

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

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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)

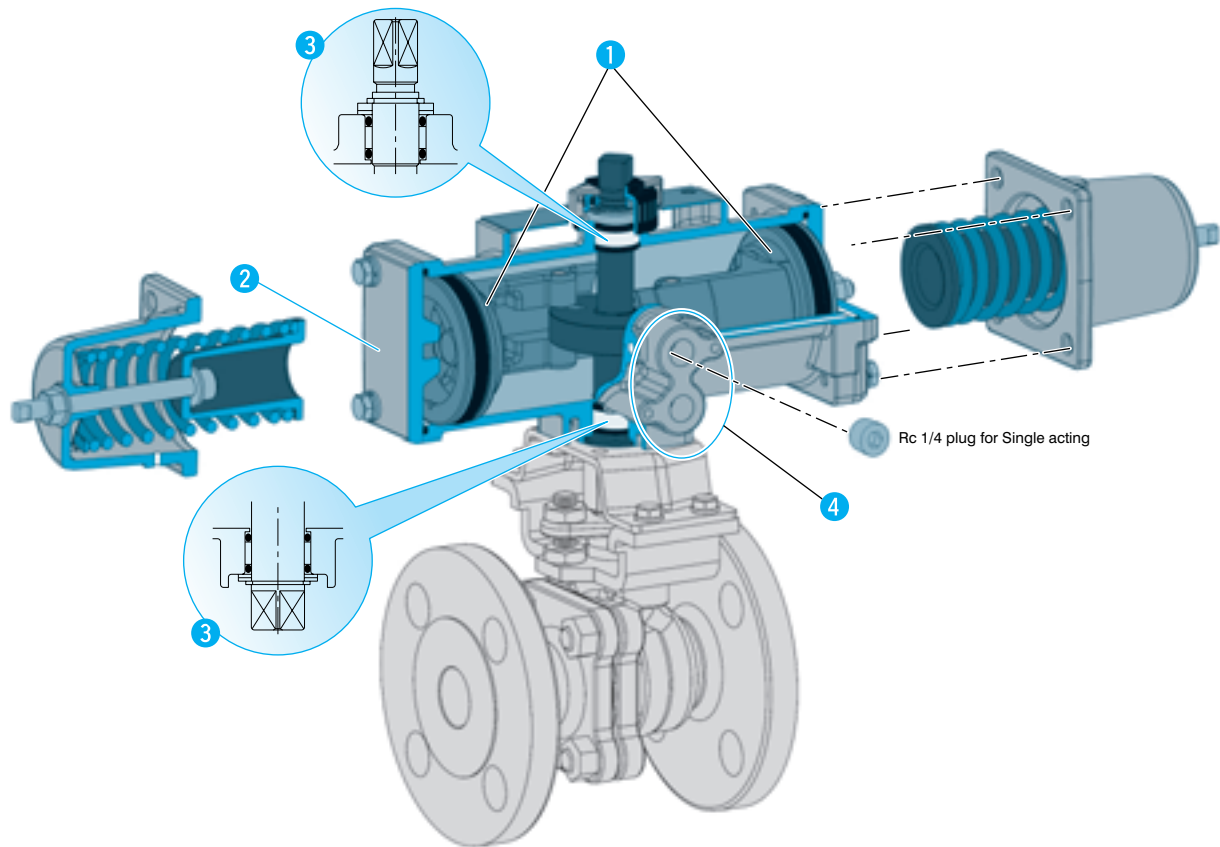
4-4. References for Pneumatically Operated Valve

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(*).

