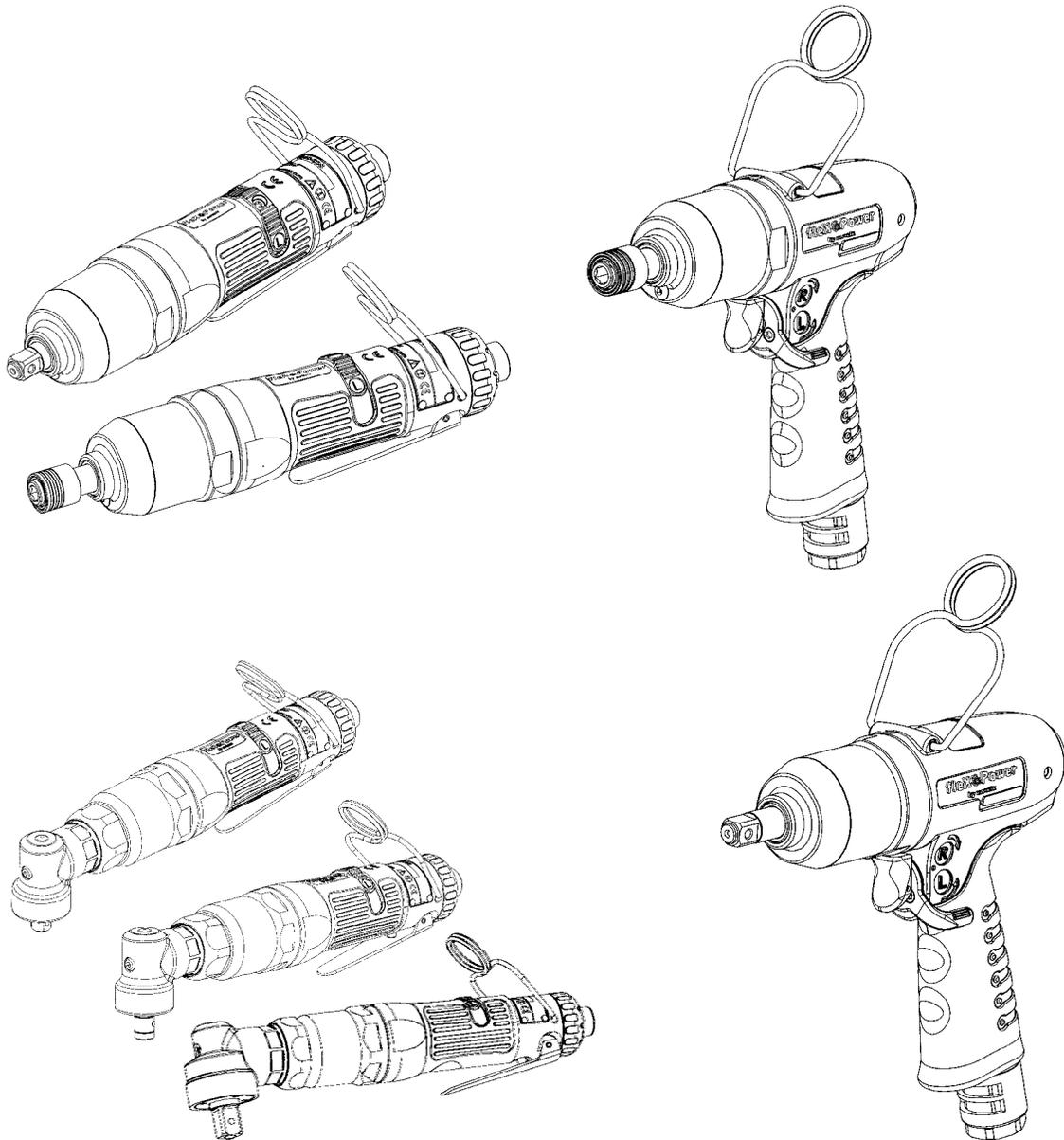


PULSE TOOLS INSTRUCTION MANUAL & MAINTENANCE



Rev 5.0 (06/22/2015)

- READ ALL THE INSTRUCTIONS COMPLETELY BEFORE OPERATION.
- COMPLY WITH ALL THE INSTRUCTIONS AND RULES IN THIS MANUAL AND SAVE THIS MANUAL FOR FUTURE REFERENCE.

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General Safety Rules

ALWAYS OBSERVE THE FOLLOWING RULES TO ASSURE SAFE USE OF THE TOOLS!!

- Do not operate the pulse tools unless you fully understand the instructions contained in this manual. If any unclear, please contact the agents.
- Never expose to rain or use in damp locations.
- Always use the proper pressure at air inlet. Apply either less or exceed air inlet pressure will affect the performance of the tools, including quality, torque, function, and life, then lead to damage.

Air inlet pressure standard

85PSI (6.2kg/cm²)

- Always add oil about 0.5~1cc at air inlets at least every week to maintain the performance and the life of the pulse tools.
- Keep children away. Tools must need to be kept in a safe and clean position where children cannot reach.
- DO NOT force tools. The tool will be damaged easily and quickly if over-load over 15 seconds.
- Always use the proper length of air hose. The length of air hose shall not exceed 5m, or the pressure reduces. Do be sure the air inlet pressure is in between the standard number(0.5Mpa~0.6Mpa) before operating tools.
- Always use safety glasses and earphone.
- Always operate the tools by two hands. One hand operation may cause risk of injury to persons.
- Disconnect the air hose and the quick nipple after operating tools. Be sure to return tools to safety position. Tools drop or unintentionally contact can cause risk of injury.
- Install the safety buckle to avoid tools drop while operating in high position.
- Never contact with any electricity conducted objects to avoid electricity shock hazard.

Replacement and Maintenance

- (1) Never try to repair or replace the defective tools by others under the warranty period. The authorized service centers have the right to refuse or certain fee may incur for extra repair work.
- (2) Keep all related servicing records for future repairs, maintenance, and adjustment.
- (3) The warranty does not apply to accessories or damage caused where repairs have been made or attempted by others ◦
- (4) Mountz will repair, without charge, any defects due to faulty material under the warranty period ◦
- (5) The warranty does not cover part failures due to normal wear and tool abuse, and damage caused due to any appropriate appliances, i.e. tool over loaded, improper air inlet pressure and air hose size, unauthorized replacement parts.

Steps for Torque Adjustment – pistol type

1. Loosen the screw on the pulse unit housing.

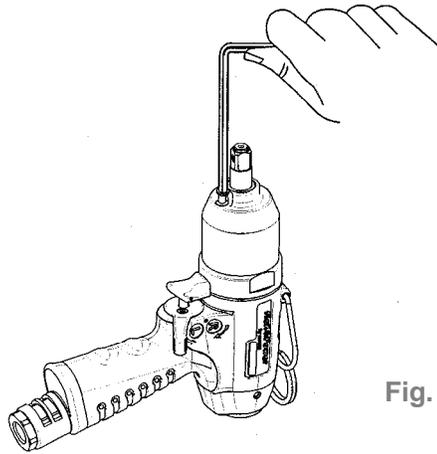


Fig. 1

2. Rotate the anvil manually; adjust the valve screw inside the pulse unit to the hole; where the screw taken off. Then, use the attached tool to adjust the torque. Torque increased by turning clockwise and vice versa.

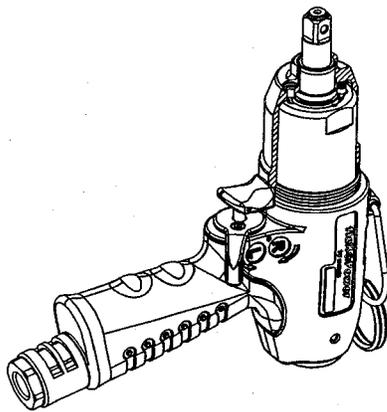


Fig. 2

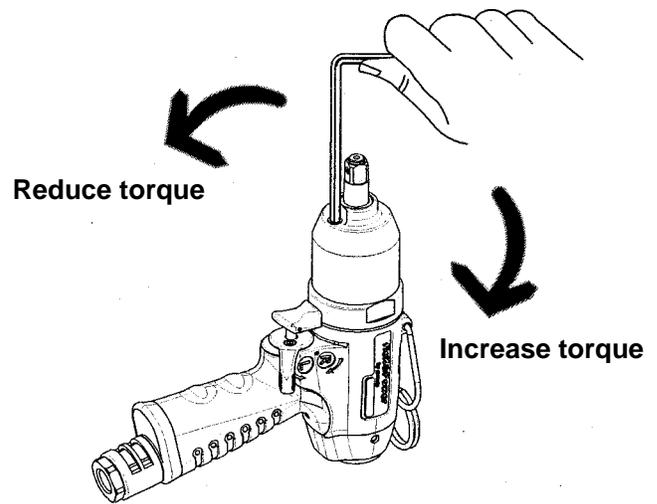


Fig. 3

3. Tighten the screw back to the pulse unit housing.

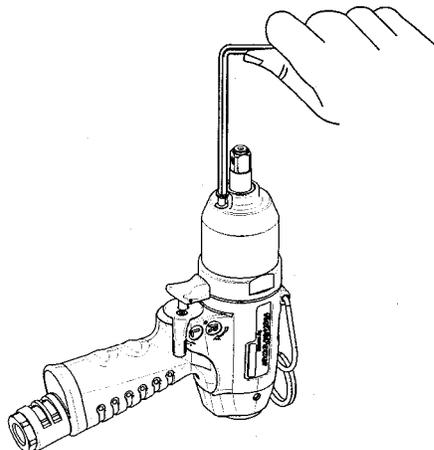


Fig. 4

DISASSEMBLY/ASSEMBLY FOR PULSE TOOLS

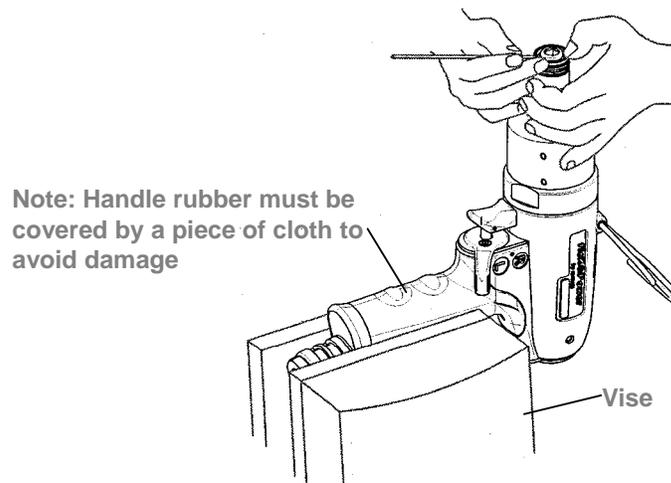
- FLEX-30P, FLEX-40P, FLEX-50P, FLEX-60P, FLEX-65P, FLEX-70P, FLEX-80P, FLEX-90P, FLEX-100P, FLEX-130P, FLEX-150P, FLEX-180P, FLEX-30PX, FLEX-40PX, FLEX-50PX, FLEX-60PX, FLEX-65PX, FLEX-70PX, FLEX-70X, FLEX-80H

● PULSE MECHANISM DISASSEMBLY

(1) Anvil Unit Disassembly: (for Model No. FLEX-30PX, FLEX-40PX, FLEX-50PX, FLEX-60PX, FLEX-65PX, FLEX-70PX)

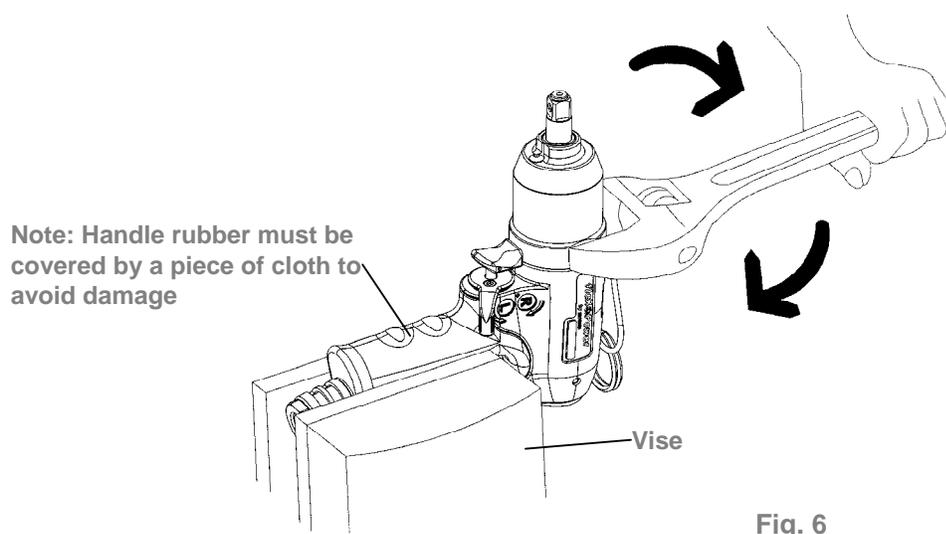
Press down the hold spacer, and find the anvil collar. Use an acicular piece to get the anvil collar out, then take the quick change holder, the hold spacer, the spring, and the steel ball apart.

 The steel ball may drop off when taking out the Quick Change Holder



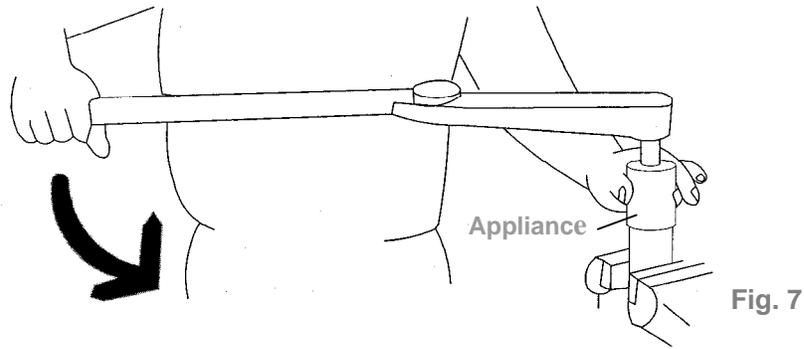
(2) Pulse Unit Housing Disassembly:

Fix the tool by a vise, use an adjustable wrench clockwise to loosen the pulse unit housing until the pulse unit housing detach from the motor housing. Then, take the pulse unit out as shown in Figure 6.



(3) Pulse Unit Disassembly:

- ① Fix the pulse unit by a vise. Use the appliance (see Table 1) to loosen the lock nut on the pulse unit, Fig. 7.



Note: Lock-tite was applied on the lock nut when tools were assembled.

Appliance No.	Apply to
63-40RT001	FLEX-30P, FLEX-30PX, FLEX-40P, FLEX-40PX, FLEX-50P, FLEX-50PX, FLEX-60P, FLEX-60PX
63-70RT001	FLEX-65P, FLEX-65PX, FLEX-70P, FLEX-70PX, FLEX-70X, FLEX-80P, FLEX-80H
63-90RT001	FLEX-90P
63-100RT001	FLEX-100P
63-130RT001	FLEX-130P
63-150RT001	FLEX-150P, FLEX-180P

Table1

- ② Put the Appliance, see Table 2, on the anvil and tap on it slightly to detach the interior parts from the pulse unit, Fig. 8.

Appliance No.	Apply to
63-40RT002	FLEX-30P, FLEX-30PX, FLEX-40P, FLEX-40PX, FLEX-50P, FLEX-50PX, FLEX-60P, FLEX-60PX, FLEX-65P, FLEX-65PX, FLEX-70P, FLEX-70PX, FLEX-70X, FLEX-80P
63-90RT002	FLEX-80H, FLEX-90P, FLEX-100P, FLEX-130P
63-150RT002	FLEX-150P
63-180RT002	FLEX-180P

Table 2

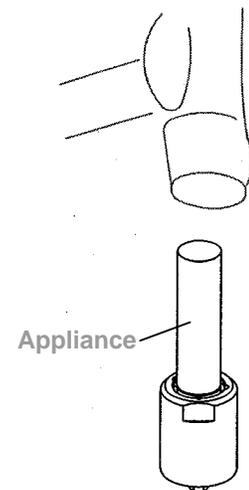
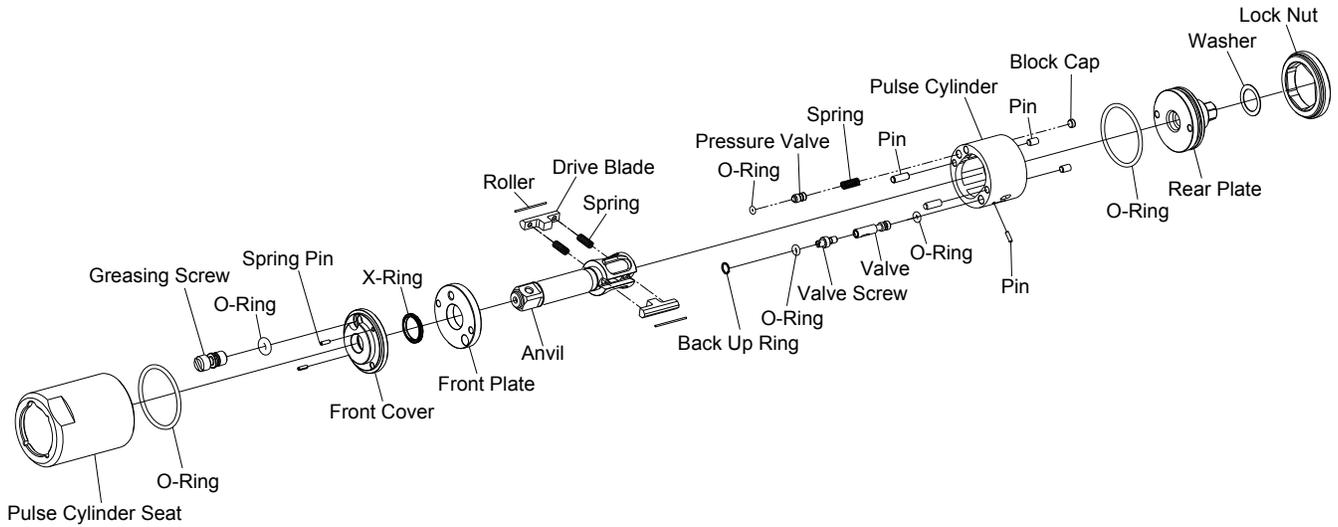


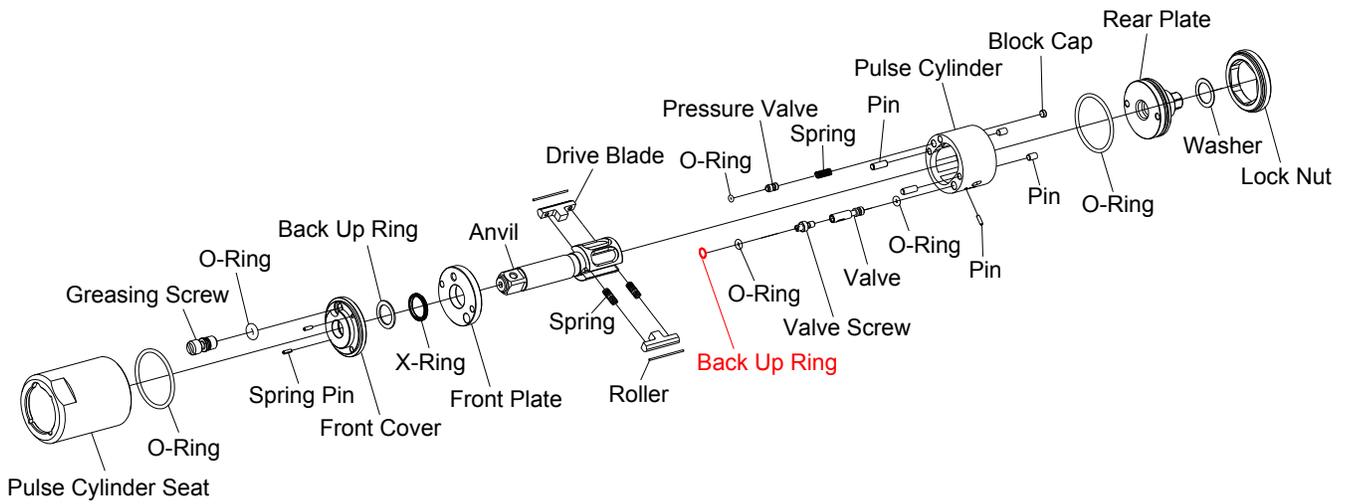
Fig. 8

(4) Parts of Pulse Cylinder Unit:

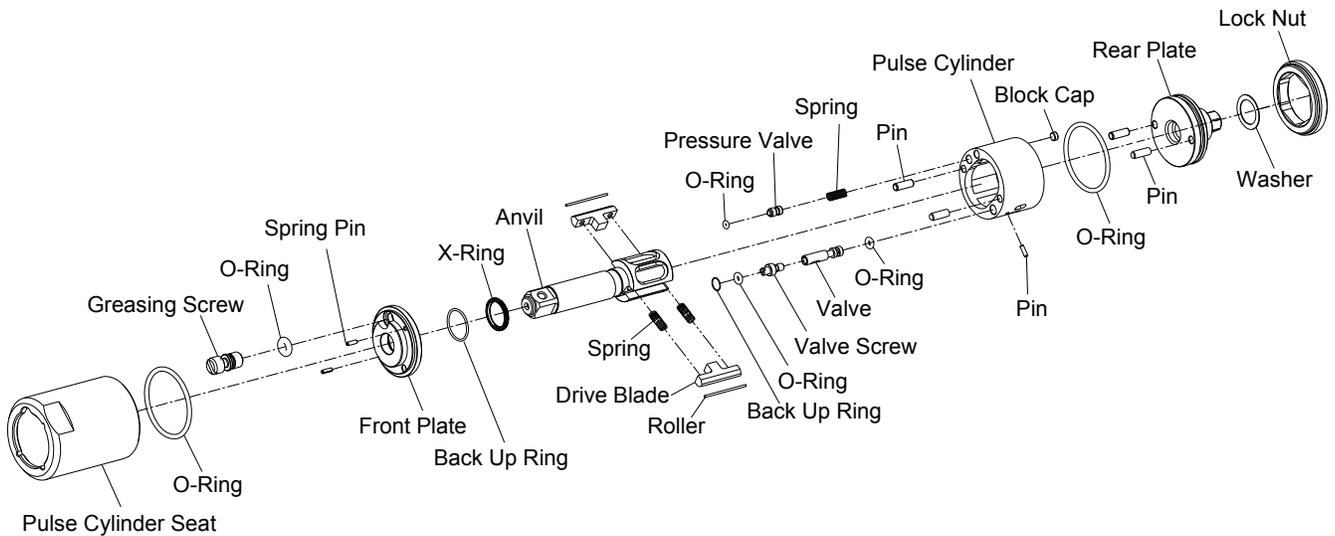
a. FLEX-30P



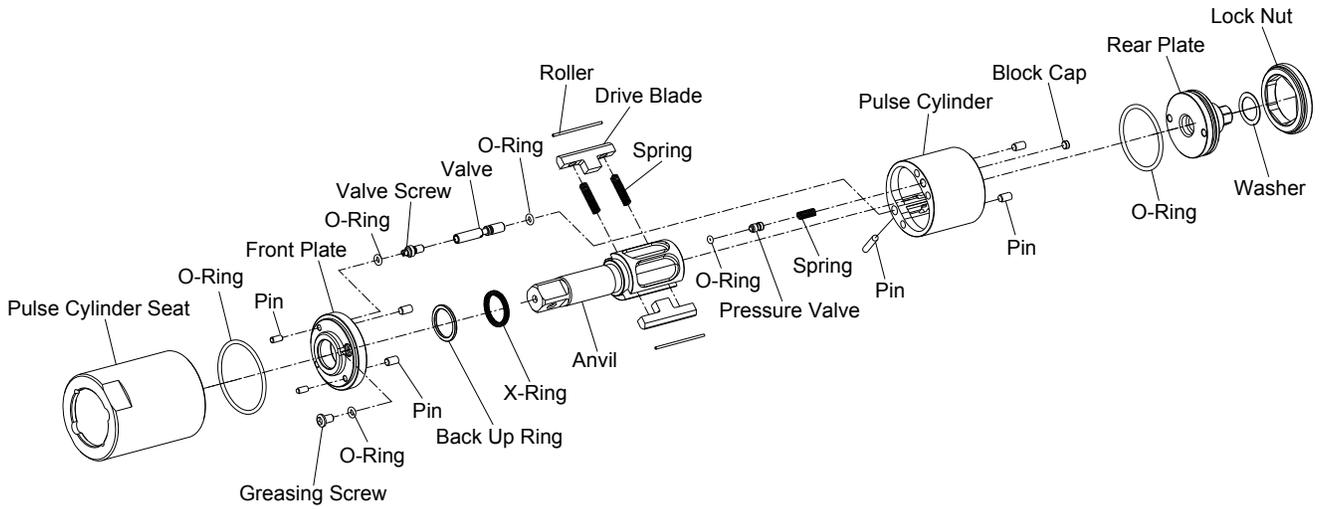
b. FLEX-40P, FLEX-50P, FLEX-60P, FLEX-65P, FLEX-70P, FLEX-70X, FLEX-80H, FLEX-90P



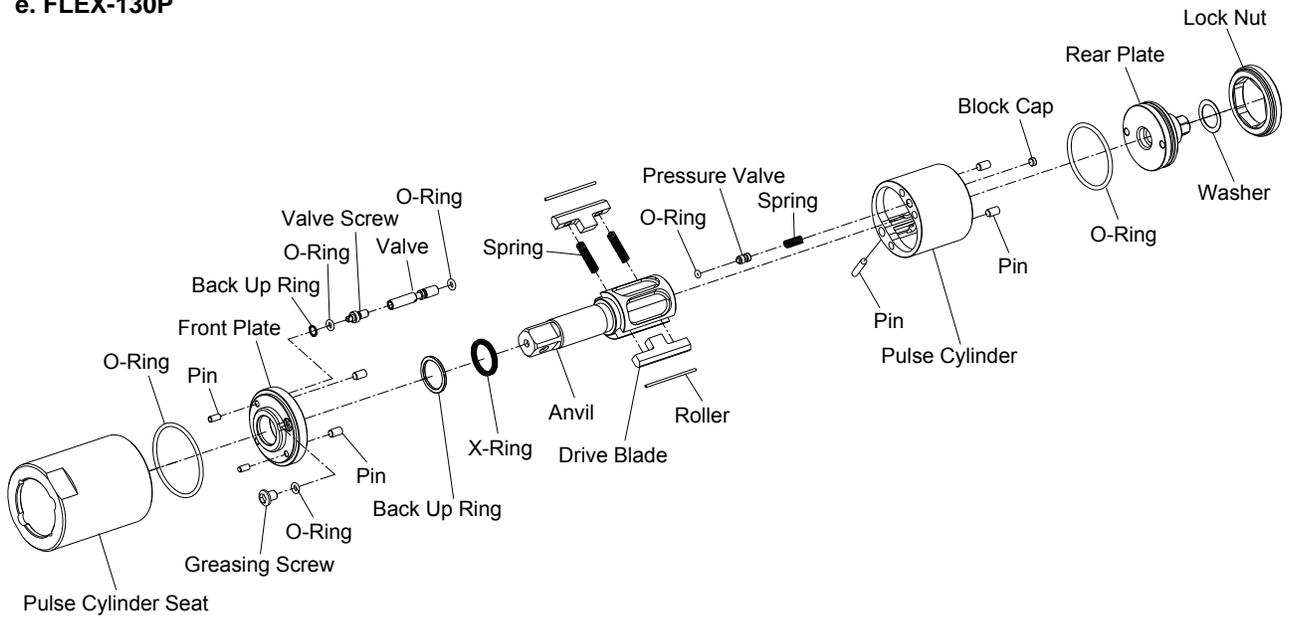
c. FLEX-80P



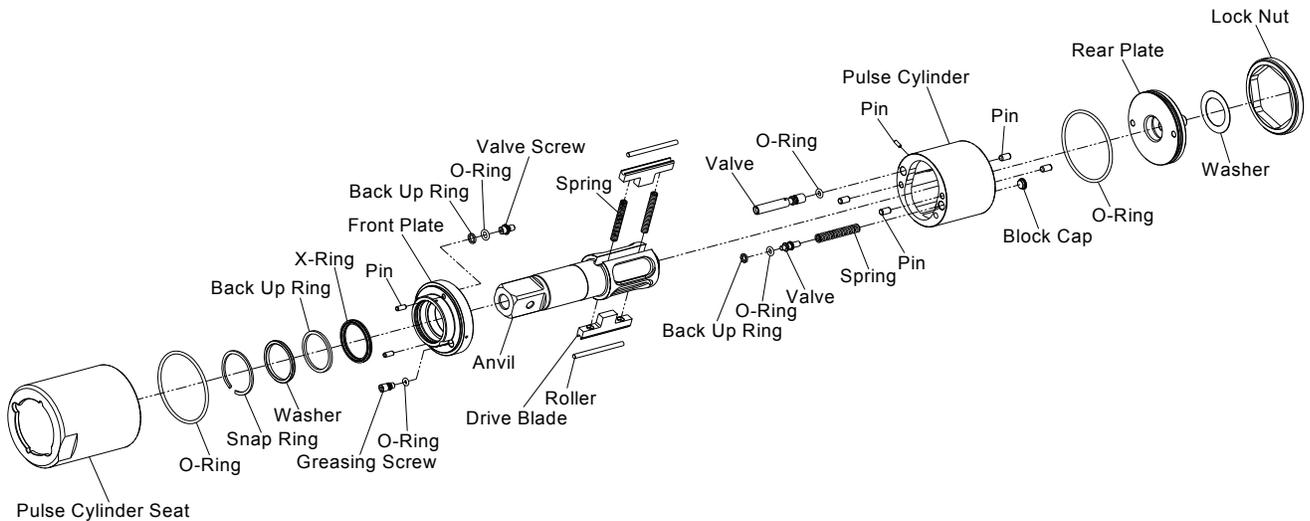
d. FLEX-100P



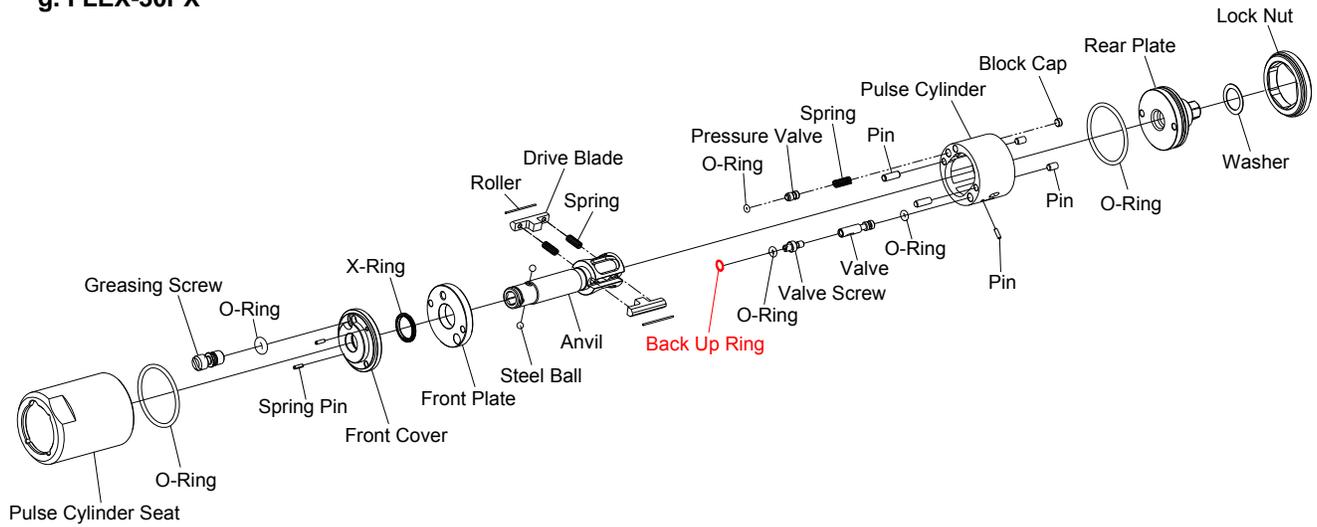
e. FLEX-130P



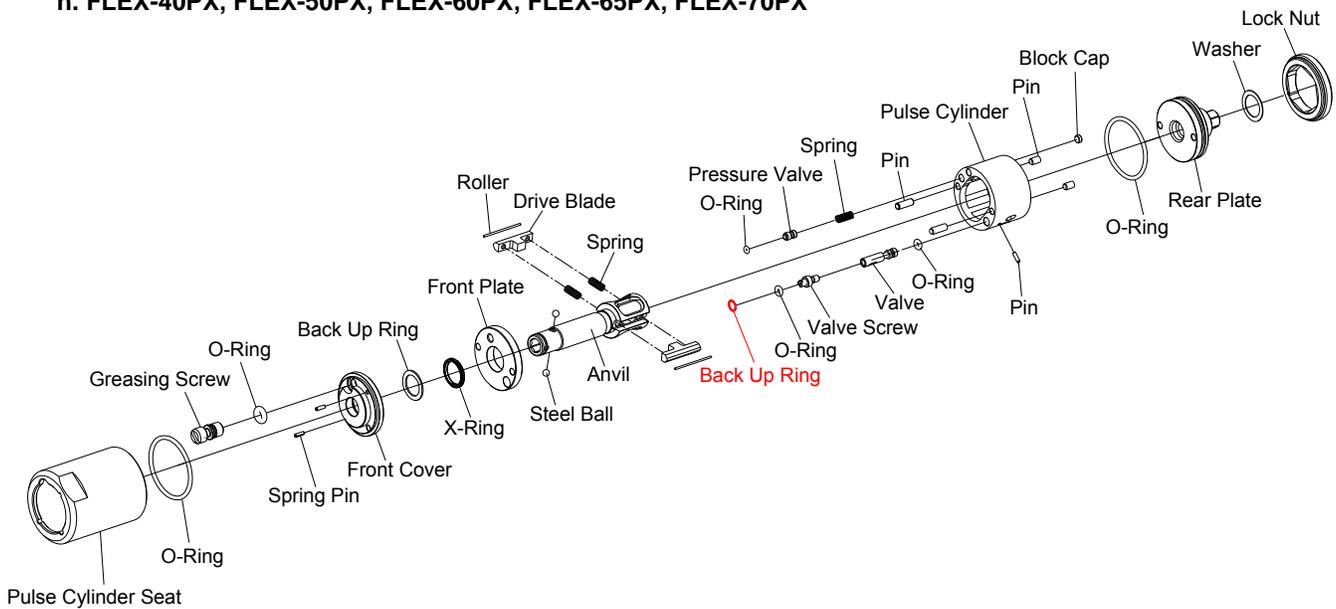
f. FLEX-150P, FLEX-180P



g. FLEX-30PX



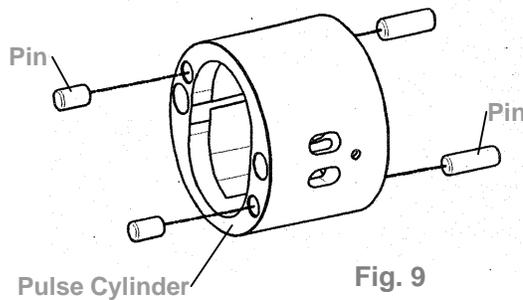
h. FLEX-40PX, FLEX-50PX, FLEX-60PX, FLEX-65PX, FLEX-70PX



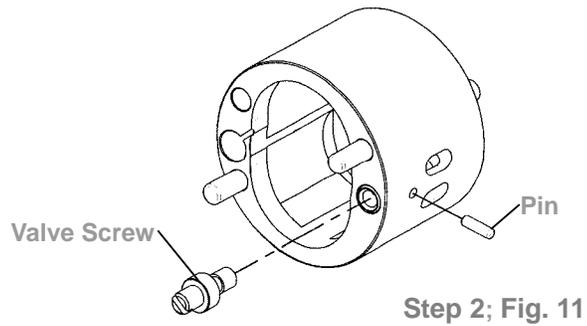
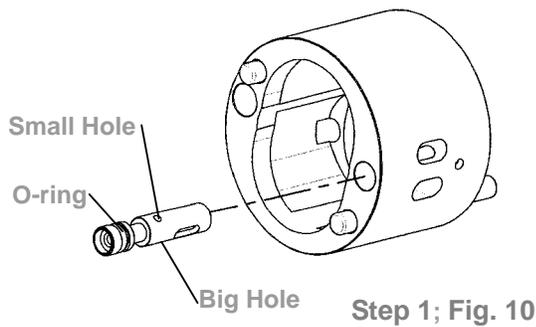
● PULSE UNIT ASSEMBLY:

(1) Pulse Cylinder Unit Assembly:

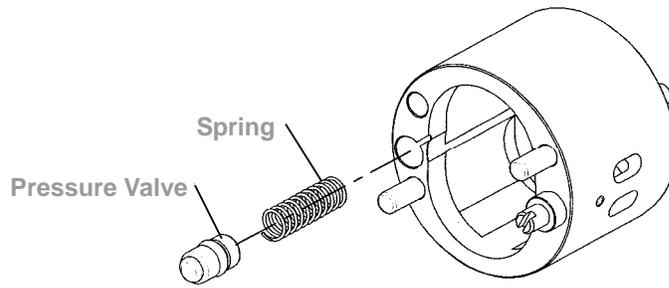
- ① Install the pins on both sides of the pulse cylinder. (Fig. 9)



- ② Sleeve the o-ring to the valve and install the valve into the big hole on the pulse cylinder. (Step 1; Fig.10)
 - ③ Insert the pin into the hole on the side of the pulse cylinder. (Step 2; Fig.11)
 - ④ Tighten the valve screw left thread to the pressure valve. (Step 3; Fig.11)
- NOTE:** the valve screw **MUST** tighten to the most bottom position certainly.

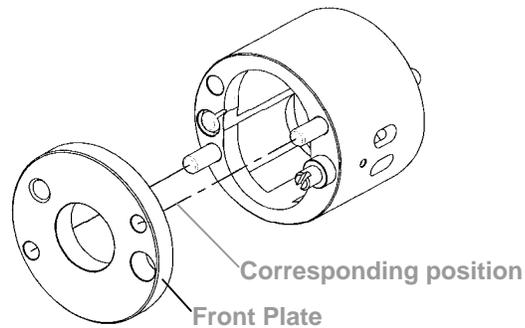


⑤ Put the spring into the hole then install the pressure valve that with the o-ring sleeved. (Step 4; Fig. 12)



Step 4; Fig. 12

⑥ Install the front plate and make sure the corresponding position with the pins. (Step 5; Fig. 13)



Step 5; Fig. 13

(2) Anvil Unit Assembly :

Install the roller to the drive blade, then insert the springs into the anvil and press the blades from both sides. Finally put the anvil to the pulse cylinder to complete the anvil unit assembly.



MUST follow the direction as shown in Figure 16 while installing the anvil unit into the pulse cylinder; be sure to aim at the highest points by two sides of the interior pulse unit and press the two drive blades in slowly.

NOTE: IT IS RECOMMENDED TO USE THE SPECIAL FIXTURE FOR EASIER INSTALLATION OF ANVIL WITH THE ROLLER AND THE BLADE INTO THE CYLINDER (No picture showed)

FIXTURE PART No	TOOL MODEL
63-I30AST-001K	All 30 Series
63-I40AST-001K	All 40, 50 and 60 Series
63-I70AST-001K	All 70 Series
63-I90AST-001K	All 90 Series
63-I100AST-001K	All 100 Series
63-I130AST-001K	All 130 Series
63-I150AST-001K	All 150 Series
63-I180AST-001K	All 180 Series

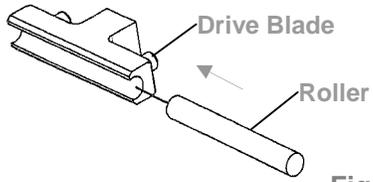


Fig. 14

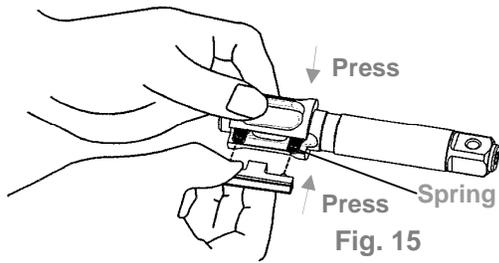


Fig. 15

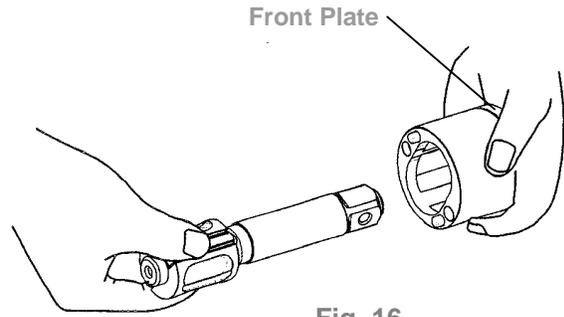
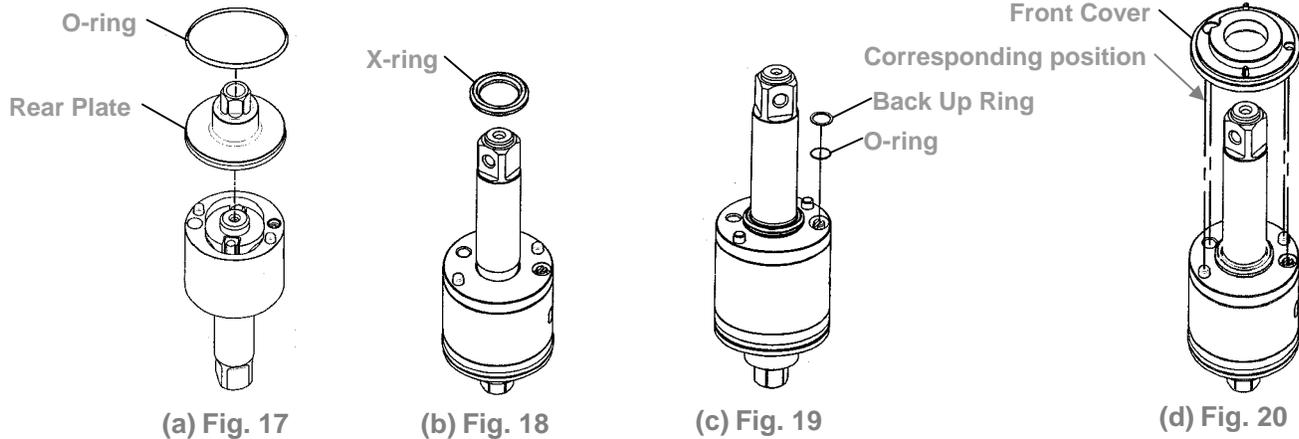


Fig. 16

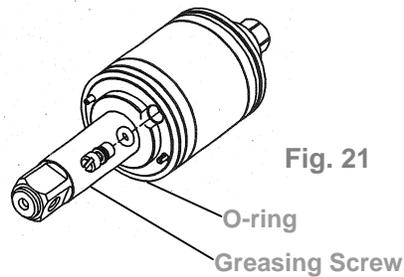
(3) Front Cover and Rear Plate of Pulse Cylinder Assembly

→ FLEX-30P, FLEX-30PX

- ① (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 17)
- (b) Put the X-ring on the anvil with the oil applied. (Fig. 18)
- (c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 19)
- (d) Install the front cover to the pulse cylinder by the corresponding positions. (Fig. 20)

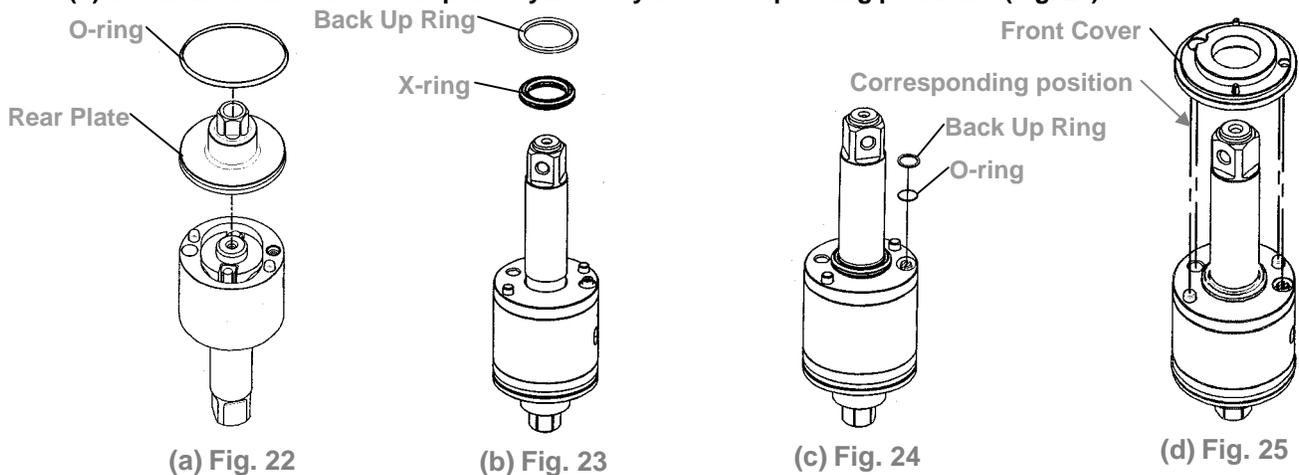


- ② After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.



