

MAINTENANCE MANUAL
YAMADA AIR-OPERATED DIAPHRAGM PUMPS
NDP-20
NDP-25

WARNING



- For your own safety, be sure to read these procedures carefully before performing maintenance on this product. After reading this document, be sure to keep it handy for future reference.

This maintenance manual covers what you should know about maintenance of the Yamada NDP-20 series and NDP-25 series Diaphragm Pumps.

This edition is based on the standards for the March 2007 production run. Remember, the specifications are always subject to change; therefore, some of the information in this edition may not apply to new specifications.

•Warnings and Cautions

For safe use of this product, be sure to note the following: In this document, warnings and cautions are indicated by symbols. These symbols are for those who will operate this product and for those who will be nearby, for safe operation and for prevention of personal injury and property damage. The following warning and caution symbols have the meanings described below. Be sure to remember their meanings.



WARNING : If you ignore the warning described and operate the product in an improper manner, there is danger of serious bodily injury or death.



CAUTION : If you ignore the caution described and operate the product in an improper manner. There is danger of personal injury or property damage.

Furthermore, to indicate the type of danger and damage, the following symbols are also used along with those mentioned above:



This symbol indicates a DON'T, and will be accompanied by an explanation on something you must not do.



This symbol indicates a DO, and will be accompanied by instructions on something you must do in a certain situation.

WARNING



- Before starting maintenance work, cut off the feed air and clean the pump. If air pressure or residue remain in the pump, there is danger of explosion, or possible poisoning resulting in serious injury or death if chemicals adhere to the skin or are accidentally swallowed. (For details on cleaning the pump, refer to Chapter 6 of the operating manual.)
- When replacing parts, be sure to use the recommended genuine parts or Equivalents. Use of other parts may cause a malfunction of the product.

CAUTION



- When it is instructed that special tools must be used, be sure to use the specified tools. Otherwise, the pump may be damaged.
- Refer to 10.1 "Specifications" in the Operating Manual. Also, remember that the pump is heavy, and extreme care must be taken when lifting it.

Table of Contents

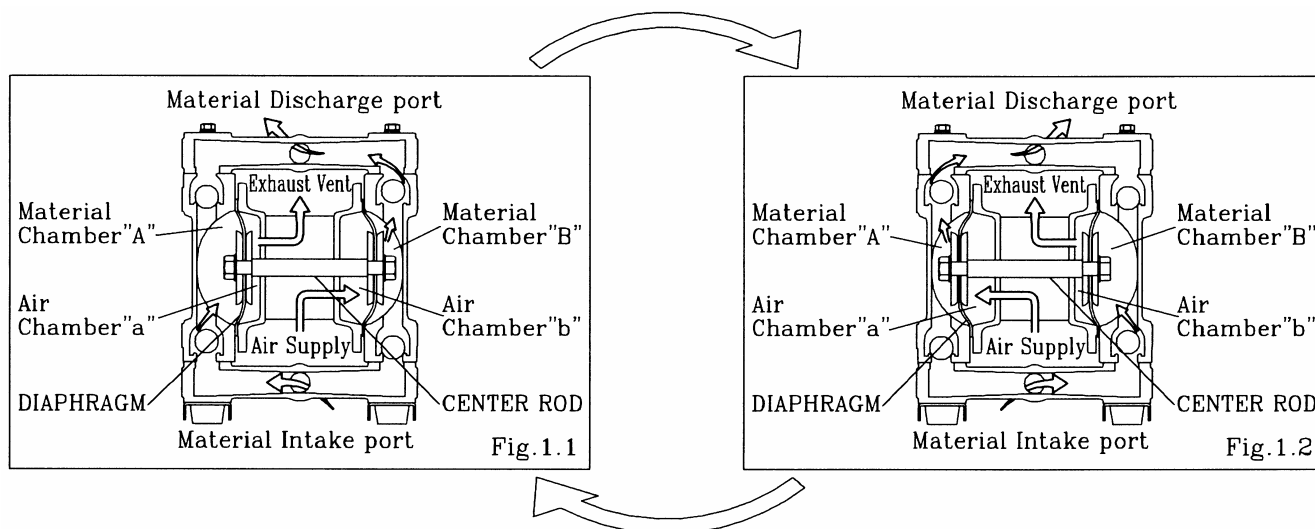
·Warnings and Cautions	
·Table of Contents	
1.Principles of operation	1
2.Tools, etc.	
2.1 General tools	1
2.2 Special tools	1
2.3 Misc.	1
3.Ordering Replacement parts	1
4.Balls and Valve seats	
4.1 Removal	
■BA□, BS□, BF□, BA□-D types	2
■BP□, BV □types	3
4.2 Inspection	4
4.3 Installation	4
5.Diaphragm and Center rod	
5.1 Removal	
■BA□, BS□, BF□, BA□-D types	5
■BP□, BV□ types	5
5.2 Inspection	6
5.3 Installation	
■B□C, B□N, B□E, B□V, B□H, B□S, BAC-D, BAN-D types	7
■B□T, BAT-D types	7
6.Throat bearing and Pilot valve Assembly	
6.1 Removal	8
6.2 Inspection	8
6.3 Installation	8
7.C Spool Valve Assembly and Sleeve Assembly	
7.1 Removal	9
7.2 Inspection	9
7.3 Installation	9
8.Retightening of Tie rods	10
9.Exploded View and Parts List	
9.1 NDP-20•25 BA□, BS□, BF□	11
9.2 NDP-20 BA□-D	13
9.3 NDP-20•25 BP□, BV□	15
9.4 COMMON PARTS	17
9.5 BODY ASSEMBLY	18
9.6 VALVE BODY ASSEMBLY	19
9.7 SUCTION PIPE SET	19

1.Principles of operation

There are two diaphragms fixed to the center rod, one at each end. When compressed air is supplied to air chamber b (right side, see Fig. 1.1), the center rod moves to the right, the material in material chamber B is pushed out, and at the same time material is sucked into material chamber A.

When the center rod is moved full-stroke to the right, the air switch valve is switched, compressed air is sent to air chamber a (left side, see Fig.1.2), and the center rod moves to the left. The material in material chamber A is pushed out, and at the same time material is sucked into material chamber B.

Through repetition of this operation, material is repeatedly taken in and discharged out.



2.Tools, etc.

2.1 General tools

- Socket wrenches 10mm, 12mm, 13mm, 17mm, 22mm
- Hexagonal box wrenches 5mm
- Open-end wrenches 13mm (BP□, BV□), 22mm (BA□, BS□, BF□, BA□-D)

2.2 Special tools

- Accessory tool (Included)

Purpose: Removing the center disk of BP□ and BV□ types

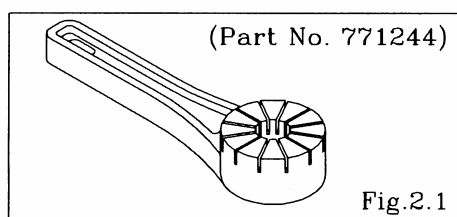


Fig.2.1

- Sleeve remover (sold separately)

Purpose: For removing sleeves

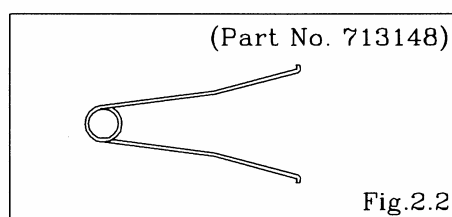


Fig.2.2

2.3 Misc.

- Assembly oil Turbine oil none addition class 1(equivalent to ISO VG32 grade)
- Nuts M14×1.5
- Grease Urea grease grade (NLGI) No. 2

3.Ordering Replacement parts

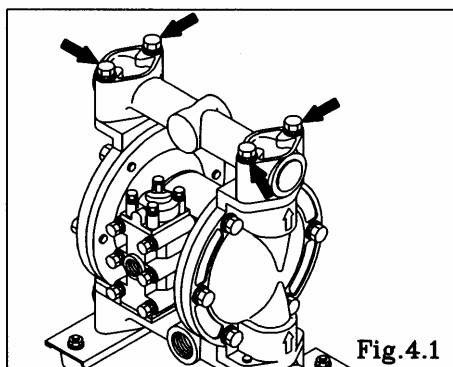
For accurate and speedy shipment of parts, be sure to order the right parts for your model to distributor. Indicate the part numbers, descriptions, and quantities.

