

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

2-Way Ball Valve

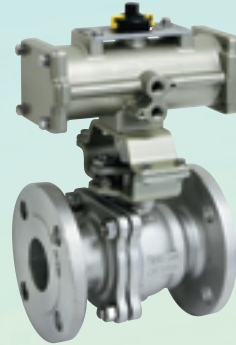
Fire Safe Ball Valve



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

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	Fire Safe Type:		E□4300N-T3/L3
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2-Way Ball Valve

2-Way Ball Valve Structure and Features

Sealing Mechanism

Reference for Seat Selection

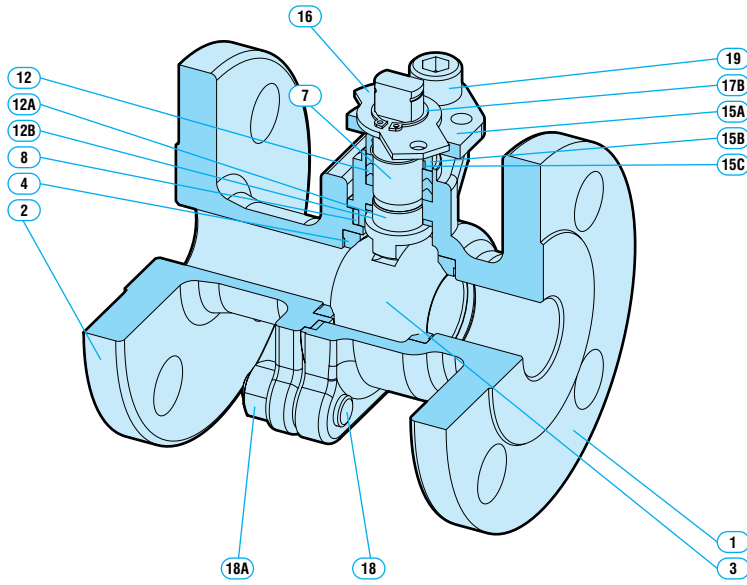
1-1. Fire Safe Ball Valve: F100NB

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



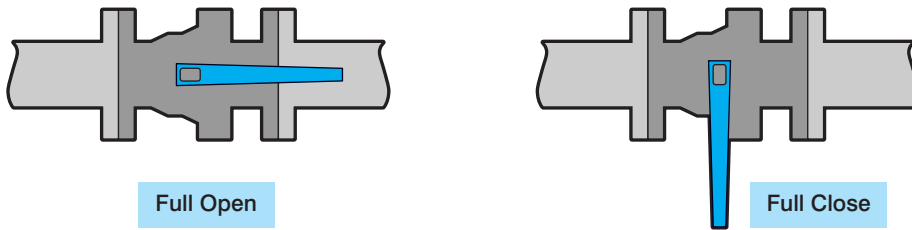
1	Body
2	Cap
3	Ball
4	Seat
7	Stem
8	Gasket
12	Packing
12A	Bearing
12B	Thrust Washer
15A	Gland Flange
15B	Gland
15C	Bearing
16	Travel Stop
17B	Retaining Ring
18	Stud Bolt
18A	Nut
19	Cap Screw

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

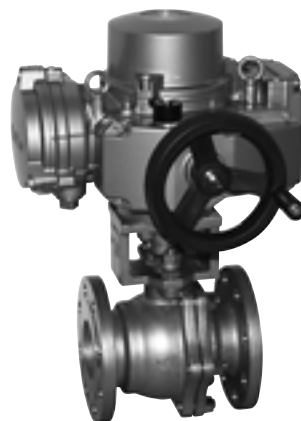
Since resins such as PTFE are used for valve seat, sealing is superior and fluid can be stopped easily.

4 Easy Attachment of Actuator

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



Pneumatically Operated Valve



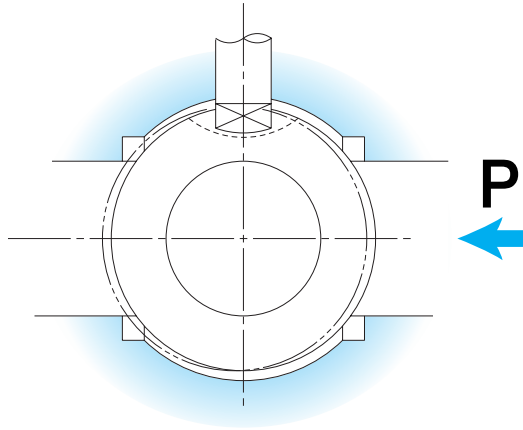
Electrically Operated Valve

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.

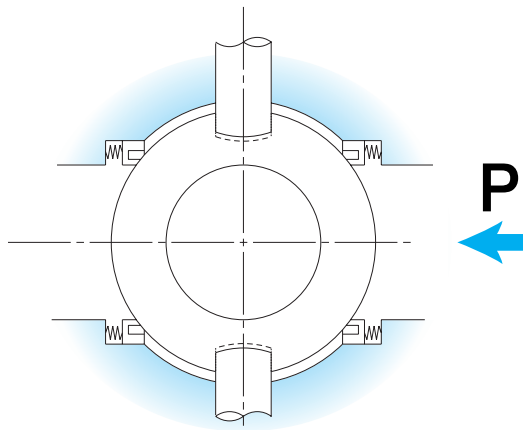
Floating Ball types are applicable for low pressure use (up to JIS 20K, CL300) and Smaller bore valves (up to DN200).



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.

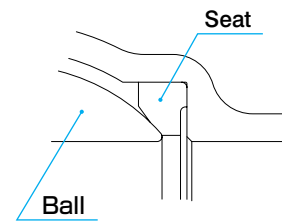
Trunnion types are applicable for high pressure use (JIS 30K, CL600 or more) or large bore valves (DN250 or more).



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

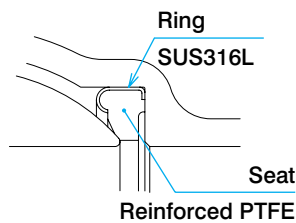
Material: Reinforced PTFE with Carbon Fiber **Features:** Superior in Less abrasion to PTFE

•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.

