

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

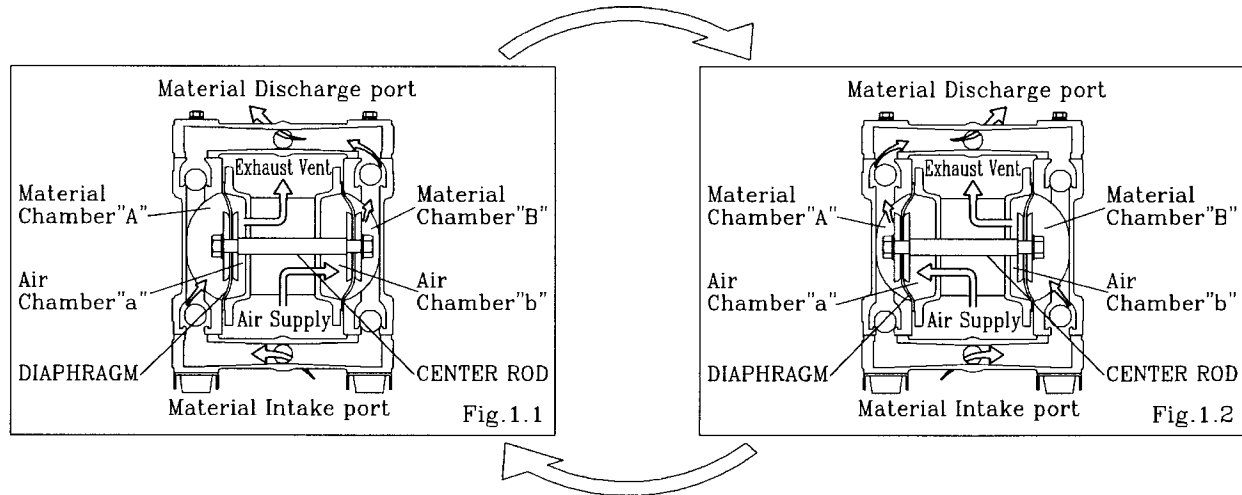
·Warnings and Cautions	
·Table of Contents	
1.Principles of operation	1
2.Tools, etc	
2.1 General tools	1
2.2 Special tools	1
2.3 Misc.	1
3.Ordering Replacement parts	1
4.Balls and Valve seats	
4.1 Removal	
■BA□, BS□, BF□ types	2
■BP□, BV□ types	3
4.2 Inspection	4
4.3 Installation	4
5.Diaphragm and Center rod	
5.1 Removal	
■BA□, BS□, BF□ types	5
■BP□, BV□ types	5
5.2 Inspection	6
5.3 Installation	
■BC□, BN□, BE□, BV□, BH□, BS□ types	7
■B□T 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 B□A, BS□, BF□	11
9.2 NDP-20-25 BP□, BV□	13
9.3 COMMON PARTS	15
9.4 BODY ASSEMBLY	16
9.5 VALVE BODY ASSEMBLY	17

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.



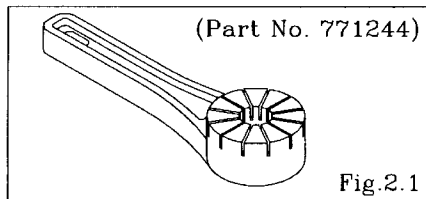
2.Tools, etc.

2.1 General tools

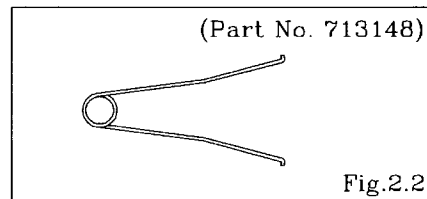
- Socket wrenches 10mm, 12mm, 13mm, 17mm, 22mm
- Hexagonal box wrenches 5mm
- Open-end wrenches 13mm (BP□, BV□), 22mm (BA□, BS□, BF□)

2.2 Special tools

- Accessory tool (included)
Purpose: Removing the center disk
of BP and BV□ types



- Sleeve remover (sold separately)
Purpose: For removing sleeves



2.3 Misc.

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

3.Ordering Replacement parts

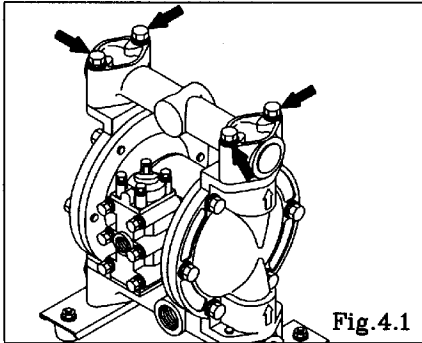
For accurate and speedy shipment of parts, be sure to order the right parts for your model to distributor. Indicate the part numbers, descriptions, and quantities.