4. Balls and Valve seats

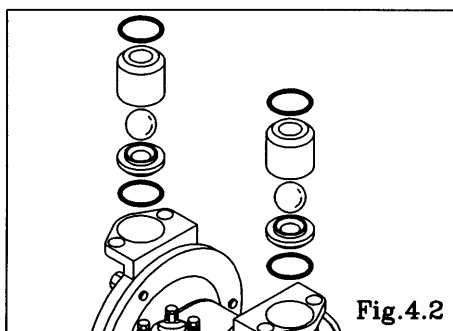
4.1 Removal

■BA□, BS□, BF□, BA□-D types

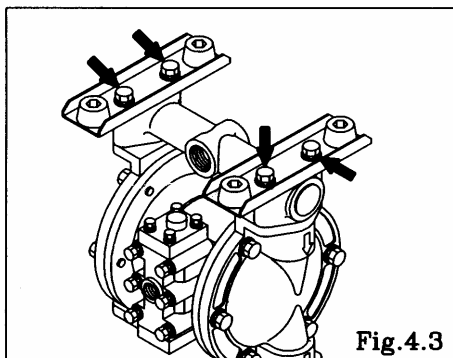
See [9. Exploded View] on after p. 11. (Fig. 4.1, 4.2, 4.3 and 4.4 show the NDP-20 BS□.)



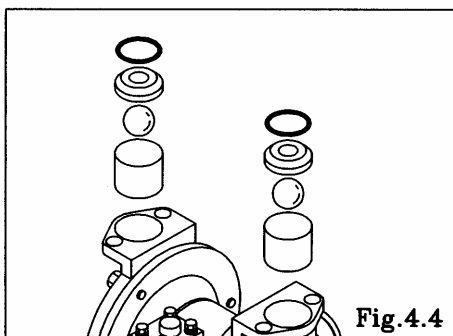
- Remove the 4 retainer bolts from the out manifold, and remove the out manifold. [Fig.4.1]



- Remove the O ring, valve stopper, ball and valve seat. [Fig.4.2]



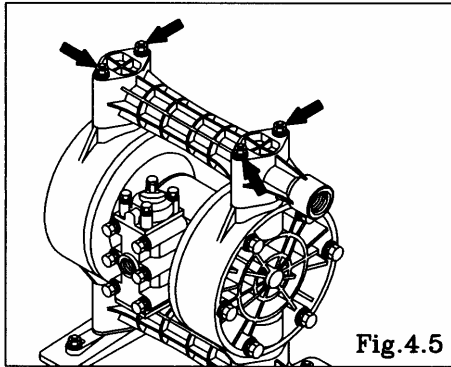
- Turn over the main body assembly. [Fig.4.3]
- Remove the 4 retainer bolts from the in manifold, and remove the in manifold and pump bases. [Fig.4.3] (The pump bases are not installed in BA□-D types.)



- Remove the O ring, valve seat, ball and valve stopper. [Fig.4.4]

■BP□, BV□ types

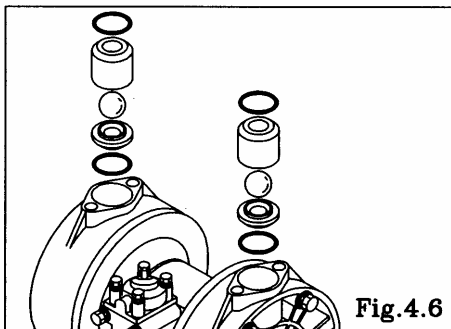
See [9. Exploded View] on after p. 11. (Fig. 4.5, 4.6, 4.7 and 4.8 show the NDP-20 BP□[Thread type].)



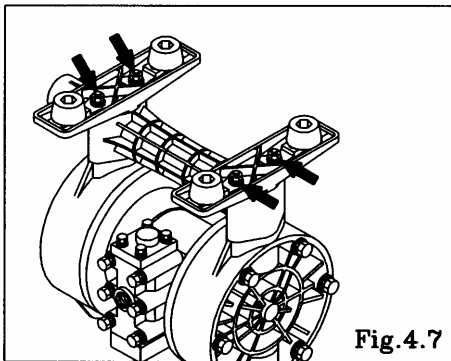
- Remove the 4 retainer nuts from the upper side of tie rods, and remove the out manifold. [Fig.4.5]

<NOTE>

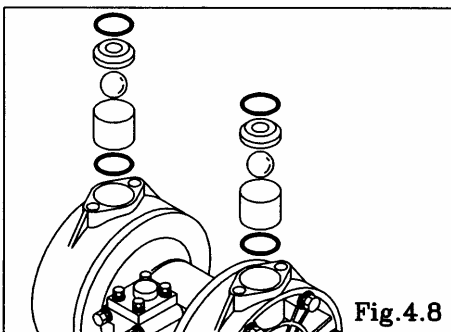
- When the retainer nuts both sides of the tie rod remove, the in manifold removes.



- Remove the O ring, valve stopper, ball and valve seat. [Fig.4.6]

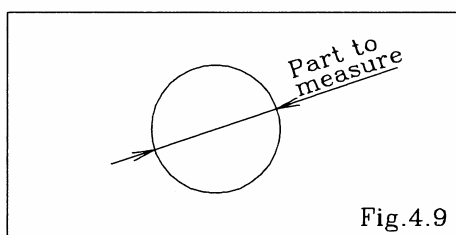


- Turn over the main body assembly. [Fig.4.7]
- Pull out the tie rod , and remove the base and in manifold. [Fig.4.7]



- Remove the O ring, valve seat, ball and valve stopper. [Fig.4.8]

4.2 Inspection

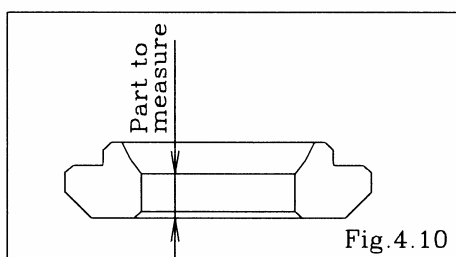


▪ Ball [Fig.4.9]

Measure the outside diameter, and if it is outside the usable range, replace the ball.

Usable range of Ball

NDP-20	SØ24.3 ~ SØ27.8 mm
NDP-25	SØ31.5 ~ SØ36.1 mm



▪ Valve seat [Fig.4.10]

Measure the dimension shown at left, and if it is outside the usable range, replace the valve seat.

