PN-10DN	336			355	35.1
				PN-12DN	420			390	48.0
100	102	340	170	PN-10DN	336			420	58.0
				PN-12DN	420			426	66.5
125	127	370	185	PN-10DN	336			459	83.5
				PN-12DN	420			505	100.0
150	152	430	215	PN-12DN	420			479	102.5
				PN-13D	644			525	119.0
200	203	520	260	PN-13D	644	596	156.0		
				PN-18D	758	579	185.0		
				PN-13D	644	641	222.0		
				PN-18D	758	752	302.0		

Valve Type: EPO1300NB-L2 (Single Acting Type)



EPO1300NB-L2 (04DN to 12DN)



EPO1300NB-L2 (13D to 25D)

Unit: mm

Nominal size DN	d	L1	L2	Actuator Code	B	B1	B2	H	Mass (Approx. kg)		
									Stainless Cast Steel 10K, CL150		
15	13	146	73	PO-04DN	212	B/2	B/2	175	4.5		
				PO-05DN	268			188	5.4		
20	19	150	75	PO-06DN	314			208	7.8		
				PO-08DN	392			222	9.9		
25	25	170	85	PO-08DN	392			261	17.0		
				PO-10DN	500			269	20.5		
40	38	200	100	PO-10DN	500			317	29.2		
				PO-12DN	634			345	38.5		
50	51	230	115	PO-12DN	634			376	50.5		
				PO-10DN	500			355	42.6		
65	64	260	130	PO-12DN	634			386	54.6		
				PO-10DN	500			420	68.5		
80	76	280	140	PO-12DN	634			500	106.0		
				PO-13D	869			547	322	550	132.0
100	102	340	170	PO-18D	1013			634	379	621	192.0
				PO-13D	869			547	322	570	151.0
125	127	370	185	PO-18D	1013			634	379	641	211.0
				PO-18D	1013			634	379	687	277.0
150	152	430	215	PO-22D	1272			778	494	752	352.0
				PO-25D	1671			1036	635	789	509.0

2-Way Ball Valve

3-Way Ball Valve

V-Port Valve

Pneumatically Operated Valve  
3-Way Ball Valve

Electrically Operated Valve

Special Purpose Ball Valve

Safety Instructions

**4-2 Pneumatically Operated 3-Way Ball Valve 4 Seats 3-Way Type: EPN(PO,PC)1300NB-T4/L4  
3 Seats 3-Way Type: EPN(PO,PC)1300NB-T3/L3**

**Actuator Selection Table**

Valve Type: EPN1300NB-T4(L4)-15/100, EPN1300N-T3(L3)-125/200 (Double Acting Type)

Operating Pressure: 0.4MPa

DN	Rank	Double Acting										Rank	DN
		Shutoff Deferential Pressure: MPa											
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0		
15	A	PN-04DN										A	15
	B	PN-05DN										B	
	C	PN-05DN										C	
20	A	PN-04DN										A	20
	B	PN-05DN										B	
	C	PN-05DN										C	
25	A	PN-05DN										A	25
	B	PN-06DN										B	
	C	PN-06DN										C	
40	A	PN-06DN										A	40
	B	PN-08DN										B	
	C	PN-08DN										C	
50	A	PN-08DN										A	50
	B	PN-10DN										B	
	C	PN-10DN										C	
65	A	PN-10DN										A	65
	B	PN-12DN										B	
	C	PN-12DN										C	
80	A	PN-10DN										A	80
	B	PN-12DN										B	
	C	PN-12DN										C	
100	A	PN-12DN										A	100
	B	PN-18D										B	
	C	PN-18D										C	
125	A	PN-13D										A	125
	B	PN-18D										B	
	C	PN-18D										C	
150	A	PN-13D										A	150
	B	PN-18D										B	
	C	PN-18D										C	
200	A	PN-18D										A	200
	B	PN-22D										B	
	C	PN-22D										C	

Valve Type: EPO1300NB-T4(L4)-15/100, EPO1300N-T3(L3)-125/200 (Single Acting Type)

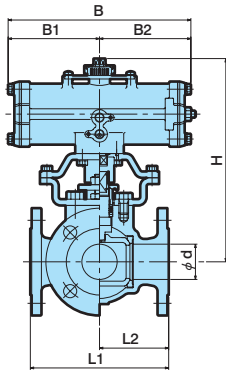
Operating Pressure: 0.4MPa

DN	Rank	Single Acting										Rank	DN
		Shutoff Deferential Pressure: MPa											
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0		
15	A	PO-06DN4										A	15
	B	PO-06DN4										B	
	C	PO-06DN4										C	
20	A	PO-06DN4										A	20
	B	PO-08DN4										B	
	C	PO-08DN4										C	
25	A	PO-08DN4										A	25
	B	PO-10DN4										B	
	C	PO-10DN4										C	
40	A	PO-08DN4										A	40
	B	PO-10DN4										B	
	C	PO-10DN4										C	
50	A	PO-10DN4										A	50
	B	PO-12DN4										B	
	C	PO-12DN4										C	
65	A	PO-10DN4										A	65
	B	PO-12DN4										B	
	C	PO-12DN4										C	
80	A	PO-12DN4										A	80
	B	PO-13D4										B	
	C	PO-13D4										C	
100	A	PO-13D4										A	100
	B	PO-18D4										B	
	C	PO-18D4										C	
125	A	PO-13D4										A	125
	B	PO-18D4										B	
	C	PO-18D4										C	
150	A	PO-18D4										A	150
	B	PO-22D4										B	
	C	PO-22D4										C	
200	A	PO-18D4										A	200
	B	PO-22D4										B	
	C	PO-25D4										C	

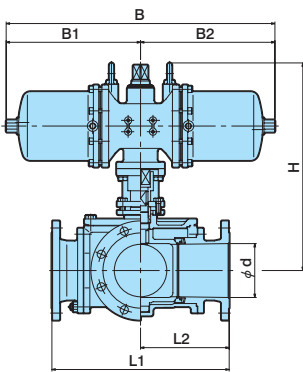
Dimension

Valve Type: EPN1300NB-T4(L4)-15/100, EPN1300N-T3(L3)-125/200 (Double Acting Type)

Unit: mm



EPN1300NB-T4 (04DN to 12DN)

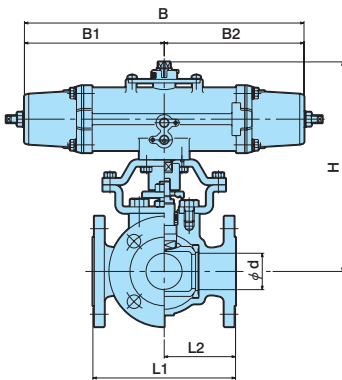


EPN1300N-T3 (13D to 22D)

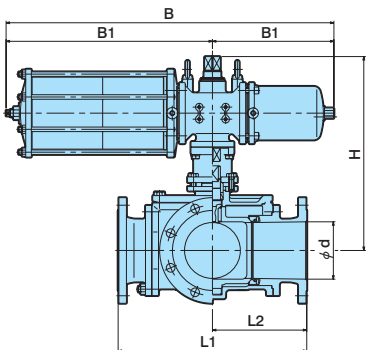
Nominal size DN	d	L1		L2		Actuator Code	B	B1	B2	H	Mass (Approx. kg) Stainless Cast Steel	
		10K CL150	20K	10K CL150	20K						10K CL150	20K
		15	19	140	146						70	73
20	19	140	146	70	73	PN-05DN	172	205	5.2	5.8		
						PN-04DN	144	192	5.3	5.8		
25	25	160	166	80	83	PN-05DN	172	205	5.7	6.2		
						PN-06DN	214	217	9.0	9.8		
40	38	180	186	90	93	PN-08DN	266	232	10.0	10.8		
								246	12.4	14.6		
50	51	200	230	100	115	PN-10DN	336	267	16.4	18.5		
								292	20.1	21.4		
65	64	240	260	120	130	PN-10DN	336	303	26.0	29.5		
								352	32.0	35.5		
80	76	260	280	130	140	PN-12DN	420	379	40.0	45.0		
								412	—	55.0		
100	102	330	350	165	175	PN-10DN	336	394	47.0	61.0		
								427	57.0	71.0		
125	127	430	—	215	—	PN-12DN	420	457	114.0	—		
								502	119.0	—		
150	152	500	—	250	—	PN-13D	644	574	156.0	—		
								514	146.0	—		
200	203	650	—	325	—	PN-18D	758	586	183.0	—		
								626	258.0	—		
						PN-22D	988	759	325.0	—		

Valve Type: EPO1300NB-T4(L4)-15/100, EPO1300N-T3(L3)-125/200 (Single Acting Type)

Unit: mm



EPO1300NB-T4 (04DN to 12DN)



EPO1300N-T3 (13D to 25D)

Nominal size DN	d	L1		L2		Actuator Code	B	B1	B2	H	Mass (Approx. kg) Stainless Cast Steel	
		10K CL150	20K	10K CL150	20K						10K CL150	20K
		15	19	140	146						70	73
20	19	140	146	70	73	232	11.2	12.0				
25	25	160	166	80	83	PO-08DN	392	B/2	B/2	253	15.5	16.3
										267	17.9	20.1
40	38	180	186	90	93	PO-10DN	500	B/2	B/2	316	26.5	28.7
										341	33.3	34.6
50	51	200	230	100	115	PO-12DN	634	B/2	B/2	372	45.3	46.6
										352	37.0	—
65	64	240	260	120	130	PO-10DN	500	B/2	B/2	383	51.5	55.0
										412	60.5	65.5
80	76	260	280	130	140	PO-12DN	634	B/2	B/2	455	98.0	103.0
										470	105.0	119.0
100	102	330	350	165	175	PO-13D	869	547	322	470	105.0	119.0
										525	—	182.0
125	127	430	—	215	—	PO-13D	869	547	322	502	151.0	—
										574	211.0	—
150	152	500	—	250	—	PO-18D	1013	634	379	586	238.0	—
										717	298.0	—
200	203	650	—	325	—	PO-22D	1272	778	494	759	375.0	—
										626	313.0	—
						PO-18D	1013	634	379	626	313.0	—
						PO-22D	1272	778	494	759	375.0	—
						PO-25D	1671	1036	635	820	400.0	—

2-Way Ball Valve

3-Way Ball Valve

V-Port Valve

Pneumatically Operated Valve  
3-Way Ball Valve

Electrically Operated Valve

Special Purpose Ball Valve

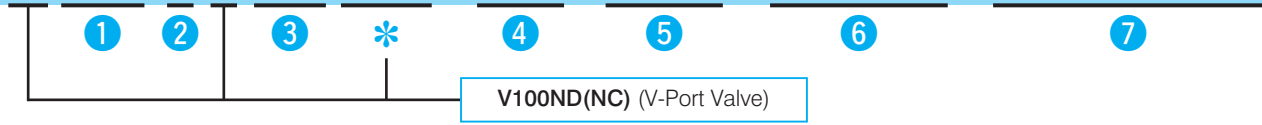
Safety Instructions

4-3 Pneumatically Operated V-Port Valve: VPN(PO,PC)1100ND

Valve Codes

Valve Code for VPN(PO,PC)1100ND

**VPN1107ND-CF-050-06DN-J10KRF**



1 Operation Type

<b>PN</b>	Double Acting Type
<b>PO</b>	Reverse Acting Type (Air to Open)
<b>PC</b>	Direct Acting Type (Air to Close)

2

<b>1</b>	Pneumatically Operated On-Off Valve
<b>3</b>	Pneumatically Operated Control Valve

3 Body Material

<b>07</b>	SCS13A
<b>12</b>	SCS14A

4 Seat Material

<b>ST</b>	Solid Seat
<b>M</b>	Thin Seat
<b>CF</b>	Soft Seat

5 Nominal Size (DN or A)

Conforming to ISO 6708 and JIS B 2001

7 Connection

<b>J10KRF</b>	JIS 10KRF
<b>J20KRF</b>	JIS 20KRF
<b>A150RF</b>	ASME CL150

\* Improvement Identification Code

<b>None</b>	Original Design
<b>N</b>	First Improvement
<b>NB</b>	Second Improvement
<b>NC</b>	Third Improvement
<b>ND</b>	Fourth Improvement

6 Actuator Type (04DN to 12DN, 13D to 25D)

• Those are standard products codes. The code may be different depending on the products specification.



### Actuator Selection Table

Valve Type: VPN1100ND-25/100, VPN1100NC-125/200 (Double Acting Type)

Operating Pressure: 0.4MPa

DN	Rank	Double Acting														Rank	DN	
		Shutoff Deferential Pressure: MPa																
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0		
25	A	PN-04DN														A	25	
	B	PN-05DN														B		
	C	PN-05DN														C		
40	A	PN-06DN														A	40	
	B	PN-08DN														B		
	C	PN-08DN														C		
50	A	PN-06DN														A	50	
	B	PN-08DN														B		
	C	PN-08DN														C		
65	A	PN-08DN														A	65	
	B	PN-10DN														B		
	C	PN-10DN														C		
80	A	PN-10DN														A	80	
	B	PN-10DN														B		
	C	PN-10DN														C		
100	A	PN-08DN														A	100	
	B	PN-10DN														B		
	C	PN-10DN														C		
125	A	PN-12DN														A	125	
	B	PN-13D														B		
	C	PN-13D														C		
150	A	PN-12DN														A	150	
	B	PN-18D														B		
	C	PN-18D														C		
200	A	PN-13D														A	200	
	B	PN-18D														B		
	C	PN-18D														C		

Valve Type: VPO1100ND-25/100, VPO1100NC-125/200 (Single Acting Type)

Operating Pressure: 0.4MPa

DN	Rank	Single Acting Type														Rank	DN	
		Shutoff Deferential Pressure: MPa																
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0		
25	A	PO-05DN														A	25	
	B	PO-06DN														B		
	C	PO-08DN														C		
40	A	PO-06DN														A	40	
	B	PO-08DN														B		
	C	PO-10DN														C		
50	A	PO-08DN														A	50	
	B	PO-10DN														B		
	C	PO-10DN														C		
65	A	PO-08DN														A	65	
	B	PO-10DN														B		
	C	PO-12DN														C		
80	A	PO-10DN														A	80	
	B	PO-10DN														B		
	C	PO-12DN														C		
100	A	PO-10DN														A	100	
	B	PO-12DN														B		
	C	PO-12DN														C		
125	A	PO-10DN														A	125	
	B	PO-13D														B		
	C	PO-18D														C		
150	A	PO-13D														A	150	
	B	PO-18D														B		
	C	PO-22D														C		
200	A	PO-18D														A	200	
	B	PO-22D														B		
	C	PO-22D														C		

2-Way Ball Valve

3-Way Ball Valve

V-Port Valve

Pneumatically Operated Valve  
V-Port Valve

Electrically Operated Valve

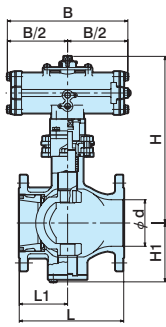
Special Purpose Ball Valve

Safety Instructions

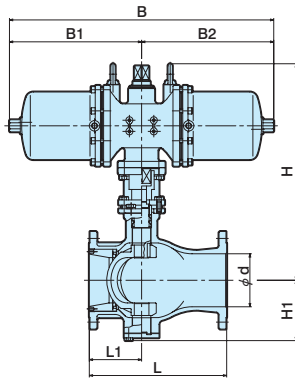
**Dimension**

Valve Type: VPN1100ND (Double Acting)

Unit: mm



VPN1100ND (NC)  
(04DN to 12DN)

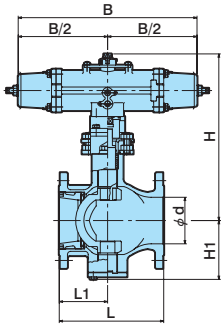


VPN1100NC (13D to 18D)