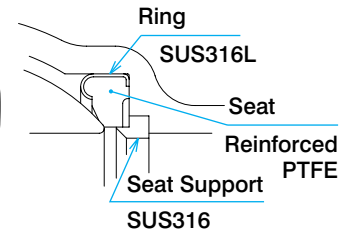
**CFM (GRM)**

Material: NCF (NGR) reinforced by 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

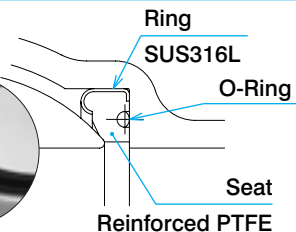
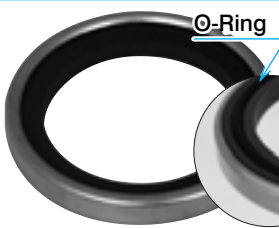
**CFMR (GRMR)**

Material: CFM (GRM) reinforced by inside metal ring

Features: Wider ranges of use than CFM (GRM)

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

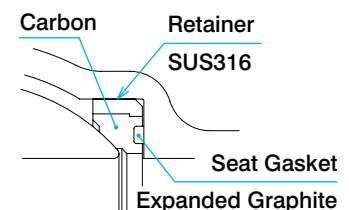
•Color: CFMR Black (resin portion) / GRMR White (resin portion) •Max. Working Temperature: 240°C (may change by working condition) •Applications: Steam, Sludge, Slurry, Powder

**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

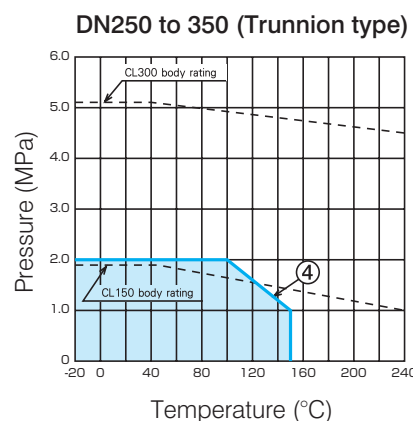
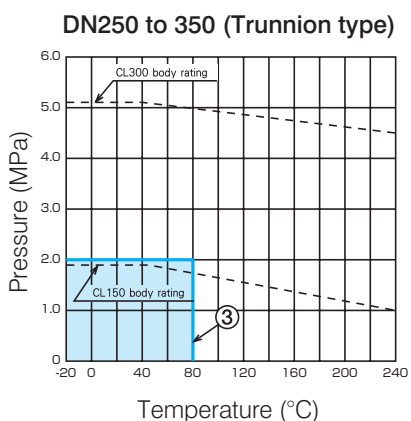
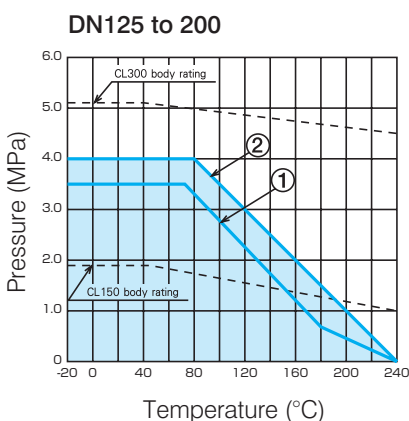
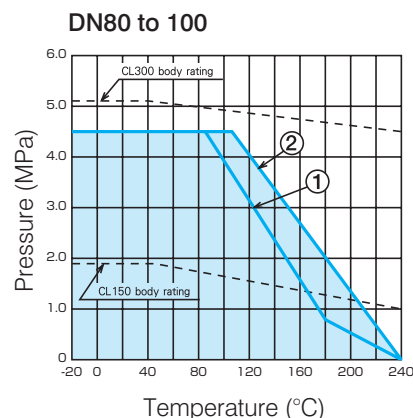
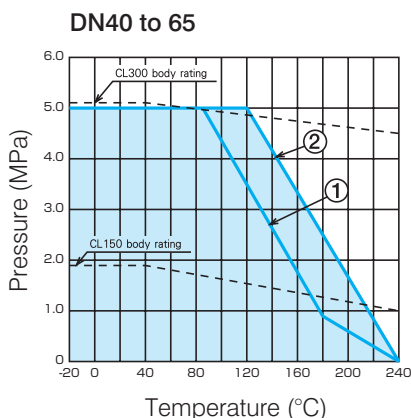
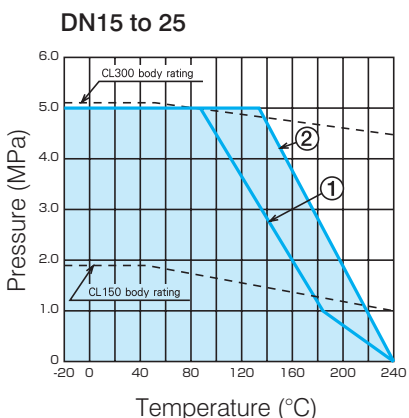
Features: Rigidity is high and suitable for use of valve with intermediate open and flow control.

•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

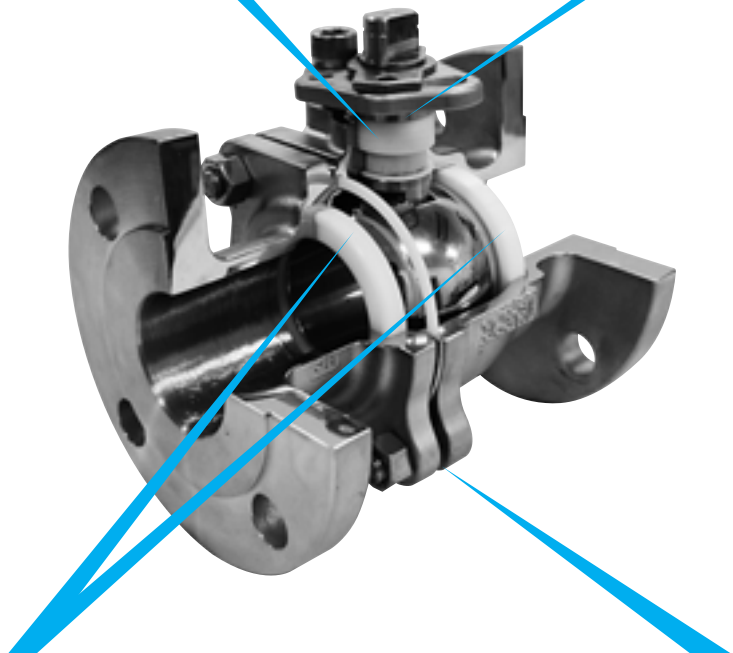
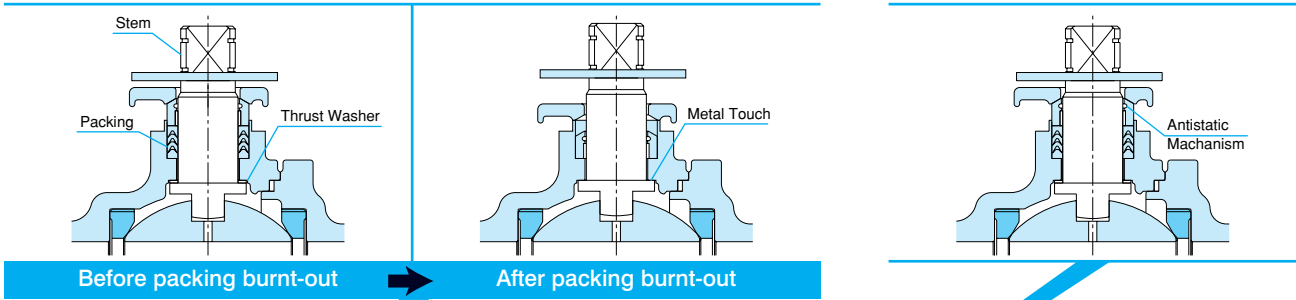
Fire Safe type mechanism is to minimize fluid leakage by producing metal shut-off when seal parts such as seats and packings are burned out by fire.

