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MAINTENANCE MANUAL

YAMADA AIR-OPERATED DIAPHRAGM PUMPS

NDP-5
NDP-15

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-5 series and NDP-15 series Diaphragm Pumps.

This edition is based on the standards for the March 2001 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 remains 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.

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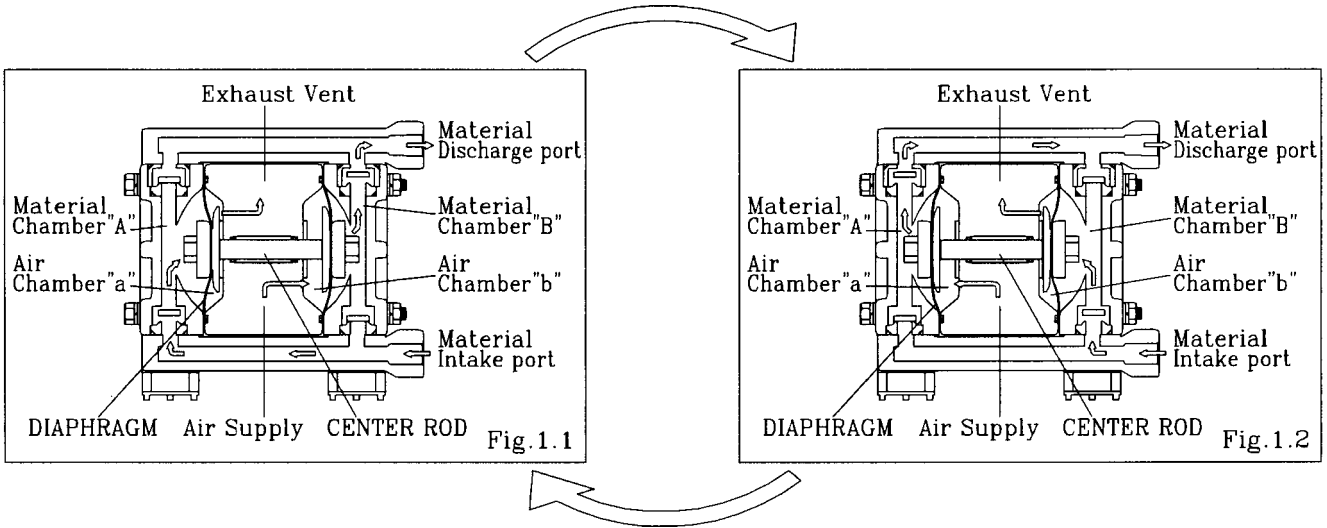
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1. Principles of Operation

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.

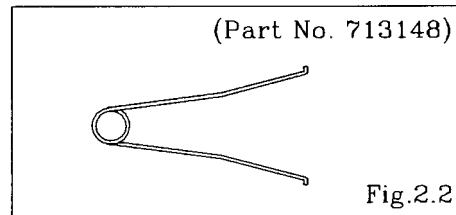
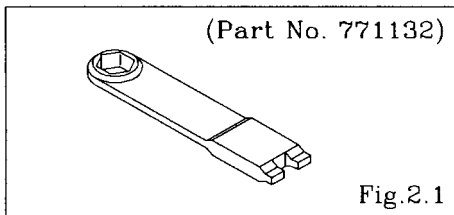
2.1 General Tools

- Socket wrenches: 10mm (NDP-5), 13mm (NDP-15)
- Open-end wrenches: 10mm (NDP-5), 13mm (NDP-15), 21mm (NDP-15)
- Pliers

2.2 Special Tools

- Accessory tool (Accessories)
Purpose: Removing the center disk of FP□ and FVT types

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



2.3 Misc.

- Lubricating oil: Turbine oil none addition class 1 (equivalent to ISO VG32 grade)
- Nuts : M6x1 (NDP-5), M8x1.25 (NDP-15)

3. Ordering Replacement Parts

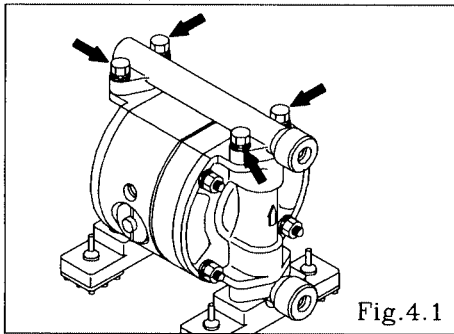
For accurate and speedy shipment of parts, be sure to order the right parts for your model to your dealer or one of our regional offices. Indicate the part numbers, descriptions, quantities and reasons for replacement, in as much in detail as possible.

4. Balls, Flat Valves and Valve Seats

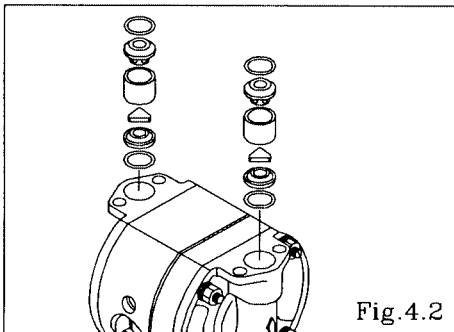
4.1 Removal

■ FAT, FST, BA□, BS□ types

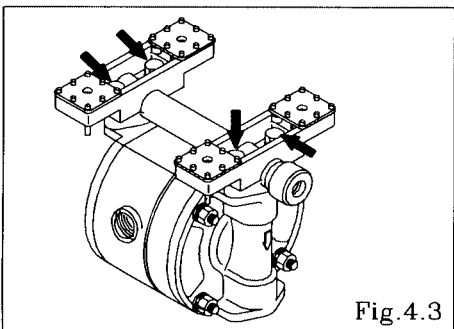
See [8.Exploded View] on after p.12. (Fig. 4.1, 4.2, 4.3 and 4.4 show the NDP-5 FAT.)