→ FLEX-40P, FLEX-40PX, FLEX-50P, FLEX-50PX, FLEX-60P, FLEX-60PX, FLEX-65P, FLEX-65PX, FLEX-70P, FLEX-70PX, FLEX-70X, FLEX-80H, FLEX-90P

- ① (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 22)
- (b) Put the X-ring and Back up ring on the anvil with the oil applied. (Fig.23)
- (c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 24)
- (d) Install the front cover to the pulse cylinder by the corresponding positions. (Fig. 25)



- ➊ After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

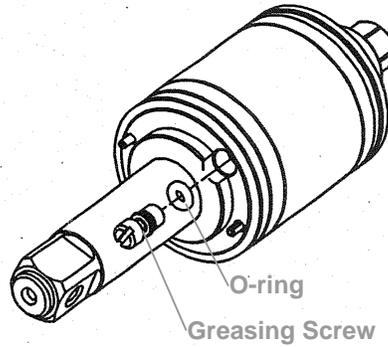
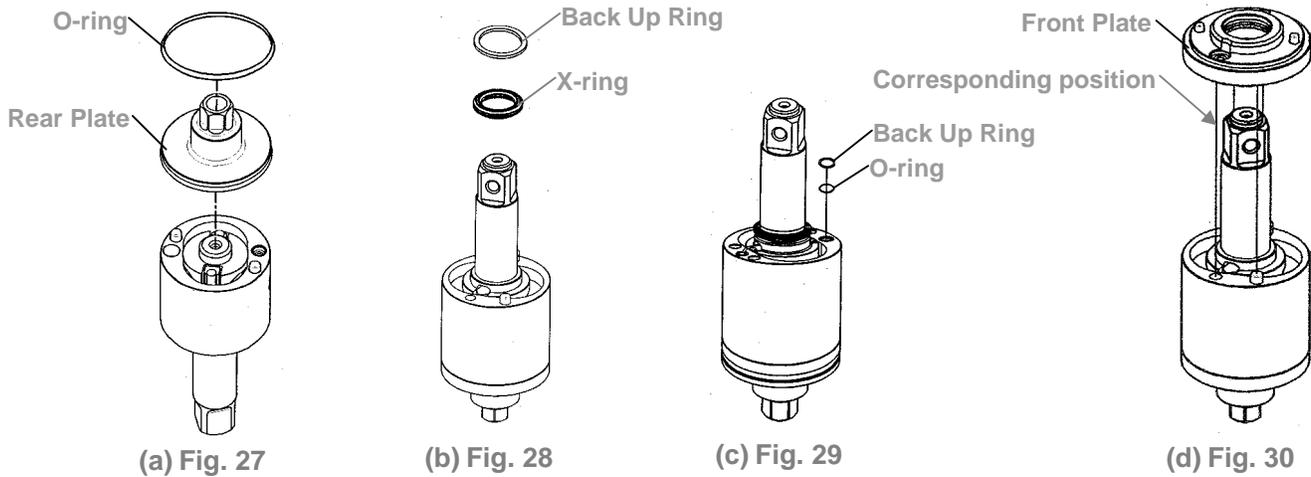


Fig. 26

➔ **FLEX-80P**

- ➊ (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 27)
- (b) Put the X-ring and Back up ring on the anvil with the oil applied. (Fig. 28)
- (c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 29)
- (d) Install the front plate to the pulse cylinder by the corresponding positions. (Fig. 30)



- ➋ After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

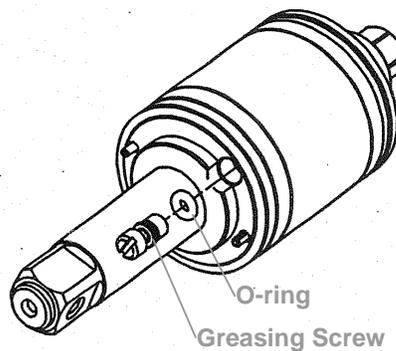
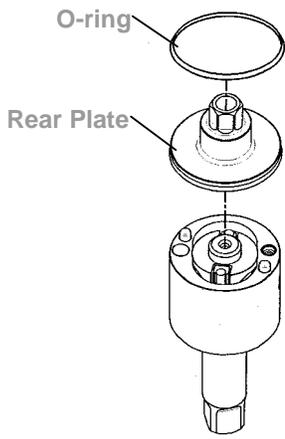


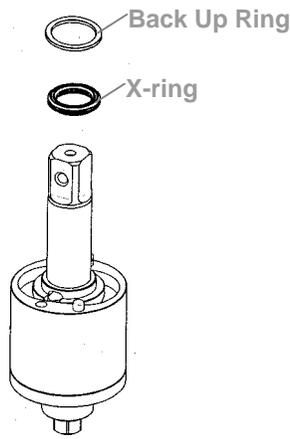
Fig. 31

➔ **FLEX-100P**

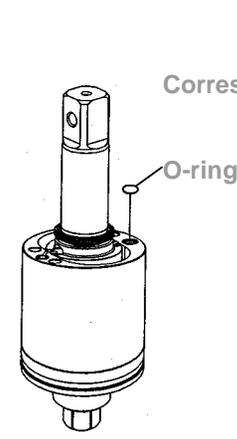
- ➊ (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 32)
- (b) Put the X-ring and Back up ring on the anvil with the oil applied. (Fig. 33)
- (c) Put the O-ring into the Valve Screw. (Fig. 34)
- (d) Install the front plate to the pulse cylinder by the corresponding positions. (Fig. 35)



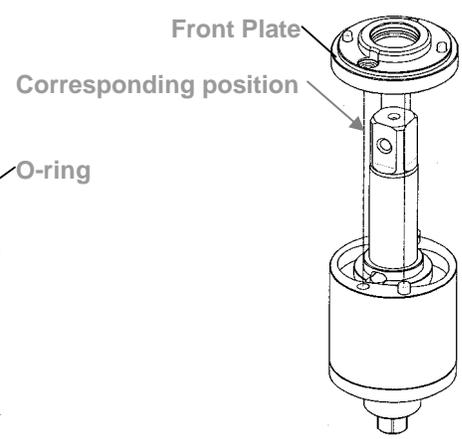
(a) Fig. 32



(b) Fig. 33



(c) Fig. 34



(d) Fig. 35

② After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

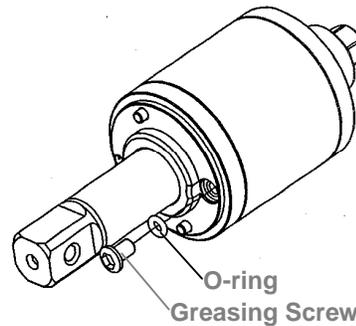
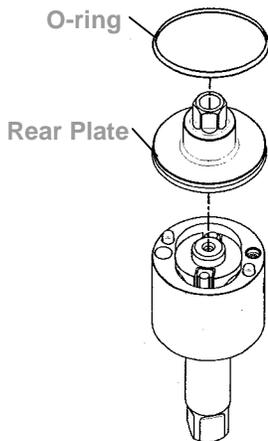


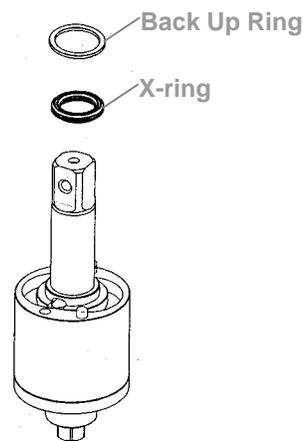
Fig. 36

→ **FLEX-130P**

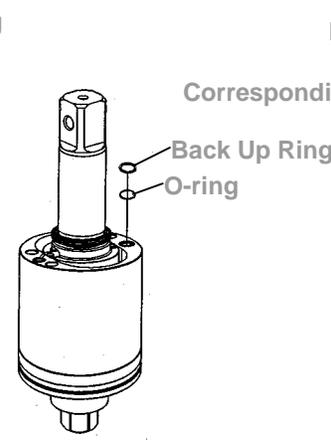
- ① (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 37)
- (b) Put the X-ring and Back up ring on the anvil with the oil applied. (Fig. 38)
- (c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 39)
- (d) Install the front plate to the pulse cylinder by the corresponding positions. (Fig. 40)



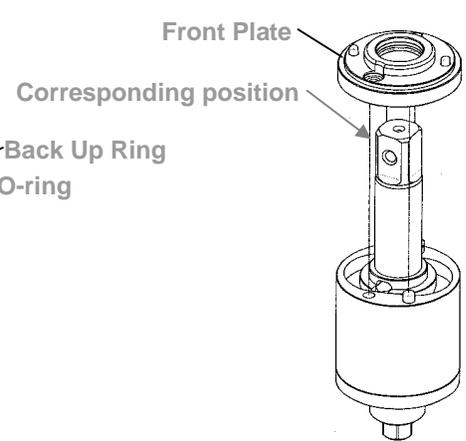
(a) Fig. 37



(b) Fig. 38



(c) Fig. 39



(d) Fig. 40

② After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

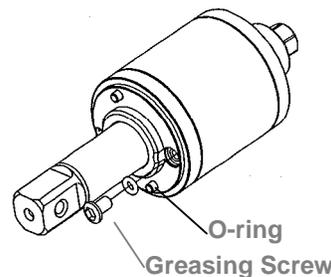
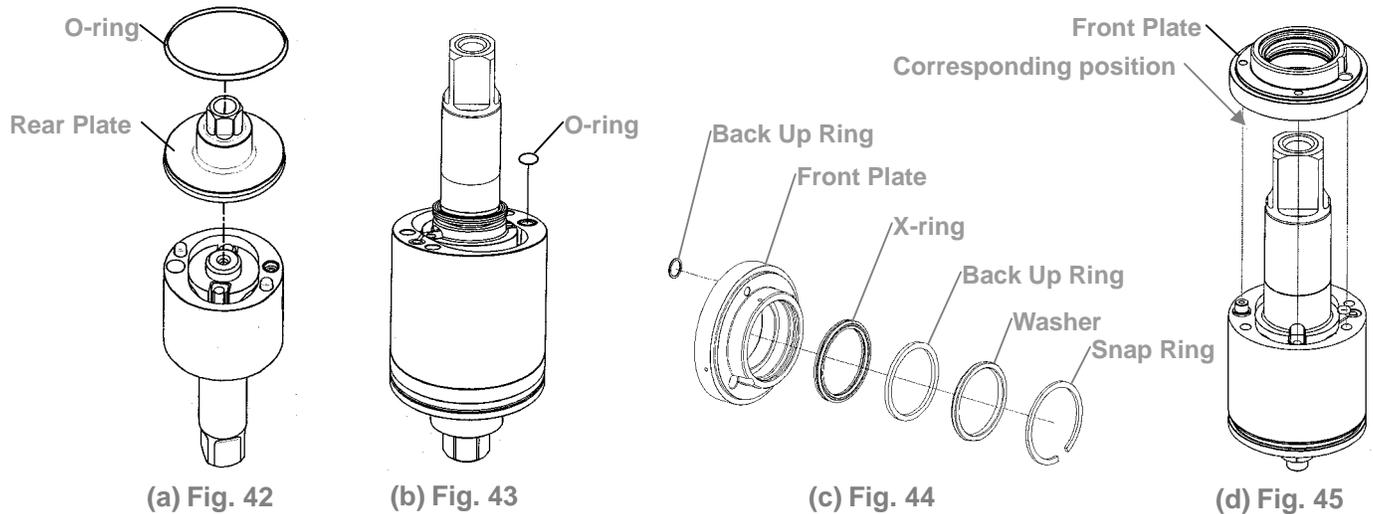


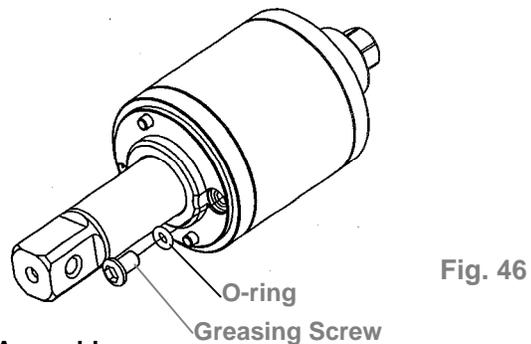
Fig. 41

→ **FLEX-150P, FLEX-180P**

- ① (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 42)
- (b) Put the O-ring into the Valve Screw. (Fig. 43)
- (c) Put the X-ring and Back Up Ring , Washer , Snap Ring on the anvil with the oil applied. (Fig. 44)
- (d) Install the front plate to the pulse cylinder by the corresponding positions. (Fig. 45)



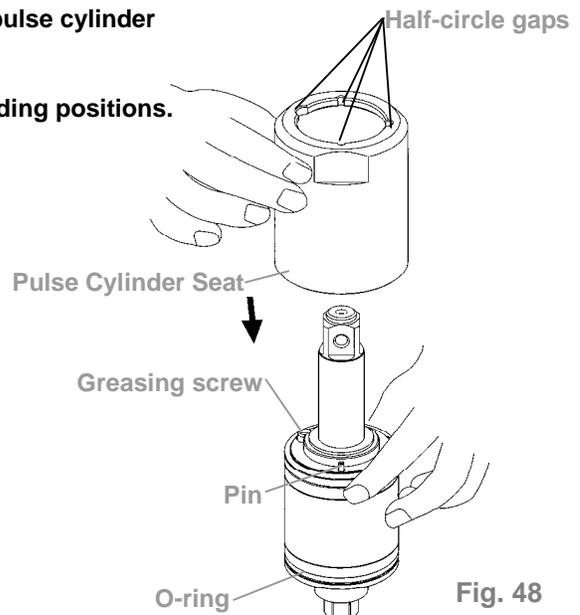
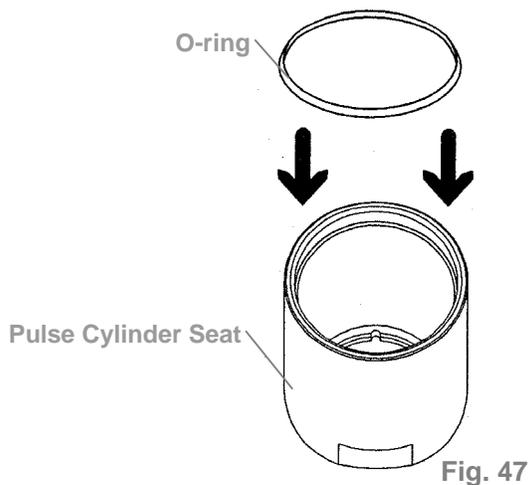
- ② After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.



(4) Pulse Cylinder Seat and Lock Nut of Pulse Cylinder Assembly

- ① Place the o-ring inside the bottom of the pulse cylinder seat, then combine the pulse cylinder seat with the assembled pulse cylinder unit. (Fig. 47, Fig. 48)

⚠ Make sure the half-circle gaps aim at the corresponding positions.



- ② Use the appliance to push out the rear plate from the pulse cylinder seat. See Table 2 in reference to the proper appliance selection. (Fig. 49)
- ③ Fill up the interior pulse cylinder with the pulse oil about 90% full by an injector. (Fig. 50)
- ④ Install the rear plate taken from the step 2 on the pulse cylinder. Note the corresponding positions! (Fig. 51)
- ⑤ Turn the assembled unit up side down so the rear plate is at the bottom. Then press the pulse cylinder seat all the way down to the fixed position. Make sure the corresponding positions are matched exactly. (Fig. 52)

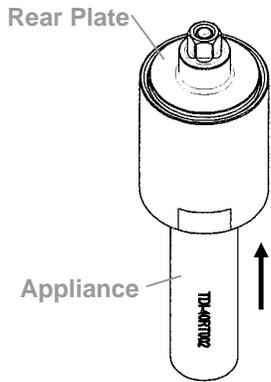


Fig. 49

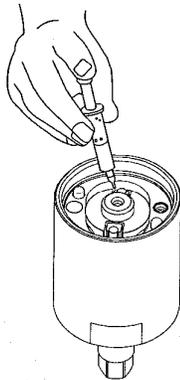


Fig. 50

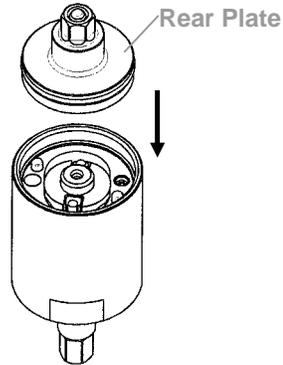


Fig. 51

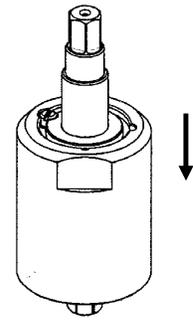


Fig. 52

- ⑥ Fix the pulse cylinder seat by a vise. Use an appliance and a torque wrench then turn clockwise to tighten the lock nut of the pulse cylinder. See Table 3 and Table 4 in reference to the proper appliance and tightness. (Note: Lock-tite needed when tightening the lock nut of the pulse cylinder)

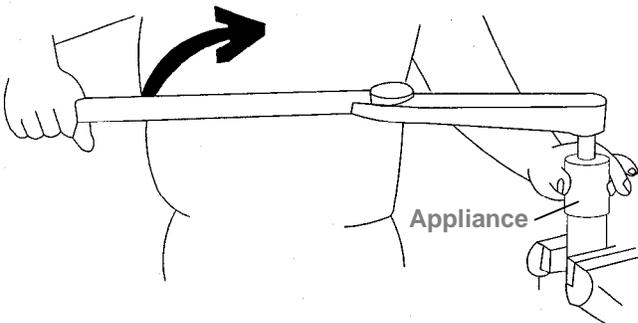
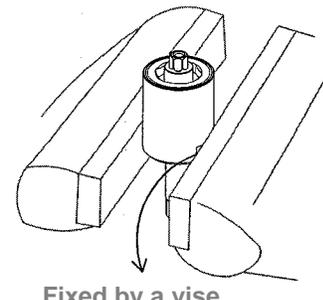


Fig. 53



Fixed by a vise

Appliance No.	Apply to
63-40RT001	FLEX-30P, FLEX-30PX, FLEX-40P, FLEX-40PX, FLEX-50P, FLEX-50PX, FLEX-60P, FLEX-60PX
63-70RT001	FLEX-65P, FLEX-65PX, FLEX-70P, FLEX-70PX, FLEX-70X, FLEX-80P, FLEX-80H
63-90RT001	FLEX-90P
63-100RT001	FLEX-100P
63-130RT001	FLEX-130P
63-150RT001	FLEX-150P, FLEX-180P

Table 3

Model No.	Tighten torque
FLEX-30P	70 N.M
FLEX-30PX	70 N.M
FLEX-40P	80 N.M
FLEX-40PX	80 N.M
FLEX-50P	80 N.M
FLEX-50PX	80 N.M
FLEX-60P	80 N.M
FLEX-60PX	80 N.M
FLEX-65P	100 N.M
FLEX-65PX	100 N.M

Model No.	Tighten torque
FLEX-70P	100 N.M
FLEX-70PX	100 N.M
FLEX-70X	100 N.M
FLEX-80P	100 N.M
FLEX-80H	100 N.M
FLEX-90P	120 N.M
FLEX-100P	130 N.M
FLEX-130P	150 N.M
FLEX-150P	150 N.M
FLEX-180P	180 N.M

Table 4

⑦ After completing the above steps, test to make sure the square drive of the anvil rotates smoothly.

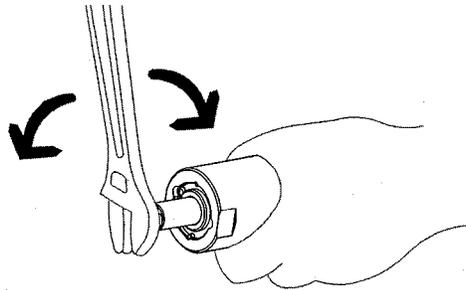


Fig. 54

(5) Steps for Pulse Cylinder Oiling :

① Loosen the greasing screw, and fill in the authorized oil by an injector until it is full and overflow.

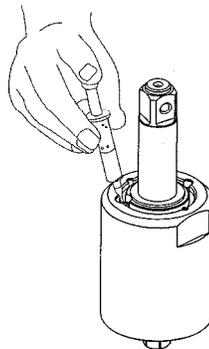


Fig. 55

② Take the unit and dip it in an oil tank, then rotate the anvil by a wrench to release air inside, in the mean time, the unit would be full with oil completely.

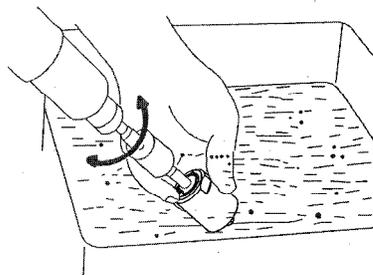
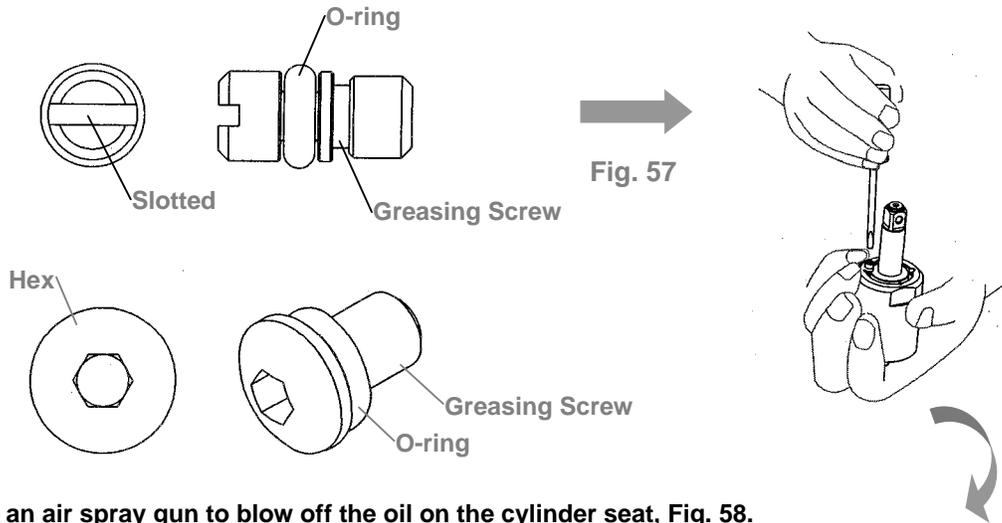
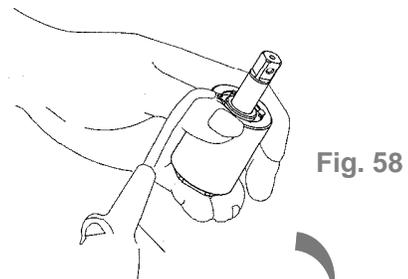


Fig. 56

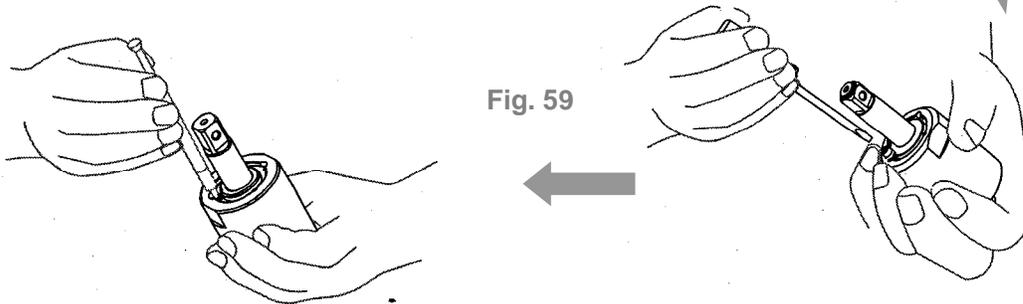
③ Use the screwdriver either, the slotted or the hex one to tighten the greasing screw, Fig. 57.



④ Use an air spray gun to blow off the oil on the cylinder seat, Fig. 58.



⑤ Loosen the greasing screw again and use an injector to draw out a little amount of oil (see Table 5) Finally, tighten the greasing screw back to the pulse cylinder unit, Fig. 59.



Model No.	Amount of oil draw
FLEX-30P	0.25 CC
FLEX-30PX	0.25 CC
FLEX-40P	0.3 CC
FLEX-40PX	0.3 CC
FLEX-50P	0.35 CC
FLEX-50PX	0.35 CC
FLEX-60P	0.45 CC
FLEX-60PX	0.45 CC
FLEX-65P	0.6 CC
FLEX-65PX	0.6 CC

Model No.	Amount of oil draw
FLEX-70P	0.63 CC
FLEX-70PX	0.63 CC
FLEX-70X	0.63 CC
FLEX-80P	0.6 CC
FLEX-80H	0.56 CC
FLEX-90P	0.9 CC
FLEX-100P	1.5 CC
FLEX-130P	1.6 CC
FLEX-150P	2.2 CC
FLEX-180P	2.5 CC

Table 5

(6) Torque Testing :

- ① Put the washer on the front end of the anvil, and then put another washer on the rear plate.**

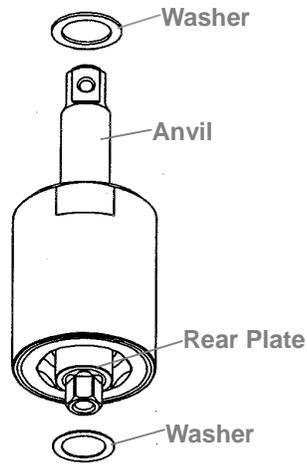


Fig. 60

- ② Tighten the clutch housing by hands.**

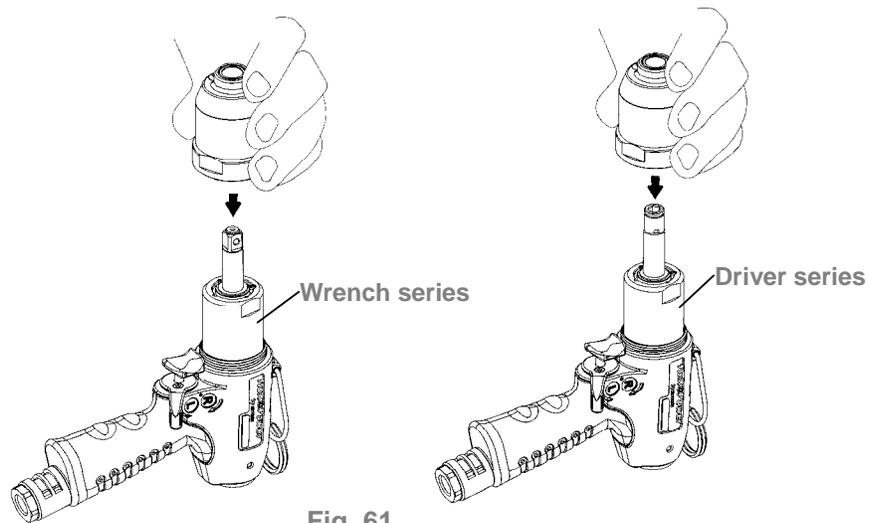


Fig. 61

- ③ Test the forward torque by a digital torque tester and make sure the tool pulses smoothly.**

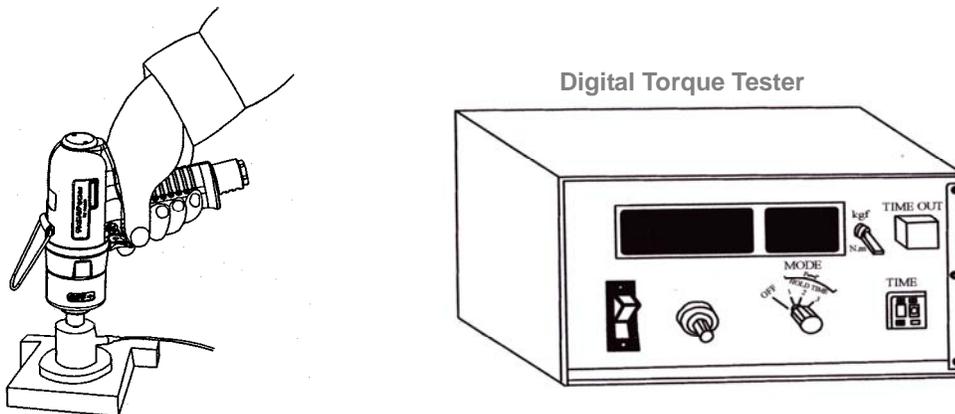


Fig. 62

Model No.	Air inlet pressure 0.6 Mpa	Model No.	Air inlet pressure 0.6 Mpa
	N.M (at least)		N.M (at least)
FLEX-30P	12.5	FLEX-70P	57
FLEX-30PX	12.5	FLEX-70PX	47
FLEX-40P	19	FLEX-70X	55
FLEX-40PX	18	FLEX-80P	70
FLEX-50P	27	FLEX-80H	72
FLEX-50PX	26	FLEX-90P	90
FLEX-60P	35	FLEX-100P	120
FLEX-60PX	30	FLEX-130P	148
FLEX-65P	45	FLEX-150P	210
FLEX-65PX	38	FLEX-180P	255

Table 6

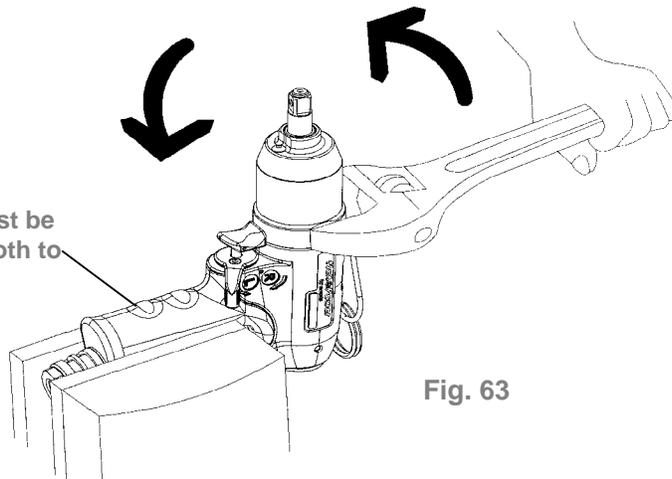
④ If the test result is NG (see Table 6 in reference to the torque standard), MUST draw out or add a little amount of oil and do the following steps:

- ① Loosen the pulse unit housing by hands.
- ② Loosen the greasing screw.
- ③ Draw out or add a little amount of oil.
- ④ Tighten the greasing screw back.
- ⑤ Tighten the pulse unit housing.
- ⑥ Test the torque again. If the test result is still NG, repeat the Steps ①~⑥ until the standard torque is reached.

(7) Pulse Unit Housing Assembly :

Fix the housing by a vise. Turn the wrench in counter clockwise direction to tighten the pulse unit housing.

Note: Handle rubber must be covered by a piece of cloth to avoid damage



(8) Anvil Unit Assembly: (for FLEX-30PX, FLEX-40PX, FLEX-50PX, FLEX-60PX, FLEX-65PX, FLEX-70PX)

(a) Place the steel ball, the quick change holder, the spring, and the hold spacer orderly on the anvil as shown.

(b) Put the anvil collar on the Anvil. (Fig. 65)

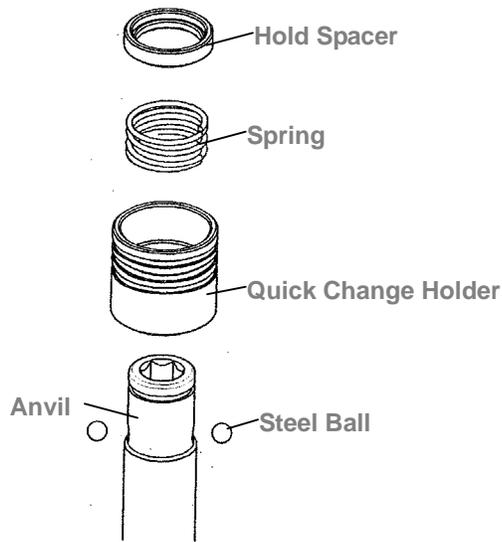


Fig. 64

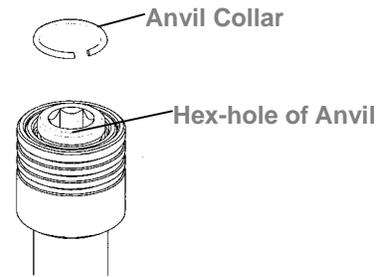


Fig. 65

● **HOUSING AND MOTOR SET DISASSEMBLY:**

(1) Cylinder Unit Disassembly:

- ① Take a piece of cloth to cover the housing handle and fix the tool with a vise. Use the appliance (see Table 7) to take the lock nut out of cylinder by turning clockwise.

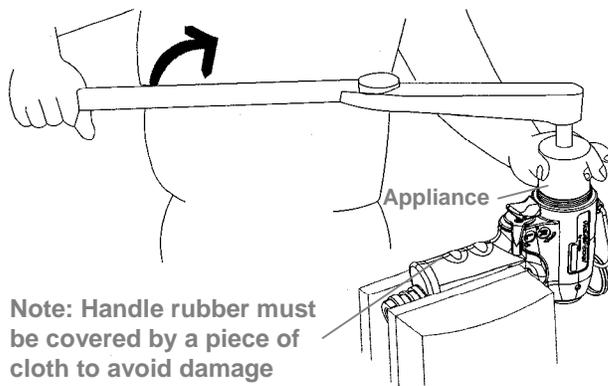
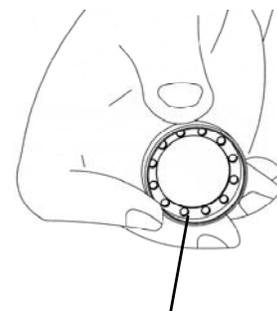


Fig. 66



Lock Nut of Cylinder

Appliance No.	Apply to
63-40RT004	FLEX-30P, FLEX-30PX, FLEX-40P, FLEX-40PX, FLEX-50P, FLEX-50PX, FLEX-60P, FLEX-60PX
63-70XRT004	FLEX-65P, FLEX-65PX, FLEX-70X, FLEX-80P, FLEX-80H
63-90RT003	FLEX-70P, FLEX-70PX, FLEX-90P
63-100RT003	FLEX-100P
63-130RT003	FLEX-130P
63-150RT003	FLEX-150P

Table 7

- ② Fix the housing in an opposite position. Use the appliance to loosen the lock nut of rear plate on the cylinder in counter clockwise direction.

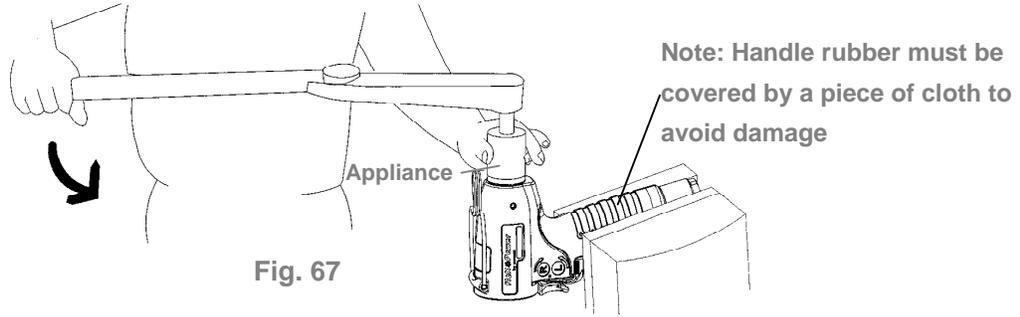


Fig. 67

Appliance No.	Apply to
63-40RT003	FLEX-30P, FLEX-30PX, FLEX-40P, FLEX-40PX, FLEX-50P, FLEX-50PX, FLEX-60P, FLEX-60PX, FLEX-65P, FLEX-65PX, FLEX-70X, FLEX-80P, FLEX-80H
63-100RT002	FLEX-70P, FLEX-70PX, FLEX-90P, FLEX-100P
63-130RT002	FLEX-130P, FLEX-150P
63-180RT001	FLEX-180P

Table 8

- ③ Take a piece of cloth and lay it on a table before disassembly. Hold the housing and tap slightly with a plastic stick to push the cylinder unit out.

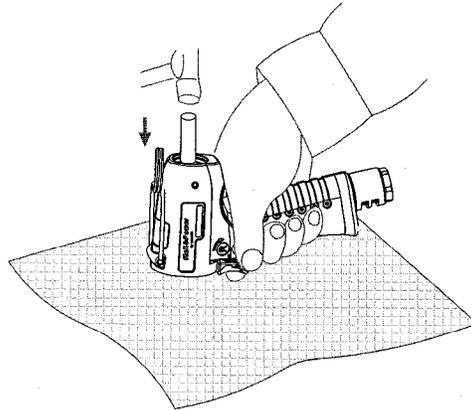


Fig. 68

④ Parts of Motor Set:

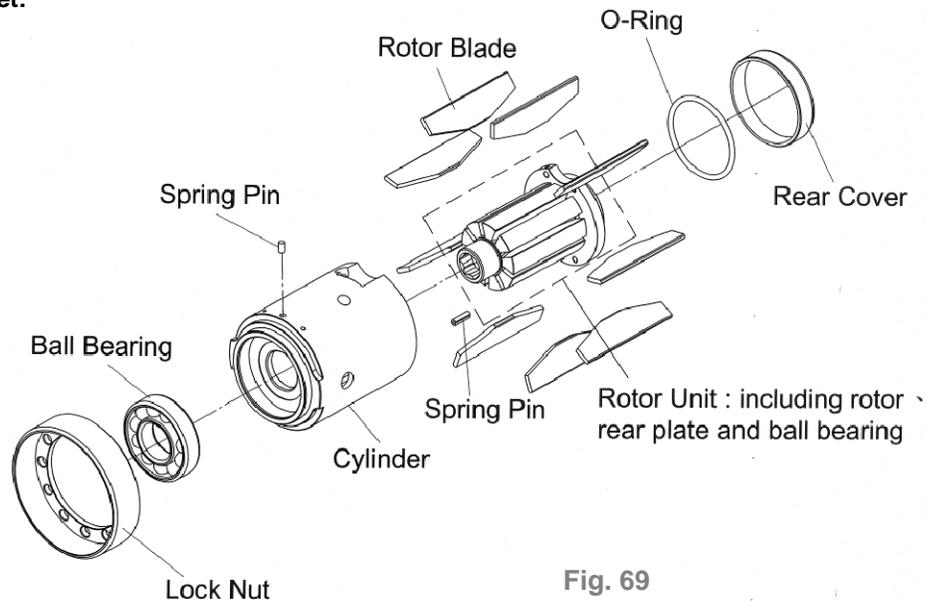


Fig. 69



The rotor and the rear end plate must be press fitted. The clearance of the two parts must be in between 0.01~0.02 mm. It would not be easy to assemble the two parts by repair centers in general. Therefore, as there is a need of repair on the parts of the rotor, the rear end plate, and the ball bearing, we strongly suggest replacing a complete ROTOR UNIT, which is including the rotor, the rear plate, and the ball bearing. The rotor unit would be full assembled and well-measured before delivery.

(2) Air Inlet Disassembly:

Take the air inlet unit apart from the end of the housing. The parts of O-ring, Muffler, Exhaust deflector are separated by each other.

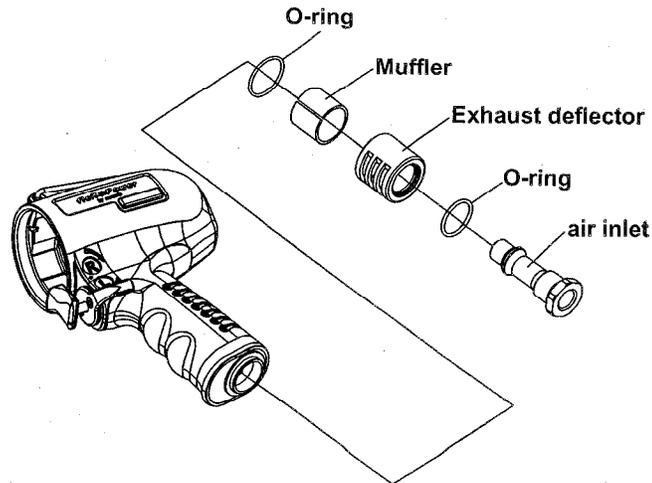
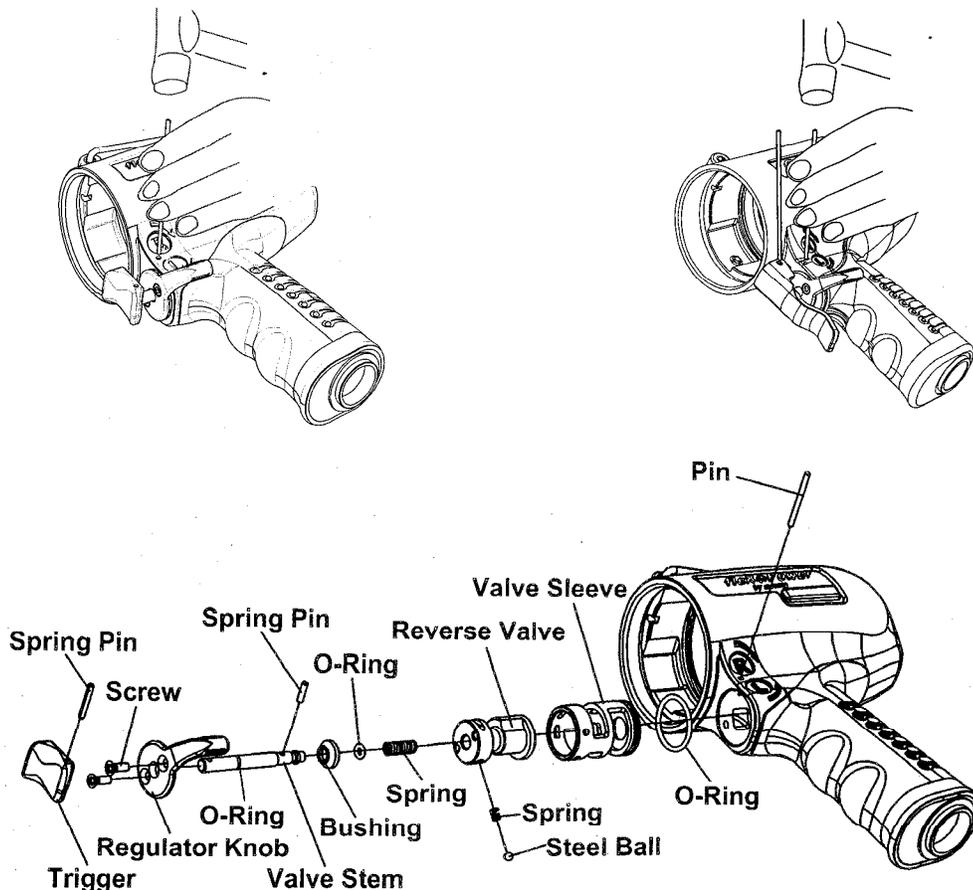


Fig. 70

(3) Trigger Set Disassembly:

Remove the pin to take apart the valve sleeve set. All the parts are disassembled as the below drawing shown.



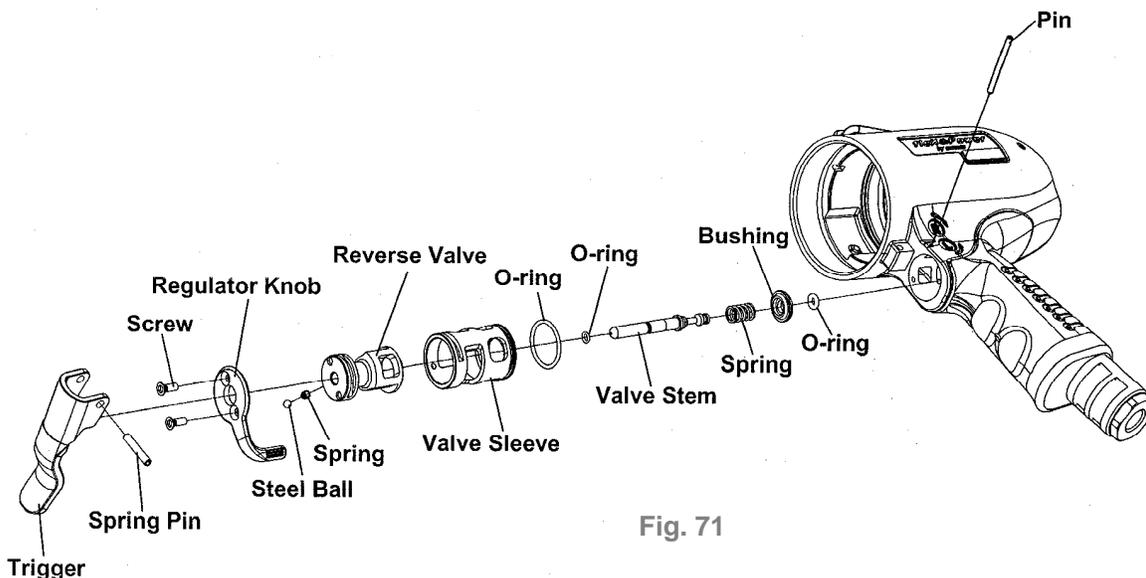


Fig. 71

● HOUSING AND MOTOR SET ASSEMBLY:

(1) Housing and Air Inlet Assembly:

Install and tighten the parts of air inlet one by one and in order. (NOTE: Apply the Lock-tite on the threads of air inlet before assembly)

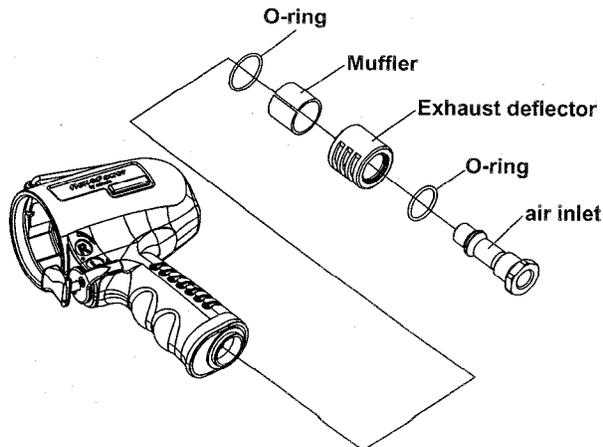
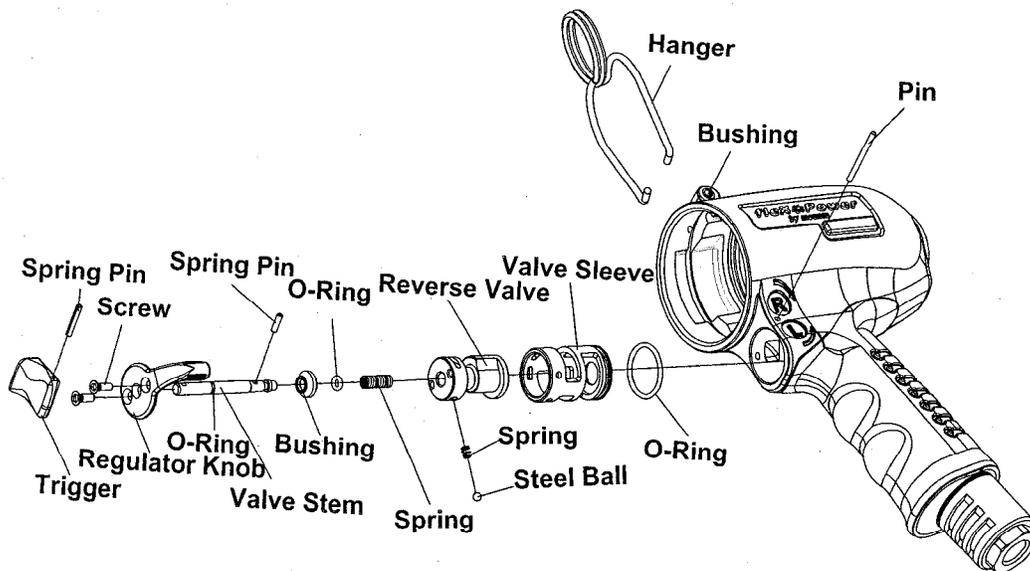


Fig. 72

(2) Housing and Trigger Set Assembly:

Install the parts of the trigger set orderly (see Fig. 73 drawing for reference). Then, insert the pin to fix all the parts. And, install the hanger to complete the assembly.



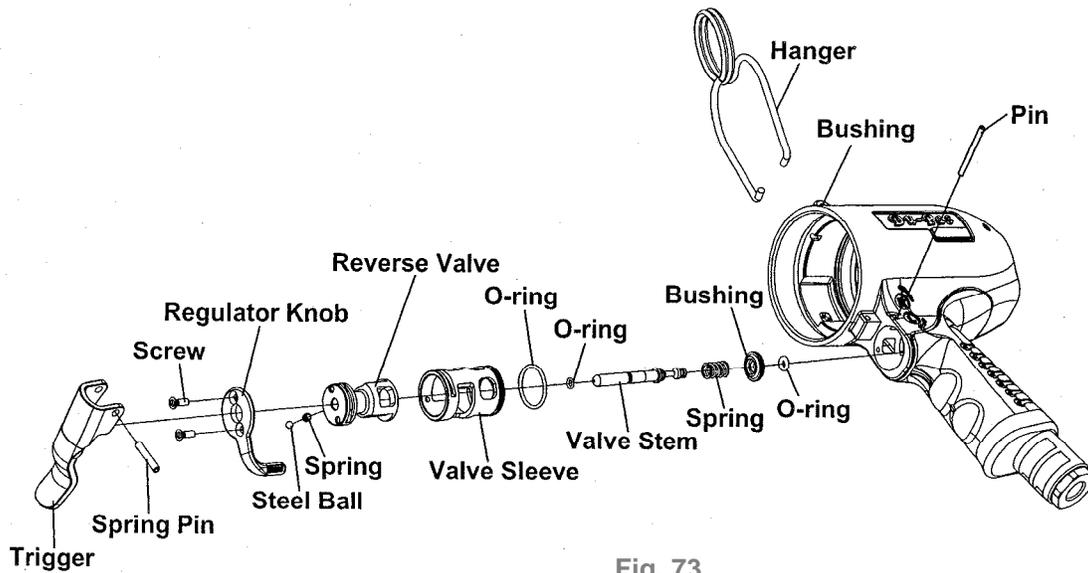


Fig. 73

(3) Cylinder Unit Assembly

- ① Place the rotor blades into the rotor. Insert the spring pin A and B into the cylinder. Make sure the pins aim at the pin holes when putting the cylinder down.

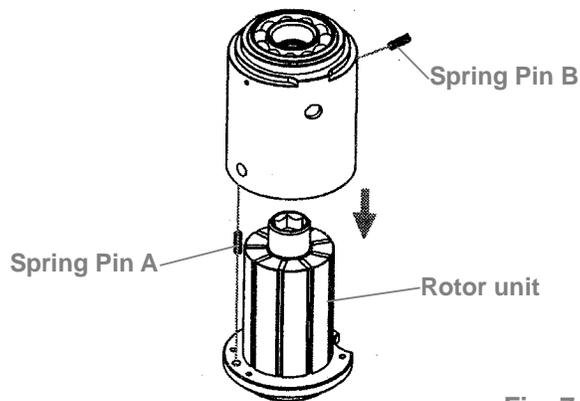


Fig. 74

- ② Install the o-ring and the rear cover to the rear plate. The motor set assembly is completed.

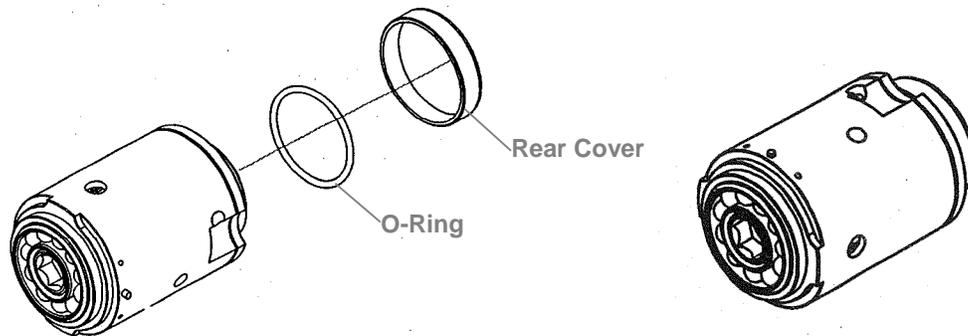
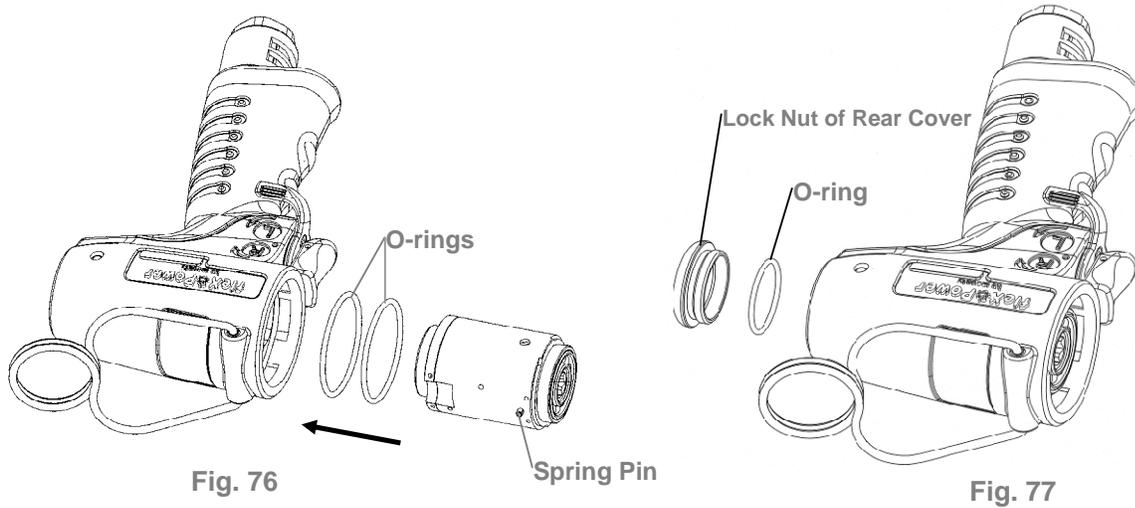


Fig. 75

(4) Housing and Motor Set Assembly

Place two o-rings into the housing, then the motor set. Be sure the direction is correct when putting the motor set in, i.e. the pin on the side of the cylinder must aim at the hole to fix position as shown in Figure 76. Finally, place the o-ring and the lock nut of the rear cover, Fig.77 to complete the assembly.



(5) Housing and Lock Nut of Cylinder Assembly

Fix the tool by a vise. Place the lock nut of the cylinder nut and tighten by the appliance in counter clockwise direction. Assembly is completed. See the Table 9 and 10 in reference to appliance use and tighten torque.

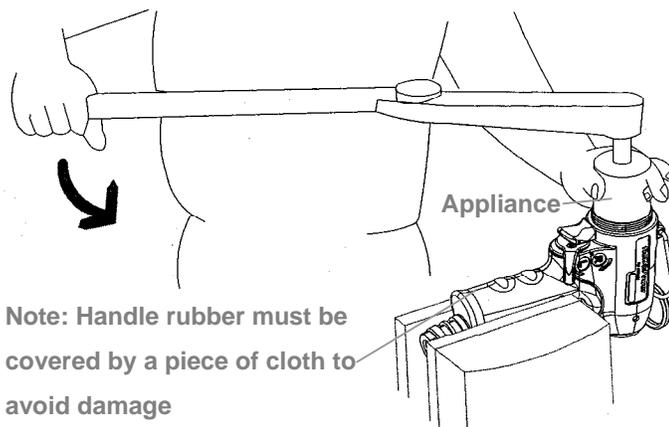


Fig. 78

Appliance No.	Apply to
63-40RT004	FLEX-30P, FLEX-30PX, FLEX-40P FLEX-40PX, FLEX-50P, FLEX-50PX FLEX-60P, FLEX-60PX
63-70XRT004	FLEX-65P, FLEX-65PX, FLEX-70X FLEX-80P, FLEX-80H
63-90RT003	FLEX-70P, FLEX-70PX, FLEX-90P
63-100RT003	FLEX-100P
63-130RT003	FLEX-130P
63-150RT003	FLEX-150P

Table 9

Model No.	Tighten torque		Model No.	Tighten torque	
FLEX-30P	40	N.M	FLEX-70P	60	N.M
FLEX-30PX	40	N.M	FLEX-70PX	60	N.M
FLEX-40P	40	N.M	FLEX-70X	40	N.M
FLEX-40PX	40	N.M	FLEX-80P	40	N.M
FLEX-50P	40	N.M	FLEX-80H	40	N.M
FLEX-50PX	40	N.M	FLEX-90P	60	N.M
FLEX-60P	40	N.M	FLEX-100P	60	N.M
FLEX-60PX	40	N.M	FLEX-130P	80	N.M
FLEX-65P	40	N.M	FLEX-150P	60	N.M
FLEX-65PX	40	N.M			

Table 10

→ **FLEX-180P**

● **HOUSING AND MOTOR SET DISASSEMBLY:**

(1) **Cylinder Unit Disassembly**

- ① Take out the lock washer.

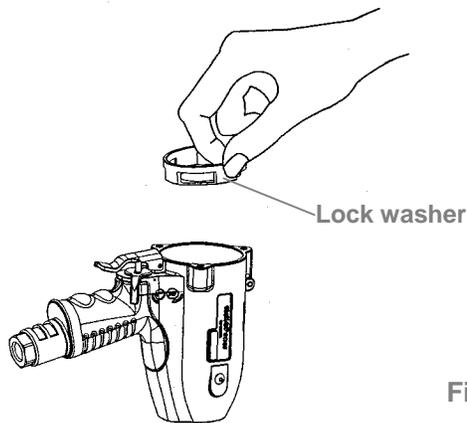


Fig. 79

- ② Fix the housing in an opposite position. Use the appliance to loosen the lock nut of rear plate on the cylinder in counter clockwise direction.