Usable range of Valve seat

	BA□, BS□	BP□, BV□
NDP-20	3.4 ~ 8.5 mm	3.3 ~ 8.1 mm
NDP-25	3.8 ~ 9.5 mm	3.4 ~ 9.5 mm

▪ O ring (other than PTFE)

If O rings are worn out or cracked, replace them.

4.3 Installation

For installation, see [9. Exploded View] on after p. 11, and install in the reverse order of disassembly.

Tightening torque for manifold retainer bolts

		C, N, E, V	T, H, S
NDP-20	BA□	10N·m{100kgf·cm}	20N·m{200kgf·cm}
	BS□		
	BA□·D	10N·m{100kgf·cm}	15N·m{150kgf·cm}
NDP-25	BA□	10N·m{100kgf·cm}	35N·m{350kgf·cm}
	BS□		
	BF□		

Tightening torque for manifold retainer nuts

		C, N, E, V	T, H, S
NDP-20	BP□	10N·m{100kgf·cm}	12N·m{120kgf·cm}
NDP-25	BP□		
	BV□		

- NDP-20B□H/T, NDP-25B□H/T type be with 10N·m tightening.

<NOTE>

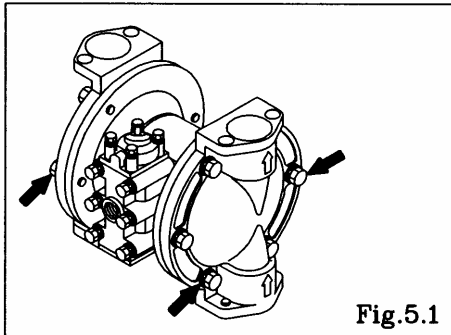
- Make sure there is no dust on the seal surface and the seal is not damaged.
- Replace the PTFE O ring regardless of its condition.

5. Diaphragm and Center rod

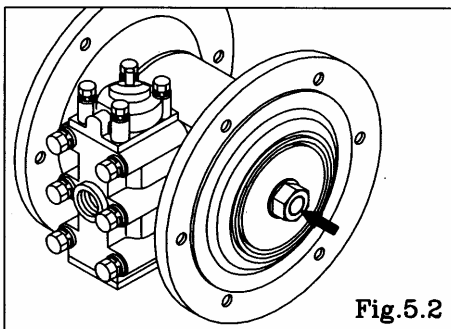
5.1 Removal

■ BA□, BS□, BF□, BA□-D types

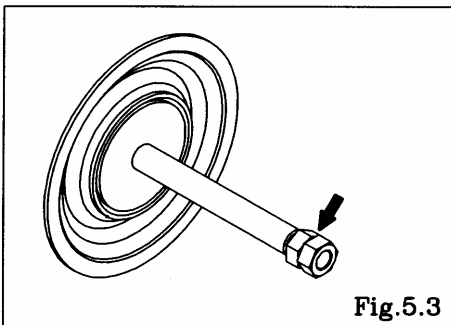
See [9. Exploded View] on after p. 11. (Fig. 5.1 shows the NDP-20 BS□.)



- Remove the ball and valve seat etc. (see [4.1 Removal BA, □BS□, BF□, BA□-D types] on p.4)
- Remove the 12 retainer bolts from the out chamber, and remove the out chamber. [Fig.5.1]



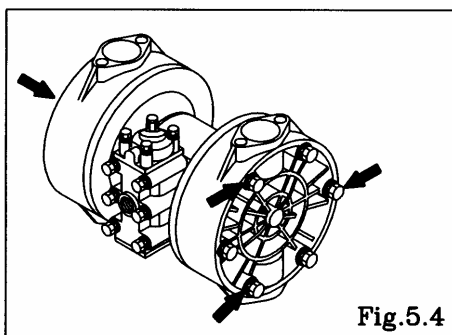
- Remove the nuts on both sides of the center rod. [Fig.5.2]
- After the nuts on one side have been removed, remove the center disk and diaphragm. Remove the diaphragm, center disk and center rod from the opposite side of the main body.



- Remove the nuts on the opposite side using the double nut. [Fig.5.3]
- Remove the coned disk spring, center disk and diaphragm.

■ BP□, BV□ types

See [9. Exploded View] on after p. 11. (Fig. 5.4 shows the NDP-20 BP□.)



- Remove the ball and valve seat etc. (see [4.1 Removal BP□, BV□ types] on p.3)
- Remove the 12 retainer bolts from the out chamber, and remove the out chamber. [Fig.5.4]

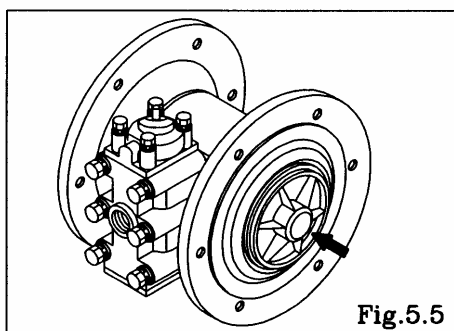


Fig.5.5

- Remove the center disk from one side using the Accessory tool (special tool: Part No. 771244). [Fig.5.5]
- After the center disk (outside) has been removed, remove the diaphragm and the center disk (inside).
- Remove the center disk and center rod from the opposite side of the main body.

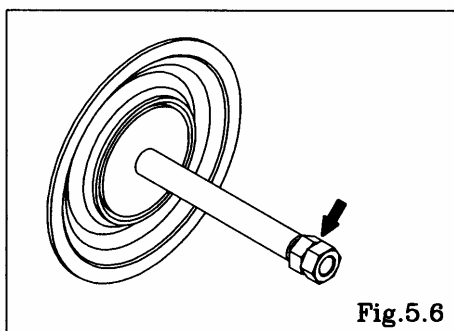


Fig.5.6

- Fix a double nut to one end of the center rod and take the diaphragm and center disk off the opposite end. [Fig.5.6]
- Be careful not to scratch or score the center rod.

5.2 Inspection

- Diaphragm
If the diaphragm is worn out or damaged, replace it.
New replace just one diaphragm.

Guideline of diaphragm life

CR, NBR, EPDM	10,000,000 cycle
FKM	2,500,000 cycle
PTFE	3,000,000 cycle
TPEE, TPO	15,000,000 cycle

(When used with clean water at room temperature)

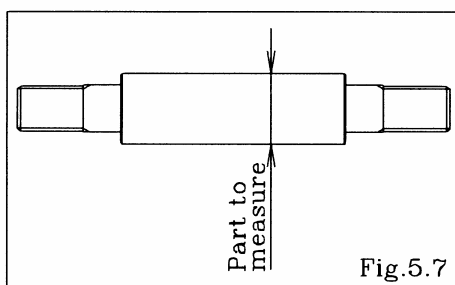


Fig.5.7

- Center rod [Fig.5.7]
Measure the diameter, and if it is outside the usable range, replace the center rod.

Usable range of center rod

Ø 17.9 ~ Ø18.0 mm

5.3 Installation

■ B□C, B□N, B□E, B□V, B□H, B□S, BAC-D, BAN-D types

For installation, see [9. Exploded View] on after p. 11, and install in the reverse order of disassembly.