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.

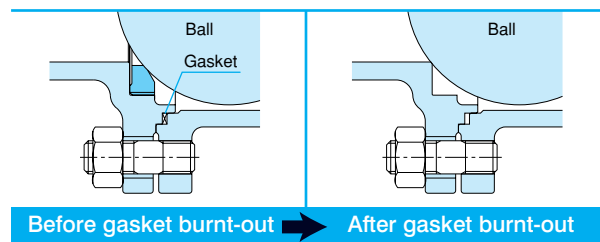
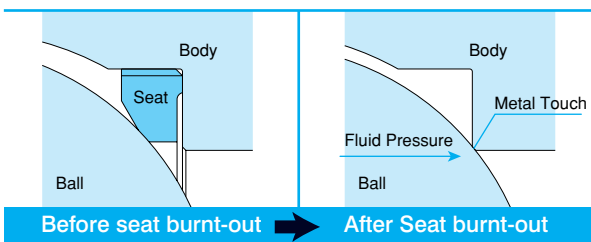


Seat

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.



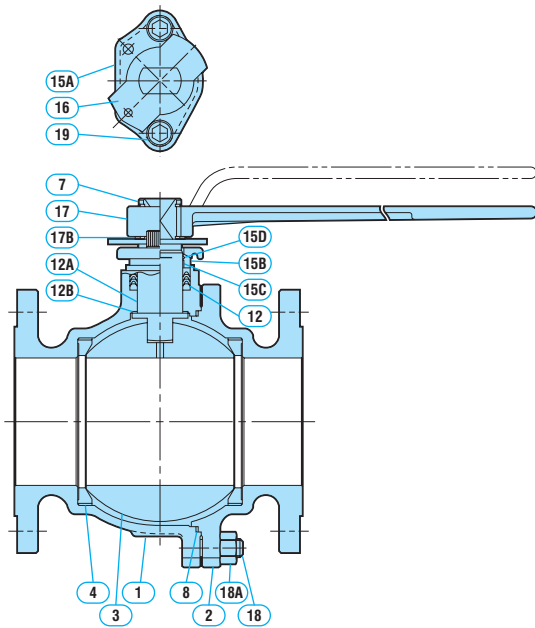
Specification

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



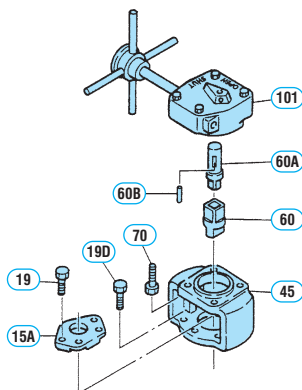
Parts	Material			
	F104NB	F107NB	F112NB	F113NB
1 Body	FCD400	SCS13A	SCS14A	SCS16A
2 Cap	FCD400	SCS13A	SCS14A	SCS16A
3 Ball	SCS13A or SUS304	SCS13A or SUS304	SCS14A or SUS316	SCS16A or SUS316L
4 Seat	NTF, NCF, etc.			
7 Stem	SUS304	SUS304	SUS316	SUS316L
8 Gasket	New-PTFE			
12 Packing	New-PTFE			
12A 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	Cap Screw	SUS304
19D	Set Screw	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

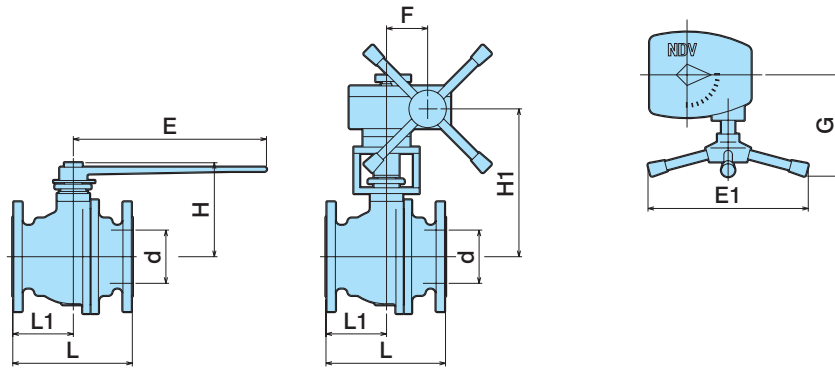
J10KRF	JIS 10KRF
J20KRF	JIS 20KRF
A150RF	ASME CL150
A300RF	ASME CL300

* Improvement Identification Code

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

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.

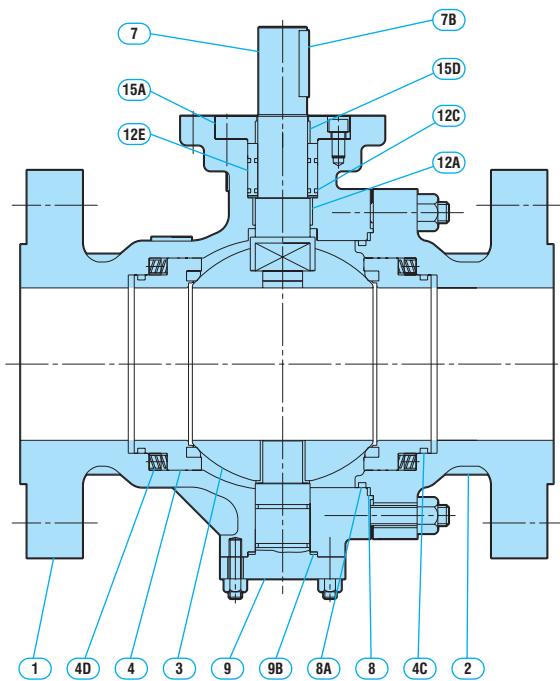
Large Bore valve: DN250 or more.