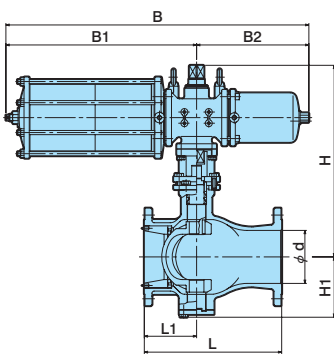
Nominal size DN	d	L		L1		H1	Actuator Code	B	B1	B2	H	Mass (Approx. kg) Stainless Cast Steel	
		10K CL150	20K	10K CL150	20K							10K CL150	20K
		25	25	127	165							55	
40	38	165	190	70		71	PN-05DN	172	221	6.3	7.5		
							PN-06DN	214	250	9.3	11.0		
							PN-08DN	266	266	10.3	12.0		
							PN-08DN	266	287	13.8	15.5		
50	51	178	216	75		77	PN-06DN	214	271	11.6	14.0		
							PN-08DN	266	292	15.1	17.5		
65	64	190	241	80		96	PN-06DN	214	306	17.0	19.5		
							PN-08DN	266	327	19.0	21.5		
							PN-10DN	336	373	24.5	27.0		
80	76	203	283	90		101	PN-08DN	266	332	20.0	23.0		
							PN-10DN	336	378	25.5	28.5		
100	102	229	305	106		131	PN-08DN	266	372	27.5	33.0		
							PN-10DN	336	418	33.0	38.5		
							PN-12DN	420	451	41.0	46.5		
125	127	356	381	145		163	PN-10DN	336	462	50.5	56.5		
							PN-12DN	420	495	67.5	73.5		
							PN-13D	644	541	—	90.0		
150	152	394	403	150		173	PN-12DN	420	505	78.5	87.5		
							PN-13D	644	551	95.0	104.0		
							PN-18D	758	622	—	141.0		
200	203	457	502	200		211	PN-13D	644	600	128.0	140.0		
							PN-18D	758	662	165.0	177.0		

Valve Type: VPO1100ND (Single Acting)

Unit: mm



VPO1100ND (NC)  
(04DN to 12DN)



VPO1100NC (13D to 18D)

Nominal size DN	d	L		L1		H1	Actuator Code	B	B1	B2	H	Mass (Approx. kg) Stainless Cast Steel	
		10K CL150	20K	10K CL150	20K							10K CL150	20K
		25	25	127	165							55	
40	38	165	190	70		71	PO-06DN	314	237	8.8	10.0		
							PO-08DN	392	258	11.8	13.0		
							PO-10DN	500	333	23.8	25.5		
50	51	178	216	75		77	PO-06DN	314	292	17.1	19.5		
							PO-08DN	392	338	25.1	27.5		
65	64	190	241	80		96	PO-08DN	392	327	21.5	24.0		
							PO-10DN	500	373	29.5	32.0		
							PO-12DN	634	406	42.5	45.0		
80	76	203	283	90		101	PO-10DN	500	378	31.0	34.0		
							PO-12DN	634	411	44.0	47.0		
100	102	229	305	106		131	PO-10DN	500	418	40.0	45.5		
							PO-12DN	634	451	53.0	58.5		
125	127	356	381	145		163	PO-13D	869	547	322	491	91.0	97.0
							PO-13D	869	541	116.0	122.0		
							PO-18D	1013	634	379	612	—	182.0
150	152	394	403	150		173	PO-13D	869	547	322	551	127.0	136.0
							PO-18D	1013	634	379	622	187.0	196.0
200	203	457	502	200		211	PO-18D	1013	634	379	622	220.0	232.0
							PO-22D	1272	778	494	773	280.0	292.0

4-4 Data for Pneumatically Operated Valve

Air Consumption

Cumulative air volume necessary to operate actuator (1 time = 1 back and forth) can be calculated by the following.

Calculation for Air Consumption

**Q** = Air Consumption (NI), **P** = Operating Pressure (MPa)

**A, B, C** = Air Chamber Volume (l), **N** = Operation Number (1 time=1 back and forth)

Actuator Code 04DN to 12DN	Actuator Code 13D to 25D
<p><b>Double Acting Type</b>  <math>Q = \{(10P + 1) \times (A + B)\} \times N</math></p> <p><b>Single Acting Type</b>  <math>Q = (10P + 1)B \times N</math></p>	<p><b>Double Acting Type</b>  <math>Q = [(10P + 1) \times \{(A + B) \times 2\}] \times N</math></p> <p><b>Single Acting Type</b>  <math>Q = \{(10P + 1) \times (A + C)\} \times N</math></p>

Air Chamber Volume (l)

Actuator Code	A	B	C
04DN	0.08	0.1	—
05DN	0.15	0.2	—
06DN	0.3	0.4	—
08DN	0.6	0.8	—
10DN	1.1	1.5	—
12DN	2.2	3.0	—
13D	1.83	1.56	3.13
18D	3.86	3.39	5.67
22D	7.88	6.88	6.88
25D	14.0	11.6	11.6

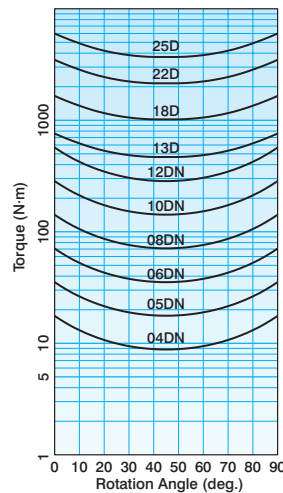
Output Torque

Output Torque Value (Operating Pressure 0.4 MPa)

Unit: N·m

Actuator Code	PN- (Double Acting)
	0° or 90°
04DN	17.7
05DN	35.3
06DN	70.6
08DN	142
10DN	284
12DN	569
13D	785
18D	1670
22D	3480
25D	5990

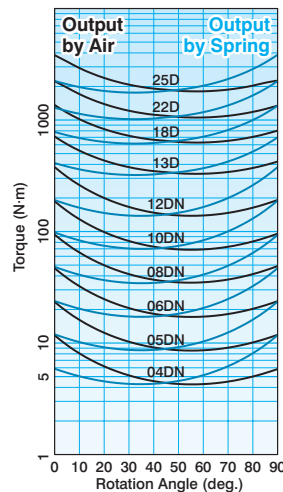
Output Characteristic Curve (Operating Pressure 0.4 MPa)



PN Type (Double Acting) Output Characteristic Curve

Unit: N·m

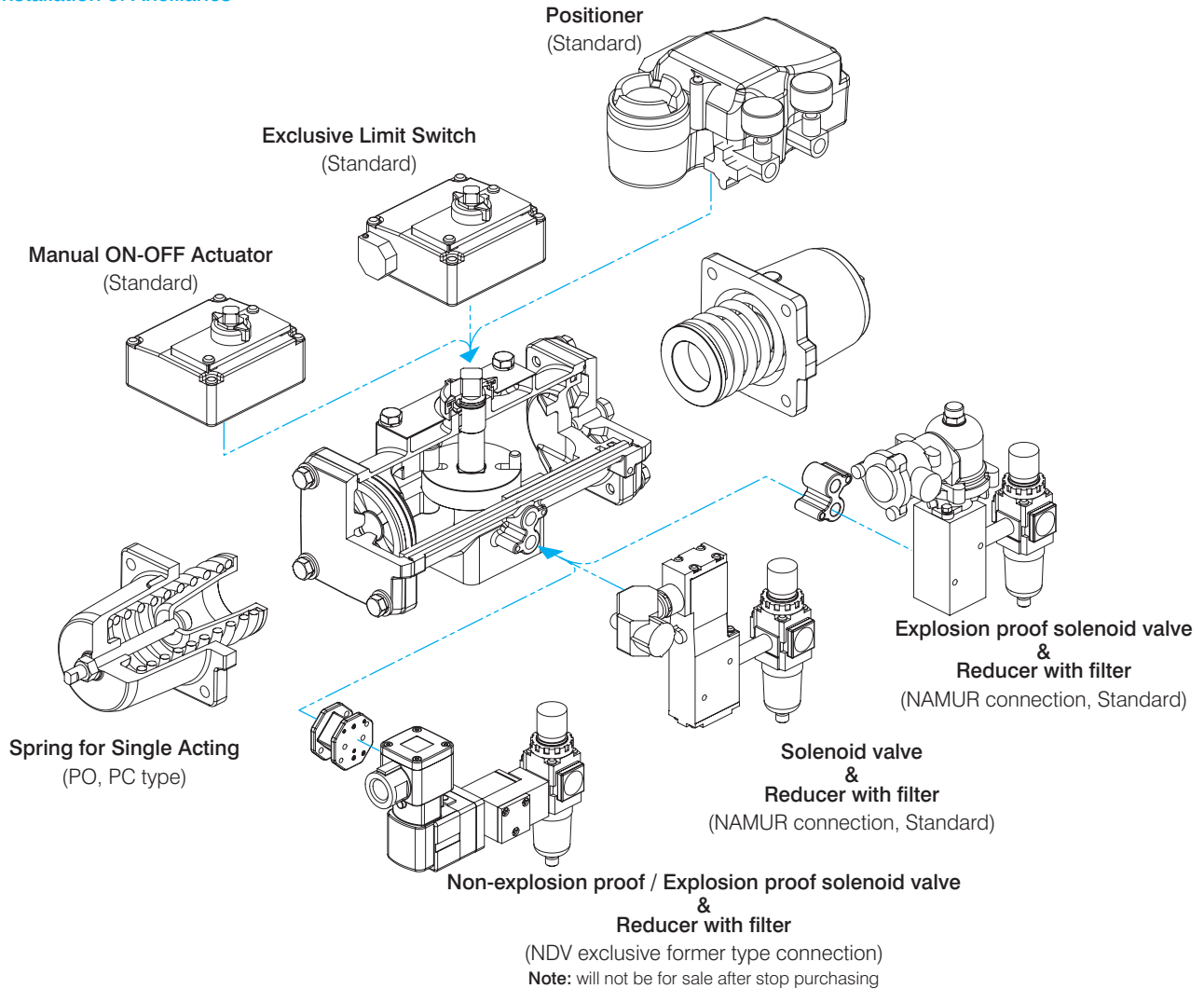
Actuator Code	PO-(C) (Single Acting)			
	Output by Air		Output by Spring	
	0°	90°	0°	90°
04DN	11.8	5.8	5.9	11.8
05DN	23.5	11.8	11.8	23.5
06DN	47.1	23.5	23.5	47.1
08DN	94.1	49	48.1	93.2
10DN	186	96.1	98.1	186
12DN	376	191	191	378
13D	716	425	410	701
18D	1370	809	785	1340
22D	2200	1260	1290	2230
25D	3740	2150	2250	3840



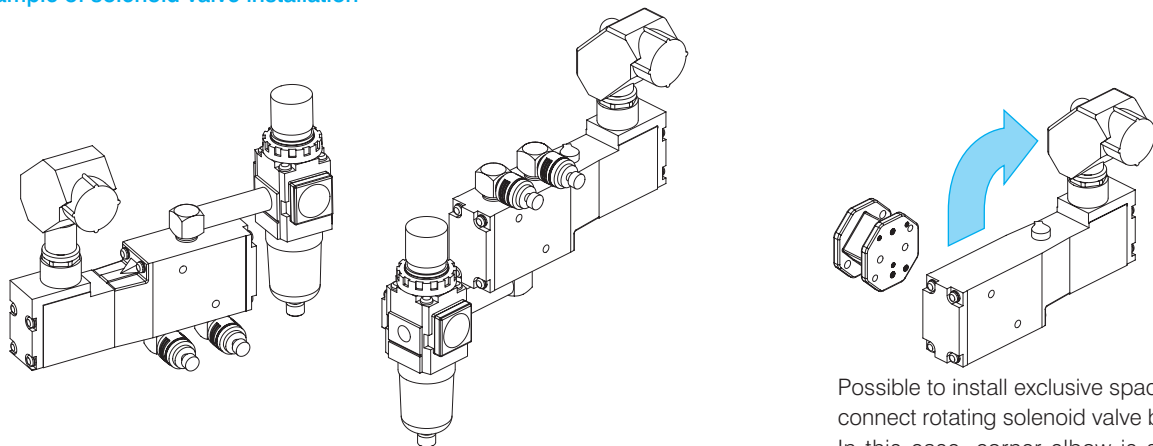
PO Type (Single Acting) Output Characteristic Curve

## Ancillary Equipment

### Installation of Ancillaries



### Example of solenoid valve installation



Rotate 90° solenoid valve and install reducer by corner elbow and nipple.  
Speed controller is installed at air outlet of solenoid valve by corner elbow.

Possible to install exclusive spacer first and connect rotating solenoid valve by 90°. In this case, corner elbow is screwed at upper or lower side of solenoid valve and reducer is installed by nipple directly.

### Installation of NAMUR standard connection

#### Solenoid Valve

By application of NAMUR Standard, any NAMUR standard solenoid valves are connectable without special bracket.

#### Reducer with filter

- To install upright position by NAMUR solenoid valve: Directly install to the solenoid valve by nipple.
- To install in 90° rotation by NAMUR solenoid valve: Screw a corner elbow to upper or lower side of the solenoid valve and directly install by nipple.
- Other cases: Install by bracket. (Connect to solenoid valve by copper pipe.)

## Ancillary Equipment (continues from the previous page)

### Solenoid Valve

Protection Type	Drip-proof	Explosion Proof	Drip-proof	Rainproof	Explosion proof
Actuator Code	04DN to 12DN		13D, 18D, 22D, 25D		
Code	EV20	EV30	4F310-08, 10	4F310-08, 10-B	4F310E-08, 10
Manufacturer	SMC		CKD		
Rated Voltage	AC100/110V · 50/60Hz, 200/220V · 50/60Hz				
Bore Size	Rc1/4		13D: Rc1/4 · 18D to 25D: Rc3/8		
Effective Sectional Area	—		13D: 13.5mm <sup>2</sup> · 18D to 25D: 32mm <sup>2</sup>		

### Reducer with filter

Actuator Code	04DN to 12DN, 13D		18D, 22D, 25D	
Manufacturer Code	AW20-02EH-CR-B-X2227	AW20-02EH-2R-B-X2226	AW30-03EH-R-B-X2259	AW30-03EH-2R-B-X2260
Bore Size	Rc1/4		Rc3/8	
Pressure Range	0.05 to 0.85MPa			
Filtration Accuracy	5μm			
Filter Case Material	PC with guard	Aluminum (ADC12)	PC with guard	Aluminum (ADC12)
Manufacturer	SMC			
Note	When positioner is used, reducer of XR108-S/M0R1 (for NE22) or XR108-S/M0J3 (for NPN22) manufactured by SSS is applicable.			

### Limit Switch

Protection Type	Rainproof (built-in BOX)			Explosion Proof	Rainproof	Explosion Proof
Actuator Code	04DN · 05DN	06DN · 08DN	10DN · 12DN	04DN to 12DN	13D, 18D, 22D, 25D	
Code	LS1A	LS1B	LS20	1LX7001-J	1LS19-J	1LX7001-J
Electrical Rating	AC	16A-125, 250V		5A-250V	10A-125, 250, 480V	5A-250V
	DC	0.6A-115V 0.3A-230V		0.8A-125V 0.4A-250V	0.4A-125V 0.2A-250V	0.8A-125V 0.4A-250V
Manufacturer	NDV			Azbil		

### Positioner

Input-Output	Pneumatical-Pneumatical	Electrical-Pneumatical (Explosion proof)
NDV Code	NPN22	NE22
Bore Size	Rc1/4	
Supply Pressure	0.4 to 0.7MPa	
Signal	20 to 100kPa	4 to 20mA DC
Linearity	Within ± 1.5%F.S	
Hysteresis	Within 1%F.S	
Air Consumption	15NI/min Supply pressure 0.4MPa	13NI/min Supply pressure 0.4MPa
Note	Standard for actuator code 04DN, 05DN, 06DN is with speed controller.	

### Manual ON-OFF Actuator

NDV Code	MT1	MT2
Actuator Code	04DN to 08DN	10DN to 12DN
Handwheel Rotation	Approx. 43	Approx. 45

### Speed Controller

Actuator Code	04DN to 12DN	04DN to 12DN, 13D		18D, 22D, 25D
Manufacturer Code	ASN2-01	AS2200-02	AS2000-02	AS4000-03
Working Pressure Range	0 to 0.99MPa	0.1 to 0.7MPa	0.05 to 0.99MPa	0.05 to 0.99MPa
Bore Size	Rc1/4			Rc3/8
Manufacturer	SMC			
Note	Install directly to solenoid valve (EV20 to EV30). Exhausts throttle type.	Applicable to solenoid valve of non direct installation type and with positioner type. Exhausts throttle type. Install directly to actuator.	Applicable to solenoid valve other than mentioned in the left column or for the case inlet throttle is required.	—

Please contact NDV if you have any questions.