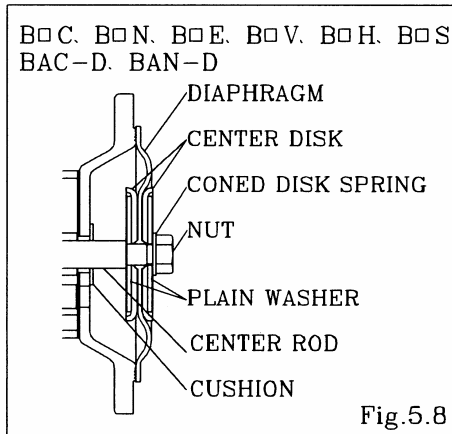


Fig.5.8

- Apply grease to the center rod, and insert it into the main body.
- Keep the marking "OUTSIDE" to liquid end for CR, NBR, EPDM, FKM diaphragms.
- Keep the convex side to the outside for TPEE, TPO diaphragms.
- Tighten the center disk using the Accessory tool(special tool: Part No.771244) for the BP□, BV□ types.
(No coned disk springs and nuts are needed.)

Tightening torque for center rod

B□C, B□N, B□E, B□V	30 N·m { 300 kgf·cm }
B□H, B□S	40 N·m { 400 kgf·cm }

- Draw the center disk to one side, (cf. Fig.5.8) and install the out chamber. Tighten the bolts temporarily.
- Draw the center disk to the opposite side, then turn the diaphragm over (cf. Fig.5.8). And install the out chamber. Tighten the bolts temporarily.
- After installation of the out chambers on both sides, place the pump on a flat surface and stand the pump upright for further assembly.

Tightening torque for out chamber.

NDP-20	B□C, B□N, B□E, B□V	10 N·m {100 kgf·cm}
	B□H, B□S	13 N·m {130 kgf·cm}
NDP-25	B□C, B□N, B□E, B□V	10 N·m {100 kgf·cm}
	B□H, B□S	20 N·m {200 kgf·cm}

<NOTE>

- Make sure there is no dust on the seal surface in order to prevent seal damaged.
- Tighten the bolts that balance should be equal from both side on diagonal line with even torque.

■ B□T, BAT-D types

For installation, see [9. Exploded View] on after p. 11, and install in the reverse order of disassembly.

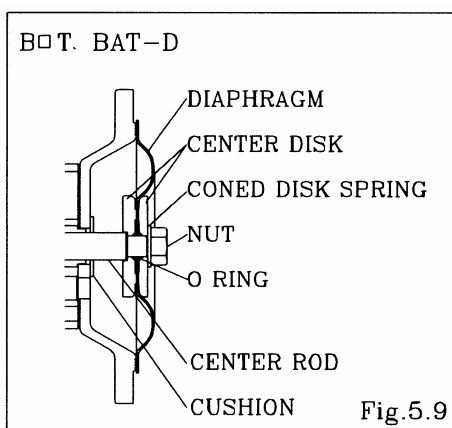


Fig.5.9

- Apply grease to the center rod, and insert it into the main body.
- Keep the convex side to the outside (cf. Fig.5.9).
- Put the O rings to both sides of the diaphragm. (cf. Fig.5.9).
- Tighten the center disk using the Accessory tool(special tool: Part No. 771244) for the BPT, BVT types.
(No coned disk springs and nuts are needed.)

Tightening torque for center rod

40 N·m { 400 kgf·cm }

- Tighten the out chamber temporarily at first.
- After installation of the out chambers on both sides, place the pump on a flat surface and stand the pump upright for further assembly.

Tightening torque for out chamber

NDP-20	13 N·m { 130 kgf·cm }
NDP-25	20 N·m { 200 kgf·cm }

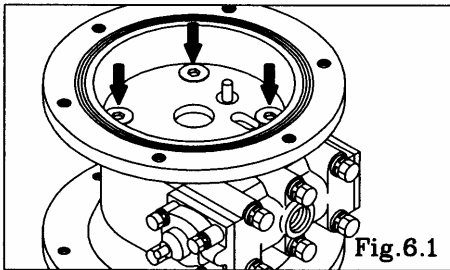
<NOTE>

- Make sure there is no dust on the seal surface in order to prevent seal damaged.
- Replace the PTFE O ring by new one.
- Tighten the bolts that balance should be equal from both side on diagonal line with even torque.

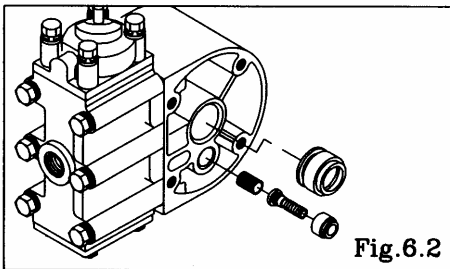
6. Throat bearing and Pilot valve Assembly

6.1 Removal

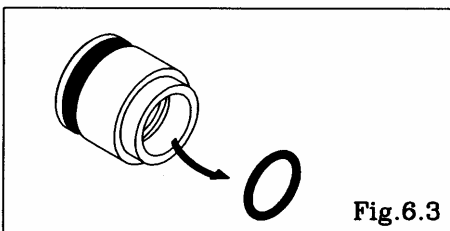
See [9. Exploded View] on after p. 11.



- Remove the diaphragm and center rod (see [5.1 Removal] on p.5).
- Remove the 8 retainer bolts from the air chamber, and remove the air chamber and gasket. [Fig.6.1]

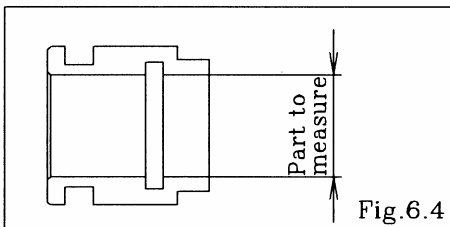


- Draw out the pilot valve assembly. [Fig.6.2]
- Draw out the throat bearing. [Fig.6.2]



- Remove the packing from the throat bearing. [Fig.6.3]

6.2 Inspection



- Throat bearing [Fig.6.4]
Measure the inside diameter, and if it is outside the usable range, replace the throat bearing.

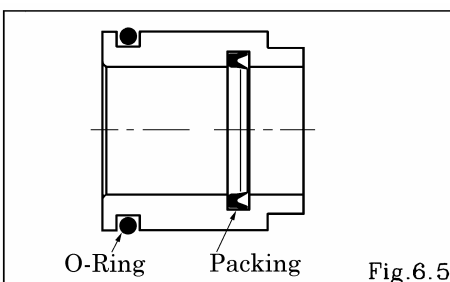
Usable range of throat bearing

Ø 18.03 ~ Ø 18.14 mm

- O rings, Packing
If the O ring is worn out or cracked, replace it.
- Pilot valve assembly
If the pilot valve is worn out or cracked, replace it.

6.3 Installation

For installation, see [9. Exploded View] on after p. 11, and install in the reverse order of disassembly.



Tightening torque for air chamber retainer bolts

18 N·m { 180 kgf·cm }

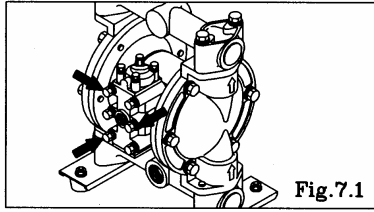
<NOTE>

- Make sure there is no dust on the seal surface and the seal is not damaged.
- Apply grease to packing.