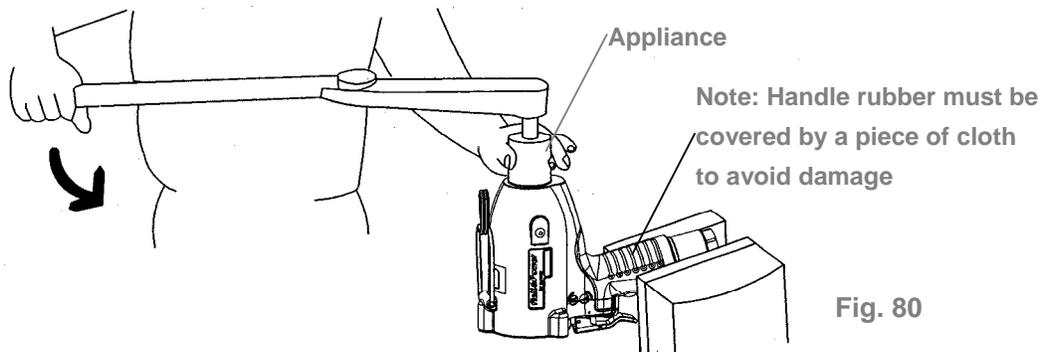


Fig. 80

Appliance No.	Apply to
63-180RT001	FLEX-180P

Table 11

- ③ Take a piece of cloth and lay it on a table before disassembly. Hold the housing and tap slightly with a plastic stick to push the cylinder unit out.

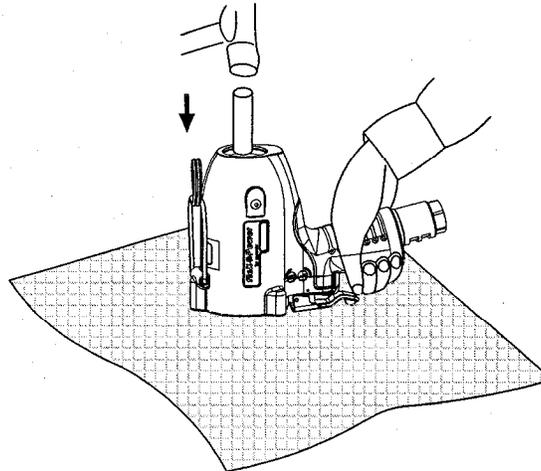


Fig. 81

④ Parts of Motor Set:

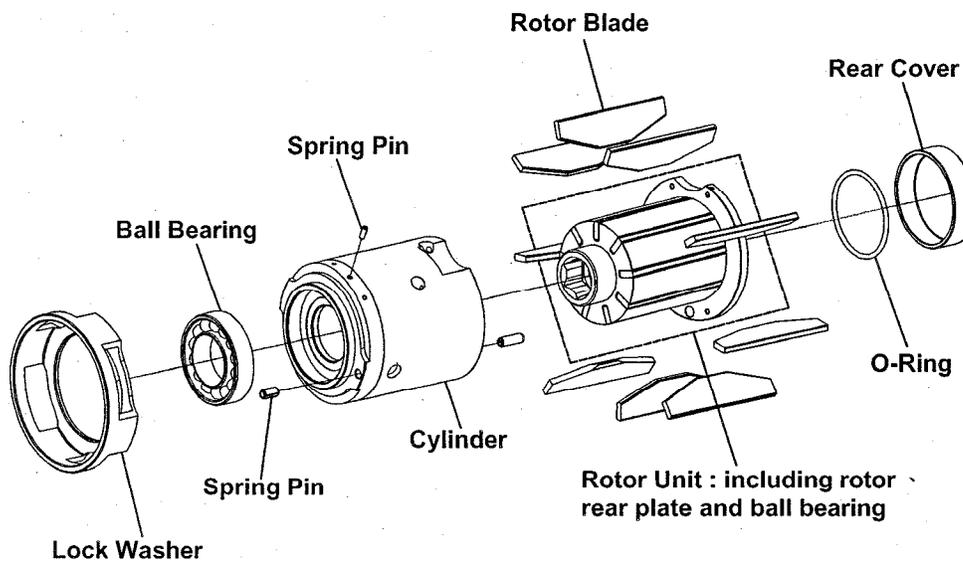


Fig. 82



The rotor and the rear end plate must be press fitted. The clearance of the two parts must be in between 0.01~0.02 mm. It would not be easy to assemble the two parts by repair centers in general. Therefore, as there is a need of repair on the parts of the rotor, the rear end plate, and the ball bearing, we strongly suggest replacing a complete ROTOR UNIT, which is including the rotor, the rear plate, and the ball bearing. The rotor unit would be full assembled and well-measured before delivery.

(2) Air Inlet Disassembly:

Take the air inlet unit apart from the end of the housing. The parts of O-ring, Muffler, Exhaust deflector are separated by each other.

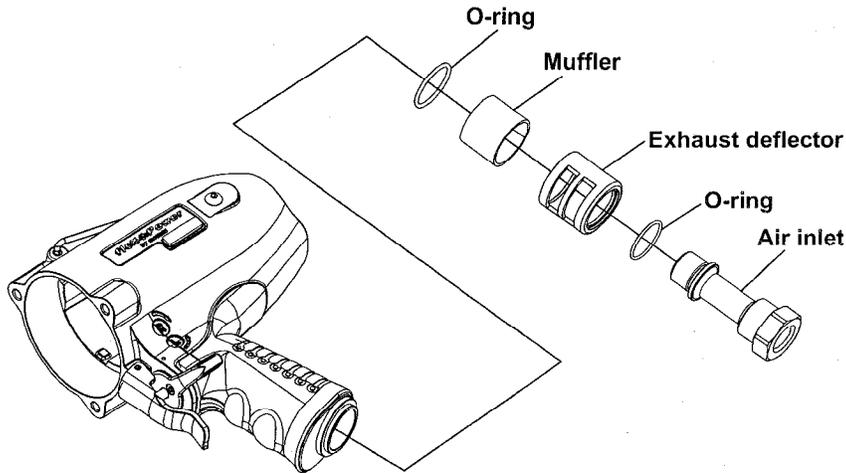


Fig. 83

(3) Trigger Set Disassembly:

Remove the pin to take apart the valve sleeve set. All the parts are disassembled as the below drawing showed.

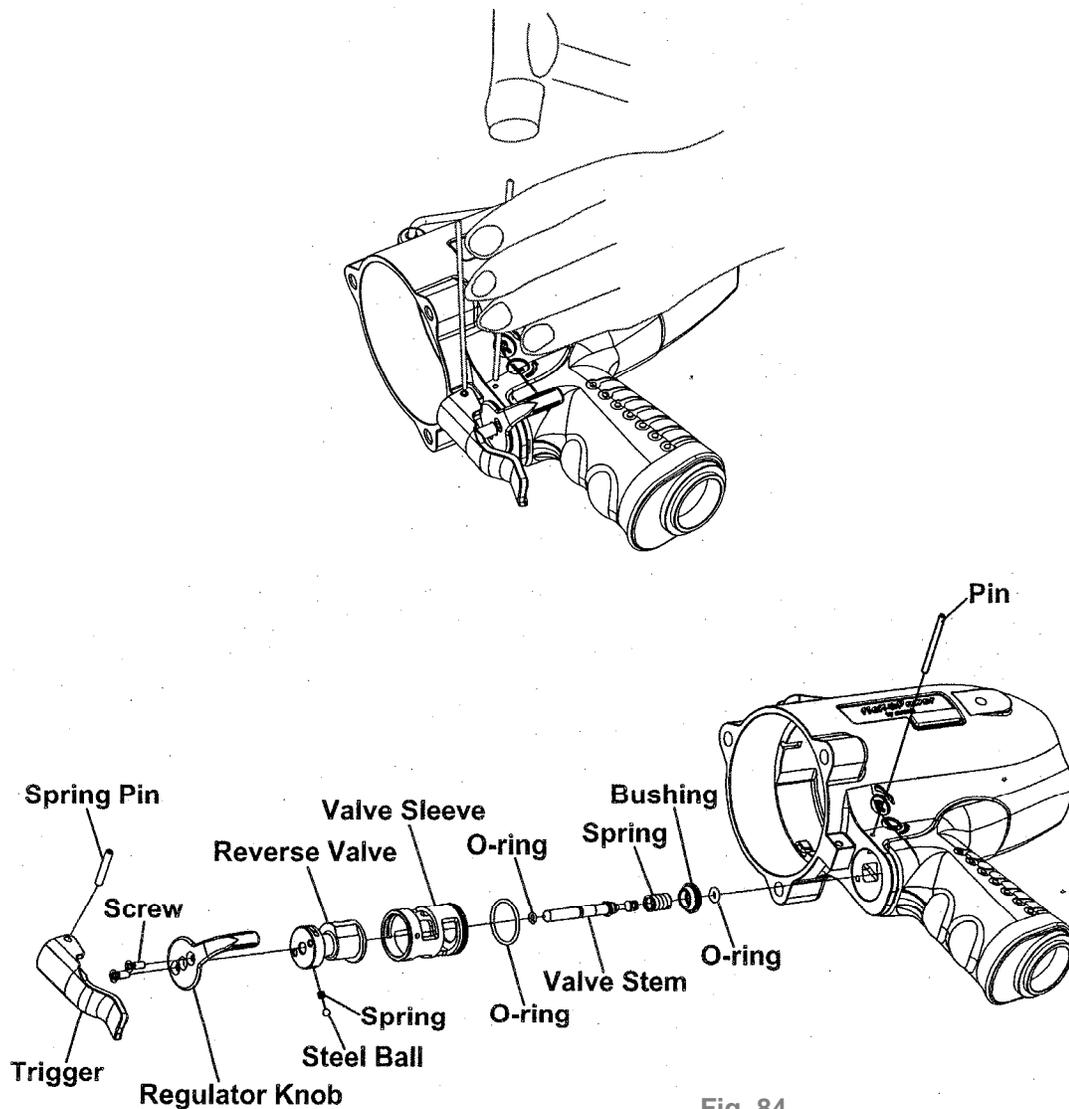


Fig. 84

- HOUSING AND MOTOR SET ASSEMBLY:

(1) Housing and Air Inlet Assembly:

Install and tighten the parts of air inlet one by one and in order. (NOTE: Apply the Lock-tite on the threads of air inlet before assembly)

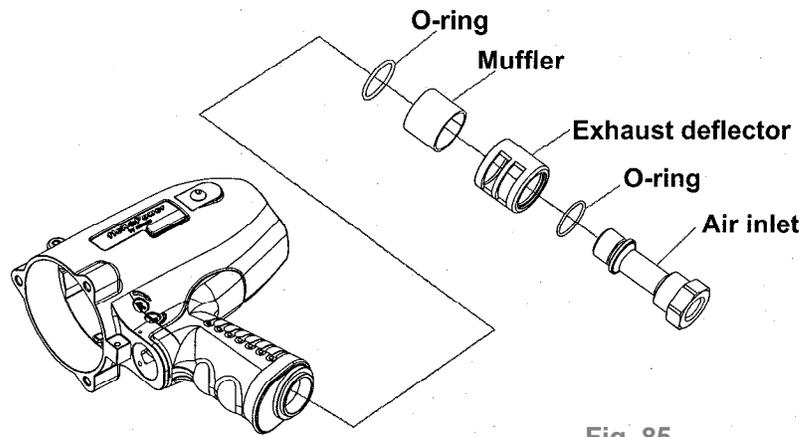


Fig. 85

(2) Housing and Trigger Set Assembly:

Install the parts of the trigger set orderly (see Fig. 86 drawing for reference). Then, insert the pin to fix all the parts. And, install the hanger to complete the assembly.

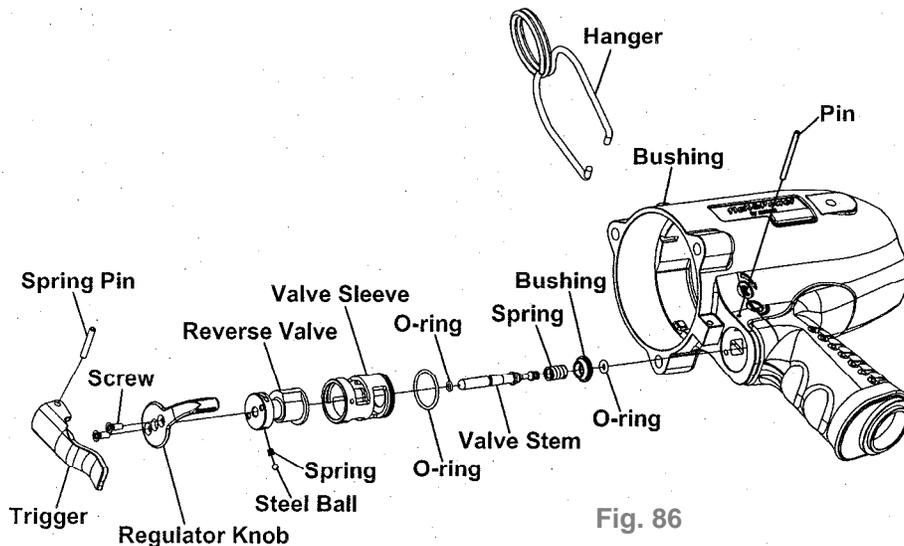


Fig. 86

(3) Cylinder Unit Assembly

① Place the rotor blades into the rotor. Insert the spring pin A and B into the cylinder. Make sure the pins aim at the pin holes when putting the cylinder down.

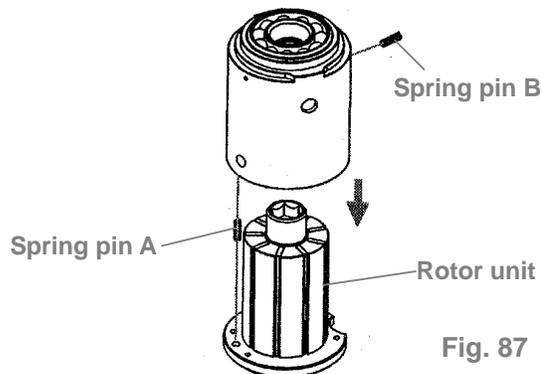


Fig. 87

② Install the o-ring and the rear cover to the rear plate. The motor set assembly is completed.

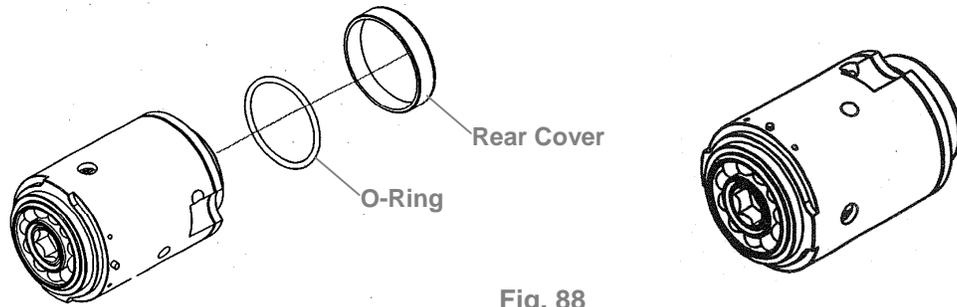


Fig. 88

(4) Housing and Motor Set Assembly

Place two o-rings into the housing, then the motor set. Be sure the direction is correct when putting the motor set in, i.e. the pin on the side of the cylinder must aim at the hole to fix position as Fig. 89 showed. Finally, place the o-ring and the lock nut of the rear cover, Fig. 90 to complete the assembly.

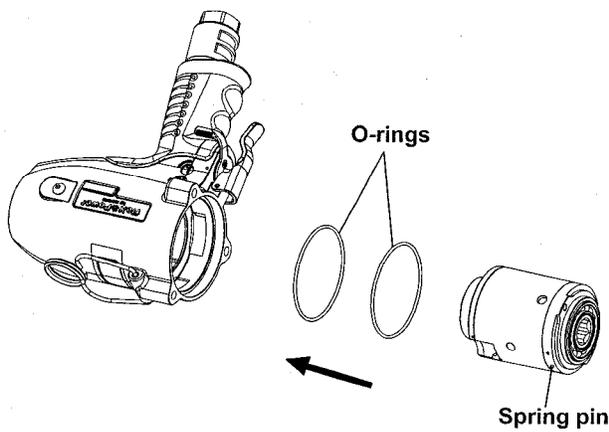


Fig. 89

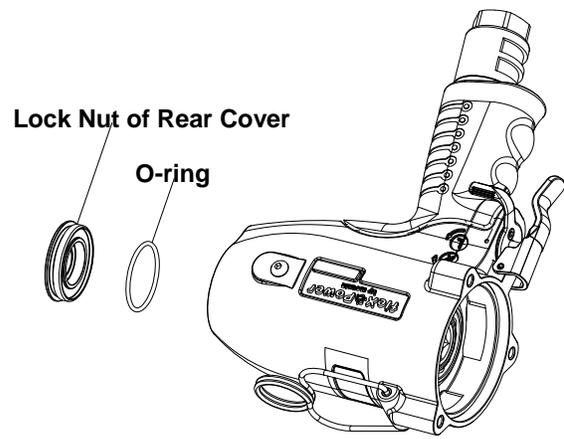


Fig. 90

(5) Motor housing, Pulse Unit, and Pulse Unit Housing Assembly

(a) Put the lock washer into the housing. (Fig. 91)

(b) Put the pulse unit, washer, pulse unit housing in order. (Fig. 92)

(c) Lock up the housings with 3 screws, Please refer to Table 12 for the tighten torque of screws.

NOTE : The 3 screws must be applied with loc-tite.

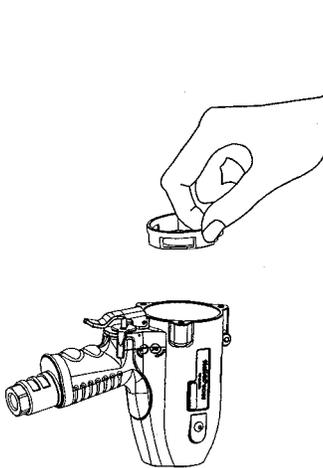


Fig. 91

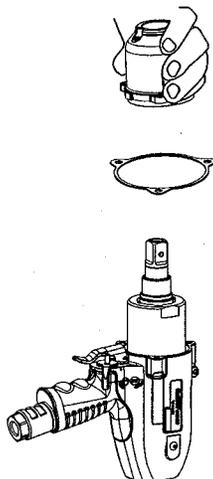


Fig. 92

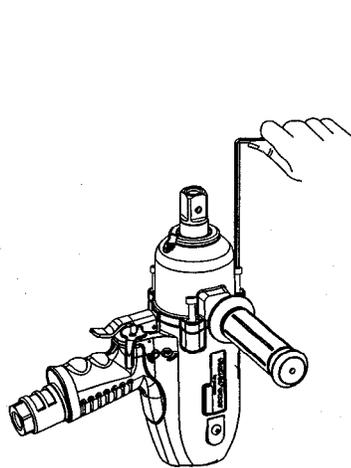


Fig. 93

Model No.	Tighten torque
FLEX-180P	15 N.M

Table 12



After all the assembly is complete, test to make sure the anvil rotates smoothly, then connect the air hose to test the torque.

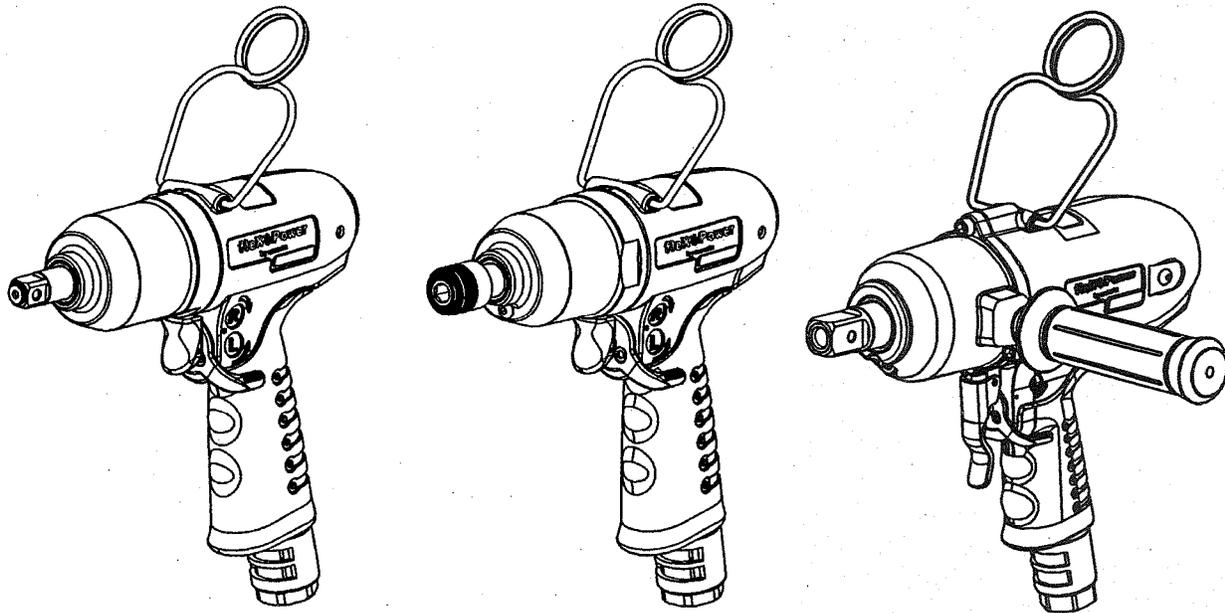
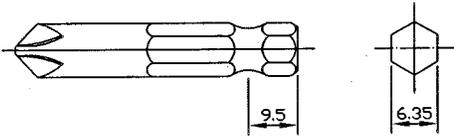


Fig. 94

MODEL	Bolt Capacity	Inserted Tools
FLEX-30PX FLEX-40PX FLEX-50PX FLEX-60PX FLEX-65PX FLEX-70PX	M6 M6-M8 M8 M8 M8-M10 M10	
FLEX-30P ~ FLEX-70P FLEX-90P ~ FLEX-130P FLEX-150P & FLEX-180P		3/8" power sockets 1/2" power sockets 3/4" power sockets

Unit : mm

General safety rules

- For multiple hazards, read and understand the safety instructions before installing, operating, repairing, maintaining, changing accessories on, or working near the power tool. Failure to do so can result in serious bodily injury.
- Only qualified and trained operators should install, adjust or use the power tool.
- Do not modify this power tool. Modifications can reduce the effectiveness of safety measures and increase the risks to the operator.
- Do not discard the safety instructions; give them to the operator.
- Do not use the power tool if it has been damaged.
- Tools shall be inspected periodically to verify that the ratings and markings are legibly marked on the tool. The employer/user shall contact the manufacturer to obtain replacement marking labels when necessary.

Projectile hazards

- Be aware that failure of the work piece, of accessories or even of the inserted tool itself

can generate high-velocity projectiles.

- Always wear impact-resistant eye protection during the operation of the power tool.
- The grade of protection required should be assessed for each use.
- Ensure that the work piece is securely fixed.

Entanglement hazards

- Entanglement hazards can result in choking, scalping and/or lacerations if loose clothing, personal jewellery, neckwear, hair or gloves are not kept away from the tool and accessories.
- Gloves can become entangled with the rotating drive, causing severed or broken fingers.
- Rotating drive sockets and drive extensions can easily entangle rubber-coated or metal-reinforced gloves.
- Do not wear loose-fitting gloves or gloves with cut or frayed fingers.
- Never hold the drive, socket or drive extension.
- Keep hands away from rotating drives.

Operating hazards

- The use of the tool can expose the operator's hands to hazards including crushing, impacts, cuts, abrasions and heat. Wear suitable gloves to protect hands.
- Operators and maintenance personnel shall be physically able to handle the bulk, weight and power of the tool.
- Hold the tool correctly; be ready to counteract normal or sudden movements and have both hands available.
- Maintain a balanced body position and secure footing.
- In cases where the means to absorb the reaction torque are requested, it is recommended to use a suspension arm whenever possible. If that is not possible, side handles are recommended for straight case and pistol-grip tools. Reaction bars are recommended for angle nut runners. In any case, it is recommended to use a means to absorb the reaction torque above 4 Nm for straight tools, above 10 Nm for pistol-grip tools, and above 60 Nm for angle nut runners.
- Release the start-and-stop device in the case of an interruption of the energy supply.
- Use only lubricants recommended by the manufacturer.
- Fingers can be crushed in open-ended crow-foot nut runners.
- Do not use in confined spaces and beware of crushing hands between tool and work piece, especially when unscrewing.

Repetitive motions hazards

- When using a power tool, the operator can experience discomfort in the hands, arms, shoulders, neck, or other parts of the body.
- While using a power tool, the operator should adopt a comfortable posture whilst maintaining secure footing and avoiding awkward or off-balanced postures. The operator should

change posture during extended tasks, which can help avoid discomfort and fatigue.

- If the operator experiences symptoms such as persistent or recurring discomfort, pain, throbbing, aching, tingling, numbness, burning sensations or stiffness, these warning signs should not be ignored. The operator should tell the employer and consult a
- qualified health professional.

Accessory hazards

- Disconnect the power tool from the energy supply before changing the inserted tool or accessory.
- Do not touch sockets or accessories during impacting, as this increases the risk of cuts, burns or vibration injuries.
- Use only sizes and types of accessories and consumables that are recommended by the power tool manufacturer.
- Use only impact-wrench-rated sockets in good condition, as poor condition or hand sockets and accessories used with impact wrenches can shatter and become a projectile.

Workplace hazards

- Slips, trips and falls are major causes of workplace injury. Be aware of slippery surfaces caused by the use of the tool and also of trip hazards caused by the air line or hydraulic hose.
- Proceed with care in unfamiliar surroundings. Hidden hazards, such as electricity or other utility lines, can exist.
- The power tool is not intended for use in potentially explosive atmospheres and is not
- insulated against coming into contact with electric power.
- Make sure there are no electrical cables, gas pipes, etc., that can cause a hazard if damaged by use of the tool.

Dust and fume hazards

- Dust and fumes generated when using power tools can cause ill health (for example, cancer, birth defects, asthma and/or dermatitis); risk assessment and implementation of appropriate controls for these hazards are essential.
- Risk assessment should include dust created by the use of the tool and the potential for disturbing existing dust.
- Direct the exhaust so as to minimize disturbance of dust in a dust-filled environment.
- Where dust or fumes are created, the priority shall be to control them at the point of emission.
- All integral features or accessories for the collection, extraction or suppression of airborne dust or fumes should be correctly used and maintained in accordance with the manufacturer's instructions.
- Use respiratory protection in accordance with employer's instructions and as required by occupational health and safety regulations.

Noise hazards

- Unprotected exposure to high noise levels can cause permanent, disabling, hearing loss and other problems, such as tinnitus (ringing, buzzing, whistling or humming in the ears).
- Risk assessment and implementation of appropriate controls for these hazards are essential.
- Appropriate controls to reduce the risk may include actions such as damping materials to prevent work pieces from “ringing”.
- Use hearing protection in accordance with employer's instructions and as required by occupational health and safety regulations.
- Operate and maintain the power tool as recommended in the instruction handbook, to prevent an unnecessary increase in noise levels.
- If the power tool has a silencer, always ensure it is in place and in good working order when the power tool is operating.
- Select, maintain and replace the consumable/inserted tool as recommended in the instruction hand book, to prevent an unnecessary increase in noise.

Vibration hazards

- Exposure to vibration can cause disabling damage to the nerves and blood supply of the hands and arms.
- Keep the hands away from the nut runner sockets.
- Wear warm clothing when working in cold conditions and keep your hands warm and dry.
- If you experience numbness, tingling, pain or whitening of the skin in your fingers or hands, stop using the power tool, tell your employer and consult a physician.
- Operate and maintain the power tool as recommended in the instruction handbook, to prevent an unnecessary increase in vibration levels.
- Do not use worn or ill-fitting sockets or extensions, as this is likely to cause a substantial increase in vibration.
- Select, maintain and replace the consumable/inserted tool as recommended in the instruction handbook, to prevent an unnecessary increase in vibration levels.
- Sleeve fittings should be used where practicable.
- Support the weight of the tool in a stand, tensioner or balancer, if possible.
- Hold the tool with a light but safe grip, taking account of the required hand reaction forces, because the risk from vibration is generally greater when the grip force is higher.

Additional safety instructions for pneumatic power tool

- Air under pressure can cause severe injury
- Always shut off air supply, drain hose of air pressure and disconnect tool from air supply when not in use, before changing accessories or when making repairs
- Never direct air at yourself or anyone else.
- Whipping hoses can cause severe injury. Always check for damaged or loose hoses

and fittings.

- Cold air shall be directed away from the hands.
- Do not use quick-disconnect couplings at tool inlet for impact and air-hydraulic impulse wrenches. Use hardened steel (or material with comparable shock resistance) threaded hose fittings.
- Whenever universal twist couplings (claw couplings) are used, lock pins shall be installed and whipcheck safety cables shall be used to safeguard against possible hose-to-tool and hose-and-hose connection failure.
- Do not exceed the maximum air pressure stated on the tool.
- For torque-control and continuous-rotation tools, the air pressure has a safety critical effect on performance. Therefore, requirements for length and diameter of the hose shall be specified.
- Never carry an air tool by the hose.

DISASSEMBLY/ASSEMBLY FOR PULSE TOOLS

- FLEXS-30P, FLEXS-40P, FLEXS-50P, FLEXS-60P, FLEXS-65P, FLEXS-70P, FLEXS-80P, FLEXS-90P, FLEXS-100P, FLEXS-130P, FLEXS-150P, FLEX-180P, FLEXS-30PX, FLEXS-40PX, FLEXS-50PX, FLEXS-60PX, FLEXS-65PX, FLEXS-70PX, FLEXS-70X, FLEXS-80H

● IMPULSE MECHANISM DISASSEMBLY

(1) Anvil Unit Disassembly: (for Model No. FLEXS-30PX, FLEXS-40PX, FLEXS-50PX, FLEXS-60PX, FLEXS-65PX, FLEXS-70PX)

Press down the hold spacer, and find the anvil collar. Use an acicular piece to get the anvil collar out, then take the quick change holder, the hold spacer, the spring, and the steel ball apart.

 The steel ball may drop off when taking out the Quick Change Holder

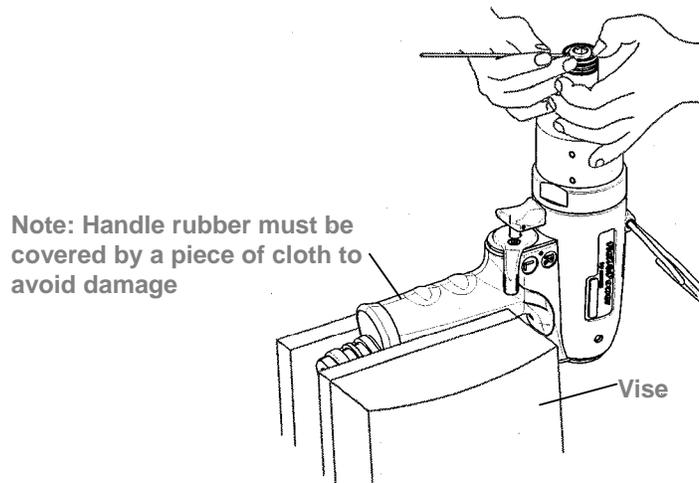


Fig. 95

(2) Pulse Unit Housing Disassembly:

Fix the tool by a vise, use an adjustable wrench clockwise to loosen the pulse unit housing until the pulse unit housing detach from the motor housing. Then, take the pulse unit out, Fig 96.

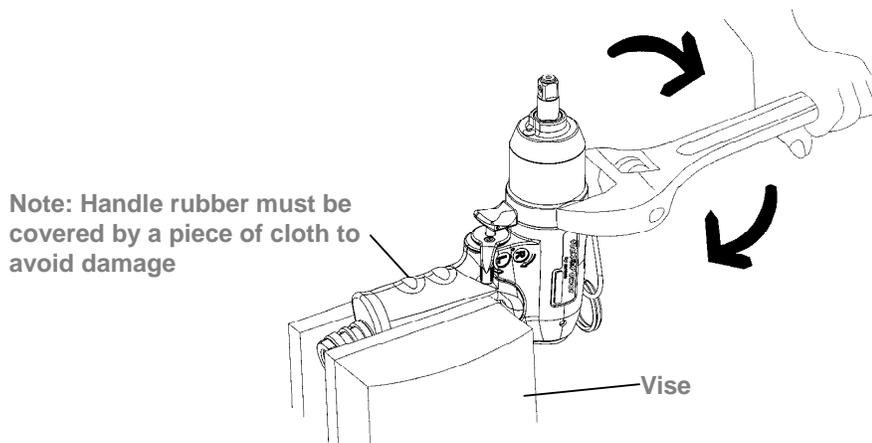
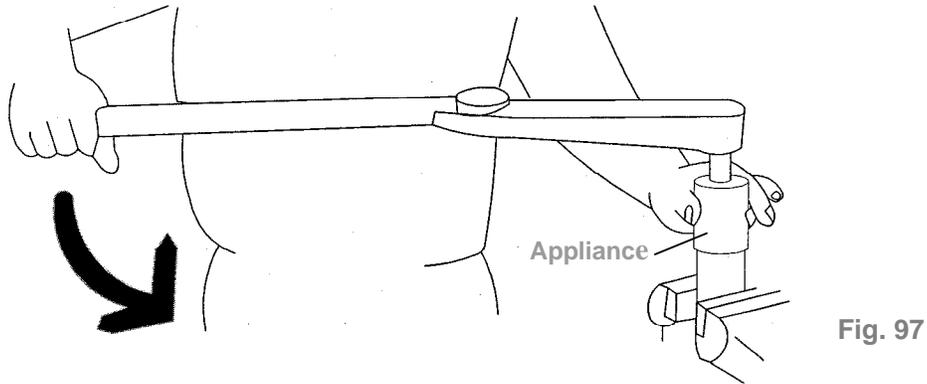


Fig. 96

(3) Pulse Unit Disassembly:

- ① Fix the pulse unit by a vise. Use the appliance (see Table 13) to loosen the lock nut on the pulse unit, Fig. 97.



Note: Lock-tite was applied on the lock nut when tools were assembled.

Appliance No.	Apply to
63-40RT001	FLEXS-30P, FLEXS-30PX, FLEXS-40P, FLEXS-40PX, FLEXS-50P, FLEXS-50PX, FLEXS-60P, FLEXS-60PX
63-70RT001	FLEXS-65P, FLEXS-65PX, FLEXS-70P, FLEXS-70PX, FLEXS-70X, FLEXS-80P, FLEXS-80H
63-90RT001	FLEXS-90P
63-100RT001	FLEXS-100P
63-130RT001	FLEXS-130P
63-150RT001	FLEXS-150P, FLEXS-180P

Table13

- ② Put the Appliance, see Table 14, on the anvil and tap on it slightly to detach the interior parts from the pulse unit, Fig. 98.

Appliance No.	Apply to
63-40RT002	FLEXS-30P, FLEXS-30PX, FLEXS-40P FLEXS-40PX, FLEXS-50P, FLEXS-50PX FLEXS-60P, FLEXS-60PX, FLEXS-65P FLEXS-65PX, FLEXS-70P, FLEXS-70PX FLEXS-70X, FLEXS-80P
63-90RT002	FLEXS-80H, FLEXS-90P, FLEXS-100P, FLEXS-130P
63-150RT002	FLEXS-150P
63-180RT002	FLEXS-180P

Table14

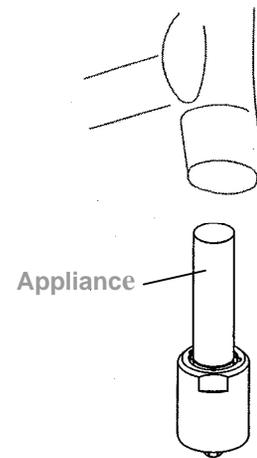
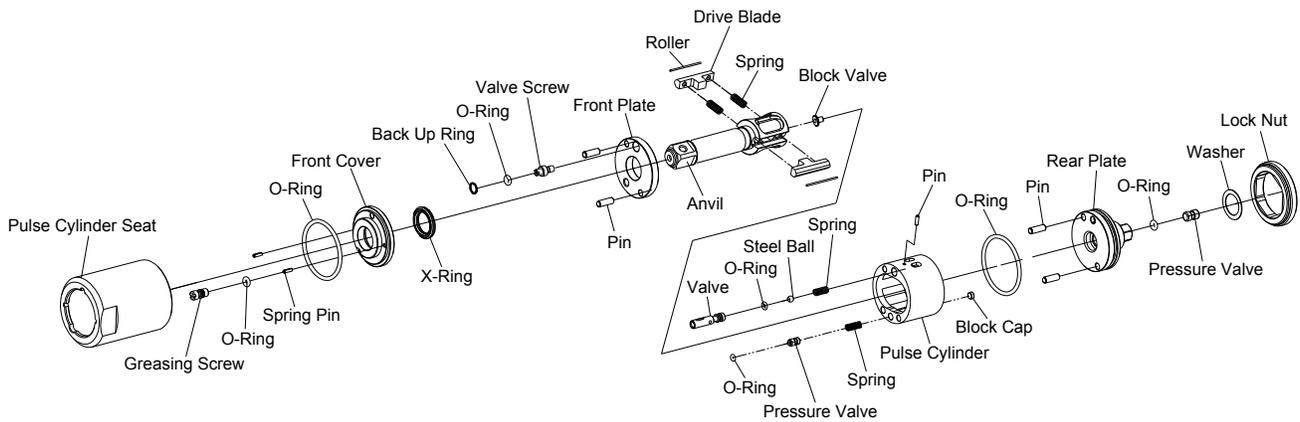


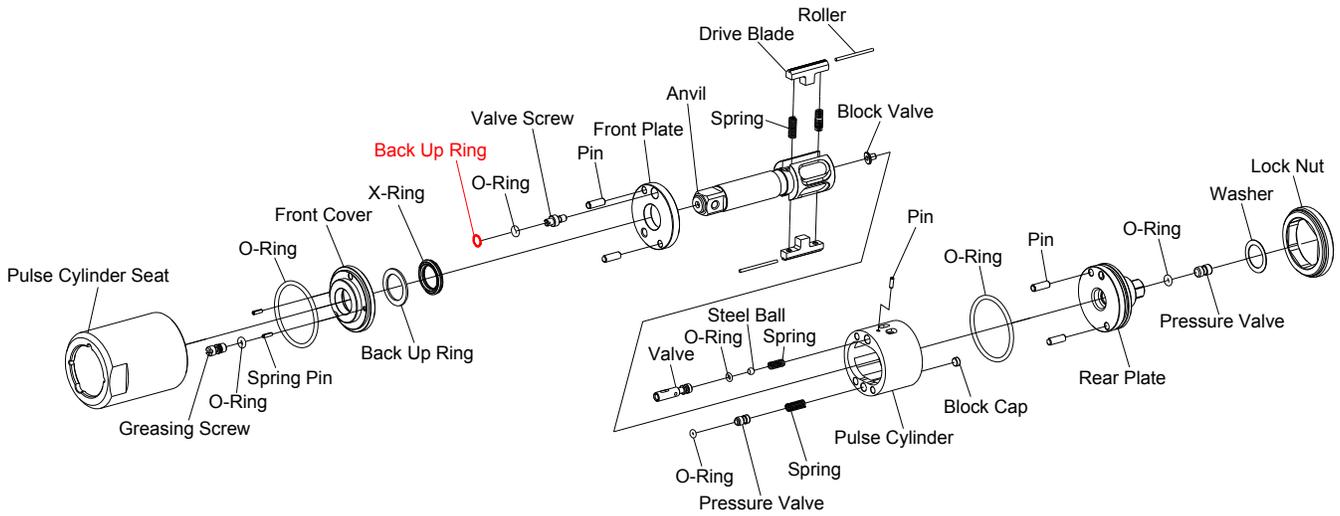
Fig. 98

(4) Parts of Pulse Cylinder Unit:

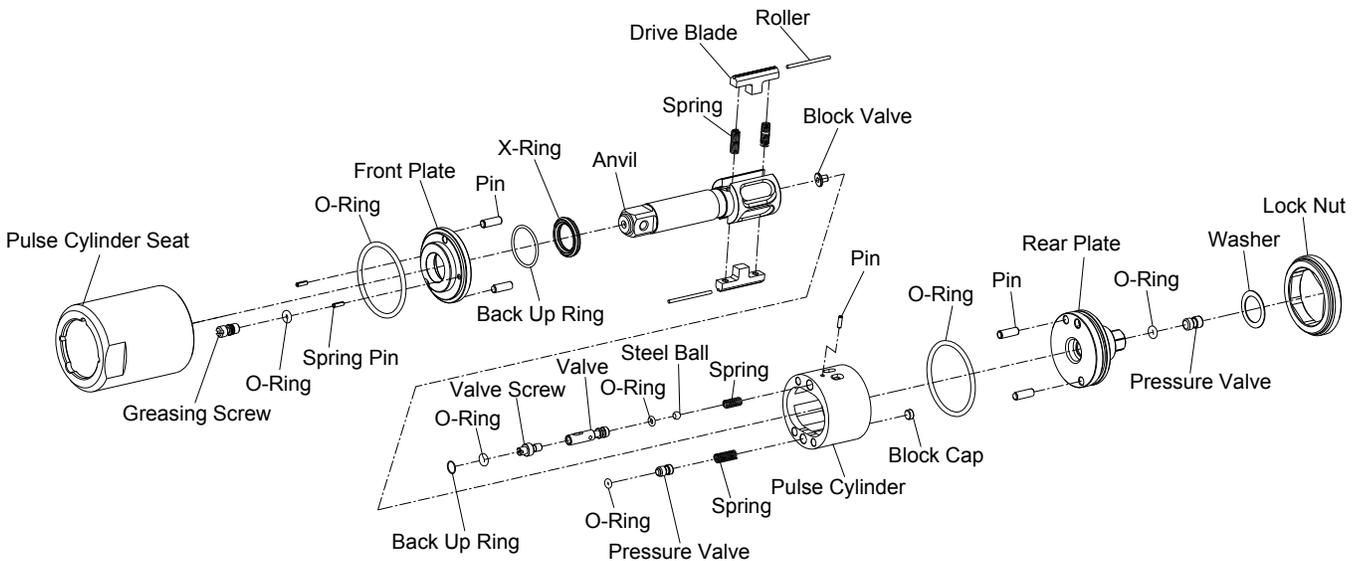
a. FLEXS-30P



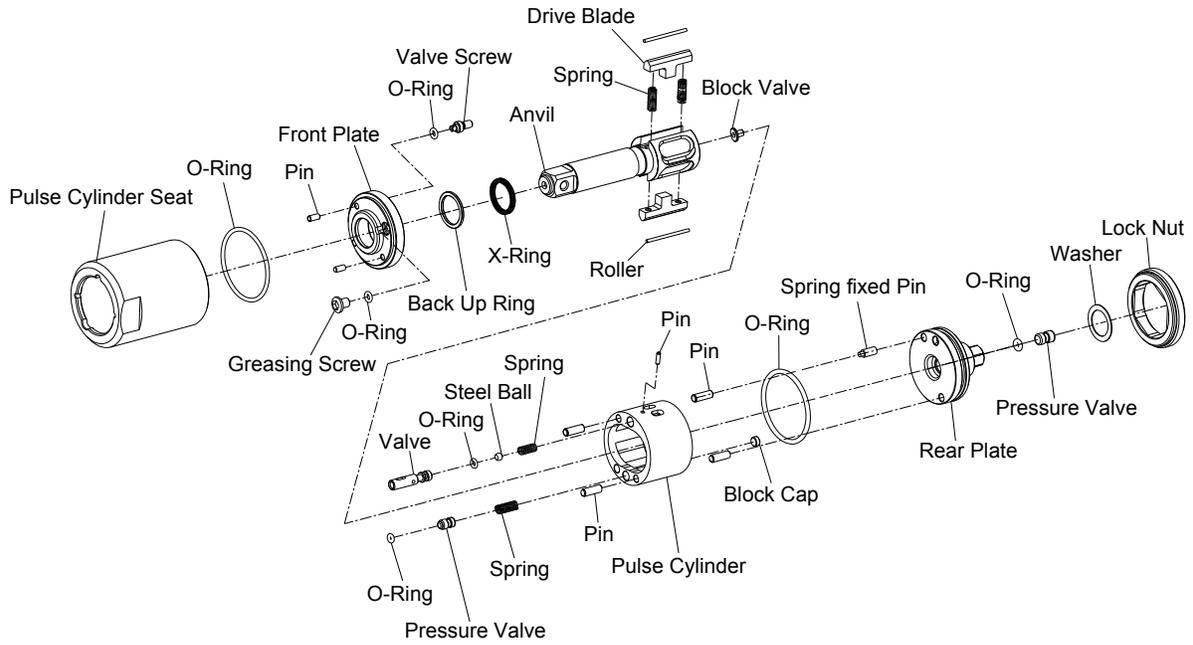
b. FLEXS-40P, FLEXS-50P, FLEXS-60P, FLEXS-65P, FLEXS-70P, FLEXS-70X, FLEXS-80H, FLEXS-90P



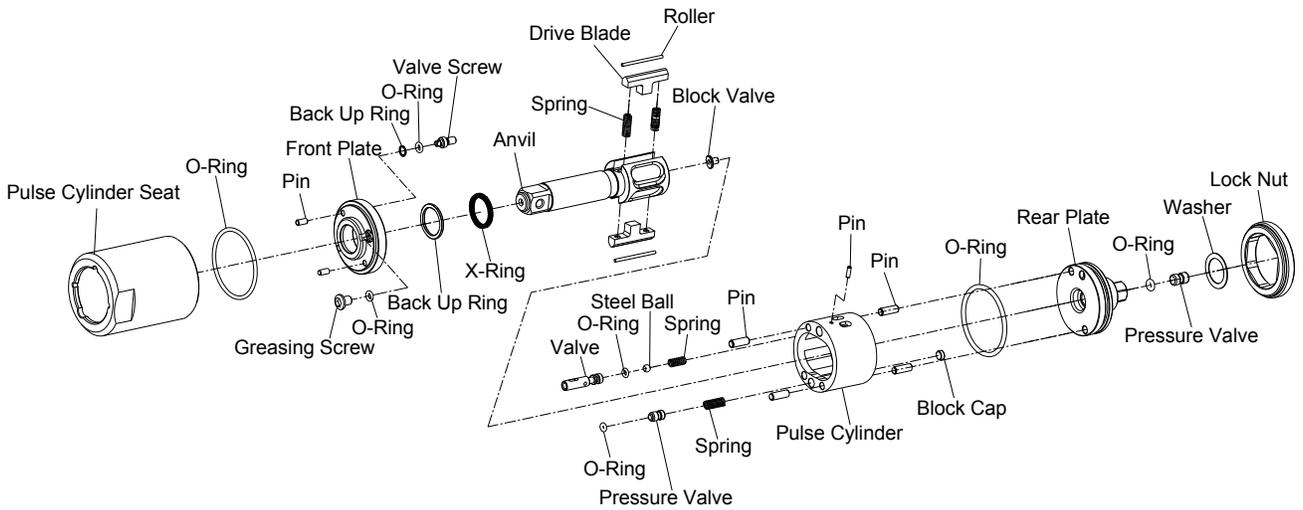
c. FLEXS-80P



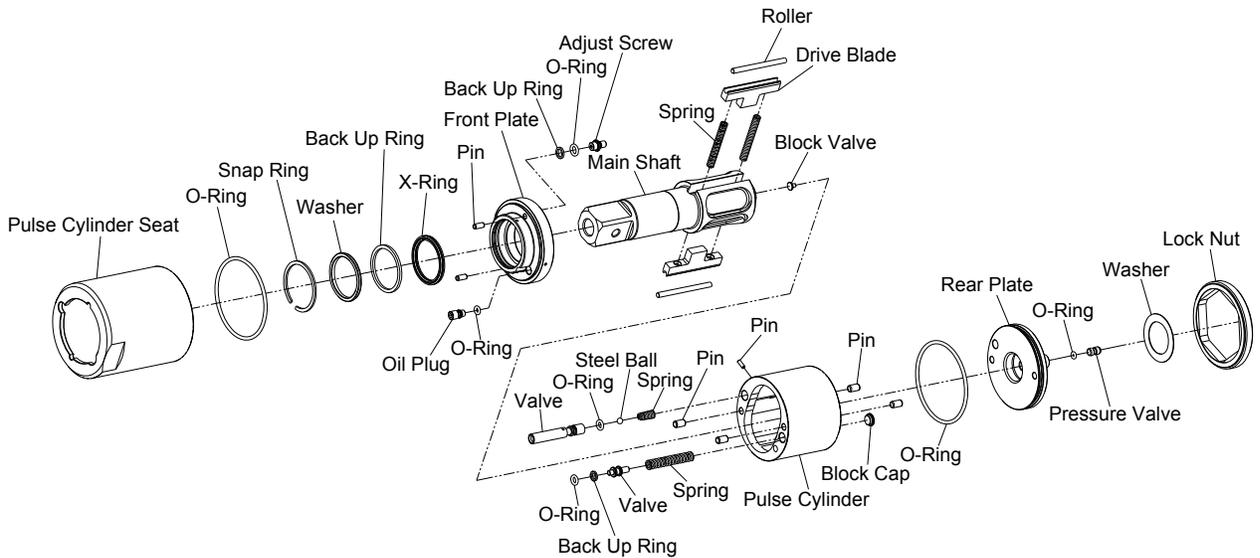
d. FLEXS-100P



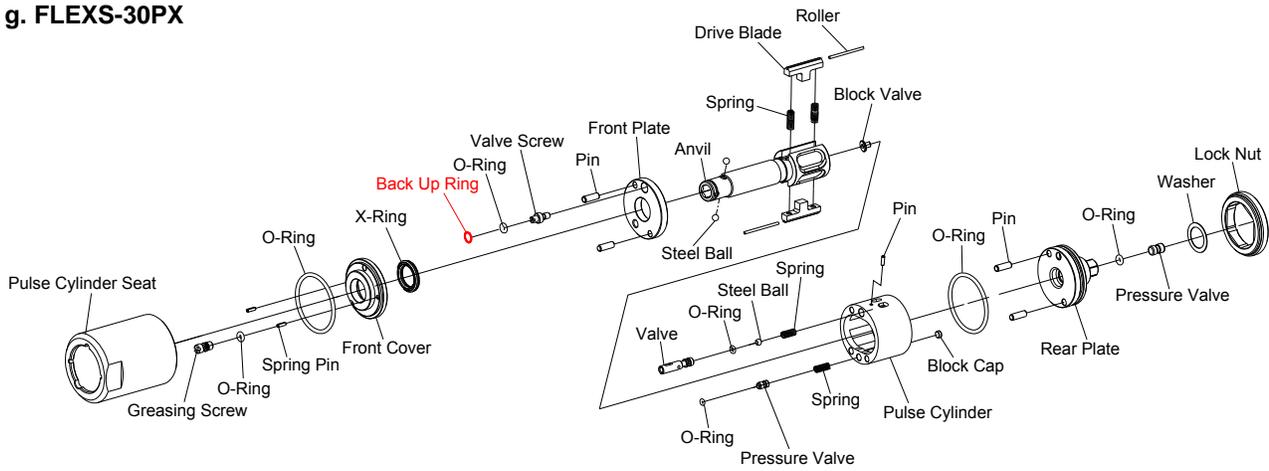
e. FLEXS-130P



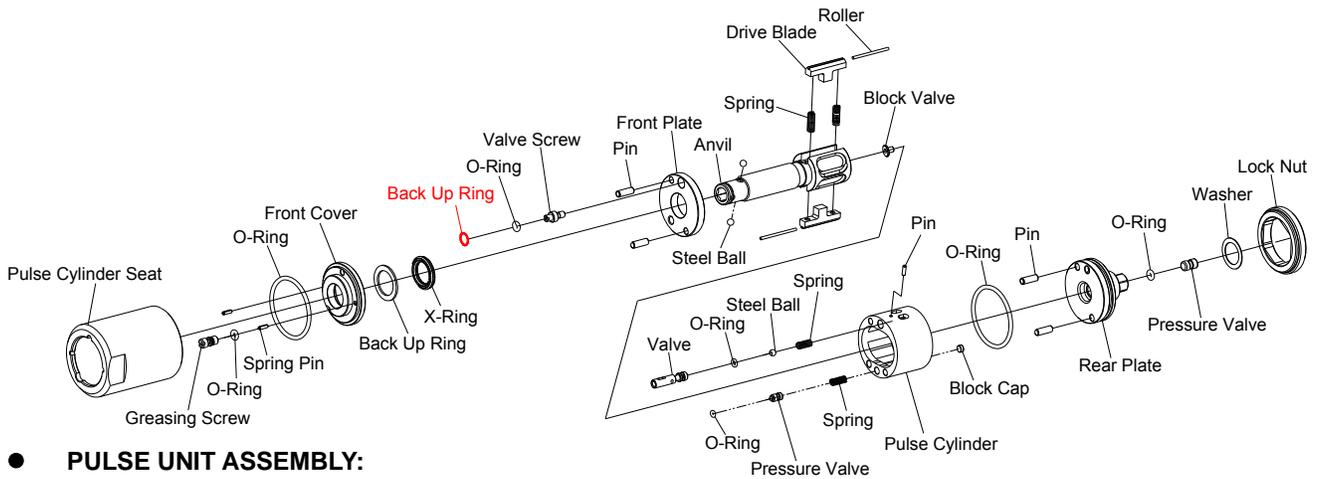
f. FLEXS-150P, FLEXS-180P



g. FLEXS-30PX



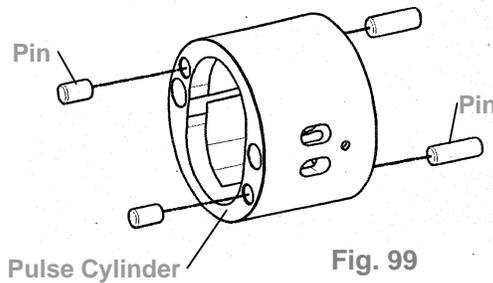
h. FLEXS-40PX, FLEXS-50PX, FLEXS-60PX, FLEXS-65PX, FLEXS-70PX



● PULSE UNIT ASSEMBLY:

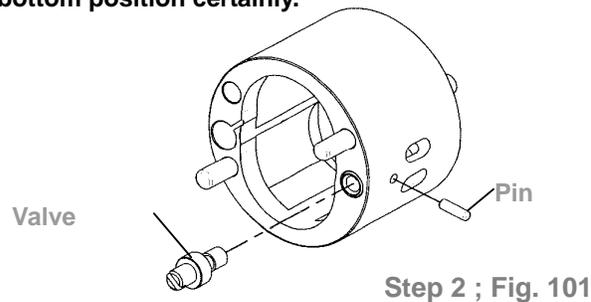
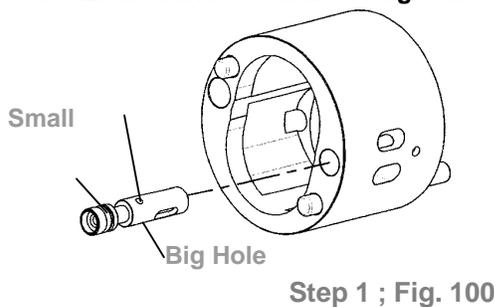
(1) Pulse Cylinder Unit Assembly:

- ❶ Install the pins on both sides of the pulse cylinder. (Fig. 99)

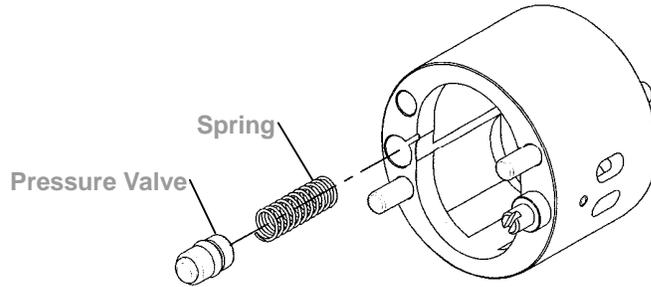


- ❷ Sleeve the o-ring to the valve and install the valve into the big hole on the pulse cylinder. (Step 1; Fig.100)
- ❸ Insert the pin into the hole on the side of the pulse cylinder. (Step 2; Fig.101)
- ❹ Tighten the valve screw left thread to the pressure valve. (Step 3; Fig.101)

NOTE: the valve screw MUST tighten to the most bottom position certainly.