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

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

Parts and Materials (Reference)



Parts	Material			
1 Body	SCPH2	SCS13A	SCS14A	SCS16A
2 Cap	SCPH2	SCS13A	SCS14A	SCS16A
3 Ball	SCS13A		SCS14A	SCS16A
4 Seat	Carbon Reinforced PTFE			
4C O-Ring	NBR	FKM		
4D Spring	SUS304WPB		Inconel X-750	
7 Stem	SUS304		SUS316	SUS316L
7B Key	S45C-H			
8 Gasket	SUS304 & Expanded Graphite		SUS316 & Expanded Graphite	
8A O-Ring	NBR	FKM		
9 Trunnion	SCS13A		SCS14A	SCS16A
9B Gasket	SUS304 & Expanded Graphite		SUS316 & Expanded Graphite	
12A Bearing	SPCC *	SUS316 & PTFE		
12C O-Ring	NBR	FKM		
12E Sleeve	SUS304		SUS316	SUS316L
15A Gland	S20C	SUS304		
15D Bearing	SPCC *			

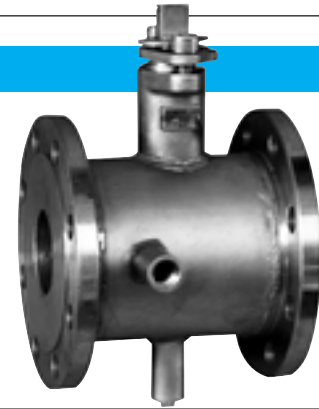
* SPCC (Galvanized) & PTFE coating

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

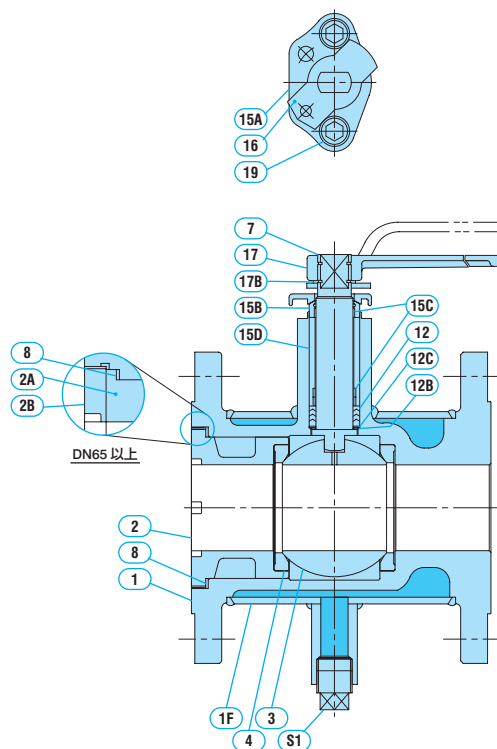
E100JNC type | Full Port | Floating Ball Valve

Nominal Size	DN15 to 200	
Connection	Flange JIS10K, 20K (*1) Class (ASME, JPI) 150,300 (*2)	
Body Material	SCS14 (CF8M), SCS16A (CF3M) • Flange is oversized (refer to Dimension of E100JNC at page 17) • JIS20K, CL300 are available up to DN100.	
Ball Material	SCS14A (SUS316), SCS16A (SUS316L)	
Seat Material	NTF, NCF, NGR, CFM, CFMR, CFMO (refer to page 10)	
Operation Type	Lever, Gear, Pneumactical, Electrical	
Jacket	Max. Pressure	1.0MPa
	Max. Temperature	250°C
	Connection	2-Rp (Parallel pipe thread)
	Discharge (Lower Plug)	1-Rp (Parallel pipe thread)

The other special specifications are available upon request.

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

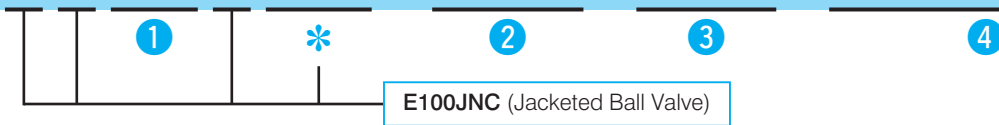
Parts and Materials



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

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

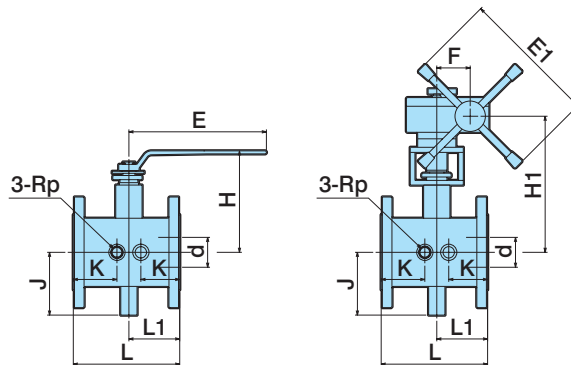
J10KRF	JIS 10KRF
J20KRF	JIS 20KRF
A150RF	ASME CL150
A300RF	ASME CL300

* Improvement Identification Code

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

Dimension

E100JNC



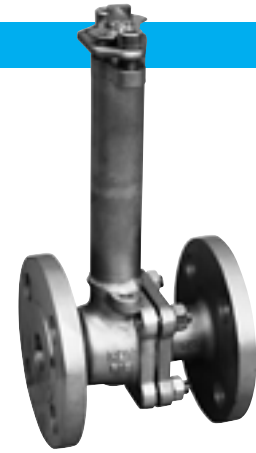
Unit: mm

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.



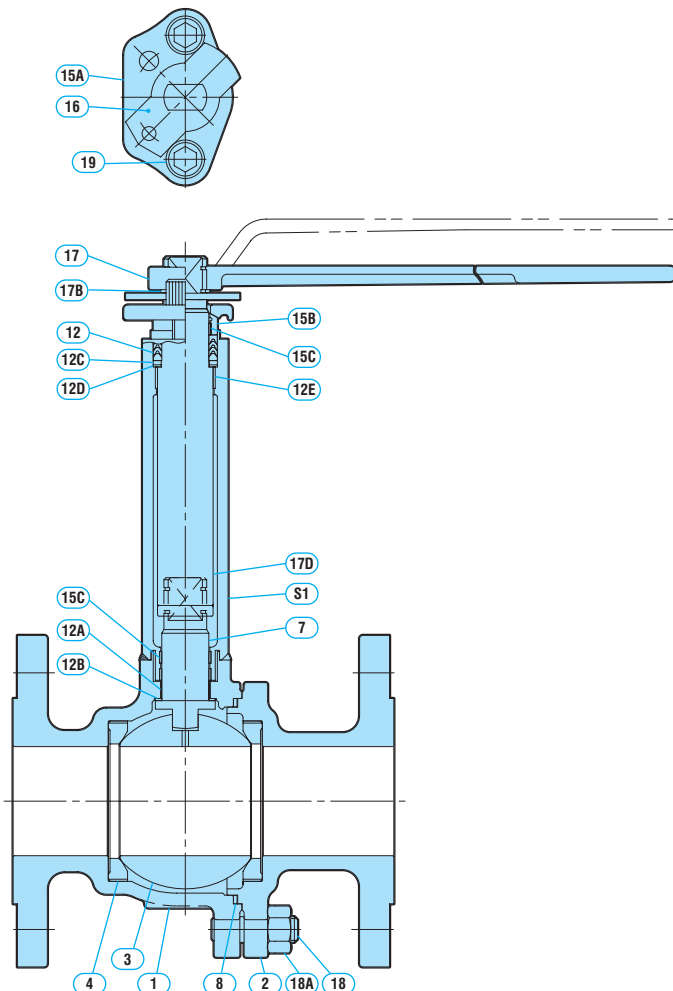
Specification

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		
16 Travel Stop	SUS304		
17 Lever	SCPH2		
17B Retaining Ring	SUS304		
17D Extended Rod	SUS304	SUS316	SUS316L
18 Stud Bolt	SUS304		
18A Nut	SUS304		
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