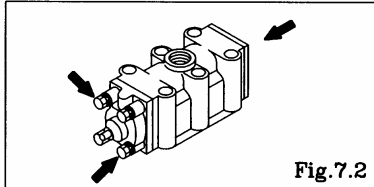
7. C Spool Valve Assembly and Sleeve Assembly

7.1 Removal

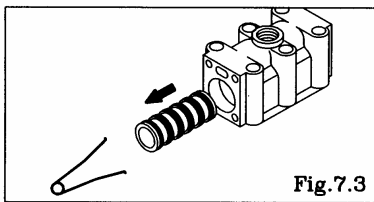
See [9. Exploded View] on after p. 11.



- Remove the 6 retainer bolts from the valve body, and remove the valve body. [Fig.7.1]

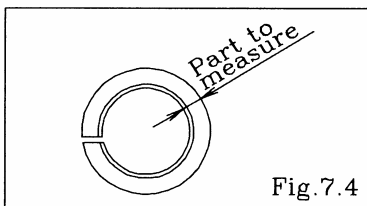


- Remove the 8 cap A and cap B retainer bolts, and remove cap A, cap B, packing, plain washer, cushion and gasket. [Fig.7.2]
- Draw out the C spool valve assembly, and remove the seal ring from the C spool valve assembly.



- Remove the sleeve using the sleeve remover (special tool: Part number 713148). [Fig.7.3]

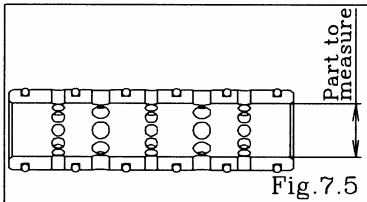
7.2 Inspection



- C Spool Valve Assembly
Seal ring [Fig.7.4] Measure the inside thick diameter, and if it is outside the usable range, replace the C Spool Valve Assembly.
If the seal ring is worn out or cracked, replace C Spool Valve Assembly .

Usable range of Seal ring

2.95 ~ 3.00 mm



- Sleeve Assembly [Fig.7.5]
Measure the inside diameter, and if it is outside the usable range, replace the sleeve assembly.

Usable range of Sleeve

Ø 18.63 ~ Ø 18.65 mm

- O rings
If the O ring is worn out or cracked, replace it.
- <NOTE>
C Spool Valve Assembly and Sleeve Assembly must be replaced complete set. Unable to replace individual component

7.3 Installation

For installation, see [9. Exploded View] on after p. 11, and install in the reverse order of disassembly.

Tightening torque for installation Cap A, Cap B

6 N·m { 60kgf·cm }

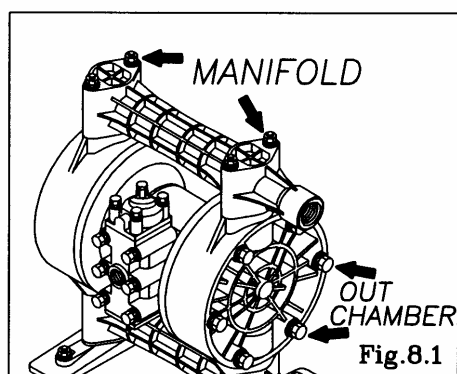
Tightening torque for Valve body installation bolts

7.5 N·m { 75kgf·cm }

<NOTE>

- Make sure there is no dust on the seal surface and it is not damaged.
- Install the sleeve at the center of the valve body. At this point, apply lubricating oil around the sleeve and O ring.

8. Retightening of Tie rods



- The torque should be applied on the occasion of
 - (1) Right before the pump to use.
 - (2) There are any leaks of material on daily inspecting a pump.

■ Metal type

		Retainer bolts from the out chamber	Retainer bolts from the manifold
NDP-20	BAC, BAN, BAE, BAV	10 N·m {100 kgf·cm}	10 N·m {100 kgf·cm}
	BSC, BSN, BSE, BSV		
	BAC-D, BAN-D		
	BAT, BAH, BAS	13 N·m {130 kgf·cm}	20 N·m {200 kgf·cm}
	BST, BSH, BSS		
	BAT-D, BAH-D		

		Retainer bolts from the out chamber	Retainer bolts from the manifold
NDP-25	BAC, BAN, BAE, BAV	10 N·m {100 kgf·cm}	10 N·m {100 kgf·cm}
	BSC, BSN, BSE, BSV		
	BFC, BFN, BFE, BFV		
	BAT, BAH, BAS	20 N·m {200 kgf·cm}	35 N·m {350 kgf·cm}
	BST, BSH, BSS		
	BFT, BFH, BFS		

■ Plastic type

		Retainer bolts from the out chamber	Retainer bolts from the manifold
NDP-20	BPC, BPN, BPE, BPV	10 N·m {100 kgf·cm}	10 N·m {100 kgf·cm}
	BPT, BPH, BPS	13 N·m {130 kgf·cm}	12 N·m {120 kgf·cm}
	BPH/T	13 N·m {130 kgf·cm}	10 N·m {100 kgf·cm}

		Retainer bolts from the out chamber	Retainer bolts from the manifold
NDP-25	BPC, BPN, BPE, BPV	10 N·m {100 kgf·cm}	10 N·m {100 kgf·cm}
	BVE, BVV		
	BPT, BPH, BPS, BVT	20 N·m {200 kgf·cm}	12 N·m {120 kgf·cm}
	BVH		
	BPH/T	20 N·m {200 kgf·cm}	10 N·m {100 kgf·cm}
	BVH/T		