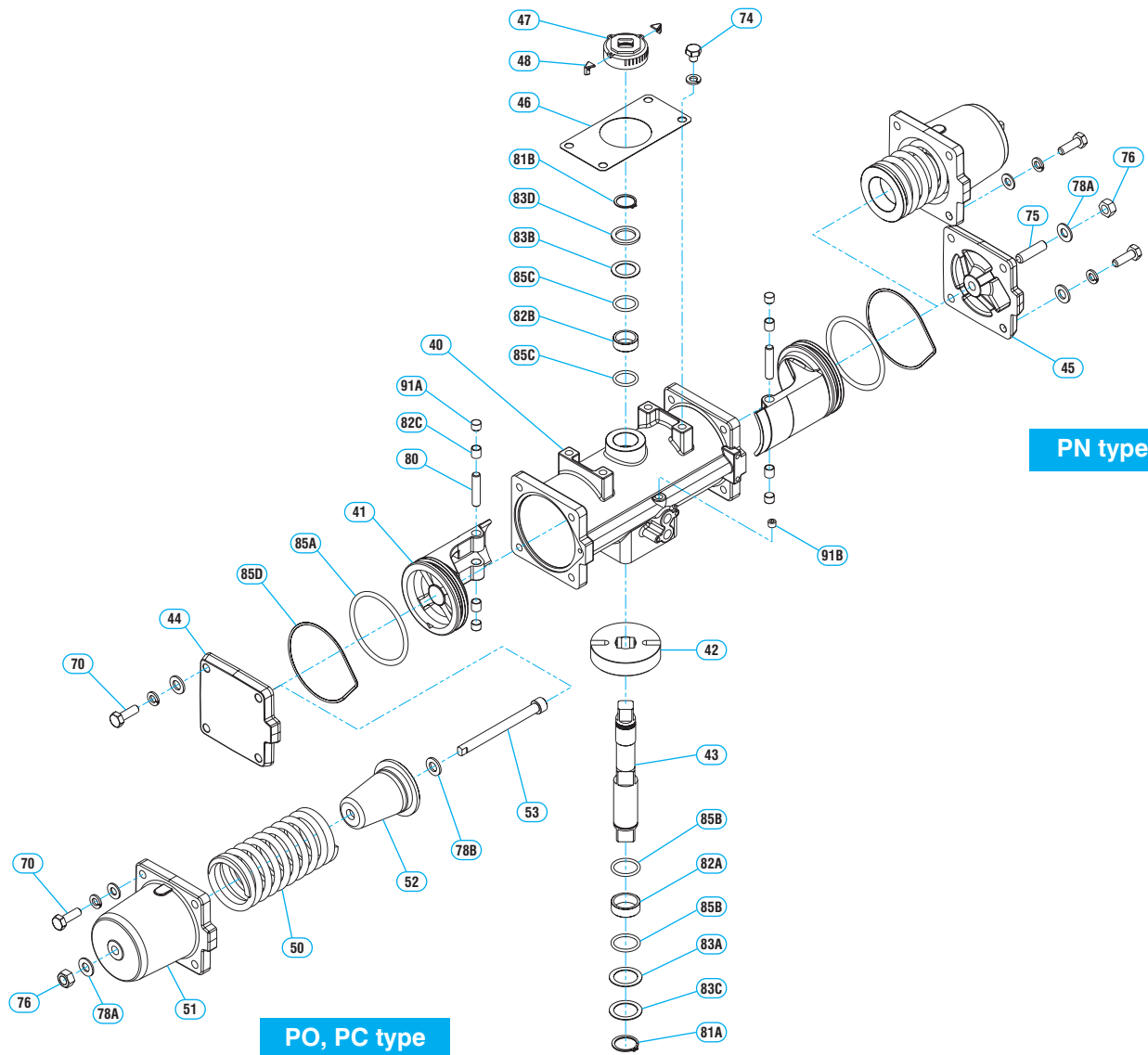
*: The code VDI/VDE3845-2010 for the size of the attachments of actuators



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
74	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