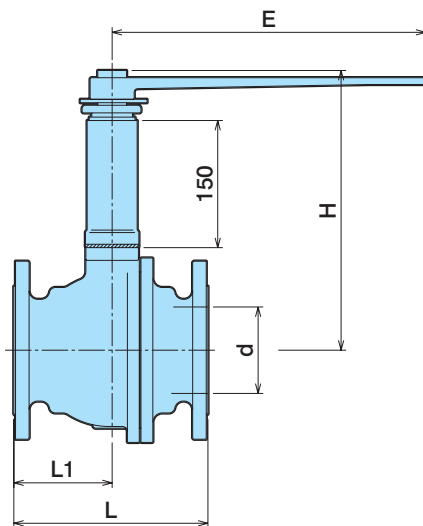
* Improvement Identification Code

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

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	130	130	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	230	230	10.0	11.9
65	64	190	241	87	103	285	350	350	16.0	20.0
80	76	203	283	97	124	295	350	350	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	53.0	66.8
150	152	394	403	173	178	430	650	800	67.0	81.8

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

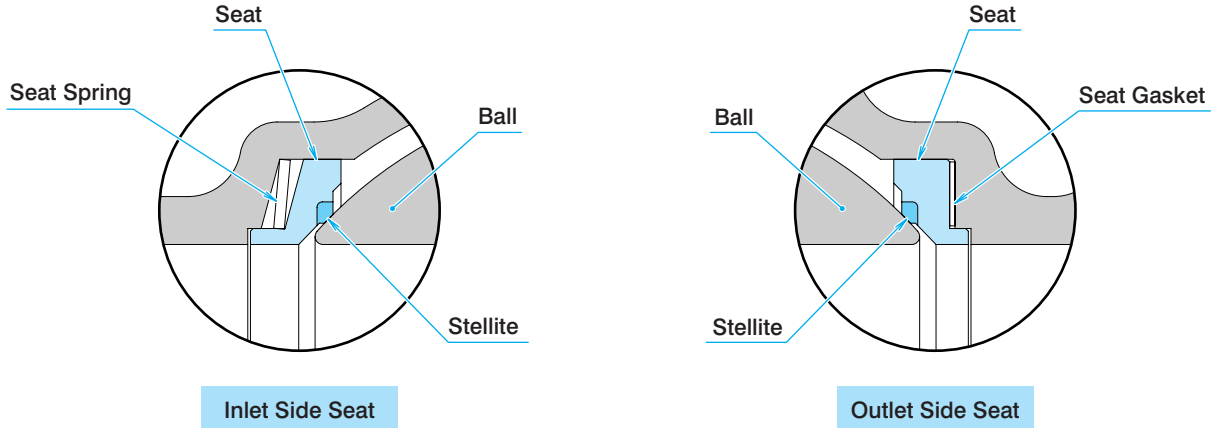
6-1 High Temperature Ball Valve

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

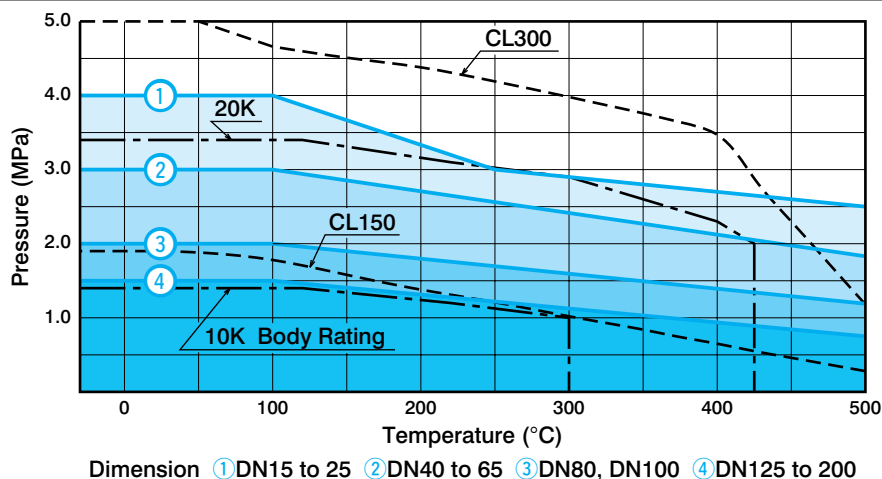
Allowable Seat Leakage

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

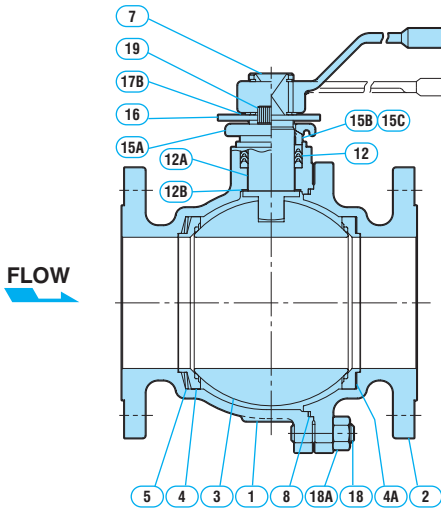
Allowable Leakage of hydraulic pressure is according to ASME B16.104 Class V.

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.

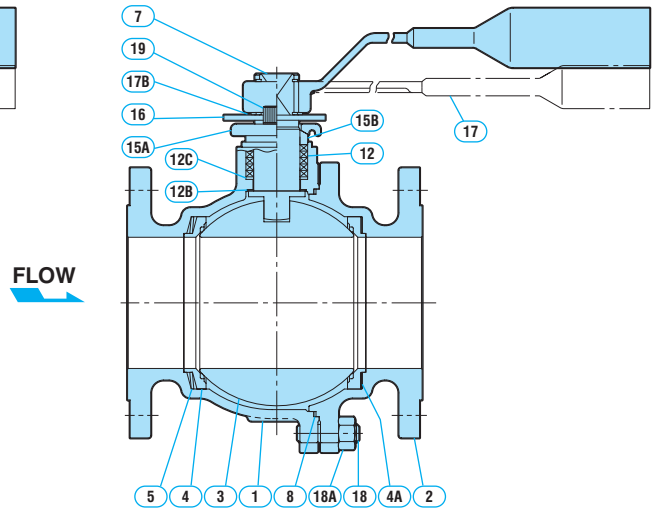
Working Pressure and Temperature Range



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: Inconel 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, 54 piping 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