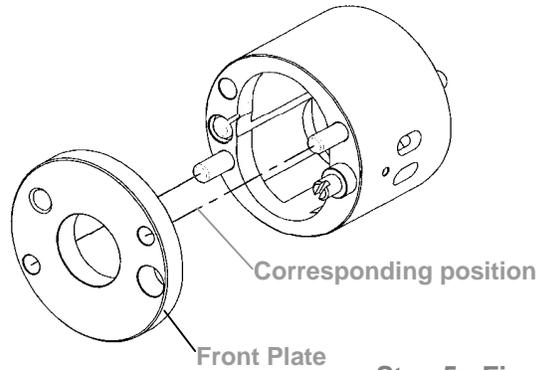


- ⑤ Put the spring into the hole then install the pressure valve that with the o-ring sleeved.(Step 4 Fig. 102)



Step 4 ; Fig. 102

- ⑥ Install the front plate and make sure the corresponding position with the pins. (Step 5 Fig. 103)



Step 5 ; Fig. 103

(2) Anvil Unit Assembly :

Install the roller to the drive blade, then insert the springs into the anvil and press the blades from both sides. Finally put the anvil to the pulse cylinder to complete the anvil unit assembly.

⚠ MUST follow the direction as shown in Figure 106 while installing the anvil unit into the pulse cylinder; be sure to aim at the highest points by two sides of the interior pulse unit and press the two drive blades in slowly.

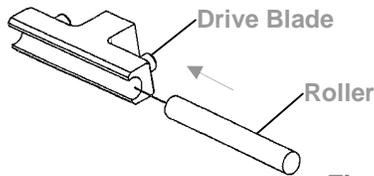


Fig. 104

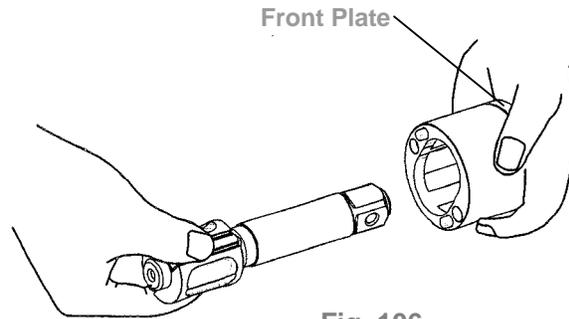
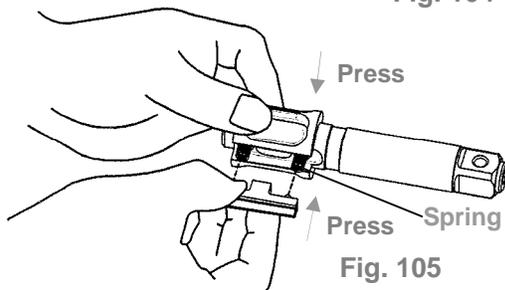
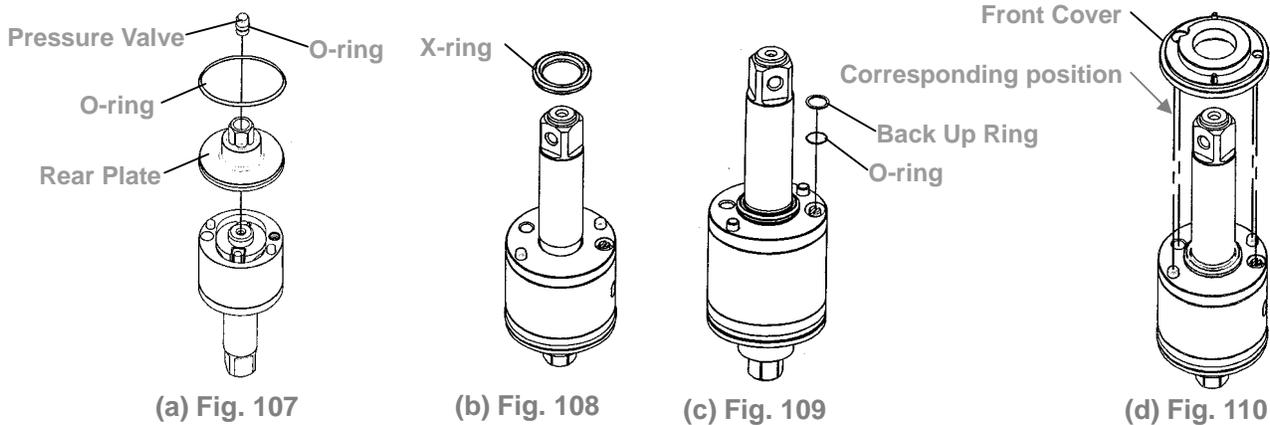


Fig. 106

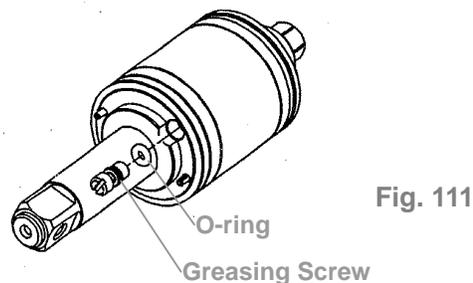
(3) Front Cover and Rear Plate of Pulse Cylinder Assembly

→ **FLEXS-30P, FLEXS-30PX**

- ①(a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 107) Then, plug the pressure valve with the convex facing outside in the hole on the rear plate.
- (b) Put the X-ring on the anvil with the oil applied. (Fig. 108)
- (c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 109)
- (d) Install the front cover to the pulse cylinder by the corresponding positions. (Fig. 110)

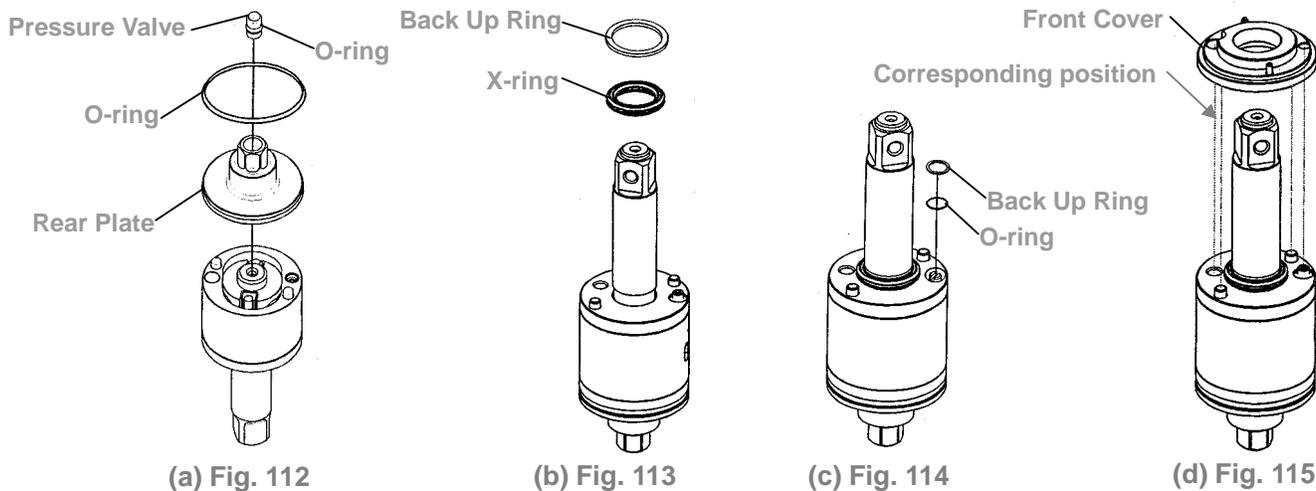


- ➊ After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.



➔ FLEXS-40P, FLEXS-40PX, FLEXS-50P, FLEXS-50PX, FLEXS-60P, FLEXS-60PX, FLEXS-65P, FLEXS-65PX, FLEXS-70P, FLEXS-70PX, FLEXS-70X, FLEXS-80H, FLEXS-90P

- ➋ (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 112) Then, plug the pressure valve with the convex facing outside in the hole on the rear plate.
- (b) Put the X-ring and back up ring on the anvil with the oil applied. (Fig. 113)
- (c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 114)
- (d) Install the front cover to the pulse cylinder by the corresponding positions. (Fig. 115)



- ② After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

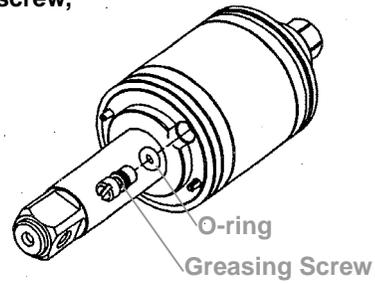
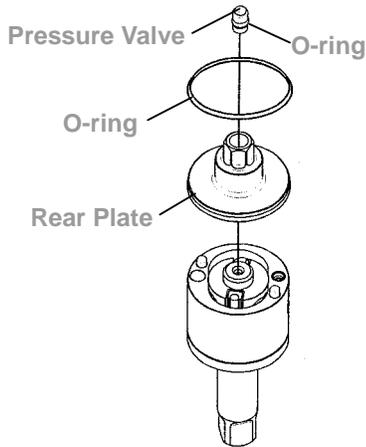


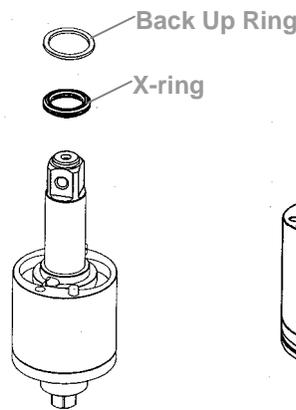
Fig. 116

→ **FLEXS-80P**

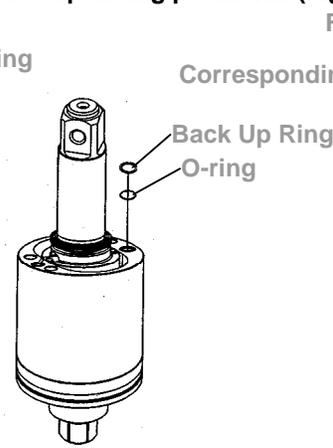
- ① (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 117) Then, plug the pressure valve with the convex facing outside in the hole on the rear plate.
- (b) Put the X-ring and Back up ring on the anvil with the oil applied. (Fig. 118)
- (c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 119)
- (d) Install the front plate to the pulse cylinder by the corresponding positions. (Fig. 120)



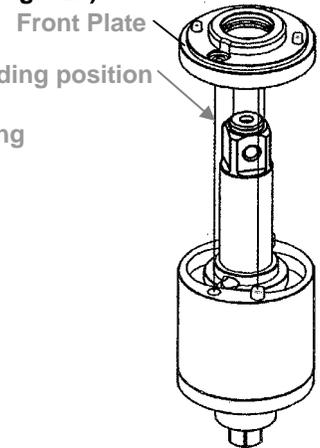
(a) Fig. 117



(b) Fig. 118



(c) Fig. 119



(d) Fig. 120

- ② After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

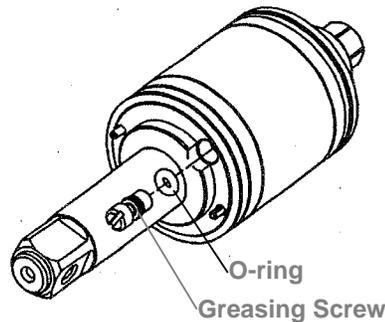
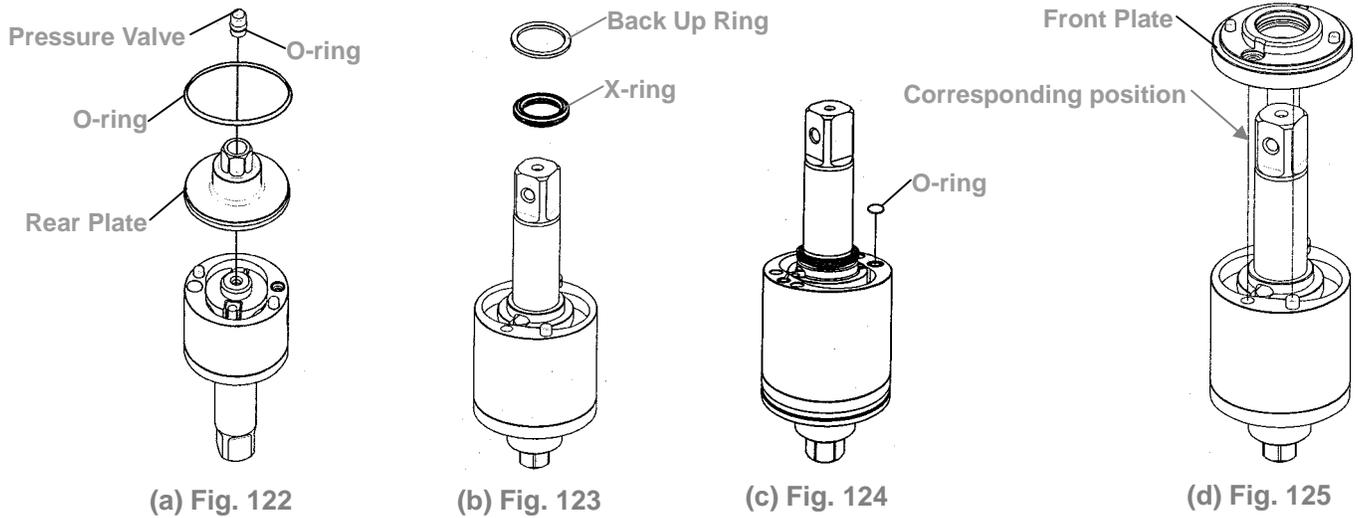


Fig. 121

→ **FLEXS-100P**

- ① (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 122) Then, plug the pressure valve with the convex facing outside in the hole on the rear plate.
- (b) Put the X-ring and Back up ring on the anvil with the oil applied. (Fig. 123)
- (c) Put the O-ring into the Valve Screw. (Fig. 124)
- (d) Install the front plate to the pulse cylinder by the corresponding positions. (Fig. 125)



- ② After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

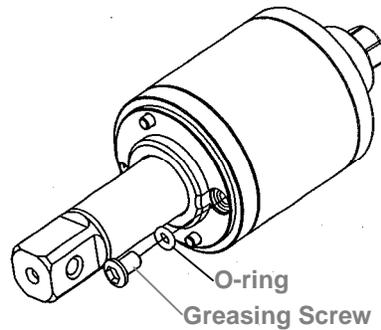
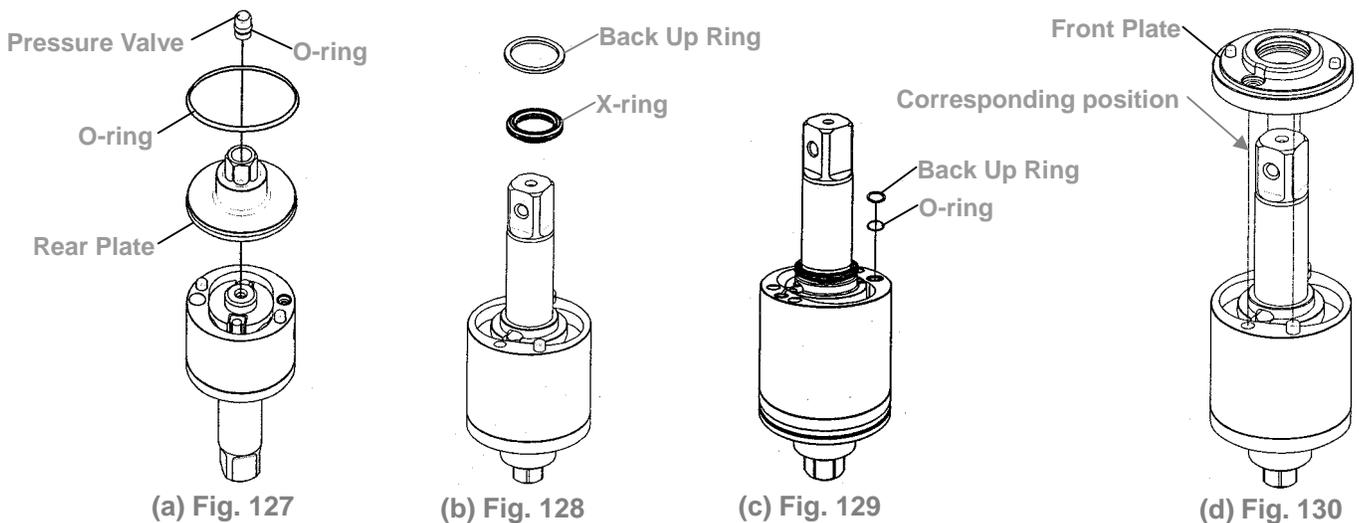


Fig. 126

→ **FLEXS-130P**

- ① (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 127) Then, plug the pressure valve with the convex facing outside in the hole on the rear plate.
- (b) Put the X-ring and Back up ring on the anvil with the oil applied. (Fig. 128)
- (c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 129)
- (d) Install the front plate to the pulse cylinder by the corresponding positions. (Fig. 130)



- ② After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

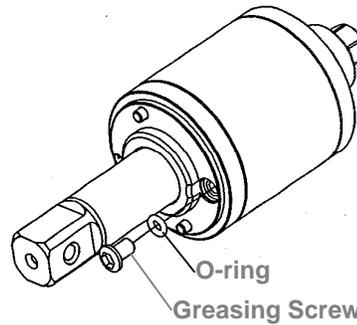
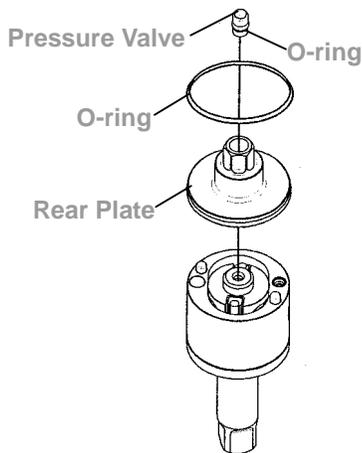


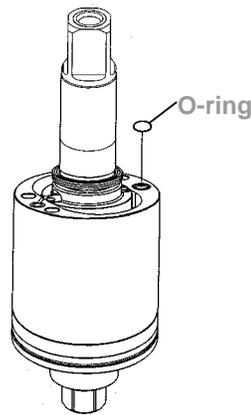
Fig. 131

→ **FLEXS-150P, FLEXS-180P**

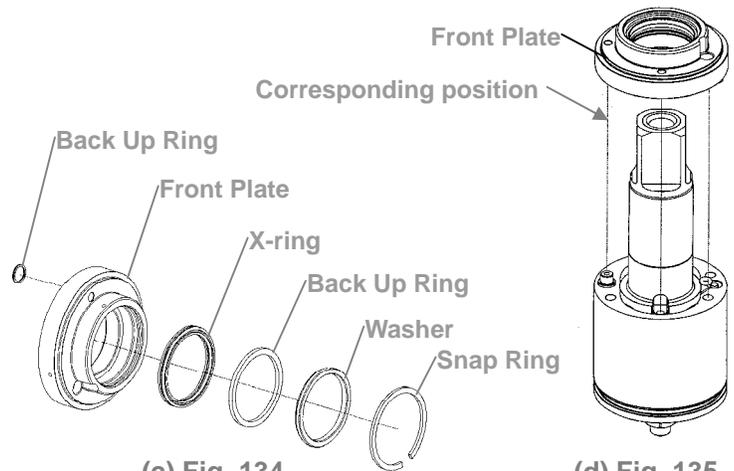
- ① (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 132) Then, plug the pressure valve with the convex facing outside in the hole on the rear plate.
- (b) Put the O-ring into the Valve Screw. (Fig. 133)
- (c) Put the X-ring and Back Up Ring , Washer , Snap Ring on the anvil with the oil applied . (Fig. 134)
- (d) Install the front plate to the pulse cylinder by the corresponding positions. (Fig. 135)



(a) Fig. 132



(b) Fig. 133



(c) Fig. 134

(d) Fig. 135

- ② After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

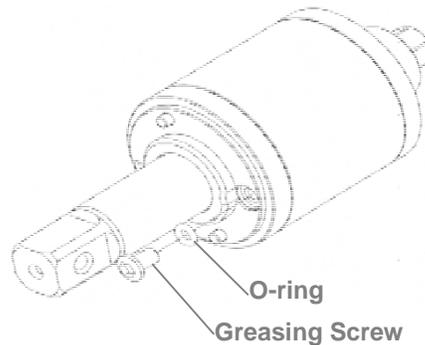
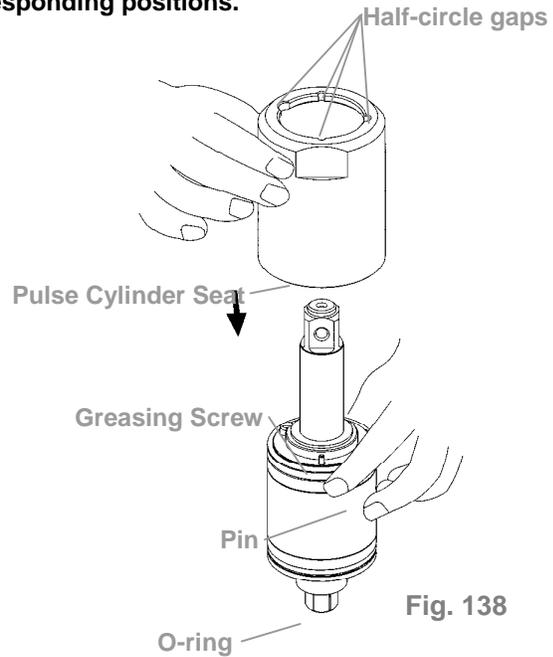
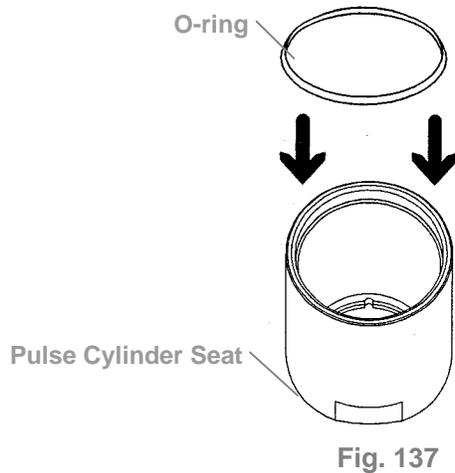


Fig. 136

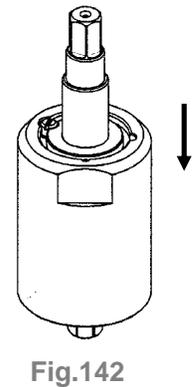
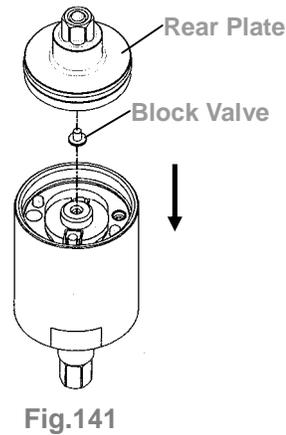
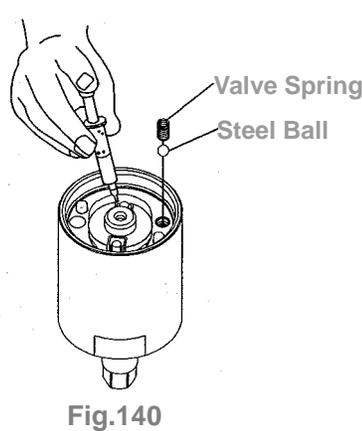
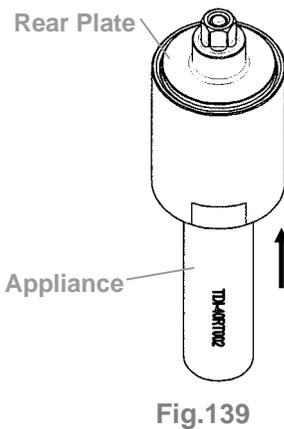
(4) **Pulse Cylinder Seat and Lock Nut of Pulse Cylinder Assembly**

- ① Place the o-ring inside the bottom of the pulse cylinder seat, then combine the pulse cylinder seat with the assembled pulse cylinder unit. (Fig. 137, Fig. 138)

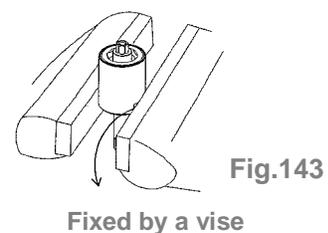
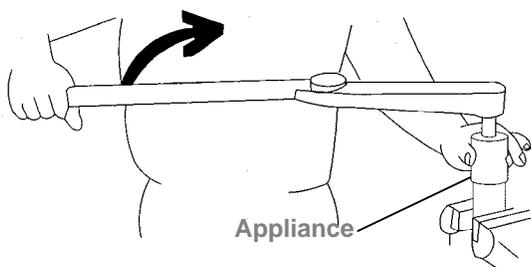
⚠ Make sure the half-circle gaps aim at the corresponding positions.



- ② Use the appliance to push out the rear plate from the pulse cylinder seat. See Table 14 in reference to the proper appliance selection. (Fig. 139)
- ③ Fill up the interior pulse cylinder with the pulse oil about 90% full by an injector. Put the steel ball and the valve spring into the hole on the pulse cylinder in order. (Fig. 140)
- ④ Put the block valve into the rear plate taken out at Step 2, and then install the rear plate to the pulse cylinder. Make sure the positions of the pins and the holes are exactly matched. (Fig. 141)
- ⑤ Turn the assembled unit up side down so the rear plate is at the bottom. Then press the pulse cylinder seat all the way down to the fixed position. Make sure the corresponding positions are matched exactly.



- ⑥ Fix the pulse cylinder seat by a vise. Use an appliance and a torque wrench then turn clockwise to tighten the lock nut of the pulse cylinder. See Table 15 and Table 16 in reference to the proper appliance and tightness. (Note: Lock-tite needed when tightening the lock nut of the pulse cylinder)



Appliance No.	Apply to
63-40RT001	FLEXS-30P, FLEXS-30PX, FLEXS-40P, FLEXS-40PX, FLEXS-50P, FLEXS-50PX, FLEXS-60P, FLEXS-60PX
63-70RT001	FLEXS-65P, FLEXS-65PX, FLEXS-70P, FLEXS-70PX, FLEXS-70X, FLEXS-80P, FLEXS-80H
63-90RT001	FLEXS-90P
63-100RT001	FLEXS-100P
63-130RT001	FLEXS-130P
63-150RT001	FLEXS-150P, FLEXS-180P

Table 15

Model No.	Tighten torque
FLEXS-30P	70 N.M
FLEXS-30PX	70 N.M
FLEXS-40P	80 N.M
FLEXS-40PX	80 N.M
FLEXS-50P	80 N.M
FLEXS-50PX	80 N.M
FLEXS-60P	80 N.M
FLEXS-60PX	80 N.M
FLEXS-65P	100 N.M
FLEXS-65PX	100 N.M

Model No.	Tighten torque
FLEXS-70P	100 N.M
FLEXS-70PX	100 N.M
FLEXS-70X	100 N.M
FLEXS-80P	100 N.M
FLEXS-80H	100 N.M
FLEXS-90P	120 N.M
FLEXS-100P	130 N.M
FLEXS-130P	150 N.M
FLEXS-150P	150 N.M
FLEXS-180P	180 N.M

Table 16

⑦ After completing the above steps, test to make sure the square drive of the anvil rotates smoothly.

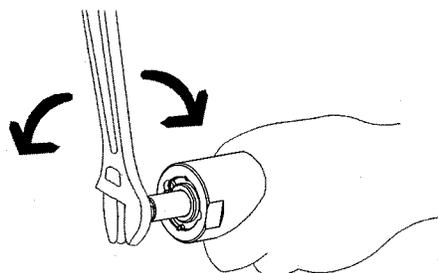


Fig.144

(5) Steps for Pulse Cylinder Oiling :

① Loosen the greasing screw, and fill in the authorized oil by an injector until it is full and overflow.

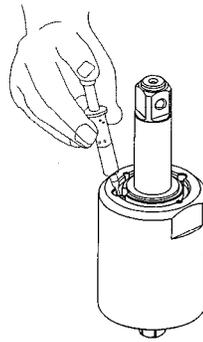


Fig.145

- ② Take the unit and dip it in an oil tank, then rotate the anvil by a wrench to release air inside, in the mean time, the unit would be full with oil completely.

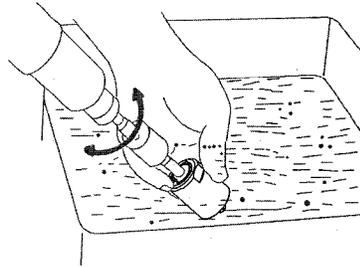


Fig.146

- ③ Use the screwdriver either, the slotted or the hex one to tighten the greasing screw, Fig. 147.

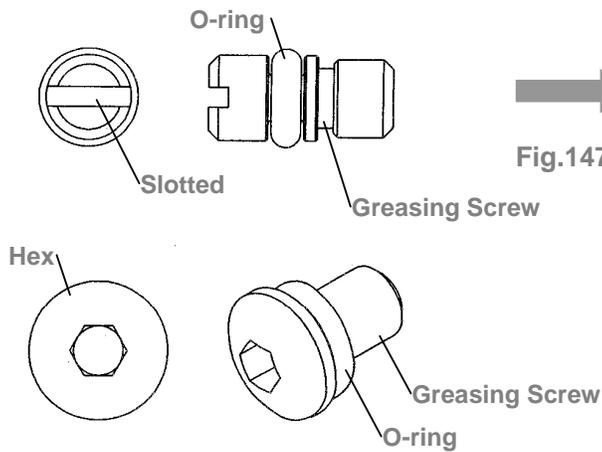
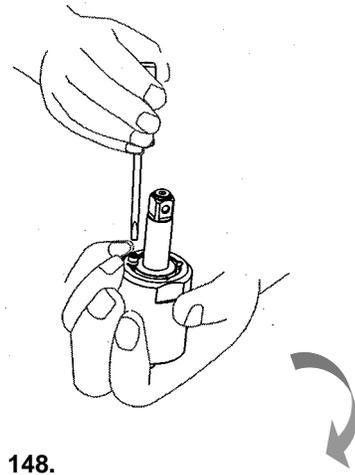


Fig.147



- ④ Use an air spray gun to blow off the oil on the cylinder seat, Fig. 148.

Fig.148



- ⑤ Loosen the greasing screw again and use an injector to draw out a little amount of oil (see Table 17) . Finally, tighten the greasing screw back to the pulse cylinder unit, Fig. 149.

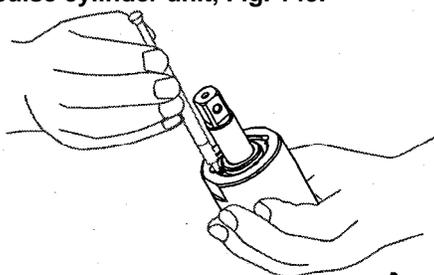
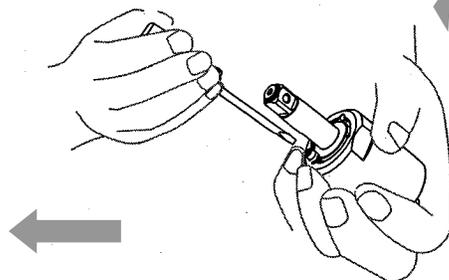


Fig.149



Model No.	Amount of oil draw
FLEXS-30P	0.2 CC
FLEXS-30PX	0.2 CC
FLEXS-40P	0.25 CC
FLEXS-40PX	0.25 CC
FLEXS-50P	0.3 CC
FLEXS-50PX	0.3 CC
FLEXS-60P	0.4 CC
FLEXS-60PX	0.4 CC
FLEXS-65P	0.55 CC
FLEXS-65PX	0.55 CC

Model No.	Amount of oil draw
FLEXS-70P	0.6 CC
FLEXS-70PX	0.6 CC
FLEXS-70X	0.6 CC
FLEXS-80	0.56 CC
FLEXS-80H	0.52 CC
FLEXS-90P	0.85 CC
FLEXS-100P	1.4 CC
FLEXS-130P	1.5 CC
FLEXS-150P	1.85 CC
FLEXS-180P	2.2 CC

Table 17

(6) Torque Testing :

- Put the washer on the front end of the anvil, and then put another washer to the rear plate.

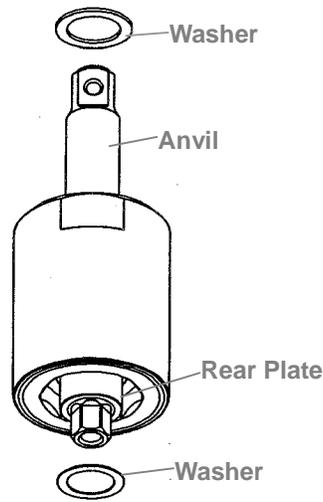


Fig.150

- Tighten the clutch housing by hands.

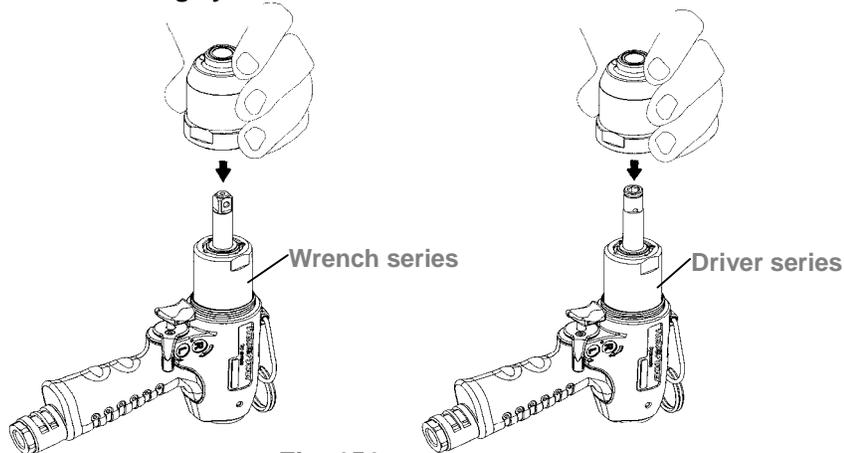


Fig. 151

③ Test the forward torque by a digital torque tester and make sure the tool pulses smoothly.

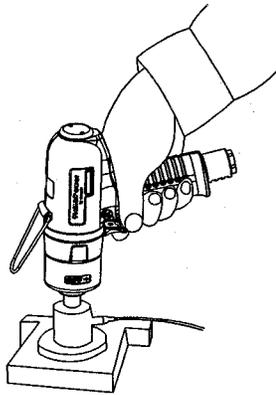
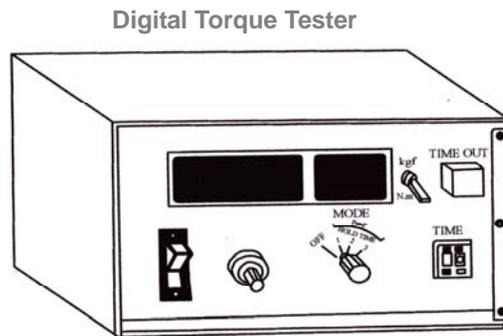


Fig. 152



Model No.	Air inlet pressure 0.6 Mpa
	N.M (at least)
FLEXS-30P	12.5
FLEXS-30PX	12.5
FLEXS-40P	19
FLEXS-40PX	18
FLEXS-50P	27
FLEXS-50PX	26
FLEXS-60P	35
FLEXS-60PX	30
FLEXS-65P	45
FLEXS-65PX	38

Model No.	Air inlet pressure 0.6 Mpa
	N.M (at least)
FLEXS-70P	57
FLEXS-70PX	47
FLEXS-70X	54
FLEXS-80P	68
FLEXS-80H	70
FLEXS-90P	90
FLEXS-100P	120
FLEXS-130P	148
FLEXS-150P	210
FLEXS-180P	255

Table 18

④ If the test result is NG (see Table 18 in reference to the torque standard), MUST draw out or add a little amount of oil and do the following steps:

- ① Loosen the pulse unit housing by hands.
- ② Loosen the greasing screw.
- ③ Draw out or add a little amount of oil.
- ④ Tighten the greasing screw back.
- ⑤ Tighten the pulse unit housing.
- ⑥ Test the torque again. If the test result is still NG, repeat the Steps ①~⑤ until the standard torque is reached.

(7) Pulse Unit Housing Assembly :

Fix the housing by a vise. Turn the wrench in counter clockwise direction to tighten the pulse unit housing.

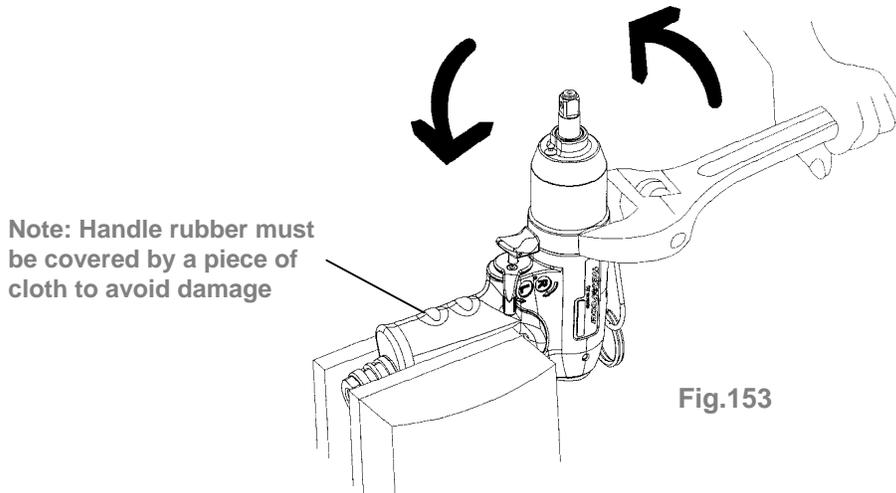


Fig.153

(8) Anvil Unit Assembly: (for FLEXS-30PX, FLEXS-40PX, FLEXS-50PX, FLEXS-60PX, FLEXS-65PX, FLEXS-70PX)

(a) Place the steel ball, the quick change holder, the spring, and the hold spacer orderly on the anvil as shown.

(b) Put the anvil collar on the Anvil. (Fig. 155)

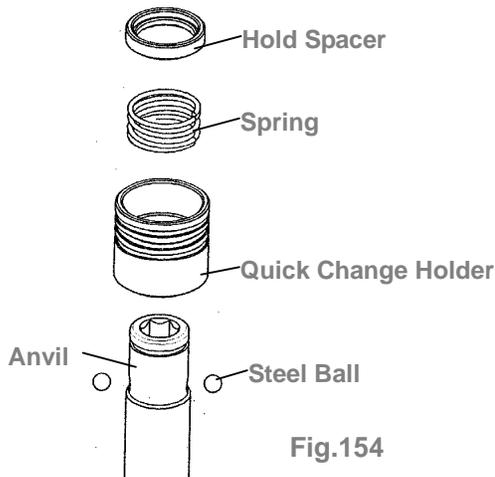


Fig.154

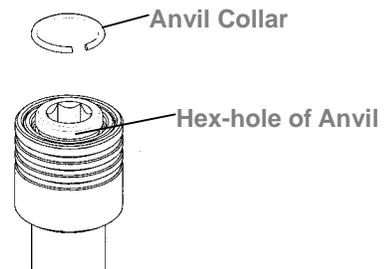


Fig.155

● HOUSING AND MOTOR SET DISASSEMBLY:

(1) Cylinder Unit Disassembly:

① Take a piece of cloth to cover the housing handle and fix the tool with a vise. Use the appliance (see Table 156) to take the lock nut out of cylinder by turning clockwise.

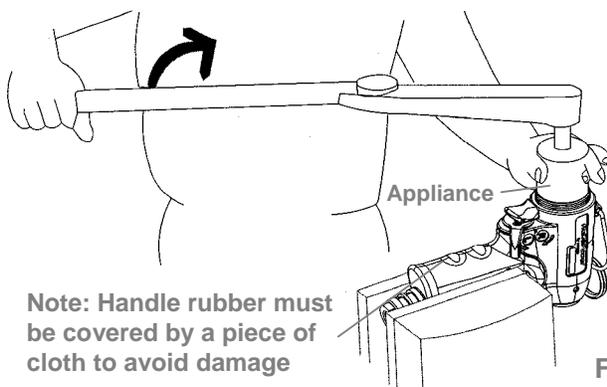
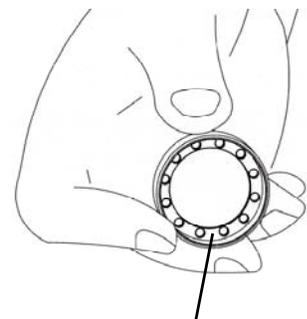


Fig.156

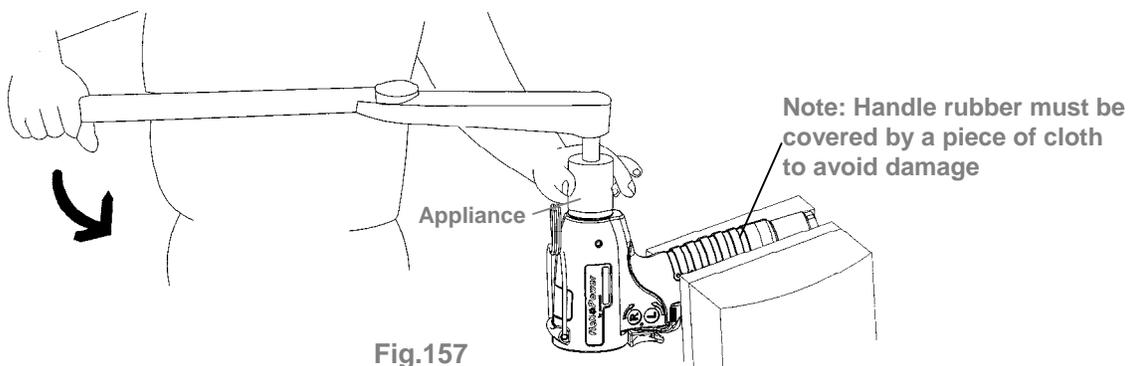


Lock Nut of Cylinder

Appliance No.	Apply to
63-40RT004	FLEXS-30P, FLEXS-30PX, FLEXS-40P, FLEXS-40PX, FLEXS-50P, FLEXS-50PX, FLEXS-60P, FLEXS-60PX
63-70XRT004	FLEXS-65P, FLEXS-65PX, FLEXS-70XP, FLEXS-80P, FLEXS-80H
63-90RT003	FLEXS-70P, FLEXS-70PX, FLEXS-90P
63-100RT003	FLEXS-100P
63-130RT003	FLEXS-130P
63-150RT003	FLEXS-150P

Table 19

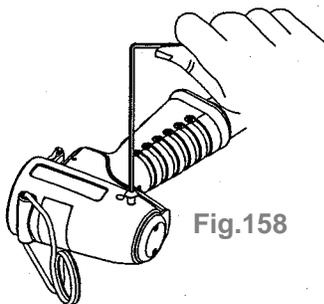
- ② Fix the housing in an opposite position. Use the appliance to loosen the lock nut of rear plate on the cylinder in counter clockwise direction.



Appliance No.	Apply to
63-40RT003	FLEXS-30P, FLEXS-30PX, FLEXS-40P, FLEXS-40PX, FLEXS-50P, FLEXS-50PX, FLEXS-60P, FLEXS-60PX, FLEXS-65P, FLEXS-65PX, FLEXS-70X, FLEXS-80P, FLEXS-80H
63-100RT002	FLEXS-70P, FLEXS-70PX, FLEXS-90P, FLEXS-100P
63-130RT002	FLEXS-130P, FLEXS-150P
63-180RT001	FLEXS-180P

Table 20

- ③ Loosen the screw by a wrench.



- ④ Detach the seat, the valve, the spring, the steel ball and the valve seat from the motor housing.

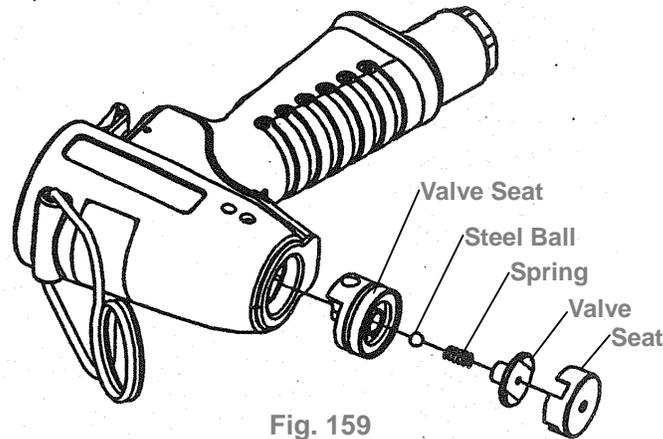


Fig. 159

- ⑤ Take a piece of cloth and lay it on a table before disassembly. Hold the housing and tap slightly with a plastic stick to push the cylinder unit out.

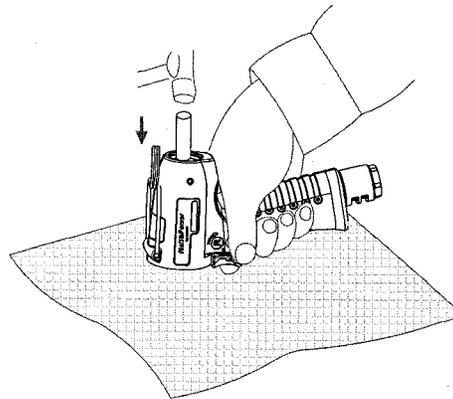


Fig.160

⑥ Parts of Motor Set:

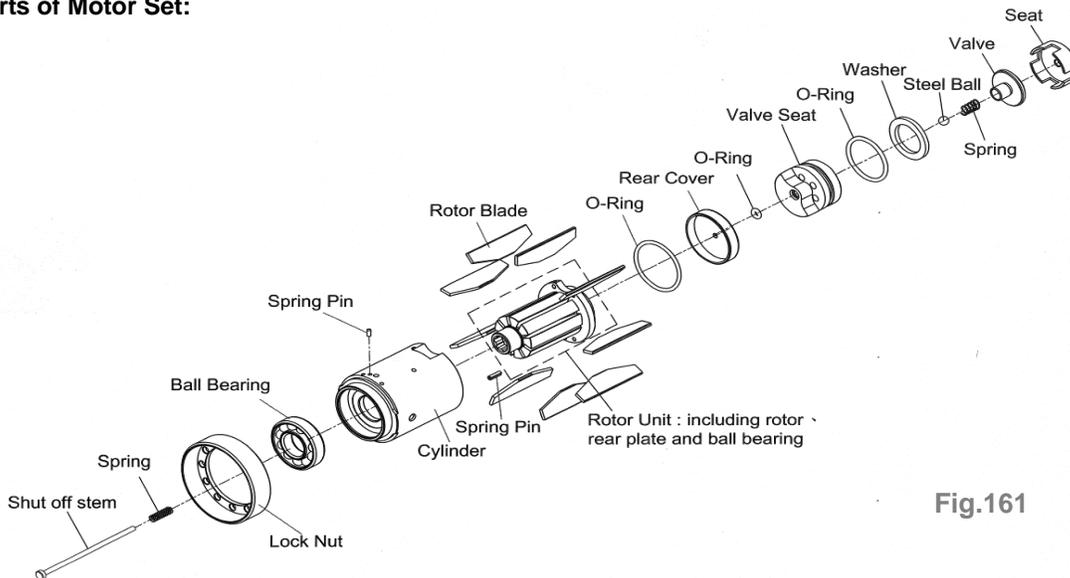


Fig.161



The rotor and the rear end plate must be press fitted. The clearance of the two parts must be in between 0.01~0.02 mm. It would not be easy to assemble the two parts by repair centers in general. Therefore, as there is a need of repair on the parts of the rotor, the rear end plate, and the ball bearing, we strongly suggest replacing a complete ROTOR UNIT, which is including the rotor, the rear plate, and the ball bearing. The rotor unit would be full assembled and well-measured before delivery.