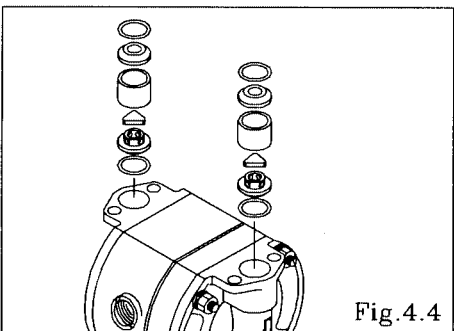
- Remove the 4 retainer bolts from the out manifold, and remove the out manifold. [Fig.4.1]



- Remove the O-ring, valve stopper, valve guide, flat valve and valve seat. (NDP-5) [Fig.4.2]
- Remove the O-ring, valve guide, ball and valve seat. (NDP-15) [Fig.4.2]



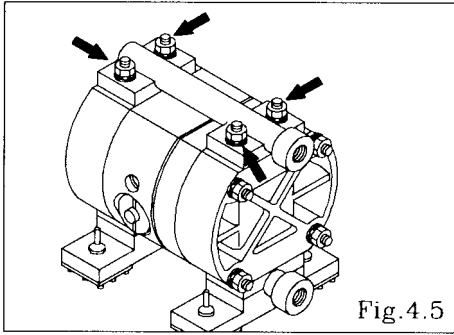
- Turn over the main body assembly. [Fig.4.3]
- Remove the 4 retainer bolts from the in manifold, and remove the base and in manifold. [Fig.4.3]



- Remove the O-ring, valve seat, flat valve, valve guide and valve stopper. (NDP-5) [Fig.4.4]
- Remove the O-ring, valve seat, ball and valve guide (NDP-15) [Fig.4.4]

■ FP□, FV□ types

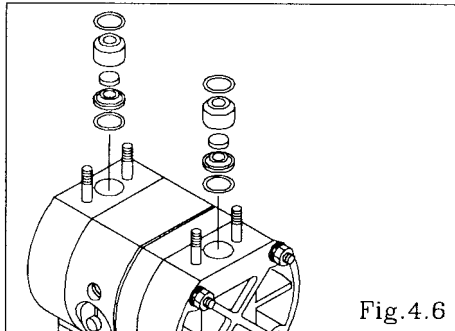
See [8.Exploded View] on after p.12. (Fig. 4.5, 4.6, 4.7 and 4.8 show the NDP-5 FPT.)



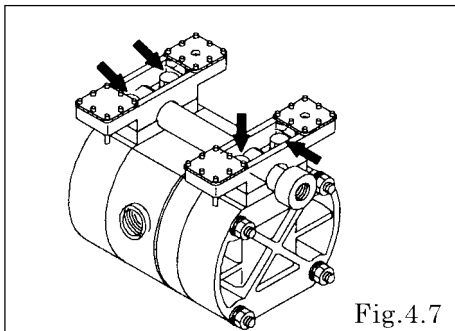
- Remove the 4 retainer nuts from the out manifold, and remove the out manifold. [Fig.4.5]

<NOTE>

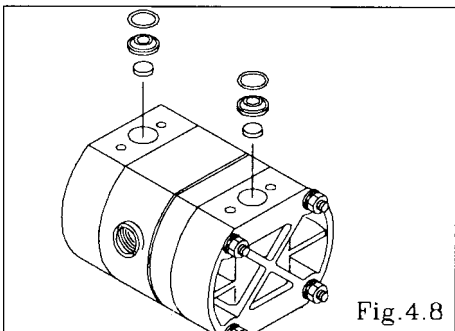
- When the retainer nuts both side of the tie rod remove, the in manifold removes. (NDP-5)



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



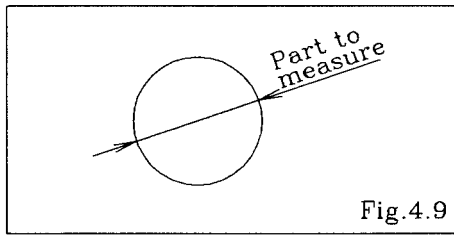
- Turn over the main body assembly. [Fig.4.7]
- Pull out the bolt, and remove the base and in manifold. (NDP-5)
- Remove the 4 retainer bolts from the in manifold, and remove the base and in manifold. (NDP-15) [Fig.4.7]



- Remove the O-ring, valve seat and flat valve. (NDP-5) [Fig.4.8]
- Remove the O-ring, valve seat, flat valve and valve guide. (NDP-15) [Fig.4.8]

4.2 Checking

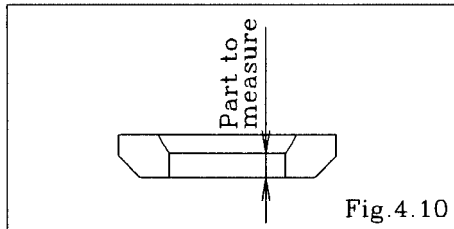
■ Ball valve type



- Ball [Fig.4.9]
Measure the outside diameter, and if it is outside the usable range, replace the ball.

Usable range of Ball

NDP-15	S Ø 20.0 ~ S Ø 22.8mm
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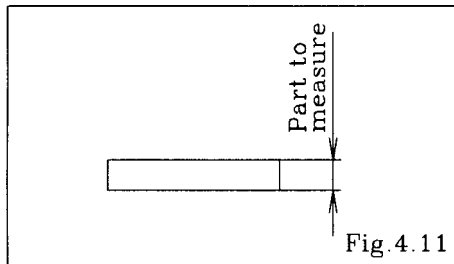


- Valve seat [Fig.4.10]
Measure the dimension shown at left, and if it is outside the usable range, replace the seat.

Usable range of Valve seat

NDP-15	2.6 ~ 6.5mm
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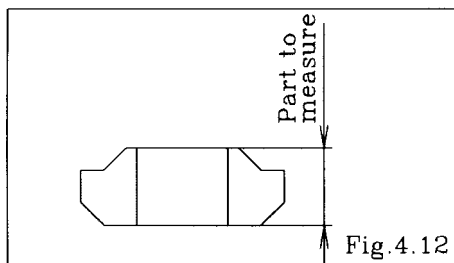
■ Flat valve type



- Flat valve [Fig.4.11]
Measure the dimension shown at left, and if it is outside the usable range, replace the seat. If the seal ring is worn out or cracked, replace it.

Usable range of Flat valve

NDP-5	2.5 ~ 3.0mm
NDP-15	4.3 ~ 5.0mm



- Valve seat [Fig.4.12]
Measure the dimension shown at left, and if it is outside the usable range, replace the seat.

Usable range of Valve seat

NDP-5	5.8 to 7.1mm
NDP-15	8.2 to 10.0mm

- O ring (other than PTFE)
If O-rings are worn out or cracked, replace them.

4.3 Installation

For installation, see [8. Exploded View] on after p.12, and install in the reverse order of disassembly.

Tightening torque for manifold retainer bolts or nuts

NDP-5	7.5N·m {75kgf/cm}
NDP-15	12N·m {120kgf/cm}

<NOTE>

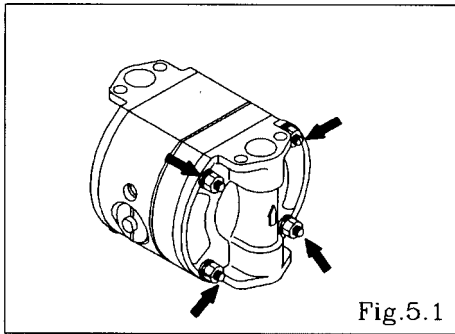
- Make sure there is no dust on the seal surface, and the seal is not damaged.
- Replace the PTFE O-ring regardless of its condition.