4. Balls and Valve seats

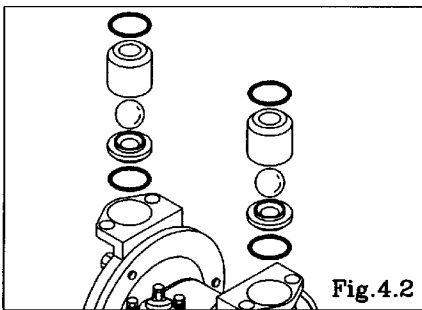
4.1 Removal

■BA□, BS□, BF□

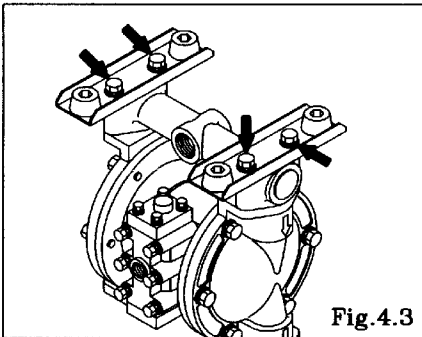
See [9. Exploded View] on after p. 11. (Fig. 4.1, 4.2, 4.3 and 4.4 show the NDP-20 BS□.)



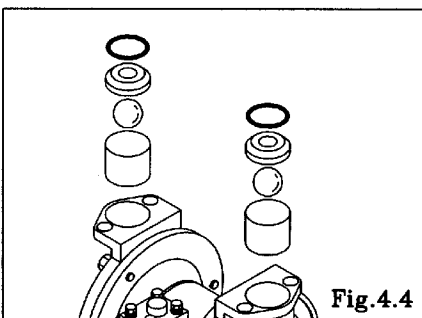
- Remove the 4 retainer bolts from the out manifold, and remove the out manifold. [Fig.4.1]



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



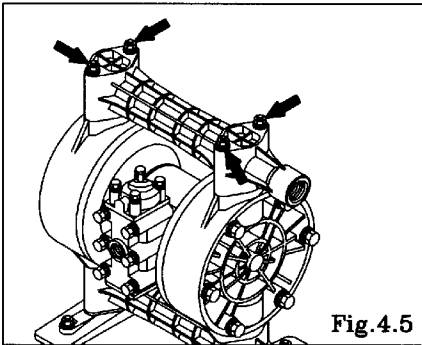
- Turn over the main body assembly. [Fig.4.3]
- Remove the 4 retainer bolts from the in manifold, and remove the in manifold and pump bases. [Fig.4.3]



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

■BP□, BV□ types

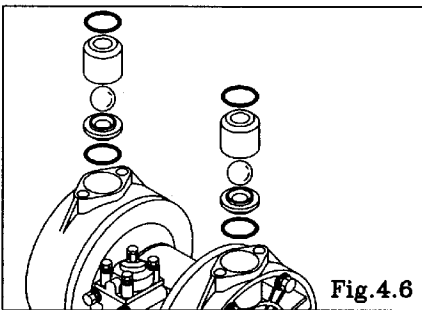
See [9. Exploded View] on after p. 11 (Fig. 4.5, 4.6, 4.7 and 4.8 show the NDP-20 BP□ [Thread type].)



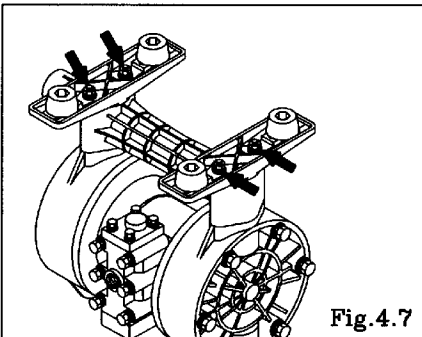
- Remove the 4 retainer nuts from the upper side of tie rods, and remove the out manifold. [Fig.4.5]

<NOTE>

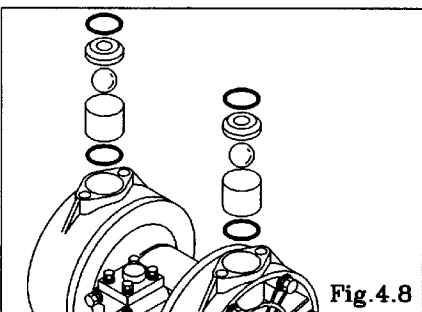
- When the retainer nuts both sides of the tie rod remove, the in manifold removes.