(2) Air Inlet Disassembly:

Take the air inlet unit apart from the end of the housing. The parts of O-ring, Muffler, Exhaust deflector are separated by each other.

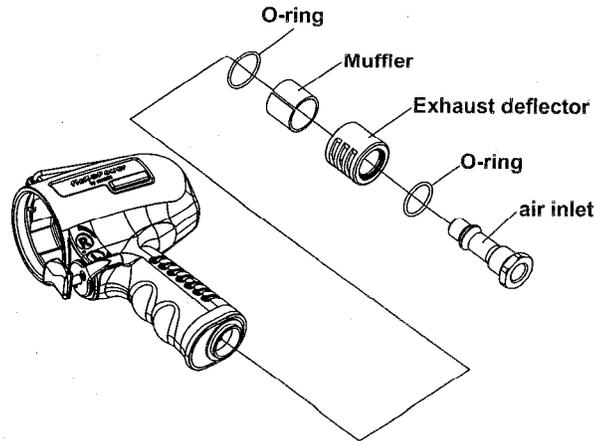
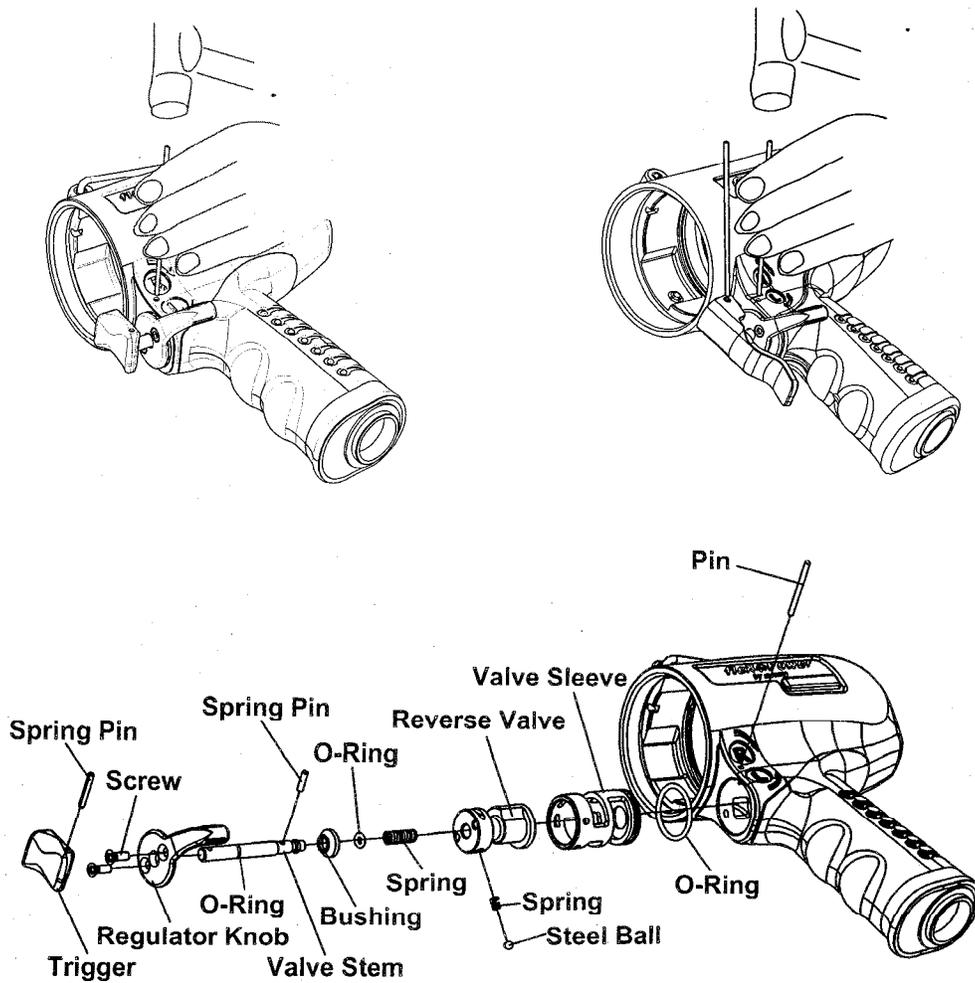


Fig.162

(3) Trigger Set Disassembly:

Remove the pin to take apart the valve sleeve set. All the parts are disassembled as the below drawing showed.



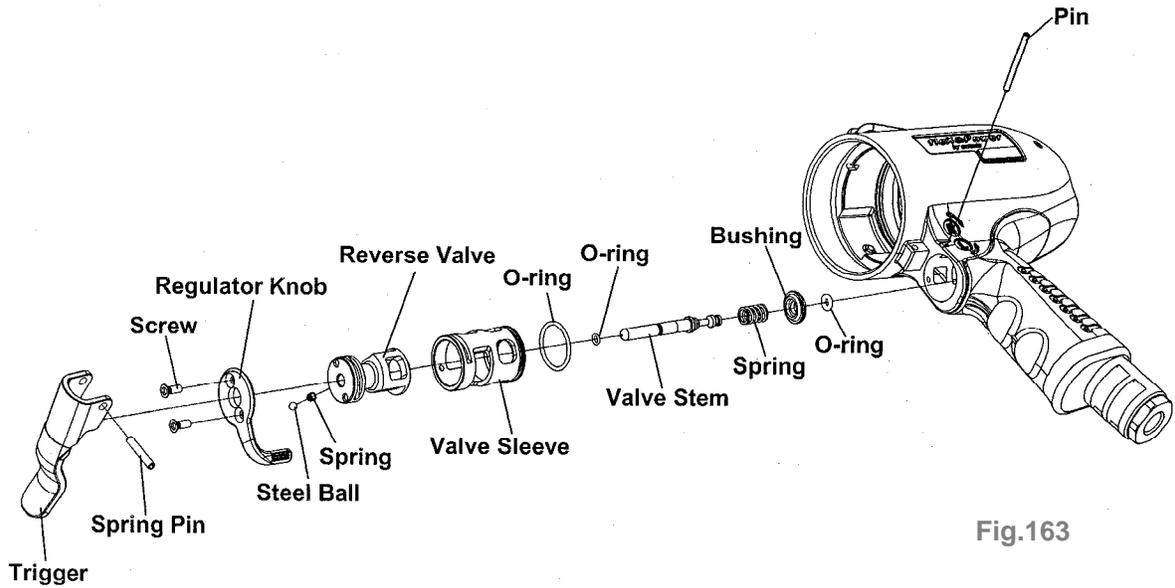


Fig.163

● HOUSING AND MOTOR SET ASSEMBLY:

(1) Housing and Air Inlet Assembly:

Install and tighten the parts of air inlet one by one and in order. (NOTE: Apply the Lock-tite on the threads of air inlet before assembly)

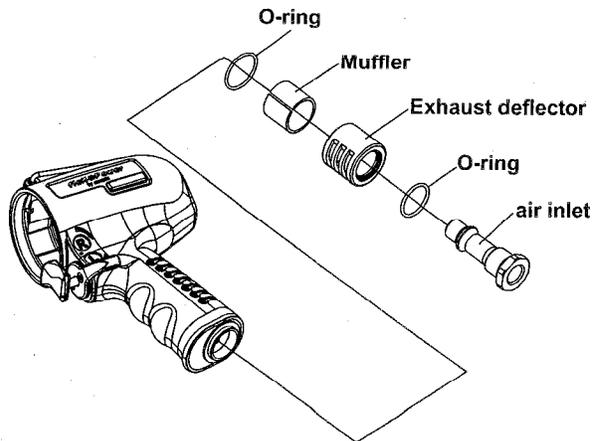
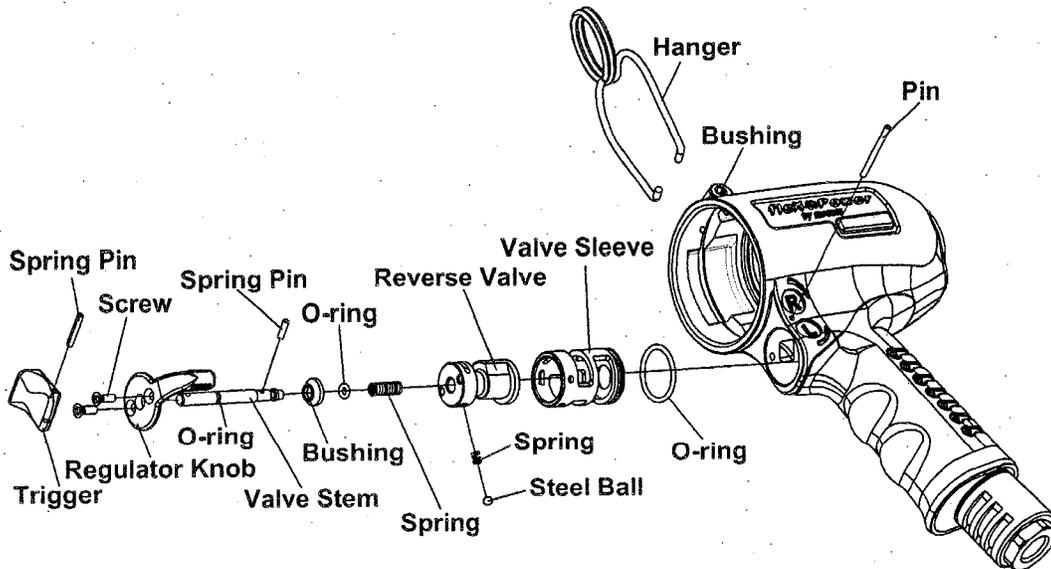


Fig.164

(2) Housing and Trigger Set Assembly:

Install the parts of the trigger set orderly (see Fig. 165 drawing for reference). Then, Insert the pin to fix all the parts. And, install the hanger to complete the assembly.



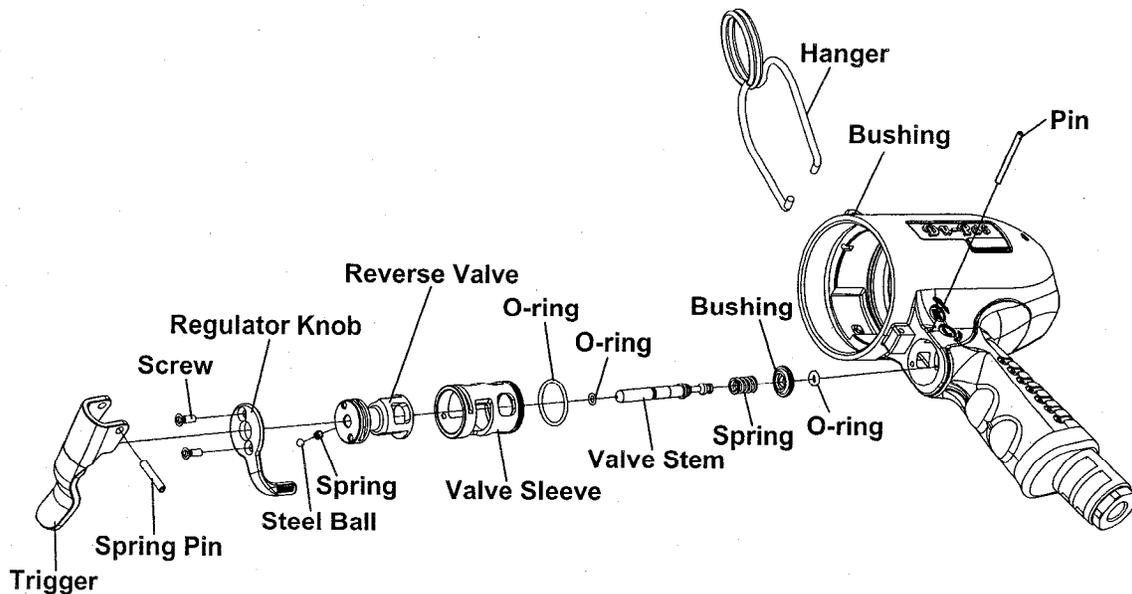


Fig. 165

(3) Cylinder Unit Assembly

- ❶ Place the rotor blades into the rotor. Insert the spring pin A and B into the cylinder. Make sure the pins aim at the pin holes when putting the cylinder down.

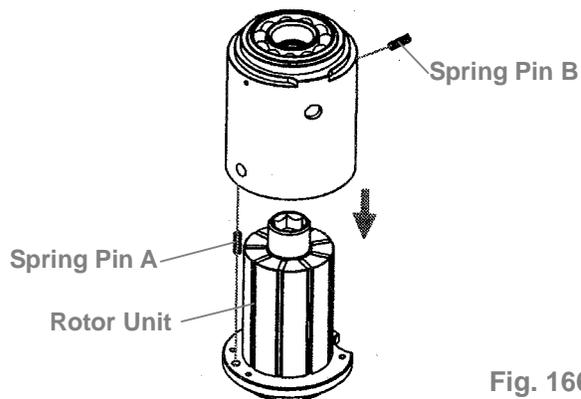


Fig. 166

- ❷ Install the o-ring and the rear cover to the rear plate. The motor set assembly is completed.

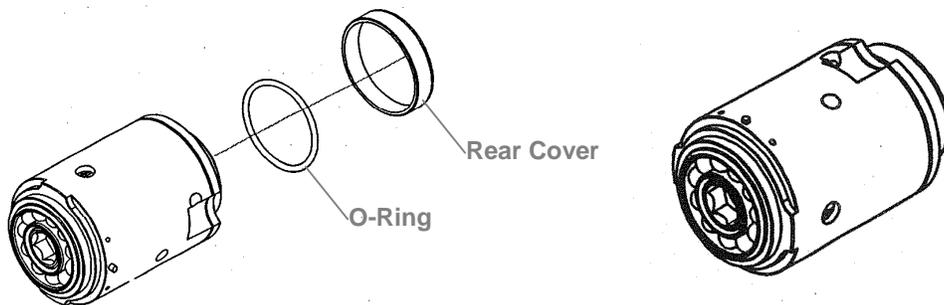


Fig. 167

(4) Housing and Motor Set Assembly

- Place two o-rings into the housing, then the motor set. Be sure the direction is correct when putting the motor set in, i.e. the pin on the side of the cylinder must aim at the hole to fix position as shown in Figure 168.

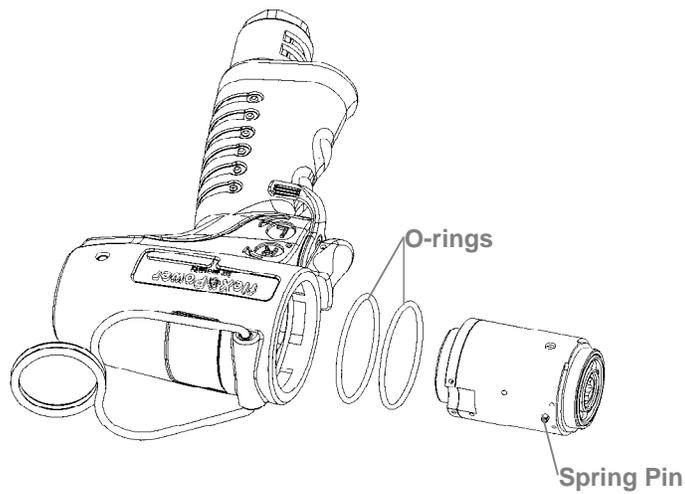


Fig. 168

(5) Shut-Off Valve Unit Assembly

- ❶ Place the three o-rings and the washer on the valve seat.
- ❷ Place the assembled valve seat into the housing, making sure the hole on the side of valve seat aims at the hole on the side of the motor housing and the two holes should be at the same position in order to be fixed when the screw tighten in.

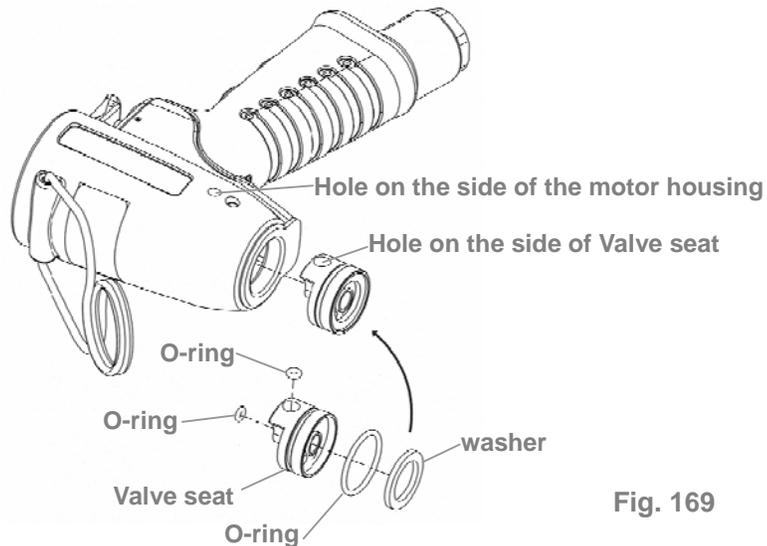


Fig. 169

- ❸ Install the steel ball, the spring, the valve and the seat into the motor housing. Then, place the two o-rings on the lock nut of the rear plate and tighten it into the motor housing.

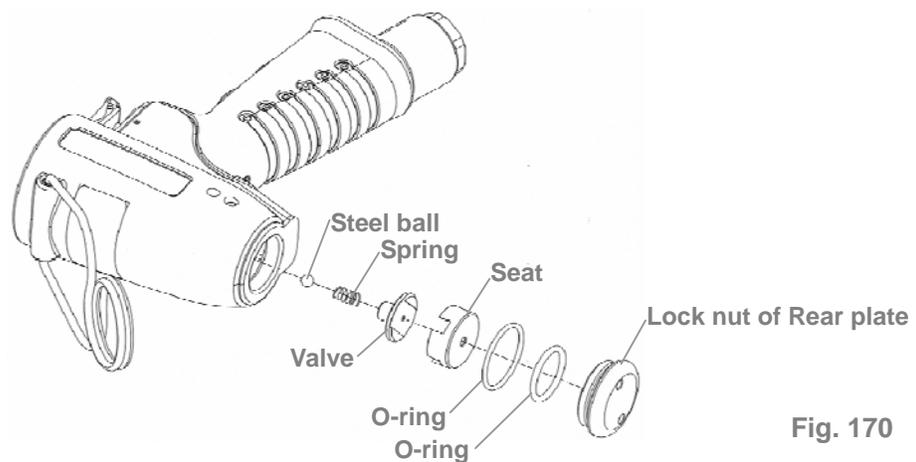


Fig. 170

(6) Housing and Lock Nut of Cylinder Assembly

Fix the tool by a vise. Place the lock nut of the cylinder nut and tighten by the appliance in counter clockwise direction. Assembly is completed. See the Table 21 and 22 in reference to appliance use and tighten torque.

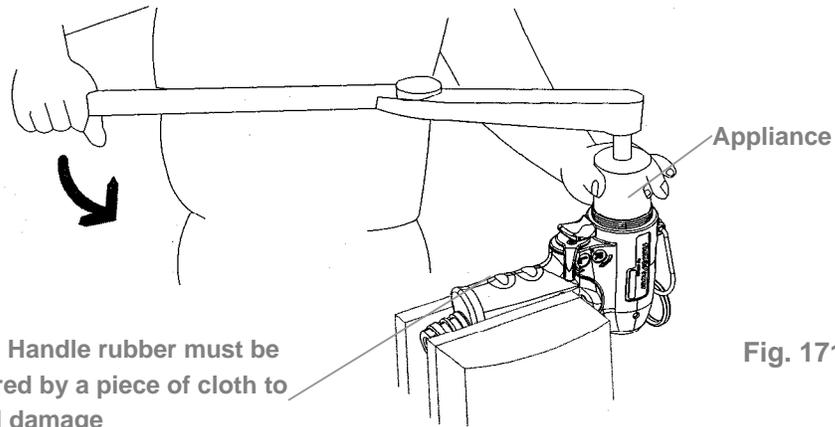


Fig. 171

Appliance No.	Apply to
63-40RT004	FLEXS-30P, FLEXS-30PX, FLEXS-40P, FLEXS-40PX, FLEXS-50P, FLEXS-50PX, FLEXS-60P, FLEXS-60PX
63-70XRT004	FLEXS-65P, FLEXS-65PX, FLEXS-70X, FLEXS-80P FLEXS-80H
63-90RT003	FLEXS-70P, FLEXS-70PX, FLEXS-90P
63-100RT003	FLEXS-100P
63-130RT003	FLEXS-130P
63-150RT003	FLEXS-150P

Table 21

Model No.	Tighten torque
FLEXS-30P	40 N.M
FLEXS-30PX	40 N.M
FLEXS-40P	40 N.M
FLEXS-40PX	40 N.M
FLEXS-50P	40 N.M
FLEXS-50PX	40 N.M
FLEXS-60P	40 N.M
FLEXS-60PX	40 N.M
FLEXS-65P	40 N.M
FLEXS-65PX	40 N.M

Model No.	Tighten torque
FLEXS-70P	60 N.M
FLEXS-70PX	60 N.M
FLEXS-70X	40 N.M
FLEXS-80P	40 N.M
FLEXS-80H	40 N.M
FLEXS-90P	60 N.M
FLEXS-100P	60 N.M
FLEXS-130P	80 N.M
FLEXS-150P	60 N.M

Table 22

(7) Tighten the screw on the housing

Before tightening the screw, make sure the hole of the housing should be at the same position where the hole of the seat at in order to assure the screw can tighten into the housing and the seat properly. Finally, insert the shut off stem with the spring sleeved into the center of the rotor. Assembly is completed.

Note: Loc-tite needed when tighten the screw.

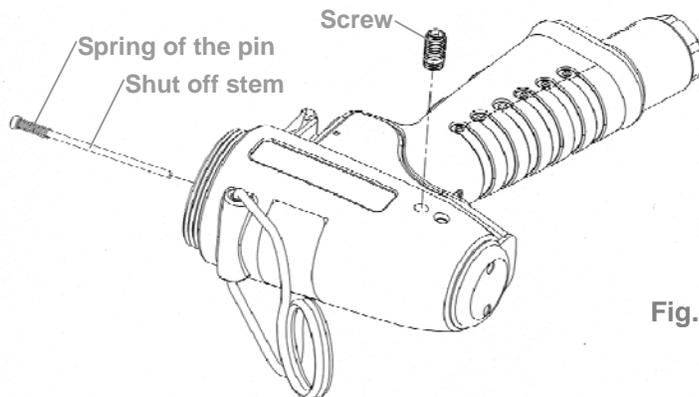


Fig. 172

→ FLEXS-180P

● HOUSING AND MOTOR SET DISASSEMBLY:

(1) Cylinder Unit Disassembly

① Take out the lock washer.

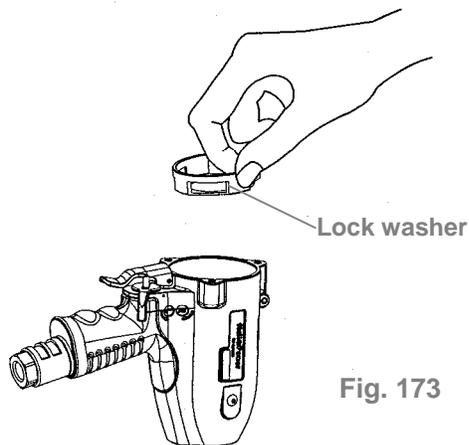


Fig. 173

② Loosen the screw by a wrench.

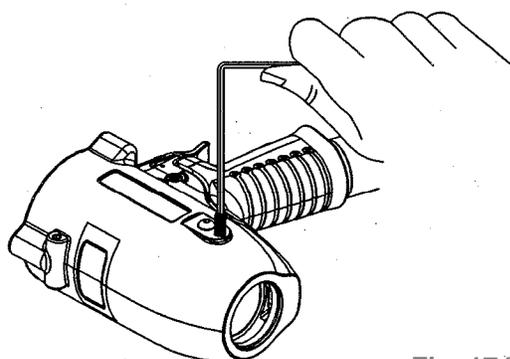


Fig. 174

③ Fix the housing in an opposite position. Use the appliance to loosen the lock nut of rear plate on the cylinder in counter clockwise direction.

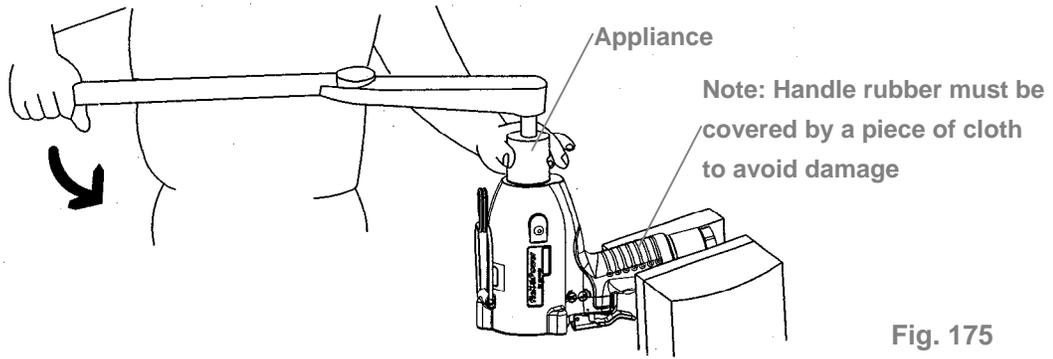


Fig. 175

④ Detach the seat, the valve, the spring, the steel ball and the valve seat from the motor housing.

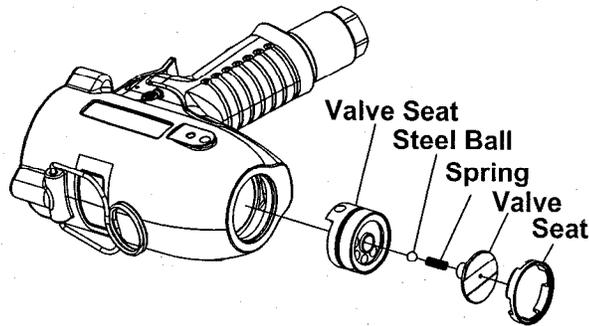


Fig. 176

⑤ Take a piece of cloth and lay it on a table before disassembly. Hold the housing and tap slightly with a plastic stick to push the cylinder unit out.

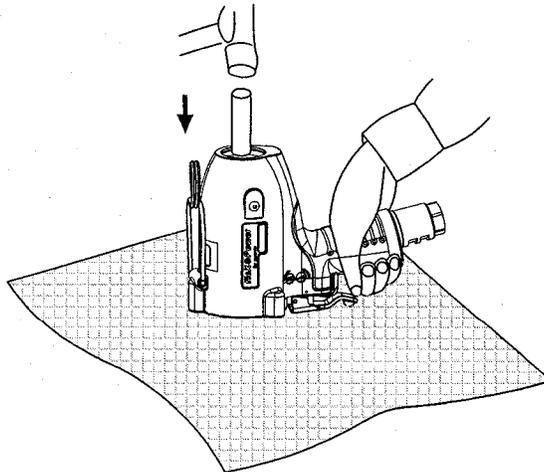


Fig. 177

⑥ Parts of Motor Set:

Appliance No.	Apply to
63-180RT001	FLEXS-180P

Table 23

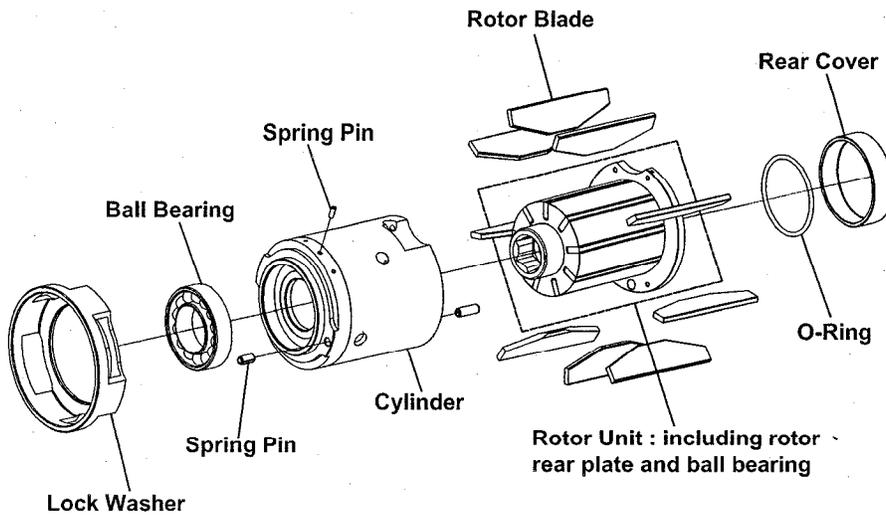


Fig. 178



The rotor and the rear end plate must be press fitted. The clearance of the two parts must be in between 0.01~0.02 mm. It would not be easy to assemble the two parts by repair centers in general. Therefore, as there is a need of repair on the parts of the rotor, the rear end plate, and the ball bearing, we strongly suggest replacing a complete ROTOR UNIT, which is including the rotor, the rear plate, and the ball bearing. The rotor unit would be full assembled and well-measured before delivery.

(2) Air Inlet Disassembly:

Take the air inlet unit apart from the end of the housing. The parts of O-ring, Muffler, Exhaust deflector are separated by each other.

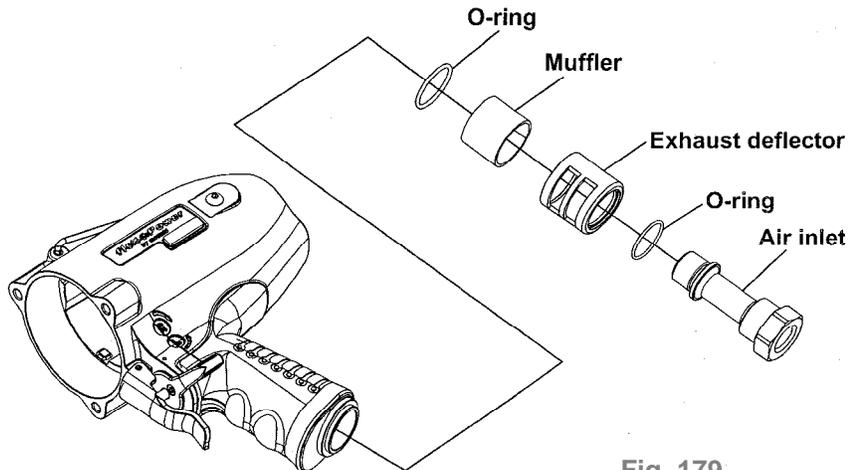


Fig. 179

(3) Trigger Set Disassembly:

Remove the pin to take apart the valve sleeve set. All the parts are disassembled as the below drawing showed

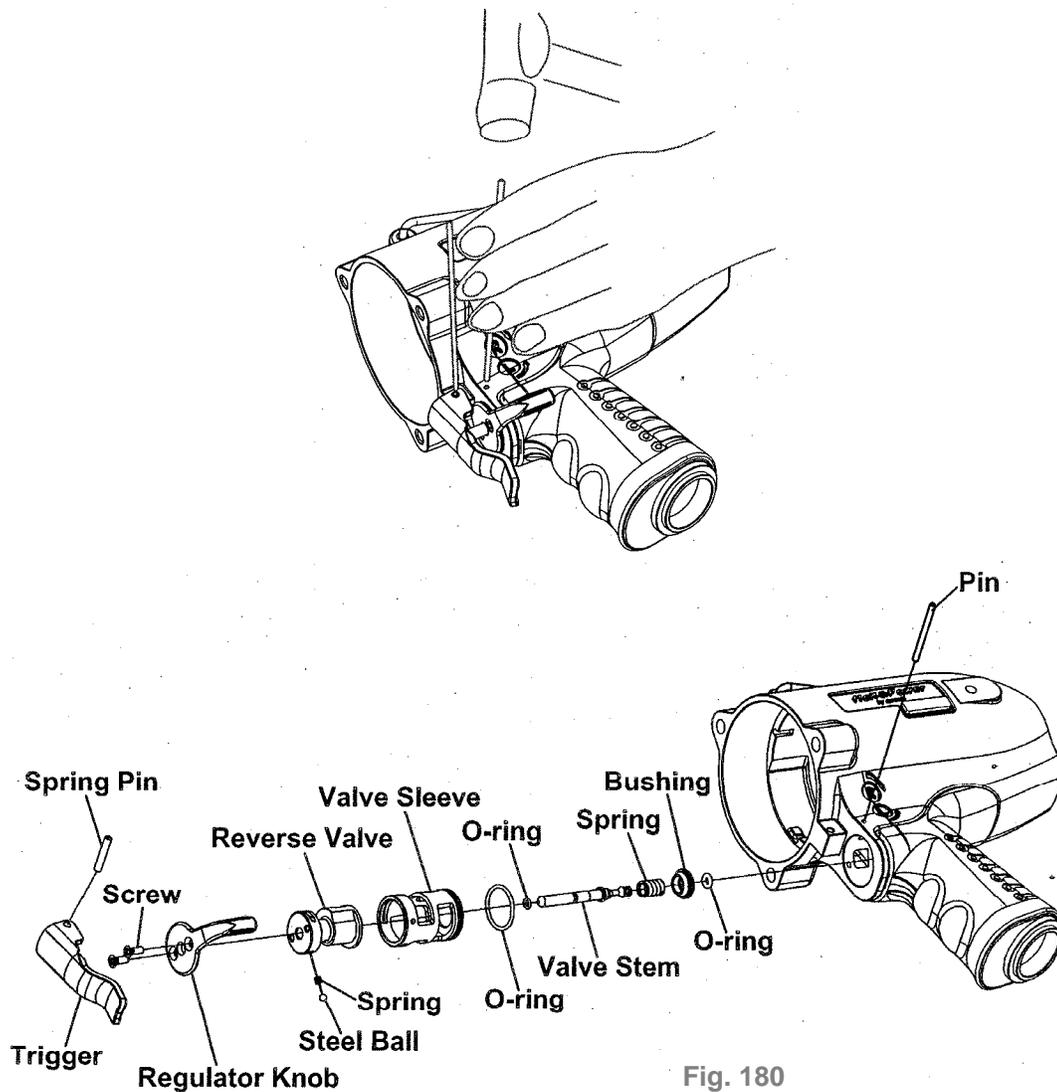


Fig. 180

● **HOUSING AND MOTOR SET ASSEMBLY:**

(1) Housing and Air Inlet Assembly:

Install and tighten the parts of air inlet one by one and in order. (NOTE: Apply the Lock-tite on the threads of air inlet before assembly)

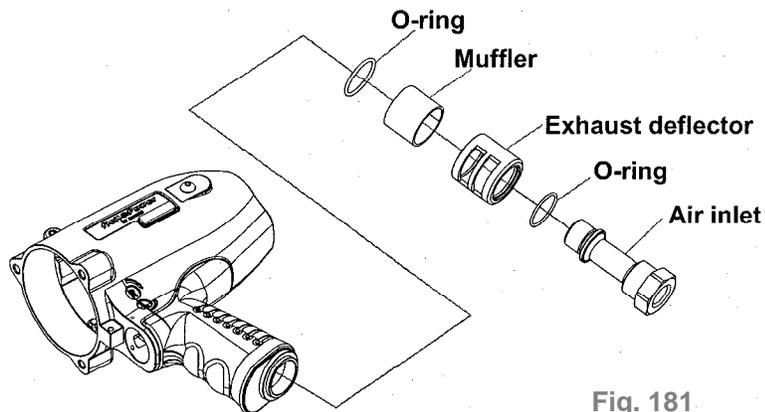


Fig. 181

(2) Housing and Trigger Set Assembly:

Install the parts of the trigger set orderly (see Fig. 182 drawing for reference). Then, insert the pin to fix all the parts. And, install the hanger to complete the assembly.

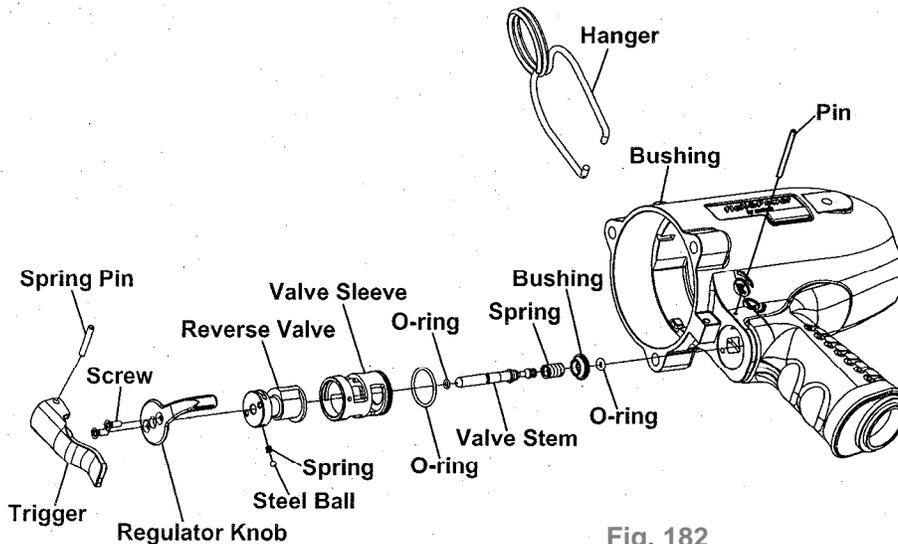


Fig. 182

(3) Cylinder Unit Assembly

❶ Place the rotor blades into the rotor. Insert the spring pin A and B into the cylinder. Make sure the pins aim at the pin holes when putting the cylinder down.

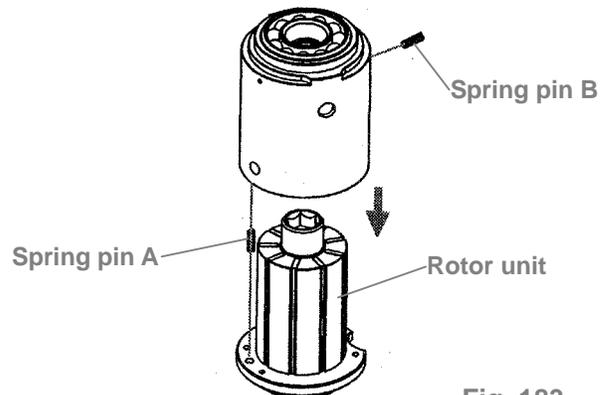


Fig. 183

❷ Install the o-ring and the rear cover to the rear plate. The motor set completed.

assembly is



Fig. 184

(4) Housing and Motor Set Assembly

Place two o-rings into the housing, then the motor set. Be sure the direction is correct when putting the motor set in, i.e. the pin on the side of the cylinder must aim at the hole to fix position as shown in Figure 185.

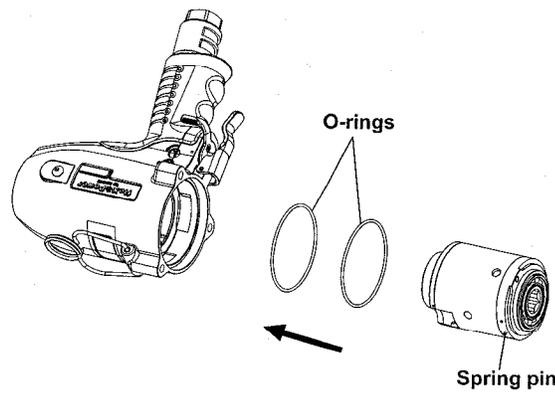


Fig. 185

(5) Shut-Off Valve Unit Assembly

- ① Place the three o-rings and the washer on the valve seat.
- ② Place the assembled valve seat into the housing, making sure the hole on the side of valve seat aims at the hole on the side of the motor housing and the two holes should be at the same position in order to be fixed when the screw tighten in.

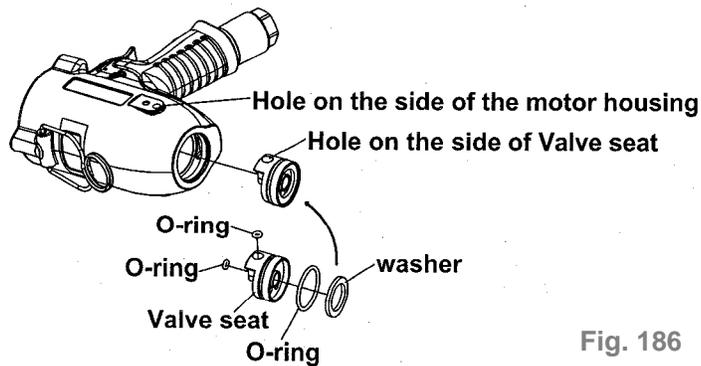


Fig. 186

- ③ Install the steel ball, the spring, the valve and the seat into the motor housing. Then, place the two o-rings on the lock nut of the rear plate and tighten it into the motor housing.

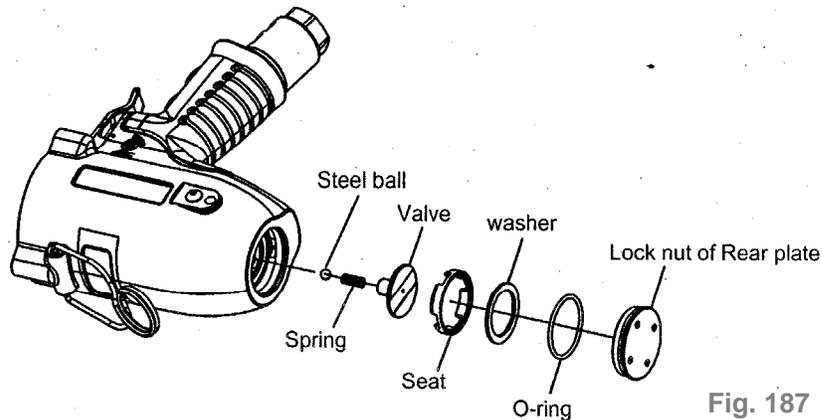


Fig. 187

(6) Motor housing, Pulse Unit, and Pulse Unit Housing Assembly

- (a) Put the lock washer into the housing. (Fig. 188)
- (b) Put the pulse unit, washer, pulse unit housing in order. (Fig. 189)
- (c) Lock up the housings with 3 screws, Please refer to Table 12 for the tighten torque of screws.

NOTE : The 3 screws must be applied with loc-tite.

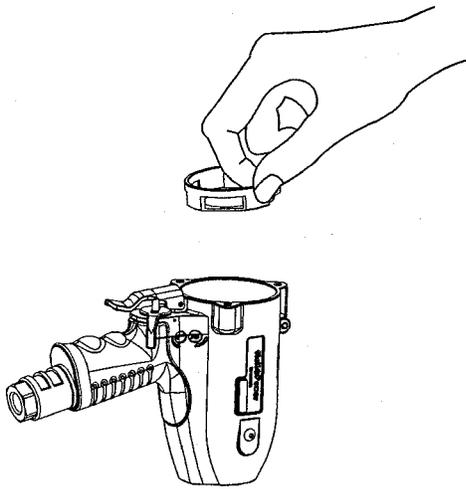


Fig. 188

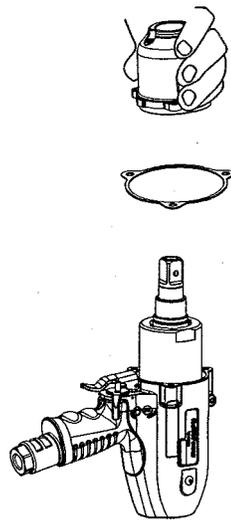


Fig. 189

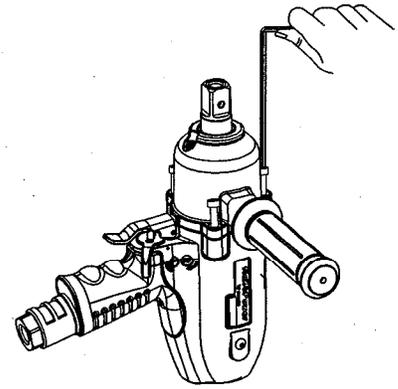


Fig. 190

Model No.	Tighten torque
FLEXS-180P	15 N.M

Table 24

(7) Tighten the screw on the housing

Before tightening the screw, make sure the hole of the housing should be at the same position where the hole of the seat at in order to assure the screw can tighten into the housing and the seat properly. Finally, insert the shut off stem with the spring sleeved into the center of the rotor. Assembly is completed.

Note: Loc-tite needed when tighten the screw.

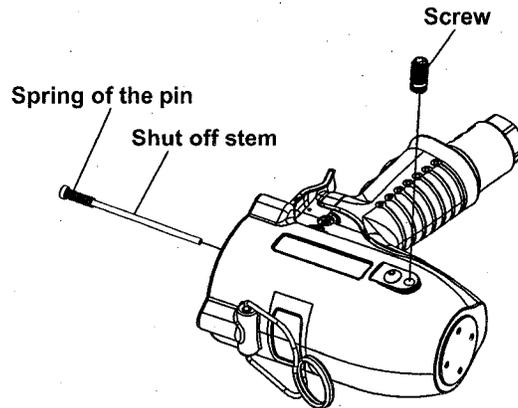


Fig. 191



After all the assembly is complete, test to make sure the anvil rotates smoothly, then connect the air hose to test the torque.

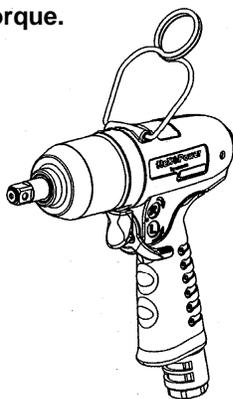
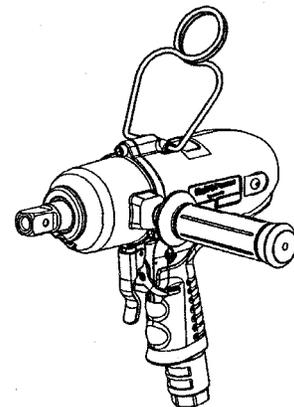
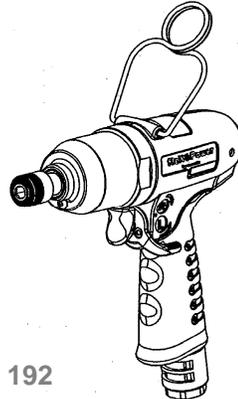
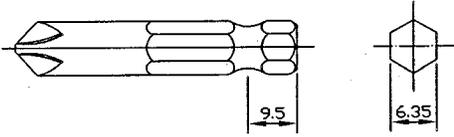


Fig. 192



MODEL	Bolt Capacity	Inserted Tools
FLEXS-30PX FLEXS-40PX FLEXS-50PX FLEXS-60PX FLEXS-65PX FLEXS-70PX	M6 M6-M8 M8 M8 M8-M10 M10	 <p style="text-align: right;">Unit : mm</p>
FLEXS-30P ~ FLEXS-70P FLEXS-90P ~ FLEXS-130P FLEXS-150P & FLEXS-180P		<p>3/8" power sockets 1/2" power sockets 3/4" power sockets</p>

General safety rules

- For multiple hazards, read and understand the safety instructions before installing, operating, repairing, maintaining, changing accessories on, or working near the power tool. Failure to do so can result in serious bodily injury.
- Only qualified and trained operators should install, adjust or use the power tool.
- Do not modify this power tool. Modifications can reduce the effectiveness of safety measures and increase the risks to the operator.
- Do not discard the safety instructions; give them to the operator.
- Do not use the power tool if it has been damaged.
- Tools shall be inspected periodically to verify that the ratings and markings are legibly marked on the tool. The employer/user shall contact the manufacturer to obtain replacement marking labels when necessary.

Projectile hazards

- Be aware that failure of the work piece, of accessories or even of the inserted tool itself can generate high-velocity projectiles.
- Always wear impact-resistant eye protection during the operation of the power tool.
- The grade of protection required should be assessed for each use.
- Ensure that the work piece is securely fixed.

Entanglement hazards

- Entanglement hazards can result in choking, scalping and/or lacerations if loose clothing, personal jewelry, neckwear, hair or gloves are not kept away from the tool and accessories.
- Gloves can become entangled with the rotating drive, causing severed or broken fingers.
- Rotating drive sockets and drive extensions can easily entangle rubber-coated or metal-reinforced gloves.
- Do not wear loose-fitting gloves or gloves with cut or frayed fingers.
- Never hold the drive, socket or drive extension.
- Keep hands away from rotating drives.

Operating hazards

- The use of the tool can expose the operator's hands to hazards including crushing, impacts, cuts, abrasions and heat. Wear suitable gloves to protect hands.
- Operators and maintenance personnel shall be physically able to handle the bulk, weight and power of the tool.
- Hold the tool correctly; be ready to counteract normal or sudden movements and have both hands available.
- Maintain a balanced body position and secure footing.
- In cases where the means to absorb the reaction torque are requested, it is recommended to use a suspension arm whenever possible. If that is not possible, side handles are recommended for straight case and pistol-grip tools. Reaction bars are recommended for angle nut runners. In any case, it is recommended to use a means to absorb the reaction torque above 4 Nm for straight tools, above 10 Nm for pistol-grip tools, and above 60 Nm for angle nut runners.
- Release the start-and-stop device in the case of an interruption of the energy supply.
- Use only lubricants recommended by the manufacturer.
- Fingers can be crushed in open-ended crow-foot nut runners.
- Do not use in confined spaces and beware of crushing hands between tool and work piece, especially when unscrewing.

Repetitive motions hazards

- When using a power tool, the operator can experience discomfort in the hands, arms, shoulders, neck, or other parts of the body.
- While using a power tool, the operator should adopt a comfortable posture whilst maintaining secure footing and avoiding awkward or off-balanced postures. The operator should change posture during extended tasks, which can help avoid discomfort and fatigue.
- If the operator experiences symptoms such as persistent or recurring discomfort, pain, throbbing, aching, tingling, numbness, burning sensations or stiffness, these warning signs should not be ignored. The operator should tell the employer and consult a
- qualified health professional.

Accessory hazards

- Disconnect the power tool from the energy supply before changing the inserted tool or accessory.
- Do not touch sockets or accessories during impacting, as this increases the risk of cuts, burns or vibration injuries.
- Use only sizes and types of accessories and consumables that are recommended by the power tool manufacturer.
- Use only impact-wrench-rated sockets in good condition, as poor condition or hand sockets and accessories used with impact wrenches can shatter and become a projectile.

Workplace hazards

- Slips, trips and falls are major causes of workplace injury. Be aware of slippery surfaces caused by the use of the tool and also of trip hazards caused by the air line or hydraulic hose.
- Proceed with care in unfamiliar surroundings. Hidden hazards, such as electricity or other utility lines, can exist.
- The power tool is not intended for use in potentially explosive atmospheres and is not insulated against coming into contact with electric power.
- Make sure there are no electrical cables, gas pipes, etc., that can cause a hazard if damaged by use of the tool.

Dust and fume hazards

- Dust and fumes generated when using power tools can cause ill health (for example, cancer, birth defects, asthma and/or dermatitis); risk assessment and implementation of appropriate controls for these hazards are essential.
- Risk assessment should include dust created by the use of the tool and the potential for disturbing existing dust.
- Direct the exhaust so as to minimize disturbance of dust in a dust-filled environment.
- Where dust or fumes are created, the priority shall be to control them at the point of emission.
- All integral features or accessories for the collection, extraction or suppression of airborne dust or fumes should be correctly used and maintained in accordance with the manufacturer's instructions.
- Use respiratory protection in accordance with employer's instructions and as required by occupational health and safety regulations.