5. Diaphragm and Center rod

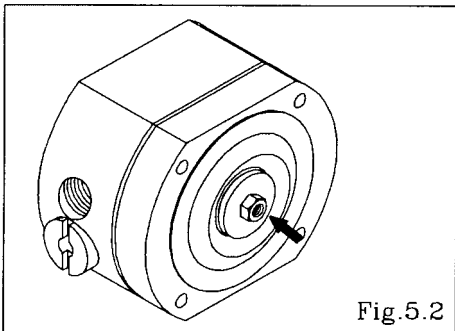
5.1 Removal

■ FAT, FST, BA□, BS□ types

See [8. Exploded View] on after p.12. (Fig. 5.1, 5.2 and 5.3 show the NDP-5 FAT.)



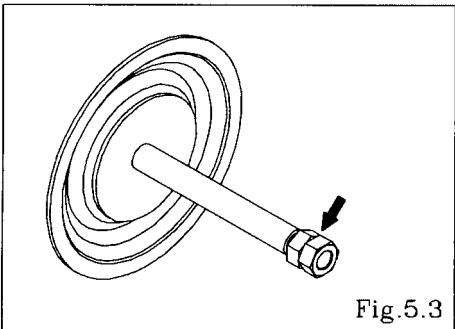
- Remove the ball or flat valve and valve seat (see [4.1 Removal FAT, FST, BA□, BS□ types] on p. 4).
- Remove the 8 (12 on the NDP-15) retainer bolts from the out chamber, and remove the out chamber. [Fig.5.1]



- 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.

<NOTE>

- When the diaphragms are removed, the main body is separated 2 pieces. For easy work, leave the tie rods or bolts fastened temporarily before remove the diaphragms.
- Remove the nuts on the opposite side using the double nuts. [Fig.5.3]
- Remove the coned disk spring, center disk and diaphragm.



■ FP□, FV□ types

See [8. Exploded View] on after p.12. (Fig. 5.4, 5.5 and 5.6 show the NDP-5 FPT.)

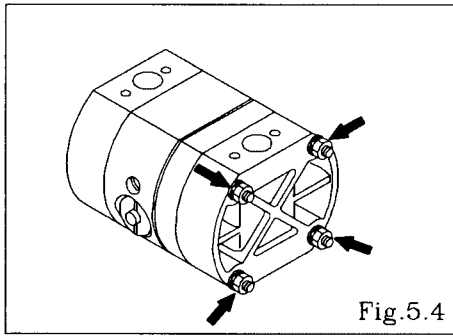


Fig.5.4

- Remove the flat valve and valve seat (see [4.1 Removal FP□, FV□ types] on p. 5).
- Remove the 8 (12 on the NDP-15) retainer nuts from the out chamber, and remove the out chamber. [Fig.5.4]

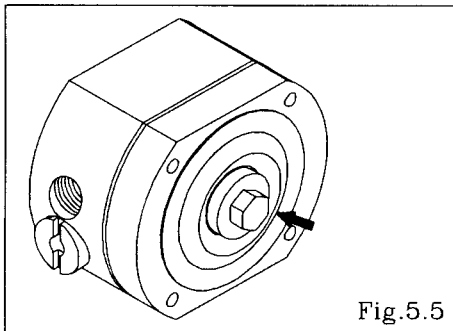


Fig.5.5

- Remove the center disk from one side using the Accessory tool (special tool: Part No. 771132). (NDP-5) [Fig.5.5]
- Remove the center disk from one side. (NDP-15) [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.

<NOTE>

- When the diaphragms are removed, the main body is separated 2 pieces. For easy work, leave bolts fastened temporarily before remove the diaphragms.

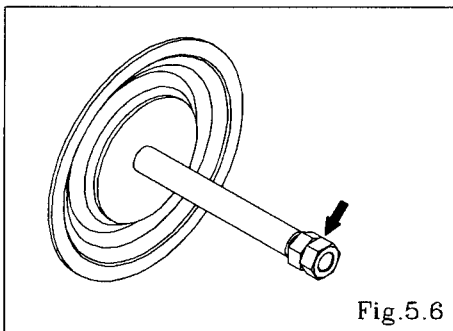


Fig.5.6

- Remove the center disk and diaphragm from the opposite side using the double nut. [Fig.5.6]

5.2 Checking

- Diaphragm

If the diaphragm is worn out or damaged, replace it.

Guideline of diaphragm life

NDP-5	PTFE	30,000,000 cycles
	CR, NBR, PTFE	10,000,000 cycles
NDP-15	TPEE, TPO	15,000,000 cycles

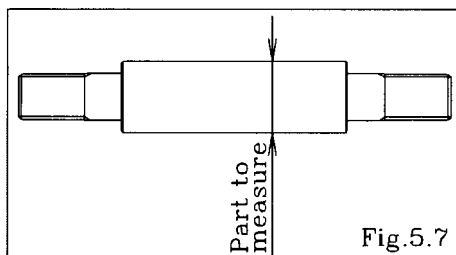


Fig.5.7

- Center rod [Fig.5.7]

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

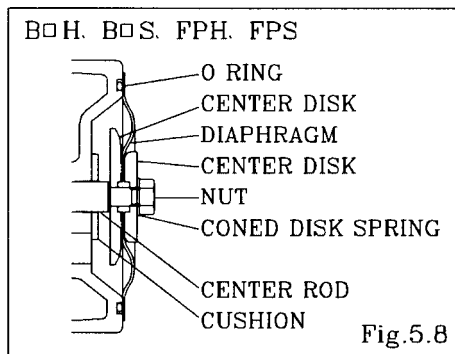
Usable range of center rod

NDP-5	Ø 9.95 ~ Ø 10.0mm
NDP-15	Ø 13.96 ~ Ø 14.0mm

5.3 Installation

■ B□H, B□S, FPH, FPS types

For installation, see [8. Exploded View] on after p.12, and install in the reverse order of disassembly.



- Apply lubricating oil to the center rod, and insert it into the main body.
- Keep the convex side to the outside.
- Tighten the center disk using the open-end wrenches for the NDP-15FP□, FV□.
(No coned disk springs and nuts are needed.)
- 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.