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

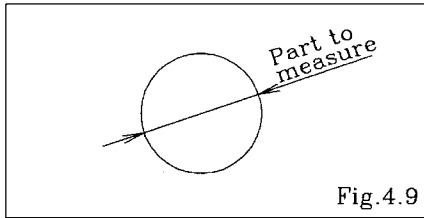


- Turn over the main body assembly. [Fig.4.7]
- Pull out the tie rod, and remove the base and in manifold. [Fig.4.7]



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

4.2 Inspection

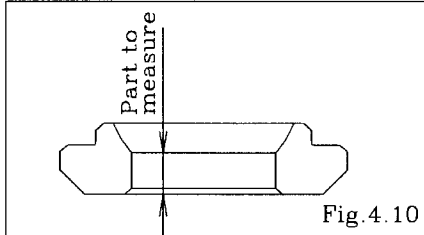


- Ball [Fig.4.9]

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

Usable range of Ball

NDP-20	Sø0.957 ~ Sø1.095 in {Sø24.3 ~ Sø27.8 mm}
NDP-25	Sø1.240 ~ Sø1.421 in {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□, BF□	BP□, BV□
NDP-20	0.134 ~ 0.335 in {3.4 ~ 8.5 mm}	0.130 ~ 0.319 in {3.3 ~ 8.1 mm}
NDP-25	0.150 ~ 0.374 in {3.8 ~ 9.5 mm}	0.134 ~ 0.374 in {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□	8 lbf-ft	15 lbf-ft
	BS□	{100kgf-cm}	{200kgf-cm}
NDP-25	BA□	8 lbf-ft	25 lbf-ft
	BS□	{100kgf-cm}	{350kgf-cm}
	BF□		

Tightening torque for manifold retainer nuts

		C, N, E, V	T, H, S,
NDP-20	BP□	8 lbf-ft	9 lbf-ft
NDP-25	BP□	{100kgf-cm}	{120kgf-cm}
	BV□		

- NDP-20B□H/T, NDP-25□H/T type be with 8 lbf-ft tightening.

<NOTE>

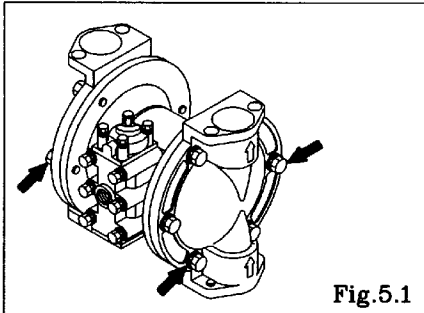
- Make sure there is no dust on the seal surface and the seal is not damaged.
- Replace the PTFE O ring regardless of its condition.

5. Diaphragm and Center rod

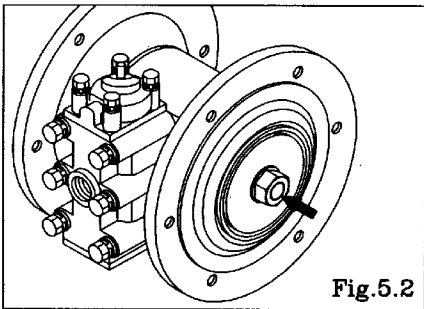
5.1 Removal

■ BA□, BS□, B□F types

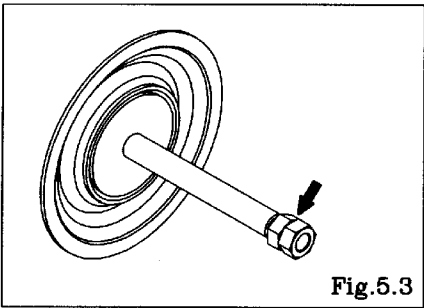
See [9. Exploded View] on after p. 11. (Fig. 5.1 shows the NDP-20 BS□.)



- Remove the ball and valve seat etc. (see [4.1 Removal BA□, BS□, BF□ types] on p.2)
- Remove the 12 retainer bolts from the out chamber, and remove the out chamber. [Fig.5.1]



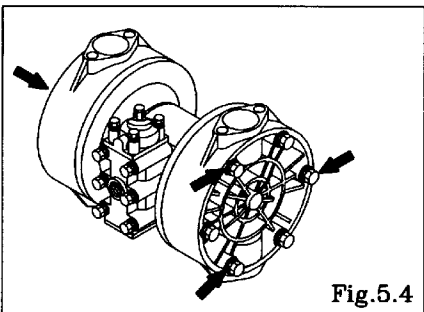
- Remove the nuts on both sides of the center rod. [Fig.5.2]
- After the nuts on one side have been removed, remove the center disk and diaphragm. Remove the diaphragm, center disk and center rod from the opposite side of the main body.



- 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]

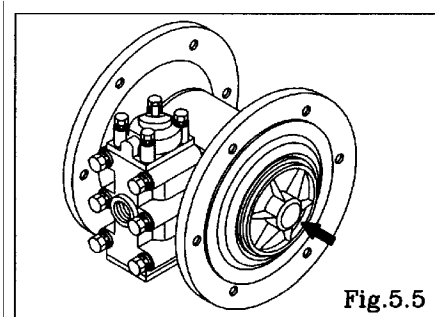


Fig.5.5

- 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.