Noise hazards

- Unprotected exposure to high noise levels can cause permanent, disabling, hearing loss and other problems, such as tinnitus (ringing, buzzing, whistling or humming in the ears).
- Risk assessment and implementation of appropriate controls for these hazards are essential.
- Appropriate controls to reduce the risk may include actions such as damping materials to prevent work pieces from "ringing".
- Use hearing protection in accordance with employer's instructions and as required by occupational health and safety regulations.
- Operate and maintain the power tool as recommended in the instruction handbook, to prevent an unnecessary increase in noise levels.
- If the power tool has a silencer, always ensure it is in place and in good working order when the power tool is operating.
- Select, maintain and replace the consumable/inserted tool as recommended in the instruction hand book, to prevent an unnecessary increase in noise.

Vibration hazards

- Exposure to vibration can cause disabling damage to the nerves and blood supply of the hands and arms.
- Keep the hands away from the nut runner sockets.
- Wear warm clothing when working in cold conditions and keep your hands warm and dry.
- If you experience numbness, tingling, pain or whitening of the skin in your fingers or hands, stop using the power tool, tell your employer and consult a physician.
- Operate and maintain the power tool as recommended in the instruction handbook, to prevent an unnecessary increase in vibration levels.
- Do not use worn or ill-fitting sockets or extensions, as this is likely to cause a substantial increase in vibration.
- Select, maintain and replace the consumable/inserted tool as recommended in the instruction handbook, to prevent an unnecessary increase in vibration levels.
- Sleeve fittings should be used where practicable.
- Support the weight of the tool in a stand, tensioner or balancer, if possible.
- Hold the tool with a light but safe grip, taking account of the required hand reaction forces, because the risk from vibration is generally greater when the grip force is higher.

Additional safety instructions for pneumatic power tool

- Air under pressure can cause severe injury
- Always shut off air supply, drain hose of air pressure and disconnect tool from air supply when not in use, before changing accessories or when making repairs
- Never direct air at yourself or anyone else.
- Whipping hoses can cause severe injury. Always check for damaged or loose hoses and fittings.
- Cold air shall be directed away from the hands.
- Do not use quick-disconnect couplings at tool inlet for impact and air-hydraulic impulse wrenches. Use hardened steel (or material with comparable shock resistance) threaded hose fittings.
- Whenever universal twist couplings (claw couplings) are used, lock pins shall be installed and whipcheck safety cables shall be used to safeguard against possible hose-to-tool and hose-and-hose connection failure.
- Do not exceed the maximum air pressure stated on the tool.
- For torque-control and continuous-rotation tools, the air pressure has a safety critical effect on performance. Therefore, requirements for length and diameter of the hose shall be specified.
- Never carry an air tool by the hose.

Steps for Torque Adjustment – Straight Type

1. Loosen the screw on the pulse unit housing.

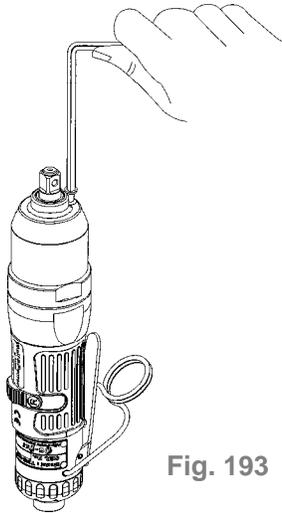


Fig. 193

2. Rotate the anvil manually; adjust the valve screw inside the pulse unit to the hole; where the screw taken off. Then, use the attached tool to adjust the torque. Torque increased by turning clockwise and vice versa.

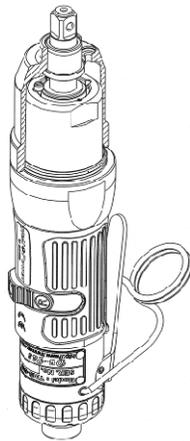


Fig. 194

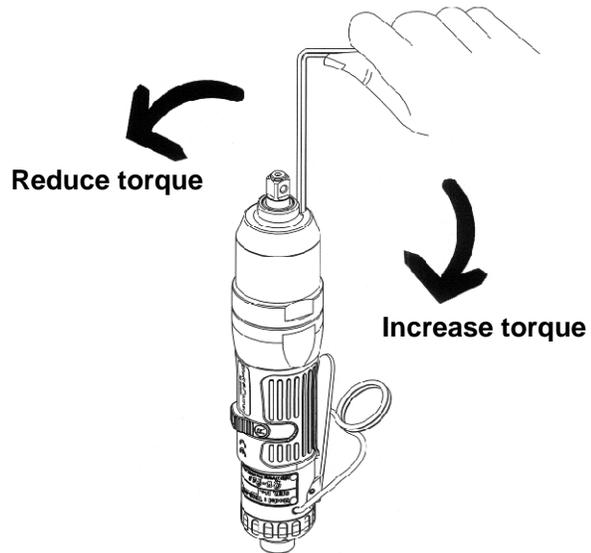


Fig. 195

3. Tighten the screw back to the pulse unit housing.

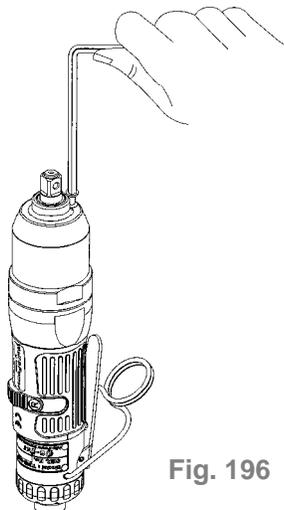


Fig. 196

DISASSEMBLY/ASSEMBLY FOR PULSE TOOLS

- FLEX-30S, FLEX-40S, FLEX-50S, FLEX-60S, FLEX-70S, FLEX-80S, FLEX-30SX, FLEX-40SX, FLEX-50SX, FLEX-60SX, FLEX-70SX

● PULSE MECHANISM DISASSEMBLY

(1) Anvil Unit Disassembly: (for Model No. FLEX-30SX, FLEX-40SX, FLEX-50SX, FLEX-60SX, FLEX-70SX)

Press down the hold spacer, and find the anvil collar. Use an acicular piece to get the anvil collar out, then take the quick change holder, the hold spacer, the spring, and the steel ball apart.

 The steel ball may drop off when taking out the Quick Change Holder

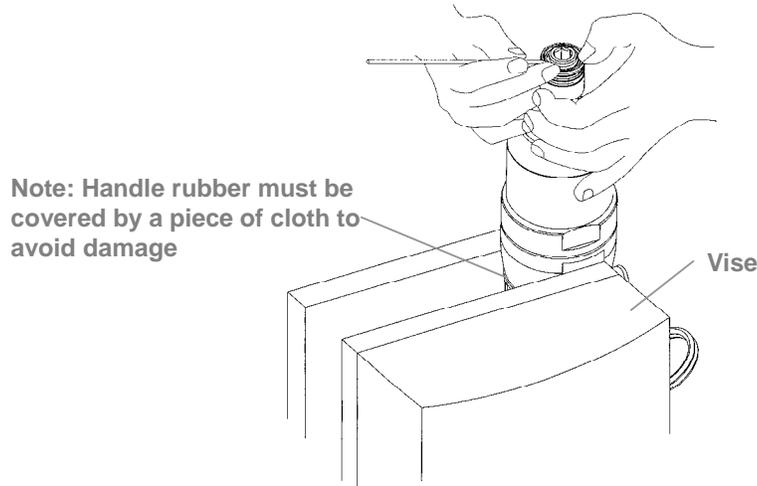


Fig. 197

(2) Pulse Unit Housing Disassembly:

Fix the tool by a vise, use an adjustable wrench clockwise to loosen the pulse unit housing until the pulse unit housing detach from the motor housing. Then, take the pulse unit out, Fig. 198.

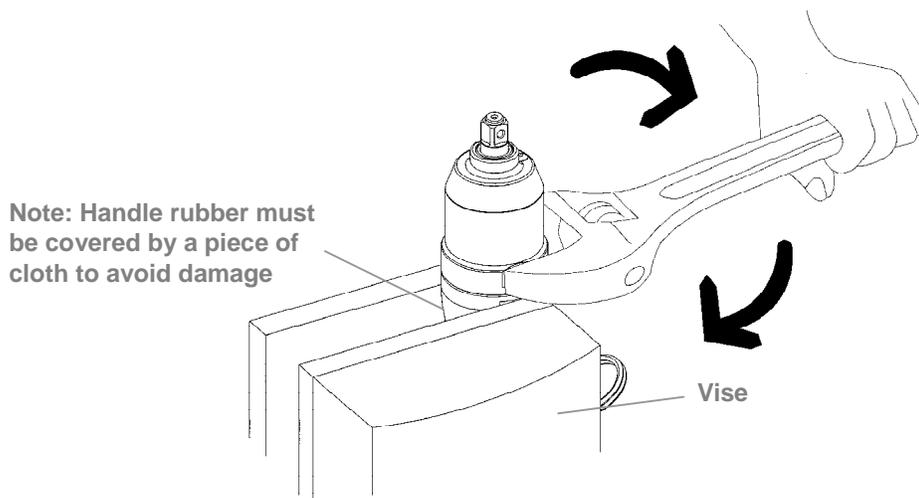


Fig. 198

(3) Pulse Unit Disassembly:

- ① Fix the pulse unit by a vise. Use the appliance (see Table 25) to loosen the lock nut on the pulse unit, Fig. 199.

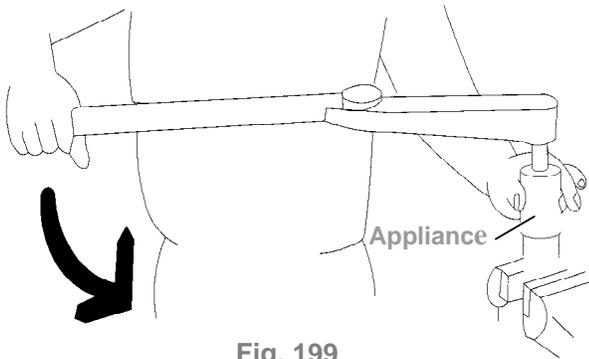


Fig. 199

Appliance No.	Apply to
63-40RT001	FLEX-30S, FLEX-30SX, FLEX-40S, FLEX-40SX, FLEX-50S, FLEX-50SX, FLEX-60S, FLEX-60SX
63-70RT001	FLEX-70S, FLEX-70SX, FLEX-80S

Table 25

Note: Lock-tite was applied on the lock nut when tools were assembled.

- ② Put the Appliance, see Table 26 the anvil and tap on it slightly to detach the interior parts from the pulse unit, Fig.200.

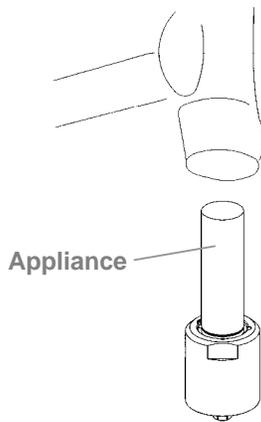


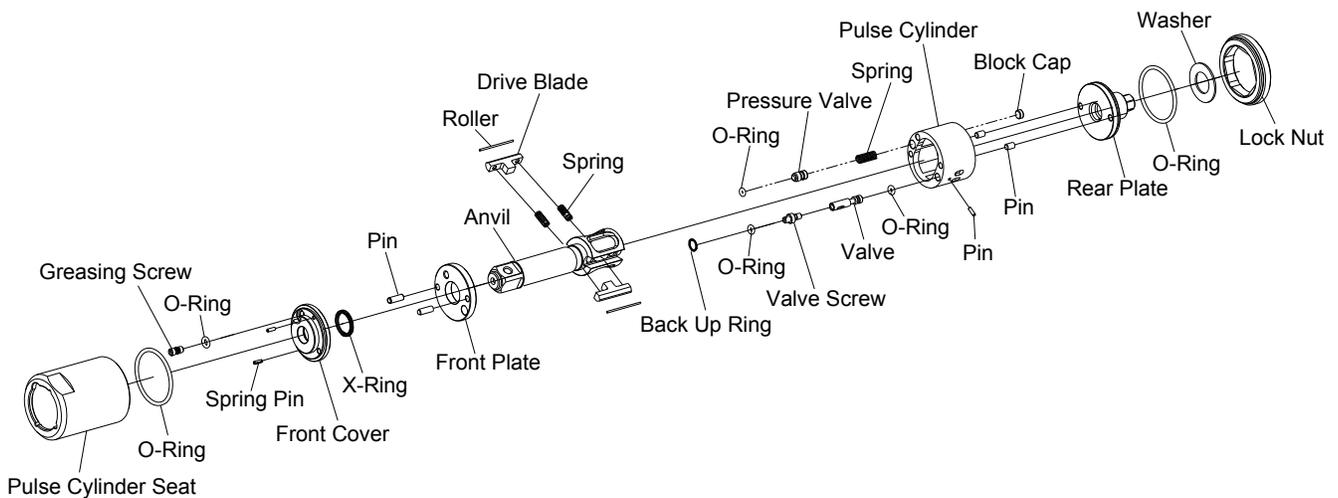
Fig. 200

Appliance No.	Apply to
63-40RT002	FLEX-30S, FLEX-30SX, FLEX-40S FLEX-40SX, FLEX-50S, FLEX-50SX FLEX-60S, FLEX-60SX, FLEX-70S FLEX-70SX, FLEX-80S

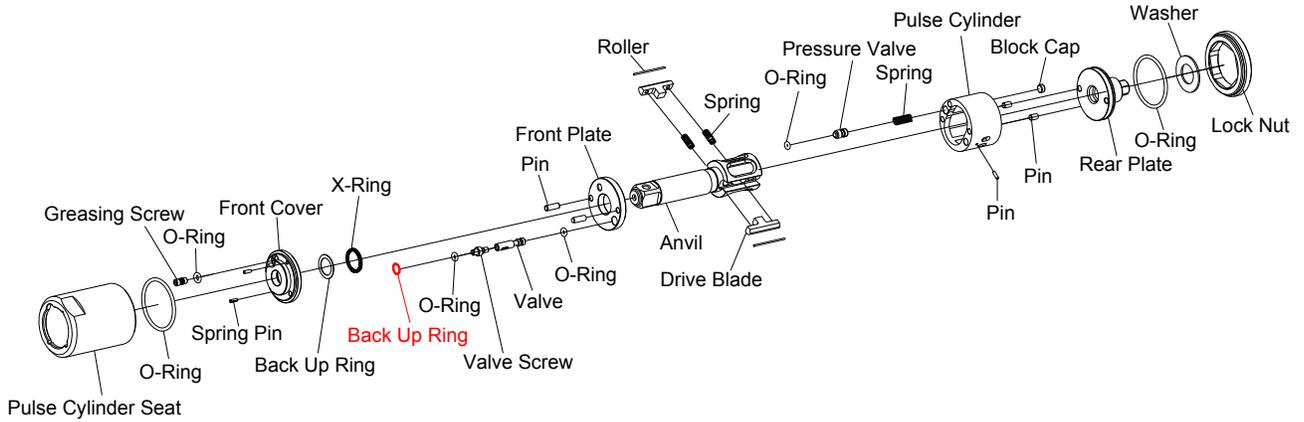
Table 26

(4) Parts of Pulse Cylinder Unit:

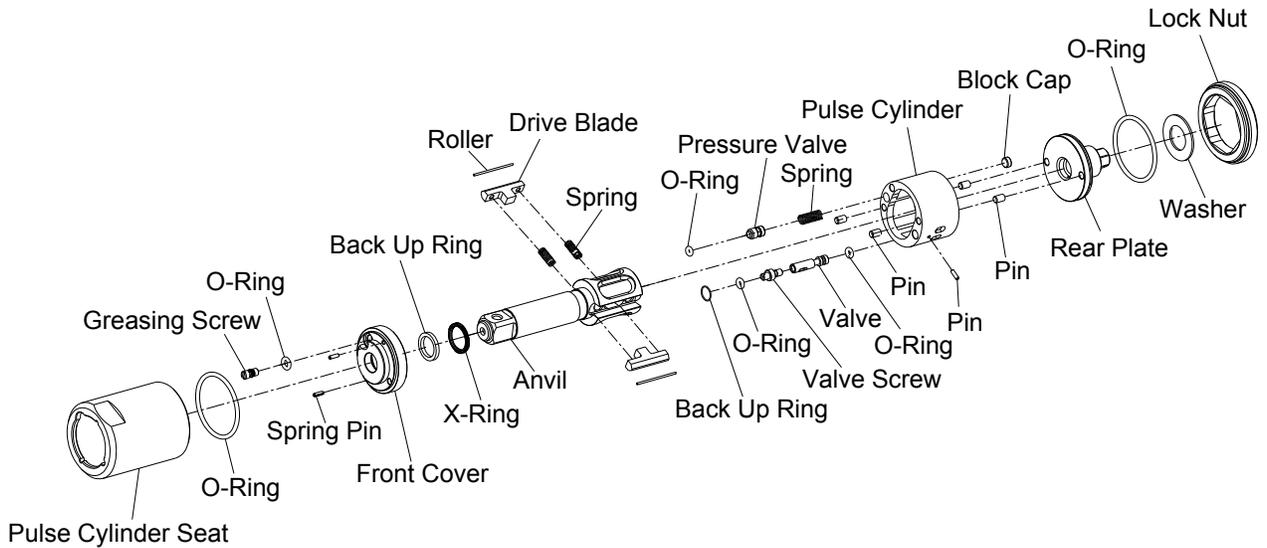
a. FLEX-30S



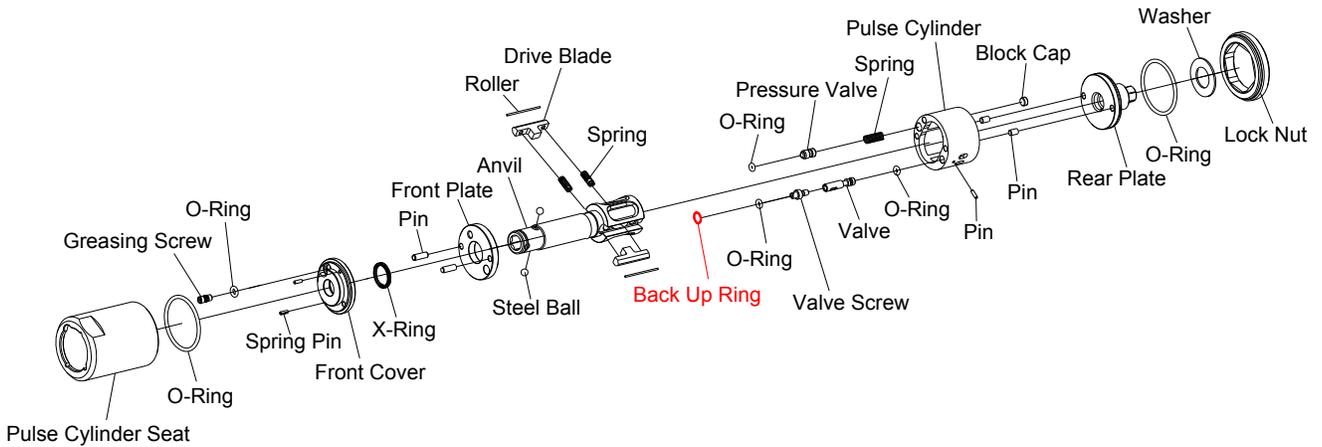
b. FLEX-40S, FLEX-50S, FLEX-60S, FLEX-70S



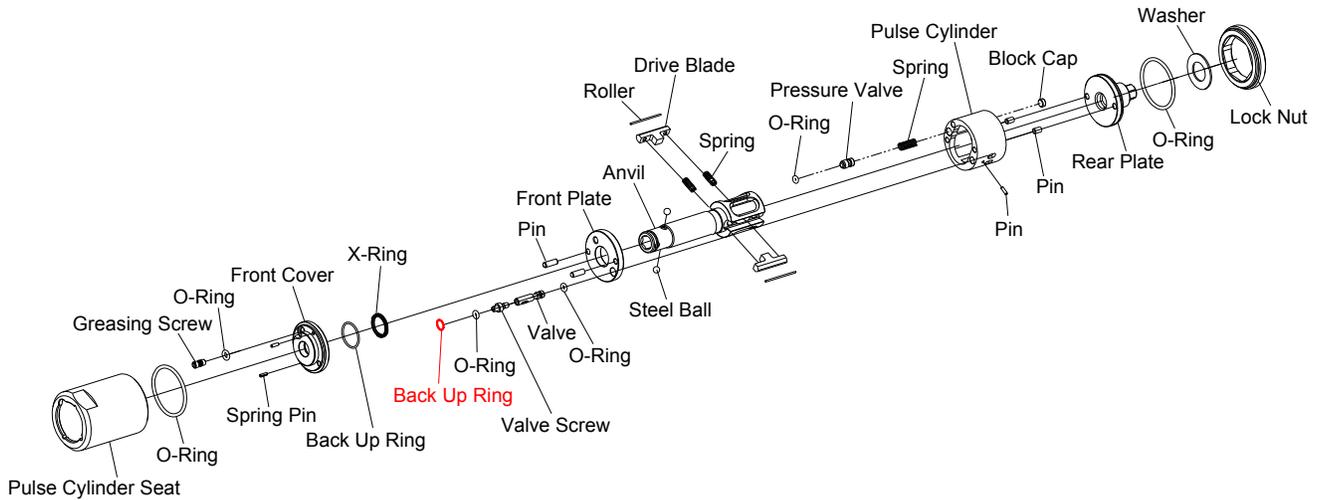
c. FLEX-80S



d. FLEX-30SX



e. FLEX-40SX, FLEX-50SX, FLEX-60SX, FLEX-70SX



● **PULSE UNIT ASSEMBLY:**

(1) **Pulse Cylinder Unit Assembly:**

- ❶ Install the pins on both sides of the pulse cylinder. (Fig. 201)

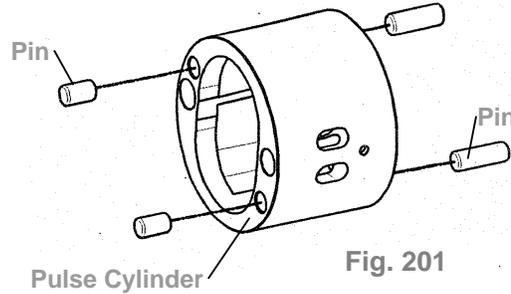
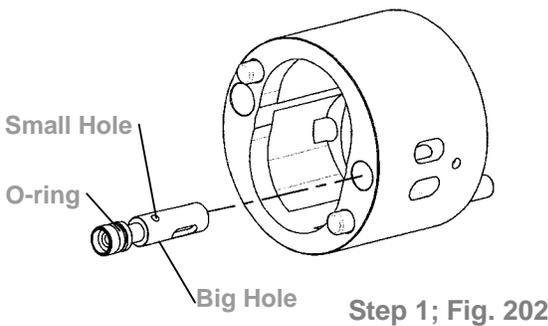


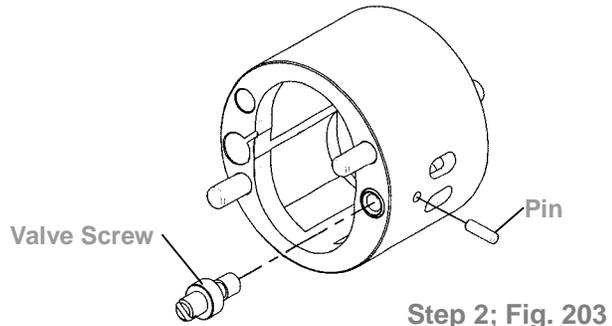
Fig. 201

- ❷ Sleeve the o-ring to the valve and install the valve into the big hole on the pulse cylinder. (Step 1; Fig.202)
- ❸ Insert the pin into the hole on the side of the pulse cylinder. (Step 2; Fig.203)
- ❹ Tighten the valve screw left thread to the pressure valve. (Step 3; Fig.203)

NOTE: the valve screw **MUST** tighten to the most bottom position certainly.

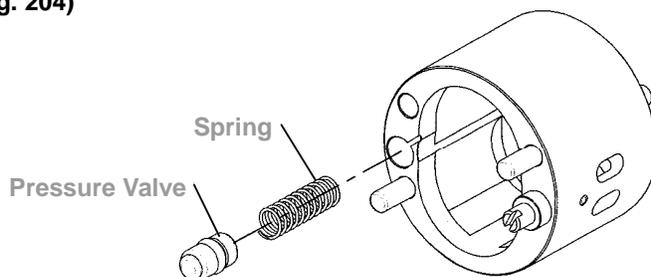


Step 1; Fig. 202



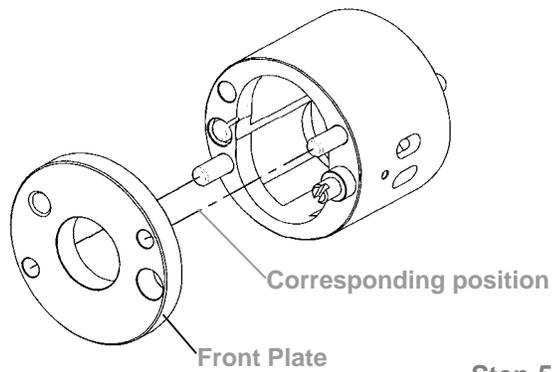
Step 2; Fig. 203

- ❺ Plug the spring into the hole then install the pressure valve that with the o-ring sleeved. (Step 4; Fig. 204)



Step 4; Fig. 204

⑥ Install the front plate and make sure the corresponding position with the pins. (Step 5; Fig.205)



Step 5; Fig. 205

(2) Anvil Unit Assembly :

Install the roller to the drive blade, then insert the springs into the anvil and press the blades from both sides. Finally put the anvil to the pulse cylinder to complete the anvil unit assembly.



MUST follow the direction as shown in Figure 208 while installing the anvil unit into the pulse cylinder; be sure to aim at the highest points by two sides of the interior pulse unit and press the two drive blades in slowly.

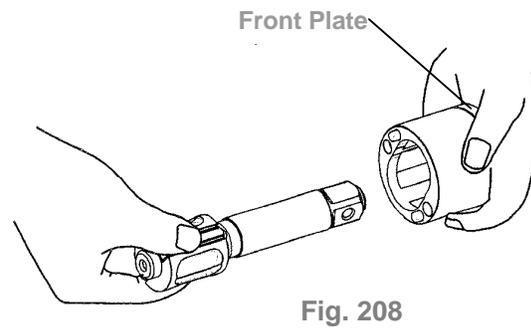
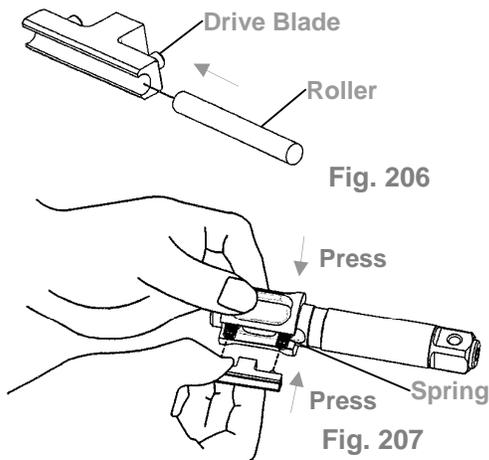
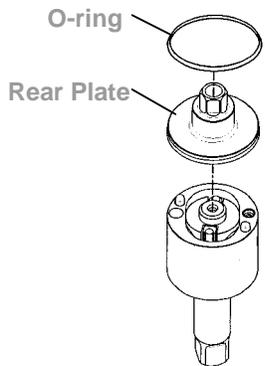


Fig. 208

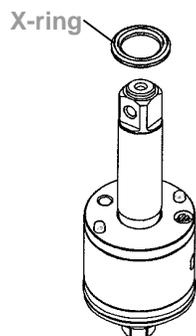
(3) Front Cover and Rear Plate of Pulse Cylinder Assembly

→ **FLEX-30S, FLEX-30SX**

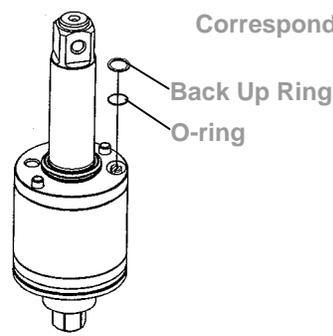
- ①(a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 209)
- (b) Put the X-ring on the anvil with the oil applied. (Fig. 210)
- (c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 211)
- (d) Install the front cover to the pulse cylinder by the corresponding positions. (Fig. 212)



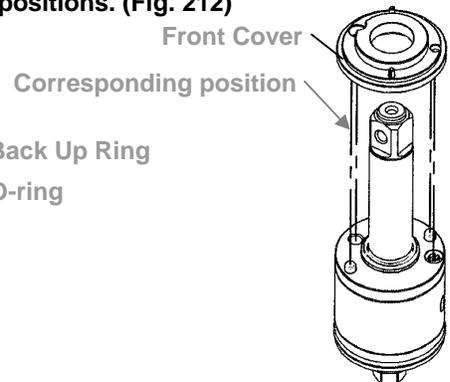
(a) Fig. 209



(b) Fig. 210



(c) Fig. 211



(d) Fig. 212

- ➊ After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

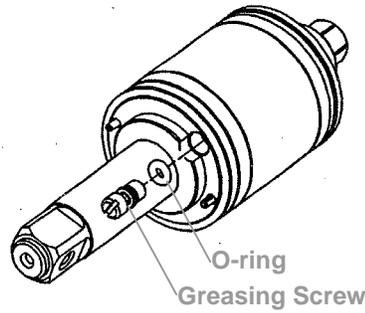
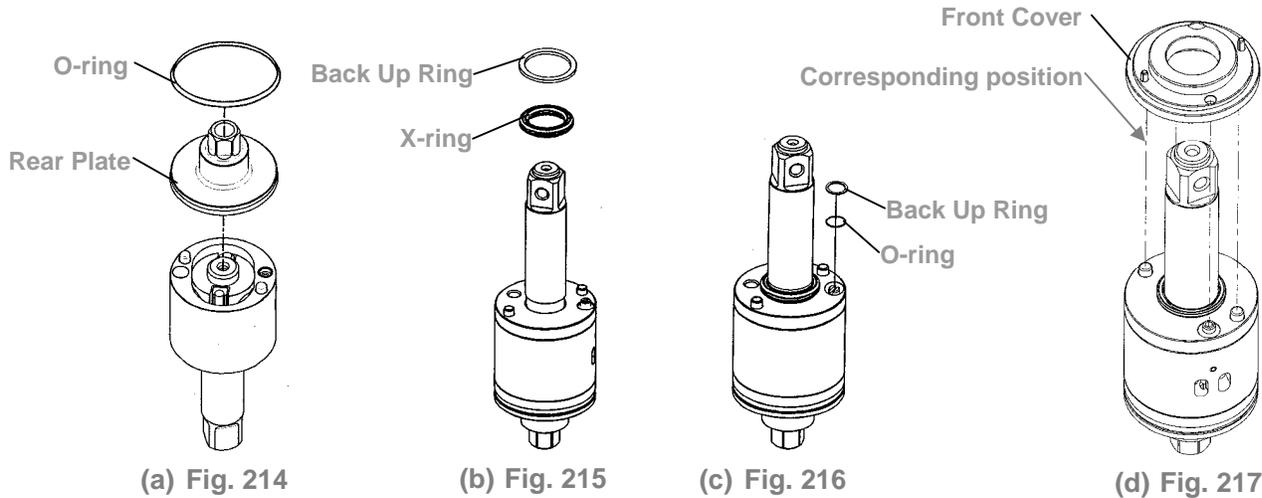


Fig. 213

➔ **FLEX-40S, FLEX-40SX, FLEX-50S, FLEX-50SX, FLEX-60S, FLEX-60SX, FLEX-70S, FLEX-70SX**

- ➋ (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 214)
- (b) Put the X-ring and back up ring on the anvil with the oil applied. (Fig. 215)
- (c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 216)
- (d) Install the front cover to the pulse cylinder by the corresponding positions. (Fig. 217)



- ➌ After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

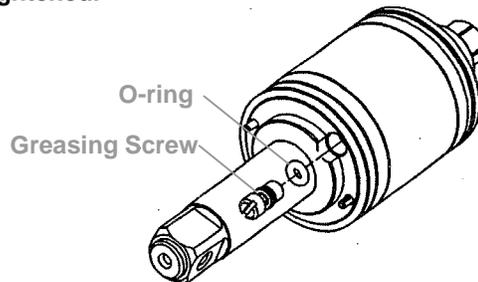
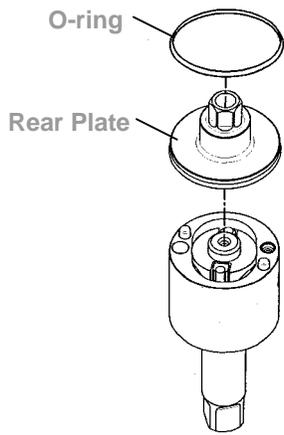


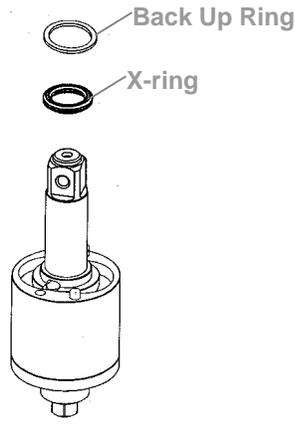
Fig. 218

➔ **FLEX-80S**

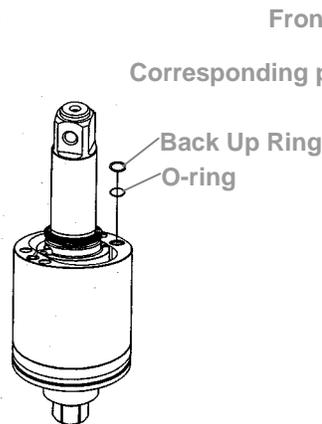
- ➋ (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 219)
- (b) Put the X-ring and back up ring on the anvil with the oil applied. (Fig. 220)
- (c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 221)
- (d) Install the front plate to the pulse cylinder by the corresponding positions. (Fig. 222)



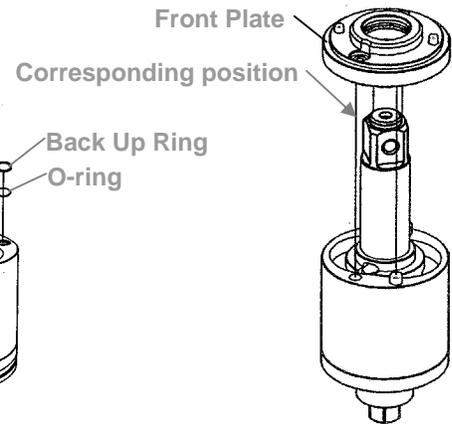
(a) Fig. 219



(b) Fig. 220



(c) Fig. 221



(d) Fig. 222

- ② After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

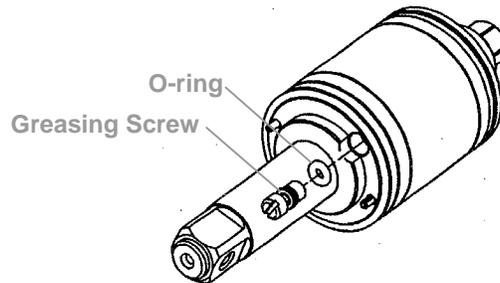


Fig. 223

(4) Pulse Cylinder Seat and Lock Nut of Pulse Cylinder Assembly

- ① Place the o-ring inside the bottom of the pulse cylinder seat, then combine the pulse cylinder seat with the assembled pulse cylinder unit. (Fig. 224, Fig. 225)

⚠ Make sure the half-circle gaps aim at the corresponding positions.

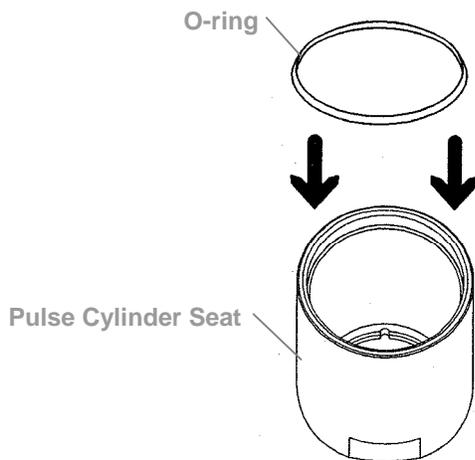


Fig. 224

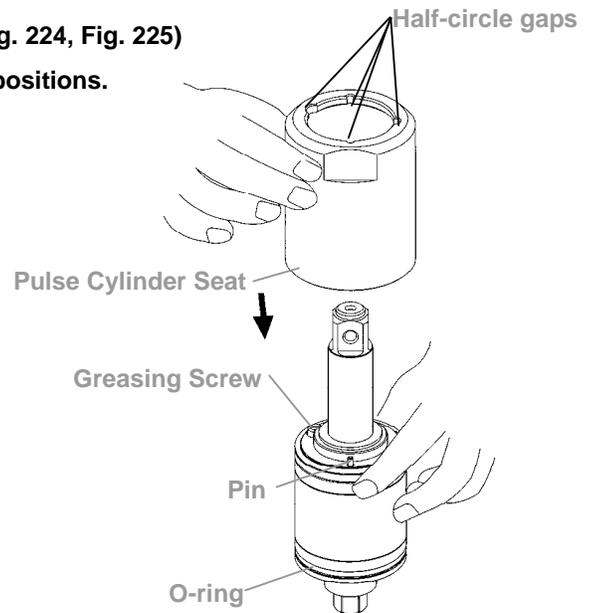


Fig. 225

- ② Use the appliance to push out the rear plate from the pulse cylinder seat. See Table 26 in reference to the proper appliance selection. (Fig. 226)
- ③ Fill up the interior pulse cylinder with the pulse oil about 90% full by an injector. (Fig. 227)
- ④ Install the rear plate taken from the step 2 on the pulse cylinder. Note the corresponding positions!
- ⑤ Turn the assembled unit up side down so the rear plate is at the bottom. Then press the pulse cylinder seat all the way down to the fixed position. Make sure the corresponding positions are matched exactly.

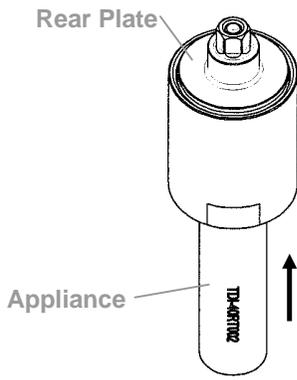


Fig. 226

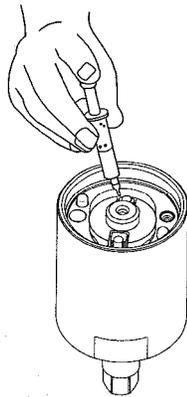


Fig. 227

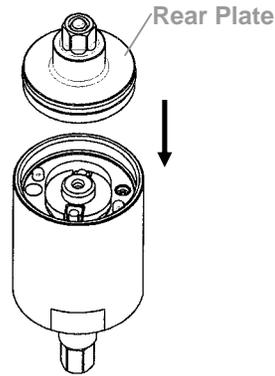


Fig. 228

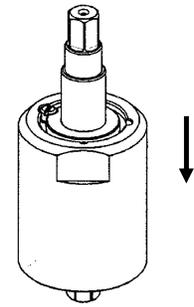


Fig. 229

⑥ Fix the pulse cylinder seat by a vise. Use an appliance and a torque wrench, and then turn clockwise to tighten the lock nut of the pulse cylinder. See Table 27 and 28 in reference to the proper appliance and tightness. (Note: Lock-tite needed when tightening the lock nut of the pulse cylinder)

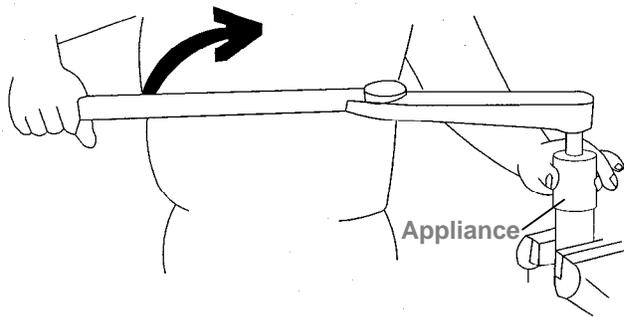
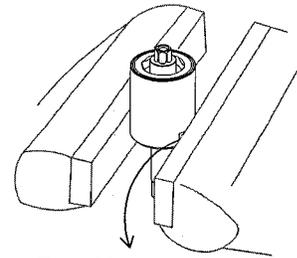


Fig. 230



Fixed by a vise

Appliance No.	Apply to
63-40RT001	FLEX-30S, FLEX-30SX, FLEX-40S, FLEX-40SX, FLEX-50S, FLEX-50SX, FLEX-60S, FLEX-60SX
63-70RT001	FLEX-70S, FLEX-70SX, FLEX-80S

Table 27

Model No.	Tighten torque
FLEX-30S	70 N.M
FLEX-30SX	70 N.M
FLEX-40S	80 N.M
FLEX-40SX	80 N.M
FLEX-50S	80 N.M
FLEX-50SX	80 N.M

Model No.	Tighten torque
FLEX-60S	80 N.M
FLEX-60SX	80 N.M
FLEX-70S	100 N.M
FLEX-70SX	100 N.M
FLEX-80S	100 N.M

Table 28

⑦ After completing the above steps, test to make sure the square drive of the anvil rotates smoothly.

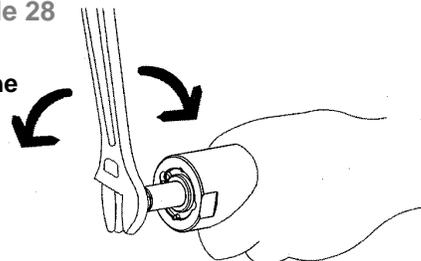


Fig. 231

(5) Steps for Pulse Cylinder Oiling :

- 1 Loosen the greasing screw, and fill in the authorized oil by an injector until it is full and overflow.

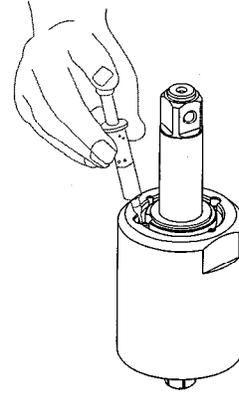


Fig. 232

- 2 Take the unit and dip it in an oil tank, then rotate the anvil by a wrench to release air inside, in the mean time, the unit would be full with oil completely.

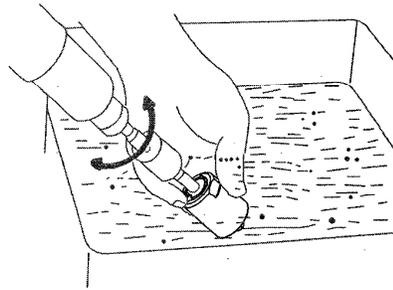


Fig. 233

- 3 Use the screwdriver either, the slotted to tighten the greasing screw, Fig. 234.

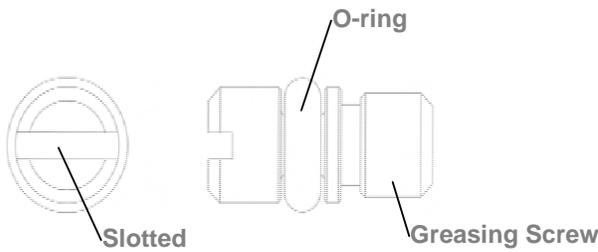
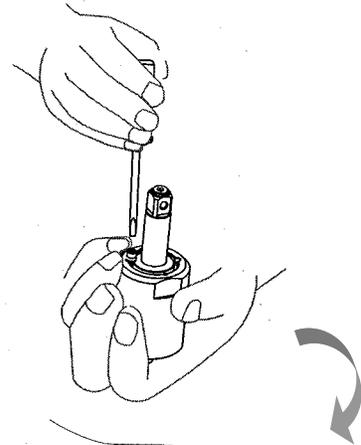
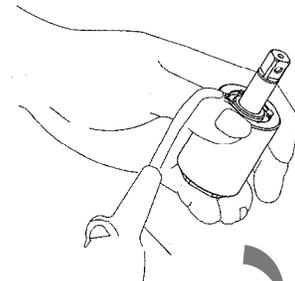


Fig. 234



- 4 Use an air spray gun to blow off the oil on the cylinder seat, Fig. 235.

Fig. 235



- 5 Loosen the greasing screw again and use an injector to draw out a little amount of oil (see Table 29) . Finally, tighten the greasing screw back to the pulse cylinder unit, Fig. 236.

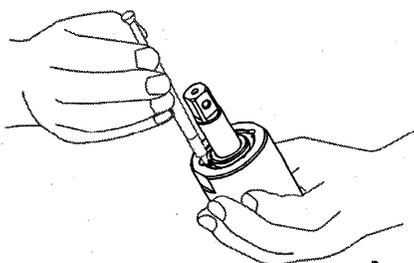
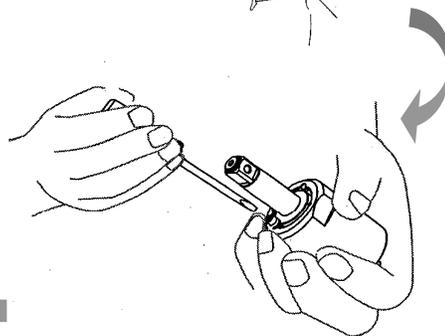


Fig. 236



Model No.	Amount of oil draw
FLEX-30S	0.25 CC
FLEX-30SX	0.25 CC
FLEX-40S	0.3 CC
FLEX-40SX	0.3 CC
FLEX-50S	0.35 CC
FLEX-50SX	0.35 CC

Model No.	Amount of oil draw
FLEX-60S	0.45 CC
FLEX-60SX	0.45 CC
FLEX-70S	0.63 CC
FLEX-70SX	0.63 CC
FLEX-80S	0.6 CC

Table 29

(6) Torque Testing :

- Put the washer on the front end of the anvil, and then put another washer on the rear plate.

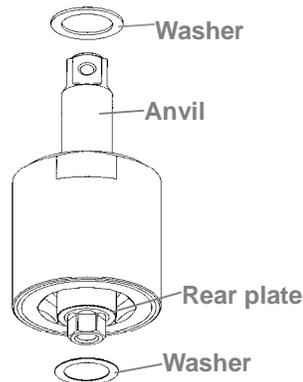


Fig. 237

- Tighten the clutch housing by hands.

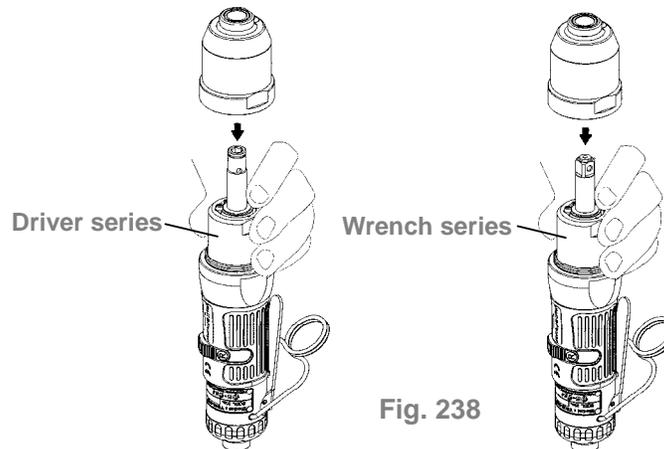


Fig. 238

- Test the forward torque by a digital torque tester and make sure the tool pulses smoothly.

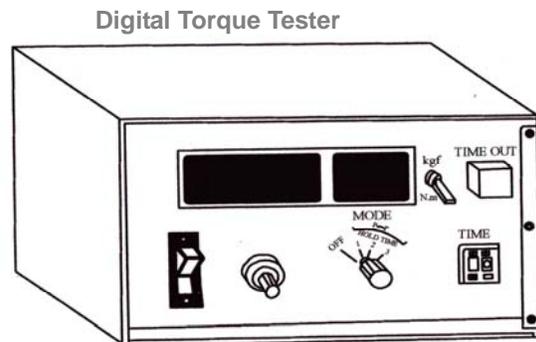
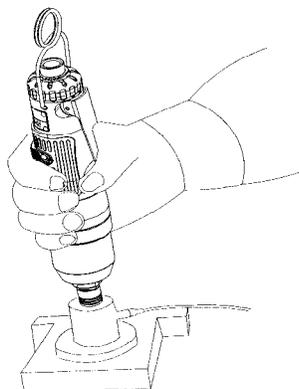


Fig. 239

Model No.	Air inlet pressure 0.6 Mpa
	N.M (at least)
FLEX-30S	12.5
FLEX-30SX	11.5
FLEX-40S	19
FLEX-40SX	17
FLEX-50S	27
FLEX-50SX	25
FLEX-60S	35
FLEX-60SX	30
FLEX-70S	47
FLEX-70SX	40
FLEX-80S	70

Table 30

④ If the test result is NG (see Table 30 in reference to the torque standard), MUST draw out or add a little amount of oil and do the following steps:

- ① Loosen the pulse unit housing by hands.
- ② Loosen the greasing screw.
- ③ Draw out or add a little amount of oil.
- ④ Tighten the greasing screw back.
- ⑤ Tighten the pulse unit housing.
- ⑥ Test the torque again. If the test result is still NG, repeat the Steps ①~⑥ until the standard torque is reached.

(7) Pulse Unit Housing Assembly :

Fix the housing by a vise. Turn the wrench in counter clockwise direction to tighten the pulse unit housing.

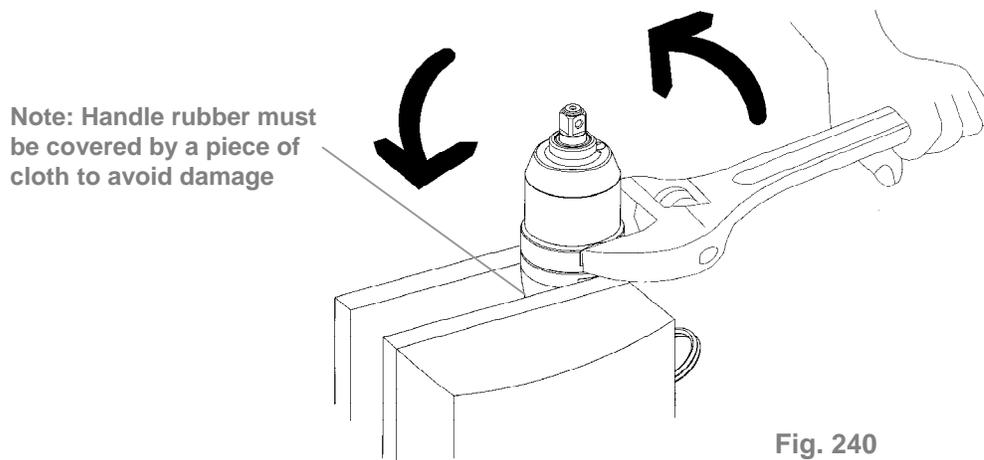


Fig. 240

(8) Anvil Unit Assembly: (for FLEX-30SX, FLEX-40SX, FLEX-50SX, FLEX-60SX and FLEX-70SX)

- (a) Place the steel ball, the quick change holder, the spring, and the hold spacer orderly on the anvil as shown.
- (b) Put the anvil collar on the Anvil. (Fig. 242)

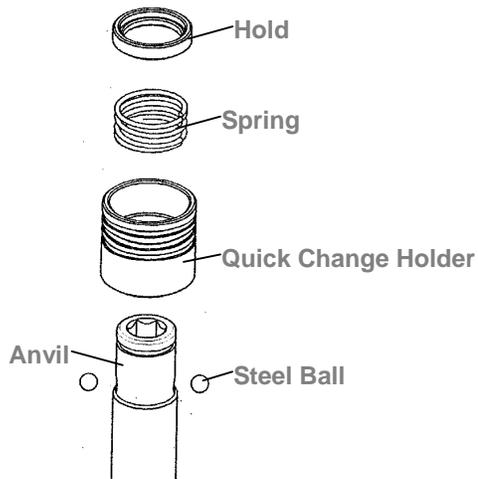


Fig. 241

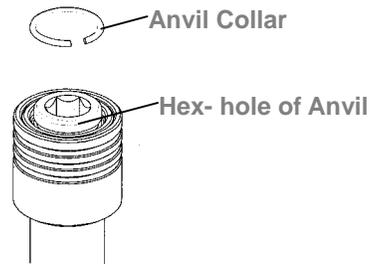


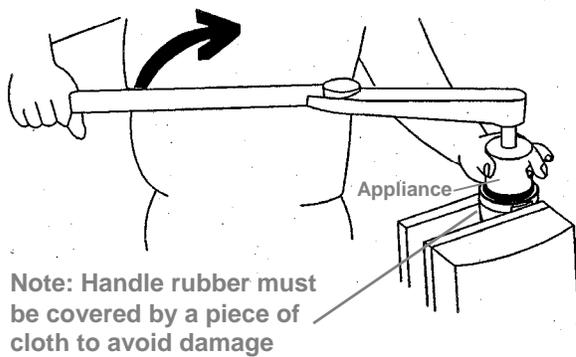
Fig. 242

● HOUSING AND MOTOR SET DISASSEMBLY:

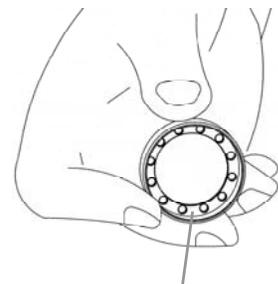
(1) Cylinder Unit Disassembly:

① Take a piece of cloth to cover the housing handle and fix the tool with a vise. Use the appliance (see Table 31)

to take the lock nut out of cylinder by turning clockwise.