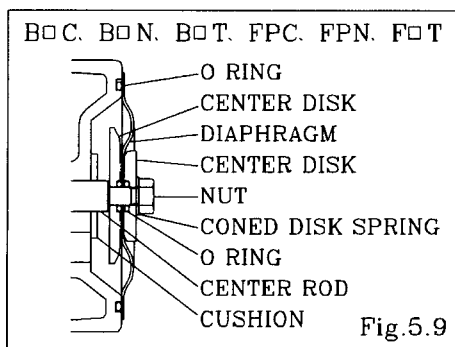
Tightening torque for center rod and out chamber	
NDP-5	7.5N·m {75kgf·cm}
NDP-15	12N·m {120kgf·cm}

<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 sides on diagonal line with even torque.

■ B□C, B□N, B□T, FPC, FPN, F□T types

For installation, see [8. Exploded View] on after p. 12, and install in the reverse order of disassembly.



- Apply lubricating oil to the center rod, and insert it into the main body.
- Keep the marking "LIQUID" to liquid end for CR, NBR diaphragms.
- Keep the convex side to the outside for PTFE diaphragm.
- Install the O-ring (cf. Fig.5.9).
- Tighten the center disk using the Accessory tool (special tool: Part No.771132) for the NDP-5FPT, FVT.
- Tighten the center disk using the open-end wrenches for the NDP-15FP□, FVT.
(No coned disk springs and nuts are needed.)
- 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 center rod and out chamber	
NDP-5	7.5N·m {75kgf·cm}
NDP-15	12N·m {120kgf·cm}

<NOTE>

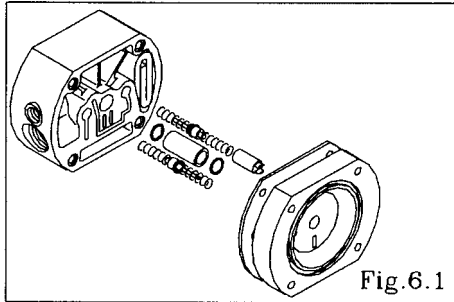
- Make sure there is no dust on the seal surface in order to prevent seal damaged.
- Replace the PTFE O-ring by new one.
- Tighten the bolts that balance should be equal from both sides on diagonal line with even torque.

6. Pilot valve Assembly, Guide and Bushing

6.1 Removal

■ NDP-5

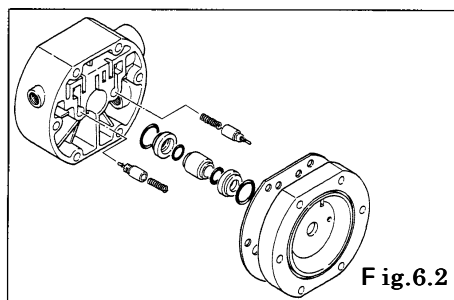
See [8. Exploded View] on after p.12.



- Remove the diaphragm and center rod etc. (see [5.1 Removal] on p.7)
- Remove the main body. [Fig.6.1]
- Draw out the pilot valve assembly. [Fig.6.1]
- Remove the O-ring and bushing. [Fig.6.1]

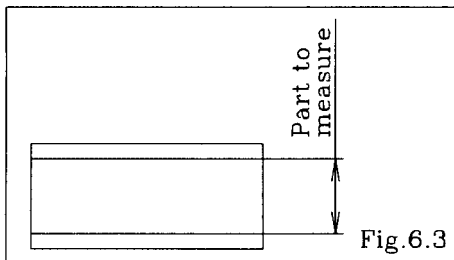
■ NDP-15

See [8. Exploded View] on after p.12.



- Remove the diaphragm and center rod etc. (see [5.1 Removal] on p.7)
- Remove the body B. [Fig.6.2]
- Draw out the pilot valve assembly. [Fig.6.2]
- Remove the O-ring, bushing and guide. [Fig.6.2]

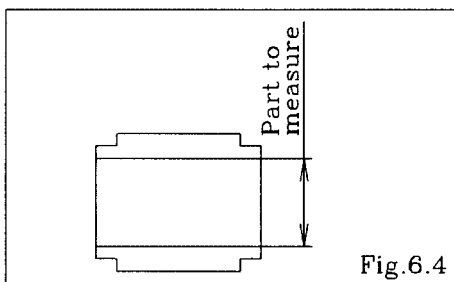
6.2 Checking



- Bushing (NDP-5) [Fig.6.3]
Measure the inside diameter, and if it is outside the usable range, replace the bushing.

Usable range of bushing

Ø10.1 ~ Ø 10.3mm



- Guide (NDP-15) [Fig.6.4]
Measure the inside diameter, and if it is outside the usable range, replace the guide.

Usable range of guide

Ø 14.1 ~ Ø 14.2mm

- O rings
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 [8. Exploded View] on after p.12, and install in the reverse order of disassembly.

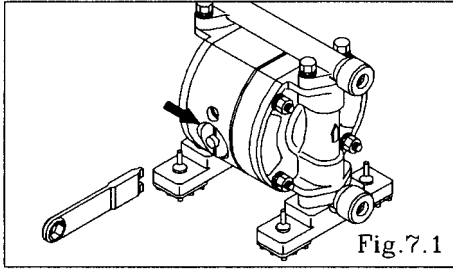
<NOTE>

- Make sure there is not dust on the seal surface and the seal is not damaged.

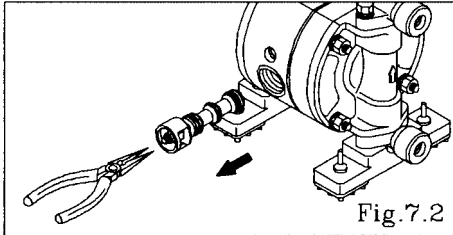
7. C-spool valve assembly and Sleeve assembly

7.1 Removal

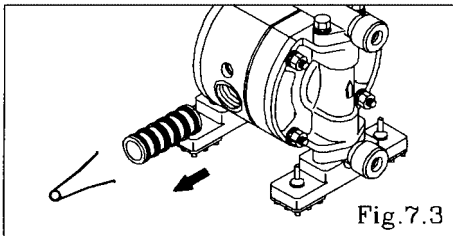
See [8.Exploded View] on after p.12. (Fig. 7.1, 7.2 and 7.3 show the NDP-5 FAT.)