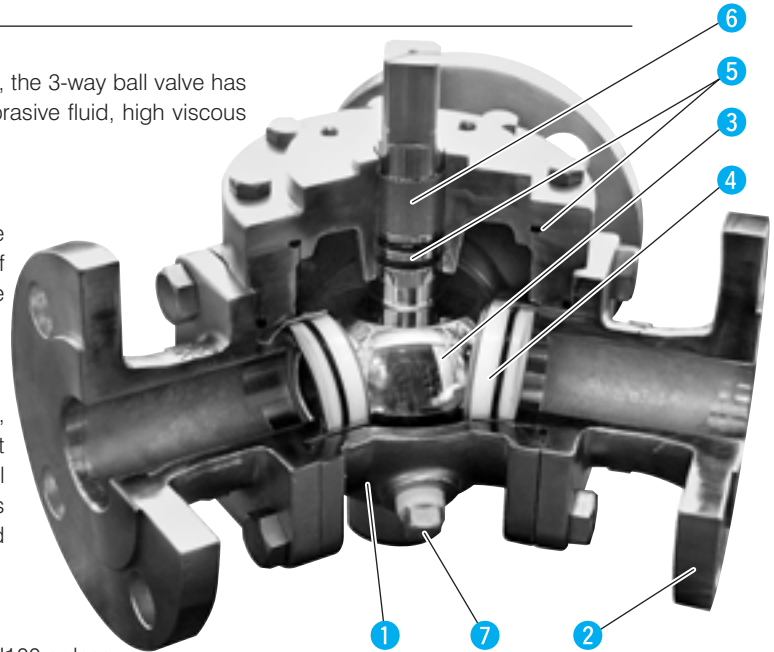
O-Rings used at each seal provide stable sealing performance and eliminates the need for periodical tightening.

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

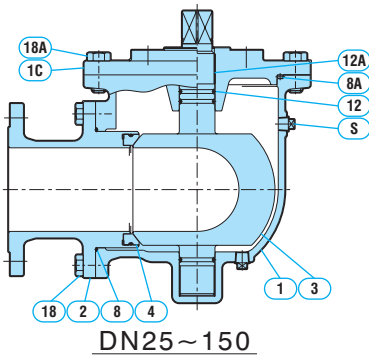
Items		Specification
Nominal Size (DN)		25 to 300
Connection		Flange Type JIS10K (*1), Class (ASME, JPI) 150 (*2)
Max. Working Pressure		1.4 MPa
Max. Working Temperature		150°C
Materials	Body	Body SCS13A, FCD400 (DN65 or more), SCS14A*, SCS16A*
	Ball	SCS13A, SCS14A*, SCS16A*
	Seat	Reinforced PTFE (CF), 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

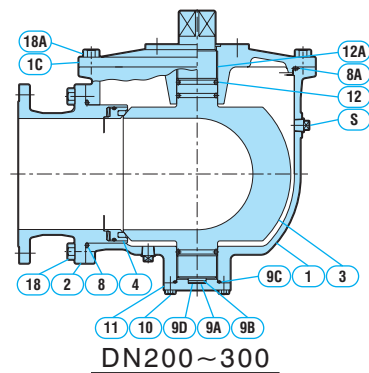
2. Hardening is treated on ball surface for semi-metal and metal seat.

*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

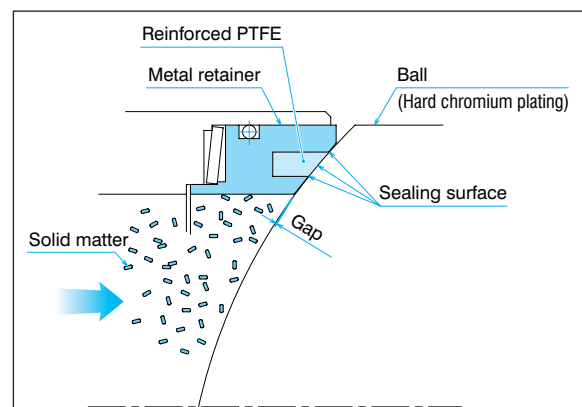
* O-Rings are of FKM (fluororubber) when fluid temperature is more than 80°C

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.

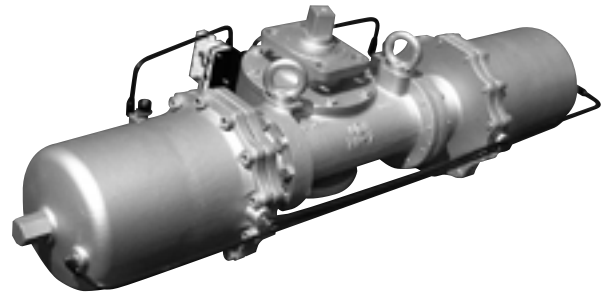
Records of Main Fluid: Corks powder, Resin pellet, CWM slurry



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"> ● Maximum Operating Pressure: 0.7MPa ● Ambient Temperature: -10 to 60°C ● Rotation Angle: 135° ● Bore Size: Bore Size: Rc1/4 (WN-1N to WN-4N) Rc3/8 (WN-5N to WN-7N) ● Painting: Silver (conforming to RoHS)
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

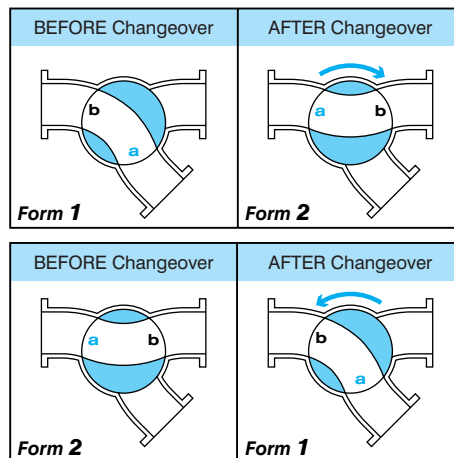
DN	Rank	Actuator Code		
		Pneumatic	Operating	
25	B	WN-1N		Lever
	C			
40	B	WN-2N		
	C			
50	B	WN-3N		
	C			
65	B	WN-2N		
	C			
80	B	WN-3N		
	C			
100	B	WN-4N		
	C			
125	B	WN-5N	Gear	
	C			
150	B	WN-6N	Lever	
	C			
200	B	WN-6N		
	C			
250	B	WN-7N		
	C			
300	B	WN-7N		
	C			
			(Operating Pressure 0.6MPa)	

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)

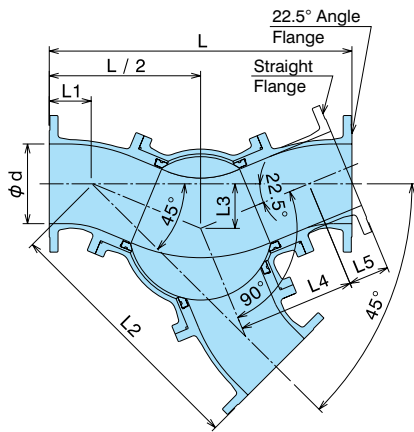
Operation Form (Example)