Note: Handle rubber must be covered by a piece of cloth to avoid damage



Lock nut of Cylinder

Fig. 243

Appliance No.	Apply to
63-40RT004	FLEX-30S, FLEX-30SX, FLEX-40S, FLEX-40SX FLEX-50S, FLEX-50SX, FLEX-60S, FLEX-60SX
63-70SRT001	FLEX-70S, FLEX-70SX
63-70XRT004	FLEX-80S

Table 31

② Use a wrench to loosen the screw on the side of the motor housing and detach the parts of the regulator.

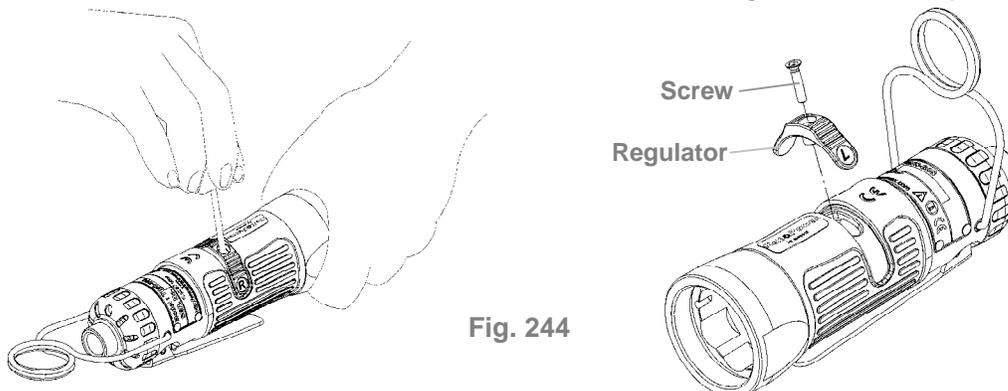


Fig. 244

③ Take a piece of cloth and lay it on a table before disassembly. Hold the housing downward to detach the cylinder unit out.

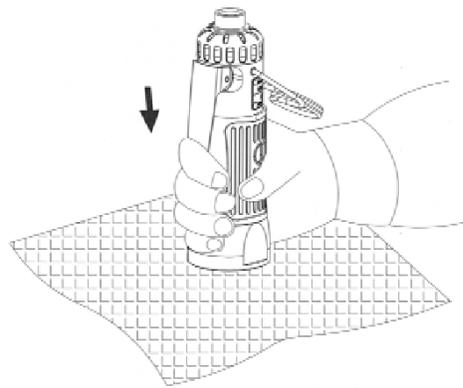


Fig. 245

④ Parts of Motor Set:

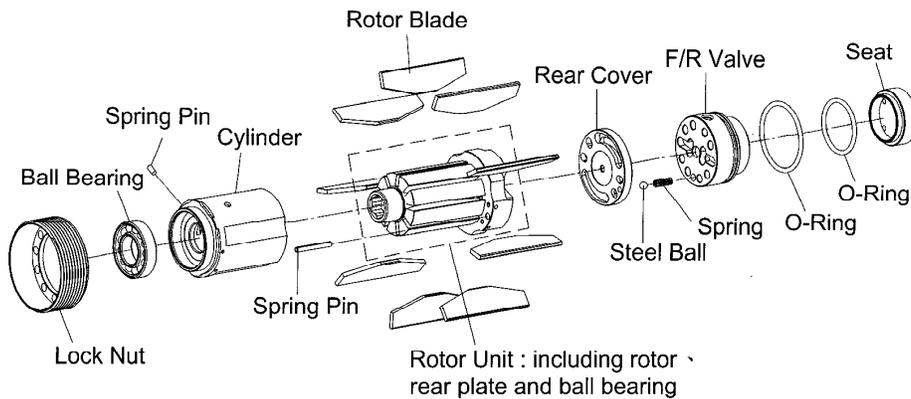


Fig. 246

⚠ The rotor and the rear end plate must be press fitted. The clearance of the two parts must be in between 0.01~ 0.02 mm. It would not be easy to assemble the two parts by repair centers in general. Therefore, as there is a need of repair on the parts of the rotor, the rear end plate, and the ball bearing, we strongly suggest replacing a complete ROTOR UNIT, which is including the rotor, the rear plate, and the ball bearing. The rotor unit would be full assembled and well-measured before delivery.

(2) Air Inlet Disassembly:

Take off the snap ring from the air inlet, and then take off the exhaust deflector. Use an open wrench to open the air inlet in counter clock wise direction. All the interior parts are detached.

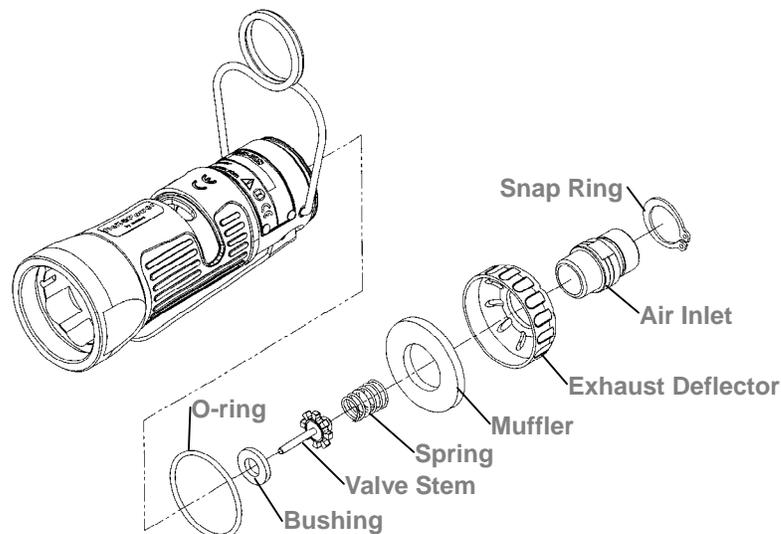


Fig. 247

(3) Trigger Set Disassembly:

Remove the spring pin from the trigger to detach the interior parts. And then, remove the housing rubber and the hanger to complete the disassembly.

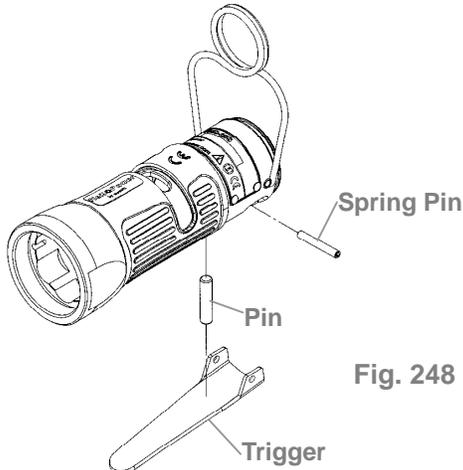


Fig. 248

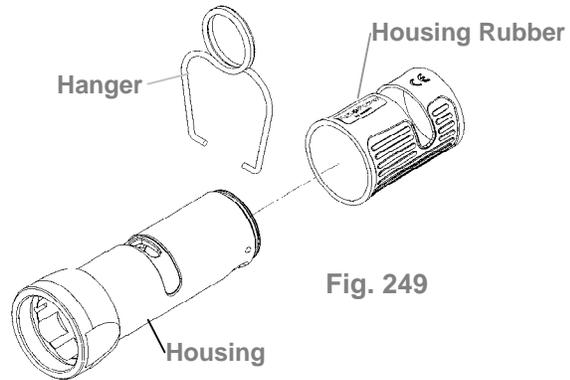


Fig. 249

● HOUSING AND MOTOR SET ASSEMBLY:

(1) Cylinder Unit Assembly

- ❶ Place the rotor blades into the rotor. Insert the spring pin A and B into the cylinder. Make sure the pins aim at the pin holes when putting the cylinder down.

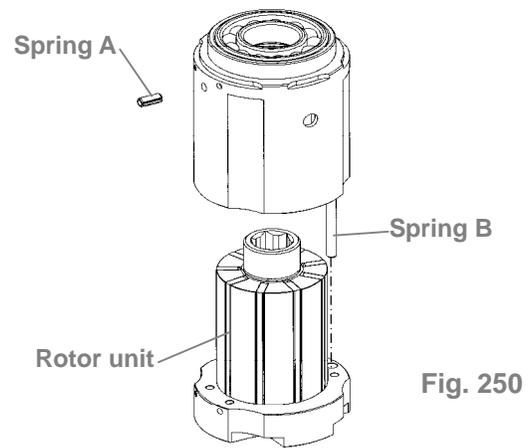


Fig. 250

- ❷ Make the groove of the air inlet plate toward the rear plate and assemble. Make sure the holes aim at the pin while assembling, Fig. 251.
- ❸ Assemble the regulator with the rotor- air inlet unit. Make sure the steel balls of the regulator are placed on the holes of the air inlet plate. Then, place the seat with the o-ring sleeved on the regulator. Assembly is completed.

⚠ Apply the lubricator between parts while assembling.

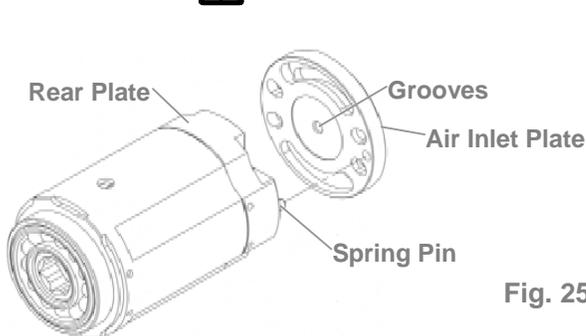


Fig. 251

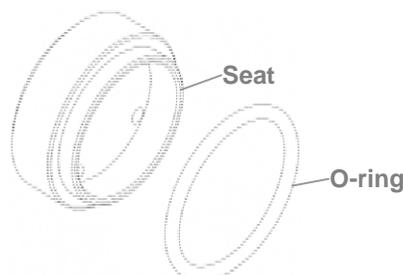


Fig. 252

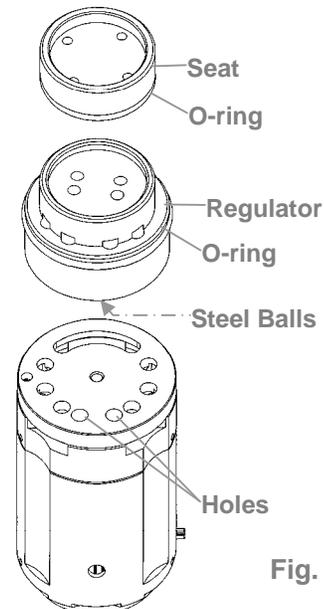


Fig. 253

(2) Housing, Motor set unit and Lock Nut of Cylinder Assembly:

- ❶ Put the housing rubber on the housing.
- ❷ Install the motor set into the housing. Make sure the direction is correct, i.e. the spring pin on the side of the cylinder aims at the hole inside the housing.
- ❸ Have the hole on the regulator aim at the screw hole on the side of the F/R valve and make sure the screw is tightened into the regulator and the F/R valve.

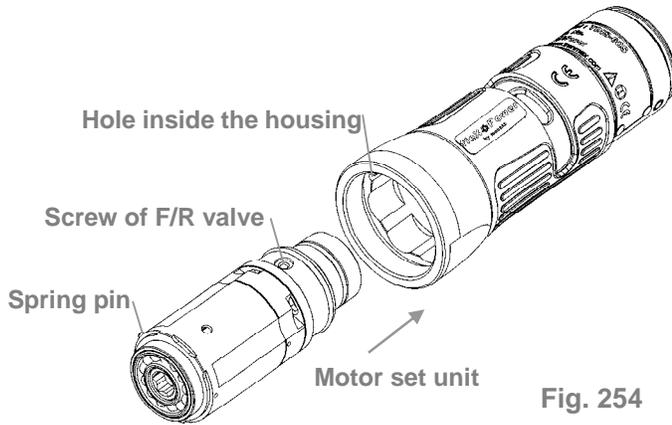


Fig. 254

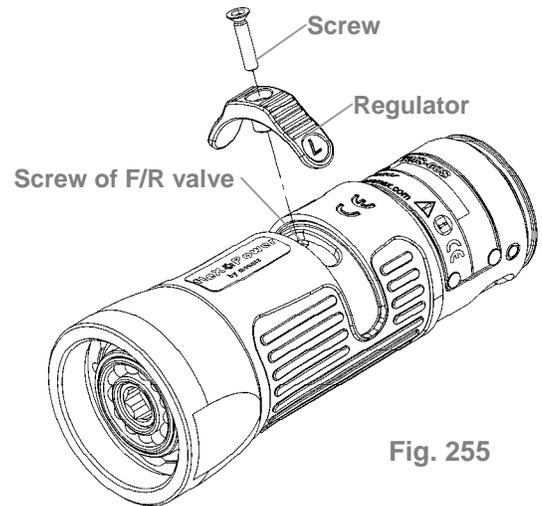


Fig. 255

- ❹ Fix the tool by a vise. Place the lock nut of the cylinder nut and tighten by the appliance in counter clockwise direction to complete the assembly. See the Table 32 and 33 in reference to appliance use and tighten torque.

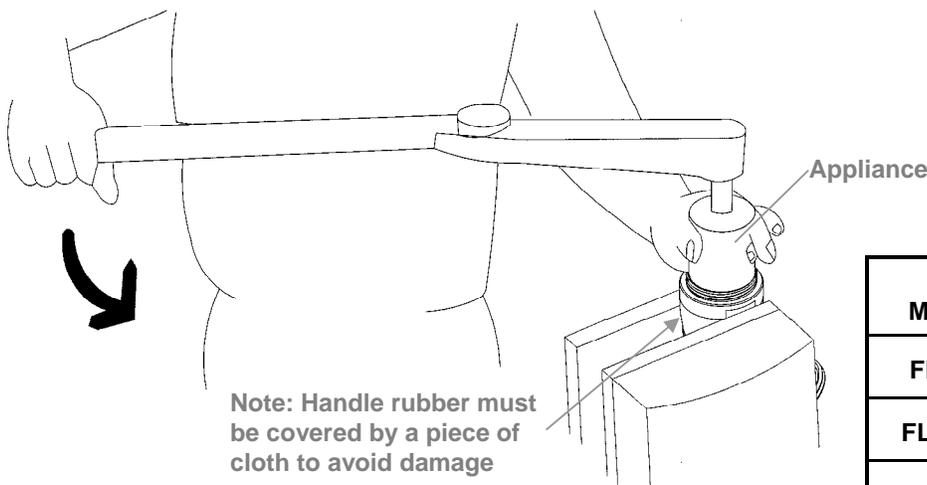


Fig. 256

Appliance No.	Apply to
63-40RT004	FLEX-30S, FLEX-30SX, FLEX-40S, FLEX-40SX, FLEX-50S, FLEX-50SX, FLEX-60S, FLEX-60SX
63-70SRT001	FLEX-70S, FLEX-70SX
63-70XRT004	FLEX-80S

Table 32

Model No.	Tighten torque
FLEX-30S	40 N.M
FLEX-30SX	40 N.M
FLEX-40S	40 N.M
FLEX-40SX	40 N.M
FLEX-50S	40 N.M
FLEX-50SX	40 N.M
FLEX-60S	40 N.M
FLEX-60SX	40 N.M
FLEX-70S	40 N.M
FLEX-70SX	40 N.M
FLEX-80S	40 N.M

Table 33

(3) Housing and Air Inlet Assembly:

Install and tighten the parts of air inlet one by one and in order. (NOTE: Apply the Lock-tite on the threads of air inlet before assembly)

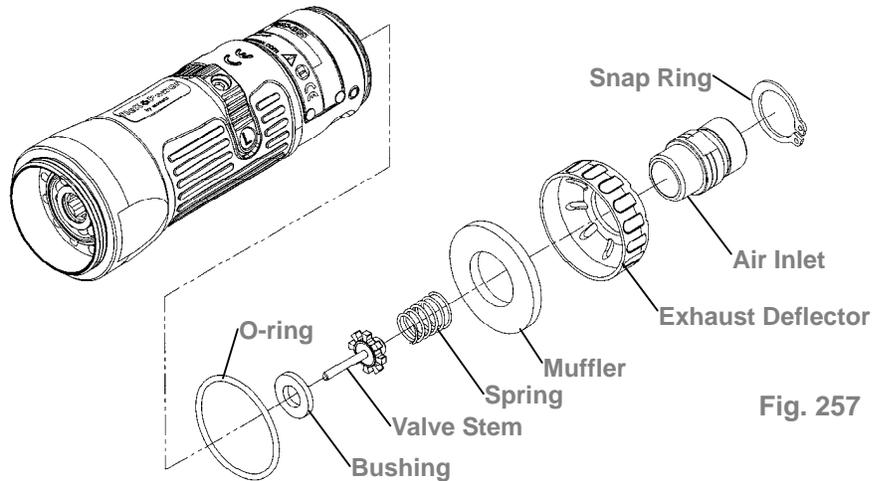


Fig. 257

(4) Housing and Trigger Set Assembly:

Install the parts of the trigger set orderly (see Fig. 258 drawing for reference). Then, insert the spring pins to fix all the parts. And, install the hanger to complete the assembly.

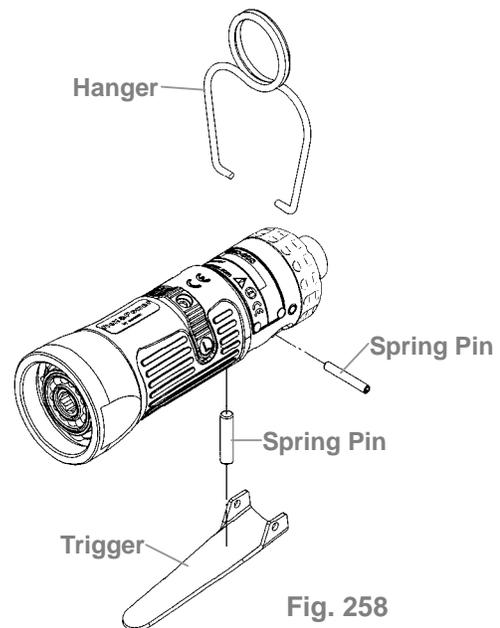


Fig. 258



After all the assembly is complete, test to make sure the anvil rotates smoothly, then connect the air hose to test the torque.

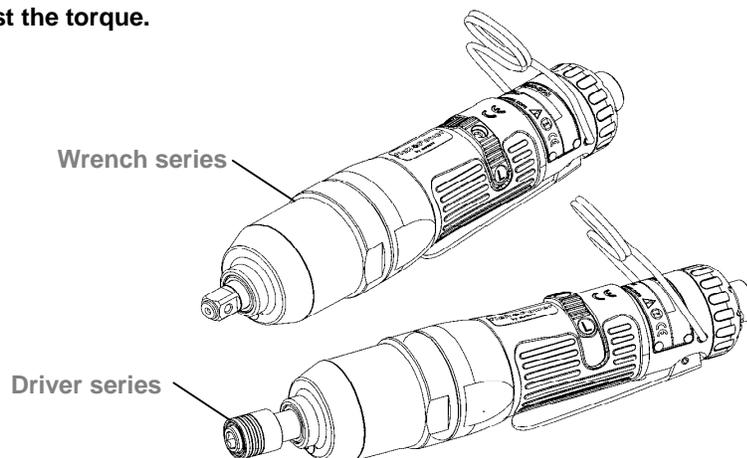
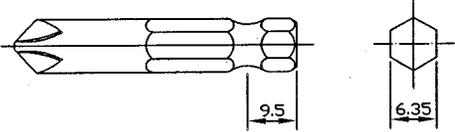


Fig. 259

MODEL	Bolt Capacity	Inserted Tools
FLEX-30SX FLEX-40SX FLEX-50SX FLEX-60SX FLEX-70SX	M6 M6-M8 M8 M8 M8-M10	
FLEX-30S ~ FLEX-70S		3/8" power sockets

Unit : mm

General safety rules

- For multiple hazards, read and understand the safety instructions before installing, operating, repairing, maintaining, changing accessories on, or working near the power tool. Failure to do so can result in serious bodily injury.
- Only qualified and trained operators should install, adjust or use the power tool.
- Do not modify this power tool. Modifications can reduce the effectiveness of safety measures and increase the risks to the operator.
- Do not discard the safety instructions; give them to the operator.
- Do not use the power tool if it has been damaged.
- Tools shall be inspected periodically to verify that the ratings and markings are legibly marked on the tool. The employer/user shall contact the manufacturer to obtain replacement marking labels when necessary.

Projectile hazards

- Be aware that failure of the work piece, of accessories or even of the inserted tool itself can generate high-velocity projectiles.
- Always wear impact-resistant eye protection during the operation of the power tool.
- The grade of protection required should be assessed for each use.
- Ensure that the work piece is securely fixed.

Entanglement hazards

- Entanglement hazards can result in choking, scalping and/or lacerations if loose clothing, personal jewelry, neck ware, hair or gloves are not kept away from the tool and accessories.
- Gloves can become entangled with the rotating drive, causing severed or broken fingers.
- Rotating drive sockets and drive extensions can easily entangle rubber-coated or metal-reinforced gloves.
- Do not wear loose-fitting gloves or gloves with cut or frayed fingers.
- Never hold the drive, socket or drive extension.
- Keep hands away from rotating drives.

Operating hazards

- The use of the tool can expose the operator's hands to hazards including crushing, impacts, cuts, abrasions and heat. Wear suitable gloves to protect hands.

- Operators and maintenance personnel shall be physically able to handle the bulk, weight and power of the tool.
- Hold the tool correctly; be ready to counteract normal or sudden movements and have both hands available.
- Maintain a balanced body position and secure footing.
- In cases where the means to absorb the reaction torque are requested, it is recommended to use a suspension arm whenever possible. If that is not possible, side handles are recommended for straight case and pistol-grip tools. Reaction bars are recommended for angle nut runners. In any case, it is recommended to use a means to absorb the reaction torque above 4 Nm for straight tools, above 10 Nm for pistol-grip tools, and above 60 Nm for angle nut runners.
- Release the start-and-stop device in the case of an interruption of the energy supply.
- Use only lubricants recommended by the manufacturer.
- Fingers can be crushed in open-ended crow-foot nut runners.
- Do not use in confined spaces and beware of crushing hands between tool and work piece, especially when unscrewing.

Repetitive motions hazards

- When using a power tool, the operator can experience discomfort in the hands, arms, shoulders, neck, or other parts of the body.
- While using a power tool, the operator should adopt a comfortable posture whilst maintaining secure footing and avoiding awkward or off-balanced postures. The operator should change posture during extended tasks, which can help avoid discomfort and fatigue.
- If the operator experiences symptoms such as persistent or recurring discomfort, pain, throbbing, aching, tingling, numbness, burning sensations or stiffness, these warning signs should not be ignored. The operator should tell the employer and consult a
- qualified health professional.

Accessory hazards

- Disconnect the power tool from the energy supply before changing the inserted tool or accessory.
- Do not touch sockets or accessories during impacting, as this increases the risk of cuts, burns or vibration injuries.
- Use only sizes and types of accessories and consumables that are recommended by the power tool manufacturer.
- Use only impact-wrench-rated sockets in good condition, as poor condition or hand sockets and accessories used with impact wrenches can shatter and become a projectile.

Workplace hazards

- Slips, trips and falls are major causes of workplace injury. Be aware of slippery surfaces caused by the use of the tool and also of trip hazards caused by the air line or hydraulic hose.

- Proceed with care in unfamiliar surroundings. Hidden hazards, such as electricity or other utility lines, can exist.
- The power tool is not intended for use in potentially explosive atmospheres and is not insulated against coming into contact with electric power.
- Make sure there are no electrical cables, gas pipes, etc., that can cause a hazard if damaged by use of the tool.

Dust and fume hazards

- Dust and fumes generated when using power tools can cause ill health (for example, cancer, birth defects, asthma and/or dermatitis); risk assessment and implementation of appropriate controls for these hazards are essential.
- Risk assessment should include dust created by the use of the tool and the potential for disturbing existing dust.
- Direct the exhaust so as to minimize disturbance of dust in a dust-filled environment.
- Where dust or fumes are created, the priority shall be to control them at the point of emission.
- All integral features or accessories for the collection, extraction or suppression of airborne dust or fumes should be correctly used and maintained in accordance with the manufacturer's instructions.
- Use respiratory protection in accordance with employer's instructions and as required by occupational health and safety regulations.

Noise hazards

- Unprotected exposure to high noise levels can cause permanent, disabling, hearing loss and other problems, such as tinnitus (ringing, buzzing, whistling or humming in the ears).
- Risk assessment and implementation of appropriate controls for these hazards are essential.
- Appropriate controls to reduce the risk may include actions such as damping materials to prevent work pieces from “ringing”.
- Use hearing protection in accordance with employer's instructions and as required by occupational health and safety regulations.
- Operate and maintain the power tool as recommended in the instruction handbook, to prevent an unnecessary increase in noise levels.
- If the power tool has a silencer, always ensure it is in place and in good working order when the power tool is operating.
- Select, maintain and replace the consumable/inserted tool as recommended in the instruction hand book, to prevent an unnecessary increase in noise.

Vibration hazards

- Exposure to vibration can cause disabling damage to the nerves and blood supply of the hands and arms.
- Keep the hands away from the nut runner sockets.
- Wear warm clothing when working in cold conditions and keep your hands warm and

dry.

- If you experience numbness, tingling, pain or whitening of the skin in your fingers or hands, stop using the power tool, tell your employer and consult a physician.
- Operate and maintain the power tool as recommended in the instruction handbook, to prevent an unnecessary increase in vibration levels.
- Do not use worn or ill-fitting sockets or extensions, as this is likely to cause a substantial increase in vibration.
- Select, maintain and replace the consumable/inserted tool as recommended in the instruction handbook, to prevent an unnecessary increase in vibration levels.
- Sleeve fittings should be used where practicable.
- Support the weight of the tool in a stand, tensioner or balancer, if possible.
- Hold the tool with a light but safe grip, taking account of the required hand reaction forces, because the risk from vibration is generally greater when the grip force is higher.

Additional safety instructions for pneumatic power tool

- Air under pressure can cause severe injury
- Always shut off air supply, drain hose of air pressure and disconnect tool from air supply when not in use, before changing accessories or when making repairs
- Never direct air at yourself or anyone else.
- Whipping hoses can cause severe injury. Always check for damaged or loose hoses and fittings.
- Cold air shall be directed away from the hands.
- Do not use quick-disconnect couplings at tool inlet for impact and air-hydraulic impulse wrenches. Use hardened steel (or material with comparable shock resistance) threaded hose fittings.
- Whenever universal twist couplings (claw couplings) are used, lock pins shall be installed and whipcheck safety cables shall be used to safeguard against possible hose-to-tool and hose-and-hose connection failure.
- Do not exceed the maximum air pressure stated on the tool.
- For torque-control and continuous-rotation tools, the air pressure has a safety critical effect on performance. Therefore, requirements for length and diameter of the hose shall be specified.
- Never carry an air tool by the hose.

DISASSEMBLY/ASSEMBLY FOR PULSE TOOLS

- FLEXS-30S, FLEXS-40S, FLEXS-50S, FLEXS-60S, FLEXS-70S, FLEXS-80S, FLEXS-30SX, FLEXS-40SX, FLEXS-50SX, FLEXS-60SX, FLEXS-70SX

● IMPULSE MECHANISM DISASSEMBLY

(1) Anvil Unit Disassembly: (for Model No. FLEXS-30SX, FLEXS-40SX, FLEXS-50SX, FLEXS-60SX, FLEXS-70SX)

Press down the hold spacer, and find the anvil collar. Use an acicular piece to get the anvil collar out, then take the quick change holder, the hold spacer, the spring, and the steel ball apart.

 The steel ball may drop off when taking out the Quick Change Holder

Note: Handle rubber must be covered by a piece of cloth to avoid damage

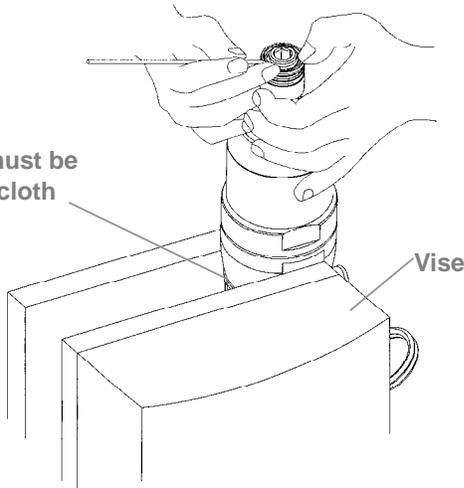


Fig. 260

(2) Pulse Unit Housing Disassembly:

Fix the tool by a vise, use an adjustable wrench clockwise to loosen the pulse unit housing until the pulse unit housing detach from the motor housing. Then, take the pulse unit out, Fig 261

Note: Handle rubber must be covered by a piece of cloth to avoid damage

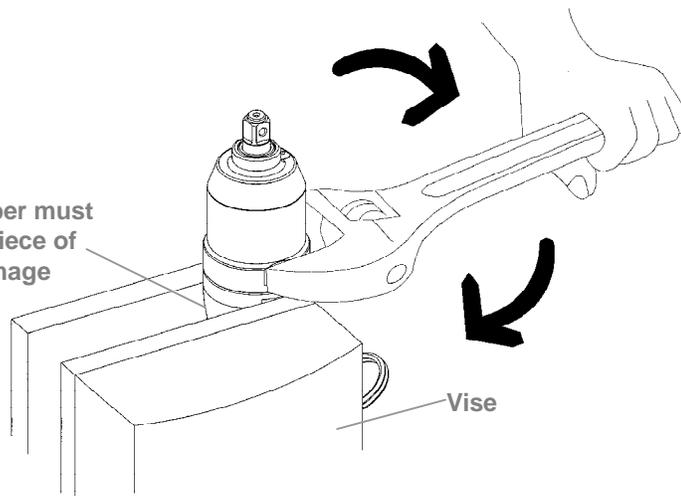


Fig. 261

(3) Pulse Unit Disassembly:

- ❶ Fix the pulse unit by a vise. Use the appliance (see Table 34) to loosen the lock nut on the pulse unit, Fig. 262

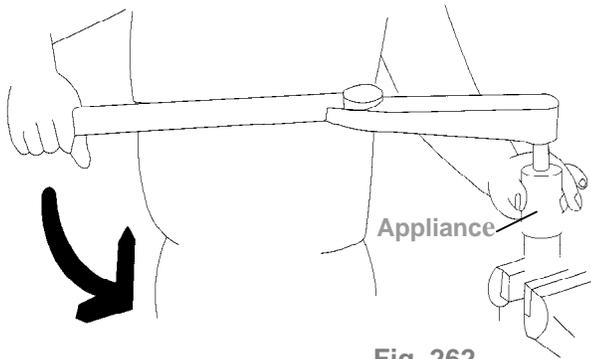


Fig. 262

Appliance No.	Apply to
63-40RT001	FLEXS-30S, FLEXS-30SX, FLEXS-40S, FLEXS-40SX, FLEXS-50S, FLEXS-50SX, FLEXS-60S, FLEXS-60SX
63-70RT001	FLEXS-70S, FLEXS-70SX, FLEXS-80S

Table 34

Note: Lock-tite was applied on the lock nut when tools were assembled.

- ❷ Put the Appliance, see Table 35, on the anvil and tap on it slightly to detach the interior parts from the pulse unit, Fig. 263

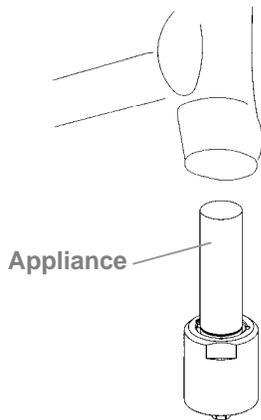


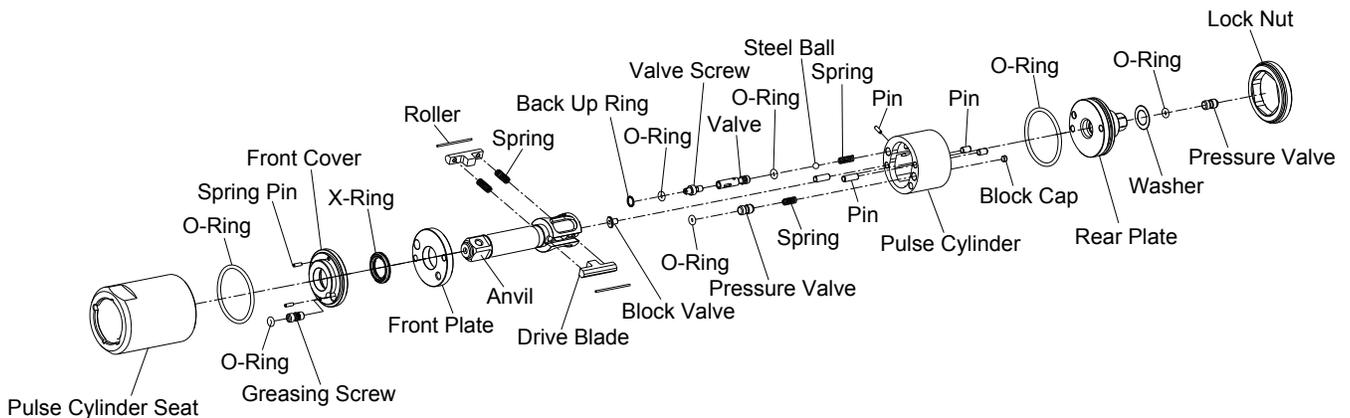
Fig. 263

Appliance No.	Apply to
63-40RT002	FLEXS-30S, FLEXS-30SX, FLEXS-40S, FLEXS-40SX, FLEXS-50S, FLEXS-50SX, FLEXS-60S, FLEXS-60SX, FLEXS-70S, FLEXS-70SX, FLEXS-80S

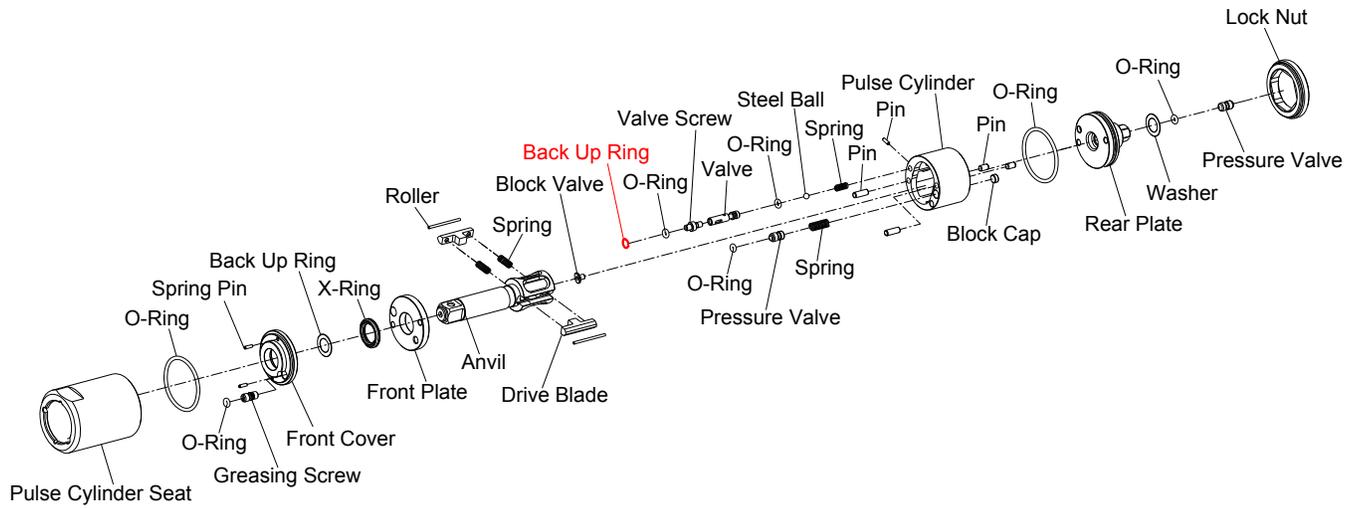
Table 35

❸ Parts of Pulse Cylinder Unit:

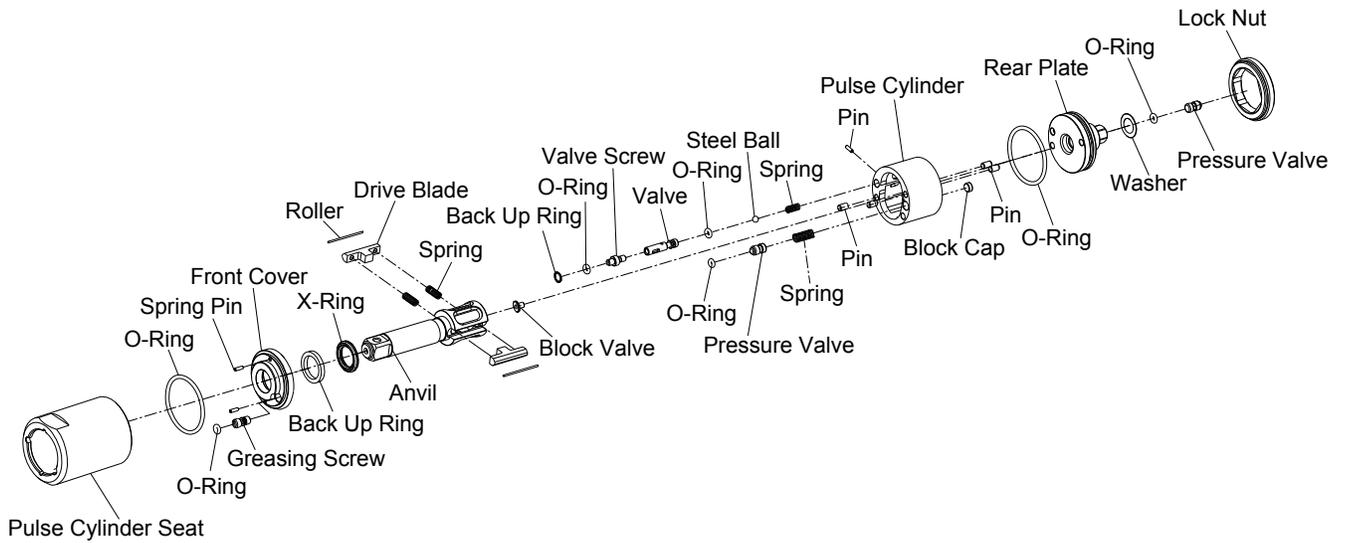
a. FLEXS-30S



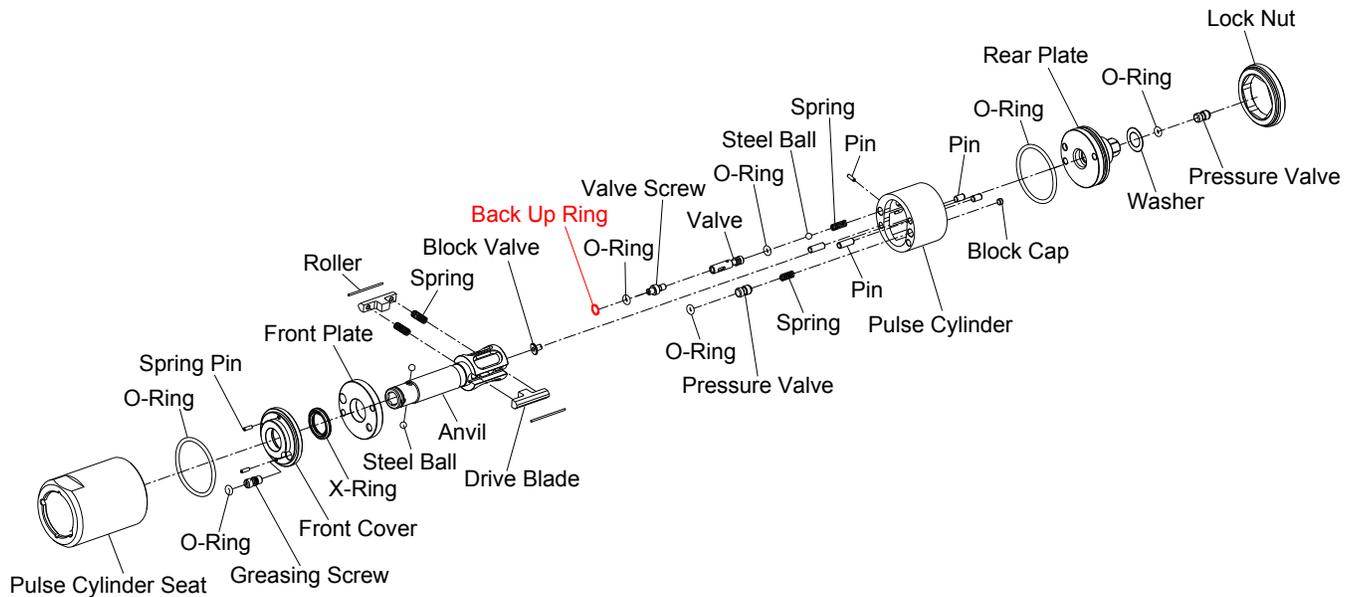
b. FLEXS-40S, FLEXS-50S, FLEXS-60S, FLEXS-70S



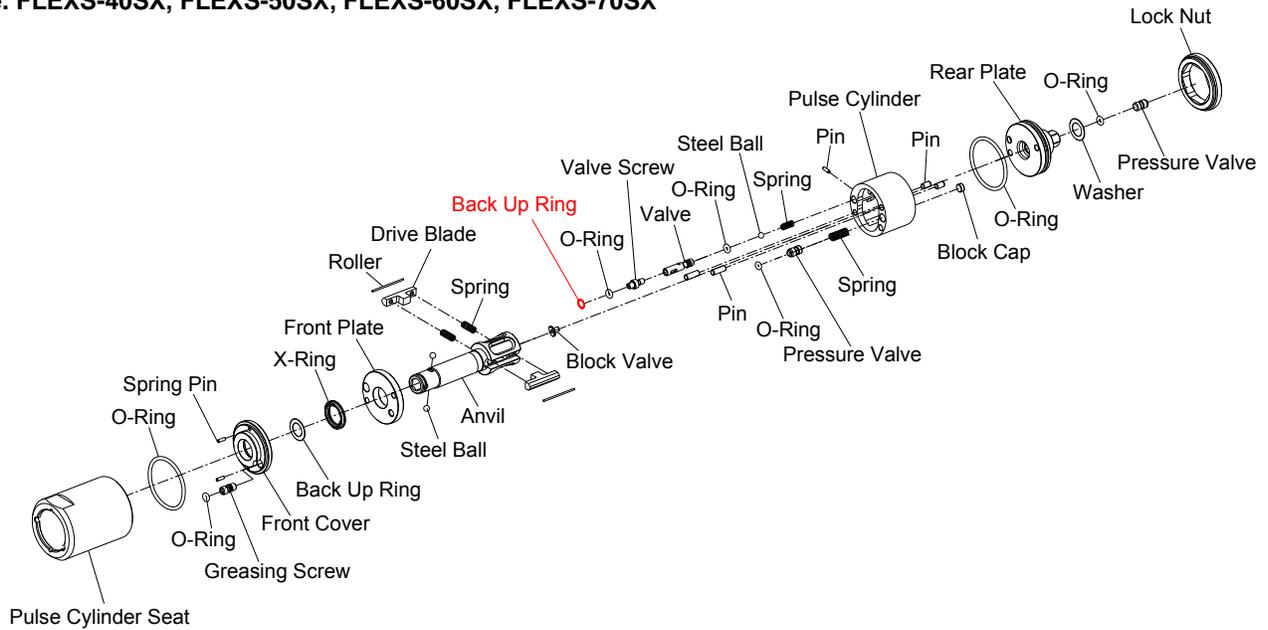
c. FLEXS-80S



d. FLEXS-30SX



e. FLEXS-40SX, FLEXS-50SX, FLEXS-60SX, FLEXS-70SX



● **PULSE UNIT ASSEMBLY:**

(1) **Pulse Cylinder Unit Assembly:**

- ① Install the pins on both sides of the pulse cylinder. (Fig. 264)

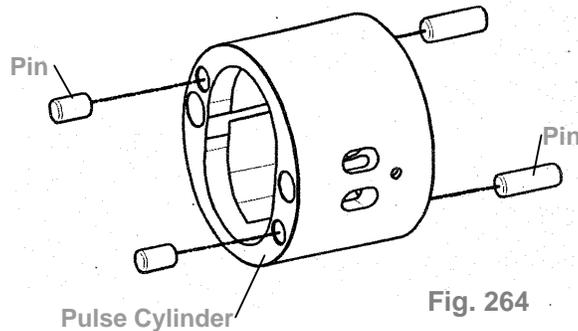
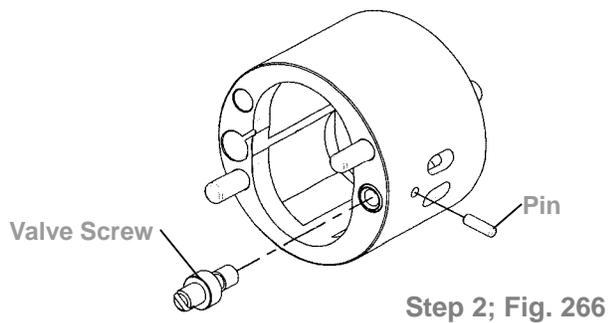
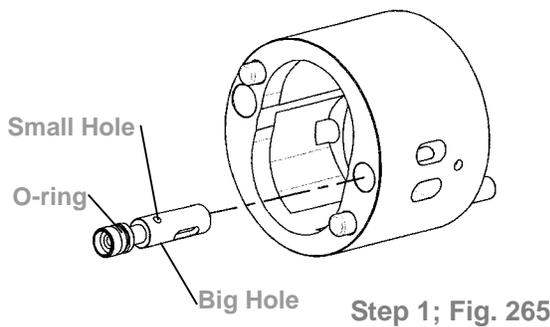


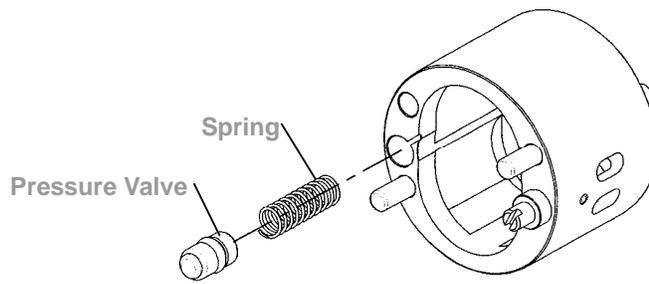
Fig. 264

- ② Sleeve the o-ring to the valve and install the valve into the big hole on the pulse cylinder. (Step 1; Fig.265)
- ③ Insert the pin into the hole on the side of the pulse cylinder. (Step 2; Fig.266)
- ④ Tighten the valve screw left thread to the pressure valve. (Step 3; Fig.266)

NOTE: the valve screw **MUST** tighten to the most bottom position certainly.

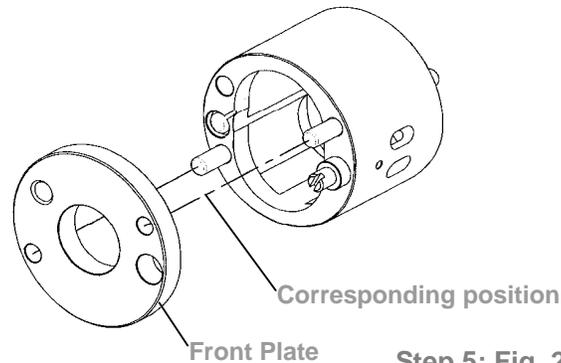


- ⑤ Put the spring into the hole then install the pressure valve that with the o-ring sleeved. (Step 4; Fig.267)



Step 4; Fig. 267

- ⑥ Install the front plate and make sure the corresponding position with the pins. (Step 5; Fig.268)

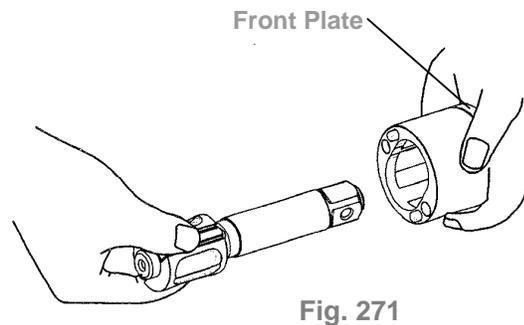
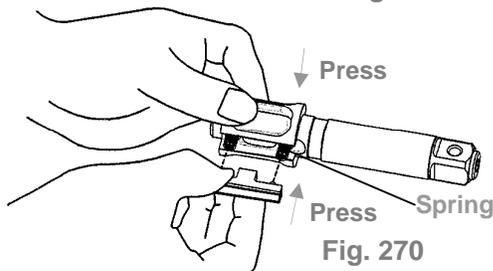
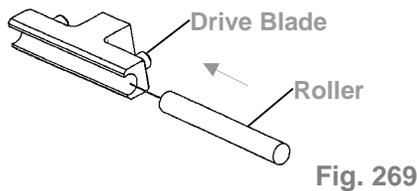


Step 5; Fig. 268

(2) Anvil Unit Assembly :

Install the roller to the drive blade, then insert the springs into the anvil and press the blades from both sides. Finally put the anvil to the pulse cylinder to complete the anvil unit assembly.