# 5

## Electrically Operated Valve

---

### Models and Features of Electrically Operated Valve

- SRH Type
- SRJ Type
- SHA Type, SD# Type
- PMK Type

#### 5-1. Electrically Operated 2-Way Ball Valve

- Fire Safe Ball Valve: F□4100NB

#### 5-2. Electrically Operated 3-Way Ball Valve

- 2 Seats 3-Way Ball Valve: E□4300NB-L2
- 4 Seats 3-Way Ball Valve: E□4300NB-T4/L4
- 3 Seats 3-Way Ball Valve: E□4300N-T3/L3

#### 5-3. Electrically Operated V-Port Valve: V□4100ND(NC)

## Models and Features of Electrically Operated Valve

### Applicable Models

Manufacturer	Type	Nominal Size			
		F100NB	E300NB-L2/T4/L4	E300N-T3/L3	V100ND (NC)
Seibu Electric & Machinery	SRH	DN 15 to 150	DN 15 to 150	DN125 to 150	DN 25 to 200
	SRJ	DN 15 to 200	DN 15 to 200	DN125 to 150	DN 25 to 200
	SHA, SD#	DN125 to 200	DN125 to 200	DN125 to 200	—
Kawaden	PMK	DN 15 to 200	DN 15 to 200	DN125 to 200	DN 25 to 200

The products other than above are also available upon request.

### SRH Type (Seibu Electric and Machinery made)

#### Features

- Compact and lightweight actuator using aluminum alloy and engineering plastic.
- Applicable to single-phase AC power.
- No built-in torque switch.
- Motor is protected by built-in thermal protector.
- Manual operation can be done by a spanner. (Interlock switch is not built in.)
- Usable as regulating valve if a seitrroller (electrical positioner) is installed.

#### Specification

##### SRH Torque Actuator

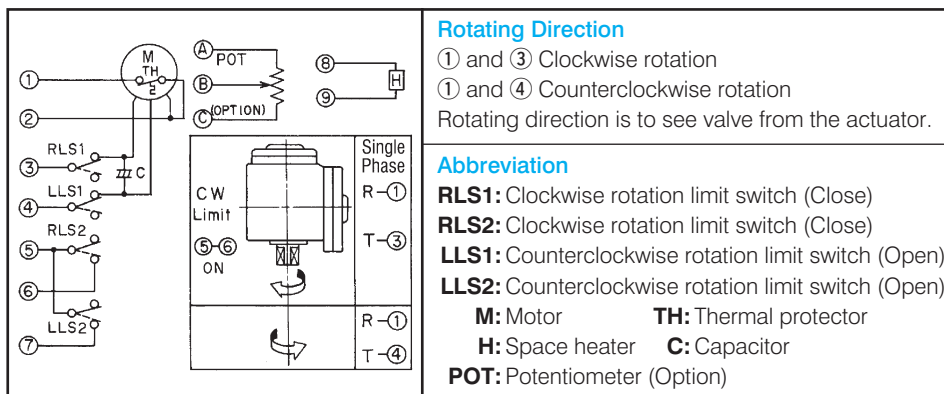
Type	SRH-007	SRH-020	SRH-060	
Maximum Output Torque $N \cdot m$	70	200	600	
Open/Close Time (50/60Hz) $sec./90^\circ$	12/10	12/10	18/15	
Power Supply (50/60Hz) $V$	Single-phase 100/110, 200/220			
Motor	Output $W$	10	40	100
	Thermal Class	Class E		
	Thermal Protector	Incorporated		
Torque Limit Switch	Not incorporated			
Space Heater $W$	5			
Microswitch Contact Capacity	AC250V-5A, DC125V-0.4A (Inductive load)			
Lead Inlet	2-G1/2			
Ambient Temperature	-10°C to 50°C			
Protection Structure	IP55/JPW55 (Outdoor waterproof)			
Terminal	Screw size M3.5 × 12P			
Manual Operation	Manually operable using spanner			

Option: Potentiometer, Seimitter, Seitrroller



Installed Image

### Connecting Diagram





## SRJ Type (Seibu Electric and Machinery made)

### Features

- Compact and lightweight actuator using aluminum alloy. Protection structure is IP68 (Submersible).
- Accommodate either single phase or three phase AC power. (Single phase three wire is not applicable to SRJ1 and 2.)
- Motor is protected by built-in torque switch and thermal protector. Damage by excessive valve torque is also prevented by the torque switch.
- Valve can be operated manually by handwheel and be automatically recovered after power input.
- Explosion proof type (conforming to Ex d II BT4/IEC) is also available.
- Usable as regulating valve if seitrroller (electrical positioner) is installed. (Seitrroller includes Seimitter function.)



Installed Image

### Specification

#### SRJ Torque Actuator

Type		SRJ-010-7	SRJ-010	SRJ-020	SRJ-060	SRJ-1	SRJ-2	
Maximum Output Torque	$N \cdot m$	70	125	250	600	1000	2000	
Open/Close Time (50/60Hz)	sec./90°	18/15					36/30	
Power Supply (50/60Hz)	V	Single-phase 100/110, 200/220 • 3-phase 200/220, 400/440				*		
Motor	Output	40			100		200	
	Thermal Class	Class B						
	Brake	Permanent brake included						
	Thermal Protector	Incorporated						
Torque Limit Switch		Incorporated						
Space Heater	W	5 to 8						
Microswitch Contact Capacity		AC250V-2A, DC125V-0.4A (Inductive load)						
Lead Inlet		3-G1						
Ambient Temperature		-10°C to 50°C						
Protection Structure		IP68 (Submersible)						
Terminal		Screw size M4 × 32P, Motor M4 × 3P						
Manual Operation		With handwheel Automatically recoverable						

Option: Explosion proof (Ex d II BT4), Potentiometer, Seimitter, Seitrroller

\*: Inapplicable to single phase three wire

### Connecting Diagram

#### Rotating Direction

Single-phase: **R-U, T-X** | 3-phase: **R-W, S-V, T-U** Clockwise rotation  
 Single-phase: **R-V, T-X** | 3-phase: **R-U, S-V, T-W** Counterclockwise rotation  
 Rotating direction is to see valve from the actuator.

#### Abbreviation

**RLS1, RLS2:** Clockwise rotation limit switch  
**LLS1, LLS2:** Counterclockwise rotation limit switch  
**RTS1, RTS2:** Clockwise rotation torque switch  
**LTS1, LTS2:** Counterclockwise rotation torque switch  
**M:** Motor      **TH:** Thermal protector  
**H:** Space heater      **C:** Capacitor  
**POT:** Potentiometer (Option)

Switch	Terminal No.	CCW limit	CW limit
RLS 1	1-4	—	—
RLS 2	5-6	—	—
LLS 1	1-8	—	—
LLS 2	9-10	—	—

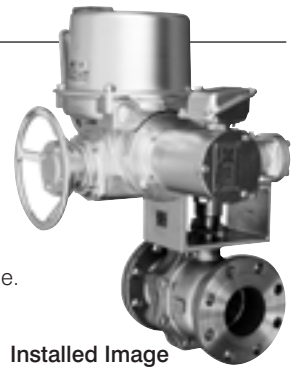
— : Contact ON    - - - - : Contact OFF

**13-14:** Overtorque at clockwise limit: ON  
**1-4:** Overtorque at clockwise limit: OFF  
**17-18:** Overtorque at counterclockwise limit: ON  
**1-8:** Overtorque at counterclockwise limit: OFF  
**31-32:** Heater power source terminal  
**27, 28, 29:** Potentiometer terminal

## SHA Type and SD# Type (Seibu Electric and Machinery made)

### Features

- Robust actuator with ductile cast iron primary and secondary gear.
- Applicable to 3-phase AC power.
- Motor is protected by built-in torque switch. Damage by excessive valve torque is also prevented by the torque switch. In order to protect motor completely, use of thermal relay at panel is advisable.
- Local control priority and Central control priority are available for manual/automatic changeover.
- Interlock switch is incorporated for local control priority.
- Many other options such as single phase motor, DC motor, regulating valve specification are available.



Installed Image

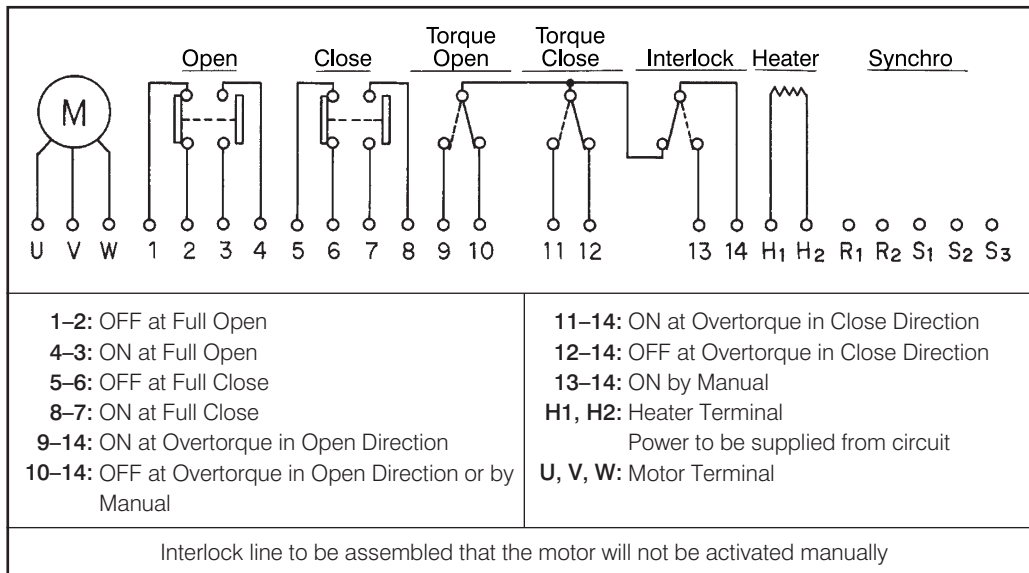
### Specification

#### SHA and SD# Torque Actuator

Type		SHA-01	SHA-02	SHA-04	SDB-075	SDE-15	SDG-22	
Maximum Output Torque	$N \cdot m$	Settle according to the specification						
Open/Close Time (50/60Hz)	sec./90°	35/29	35/29	35/29	35/30	35/30	35/30	
Power Supply (50/60Hz)	$V$	3-phase 200/220, 400/440						
Motor	Output	$W$	0.1	0.2	0.4	0.75	1.5	2.2
	Thermal Class		Class B					
	Brake		Not incorporated					
Torque Limit Switch			Incorporated					
Space Heater	$W$		10			30		
Microswitch Contact Capacity			AC250V-5A, DC125V-0.5A (Inductive load)					
Lead Inlet			2G1, 1-G3/4 (for motor)					
Ambient Temperature			-25°C to 50°C					
Protection Structure			IP55/JPW55 (Outdoor waterproof)					
Terminal			Screw size M4 × 24P, Motor M4 × 3P			Screw size M4 × 24P		
Manual Operation			With manual/electrical changeover lever					

Option: Potentiometer, Seimitter, Motor with brake, Thermal motor

### Connecting Diagram



**PMK Type** (Kawaden made)**Features**

- Compact and lightweight actuator using aluminum alloy.
- Applicable to single phase AC power
- Torque switch is not incorporated.
- Motor is protected by built-in thermal protector.

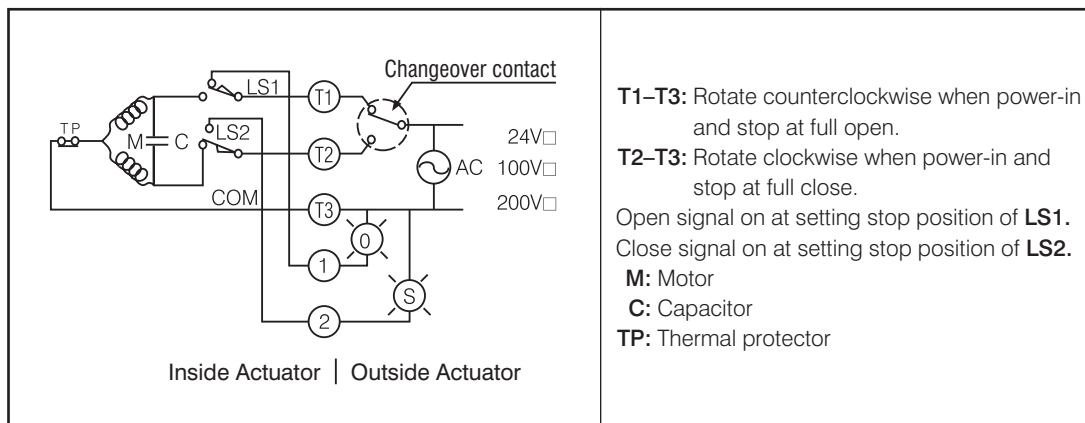


Installed Image

**Specification****PMK Torque Actuator**

Type		PMK-300YS	PMK-600YS	PMK-600YSP	PMK-010SS	PMK-030SS	PMK-060SS	PMK-080SS
Maximum Output Torque	$N \cdot m$	29.4	58.8	68.6	147.1	313.8	588.4	784.5
Open/Close Time (50/60Hz)	sec./90°	8.5/7	8.5/7	12/10	24.5/20	38.5/31.5	57/47	71.5/58.5
Power Supply (50/60Hz)	$V$	Single Phase 100/110, 200/220						
Motor	Output	$W$	20W	25W			40W	
	Thermal Class		Class E	Class B	Class E	Class B		
	Brake		Not incorporated					
Torque Limit Switch		Not incorporated						
Space Heater	$W$	10						
Lead Inlet		1-G1/2			2-G3/4			
Ambient Temperature		-10°C to 50°C						
Protection Structure		IP54 (rainproof)						
Terminal		Screw Size M3 × 8P						
Manual Operation		Actuator bottom axis can be manipulated						

**Options:** Potentiometer, Intermediate switch, Space heater, Limit switch, Torque Limiter

**Connection Diagram**

## 5-1 Electrically Operated 2-Way Ball Valve Fire Safe Type: F94100NB

## Valve Codes

Valve Code for F□4100NB

**FSR4107NB-NTF-050-( )-J10KRF****1 Actuator** (Electrically Operated Valve)

<b>SR</b>	SRH Type	Seibu Electric and Machinery
<b>MSJ</b>	SRJ Type	
<b>SH</b>	SHA, SD# Type	
<b>PMK</b>	PMK Type	Kawaden

**2 4**

Electrically Operated Valve

**3 Body Material**

<b>04</b>	FCD400
<b>07</b>	SCS13A
<b>12</b>	SCS14A
<b>13</b>	SCS16A

**4 Seat Material** (refer to P10)

NTF, NCF, NGR, CFM, CFMR

**5 Nominal Size** (DN or A)

Conforming to ISO 6708 and JIS B 2001

**7 Connection**

<b>J10KRF</b>	JIS 10KRF
<b>J20KRF</b>	JIS 20KRF
<b>A150RF</b>	ASME CL150
<b>A300RF</b>	ASME CL300

**\* Improvement Identification Code**

<b>None</b>	Original Design
<b>N</b>	First Improvement
<b>NB</b>	Second Improvement
<b>NC</b>	Third Improvement
<b>ND</b>	Fourth Improvement

**6 Actuator Code**

According to the required actuator specification, 8 numbers code will be applied.

- Those are standard products codes. The code may be different depending on the products specification.