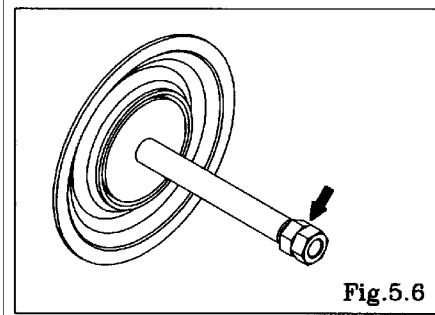


Fig.5.6

- 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

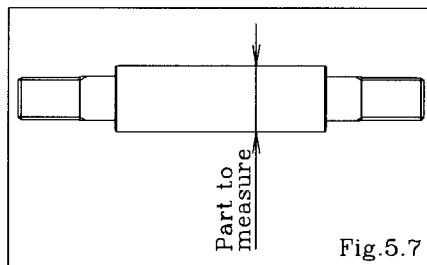


Fig.5.7

- 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

$\phi 0.704 \sim \phi 0.709$ in $\{\phi 17.9 \sim \phi 18.0 \text{ mm}\}$

5.3 Installation

■ B□C, B□N, B□E, B□V, B□H, BS types

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

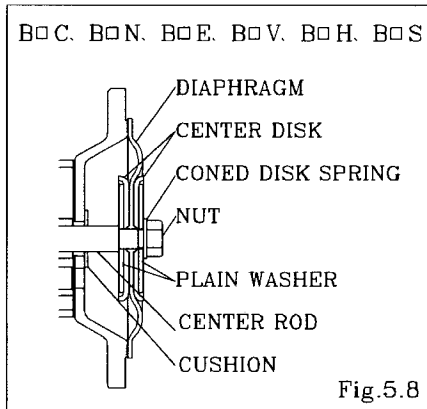


Fig.5.8

- 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 B□□, B□□ types. (No coned disk springs and nuts are needed.)

Tightening torque for center rod

B□C, B□N, B□E, B□V	22 lbf-ft { 300 kgf-cm }
B□H, B□S	29 lbf-ft { 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	8 lbf-ft { 100 kgf-cm }
	B□H, B□S	10 lbf-ft { 130 kgf-cm }
NDP-25	B□C, B□N, B□E, B□V	8 lbf-ft { 100 kgf-cm }
	B□H, B□S	15 lbf-ft { 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 types

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

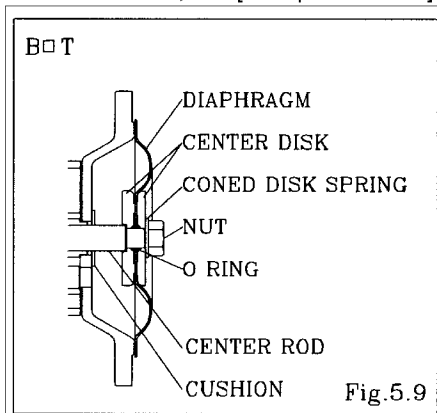


Fig.5.9

- 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 B□T, B□T types. (No coned disk springs and nuts are needed.)

Tightening torque for center rod

29 lbf-ft { 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	10 lbf-ft { 130 kgf-cm }
NDP-25	15 lbf-ft { 200 kgf-cm }

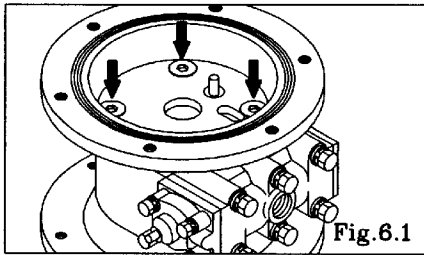
<NOTE>

- 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.

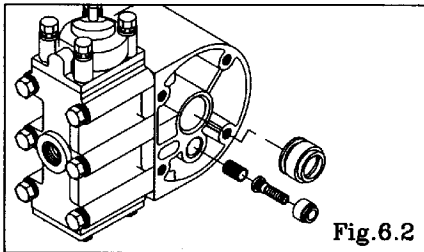
6. Throat bearing and Pilot valve Assembly

6.1 Removal

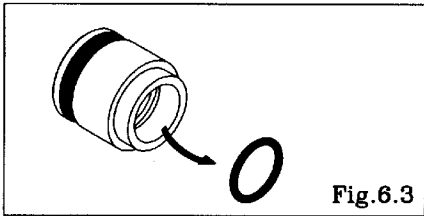
See [9. Exploded View] on after p. 11.



- 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]

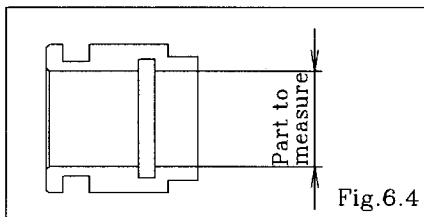


- Draw out the pilot valve assembly. [Fig.6.2]
- Draw out the throat bearing. [Fig.6.2]



- 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.