- Remove the cap using the Accessory tool (special tool: Part No. 771132). [Fig.7.1]

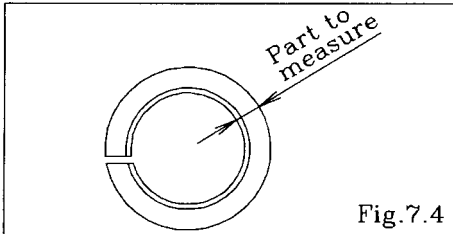


- Draw out the C-spool valve assembly using the pliers, and remove the seal ring from the C-spool valve assembly. [Fig.7.2]



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

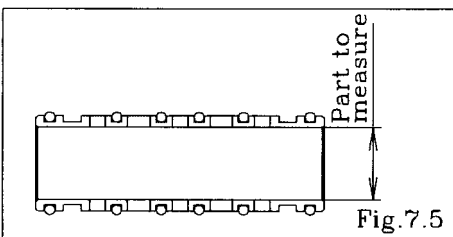
7.2 Checking



- 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

NDP-5	1.40 ~ 1.45mm
NDP-15	1.85 ~ 1.90mm



- 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

NDP-5	Ø 9.5 ~ Ø 9.55mm
NDP-15	Ø 15.8 ~ Ø 15.85mm

- O-ring
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

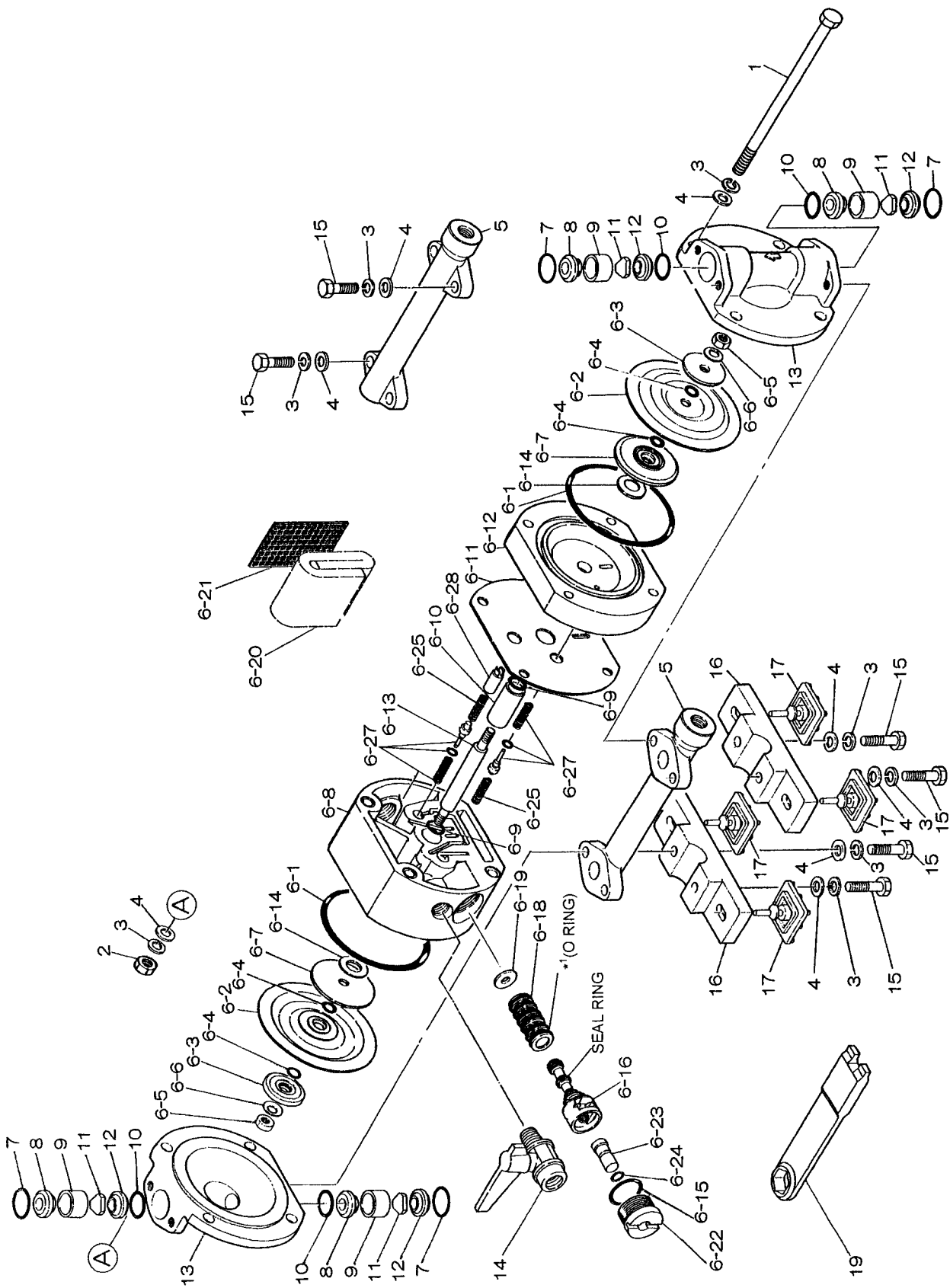
For installation, see [8. Exploded View] on after p.12, and install in the reverse order of disassembly.

<NOTE>

- Make sure there is no dust on the seal surface and it is not damaged.

8.1 Exploded View

■ NDP-5FAT, FST



8.1 Parts List

■NDP-5FAT, FST

NO.	FAT	FST	DESCRIPTION	Q'TY	NOTE
1	682528	←	BOLT	4	M6×1×92
2	628010	←	NUT	4	M6×1
3	681855	←	SPRING LOCK WASHER	16	M6
4	631328	←	PLAIN WASHER	16	M6
5	709470	←	MANIFOLD	2	
		831274	MANIFOLD ASSEMBLY	2	
6	802047	802048	BODY ASSEMBLY	1	
7	643015	←	O RING	4	P-16 PTFE
8	709634	←	VALVE STOPPER	4	
9	709635	←	VALVE GUIDE	4	
10	771133	←	O RING	4	
11	709636	←	FLAT VALVE	4	
12	709637	←	VALVE SEAT	4	
13	709469	709467	OUT CHAMBER	2	
14	682771	←	BALL VALVE	1	1/4"
15	621103	←	BOLT	8	M6×1×25
16	771101	←	PUMP BASE	2	
17	771102	←	CUSHION	4	
18 ^{*1}	790912	←	NAME PLATE	1	
18 ^{*2}	790910	←	NAME PLATE	1	
19	771132	←	ACCESSORY TOOL	1	