**FSR4100NB (SRH Type Actuator)**

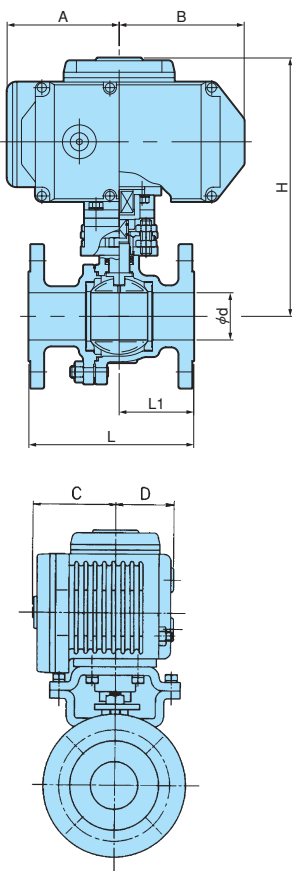
**Actuator Selection Table**

Refer to P37 for selecting rank according to operating condition.

DN	Rank	Shutoff Differential Pressure: MPa														Rank	DN		
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8			3.0	
15	A																	A	15
	B																	B	
	C																	C	
20	A																	A	20
	B																	B	
	C																	C	
25	A																	A	25
	B																	B	
	C																	C	
40	A																	A	40
	B																	B	
	C																	C	
50	A																	A	50
	B																	B	
	C																	C	
65	A																	A	65
	B																	B	
	C																	C	
80	A																	A	80
	B																	B	
	C																	C	
100	A																	A	100
	B																	B	
	C																	C	
125	A																	A	125
	B																	B	
	C																	C	
150	A																	A	150
	B																	B	
	C																	C	

**Dimension**

Unit: mm



Nominal size DN	Actuator					d	10K CL150		20K CL300		H	Mass (Approx. kg) Stainless Cast Steel	
	Code	A	B	C	D		L	L1	L	L1		10K CL150	20K CL300
15	SRH-007	100	108	75	60	13	108	45	140	63	213	7.3	7.7
20						19	117	50	152	70	217	8.5	9.0
25						25	127	51	165	71	233	9.7	10.4
40						38	165	70.5	190	76.5	251	12.9	13.7
50	SRH-020	121	135	90	63	51	178	80.5	216	86	259	16.6	18.2
65						64	190	87	241	103	279	19.1	20.7
80	SRH-020	121	135	90	63	76	203	97	283	124	317	30.0	36.5
100						102	229	116	305	135	351	42.0	53.5
125						127	356	148	381	158	413	68.0	81.0
150	152	394	173	403	178	433	85.0	99.0					

Please contact NDV or local representative if specific installing direction for actuator is required.

FMSJ4100NB (SRJ Type Actuator)

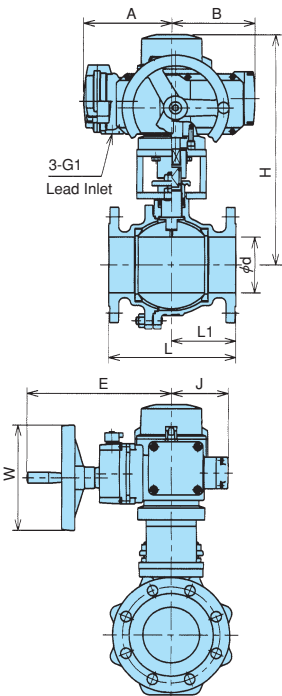
Actuator Selection Table

Refer to P37 for selecting rank according to operating condition.

DN	Rank	Shutoff Differential Pressure: MPa													Rank	DN		
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6			2.8	3.0
15	A																A	15
	B																B	
	C																C	
20	A																A	20
	B																B	
	C																C	
25	A																A	25
	B																B	
	C																C	
40	A																A	40
	B																B	
	C																C	
50	A																A	50
	B																B	
	C																C	
65	A																A	65
	B																B	
	C																C	
80	A																A	80
	B																B	
	C																C	
100	A																A	100
	B																B	
	C																C	
125	A																A	125
	B																B	
	C																C	
150	A																A	150
	B																B	
	C																C	
200	A																A	200
	B																B	
	C																C	

Dimension

Unit: mm



Nominal size DN	Actuator						10K CL150			20K CL300			Mass (Approx. kg) Stainless Cast Steel	
	Code	A	B	E	J	W	d	L	L1	L	L1	H	10K CL150	20K CL300
15	SRJ-010-7						13	108	45	140	63	328	18.3	18.7
20							19	117	50	152	70	332	19.0	19.5
25							25	127	51	165	71	345	20.7	21.4
40							38	165	70.5	190	76.5	363	23.7	24.5
50	SRJ-010	186	167	272	104	160	51	178	80.5	216	86	371	25.6	27.2
65	SRJ-010-7						64	190	87	241	103	412	32.0	35.5
80	SRJ-010						76	203	97	283	124	422	35.5	42.0
100	SRJ-020						102	229	116	305	135	453	54.5	66.0
125	SRJ-060	202	191	316	130	245	127	356	148	381	158	530	81.0	94.0
150	SRJ-1	240	267	354	191		152	394	173	403	178	550	101.0	115.0
	SRJ-060	202	191	316	130		620	126.0	140.0					
200	SRJ-1	240	267	354	191		203	457	207	502	235	609	133.0	158.0
	SRJ-2	240	267	354	191	669						155.0	180.0	

Please contact NDV or local representative if specific installing direction for actuator is required.

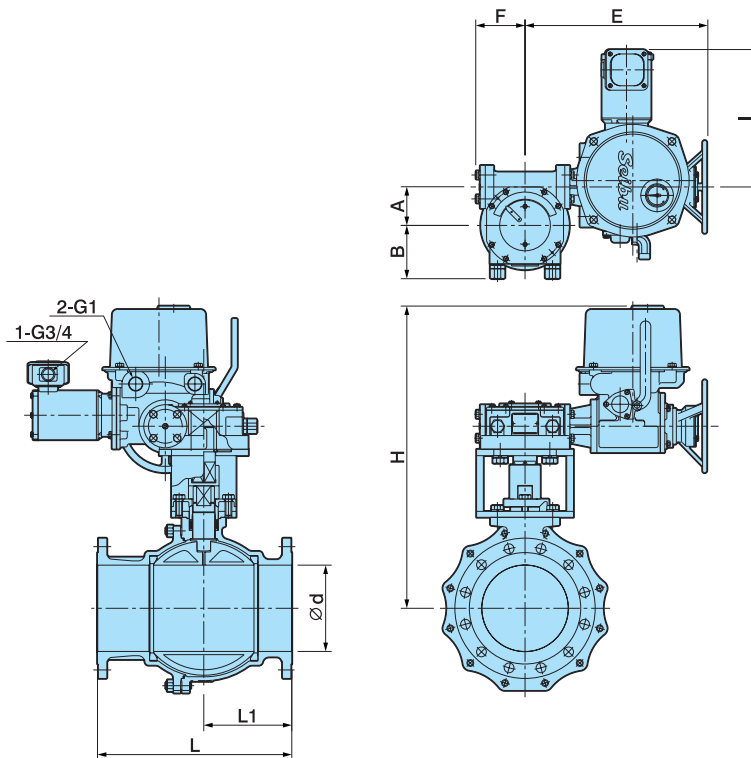
## FSH4100NB, FSD4100NB (SHA and SDB Type Actuator)

## Actuator Selection Table

Refer to P37 for selecting rank according to operating condition.

DN	Rank	Shutoff Differential Pressure: MPa											Rank	DN					
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2			2.4	2.6	2.8	3.0	
125	A																	A	125
	B																	B	
	C																	C	
150	A																	A	150
	B																	B	
	C																	C	
200	A																	A	200
	B																	B	
	C																	C	

## Dimension



Unit: mm

Nominal size DN	Actuator						d	10K CL150		20K CL300		H	Mass (Approx. kg) Stainless Cast Steel	
	Code	A	B	E	F	I		L	L1	L	L1		10K CL150	20K CL300
125	SHA-02					325	127	356	148	381	158	647	121.0	134.0
	SHA-04	91	126	430	116	318	152	394	173	403	178	667	138.0	152.0
150	SHA-02					325								
	SHA-04					318	203	457	207	502	235	715	172.0	197.0
	SDB-075	117	152	544	144	375						734	217.0	242.0

Please contact NDV or local representative if specific installing direction for actuator is required.

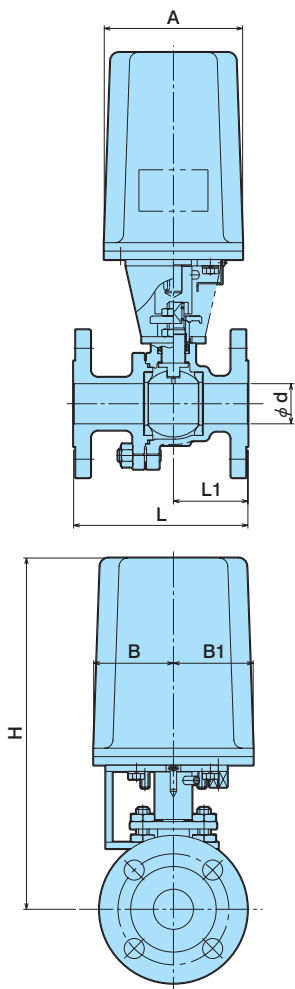
FPMK4100NB (PMK Type Actuator)

Actuator Selection Table

Refer to P37 for selecting rank according to operating condition.

DN	Rank	Shutoff Differential Pressure: MPa									Rank	DN
		0.2	0.6	1.0	1.4	1.8	2.2	2.6	3.0			
15	A										A	15
	B										B	
	C										C	
20	A										A	20
	B										B	
	C										C	
25	A										A	25
	B										B	
	C										C	
40	A										A	40
	B										B	
	C										C	
50	A										A	50
	B										B	
	C										C	
65	A										A	65
	B										B	
	C										C	
80	A										A	80
	B										B	
	C										C	
100	A										A	100
	B										B	
	C										C	
125	A										A	125
	B										B	
	C										C	
150	A										A	150
	B										B	
	C										C	
200	A										A	200
	B										B	
	C										C	

Dimension



Unit: mm

Nominal size DN	Actuator				10K CL150		20K, CL300		Mass (Approx. kg) Stainless Cast Steel			
	Code	A	B	B1	d	L	L1	L	L1	10K CL150	20K CL300	
15	PMK-300YS	131	75.5	75.5	13	108	45	140	63	301	7.7	8.1
20					19	117	50	152	70	306	8.3	8.8
25					25	127	51	165	71	314	9.8	10.5
40	PMK-600YS	131	75.5	75.5	38	165	70.5	190	76.5	333	12.3	13.1
50					51	178	80.5	216	86	342	14.5	16.1
65	PMK-600YSP	131	75.5	75.5	64	190	87	241	103	368	14.6	16.2
	PMK-600YS										19.5	23.0
80	PMK-600YSP	178	70	70	64	190	87	241	103	368	19.6	23.1
	PMK-010SS										425	22.0
100	PMK-010SS	178	70	70	76	203	97	283	124	435	25.0	31.5
	PMK-030SS										470	—
125	PMK-010SS	197	76	76	102	229	116	305	135	467	37.0	48.5
	PMK-030SS										502	39.5
150	PMK-060SS	197	76	76	127	356	148	381	158	537	58.5	72.0
	PMK-080SS										659	76.0
200	PMK-030SS	197	76	76	152	394	173	403	178	558	73.5	87.5
	PMK-060SS										680	87.0
200	PMK-060SS	272	100	100	203	457	207	502	235	740	128.0	—
	PMK-080SS										—	—

Please contact NDV or local representative for the combination of DN50-PMK010SS, DN80-PMK030SS or DN100-PMK060SS.



5-2 Electrically Operated 3-Way Ball Valve 2 Seats 3-Way Ball Valve: E□4300NB-L2  
 4 Seats 3-Way Ball Valve: E□4300NB-T4/L4  
 3 Seats 3-Way Ball Valve: E□4300N-T3/L3

## Valve Codes

Valve Code for F□4300NB(N)

**ESR4307NB-L2-NTF-050-( )-J10KRF****1 Actuator (Electrically Operated Valve)**

<b>SR</b>	SRH Type	Seibu Electric
<b>MSJ</b>	SRJ Type	and Machinery
<b>SH</b>	SHA, SD# Type	
<b>PMK</b>	PMK Type	Kawaden

**2 4**

Electrically Operated Valve

**3 Body Material**

<b>04</b>	FCD400
<b>07</b>	SCS13A
<b>12</b>	SCS14A
<b>13</b>	SCS16A

**4 Seat Mechanism**

	Port Shape	Number of Seats
<b>L2</b>	L-Port	2
<b>L3</b>		3
<b>L4</b>		4
<b>T3</b>	T-Port	3
<b>T4</b>		4

**5 Seat Material (refer to P10)**

NTF, NCF, NGR, CFM, CFMR

**7 Actuator Code**

According to the required actuator specification, 8 numbers code will be applied.

**6 Nominal Size (DN or A)**

Conforming to ISO 6708 and JIS B 2001

**8 Connection**

<b>J10KRF</b>	JIS 10KRF
<b>J20KRF</b>	JIS 20KRF
<b>A150RF</b>	ASME CL150
<b>A300RF</b>	ASME CL300

**\* Improvement Identification Code**

<b>None</b>	Original Design
<b>N</b>	First Improvement
<b>NB</b>	Second Improvement
<b>NC</b>	Third Improvement
<b>ND</b>	Fourth Improvement

- Those are standard products codes. The code may be different depending on the products specification.

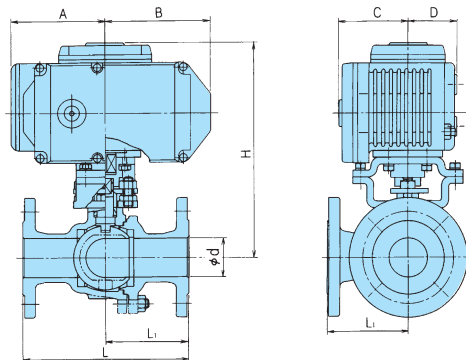
## ESR4300NB-L2-15/150, ESR4300NB-T4(L4)-15/100, ESR4300N-T3(L3)-125/150 (SRH Type Actuator)

## Actuator Selection Table

Refer to P37 for selecting rank according to operating condition.

DN	Rank	L2										T4(L4), T3(L3)										Rank	DN
		Shutoff Differential Pressure: MPa										Shutoff Differential Pressure: MPa											
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0		
15	A																				A	15	
	B																				B		
	C																				C		
20	A																				A	20	
	B																				B		
	C																				C		
25	A																				A	25	
	B																				B		
	C																				C		
40	A																				A	40	
	B																				B		
	C																				C		
50	A																				A	50	
	B																				B		
	C																				C		
65	A																				A	65	
	B																				B		
	C																				C		
80	A																				A	80	
	B																				B		
	C																				C		
100	A																				A	100	
	B																				B		
	C																				C		
125	A																				A	125	
	B																				B		
	C																				C		
150	A																				A	150	
	B																				B		
	C																				C		

## Dimension



Unit: mm

Nominal size DN	Actuator				L2					T4 (L4), T3 (L3)								
	Code	A	B	C	D	d	L	L1	H	Mass (Approx. kg)		d	L	L1	H	Mass (Approx. kg)		
										Stainless Cast Steel						Stainless Cast Steel		
										10K, CL150						10K, CL150		
15						13	146	73	213	8.3		19	140	70	232	10.0		
20						19	150	75	217	9.6							10.5	
25	SRH-007	100	108	75	60	25	170	85	233	11.3		25	160	80	244	13.0		
40						38	200	100	251	15.2		38	180	90	258	15.0		
50						51	230	115	259	19.8		51	200	100	283	20.5		
	SRH-020	121	135	90	63				279	22.3					303	26.0		
65	SRH-007	100	108	75	60	64	260	130	287	28.0								
	SRH-020	121	135	90	63				307	32.0		64	240	120	337	39.0		
80						76	280	140	317	36.5		76	260	130	340	40.0		
	SRH-060	158	164	133	85										364	47.5		
100	SRH-020	121	135	90	63	102	340	170	351	51.0		102	330	165	355	47.0		
									375	56.0					379	54.5		
125	SRH-060	158	164	133	85	127	370	185	413	82.0		127	430	215	413	103.0		
150						152	430	215	433	103.0		152	500	250	425	126.0		

Please contact NDV or local representative if specific installing direction for actuator is required.