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



Dimension

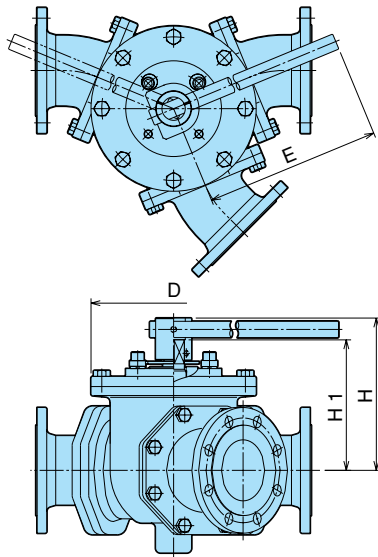
Base Dimension



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

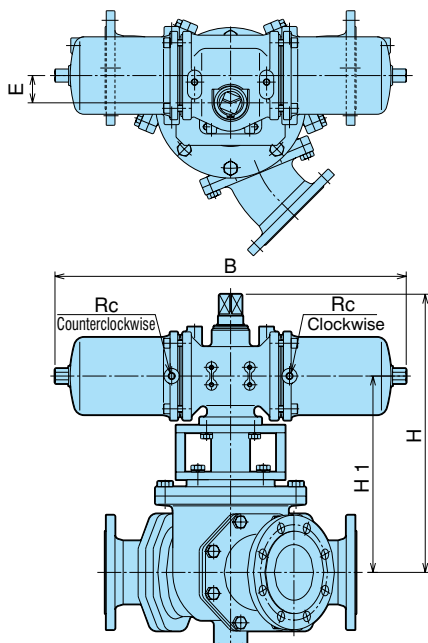
Manually Operated Valve Dimension



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	—

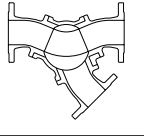
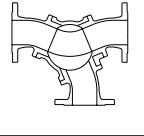
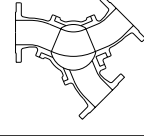
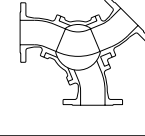
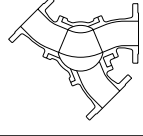
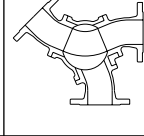
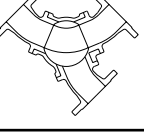
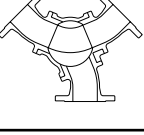
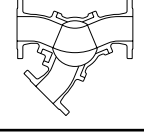
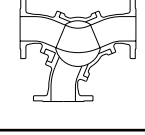
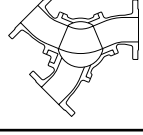
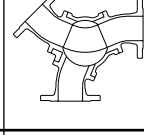
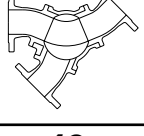
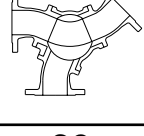
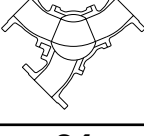
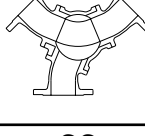
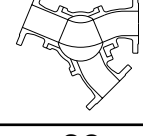
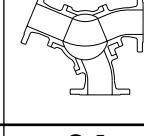
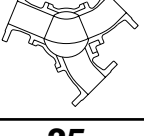
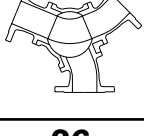
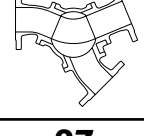
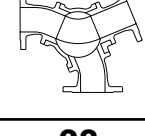
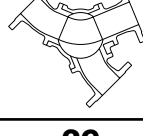
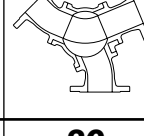
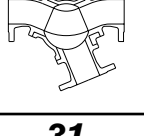
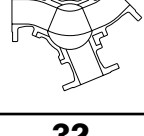
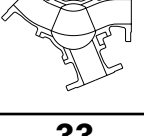
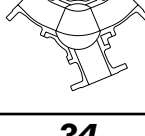
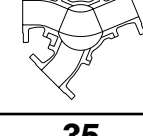
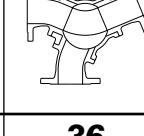
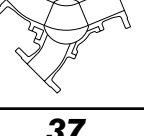
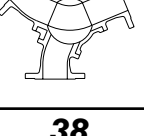
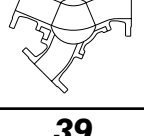
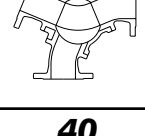
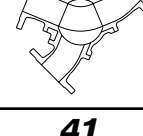
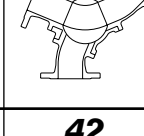
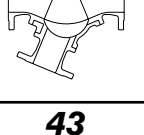
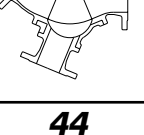
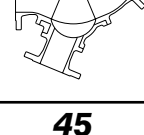
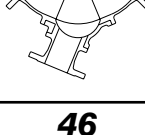
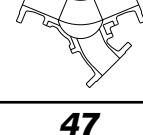
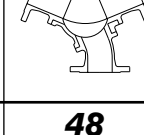
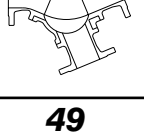
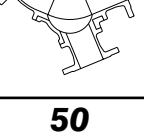
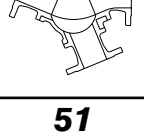
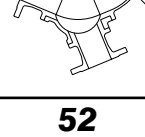
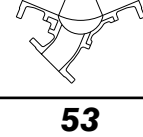
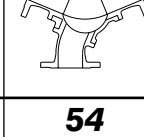
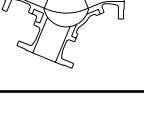
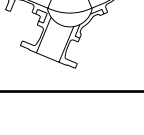
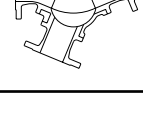
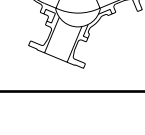
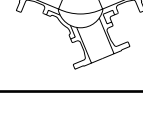
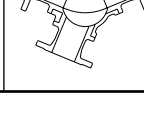
Pneumatically Operated Valve Dimension



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	
150	WN-5N	563	423			
	200	WN-6N	674	440	1204	90
WN-6N		742	508			
250	WN-7N	773	530	1558	122	
	WN-7N	844	601			
300	WN-7N	874	631			

Pattern (Flange Application Model)

No.	01	02	03	04	05	06
Combination						
No.	07	08	09	10	11	12
Combination						
No.	13	14	15	16	17	18
Combination						
No.	19	20	21	22	23	24
Combination						
No.	25	26	27	28	29	30
Combination						
No.	31	32	33	34	35	36
Combination						
No.	37	38	39	40	41	42
Combination						
No.	43	44	45	46	47	48
Combination						
No.	49	50	51	52	53	54
Combination						