NOTE 1) NO.18 (NAME PLATE) IS NOT INDICATED IN EXPLODED VIEW

2)*1: E.C. COUNTRIES *2: OTHER COUNTRIES

802047, 802048 BODY ASSEMBLY

NO.	FAT	FST	DESCRIPTION	Q'TY	NOTE
6-1	640139	←	O RING	2	G-70 NBR
6-2	771093	←	DIAPHRAGM	2	
6-3	709477	709476	CENTER DISK	2	
6-4	643003	←	O RING	4	P-6 NBR
6-5	683391	←	NUT	2	M6×1
6-6	684915	←	CONED DISK SPRING	2	M6
6-7	709317	←	CENTER DISK	2	
6-8	780000	←	BODY	1	
6-9	640007	←	O RING	2	P-10 NBR
6-10	771088	←	BUSHING	1	
6-11	771980	←	GASKET	1	
6-12	780001	←	BODY	1	
6-13	709316	←	CENTER ROD	1	
6-14	771239	←	CUSHION	2	
6-15	640017	←	O RING	1	P-20 NBR
6-16	802386	←	C SPOOL VALVE ASSEMBLY	1	
6-18	803214	←	SLEEVE ASSEMBLY	1	* ³ (771097)
6-19	771096	←	CUSHION	1	
6-20	771465	←	SILENCER	1	
6-21	771589	←	MESH	1	
6-22	771100	←	CAP	1	
6-23	771099	←	RESET BUTTON	1	
6-24	640002	←	O RING	1	P-5 NBR
6-25	709319	←	SPRING	2	
6-27	803510	←	PILOT VALVE ASSEMBLY	2	
6-28	771095	←	STOPPER	1	

NOTE) *3: PARTS NUMBER MENTIONED ON O RING FOR SLEEVE ASSEMBLY ONLY.

8.2 Parts List

■NDP-5FPT, FVT

NO.	FPT	FVT	DESCRIPTION	Q'TY	NOTE
1	682748	←	BOLT	4	M6×1×139.5
2	628010	←	NUT	8	M6×1
3	681855	←	SPRING LOCK WASHER	16	M6
4	631328	←	PLAIN WASHER	16	M6
5 ^{*1}	780167	780168	MANIFOLD	2	(BSP)
5 ^{*2}	780132	780054	MANIFOLD	2	(Re)
6	802321	802849	BODY ASSEMBLY	1	
7	643015	←	O RING	2	P-16 PTFE
8	771091	771581	VALVE STOPPER	2	
10	643013	←	O RING	4	P-14 PTFE
11	771094	←	FLAT VALVE	4	
12	771112	771582	VALVE SEAT	4	
13	771092	771583	OUT CHAMBER	2	
14	682771	←	BALL VALVE	1	1/4"
15	682747	←	BOLT	4	M6×1×127
16	771101	771648	PUMP BASE	2	
17	771102	←	CUSHION	4	
18 ^{*1}	790912	←	NAME PLATE	1	
18 ^{*2}	790910	←	NAME PLATE	1	
19	771132	←	ACCESSORY TOOL	2	