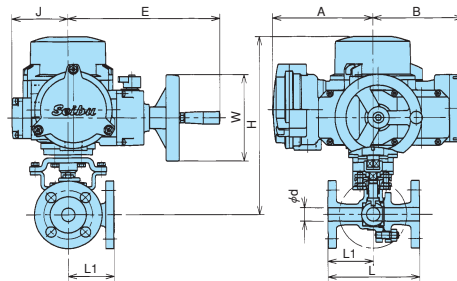
EMSJ4300NB-L2-15/150, EMSJ4300NB-T4(L4)-15/100, EMSJ4300N-T3(L3)-125/150 (SRJ Type Actuator)

Actuator Selection Table

Refer to P37 for selecting rank according to operating condition.

DN	Rank	L2										T4(4), T3(L3)										Rank	DN
		Shutoff Deferential Pressure: MPa										Shutoff Deferential Pressure: MPa											
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0		
15	A																				A	15	
	B																				B		
	C																				C		
20	A																				A	20	
	B																				B		
	C																				C		
25	A																				A	25	
	B																				B		
	C																				C		
40	A																				A	40	
	B																				B		
	C																				C		
50	A																				A	50	
	B																				B		
	C																				C		
65	A																				A	65	
	B																				B		
	C																				C		
80	A																				A	80	
	B																				B		
	C																				C		
100	A																				A	100	
	B																				B		
	C																				C		
125	A																				A	125	
	B																				B		
	C																				C		
150	A																				A	150	
	B																				B		
	C																				C		
200	A																				A	200	
	B																				B		
	C																				C		

Dimension



Unit: mm

Nominal size DN	Actuator						L2					T4 (L4), T3 (L3)								
	Code	A	B	E	J	W	d	L	L1	H	Mass (Approx. kg)		d	L	L1	H	Mass (Approx. kg)			
											Stainless Cast Steel						Stainless Cast Steel			
											10K, CL150						10K, CL150			
15	SRJ-010-7						13	146	73	328	19.3	19	140	70	344	22.5				
20							19	150	75	332	20.1					23.0				
25							25	170	85	345	22.2					25	160	80	356	24.0
40							38	200	100	363	26.0					38	180	90	370	28.5
50	SRJ-010-7	186	167	272	104	160	51	230	115	371	28.8	51	200	100	408	32.5				
	SRJ-010						64	260	130	412	37.5	—	—	—	—	—				
	SRJ-010-7						—	—	—	—	—	64	240	120	419	39.5				
65	SRJ-010						76	280	140	422	42.0	—	—	—	—	—				
	SRJ-020	76	260	130	442	45.5														
80	SRJ-010	186	167	272	104	160	102	340	170	453	63.0	102	330	165	457	62.0				
	SRJ-020						492	64.0	496	71.0										
100	SRJ-060						202	191	316	130	127	370	185	530	95.0	127	430	215	528	111.0
125	SRJ-060						152	430	215	550	119.0	152	500	250	540	132.0				
150	SRJ-1	240	267	354	191	245	620	144.0	605	161.0										
	SRJ-060	202	191	316	130	609	175.0	—	—	—	—									
200	SRJ-1	240	267	354	191	203	520	260	669	197.0	203	650	325	649	224.0					
	SRJ-2								—	—	—	—								

Please contact NDV or local representative if specific installing direction for actuator is required.

2-Way Ball Valve

3-Way Ball Valve

V-Port Valve

Pneumatically Operated Valve

Electrically Operated Valve  
3-Way Ball Valve

Special Purpose Ball Valve

Safety Instructions

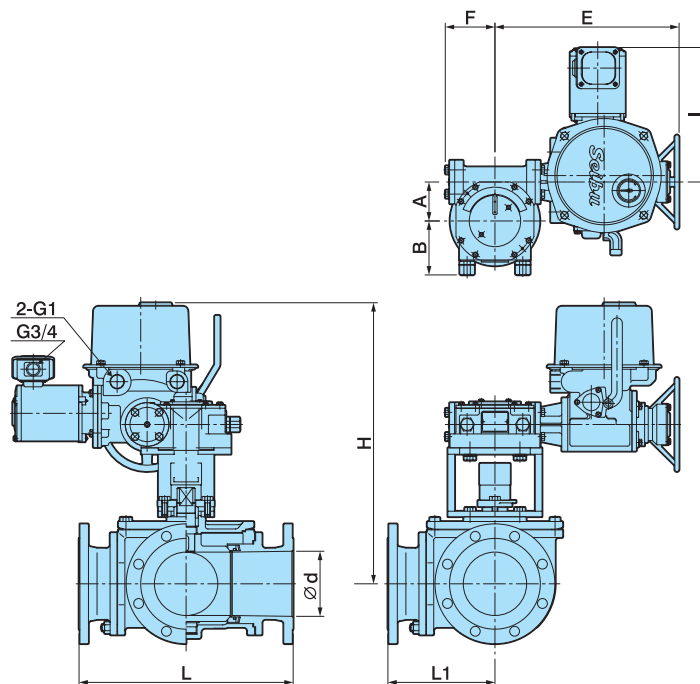
ESH4300NB-L2-125/200, ESH4300N-T3(L3)-125/200 (SHA Type Actuator)

Actuator Selection Table

Refer to P37 for selecting rank according to operating condition.

DN	Rank	L2			T3(L3)			Rank	DN
		Shutoff Differential Pressure: MPa			Shutoff Differential Pressure: MPa				
		0	0.5	1.0	0	0.5	1.0		
125	A							A	125
	B							B	
	C							C	
150	A		SHA-02			SHA-02		A	150
	B							B	
	C							C	
200	A					SHA-04		A	200
	B							B	
	C		SHA-04					C	

Dimension



Unit: mm

Nominal size DN	Actuator						L2				T3 (L3)							
	Code	A	B	E	F	I	d	L	L1	H	Mass (Approx. kg)		d	L	L1	H	Mass (Approx. kg)	
											Stainless Cast Steel						Stainless Cast Steel	
											10K, CL150						10K, CL150	
125	SHA-02					325	127	370	185	647	135.5	127	430	215	645	158.0		
150	SHA-04	91	126	430	116	318	152	430	215	667	154.5	152	500	250	657	179.5		
200	SHA-02					325	203	520	260	715	215.5	203	650	325	700	252.5		
	SHA-04					318												

Please contact NDV or local representative if specific installing direction for actuator is required.

EPMK4300NB-L2-15/200, EPMK4300NB-T4(L4)-15/100, EPMK4300N-T3(L3)-125/200 (PMK Type Actuator)

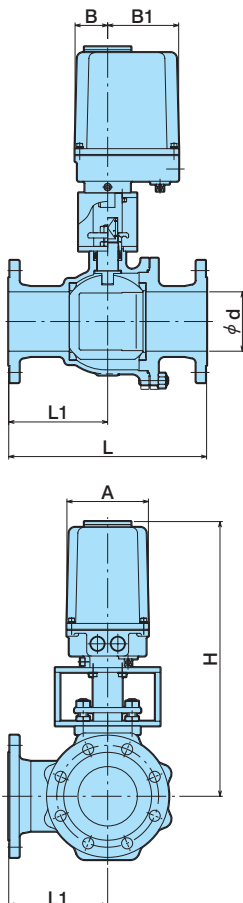
Actuator Selection Table

Refer to P37 for selecting rank according to operating condition.

DN	Rank	L2									T4(L4), T3(L3)									Rank	DN	
		Shutoff Deferential Pressure: MPa									Shutoff Deferential Pressure: MPa											
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6			1.8
15	A																				A	15
	B																				B	
	C																				C	
20	A																				A	20
	B																				B	
	C																				C	
25	A																				A	25
	B																				B	
	C																				C	
40	A																				A	40
	B																				B	
	C																				C	
50	A																				A	50
	B																				B	
	C																				C	
65	A																				A	65
	B																				B	
	C																				C	
80	A																				A	80
	B																				B	
	C																				C	
100	A																				A	100
	B																				B	
	C																				C	
125	A																				A	125
	B																				B	
	C																				C	
150	A																				A	150
	B																				B	
	C																				C	
200	A																				A	200
	B																				B	
	C																				C	

Dimension

Unit: mm



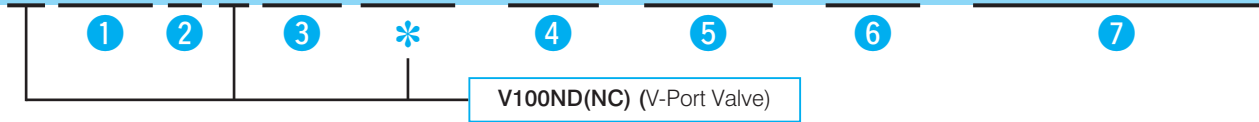
Nominal size DN	Actuator				L2					T4 (L4), T3 (L3)						
	Code	A	B	B1	d	L	L1	H	Mass (Approx. kg)		d	L	L1	H	Mass (Approx. kg)	
									Stainless	Cast Steel					Stainless	Cast Steel
15					13	146	73	301	8.7		19	140	70	285	11.4	
20	PMK-300YS				19	150	75	306	9.4		19	140	70	316	11.8	
25	PMK-600YS				25	170	85	314	11.4		25	160	80	316	12.8	
	PMK-300YS	131	75.5	75.5											13.0	
40	PMK-600YS				38	200	100	333	14.6		38	180	90	341	17.0	
	PMK-300YS								14.8							
	PMK-600YS								17.7							
50	PMK-600YSP				51	230	115	342	17.8		51	200	100	368	19.0	
	PMK-010SS	140	56	122				404	20.6					422	23.0	
65	PMK-600YS	131	75.5	75.5	64	260	130	368	25.0							
	PMK-600YSP								25.1							
	PMK-010SS	140	56	122				425	27.5		64	240	120	432	29.5	
	PMK-030SS	152	63	134										466	32.0	
80	PMK-010SS	140	56	122	76	280	140	435	31.5		76	260	130	455	35.5	
	PMK-030SS	152	63	134										485	38.0	
100	PMK-010SS	140	56	122				467	46.0							
	PMK-030SS	152	63	134	102	340	170	502	48.5		102	330	165	512	47.0	
	PMK-060SS	200	73	199										634	65.5	
	PMK-030SS	152	63	134				537	72.5							
125	PMK-060SS				127	370	185	659	90.0		127	430	215	656	120.5	
	PMK-080SS	200	73	199												
	PMK-030SS	152	63	134				558	91.5							
150	PMK-060SS				152	430	215	680	105.0		152	500	250	669	142.0	
	PMK-080SS															
	PMK-060SS	200	73	199												
200	PMK-080SS				203	520	260	740	170.0							

Please contact NDV or local representative if specific installing direction for actuator is required.

## 5-3 Electrically Operated V-Port Valve: V□4100ND(NC)

## Valve Codes

Valve Code for V□4100ND(NC)

**VSR4107ND-CF-050-( )-J10KRF****1 Actuator** (Electrically Operated Valve)

<b>SR</b>	SRH Type	Seibu Electric and Machinery
<b>MSJ</b>	SRJ Type	
<b>PMK</b>	PMK Type	Kawaden

**2 4**

Electrically Operated Valve

**3 Body Material**

<b>07</b>	SCS13A
<b>12</b>	SCS14A

**4 Seat Material**

<b>ST</b>	Solid (Thick) Seat
<b>M</b>	Thin Seat
<b>CF</b>	Soft Seat

**5 Nominal Size** (DN or A)

Conforming to ISO 6708 and JIS B 2001

**7 Connection**

<b>J10KRF</b>	JIS 10KRF
<b>J20KRF</b>	JIS 20KRF
<b>A150RF</b>	ASME CL150

**\* Improvement Identification Code**

<b>None</b>	Original Design
<b>N</b>	First Improvement
<b>NB</b>	Second Improvement
<b>NC</b>	Third Improvement
<b>ND</b>	Fourth Improvement

**6 Actuator Code**

According to the required actuator specification, 8 numbers code will be applied.

- Those are standard products codes. The code may be different depending on the products specification.

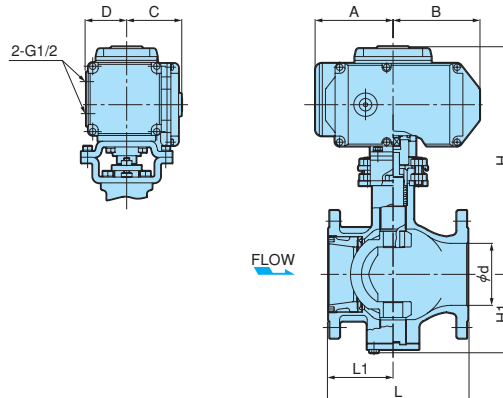
VSR4100ND(NC) (SRH Type Actuator)

Actuator Selection Table

Refer to P37 for selecting rank according to operating condition.

DN	Rank	Shutoff Differential Pressure: MPa														Rank	DN		
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8			3.0	
25	A																	A	25
	B																	B	
	C																	C	
40	A																	A	40
	B																	B	
	C																	C	
50	A																	A	50
	B																	B	
	C																	C	
65	A																	A	65
	B																	B	
	C																	C	
80	A																	A	80
	B																	B	
	C																	C	
100	A																	A	100
	B																	B	
	C																	C	
125	A																	A	125
	B																	B	
	C																	C	
150	A																	A	150
	B																	B	
	C																	C	
200	A																	A	200
	B																	B	
	C																	C	

Dimension



Unit: mm

Nominal size DN	Actuator					10K, CL150					20K			
	Code	A	B	C	D	H1	H	d	L	L1	Mass (Approx. kg)			
											L	L1	Stainless Cast Steel	
													10K, CL150	20K
25						48	245.5	25	127	55	9.8	165	55	11.0
40	SRH-007	100	108	75	60	71	274.5	38	165	70	12.8	190	70	14.5
						77	280.0	51	178	75	14.1	216	75	16.5
50	SRH-020	121	135	90	63	96	312.5	64	190	80	19.5	241	80	22.0
						96	300.0	64	190	80	19.6	241	80	27.5
65	SRH-007	100	108	75	60	101	317.5	76	203	90	20.5	283	90	23.5
						101	337.5	76	203	90	26.0	283	90	29.0
80	SRH-020	121	135	90	63	101	360.5	76	203	90	33.5	283	90	36.5
						101	376.0	102	229	106	33.0	305	106	38.5
100	SHR-060	158	164	133	85	131	400.0	102	229	106	40.5	305	106	45.5
						131	376.0	102	229	106	33.0	305	106	38.5
125	SRH-060	158	164	133	85	163	449.0	127	356	145	63.5	381	145	69.5
150						173	459.0	152	394	150	74.5	403	150	83.5

Please contact NDV or local representative if specific installing direction for actuator is required.

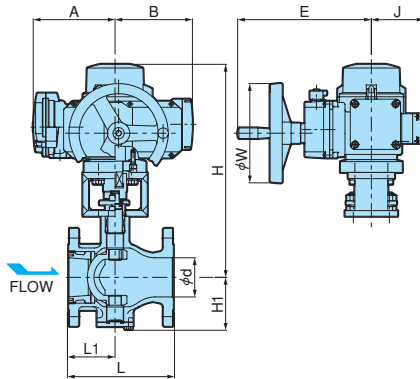
VMSJ4100ND(NC) (SRJ Type Actuator)

Actuator Selection Table

Refer to P37 for selecting rank according to operating condition.