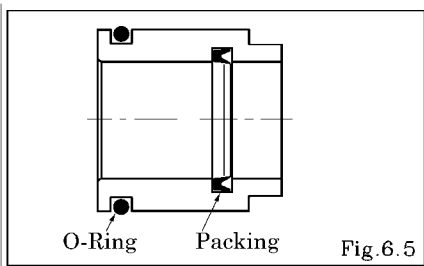
Usable range of throat bearing

$\varnothing 0.710 \sim \varnothing 0.714$ in { $\varnothing 18.03 \sim \varnothing 18.14$ 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

13 lbf-ft { 180 kgf-cm }

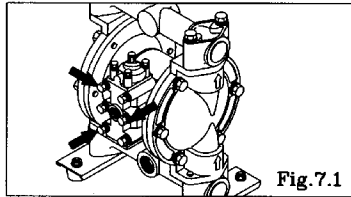
<NOTE>

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

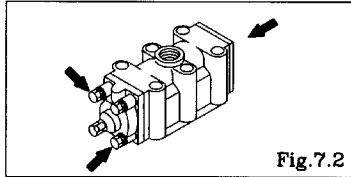
7.C Spool Valve Assembly and Sleeve Assembly

7.1 Removal

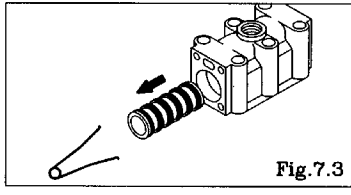
See [9. Exploded View] on after p. 11.



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

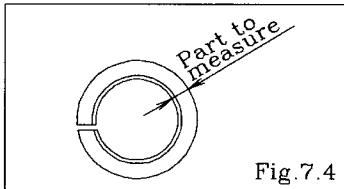


- Remove the 8 cap A and cap B retainer bolts, and remove cap A, cap B, packing, plain washer, cushion and gasket. [Fig.7.2]
- Draw out the C spool valve assembly, and remove the seal ring from the C spool valve assembly.



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

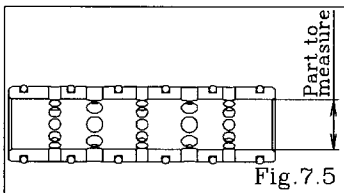
7.2 Inspection



- 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

0.1161 ~ 0.1181 in {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

ø0.733 ~ ø0.734 in {ø18.63 ~ ø18.65 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

4.5 lbf-ft { 60kgf·cm }

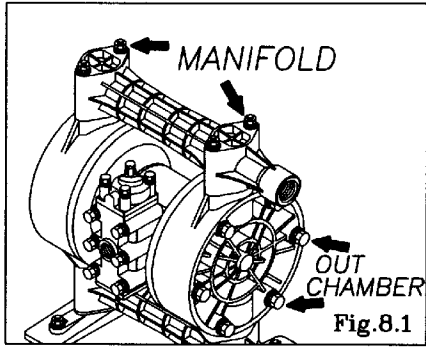
Tightening torque for valve body installation bolts

5.5 lbf-ft { 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

		Retain bolts for the out chamber	Retain bolts for the manifold
NDP-20	BAC, BAN, BAE, BAV	88 lbf-in	88 lbf-in
	BSC, BSN, BSE, BSV		
	BAT, BAH, BAS	115 lbf-in	132 lbf-in
	BST, BSH, BSS		

		Retain bolts for the out chamber	Retain bolts for the manifold
NDP-25	BAC, BAN, BAE, BAV	88 lbf-in	88 lbf-in
	BSC, BSN, BSE, BSV		
	BFC, BFN, BFE, BFV		
	BAT, BAH, BAS	132 lbf-in	221 lbf-in
	BST, BSH, BSS		
	BFT, BFH, BFS		

■ Plastic type

		Retain bolts for the out chamber	Retain bolts for the manifold
NDP-20	BPC, BPN, BPE, BPV	88 lbf-in	88 lbf-in
	BPT, BPH, BPS	115 lbf-in	106 lbf-in
	BPH/T	115 lbf-in	88 lbf-in

		Retain bolts for the out chamber	Retain bolts for the manifold
NDP-25	BPC, BPN, BPE, BPV	88 lbf-in	88 lbf-in
	BVE, BVV		
	BPT, BPH, BPS, BVT	132 lbf-in	106 lbf-in
	BVH		
	BPH/T	132 lbf-in	88 lbf-in
BVH/T			