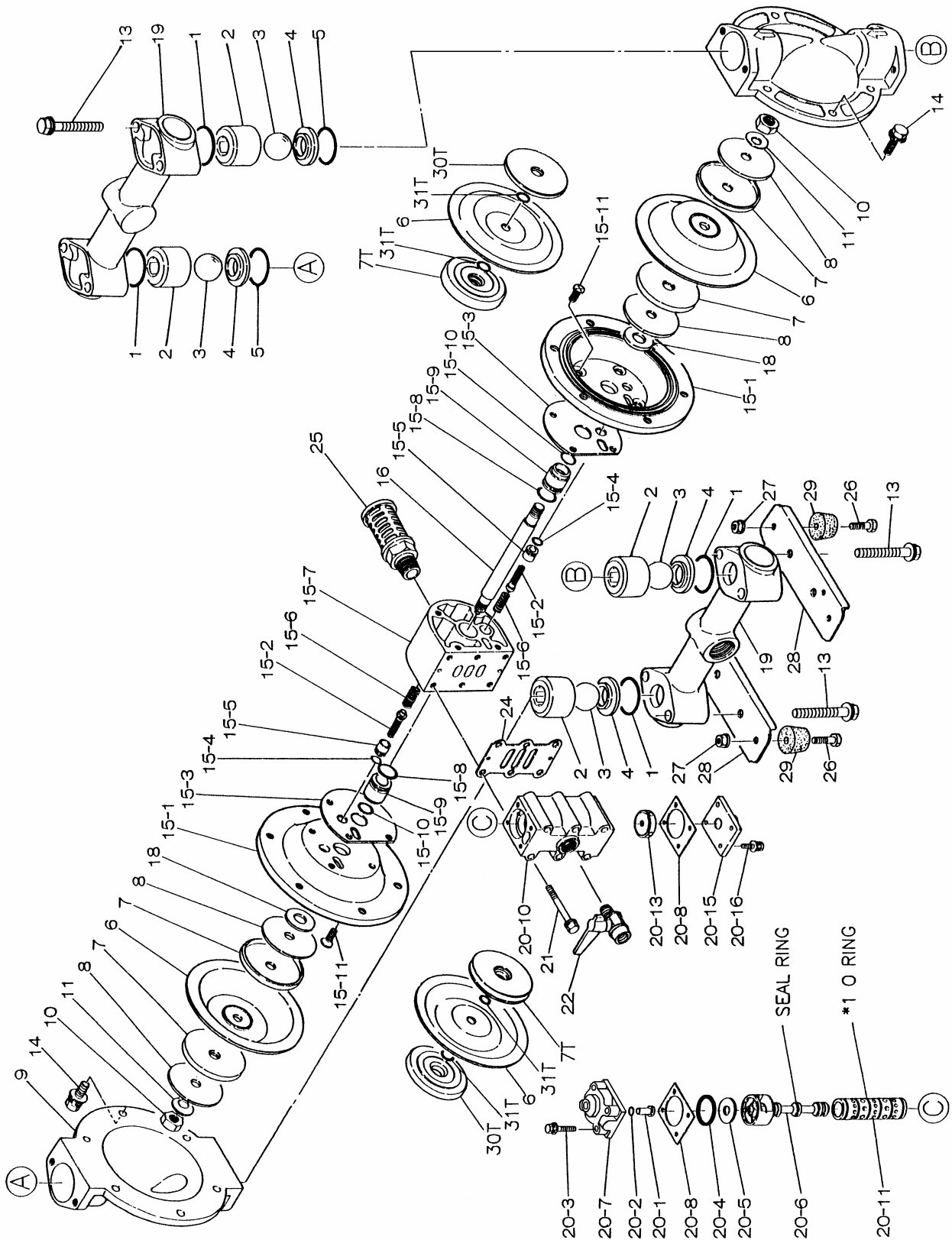
<NOTE>

- Tighten the bolts that balance should be equal from both side on diagonal line with even torque.
- Retighten the Out chamber and then the manifold in this order. [Fig.8.1]

9. Exploded View and Parts List

9.1 Exploded View

■NDP-20・25BA□,BS□,BF□



9.1 Parts List

■NDP-20・25BA□, BS□, BF□

NO.	20BA□	20BS□	25BA□	25BS□	25BF□	DESCRIPTION	QTY	NOTE
1	Tab.1	←	←	←	←	O RING	4	
2	711700	711701	711702	711703	←	VALVE STOPPER	4	
3	Tab.4	←	←	←	←	BALL	4	
4	590086	711705	590087	711707	590087	VALVE SEAT	4	
5	Tab.5	←	Tab.6	←	←	O RING	2	
6	Tab.7	←	←	←	←	DIAPHRAGM	2	
7	709153	←	709151	←	←	CENTER DISK	4	
7T	709456	←	709459	←	←	CENTER DISK	2	
8	709152	←	709150	←	←	PLAIN WASHER	4	EXCLUDED B□T
9	711686	711693	711687	711694	711695	OUT CHAMBER	2	
10	682263	←	←	←	←	NUT	2	M14 x 1.5
11	682730	←	←	←	←	CONED DISK SPRING	2	M14
13	682264	682727	←	←	←	BOLT	8	M8 x 1.25 x 60
	←	←	682267	682728	682267	BOLT	8	M10 x 1.5 x 72
14	682724	682722	←	←	←	BOLT	12	M8 x 1.25 x 30
	←	←	682725	682723	682725	BOLT	12	M10 x 1.5 x 35
15	802051	←	802052	←	←	BODY ASSEMBLY	1	
16	709163	←	709162	←	←	CENTER ROD	1	
17	791071	←	←	←	←	NAME PLATE	1	
18	771054	←	←	←	←	CUSHION	2	
19	831243	831245	831244	831250	831249	MANIFOLD ASSEMBLY	2	
20	802361	←	←	←	←	VALVE BODY ASSEMBLY	1	
21	682265	←	←	←	←	BOLT	6	M8 x 1.25 x 75
22	686018	←	←	←	←	BALL VALVE	1	3/8" x 1/4"
	←	←	682772	←	←	BALL VALVE	1	3/8"
24	771056	←	←	←	←	GASKET	1	
25	680913	←	←	←	←	SILENCER	1	3/4"
26	611148	←	←	←	←	BOLT	4	M8 x 1.25 x 22
27	682276	←	←	←	←	NUT WITH FLANGE	4	M8 x 1.25
28	709157	←	709156	←	←	PUMP BASE	2	
29	770551	←	←	←	←	CUSHION	4	
30T	709314	709326	709327	709331	←	CENTER DISK	2	
31T	643013	←	←	←	←	O RING	4	P14

NOTE 1) T: BAT/BST/BFT

2) Tab.1~Tab.7: SEE [9.4 Parts List "COMMON PARTS"] ON P.17.

3) NO.17(NAME PLATE) IS NOT INDICATED IN EXPLODED VIEW

■NDP-20BA□-D



9.2 Parts List

■NDP-20BA□-D

NO.	BA□-D	DESCRIPTION	Q'TY	NOTE
1	Tab.1	O RING	4	
2	711700	VALVE STOPPER	4	
3	Tab.4	BALL	4	
4	590086	VALVE SEAT	4	
5	Tab.5	O RING	2	
6	Tab.7	DIAPHRAGM	2	
7	709153	CENTER DISK	4	
7T	709456	CENTER DISK	2	
8	709152	PLAIN WASHER	4	EXCLUDED BAT-D
9	711686	OUT CHAMBER	2	
10	682263	NUT	2	M14 x 1.5
11	682730	CONED DISK SPRING	2	M14
13	682264	BOLT	4	M8 x 1.25 x 60
14	682724	BOLT	12	M8 x 1.25 x 30
15	802051	BODY ASSEMBLY	1	
16	709163	CENTER ROD	1	
17	791071	NAME PLATE	1	
18	771054	CUSHION	2	
19	831243	MANIFOLD ASSEMBLY	1	
20	802361	VALVE BODY ASSEMBLY	1	
21	682265	BOLT	6	M8 x 1.25 x 75
22	686018	BALL VALVE	1	3/8" x 1/4"
24	771056	GASKET	1	
25	680913	SILENCER	1	3/4"
30T	709314	CENTER DISK	2	
31T	643013	O RING	4	P14 PTFE
35	611149	BOLT	4	M8 x 1.25 x 25
36	631420	SPRING LOCK WASHER	4	M8
37	631013	PLAIN WASHER	4	M8
38	709405	MANIFOLD	1	
40	804000	SUCTION PIPE SET	1	