DN	Rank	Shutoff Differential Pressure: MPa											Rank	DN					
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2			2.4	2.6	2.8	3.0	
25	A																	A	25
	B																	B	
	C																	C	
40	A																	A	40
	B																	B	
	C																	C	
50	A																	A	50
	B																	B	
	C																	C	
65	A																	A	65
	B																	B	
	C																	C	
80	A																	A	80
	B																	B	
	C																	C	
100	A																	A	100
	B																	B	
	C																	C	
125	A																	A	125
	B																	B	
	C																	C	
150	A																	A	150
	B																	B	
	C																	C	
200	A																	A	200
	B																	B	
	C																	C	

Dimension



Unit: mm

Nominal size DN	Code	Actuator					10K, CL150					20K			
		A	B	E	J	W	H1	H	d	L	L1	Mass (Approx. kg) Stainless Cast Steel 10K, CL150	L	L1	Mass (Approx. kg) Stainless Cast Steel 20K
25	SRJ-010-7						48	359	25	127	55	20.6	165	55	21.8
40							71	388	38	165	70	23.9	190	70	25.6
50	SRJ-010						77	394	51	178	75	25.2	216	75	27.6
65	SRJ-020						96	442	64	190	80	31.6	241	80	34.1
80	SRJ-010	186	167	272	104	160	101	447	76	203	90	32.6	283	90	35.6
	SRJ-020														
100	SRJ-010						131	484	102	229	106	42.6	305	106	45.1
	SRJ-020														
125	SRJ-060	202	191	316	130	245		523			48.8			54.3	
	SRJ-020	186	167	272	104	160		544			66.7			72.7	
150	SRJ-060	202	191	316	130	245	163	566	127	356	145	78.2	381	145	84.2
	SRJ-1	240	267	354	191			636				109.6			115.6
200	SRJ-020	186	167	272	104	160		554				77.7			86.7
	SRJ-060	202	191	316	130	245	173	576	152	394	150	89.2	403	150	98.2
	SRJ-1	240	267	354	191			646				120.6			129.6
	SRJ-060	202	191	316	130	245		627				122.8			134.8
	SRJ-1	240	267	354	191		211	687	203	457	200	155.6	502	200	167.6
	SRJ-2														

Please contact NDV or local representative if specific installing direction for actuator is required.



# 6

## Special Purpose Ball Valve

---

6-1. High Temperature Ball Valve

- Metal Seat Ball Valve

6-2. Y-Shaped 3-Way Ball Valve

6-3. Ball Valve for Shield Tunneling Method

6-4. Top Entry Ball Valve

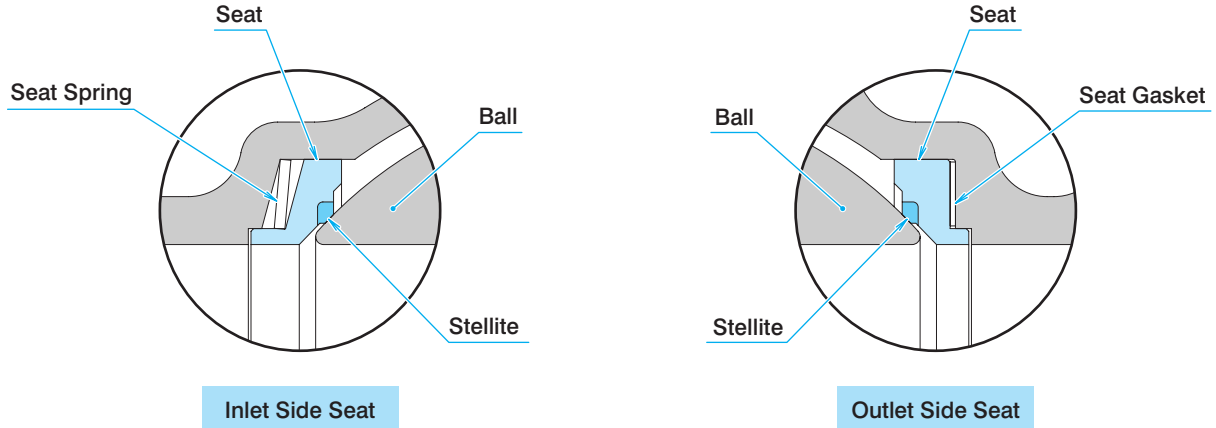
## 6-1 High Temperature Ball Valve

### Metal Seat Ball Valve



#### Features of Metal Seat (Code: ST)

- Maximum Working Temperature 500°C (may have some limit according to the working condition.)
- Superior in abrasion resistance, applicable to abrasive fluids such as powder and slurry.
- Applicable to flow control at intermediate opening position.



#### Specification

Applicable Type	F100NB, E100JNC
Nominal Size	DN15 to 200
Connection	Flanged type JIS10K, 20K (*1) Class (ASME, JPI) 150,300 (*2)
Body Material	FCD400, SCS13A, SCS14A
Seat Material	SUS304 & ST, SUS316 & ST
Ball Material	SUS304 & SFNi, SUS316 & SFNi (SFNi: Nickel base fusible alloy Thermal spraying deposit on Ball)

\*1: JIS B2220 \*2: ASME B16.5

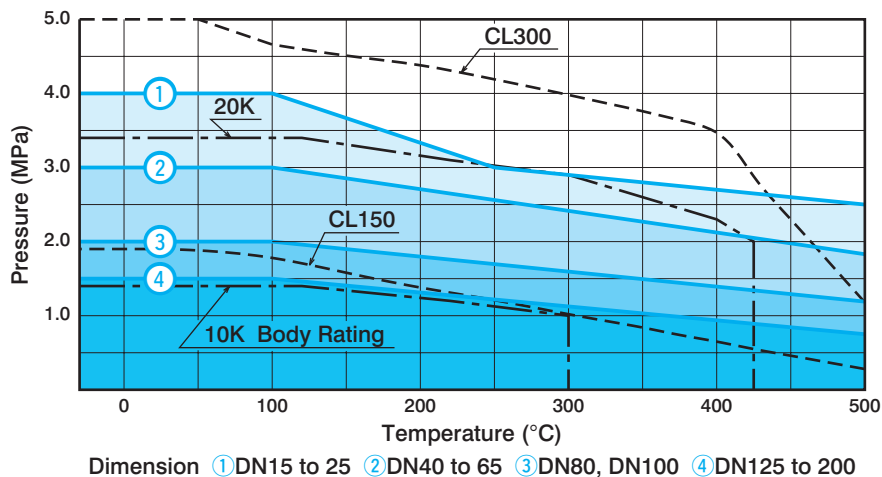
#### Allowable Seat Leakage

Nominal Size (DN)		15	20	25	40	50	65	80	100	125	150	200
Allowable leakage (cc/min)	Hydraulic Pressure 0.3MPa	0.014	0.018	0.023	0.036	0.045	0.059	0.072	0.09	0.11	0.14	0.18
	Air Pressure 0.6MPa	0.8	1.1	1.4	2.2	2.7	3.5	4.3	5.4	6.8	8.1	10.8

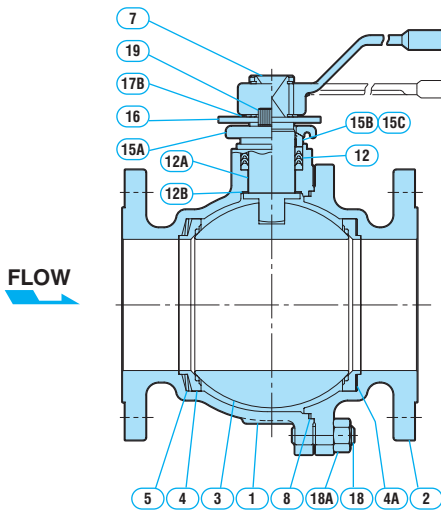
Allowable Leakage of hydraulic pressure is according to ASME B16.104 Class V.

Allowable leakage for air pressure is calculated by those for hydraulic pressure considering water and air leakage ratio written in JIS B2003 General rules for inspection of valves.

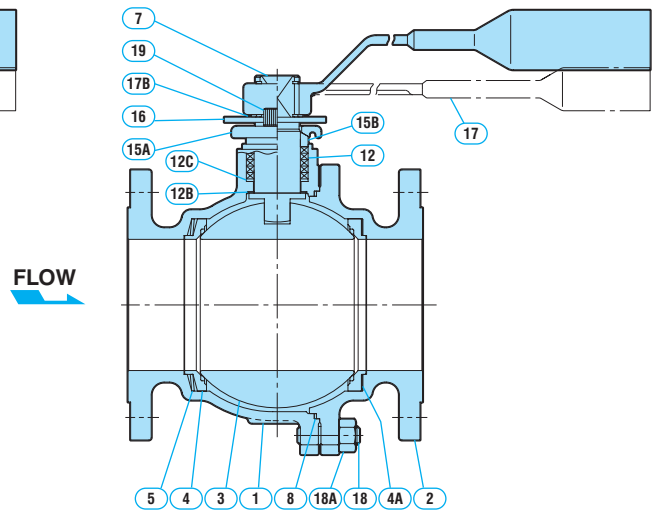
#### Working Pressure and Temperature Range



Parts and Materials



Standard Specification



High Temperature Specification

Parts	Working Temperature	Code	Standard Specification			High Temperature Specification	
			F104NB-ST	F107NB-ST	F112NB-ST	FH107NB-ST	FH112NB-ST
			-5 to 250°C	-29 to 250°C		251 to 500°C (*2)	
1	Body		FCD400	SCS13A	SCS14A	SCS13A	SCS14A
2	Flange		FCD400	SCS13A	SCS14A	SCS13A	SCS14A
3	Ball		SUS304 & SFNi		SUS316 & SFNi	SUS304 & SFNi	SUS316 & SFNi
4	Seat		SUS304 & ST		SUS316 & ST	SUS304 & ST	SUS316 & ST
4A	Seat Gasket		High intensity fiber reinforced expanded graphite			Expanded graphite & SUS316L	
5	Seat Spring		SUS316CSP or SUS316H			SUS316CSP or SUS316H (*3)	
7	Stem		SUS304 (*1)		SUS316 (*1)	SUS630 (H900)	
8	Gasket		NTF			Expanded graphite & SUS316L	
12	Packing		NTF			Wire reinforced expanded graphite	
12A	Bearing		NTF			-	
12B	Thrust Washer		NTF			SUS304CSP	
12C	Gland Flange		-			SUS304CSP	
15A	Gland Packing		SCS13A			SCS13A	
15B	Gland Packing Ring		SUS304			SUS304	
15C	Stem Bearing		NTF			-	
16	Travel Stop		SUS304			SUS304	
17	Lever		Standard Lever & Pipe			Standard Lever & Pipe	
17B	Retaining Ring		SUS304			SUS304	
18	Stud Bolt		SNB7	SUS304		SUS304	
18A	Nut		S45C	SUS303		SUS303	
19	Cap Screw		S45C	SUS304		SUS304	

\*1: DN15 and DN20 are of SUS329J1 \*2: 400°C is the maximum in oxidative atmosphere. \*3: Alloy X750 for over 351°C

2-Way Ball Valve

3-Way Ball Valve

V-Port Valve

Pneumatically Operated Valve

Electrically Operated Valve

Special Purpose Ball Valve  
High Temperature Ball Valve

Safety Instructions

## 6-2 Y-Shaped 3-Way Ball Valves

### Main Applications

- High abrasive fluid such as Powder and Slurry
- Solid etc such as pellet
- Usage of pigs or spheres for cleaning piping

### Features

#### 1 Wide Angle Body Shape

While normal 3-way ball valve has a 90 degrees angle, the 3-way ball valve has a wide angle of 135 degrees. It is suitable for high abrasive fluid, high viscous fluid or usage of pigs or spheres for cleaning piping.

#### 2 Flexible installation position

Straight type and 22.5 degrees type flanges are available. By the combination of these two types of flange at three ports of valve, various types of patterns are possible. (Refer to "Flange Application Model")

#### 3 Ball Design

Since the ball and the stem are integrated (fixed valve), the gap of angle at the valve face and the stem will not occur. In addition since the radius curvature of the ball port is 1.5 times than that of the bore, pressure loss is small and the damage of the ball can be minimized even in high abrasion fluid flow.

#### 4 Inlet Side Seal Mechanism

The spring at the seat rear side (rubber cushion for DN100 or less, metal spring for DN125 or more) provides excellent sealing even in heat cycle and pressure fluctuations. Moreover, since the sealing is done at inlet side, the functional deterioration by fluid flowing into the pocket can be minimized.

#### 5 O-Ring Seal

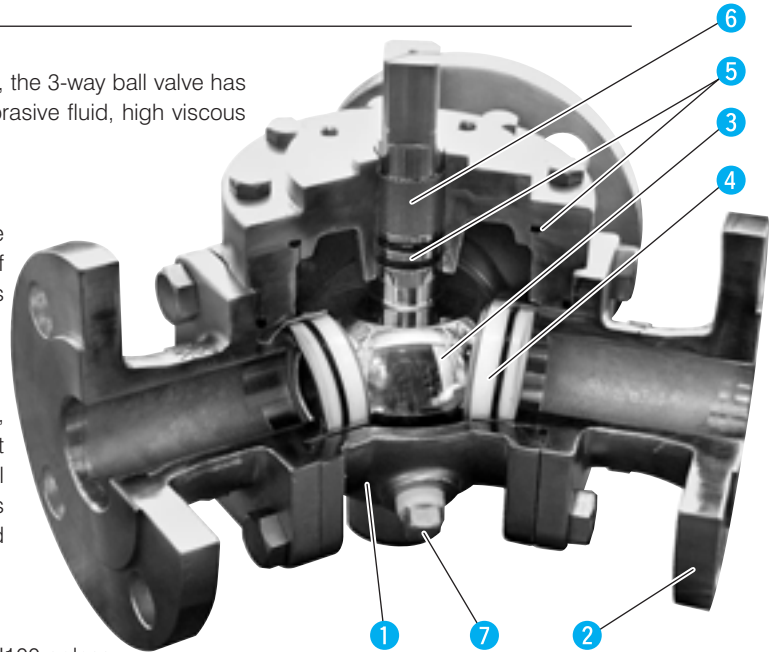
O-Rings used at each seal provide stable sealing performance and eliminates the need for periodical tightening.

#### 6 Stable Bearing Performance

Reinforced PTFE are used for the bearings for the shafts above and below the ball. This prevents galling and enables the valve to cope with very frequent operation.

#### 7 Purge hole

The body has two purge holes. They can be used for the prevention of fluid congestion by air charge, the leakage check for seat abrasion, and the purge of fluid remaining at pockets.



### Specification

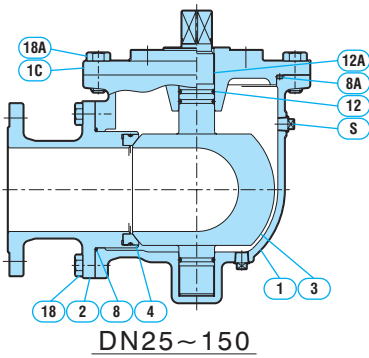
Items		Specification
Nominal Size (DN)		25 to 300
Connection		Flange Type JIS10K (*1), Class (ASME, JPI) 150 (*2)
Max. Working Pressure		1.4 MPa
Max. Working Temperature		150°C
Materials	Body	Body SCS13A, FCD400 (DN65 or more), SCS14A*, SCS16A*
	Ball	SCS13A, SCS14A*, SCS16A*
	Seat	Reinforced PTFE (CF), Semi-metal Seat (SM)*, Metal Seat (ST)*
Operation	Manual	Lever (up to DN150), Gear (DN200 or more)
	Automatic	Pneumtical (double acting only), Electrical, Hydraulic

\*Option: 1. Body Material: SCS14A, SCS16A

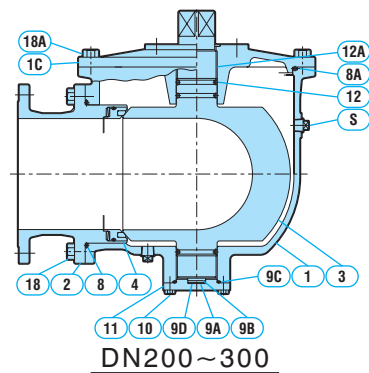
2. Hardening is treated on ball surface for semi-metal and metal seat.