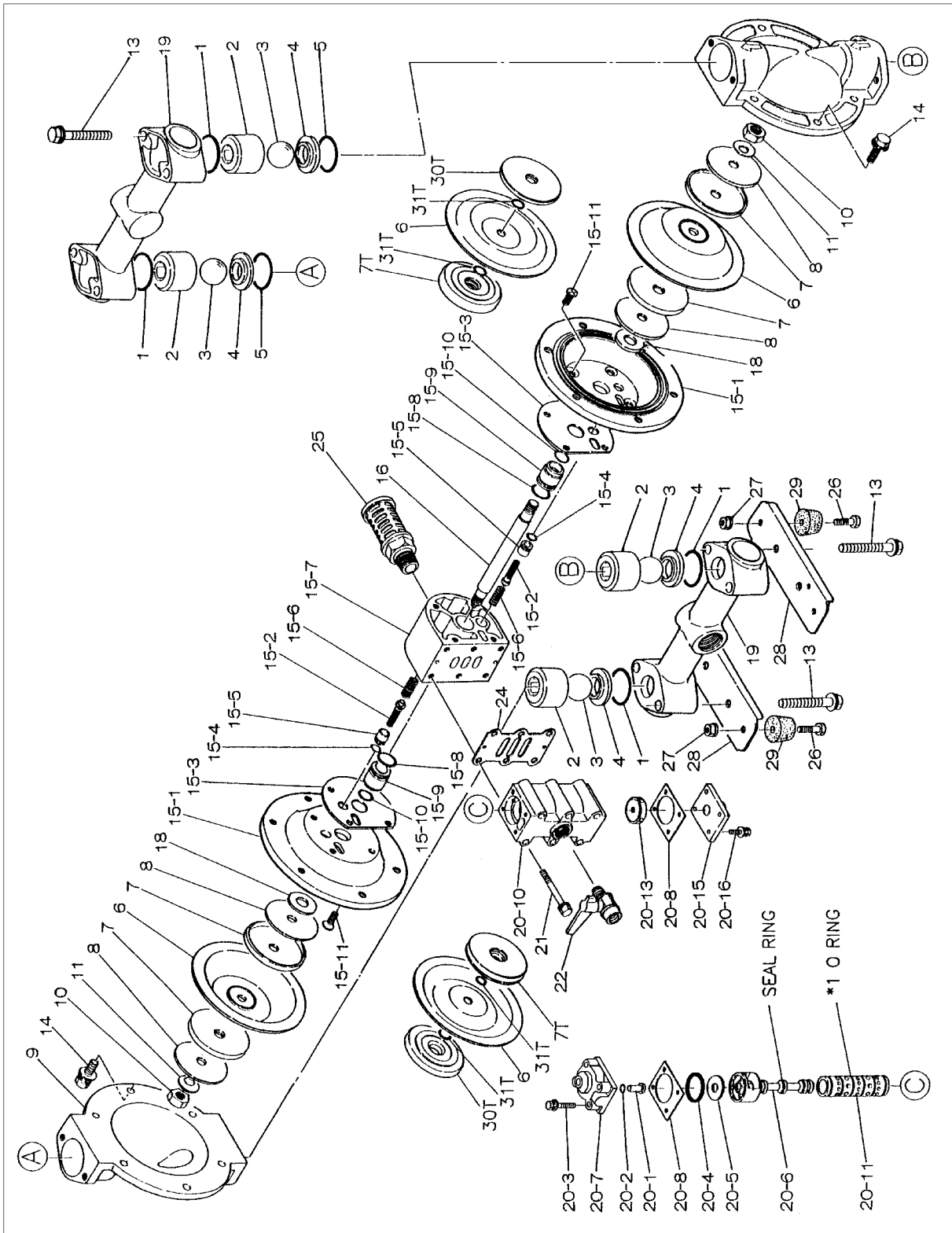
<NOTE>

- 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	Q'TY	NOTE
1	Tab.1	Tab.1	Tab.1	Tab.1	Tab.1	O RING	4	
2	711700	711701	711702	711703	711703	VALVE STOPPER	4	
3	Tab.4	Tab.4	Tab.4	Tab.4	Tab.4	BALL	4	
4	590086	711705	590087	711707	590087	VALVE SEAT	4	
5	Tab.5	Tab.5	Tab.6	Tab.6	Tab.6	O RING	2	
6	Tab.7	Tab.7	Tab.7	Tab.7	Tab.7	DIAPHRAGM	2	
7	709153	709153	709151	709151	709151	CENTER DISK	4	
7T	709456	709456	709459	709459	709459	CENTER DISK	2	
8	709152	709152	709150	709150	709150	PLAIN WASHER	4	EXCLUDED B□T
9	711686	711693	711687	711694	711695	OUT CHAMBAR	2	
10	682263	682263	682263	682263	682263	NUT	2	M14x1.5
11	682730	682730	682730	682730	682730	CONED DISK SPRING	2	M14
13	682264	682727				BOLT	8	M8x1.25x60
			682267	682728	682267	BOLT	8	M10x1.5x72
14	682724	682722				BOLT	12	M8x1.25x30
			682725	682723	682725	BOLT	12	M10x1.5x35
15	802435	802435	802410	802410	802410	BODY ASSEMBLY	1	
16	709163	709163	709162	709162	709162	CENTER ROD	1	
17	790911	790911	790911	790911	790911	NAME PLATE	1	
18	771054	771054	771054	771054	771054	CUSHION	2	
19	831280	831270	831281	831271	831322	MANIFOLD ASSEMBLY	2	
20	802362	802362	802362	802362	802362	VALVE BODY ASSEMBLY	1	
21	682265	682265	682265	682265	682265	BOLT	6	M8x1.25x75
22	686019	686019				BALL VALVE	1	3/8"x1/4"
			684320	684320	684320	BALL VALVE	1	3/8"
24	771056	771056	771056	771056	771056	GASKET	1	
25	682515	682515	682515	682515	682515	SILENCER	1	3/4"
26	611148	611148	611148	611148	611148	BOLT	4	M8x1.25x22
27	682276	682276	682276	682276	682276	NUT WITH FLANGE	4	M8x1.25
28	709157	709157	709156	709156	709156	PUMP BASE	2	
29	770551	770551	770551	770551	770551	CUSHION	4	
30T	709314	709326	709327	709331	709331	CENTER DISK	2	
31T	643013	643013	643013	643013	643013	O RING	4	P14