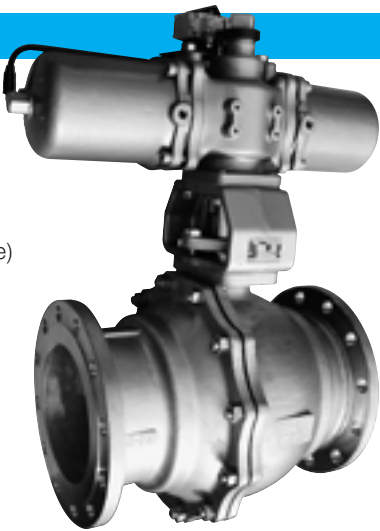
Safety Instructions

Torque Actuator for Large Bore: 13D to 25D

Structure and Features

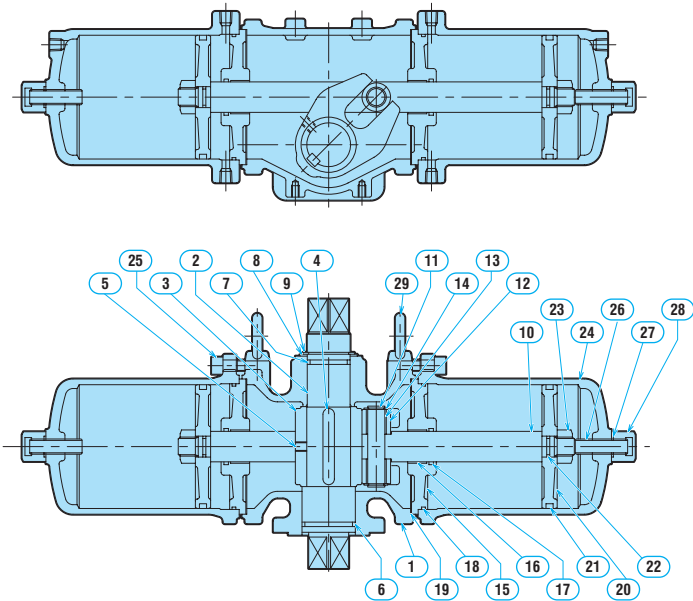
Double Cylinder 90° Rotation Piston type Actuator with Scotch York.

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)
Ambient Temperature	-10 to 50°C *except frozen condition (Please consult with NDV if the ambient temperature is more than 50°C)
Rotation Angle	Part turn 0 to 90°
Manual Operation	Manual operating device is installable.
Painting for Actuator	Silver (conforming to RoHS)

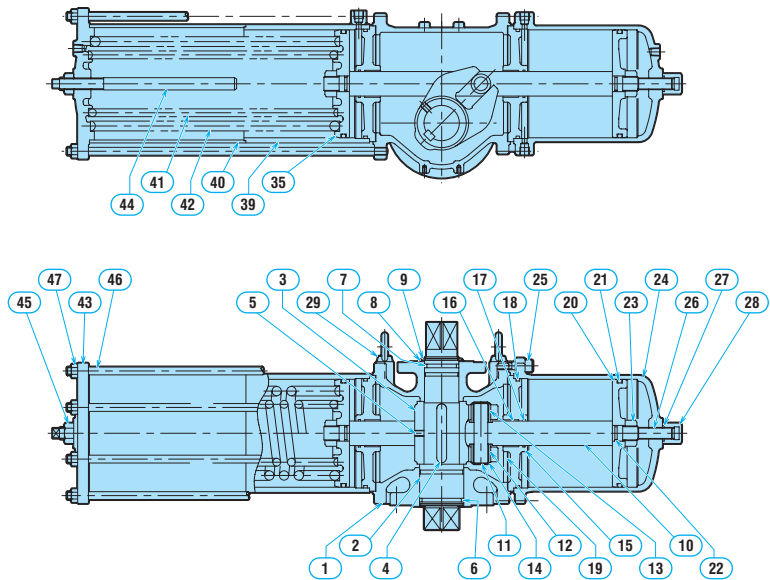


Parts and Materials

Double Acting



Single Acting



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

4-3 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

PN	Double Acting Type
PO	Reverse Acting Type (Air to Open)
PC	Direct Acting Type (Air to Close)

2 1

Pneumatically Operated
Type On-Off Valve

3 Body Material

07	SCS13A
12	SCS14A

4 Seat Material

ST	Solid Seat
M	Thin Seat
CF	Soft Seat

5 Nominal Size (DN or A)

Conforming to ISO 6708 and JIS B 2001

7 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

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

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																B	
	C	PN-05DN															C	
40	A																A	40
	B																B	
	C																C	
50	A	PN-06DN															A	50
	B																B	
	C	PN-08DN															C	
65	A	PN-08DN															A	65
	B	PN-06DN															B	
	C																C	
80	A	PN-08DN															A	80
	B																B	
	C	PN-10DN															C	
100	A	PN-10DN															A	100
	B	PN-08DN															B	
	C	PN-10DN															C	
125	A	PN-12DN															A	125
	B																B	
	C	PN-13D															C	
150	A	PN-12DN															A	150
	B																B	
	C																C	
200	A	PN-13D															A	200
	B																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 Differential 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																B	
	C	PO-06DN				PO-08DN											C	
40	A																A	40
	B																B	
	C	PO-08DN				PO-10DN											C	
50	A																A	50
	B																B	
	C													PO-10DN			C	
65	A						PO-10DN							PO-10DN			A	65
	B						PO-08DN										B	
	C						PO-12DN										C	
80	A	PO-10DN															A	80
	B						PO-10DN										B	
	C						PO-12DN							PO-13D			C	
100	A	PO-10DN															A	100
	B	PO-12DN															B	
	C																C	
125	A								PO-13D					PO-18D			A	125
	B																B	
	C	PO-13D															C	
150	A																A	150
	B																B	
	C											PO-22D					C	
200	A								PO-18D								A	200
	B																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