\*1: JIS B2220 \*2: ASME B16.5

## Parts and Materials



DN25~150



DN200~300

Parts	Material	Remarks	
1	Body	SCS13A	
1C	Body Cover	SCS13A	
2	Body Connector	SCS13A	
3	Ball	SCS13A	
		SCS13A & Surface hardening for SM, ST Seat	
4	Seat	Refer to Seat Details described below	
4A	Seat Retainer (CFRS)	Refer to Seat Details described below	
4B	O-Ring	Refer to Seat Details described below	
4C	Shim	Refer to Seat Details described below	
5	Seat Spring	Refer to Seat Details described below	
8	O-Ring	NBR (FKM) *	
8A	O-Ring	NBR (FKM) *	
9A	Pivot	SUS304	DN200 to 300
9B	Thrust Washer	Reinforced PTFE	DN200 to 300
9C	O-Ring	NBR (FKM) *	DN200 to 300
9D	Shim	SUS316	DN200 to 300
10	Bolt	SUS304	DN200 to 300
11	Trunnion Cover	SUS304	DN200 to 300
12	O-Ring	NBR (FKM) *	
12A	Bearing	SUS316 & Reinforced PTFE	
18	Bolt	SUS304	
18A	Bolt	SUS304	
S	Plug	SUS304	

## Seat Details

	DN25 to 100		DN125 to 300		
	NTF, CF, GR	SM	CFRS, GRRS	SM	
Sketch					
Parts	Material				
4	Seat	Reinforced PTFE	SUS & Reinforced PTFE	Reinforced PTFE	SUS & Reinforced PTFE
4A	Seat Retainer	—	—	SUS304	—
4B	O-Ring	NBR, FKM *	NBR, FKM *	NBR, FKM *	NBR, FKM *
4C	Shim	SUS316	SUS316	—	—
5	Seat Spring	Silicone Rubber, FKM	Silicone Rubber, FKM	SUS329J4L	SUS329J4L

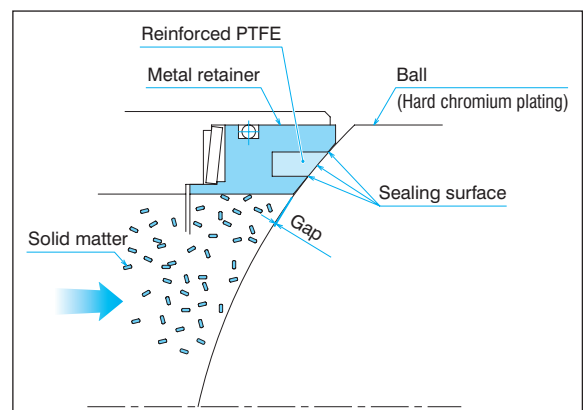
\* O-Rings are of FKM (fluororubber) when fluid temperature is more than 80°C

## Sealing Mechanism of SM (Semi-metal Seat)

Semi-metal seat has a structure that reinforced PTFE (CF: with carbon fiber, GR: with glass fiber) is inserted into metal retainer by hydraulic press and the gap between ball and metal retainer is designed to be minimum. (For CFRS and GRRS, reinforced PTFE is inserted by hand.) Therefore, solid matter in fluid can be blocked to enter into seal surface directly. In addition, even if a metal touch condition happens, the better sealing than normal metal touch condition can be maintained by metal-PTFE-metal triple seal.

Hard chromium plating is provided on the surface of ball considering abrasion resistance so that long lifetime can be attained without galling between ball and seat.

**Records of Main Fluid:** Corks powder, Resin pellet, CWM slurry



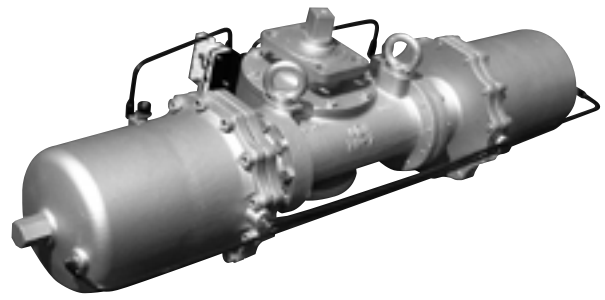
## WN Type Pneumatic Actuator

### Features

This actuator has been developed exclusively for 3-Way Ball Valve of which rotation angle is 135 degrees.

The actuator provides stable operation by applying simple rack and pinion design.

Maximum operating pressure is 0.7MPa.



### Specification

Code	Cylinder Volume (l)	Air Consumption (NI) (Operating press 0.4MPa)	Mass (kg)	Specification
WN-1N	0.94	4.6	11	<ul style="list-style-type: none"> <li>● Maximum Operating Pressure: 0.7MPa</li> <li>● Ambient Temperature: -10 to 60°C</li> <li>● Rotation Angle: 135°</li> <li>● Bore Size: Bore Size: Rc1/4 (WN-1N to WN-4N) Rc3/8 (WN-5N to WN-7N)</li> <li>● Painting: Silver (conforming to RoHS)</li> </ul>
WN-2N	2.2	10.8	18	
WN-3N	4.4	22	28	
WN-4N	8.0	40	47	
WN-5N	17	84	86	
WN-6N	33	162	156	
WN-7N	58	282	256	

### Actuator Selection Table

Unit: mm

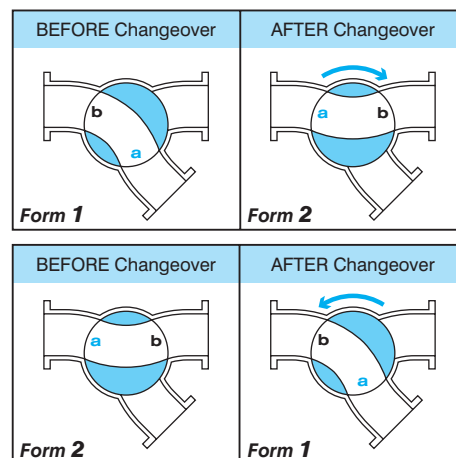
DN	Rank	Actuator Code		
		Pneumatic	Operating	
25	B	WN-1N		Lever
	C			
40	B	WN-2N		
	C			
50	B	WN-3N		
	C			
65	B	WN-2N		
	C			
80	B	WN-3N		
	C			
100	B	WN-4N		
	C			
125	B	WN-5N	Gear	
	C			
150	B	WN-6N	Lever	
	C			
200	B	WN-6N		
	C			
250	B	WN-7N	Gear	
	C			
300	B	WN-7N		
	C			
				(Operating Pressure 0.6MPa)

### Selection by Operating Condition (Rank)

Rank	Seat	Fluid (Example)
B	CF, CFRS	Oil, Sludge, Viscous Fluid (up to 500CP), Powder (Soft, not including solid matter)
C	SM	Powder (Hard/Soft, including solid matter), Slurry, High viscous fluid (Gum)

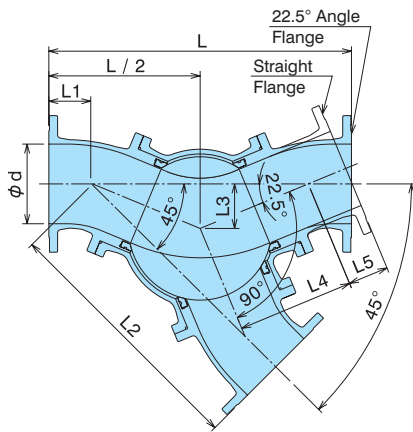
### Operation Form (Example)

Arrow direction below shows the movement from the position before changeover.



## Dimension

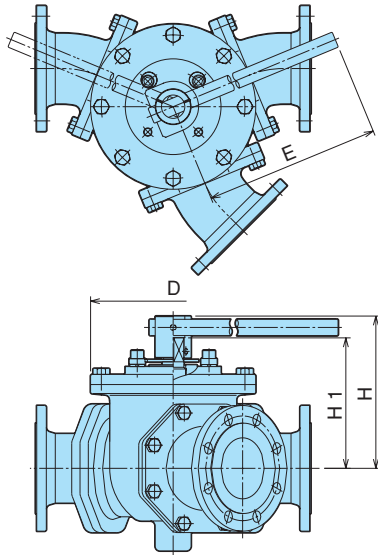
### Base Dimension



Unit: mm

DN	d	L	L1	L2	L3	L4	L5
25	25	230	50	180	27	70.4	44.6
40	38	250	51	199	31	80.1	44.9
50	51	280	56	224	35	90.9	49.1
65	64	320		264	43	112.6	47.4
80	76	360	69	291	46	120.1	59.9
100	102	460	76	384	64	166.7	63.3
125	127	530	84	446	75	195.9	44.1
150	151	580	73	507	90	234.9	30.1
200	200	760	110	650	111	292.2	47.8
250	249	800	86	714	130	339.7	60.3
300	298	1000	102	898	165	431.2	68.8

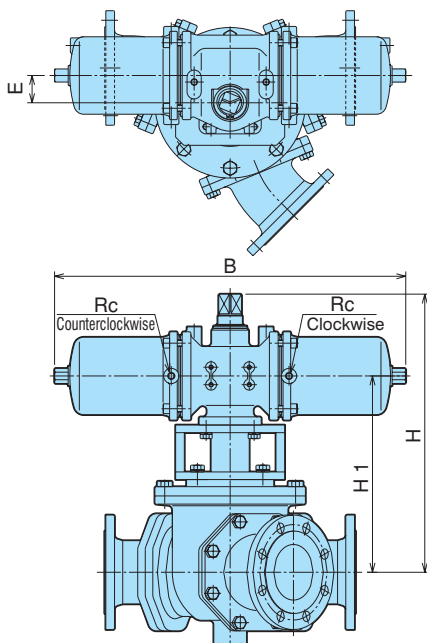
### Manually Operated Valve Dimension



Unit: mm

DN	D	H	H1	E
25	100	122	—	250
40	130	152	—	350
50	156	163	—	350
65	190	198	—	670
80	212	212	—	670
100	276	255	—	970
125	320	271	—	1350
150	366	292	—	1350
200	476	—	328	—
250	534	—	393	—
300	634	—	422	—

### Pneumatically Operated Valve Dimension



Unit: mm

DN	Actuator Code	H	H1	B	E	Rc
25	WN-1N	246	171	464	31	1/4
40	WN-1N	271	196			
50	WN-2N	316	216	520	39	
	WN-2N	327	227			
65	WN-2N	348	248	520	39	
	WN-3N	373	266			
80	WN-3N	386	279	624	45	
	WN-4N	430	300			
100	WN-4N	484	354	828	65	
	WN-5N	520	380			
125	WN-5N	542	402	916	72	
	WN-5N	563	423			
150	WN-6N	674	440	1204	90	
	WN-6N	742	508			
200	WN-7N	773	530	1558	122	
250	WN-7N	844	601			
300	WN-7N	874	631			

2-Way Ball Valve

3-Way Ball Valve

V-Port Valve

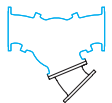
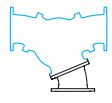
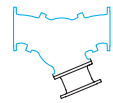


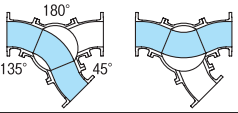
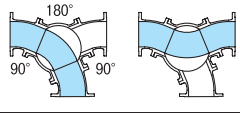
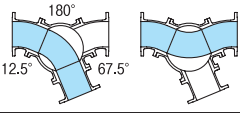


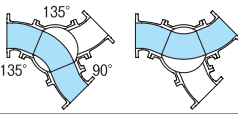
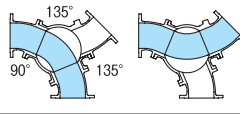
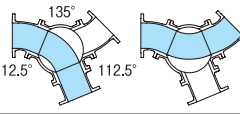
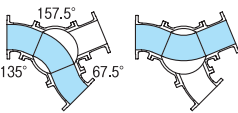
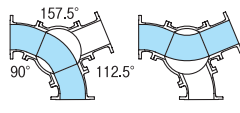
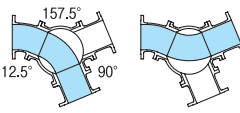


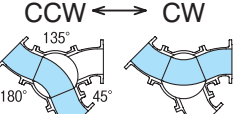
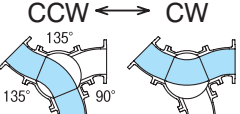
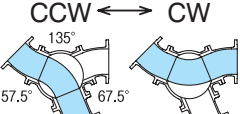


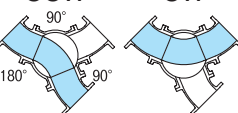
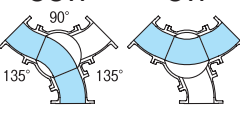
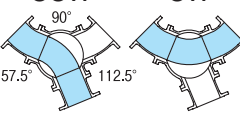
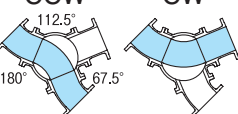
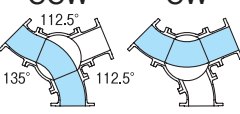
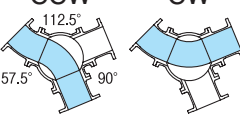


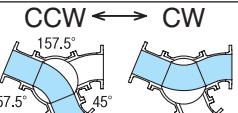
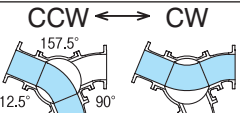
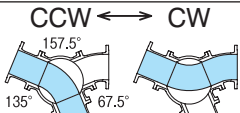
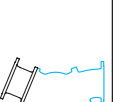
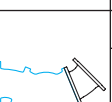
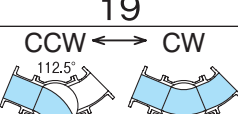
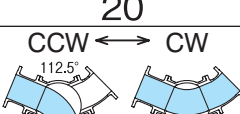
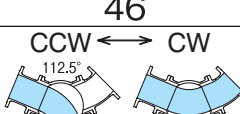
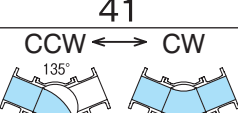
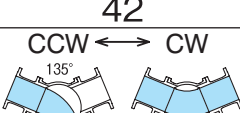
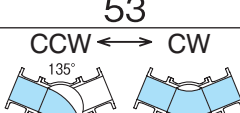
Pneumatically Operated Valve

Electrically Operated Valve

Special Purpose Ball Valve  
Y-Shaped 3-Way Ball Valve

Safety Instructions

Pattern (Flange Application Model)

						
		No.	<b>01</b>	<b>02</b>	<b>25</b>	
		Combination	CCW ↔ CW 	CCW ↔ CW 	CCW ↔ CW 	
		No.	<b>03</b>	<b>04</b>	<b>26</b>	
			Combination	CCW ↔ CW 	CCW ↔ CW 	CCW ↔ CW 
			No.	<b>21</b>	<b>22</b>	<b>43</b>
			Combination	CCW ↔ CW 	CCW ↔ CW 	CCW ↔ CW 
			No.	<b>05</b>	<b>06</b>	<b>27</b>
			Combination	CCW ↔ CW 	CCW ↔ CW 	CCW ↔ CW 
			No.	<b>07</b>	<b>08</b>	<b>28</b>
			Combination	CCW ↔ CW 	CCW ↔ CW 	CCW ↔ CW 
			No.	<b>23</b>	<b>24</b>	<b>44</b>
			Combination	CCW ↔ CW 	CCW ↔ CW 	CCW ↔ CW 
			No.	<b>17</b>	<b>18</b>	<b>45</b>
			Combination	CCW ↔ CW 	CCW ↔ CW 	CCW ↔ CW 
			No.	<b>19</b>	<b>20</b>	<b>46</b>
			Combination	CCW ↔ CW 	CCW ↔ CW 	CCW ↔ CW 
			No.	<b>41</b>	<b>42</b>	<b>53</b>
			Combination	CCW ↔ CW 	CCW ↔ CW 	CCW ↔ CW 



**6-3 Ball Valve for Shield Tunneling Method**

**Features**

- Valves for Shield Tunneling Method have abundant supply records.
- Compact and robust design.
- Lever, Gear, Ratchet lever, Hydraulic and Pneumatic operation are applicable.