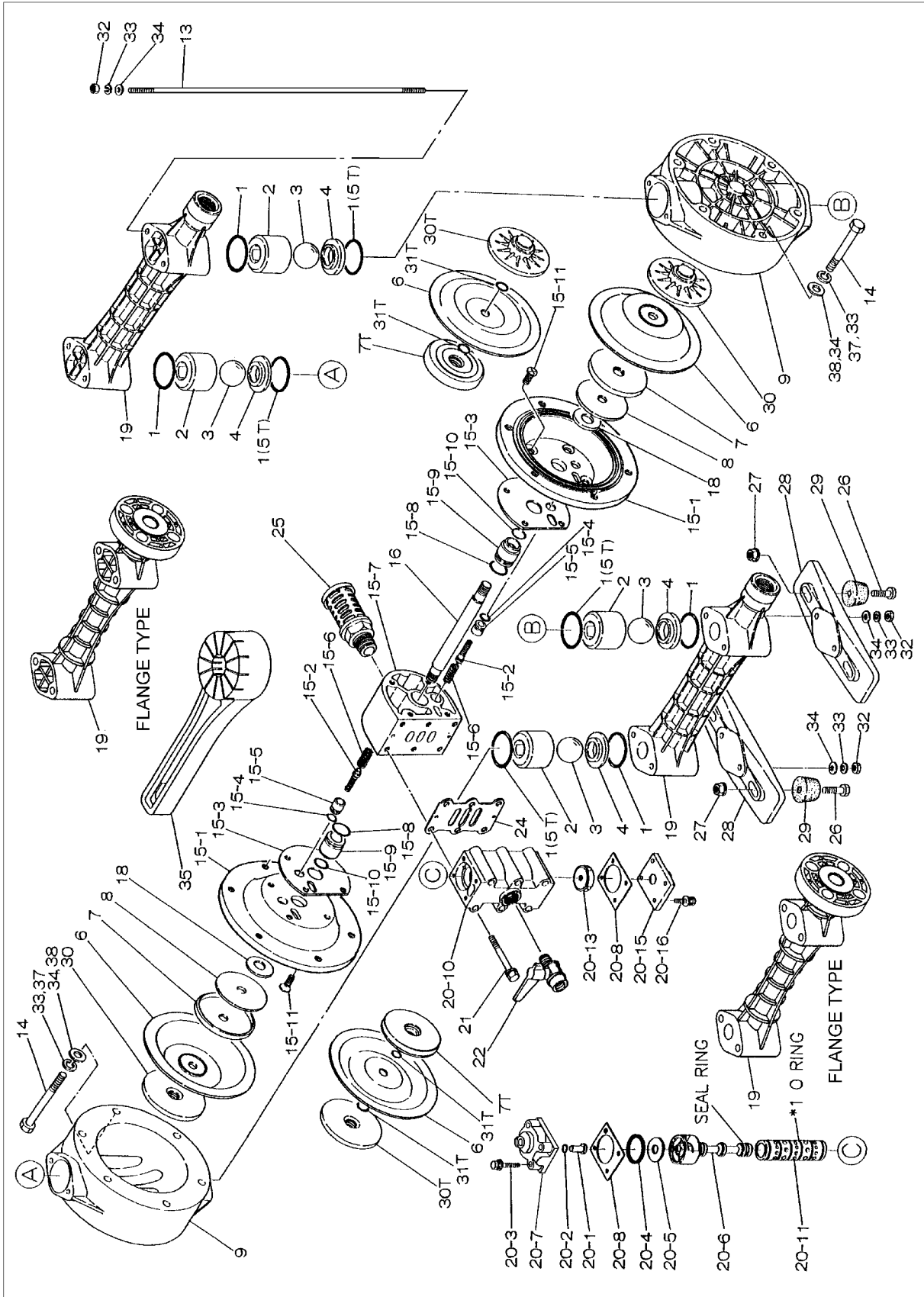
NOTE 1)T : BAT/BST/BFT

2)Tab.1~Tab7 : SEE [9.3 Parts List "COMMON PARTS"] ON P.15.