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

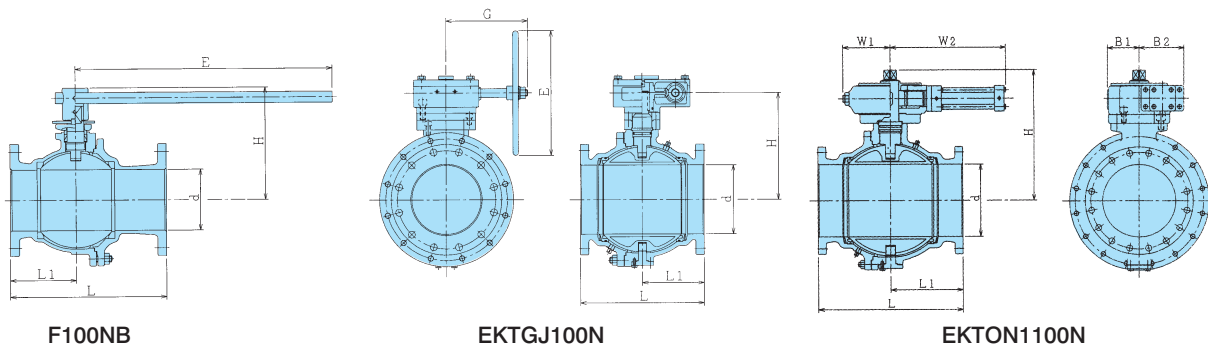
Manual Operation Type

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				H	Mass (kg)			
	d	L	L1	E	H	Mass (kg)	E	G	H	Mass (kg)	W1			W2	B1	B2
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

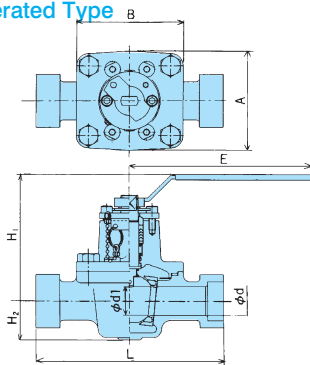
		Valve Type	
		T100S	T100H
Nominal Size (DN)		8 to 100	
Pressure Class		CL150	CL300
Connection		SW (Socket Weld), BW (Butt Weld)	
Max. Working Pressure		1.4 MPa	2.1 MPa
Max. Working Temperature		100°C	150°C
Materials	Body	SCS13A, SCS14A, SCS16A, SCS19A	
	Ball	SUS304	
	Seat	PTFE	Reinforced PTFE
	Packing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



T100S Lever Operated Type

Dimension

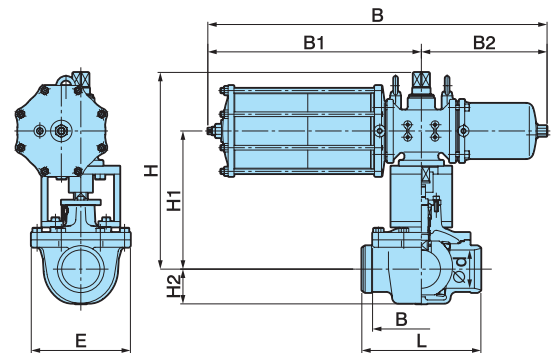
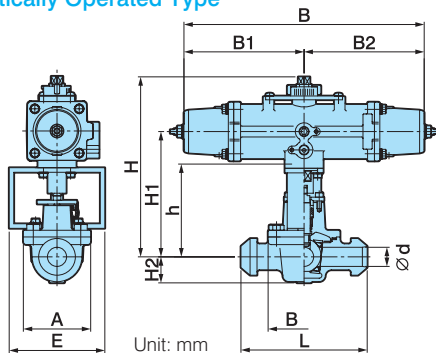
T100S Lever Operated Type



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		99	26	69	71		
20	19	165	114	32	86	90	160	2.8
25	25		148	42	116	119	230	
40	38		158	53	177	157		
50	51	216	169	63	187	184	350	15.0
65	64		172	73	208	206		
80	74		223	95	256	252		
100	98	305	223	95	256	252	450	35.0

T100H Pneumatically Operated Type



DN	d	L	H	H1	H2	A	B	E	h	Actuator				Mass (kg)	
										Code	C	W	W1		W2
8	8	108	176	122	20	52	56	70	93	PO-04D	212	—	—	—	2.5
10	10		193	133	23	65	68	80	108	PO-05D	268	—	—	—	
15	13		210	142	26	69	71		120	PO-06D	314	—	—	—	
20	19	165	233	165	32	86	90	100	103	PO-08D	392	—	—	—	7.0
25	25		286	209	42	116	119		151	PO-10D	500	—	—	—	
40	38		239	53	177	157	130	156	PO-12D	634	—	—	—	28.0	
50	51	338	280	63	187	184		160	241	PO-13D	634	—	—		—
65	64	393	280	73	208	206			233			—	—		—
80	74	216	290	73	208	206	160	233	—	PO-13D	—	869	547	322	115.0
100	98		305	510	360	95									

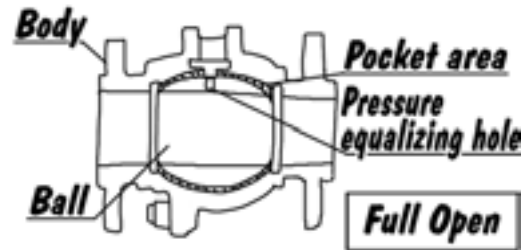
7

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. (Some of the products may not be applicable for degrease or water proof.)
- 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

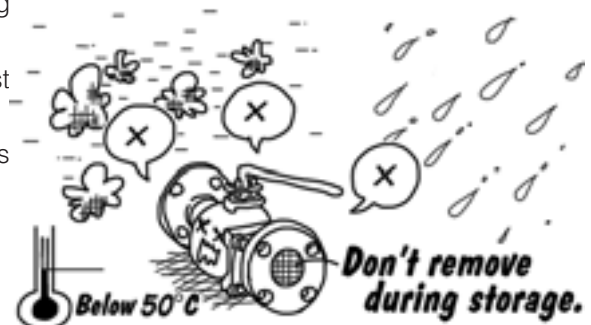
- 6 Floating ball valve has a mechanism to seal by pushing ball against the seat of the outlet side with fluid pressure. Please consult with NDV or local representative in case that the pressure change is large in operation condition because seat leakage may occur at low pressure operation.
- 7 Please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

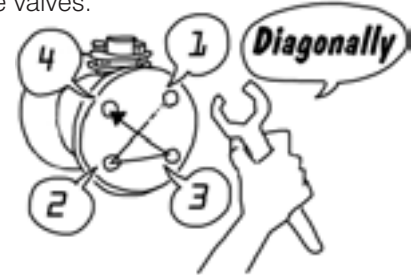
3. Storage

- 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

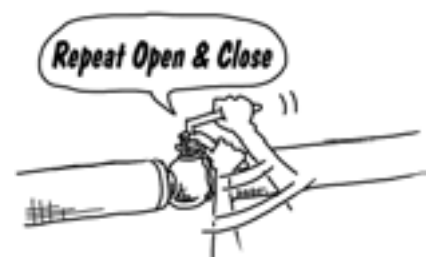
- 1 Do not operate valve with excessive torque by attaching a pipe or a wrench to the lever handle for opening or closing.
- 2 Never put fingers or hands into the inside of valve.
- 3 If there is any leakage from the gland, tighten further the gland bolt. If valve is used for fluid of large temperature 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 certificate was awarded



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.

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