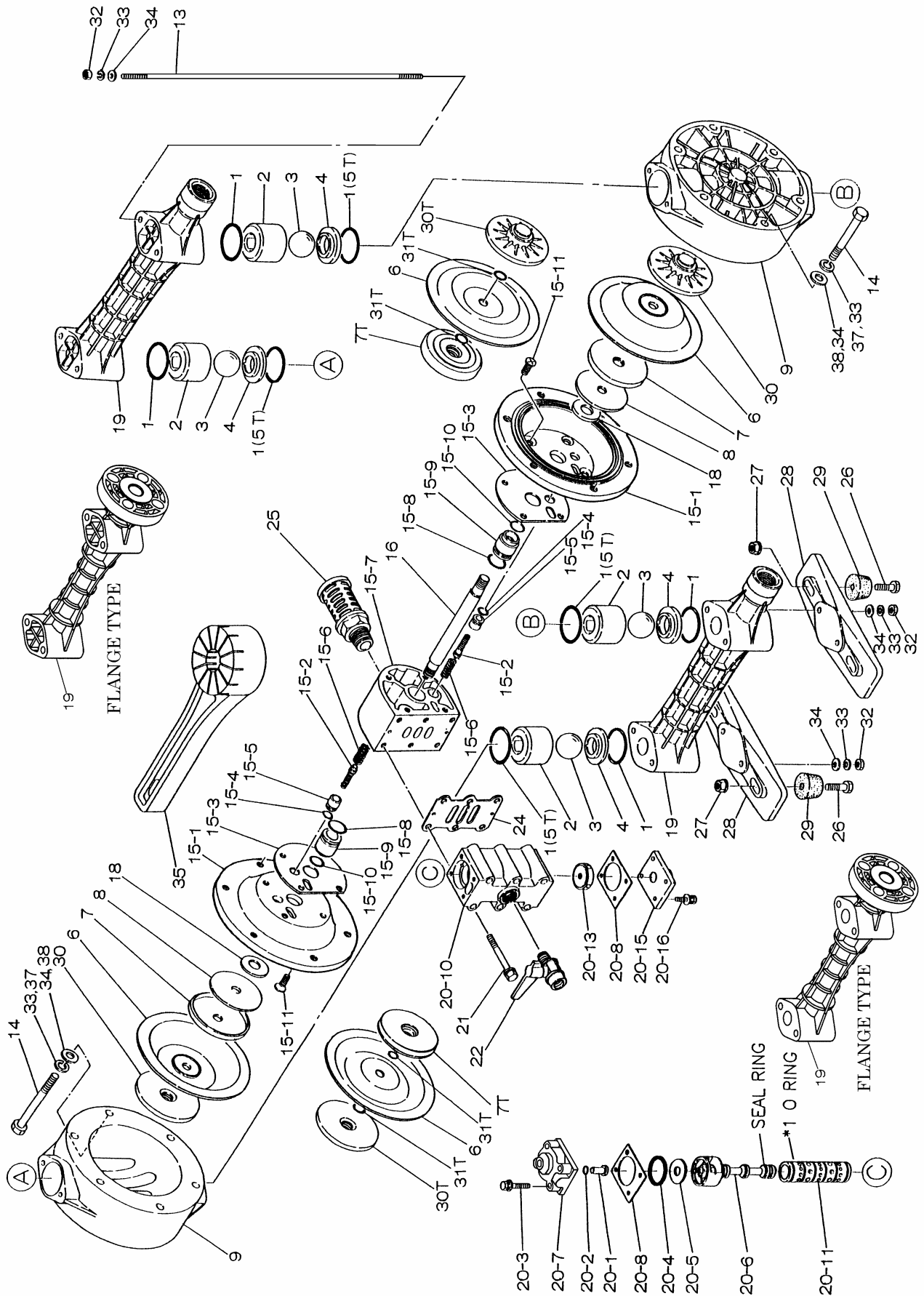
NOTE 1) T: BAT-D

2) Tab.1 ~ Tab.7: SEE [9.4 Parts List "COMMON PARTS"] ON P.17.

3) NO.17 (NAME PLATE) IS NOT INDICATED IN EXPLODED VIEW

9.3 Exploded View

■NDP-20 ■ 25BP□,BV□



9.3 Parts List

■NDP-20・25BP□,BV□

NO.	20BP□		25BP□		25BV□		DESCRIPTION	Q'TY	NOTE
	PT	20A FLANGE	PT	25A FLANGE	PT	25A FLANGE			
1	Tab.2	←	←	←	Tab.3	←	O RING	-	
2	771216	←	771231	←	780141	←	VALVE STOPPER	4	
3	Tab.4	←	←	←	←	←	BALL	4	
4	780137	←	780138	←	780139	←	VALVE SEAT	4	
5T	←	←	←	←	643041	←	O RING	4	P42 PTFE
6	Tab.7	←	←	←	←	←	DIAPHRAGM	2	
7	709153	←	709151	←	←	←	CENTER DISK	2	
7T	709456	←	709459	←	←	←	CENTER DISK	2	
8	709152	←	709150	←	←	←	PLAIN WASHER	2	EXCLUDED B□T
9	780134	←	780135	←	780136	←	OUT CHAMBER	2	
13	710122	←	710207	←	←	←	TIE ROD	4	
14	621163	←	←	←	←	←	BOLT	12	M8 x 1.25 x 80
	←	←	621189	←	←	←	BOLT	12	M10 x 1.5 x 90
15	802807	←	802701	←	←	←	BODY ASSEMBLY	1	
16	710252	←	710271	←	←	←	CENTER ROD	1	
17	790912	←	←	←	791071	←	NAME PLATE	1	
18	771054	←	←	←	←	←	CUSHION	2	
19	780172	780208	780173	780209	780174	780211	MANIFOLD	2	(BSP)
20	802700	←	←	←	←	←	VALVE BODY ASSEMBLY	1	
21	682265	←	←	←	←	←	BOLT	6	M8 x 1.25 x 75
22	686018	←	←	←	←	←	BALL VALVE	1	3/8" x 1/4"
	←	←	682772	←	←	←	BALL VALVE	1	3/8"
24	771056	←	←	←	←	←	GASKET	1	
25	680913	←	←	←	←	←	SILENCER	1	3/4"
26	611151	←	←	←	←	←	BOLT	4	M8 x 1.25 x 30
	←	←	611153	←	←	←	BOLT	4	M8 x 1.25 x 35
27	682276	←	←	←	←	←	NUT WITH FLANGE	4	M8 x 1.25
28	771219	←	771235	←	771749	←	PUMP BASE	2	
29	770551	←	←	←	←	←	CUSHION	4	
30	780123	←	780125	←	780127	←	CENTER DISK	2	
30T	780124	←	780126	←	780128	←	CENTER DISK	2	
31T	643013	←	←	←	←	←	O RING	4	P14
32	683635	←	←	←	←	←	NUT	8	M8 x 1.25
33	681300	←	←	←	←	←	SPRING LOCK WASHER	20	M8
	←	←	681300	←	←	←	SPRING LOCK WASHER	8	M8
34	631329	←	←	←	←	←	PLAIN WASHER	20	M8
	←	←	631329	←	←	←	PLAIN WASHER	8	M8
35	771244	←	←	←	←	←	ACCESSORY TOOL	2	
37	←	←	680257	←	←	←	SPRING LOCK WASHER	12	M10
38	←	←	631330	←	←	←	PLAIN WASHER	12	M10

NOTE 1)T:BPT/BVT

2)Tab.1~Tab.7:SEE [9.4 Parts List "COMMON PARTS"] ON P.17.