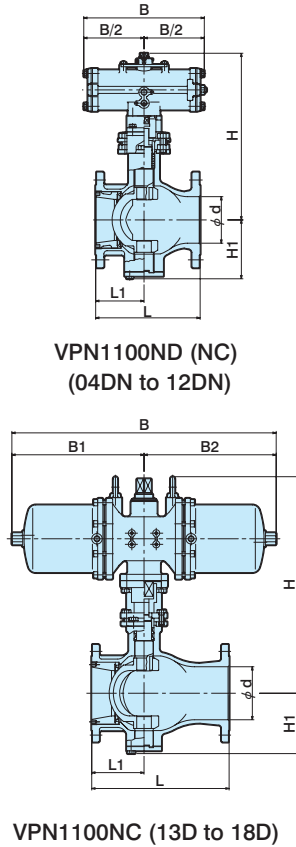
Special Purpose Ball Valve

Safety Instructions

Dimension

Valve Type: VPN1100ND (Double Acting)

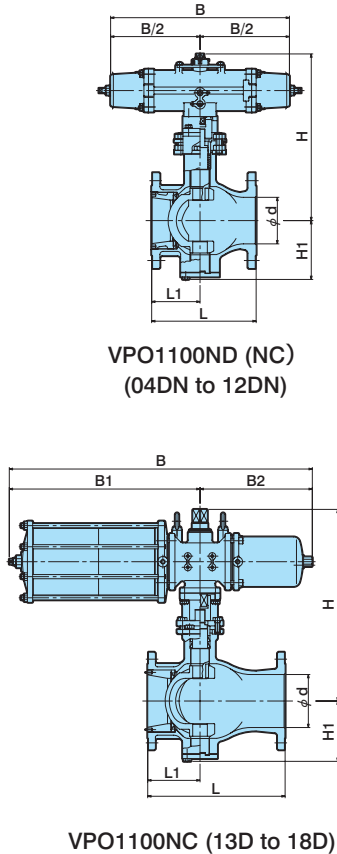
Unit: mm



Nominal size DN	d	L		L1		H1	Actuator Code	B	B1	B2	H	Mass (Approx. kg)	
		10K CL150	20K	10K CL150	20K							Stainless Cast Steel	
												10K CL150	20K
25	25	127	165	55	48	PN-04DN	144	B/2	B/2	208	5.3	6.5	
						PN-05DN	172			221	6.3	7.5	
40	38	165	190	70	71	PN-06DN	214			250	9.3	11.0	
						PN-08DN	266			266	10.3	12.0	
										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



Nominal size DN	d	L		L1		H1	Actuator Code	B	B1	B2	H	Mass (Approx. kg)	
		10K CL150	20K	10K CL150	20K							Stainless Cast Steel	
												10K CL150	20K
25	25	127	165	55	48	PO-05DN	268	B/2	B/2	221	7.3	8.5	
						PO-06DN	314			237	8.8	10.0	
						PO-08DN	392			258	11.8	13.0	
40	38	165	190	70	71	PO-06DN	314			266	12.3	14.0	
						PO-08DN	392			287	15.8	17.5	
						PO-10DN	500			333	23.8	25.5	
50	51	178	216	75	77	PO-08DN	392			292	17.1	19.5	
						PO-10DN	500			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	
						PO-13DN	869	491	91.0	97.0			
125	127	356	381	145	163	PO-13D	869	541	116.0	122.0			
						PO-18D	1013	612	—	182.0			
150	152	394	403	150	173	PO-13D	869	551	127.0	136.0			
						PO-18D	1013	622	187.0	196.0			
200	203	457	502	200	211	PO-18D	1013	634	379	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)

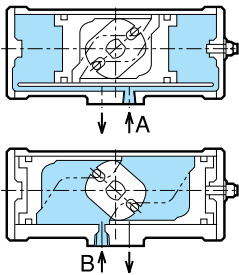
Actuator Code 04D to 12D

Double Acting Type

$$Q = \{(10P + 1) \times (A + B)\} \times N$$

Single Acting Type

$$Q = (10P + 1)B \times N$$



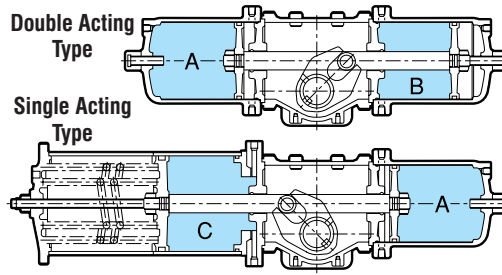
Actuator Code 13D to 25D

Double Acting Type

$$Q = [(10P + 1) \times \{(A + B) \times 2\}] \times N$$

Single Acting Type

$$Q = \{(10P + 1) \times (A + C)\} \times N$$



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)