NOTE 1) NO.18 (NAME PLATE) IS NOT INDICATED IN EXPLODED VIEW

2)*1: E.C. COUNTRIES *2: OTHER COUNTRIES

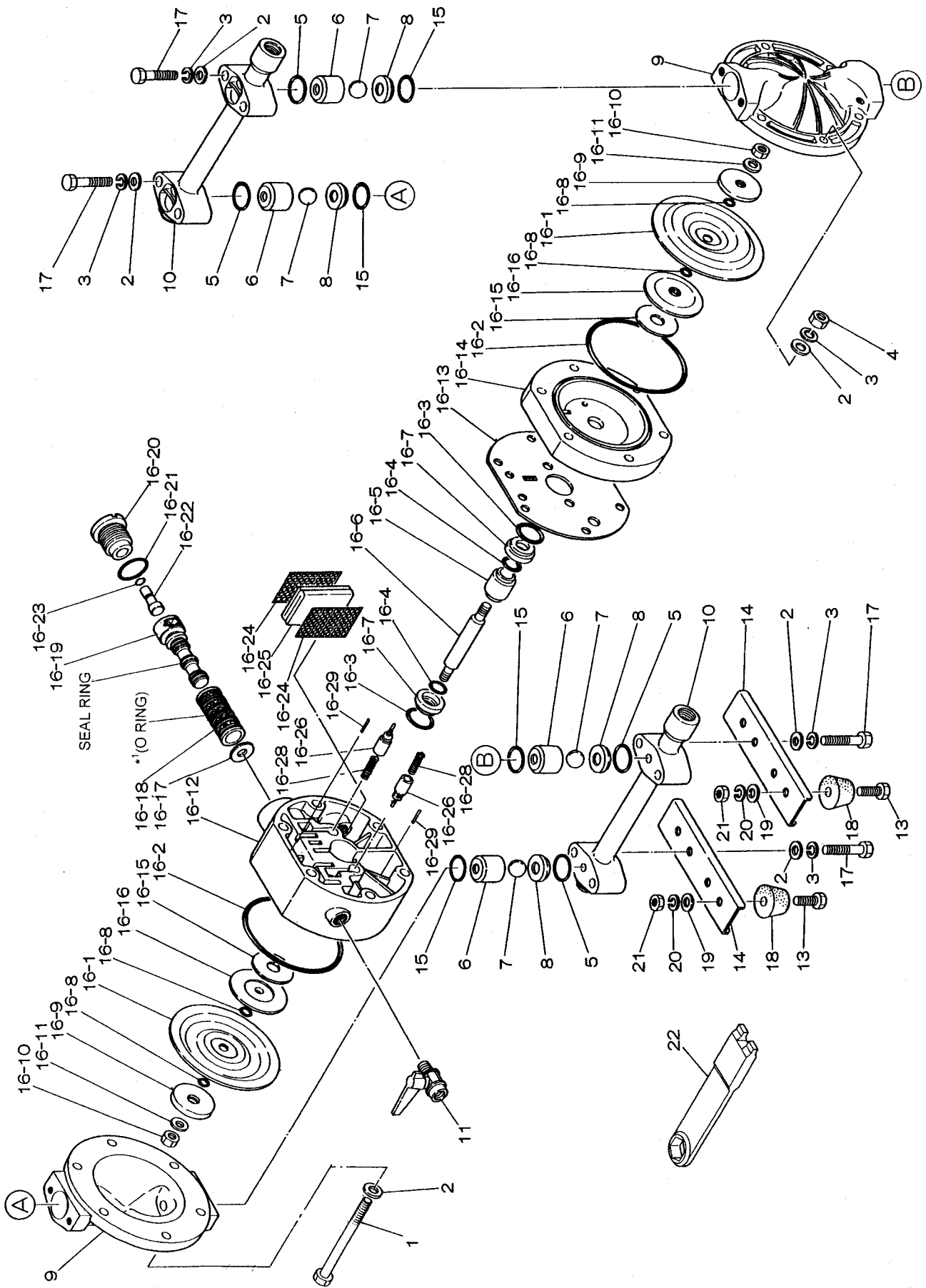
802321, 802849 BODY ASSEMBLY

NO.	FPT	FVT	DESCRIPTION	Q'TY	NOTE
6-1	640139	←	O RING	2	G-70 NBR
6-2	771093	←	DIAPHRAGM	2	
6-3	771089	771579	CENTER DISK	2	
6-4	643003	←	O RING	4	P-6 PTFE
6-7	709317	←	CENTER DISK	2	
6-8	780000	←	BODY	1	
6-9	640007	←	O RING	2	P-10 NBR
6-10	771088	←	BUSHING	1	
6-11	771980	←	GASKET	1	
6-12	780001	←	BODY	1	
6-13	709316	←	CENTER ROD	1	
6-14	771239	←	CUSHION	2	
6-15	640017	←	O RING	1	P-20 NBR
6-16	802386	←	C SPOOL VALVE ASSEMBLY	1	
6-18	803214	←	SLEEVE ASSEMBLY	1	* ³ (771097)
6-19	771096	←	CUSHION	1	
6-20	771465	←	SILENCER	1	
6-21	771589	←	MESH	1	
6-22	771100	←	CAP	1	
6-23	771099	←	RESET BUTTON	1	
6-24	640002	←	O RING	1	P-5 NBR
6-25	709319	←	SPRING	2	
6-27	803510	←	PILOT VALVE ASSEMBLY	2	
6-28	771095	←	STOPPER	1	

NOTE) *3: PARTS NUMBER MENTIONED ON O RING FOR SLEEVE ASSEMBLY ONLY.

8.3 Exploded View

■ NDP-15BA□, BS□



8.3 Parts List

■NDP-15BA□, BS□

NO.	BA□	BS□	DESCRIPTION	Q'TY	NOTE
1	683171	 	BOLT	6	M8×1.25×110
	 	683224	BOLT	6	M8×1.25×105
2	631329	←	PLAIN WASHER	20	M8
3	681300	←	SPRING LOCK WASHER	14	M8
4	628012	←	NUT	6	M8×1.25
5	Tab.1	←	O RING	4	
6	771523	711502	VALVE STOPPER	4	
7	Tab.2	←	BALL	4	
8	711227	711382	VALVE SEAT	4	
9	711226	711380	OUT CHAMBER	2	
10	802707	 	MANIFOLD ASSEMBLY	2	
	 	711501	MANIFOLD	2	
11	682771	←	BALL VALVE	1	1/4"
12 ^{*1}	790912	←	NAME PLATE	1	
12 ^{*2}	790910	←	NAME PLATE	1	
13	621102	←	BOLT	4	M6×1×22
14	711405	←	PUMP BASE	2	
15	Tab.3	←	O RING	4	
16	Tab.4	←	BODY ASSEMBLY	1	
17	682727	 	BOLT	8	M8×1.25×60
	 	621155	BOLT	8	M8×1.25×40
18	771123	←	CUSHION	4	
19	631328	←	PLAIN WASHER	4	M6
20	681855	←	SPRING LOCK WASHER	4	M6
21	628010	←	NUT	4	M6×1
22	771132	←	ACCESSORY TOOL	1	

Tab.1 O RING (P-26)

TYPE	BA/BS□	MATERIAL
B□C	640025	NBR
B□N	640025	NBR
B□T	643025	PTFE
B□H	640025	NBR
B□S	684114	EPDM
B□H/T	^{*1} 643025	PTFE
	^{*2} 640025	NBR

Tab.2 BALL

TYPE	BA/BS□	MATERIAL
B□C	771526	CR
B□N	771525	NBR
B□T	771524	PTFE
B□H	771525	NBR
B□S	771979	EPDM
B□H/T	771524	PTFE

Tab.3 O RING (G-25)

TYPE	BA/BS□	MATERIAL
B□C	640130	NBR
B□N	640130	NBR
B□T	643130	PTFE
B□H	640130	NBR
B□S	684113	EPDM
B□H/T	^{*1} 643130	PTFE
	^{*2} 640130	NBR