**Specification**

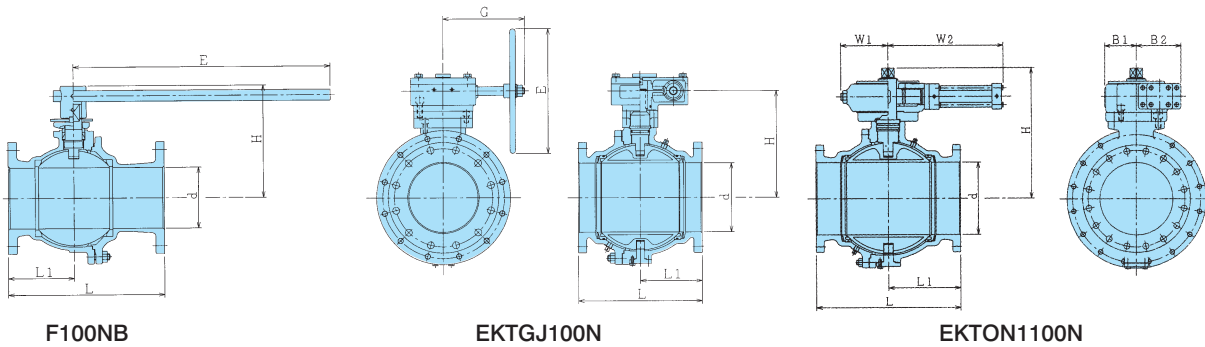
**Manual Operation Type**

Type	Lever		Gear		Ratchet Lever	
Ball	Floating		Floating	Trunnion	Floating	Trunnion
Valve Code	F104NB	ET101N	ETGH101N	EKTGJ101N	ETGRH101N	EKTGRH101N
DN	DN65 to 100	DN125 to 200	DN125 to 200	DN250 to 350	DN125 to 200	DN250 to 350
Materials	Body: FC200 (FCD400 for up to DN100)					
	Ball: SCS13 (Hard chromium plating)					
	Seat: Reinforced PTFE					

**Automatic Operation Type**

Type	Hydraulic			Pneumatic
Ball	Floating		Trunnion	Trunnion
Valve Code	FTON1104NB	ETON1101N	EKTON1101N	EKTPN1101N
DN	DN65 to 100	DN125 to 200	DN200 to 350	DN200 to 350
Operating Pressure	21 MPa			0.4 to 0.7 MPa
Materials	Body: FC200 (FCD400 for up to DN100)			
	Ball: SCS13 (Hard chromium plating)			
	Seat: Reinforced PTFE			

**Dimension**



Unit: mm

Nominal size DN	Lever			Gear				Hydraulic								
	d	L	L1	E	H	Mass (kg)	E	G	H	Mass (kg)	W1	W2	B1	B2	H	Mass (kg)
65	64	190	87	350	135	13.5	—	—	—	—	108	272	74	110	211	25.0
80	76	203	97		145	16.5	—	—	—	—					221	28.0
100	102	229	115		450	180	27.0	—	—	—					248	38.5
125	127	290	145	650	260	57.0	280	160	250	84.0	153	379	106	148	304	80.0
150	152	330	165		280	72.0			270	98.0					324	96.0
200	203	400	200		800	350			110.0	315					200	325
250	250	450	225	—	—	—	450	295	385	280.0	195	458	130	184	464	260.0
300	300	600	300	—	—	—	560	375	415	430.0					541	390.0
350	335	700	350	—	—	—			440	620.0					225	528

## 6-4 Top Entry Ball Valve (T100S/H)

### Features

Top entry type is that ball and seat can be taken out from the top of the valve. Welding connection is possible and the maintenance is easy. The valve is suitable for hazardous fluid or precious fluid of which leakage to the outside is not allowed.

### Specification

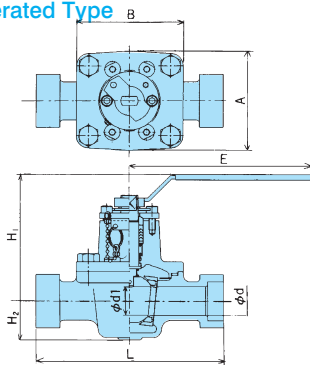
		Valve Type	
		T100S	T100H
Nominal Size (DN)		8 to 100	
Pressure Class		CL150	CL300
Connection		SW (Socket Weld), BW (Butt Weld)	
Max. Working Pressure		1.4 MPa	2.1 MPa
Max. Working Temperature		100°C	150°C
Materials	Body	SCS13A, SCS14A, SCS16A, SCS19A	
	Ball	SUS304	
	Seat	PTFE	Reinforced PTFE
	Packing	Reinforced PTFE	
		FKM (O-Ring)	FKM or Perfluorogum (O-Ring)
Gasket	SUS304 & Expanded graphite (Spiral wound type)		



T100S Lever Operated Type

### Dimension

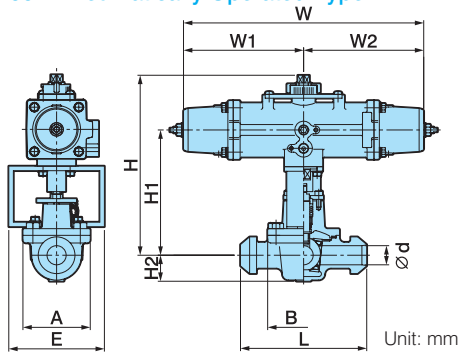
#### T100S Lever Operated Type



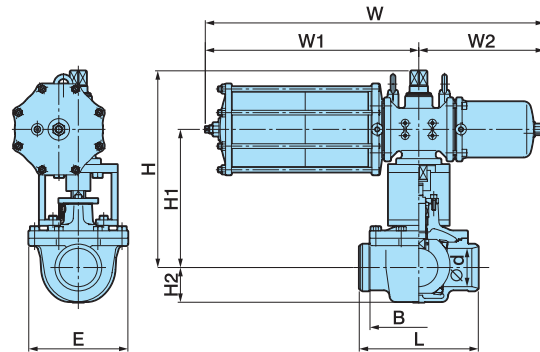
Unit: mm

DN	d	L	H1	H2	A	B	E	Mass (kg)
8	8	108	75	20	52	56	100	0.9
10	10		95	23	65	68	130	
15	13	117	99	26	69	71		160
20	19		114	32	86	90	230	
25	25	165	148	42	116	119		350
40	38		158	53	177	157		
50	51	216	169	63	187	184	450	11.0
65	64		172	73	208	206		
80	74	283	223	95	256	252	350	21.0
100	98		172	73	208	206		

#### T100H Pneumatically Operated Type



Unit: mm



DN	d	L	H	H1	H2	A	B	E	Actuator			Mass (kg)	
									Code	W	W1		W2
8	8	108	182	125	20	52	56	70	PO-04DN	212	106	106	2.5
10	10		200	136	23	65	68	80	PO-05DN	268	134	134	
15	13	117	217	145	26	69	71		100	PO-06DN	314	157	157
20	19		240	168	32	86	90	130		PO-08DN	392	196	196
25	25	165	293	212	42	116	119		160	PO-10DN	500	250	250
40	38		348	243	55	177	157						
50	51	216	403	284	63	189	186	160	PO-12DN	634	317	317	46.0
65	64		413	294	73	208	206						
80	74	283	510	360	95	256	256	252	PO-13D	869	547	322	115.0
100	98		360	95	256	256							

# 7

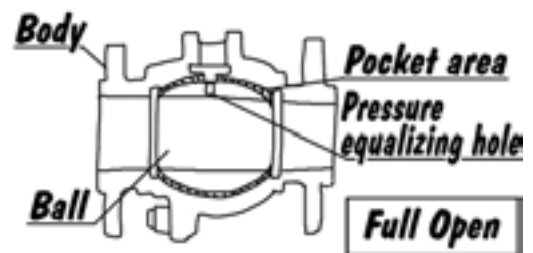
## Safety Instructions

---

# Safety Instructions

## 1. Selection of Valves

- 1 Usable ranges for products described on this brochure are limited according to the domestic/international code and standard and NDV standard. Appropriate products must be selected after confirming the usage conditions (fluid, pressure, temperature etc.).
- 2 Materials for the main parts of valves must be selected properly considering working conditions (fluid, temperature etc.).
- 3 Please specify degrease or water proof when issuing order. (Oil-free and/or water-free specification is not available for some modes. Also, note in case O-ring are equipped inside the valve, valve need to be coated with a small amount of lubricating oil. Please consult with NDV or local representative.)
- 4 Soft seat floating ball valve must be used at full open/close position. Usage at intermediate position may cause damages of the surface of ball and/or seat.
- 5 Because of the structure of ball valve, abnormal pressure rise at pocket (\*) occurs if the fluid is liquid and the temperature fluctuates. Ball top is provided with a hole to prevent this abnormal pressure rise. The alternative countermeasure should be taken in case the abnormal pressure rise happens by temperature rise at the pocket during valve full closing. Please consult with NDV or local representative if the case occurs.



\* During valve full OPEN: Space between ball and shell

During valve full CLOSE: Space between ball and shell, Ball bore portion

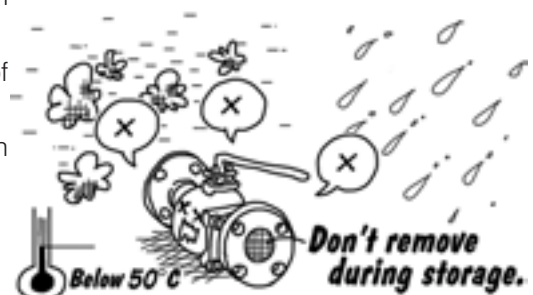
- 6 Floating ball valve has a mechanism to seal by pushing ball against the seat of the outlet side with fluid pressure. Please consult with NDV or local representative in case that the pressure change is large in operation condition because seat leakage may occur at low pressure operation.
- 7 Please consult with NDV or local representative in case that fluid includes abrasive matter because an abrasion may occur at seat, body or other parts of valve.

## 2. Receipt and Carriage

- 1 Wrapping and packing conditions, products condition and number of goods must be checked and confirmed at the time of the receipt.
- 2 Delivered goods may be heavy depending on the bore size. Unloading and carriage must be done using proper machines and tools according to the relevant law for safety and health. Do not go under lifted goods, do not insert hand or leg below goods and do not operate lifting machine under the lifted goods.
- 3 If packing is by corrugated board, the packing strength will become low when wetted. Handling must be carefully done if the corrugated board is wet.

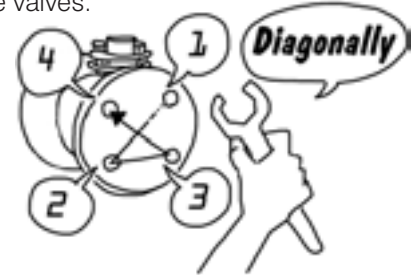
## 3. Storage

- 1 It is recommended to store products under packing condition until installing them to piping.
- 2 If products are stored for some time after unpacking, dust proof seal (cap) at flange face must not be removed.
- 3 Products must be stored under below mentioned conditions in order to avoid rust and/or degradation of materials.
  1. To protect from rain or water
  2. Ambient temperature must be below 50°C.  
(The temperature might be different by installed accessories.)
  3. To avoid high humidity and dust atmosphere



## 4. Installation to Piping

- 1 Remove dust proof seal (cap) at connection flange face and confirm that there are no dusts and/or deposits inside. Confirm also that there are no foreign materials inside of the piping after cleaning. Blow off by air or flush by fluid if necessary.
- 2 Ball valves have not a restriction for the flow direction. Install valves to piping considering the position of operation handle and the other necessary issues for safety operation. If flow direction is marked on the valve for some reason such as a protection of abnormal pressure rise, install as directed by the mark.
- 3 Keep a space for overhauling. The space needs necessary area for lifting a complete set of the valve.
- 4 Valves are delivered at full open position unless otherwise specified. Install valves keeping full open position.
- 5 Install valves avoiding strong tension, compression or bending stress to the valves.
- 6 When installing valves, bolts for installation must be tightened diagonally and equally. Unbalanced tightening may cause leakages from connection flanges.
- 7 Confirm that tightening bolts and nuts are not loosened. Retighten them if loosened.
- 8 After installing valves, blowing off by air or flushing by fluid at full open valve condition must be done to clean foreign materials in piping. (Do not close and open valve during blowing off or flushing.)



## 5. Operation

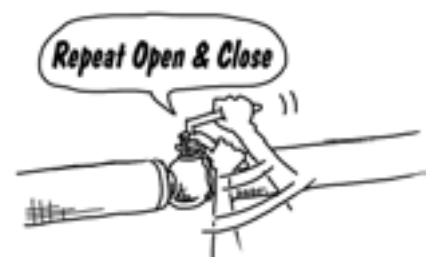
- 1 Do not operate valve with excessive torque by attaching a pipe or a wrench to the lever handle for opening or closing.
- 2 Never put fingers or hands into the inside of valve.
- 3 If there is any leakage from the gland, tighten further the gland bolt. If valve is used for fluid of large temperature change, degree of stress relief of packing is large and therefore, retightening must be done after the temperature once becomes high and falls to low.
- 4 Products may be damaged if remaining fluid in the valve is frozen. If there is a possibility of frozen, heat piping line or clean the inside of valves.

## 6. Pneumactical and Electrical Actuator

- 1 Air vent and electric wiring terminal are fitted with seals. Do not remove the seals until installation to the connections.
- 2 Actuators are delivered after adjustment. Do not disassemble or readjustment. Call NDV or local representative, if some adjustment seems necessary.
- 3 Use air dehumidified and cleaned by filtration.
- 4 Operating pressure and power source must be confirmed by the plate attached to the valve and/or the specification.
- 5 Take care that rain or water will not enter from air hole of the actuator.

## 7. Disassembling and assembling

- 1 Before remove a valve from piping, discharge the fluid in the piping and relieve the pressure. In this occasion, the valve must be opened and closed several times to relieve the pressure in the valve. Special attention must be given if the fluid is hazardous like poisonous or abrasive fluid.
- 2 Be careful not to damage the seal part of ball surface and flange face during disassembling and assembling.







● The ISO 9001 · 14001 certified

 **CAUTION**

Specifications and performance figures of products contained in this catalog are on the design calculations, in-house tests, actual records of product application, and the official standards and specifications. They are presented as the user guide on the use of product concerned under general service conditions. Users intending to use the product under a special condition are required to receive engineering advice from this company in advance or to make their own studies and evaluation to verify performance on their own responsibility. This company shall not be liable for any damages, material or human, that may arise without following this procedure. In as much as full care was taken in editing this catalog, users are kindly requested to make contact with this company for any questions or discrepancies found. This catalog is subject to change without notice for the purpose of correcting error, supplementing or improving insufficient content, updating the content to the improved product performance, design change, discontinuation of product and other reasons. Revised version automatically invalidates catalogs issued prior to the current version. Check the version with our Sales Dept. or local representative before you place orders.

 **WARNING**

 **CAUTION**

There are several points to be noticed for the use of ball valve based on the structural characteristics. When valve is delivered, a leaflet for Safety Instructions is in the package. Please read this instruction thoroughly before handling and use of products in order to use them safely and stably for a long time.

# **NDV** NIPPON DAIYA VALVE CO., LTD.

**Head Office:** 1-3-22, Hiro-machi, Shinagawa-ku, Tokyo 140-0005

**TOKYO Sales Department:** Tel. TOKYO (03)3490-4801 Fax. TOKYO (03)3490-7950

**INTERNATIONAL Sales Department:** Tel. TOKYO (03)5434-5330 Fax. TOKYO (03)5434-5331

**NAGOYA Branch:** 3-2108, Nakajima-shincho, Nakagawa-ku, Nagoya-shi, Aichi 454-0932

Tel. AICHI (052)354-3171 Fax. AICHI (052)354-3174

**OSAKA Branch:** Takakura Bldg., 2-5-9, Awaji-machi, Chuo-ku, Osaka-shi, Osaka 541-0047

Tel. OSAKA (06)6203-7721 Fax. OSAKA (06)6222-5895

**OKAYAMA Branch:** Ima 8-chome, No.2 Bldg., 3-35, Ima 8-chome, Kita-ku, Okayama-shi, Okayama 700-0975

Tel. OKAYAMA (086)241-2669 Fax. OKAYAMA (086)244-3540

**KITA-KYUSHU Branch:** 2-2-4, Tate-machi, Kokurakita-ku, Kitakyushu-shi, Fukuoka 803-0818

Tel. FUKUOKA (093)571-2438 Fax. FUKUOKA (093)591-3277

<http://www.ndv.co.jp>