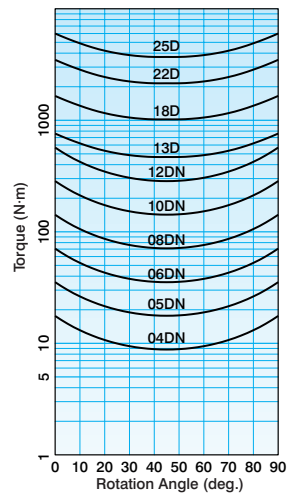
Unit: N·m

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

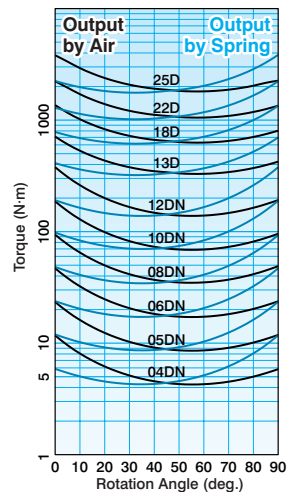
Unit: N·m

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

Output Characteristic Curve (Operating Pressure 0.4 MPa)



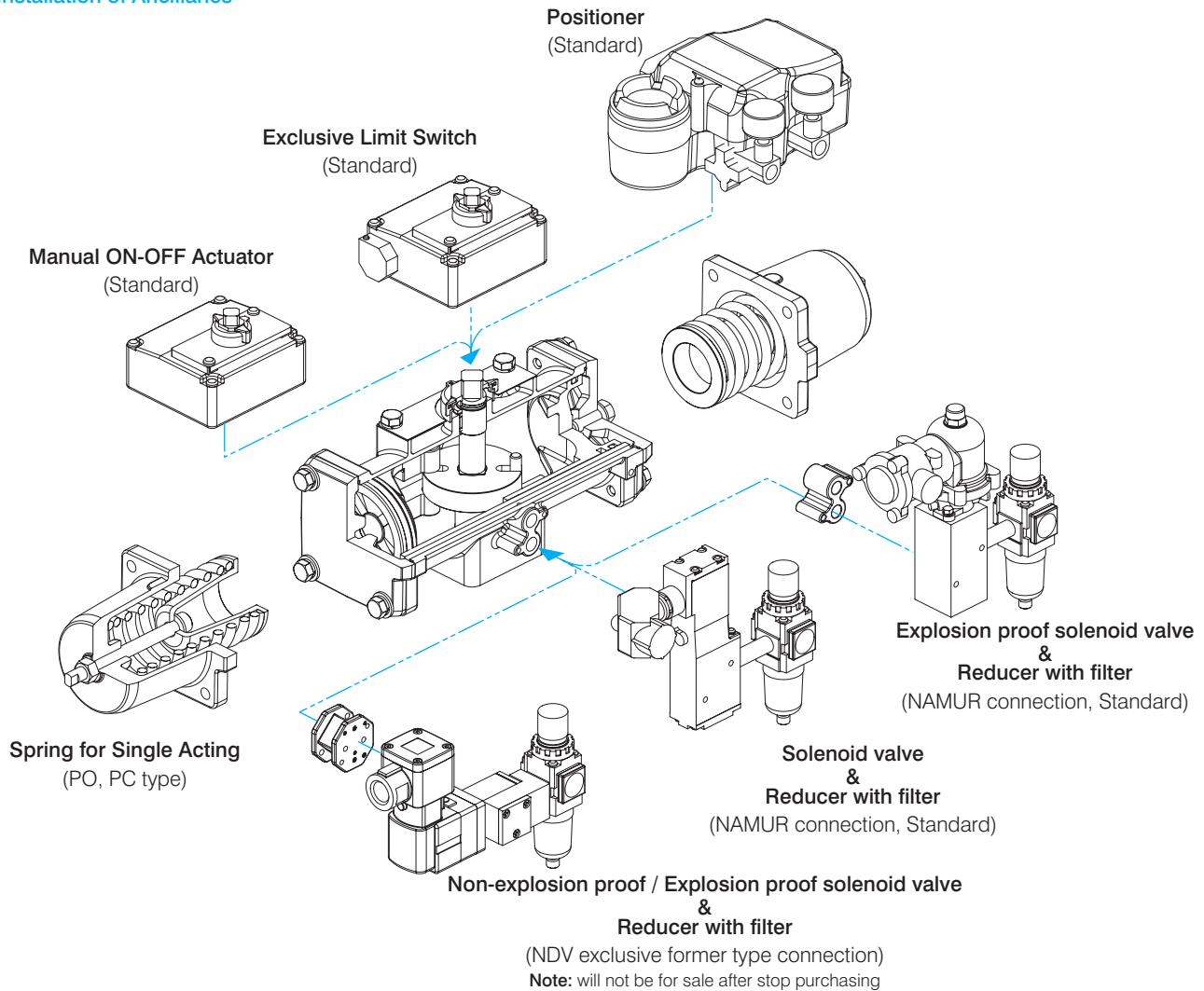
PN Type (Double Acting) Output Characteristic Curve