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

9.2 Exploded View

■NDP-20-25BP□,BV□



9.2 Parts List

■NDP-20-25BP□,BV□

NO.	20BP□		25BP□		25BV□		DESCRIPTION	Q'TY	NOTE
	NPT	20A FLANGE	NPT	25A FLANGE	NPT	25A FLANGE			
1	Tab.2	Tab.2	Tab.2	Tab.2	Tab.3	Tab.3	O RING	-	
2	771216	771216	771231	771231	780141	780141	VALVE STOPPER	4	
3	Tab.4	Tab.4	Tab.4	Tab.4	Tab.4	Tab.4	BALL	4	
4	780137	780137	780138	780138	780139	780139	VALVE SEAT	4	
5T					643041	643041	O RING	4	
6	Tab.7	Tab.7	Tab.7	Tab.7	Tab.7	Tab.7	DIAPHRAGM	2	
7	709153	709153	709151	709151	709151	709151	CENTER DISK	2	
7T	709456	709456	709459	709459	709459	709459	CENTER DISK	2	
8	709152	709152	709150	709150	709150	709150	PLAIN WASHER	2	EXCLUDED B□□
9	780134	780134	780135	780135	780136	780136	OUT CHAMBER	2	
13	710122	710122	710207	710207	710207	710207	TIE ROD	4	
14	621163	621163					BOLT	12	M8x1.25x80
			621189	621189	621189	621189	BOLT	12	M10x1.5x90
15	802808	802808	802802	802802	802802	802802	BODY ASSEMBLY	1	
16	710252	710252	710271	710271	710271	710271	CENTER ROD	1	
17	790911	790911	790911	790911	790911	790911	NAME PLATE	1	
18	771054	771054	771054	771054	771054	771054	CUSHION	2	
19	780010	780208	780012	780210	780057	780212	MANIFOLD	2	
20	802809	802809	802809	802809	802809	802809	VALVE BODY ASSEMBLY	1	
21	682265	682265	682265	682265	682265	682265	BOLT	6	M8x1.25x75
	686019	686019					BALL VALVE	1	3/8"x1/4"
22			684320	684320	684320	684320	BALL VALVE	1	3/8"
	771056	771056	771056	771056	771056	771056	GASKET	1	
24	682515	682515	682515	682515	682515	682515	SILENCER	1	3/4"
26	611151	611151					BOLT	4	M8x1.25x30
			611153	611153	611153	611153	BOLT	4	M8x1.25x35
27	682276	682276	682276	682276	682276	682276	NUT WITH FLANGE	4	M8x1.25
28	771219	771219	771235	771235	771749	771749	PUMP BASE	2	
29	770551	770551	770551	770551	770551	770551	CUSHION	4	
30	780123	780123	780125	780125	780127	780127	CENTER DISK	2	
30T	780124	780124	780126	780126	780128	780128	CENTER DISK	2	
31T	643013	643013	643013	643013	643013	643013	O RING	4	P14
32	683635	683635	683635	683635	683635	683635	NUT	8	M8x1.25
33	681300	681300					SPRING LOCK WASHER	20	M8
			681300	681300	681300	681300	SPRING LOCK WASHER	8	M8
34	631329	631329					PLAIN WASHER	20	M8
			631329	631329	631329	631329	PLAIN WASHER	8	M8
35	771244	771244	771244	771244	771244	771244	ACCESSORY TOOL	2	
37			680257	680257	680257	680257	SPRING LOCK WASHER	12	M10
38			631330	631330	631330	631330	PLAIN WASHER	12	M10

NOTE 1)T : BPT/BVT

2)Tab.1~Tab.7 : SEE [9.3 Parts List "COMMON PARTS"] ON P.15.

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

9.3 Parts List

■COMMON PARTS

Tab.1 O RING

TYPE	20BA/BS□	25BA/BS/BF□	MATERIAL
	P36	P46	
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

Tab.2 O RING

TYPE	20BP□	25BP□	Q'TY	MATERIAL
	P34	P44		
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

Tab.3 O RING

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

Tab.4 BALL

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

Tab.5 O RING(G35:EXCLUDED B□T)

TYPE	20BA/BS□	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

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

Tab.7 DIAPHRAGM

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

9.4 Parts List **■ BODY ASSEMBLY**

802435 BODY ASSEMBLY

[20BA□,BS□]

NO.	PART NO.	DESCRIPTION	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	709812	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	M8x1.25x20

802410 BODY ASSEMBLY

[25BA□,BS□,BF□]

NO.	PART NO.	DESCRIPTION	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	709812	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	M8x1.25x20

802808 BODY ASSEMBLY

[20BP□]

NO.	PART NO.	DESCRIPTION	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	711503	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	M8x1.25x20

802802 BODY ASSEMBLY

[25BP□,BV□]

NO.	PART NO.	DESCRIPTION	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	711503	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	M8x1.25x20

9.5 Parts List

■ VALVE BODY ASSEMBLY

802362 VALVE BODY ASSEMBLY

[20,25BA□,BS□,BF□]

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	M6x1x32
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	711639	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	M6x1x16

802809 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	M6x1x16
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	711640	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	M6x1x16

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

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