3)NO.17(NAME PLATE) IS NOT INDICATED IN EXPLODED VIEW

9.4 Parts List

COMMON PARTS

Tab.1 O RING

TYPE	20BA/BS□ P36	20BA□-D P36	25BA/BS/BF□ P46	MATERIAL
B□C	640036	←	640044	NBR
B□N	640036	←	640044	NBR
B□E	684118	↗	683997	EPDM
B□V	642036	↗	642044	FKM
B□T	643036	←	643044	PTFE
B□H	640036	←	640044	NBR
B□S	684118	↗	683997	EPDM
B□H/T	640036	↗	640044	NBR

Tab.2 O RING

TYPE	20BP□ P34	25BP□ P44	Q'TY	MATERIAL
BPC	640033	640042	8	NBR
BPN	640033	640042	8	NBR
BPE	684116	684119	8	EPDM
BPV	642033	642042	8	FKM
BPT	643033	643042	8	PTFE
BPH	640033	640042	8	NBR
BPS	684116	684119	8	EPDM
BPH/T	640033	640042	8	NBR

Tab.3 O RING

TYPE	25BV□ P44	Q'TY	MATERIAL
BVC	↗		
BVN	↗		
BVE	684119	8	EPDM
BVV	642042	8	FKM
BVT	643042	4	PTFE
BVH	643042	4	PTFE
BVS	↗		

Tab.4 BALL

TYPE	20BA/BS□	20BA□-D	20BP□	25BA/BS/BF□	25BP□	25BV□	MATERIAL
B□C	770705	←	←	770556	←	↗	CR
B□N	770720	←	←	770581	←	↗	NBR
B□E	770723	↗	770723	770590	←	←	EPDM
B□V	770726	↗	770726	770599	←	←	FKM
B□T	770736	←	←	770691	←	←	PTFE
B□H	770720	←	←	770581	←	↗	NBR
B□S	770723	↗	770723	770590	←	770691	PTFE
B□H/T	770736	↗	770736	770691	←	↗	EPDM
					←	↗	PTFE

Tab.5 O RING (G35: EXCLUDED B□T)

TYPE	20BA/BS□	20BA□-D	MATERIAL
B□C	640132	←	NBR
B□N	640132	←	NBR
B□E	684117	↗	EPDM
B□V	642132	↗	FKM
B□T	771131	←	PTFE
B□H	640132	←	NBR
B□S	684117	↗	EPDM
B□H/T	640132	↗	NBR

Tab.6 O RING (G45: EXCLUDED B□T)

TYPE	25BA/BS/BF□	MATERIAL
B□C	640134	NBR
B□N	640134	NBR
B□E	683996	EPDM
B□V	642134	FKM
B□T	771130	PTFE
B□H	640134	NBR
B□S	683996	EPDM
B□H/T	640134	NBR

Tab.7 DIAPHRAGM

TYPE	20BA/BS□	20BA□-D	20BP□	25BA/BS/BF□	25BP□	25BV□	MATERIAL
B□C	771254	←	←	771258	←	↗	CR
B□N	771255	←	←	771259	←	↗	NBR
B□E	771256	↗	771256	771260	←	←	EPDM
B□V	771257	↗	771257	771261	←	←	FKM
B□T	771083	←	←	771110	←	←	PTFE
B□H	771362	←	←	771363	←	←	TPEE
B□S	771973	↗	771973	771974	←	↗	TPO
B□H/T	771362	↗	771362	771363	←	↗	TPEE

9.5 Parts List

■ BODY ASSEMBLY

802051 BODY ASSEMBLY

[20BA□,BS□,BA□-D]

NO.	PART NO.	DESCRIPTAION	Q'TY	NOTE
15-1	710275	AIR CHAMBER	2	
15-2	802360	PILOT VALVE ASSEMBLY	2	
15-3	771057	GASKET	2	
15-4	640009	O RING	2	P11 NBR
15-5	771945	VALVE SEAT	2	
15-6	708666	SPRING	2	
15-7	709154	BODY	1	
15-8	685276	O RING	2	
15-9	772703	THROAT BEARING	2	
15-10	685414	PACKING	2	
15-11	682486	FLAT HEAD BOLT	8	M8 x 1.25 x 20

802052 BODY ASSEMBLY

[25BA□,BS□,BF□]

NO.	PART NO.	DESCRIPTAION	Q'TY	NOTE
15-1	710276	AIR CHAMBER	2	
15-2	802360	PILOT VALVE ASSEMBLY	2	
15-3	771057	GASKET	2	
15-4	640009	O RING	2	P11 NBR
15-5	771945	VALVE SEAT	2	
15-6	708666	SPRING	2	
15-7	709154	BODY	1	
15-8	685276	O RING	2	
15-9	772703	THROAT BEARING	2	
15-10	685414	PACKING	2	
15-11	682486	FLAT HEAD BOLT	8	M8 x 1.25 x 20

802807 BODY ASSEMBLY

[20BP□]

NO.	PART NO.	DESCRIPTAION	Q'TY	NOTE
15-1	711504	AIR CHAMBER	2	
15-2	802360	PILOT VALVE ASSEMBLY	2	
15-3	771057	GASKET	2	
15-4	640009	O RING	2	P11 NBR
15-5	771945	VALVE SEAT	2	
15-6	708666	SPRING	2	
15-7	711217	BODY	1	
15-8	685276	O RING	2	
15-9	772703	THROAT BEARING	2	
15-10	685414	PACKING	2	
15-11	682486	FLAT HEAD BOLT	8	M8 x 1.25 x 20

802701 BODY ASSEMBLY

[25BP□,BV□]

NO.	PART NO.	DESCRIPTAION	Q'TY	NOTE
15-1	711220	AIR CHAMBER	2	
15-2	802360	PILOT VALVE ASSEMBLY	2	
15-3	771057	GASKET	2	
15-4	640009	O RING	2	P11 NBR
15-5	771945	VALVE SEAT	2	
15-6	708666	SPRING	2	
15-7	711217	BODY	1	
15-8	685276	O RING	2	
15-9	772703	THROAT BEARING	2	
15-10	685414	PACKING	2	
15-11	682486	FLAT HEAD BOLT	8	M8 x 1.25 x 20

9.6 Parts List

■ VALVE BODY ASSEMBLY

802361 VALVE BODY ASSEMBLY

[20·25BA□,BS□,BF□,BA□-D]

NO.	PART NO.	DESCRIPTION	Q'TY	NOTE
20-1	709161	RESET BUTTON	1	
20-2	640005	O RING	1	P8 NBR
20-3	682704	BOLT	4	M6 x 1 x 32
20-4	771241	PACKING	1	
20-5	715961	PLAIN WASHER	1	
20-6	802400	C SPOOL VALVE ASSEMBLY	1	
20-7	710221	CAP	1	
20-8	771240	GASKET	2	
20-10	711638	VALVE BODY	1	
20-11	803931	SLEEVE ASSEMBLY	1	*1(771080)
20-13	771914	CUSHION	1	
20-15	709305	CAP	1	
20-16	682262	BOLT	4	M6 x 1 x 16

802700 VALVE BODY ASSEMBLY

[20·25BP□,BV□]

NO.	PART NO.	DESCRIPTION	Q'TY	NOTE
20-1	709161	RESET BUTTON	1	
20-2	640005	O RING	1	P8 NBR
20-3	682704	BOLT	4	M6 x 1 x 32
20-4	771241	PACKING	1	
20-5	715961	PLAIN WASHER	1	
20-6	802400	C SPOOL VALVE ASSEMBLY	1	
20-7	711219	CAP	1	
20-8	771240	GASKET	2	
20-10	711641	VALVE BODY	1	
20-11	803931	SLEEVE ASSEMBLY	1	*1(771080)
20-13	771914	CUSHION	1	
20-15	711212	CAP	1	
20-16	682262	BOLT	4	M6 x 1 x 16

NOTE)*1: PARTS NUMBER MENTIONED ON O RING FOR SLEEVE ASSEMBLY ONLY.

9.7 Parts List

■ SUCTION PIPE SET

804000 SUCTION PIPE SET

NO.	PART NO.	DESCRIPTION	Q'TY	NOTE
40-1	709406	SUCTION PIPE	1	R1 x L927
40-2	803667	BUNG ADAPTER ASSEMBLY	1	

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