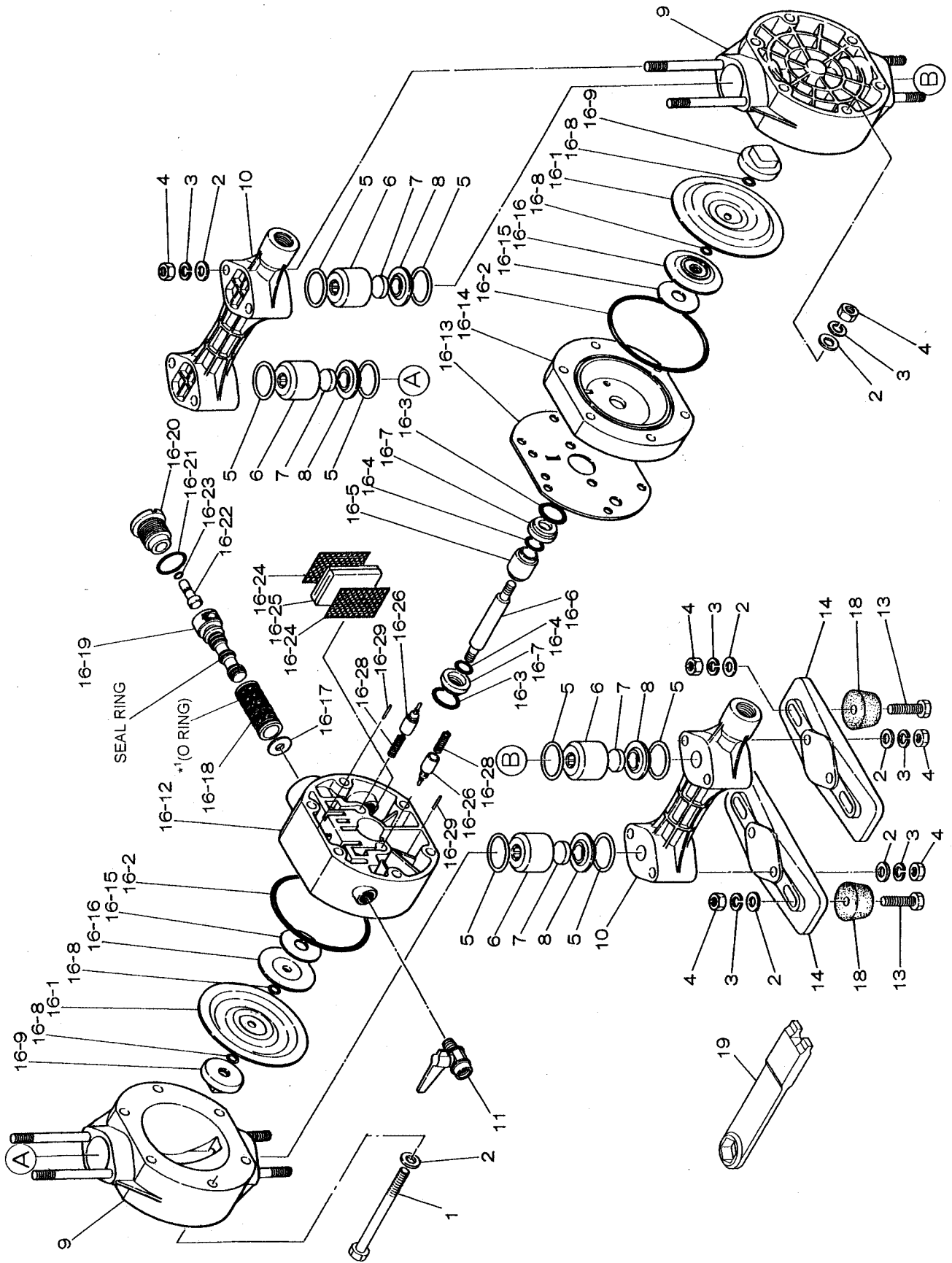
Tab.4 BODY ASSEMBLY

TYPE	BA□	BS□
B□C	802993	802997
B□N	802994	802998
B□T	802992	802996
B□H	802995	802999
B□S	803502	803503
B□H/T	802995	802999

NOTE 1) NO.12 (NAME PLATE) IS NOT INDICATED IN EXPLODED VIEW
 2)*1: E.C. COUNTRIES *2: OTHER COUNTRIES

8.4 Exploded View

■NDP-15FP□, FV□



8.4 Parts List

■NDP-15FP□, FV□

NO.	FP□	FV□	DESCRIPTION	Q'TY	NOTE
1	684310	←	BOLT	6	M8×1.25×185
2	631329	←	PLAIN WASHER	18	M8
3	681300	←	SPRING LOCK WASHER	18	M8
4	628012	←	NUT	24	M8×1.25
5	Tab.1	643027	O RING	8	P-29
6	771341	771632	VALVE STOPPER	4	
7	771340	771762	FLAT VALVE	4	
8	771345	771633	VALVE SEAT	4	
9	780119	780120	OUT CHAMBER	2	
10 ^{*1}	780078	780169	MANIFOLD	2	(BSP)
10 ^{*2}	780026	780055	MANIFOLD	2	(Rc)
11	682771	←	BALL VALVE	1	1/4"
12 ^{*1}	790912	←	NAME PLATE	1	
12 ^{*2}	790910	←	NAME PLATE	1	
13	621153	←	BOLT	4	M8×1.25×35
14	771352	771635	PUMP BASE	2	
16	Tab.2	←	BODY ASSEMBLY	1	
18	770551	←	CUSHION	4	
19	771132	←	ACCESSORY TOOL	1	

Tab.1 O RING (P-29)

TYPE	FP□	MATERIAL
FPC	640027	NBR
FPN	640027	NBR
FPT	643027	PTFE
FPH	640027	NBR
FPS	684115	EPDM
FPH/T	^{*1} 643027	PTFE
	^{*2} 640027	NBR

Tab.2 BODY ASSEMBLY

TYPE	FP□	FV□
F□C	802989	
F□N	802991	
F□T	802988	803003
F□H	802990	
F□S	803504	803565

NOTE 1) NO.12 (NAME PLATE) IS NOT INDICATED IN EXPLODED VIEW
 2)*1: E.C. COUNTRIES *2: OTHER COUNTRIES

8.5 Parts List

■NDP-15 BODY ASSEMBLY

BODY ASSEMBLY

NO.	BA□	BS□	FP□	FV□	DESCRIPTION	Q'TY	NOTE
	802992	802996	802988				
	802993	802997	802989	803003			
	802994	802998	802990	803565			
	802995	802999	802991				
16-1	Tab.1	←	Tab.3	←	DIAPHRAGM	2	
16-2	640144	←	640144	←	O-RING	2	G-95 NBR
16-3	640020	←	640020	←	O-RING	2	P-22A NBR
16-4	640013	←	640013	←	O-RING	2	P-14 NBR
16-5	771337	←	771337	←	GUIDE	1	
16-6	710578	←	710578	←	CENTER ROD	1	
16-7	771336	←	771336	←	BUSHING	2	
16-8	Tab.2	←	Tab.4	←	O-RING	4	
16-9	708770	708506	770968	771631	CENTER DISK	2	
16-10	681849	←			NUT	2	M8×1.25
16-11	684916	←			CONED DISK SPRING	2	M8
16-12	780028	←	780028	←	BODY	1	
16-13	771347	←	771347	←	GASKET	1	
16-14	780030	←	780030	←	BODY	1	
16-15	771342	←	771342	←	CUSHION	2	
16-16	771344	←	771344	←	CENTER DISK	2	
16-17	771483	←	771483	←	CUSHION	1	
16-18	683089	←	683089	←	SLEEVE ASSEMBLY	1	*1(683123)
16-19	802835	←	802835	←	C SPOOL VALVE ASSEMBLY	1	
16-20	771695	←	771695	←	CAP	1	
16-21	640022	←	640022	←	O-RING	1	P-24 NBR
16-22	771350	←	771350	←	RESET BUTTON	1	
16-23	640002	←	640002	←	O-RING	1	P-5 NBR
16-24	771589	←	771589	←	MESH	2	
16-25	771465	←	771465	←	SILENCER	1	
16-26	832141	←	832141	←	PILOT VALVE ASSEMBLY	2	
16-28	710577	←	710577	←	SPRING	2	
16-29	632752	←	632752	←	SPRING PIN	2	2×8

Tab.1 DIAPHRAGM

TYPE	BA/BS□	MATERIAL
B□C	770971	CR
B□N	770973	NBR
B□T	770933	PTFE
B□H	771372	TPEE
B□S	771972	TPO
B□H/T	771372	TPEE

Tab.2 O RING (P-8)

TYPE	BA/BS□	MATERIAL
B□C	640005	NBR
B□N	640005	NBR
B□T	643005	PTFE
B□H		
B□S		
B□H/T		

Tab.3 DIAPHRAGM

TYPE	FP□	FV□	MATERIAL
F□C	770971		CR
F□N	770973		NBR
F□T	770933	←	PTFE
F□H	771372		TPEE
F□S	771972	←	TPO

Tab.4 O RING (P-8)

TYPE	FP□	FV□	MATERIAL
F□C	640005		NBR
F□N	640005		NBR
F□T	643005	←	PTFE
F□H			
F□S			

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