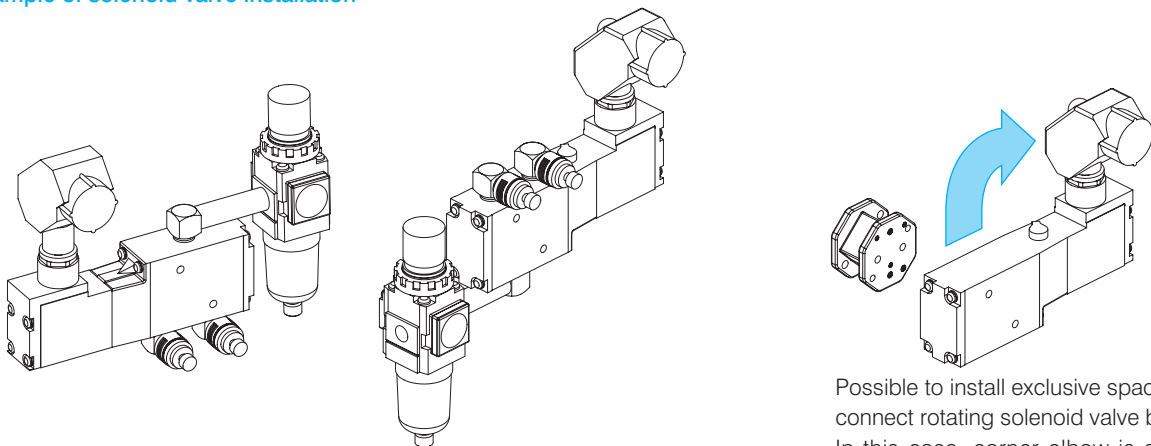
PO Type (Single Acting) Output Characteristic Curve

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.

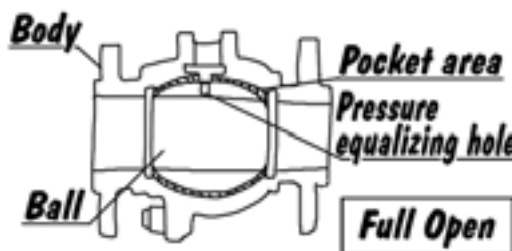
Reducer with filter

- 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.)

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 incase 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.

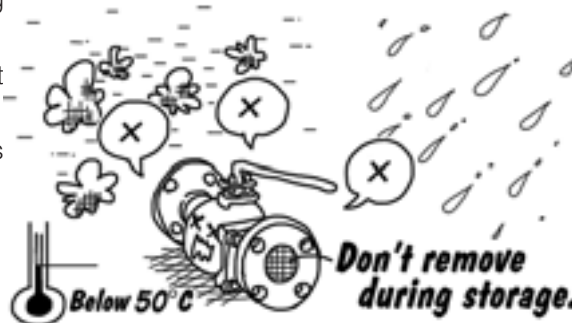


2. Receipt and Carriage

- 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.

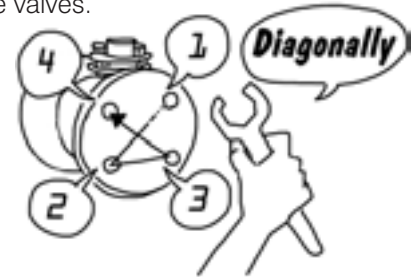
3. Storage

- 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.



Memo

[illegible]

- 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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