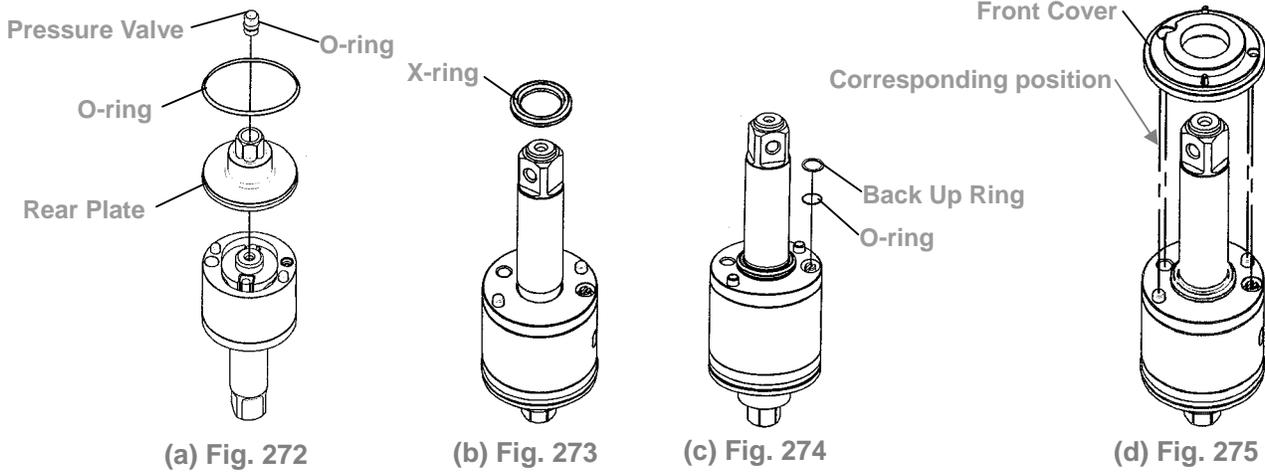
- ⚠ **MUST** follow the direction as shown in Figure 271 while installing the anvil unit into the pulse cylinder; be sure to aim at the highest points by two sides of the interior pulse unit and press the two drive blades in slowly.



(3) Front Cover and Rear Plate of Pulse Cylinder Assembly

→ **FLEXS-30S, FLEXS-30SX**

- ① (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 272) Then, plug the pressure valve with the convex facing outside in the hole on the rear plate.
- (b) Put the X-ring on the anvil with the oil applied. (Fig. 273)
- (c) Put the Back up ring and O-ring into the Valve Screw.(Fig. 274)
- (d) Install the front cover to the pulse cylinder by the corresponding positions. (Fig. 275)



- ➊ After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

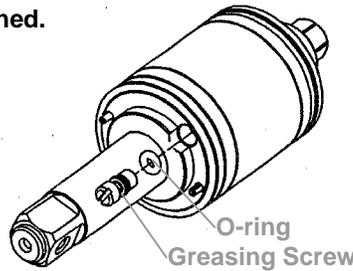
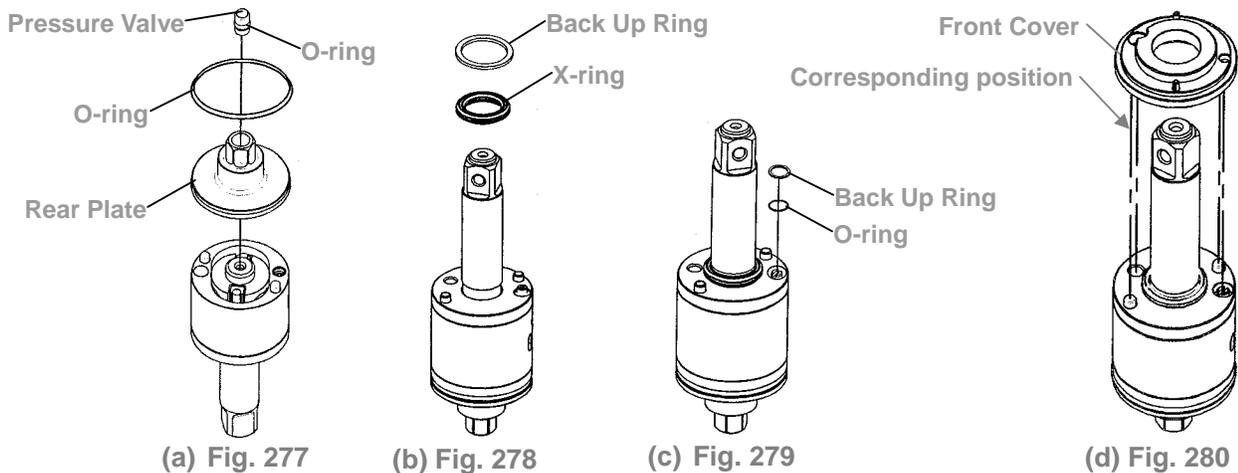


Fig. 276

➔ FLEXS-40S, FLEXS-40SX, FLEXS-50S, FLEXS-50SX, FLEXS-60S, FLEXS-60SX, FLEXS-70S, FLEXS-70SX

- ➋ (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 277) Then, plug the pressure valve with the convex facing outside in the hole on the rear plate.
- (b) Put the X-ring and back up ring on the anvil with the oil applied. (Fig. 278)
- (c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 279)
- (d) Install the front cover to the pulse cylinder by the corresponding positions. (Fig. 280)



- ➌ After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

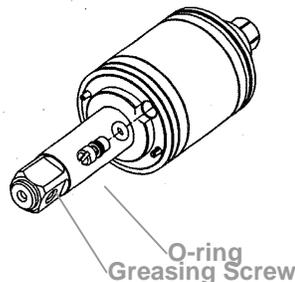


Fig. 281

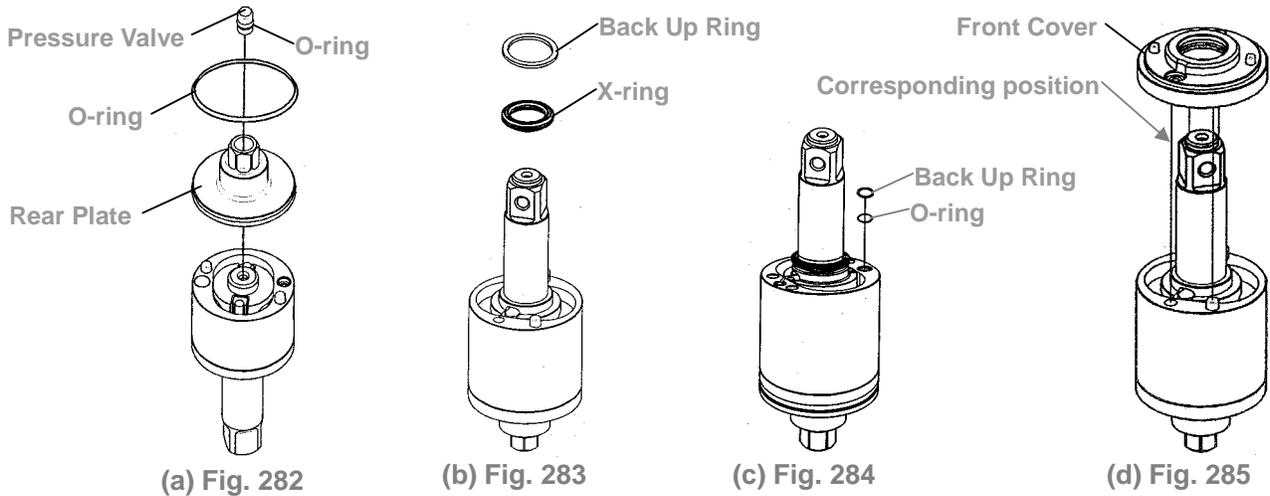
→ **FLEXS-80S**

❶ (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 282) Then, plug the pressure valve with the convex facing outside in the hole on the rear plate.

(b) Put the X-ring and Back up ring on the anvil with the oil applied. (Fig. 283)

(c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 284)

(d) Install the front plate to the pulse cylinder by the corresponding positions. (Fig. 285)



❷ After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.

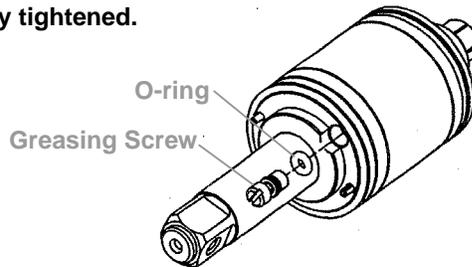


Fig. 286

(4) Pulse Cylinder Seat and Lock Nut of Pulse Cylinder Assembly

❶ Place the o-ring inside the bottom of the pulse cylinder seat, then combine the pulse cylinder seat with the assembled pulse cylinder unit. (Fig. 287, Fig. 288)

⚠ Make sure the half-circle gaps aim at the corresponding positions.

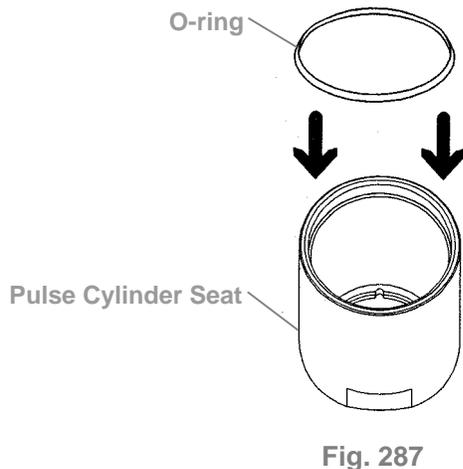


Fig. 287

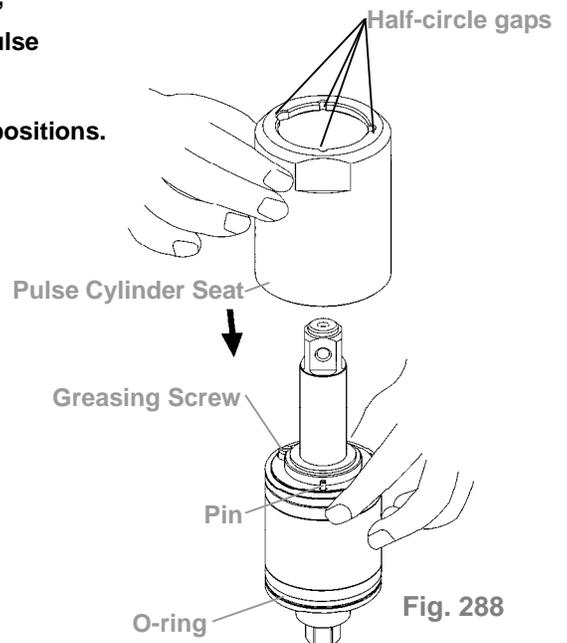
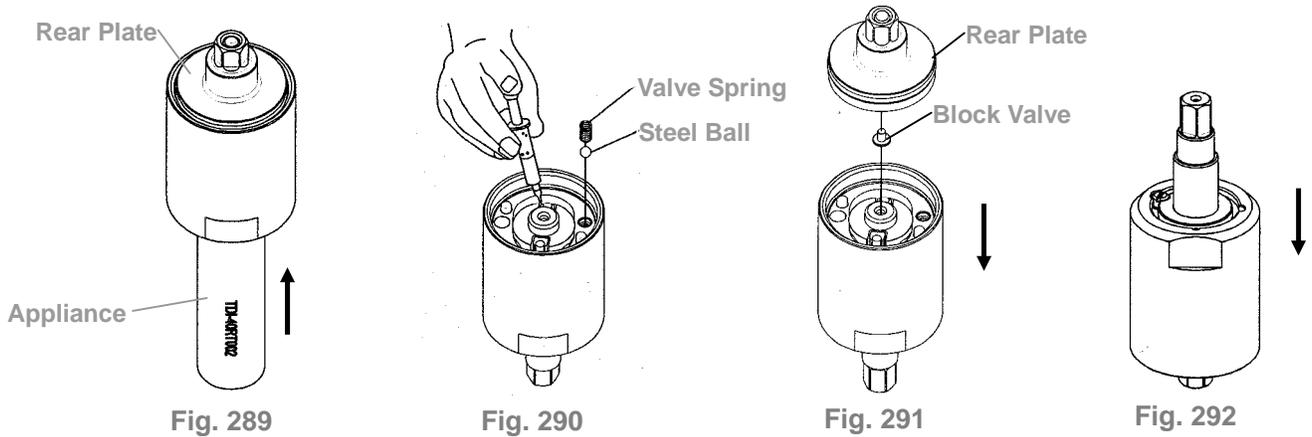


Fig. 288

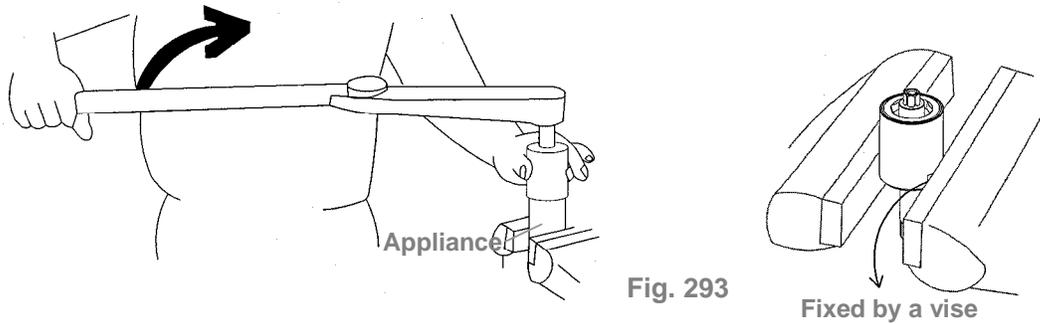
- ② Use the appliance to push out the rear plate from the pulse cylinder seat. See Table 35 in reference to the proper appliance selection. (Fig. 289)
- ③ Fill up the interior pulse cylinder with the pulse oil about 90% full by an injector. Put the steel ball and the valve spring into the hole on the pulse cylinder in order. (Fig. 290)
- ④ Put the block valve into the rear plate taken out at Step 2, and then install the rear plate to the pulse cylinder.

Make sure the positions of the pins and the holes are exactly matched. (Fig. 291)

- ⑤ Turn the assembled unit up side down so the rear plate is at the bottom. Then press the pulse cylinder seat all the way down to the fixed position. Make sure the corresponding positions are matched exactly.



- ⑥ Fix the pulse cylinder seat by a vise. Use an appliance and a torque wrench, and then turn clockwise to tighten the lock nut of the pulse cylinder. See Table 36 and 37 in reference to the proper appliance and tightness. (Note: Lock-tite needed when tightening the lock nut of the pulse cylinder)



Appliance No.	Apply to
63-40RT001	FLEXS-30S, FLEXS-30SX, FLEXS-40S, FLEXS-40SX, FLEXS-50S, FLEXS-50SX, FLEXS-60S, FLEXS-60SX
63-70RT001	FLEXS-70S, FLEXS-70SX, FLEXS-80S

Table 36

Model No.	Tighten torque
FLEXS-30S	70 N.M
FLEXS-30SX	70 N.M
FLEXS-40S	80 N.M
FLEXS-40SX	80 N.M
FLEXS-50S	80 N.M
FLEXS-50SX	80 N.M

Model No.	Tighten torque
FLEXS-60S	80 N.M
FLEXS-60SX	80 N.M
FLEXS-70S	100 N.M
FLEXS-70SX	100 N.M
FLEXS-80S	100 N.M

- ⑦ After completing the above steps, test to make sure the square drive of the anvil rotates smoothly.

Table 37

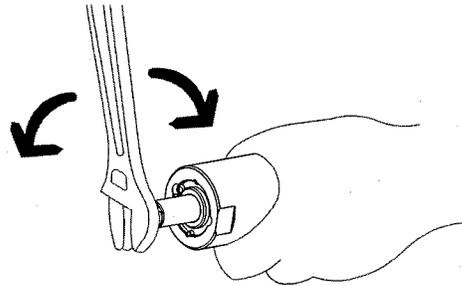


Fig. 294

(5) Steps for Pulse Cylinder Oiling :

- ① Loosen the greasing screw, and fill in the authorized oil by an injector until it is full and overflow.

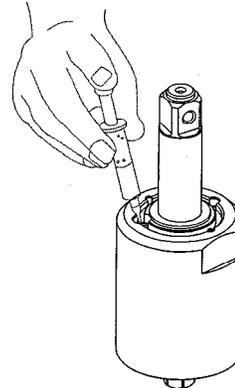


Fig. 295

- ② Take the unit and dip it in an oil tank, then rotate the anvil by a wrench to release air inside, in the mean time, the unit would be full with oil completely.

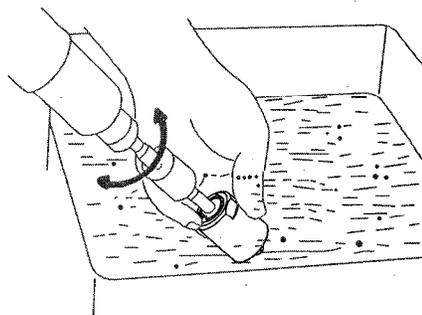


Fig. 296

③ Use the screwdriver either, the slotted to tighten the greasing screw, Fig. 297.

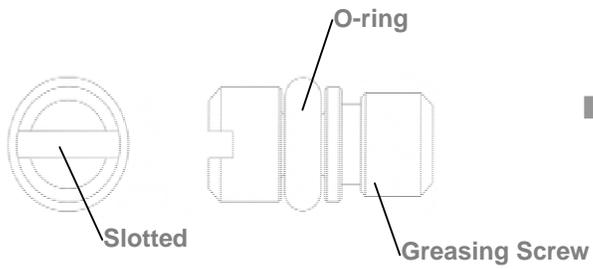
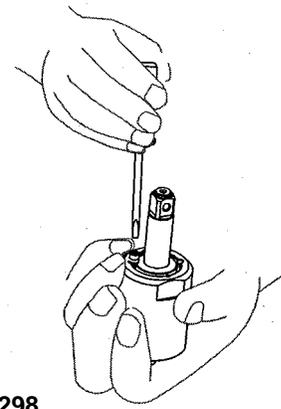


Fig. 297



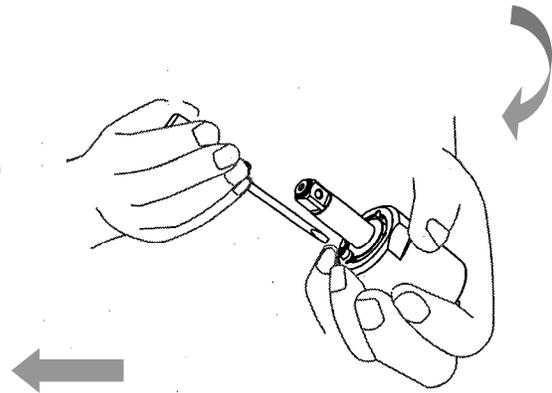
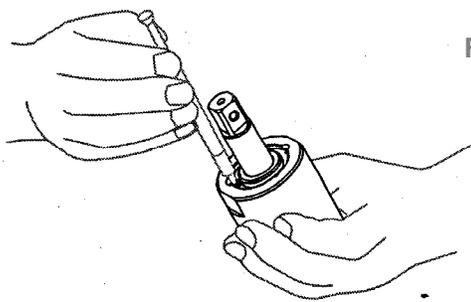
④ Use an air spray gun to blow off the oil on the cylinder seat, Fig. 298.

Fig. 298



⑤ Loosen the greasing screw again and use an injector to draw out a little amount of oil (see Table 38) . Finally, tighten the greasing screw back to the pulse cylinder unit, Fig. 299.

Fig. 299



Model No.	Amount of oil draw
FLEXS-30S	0.2 CC
FLEXS-30SX	0.2 CC
FLEXS-40S	0.25 CC
FLEXS-40SX	0.25 CC
FLEXS-50S	0.3 CC
FLEXS-50SX	0.3 CC

Model No.	Amount of oil draw
FLEXS-60S	0.4 CC
FLEXS-60SX	0.4 CC
FLEXS-70S	0.6 CC
FLEXS-70SX	0.6 CC
FLEXS-80S	0.56 CC

Table 38

(6) Torque Testing :

- ❶ Put the washer on the front end of the anvil, and then put another washer on the rear plate.

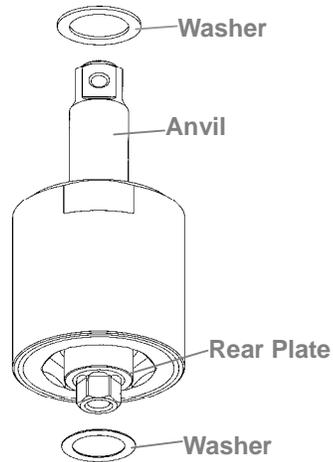


Fig. 300

- ❷ Tighten the clutch housing by hands.

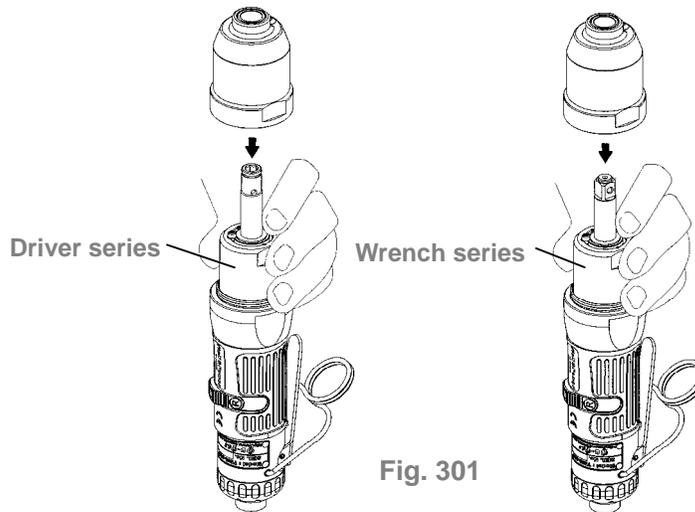


Fig. 301

- ❸ Test the forward torque by a digital torque tester and make sure the tool pulses smoothly.

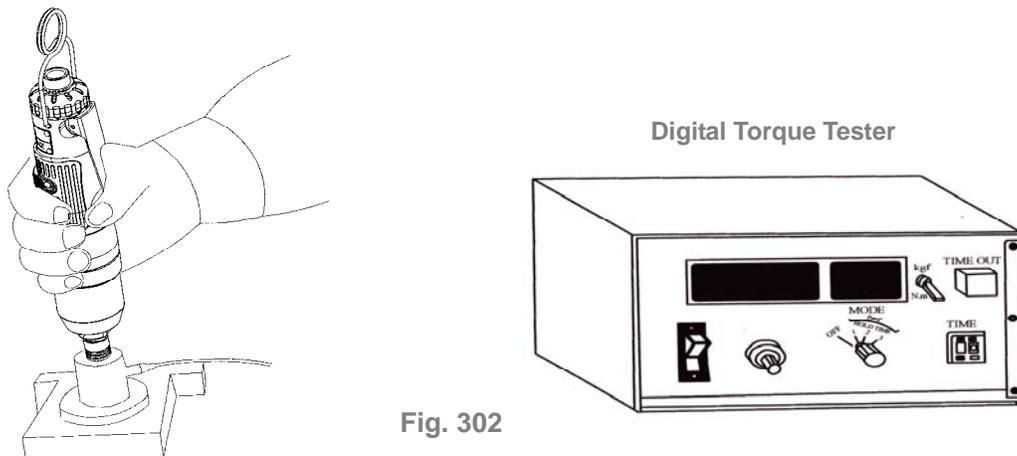


Fig. 302

Model No.	Air inlet pressure 0.6 Mpa
	N.M (at least)
FLEXS-30S	12.5
FLEXS-30SX	11.5
FLEXS-40S	19
FLEXS-40SX	17
FLEXS-50S	27
FLEXS-50SX	25
FLEXS-60S	35
FLEXS-60SX	30
FLEXS-70S	47
FLEXS-70SX	40
FLEXS-80S	68

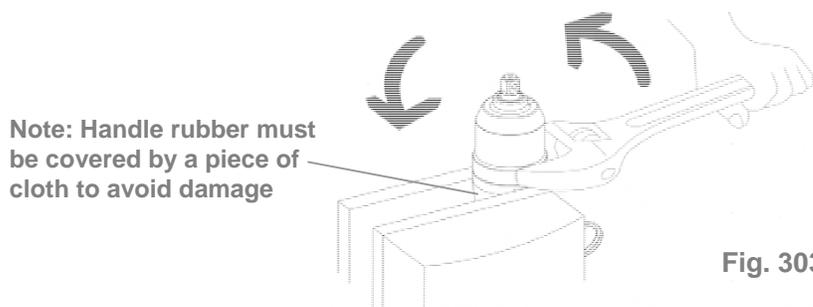
Table 39

④ If the test result is NG (see Table 39 in reference to the torque standard), MUST draw out or add a little amount of oil and do the following steps:

- ① Loosen the pulse unit housing by hands.
- ② Loosen the greasing screw.
- ③ Draw out or add a little amount of oil.
- ④ Tighten the greasing screw back.
- ⑤ Tighten the pulse unit housing.
- ⑥ Test the torque again. If the test result is still NG, repeat the Steps ①~⑥ until the standard torque is reached.

(7) Pulse Unit Housing Assembly :

Fix the housing by a vise. Turn the wrench in counter clockwise direction to tighten the pulse unit housing.



(8) Anvil Unit Assembly: (for FLEXS-30SX, FLEXS-40SX, FLEXS-50SX, FLEXS-60SX, and FLEXS-70SX)

- (a) Place the steel ball, the quick change holder, the spring, and the hold spacer orderly on the anvil as show.
- (b) Put the anvil collar on the Anvil. (Fig. 305)

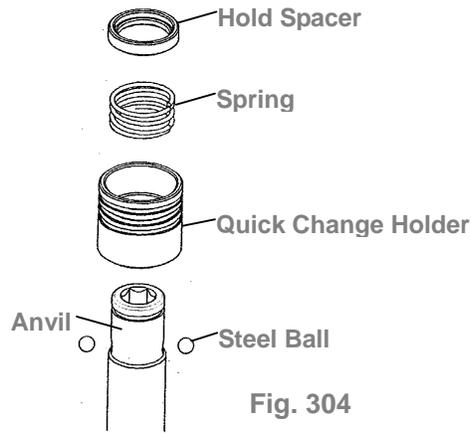


Fig. 304

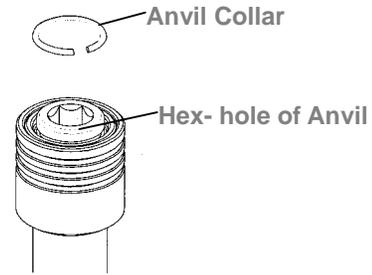


Fig. 305

● HOUSING AND MOTOR SET DISASSEMBLY:

(1) Cylinder Unit Disassembly:

- ① Fix the tool by a vise. Use the appliance (see Table 40) to take the lock nut out of cylinder by turning clockwise.

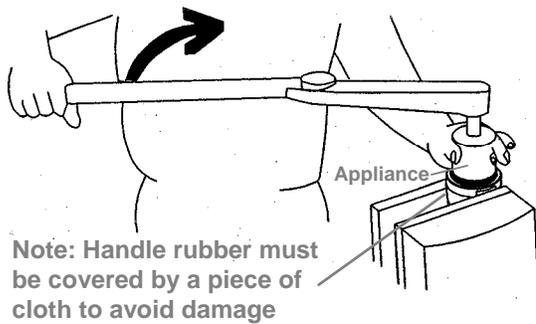
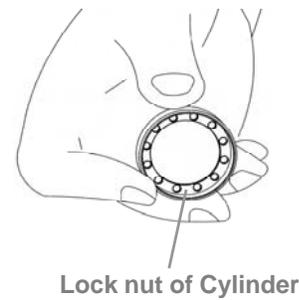


Fig. 306



Lock nut of Cylinder

Appliance No.	Apply to
63-40RT004	FLEXS-30S, FLEXS-30SX, FLEXS-40S, FLEXS-40SX, FLEXS-50S, FLEXS-50SX, FLEXS-60S, FLEXS-60SX
63-70SRT001	FLEXS-70S, FLEXS-70SX
63-70XRT004	FLEXS-80S

Table 40

- ② Use a wrench to loosen the screw on the side of the motor housing and detach the parts of the regulator.

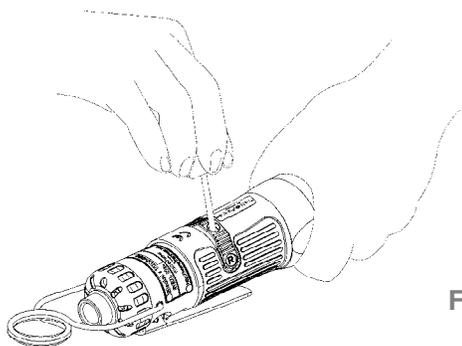
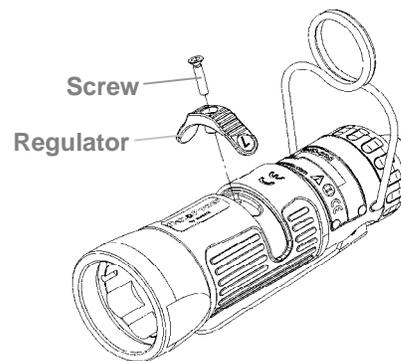


Fig. 307



- ③ Take a piece of cloth and lay it on a table before disassembly. Hold the housing downward to detach the cylinder unit out.

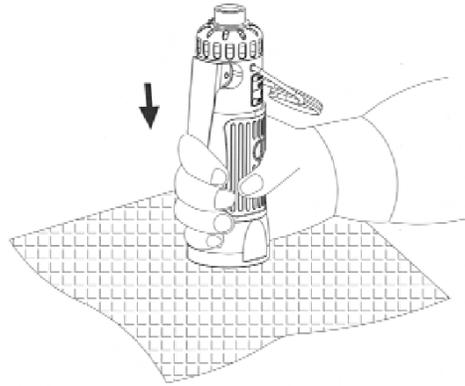


Fig. 308

④ Parts of Motor Set:

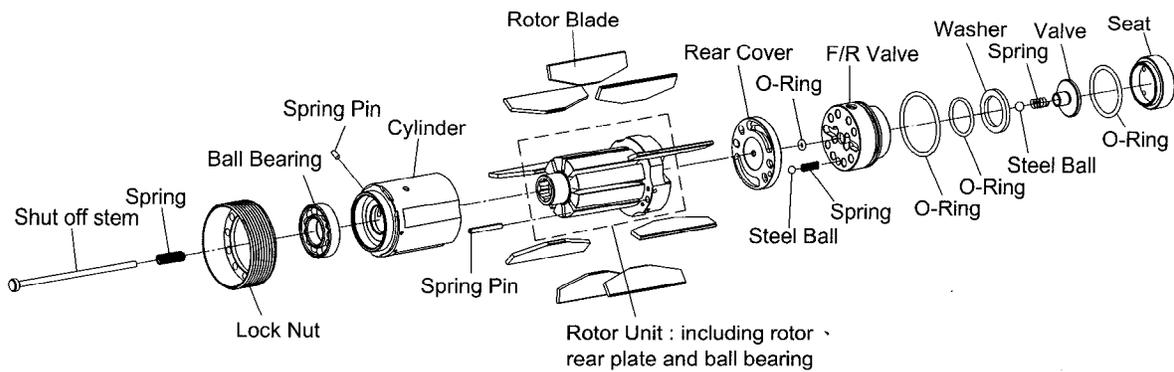


Fig. 309



The rotor and the rear end plate must be press fitted. The clearance of the two parts must be in between 0.01~ 0.02 mm. It would not be easy to assemble the two parts by repair centers in general. Therefore, as there is a need of repair on the parts of the rotor, the rear end plate, and the ball bearing, we strongly suggest replacing a complete ROTOR UNIT, which is including the rotor, the rear plate, and the ball bearing. The rotor unit would be full assembled and well-measured before delivery.

(2) Air Inlet Disassembly:

Take off the snap ring from the air inlet, and then take off the exhaust deflector. Use an open wrench to open the air inlet in counter clock wise direction. All the interior parts are detached.

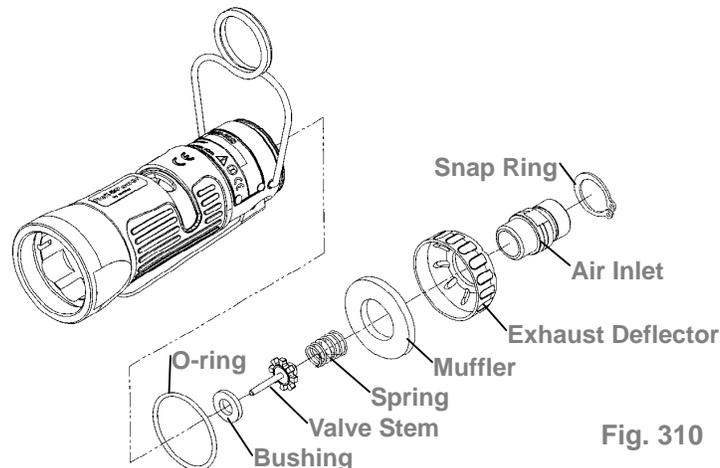


Fig. 310

(3) Trigger Set Disassembly:

Remove the spring pin from the trigger to detach the interior parts. And then, remove the housing rubber and the hanger to complete the disassembly.

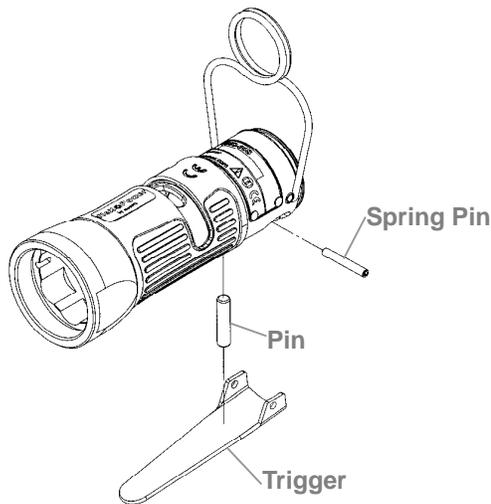


Fig. 311

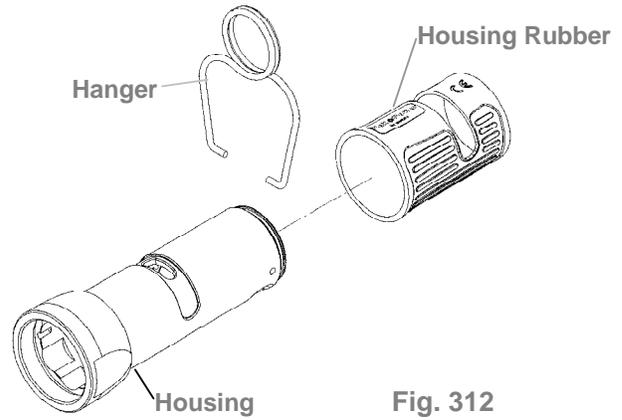


Fig. 312

● HOUSING AND MOTOR SET ASSEMBLY:

(1) Cylinder Unit Assembly

- ① Place the rotor blades into the rotor. Insert the spring pin A and B into the cylinder. Make sure the pins aim at the pin holes when putting the cylinder down.

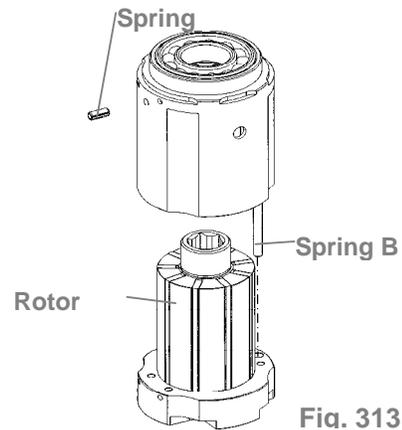


Fig. 313

- ② Place the o-ring into the groove of the F/R valve unit. And then, place the steel ball on the F/R valve unit into any hole on the air inlet plate.

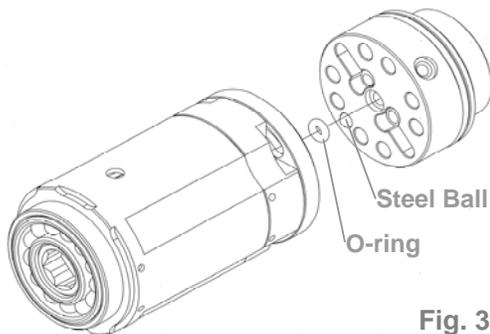


Fig. 314

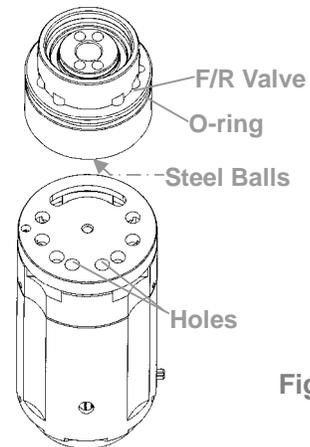


Fig. 315

- ③ Assemble the regulator with the rotor- air inlet unit. Make sure the steel balls of the regulator are placed on the holes of the air inlet plate. Then, place the seat with the o-ring sleeved on the regulator. Assembly is completed.

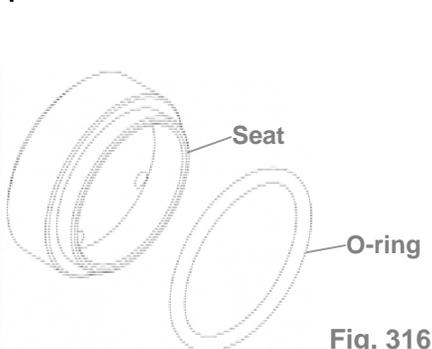


Fig. 316

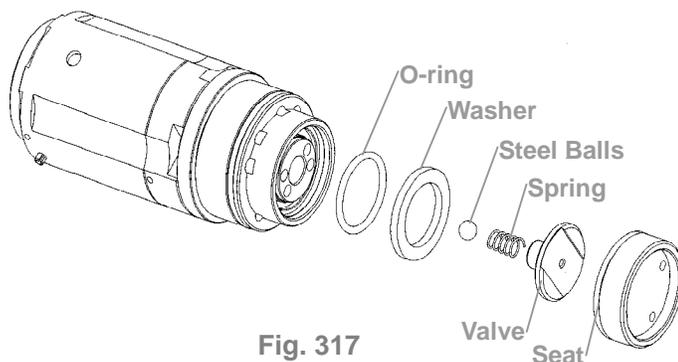
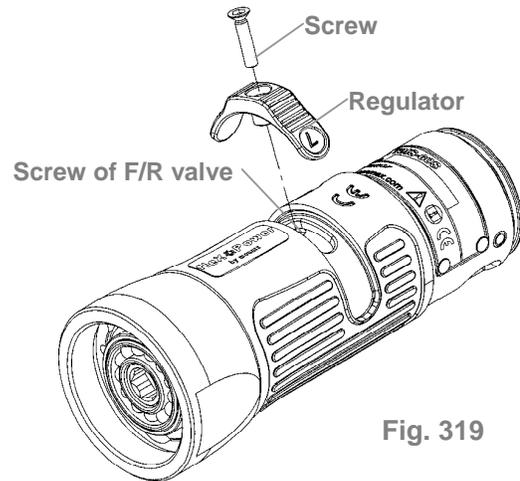
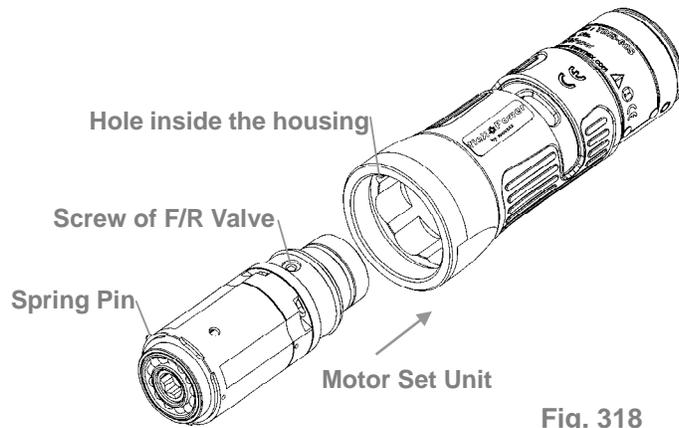


Fig. 317

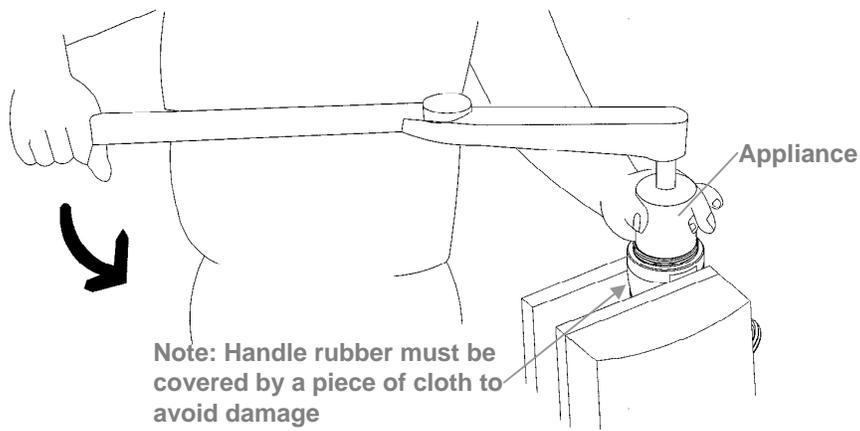
 Apply the lubricator between parts while assembling.

(2) Housing, Motor set unit and Lock Nut of Cylinder Assembly:

- ① Sleeve the housing rubber to the housing.
- ② Install the motor set into the housing. Make sure the direction is correct, i.e. the spring pin on the side of the cylinder aims at the hole inside the housing.
- ③ Have the hole on the regulator knob aim at the screw hole on the side of the F/R valve and make sure the screw is tightened into the regulator and the F/R valve.



- ④ Fix the tool by a vise. Place the lock nut of the cylinder nut and tighten by the appliance in counter clockwise direction to complete the assembly. See the Table 41 and 42 in reference to appliance use and tighten torque.

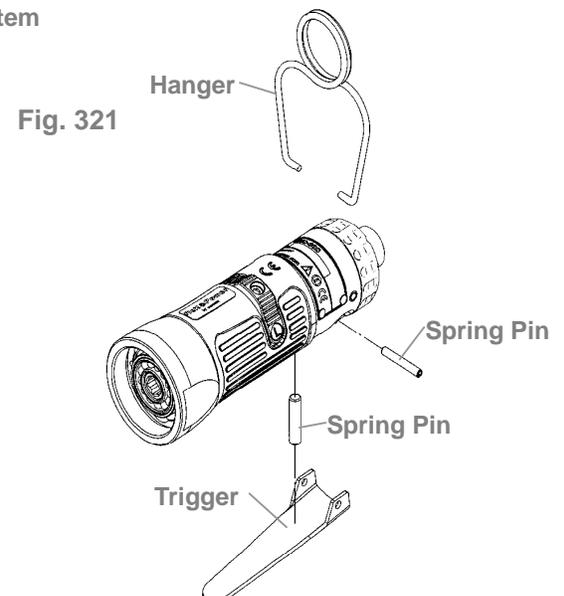
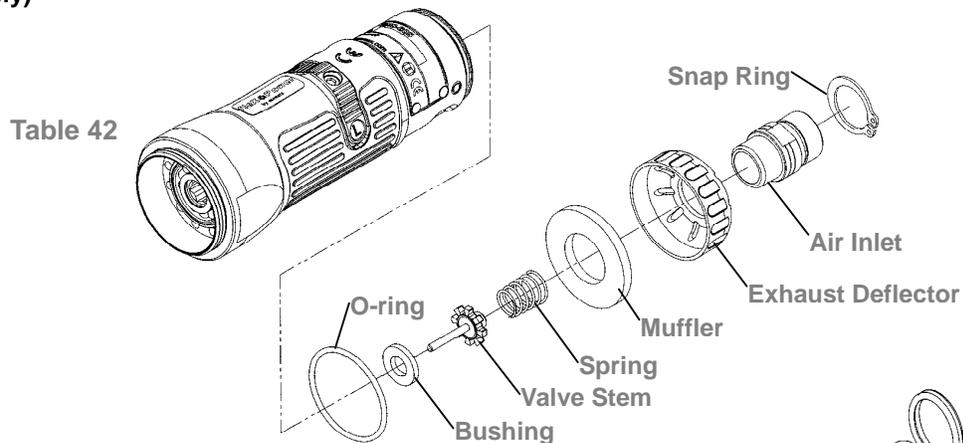


Appliance No.	Apply to
63-40RT004	FLEXS-30S, FLEXS-30SX, FLEXS-40S, FLEXS-40SX, FLEXS-50S, FLEXS-50SX, FLEXS-60S, FLEXS-60SX
63-70SRT001	FLEXS-70S, FLEXS-70SX
63-70XRT004	FLEXS-80S

Model No.	Tighten torque
FLEXS-30S	40 N.M
FLEXS-30SX	40 N.M
FLEXS-40S	40 N.M
FLEXS-40SX	40 N.M
FLEXS-50S	40 N.M
FLEXS-50SX	40 N.M
FLEXS-60S	40 N.M
FLEXS-60SX	40 N.M
FLEXS-70S	40 N.M
FLEXS-70SX	40 N.M
FLEXS-80S	40 N.M

(3) Housing and Air Inlet Assembly:

Install and tighten the parts of air inlet one by one and in order. (NOTE: Apply the Lock-tite on the threads of air inlet before assembly)



(4) Housing and Trigger Set Assembly:

Install the parts of the trigger set orderly (see Fig. 322 drawing for reference). Then, Insert the spring pins to fix all the parts. And, install the hanger to complete the assembly.

(5) Put the spring on the pin, and then install into the assembled housing.

Fig. 322

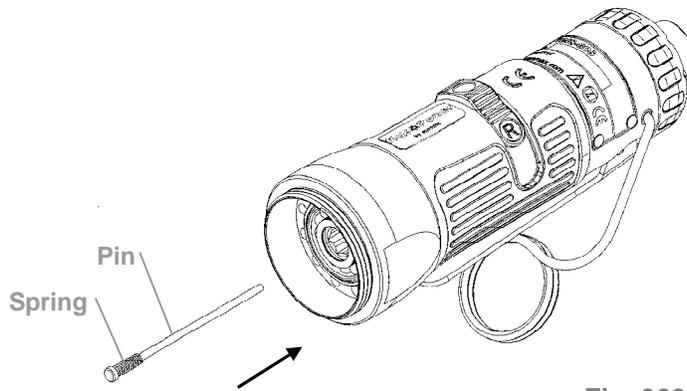


Fig. 323



After all the assembly is complete, test to make sure the anvil rotates smoothly, then connect the air hose to test the torque.

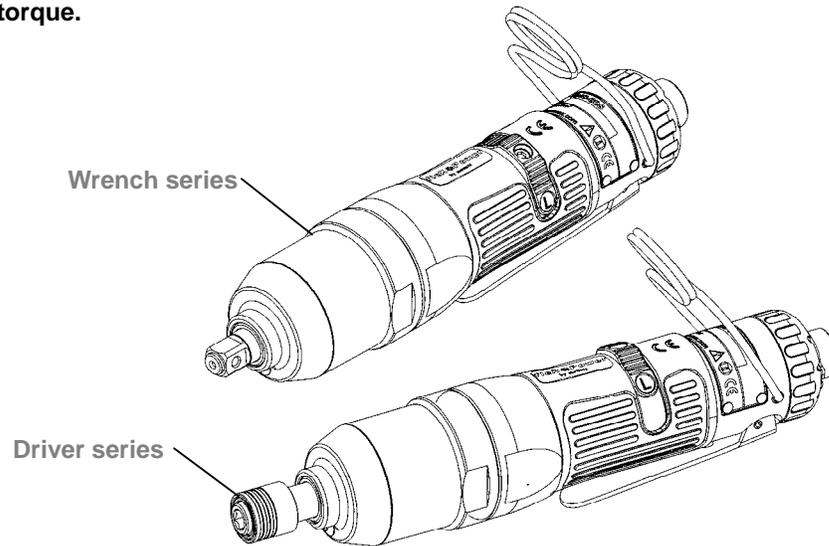


Fig. 324

MODEL	Bolt Capacity	Inserted Tools
FLEXS-30SX FLEXS-40SX FLEXS-50SX FLEXS-60SX FLEXS-70SX	M6 M6-M8 M8 M8 M8-M10	<p style="text-align: right;">Unit : mm</p>
FLEXS-30S ~ FLEXS-70S		3/8" power sockets

General safety rules

- For multiple hazards, read and understand the safety instructions before installing, operating, repairing, maintaining, changing accessories on, or working near the power tool. Failure to do so can result in serious bodily injury.
- Only qualified and trained operators should install, adjust or use the power tool.
- Do not modify this power tool. Modifications can reduce the effectiveness of safety measures and increase the risks to the operator.
- Do not discard the safety instructions; give them to the operator.
- Do not use the power tool if it has been damaged.
- Tools shall be inspected periodically to verify that the ratings and markings are legibly

marked on the tool. The employer/user shall contact the manufacturer to obtain replacement marking labels when necessary.

Projectile hazards

- Be aware that failure of the work piece, of accessories or even of the inserted tool itself can generate high-velocity projectiles.
- Always wear impact-resistant eye protection during the operation of the power tool.
- The grade of protection required should be assessed for each use.
- Ensure that the work piece is securely fixed.

Entanglement hazards

- Entanglement hazards can result in choking, scalping and/or lacerations if loose clothing, personal jewelry, neck ware, hair or gloves are not kept away from the tool and accessories.
- Gloves can become entangled with the rotating drive, causing severed or broken fingers.
- Rotating drive sockets and drive extensions can easily entangle rubber-coated or metal-reinforced gloves.
- Do not wear loose-fitting gloves or gloves with cut or frayed fingers.
- Never hold the drive, socket or drive extension.
- Keep hands away from rotating drives.

Operating hazards

- The use of the tool can expose the operator's hands to hazards including crushing, impacts, cuts, abrasions and heat. Wear suitable gloves to protect hands.
- Operators and maintenance personnel shall be physically able to handle the bulk, weight and power of the tool.
- Hold the tool correctly; be ready to counteract normal or sudden movements and have both hands available.
- Maintain a balanced body position and secure footing.
- In cases where the means to absorb the reaction torque are requested, it is recommended to use a suspension arm whenever possible. If that is not possible, side handles are recommended for straight case and pistol-grip tools. Reaction bars are recommended for angle nut runners. In any case, it is recommended to use a means to absorb the reaction torque above 4 Nm for straight tools, above 10 Nm for pistol-grip tools, and above 60 Nm for angle nut runners.
- Release the start-and-stop device in the case of an interruption of the energy supply.
- Use only lubricants recommended by the manufacturer.
- Fingers can be crushed in open-ended crow-foot nut runners.
- Do not use in confined spaces and beware of crushing hands between tool and work piece, especially when unscrewing.

Repetitive motions hazards

- When using a power tool, the operator can experience discomfort in the hands, arms,

shoulders, neck, or other parts of the body.

- While using a power tool, the operator should adopt a comfortable posture whilst maintaining secure footing and avoiding awkward or off-balanced postures. The operator should change posture during extended tasks, which can help avoid discomfort and fatigue.
- If the operator experiences symptoms such as persistent or recurring discomfort, pain, throbbing, aching, tingling, numbness, burning sensations or stiffness, these warning signs should not be ignored. The operator should tell the employer and consult a
- qualified health professional.

Accessory hazards

- Disconnect the power tool from the energy supply before changing the inserted tool or accessory.
- Do not touch sockets or accessories during impacting, as this increases the risk of cuts, burns or vibration injuries.
- Use only sizes and types of accessories and consumables that are recommended by the power tool manufacturer.
- Use only impact-wrench-rated sockets in good condition, as poor condition or hand sockets and accessories used with impact wrenches can shatter and become a projectile.

Workplace hazards

- Slips, trips and falls are major causes of workplace injury. Be aware of slippery surfaces caused by the use of the tool and also of trip hazards caused by the air line or hydraulic hose.
- Proceed with care in unfamiliar surroundings. Hidden hazards, such as electricity or other utility lines, can exist.
- The power tool is not intended for use in potentially explosive atmospheres and is not
- insulated against coming into contact with electric power.
- Make sure there are no electrical cables, gas pipes, etc., that can cause a hazard if damaged by use of the tool.

Dust and fume hazards

- Dust and fumes generated when using power tools can cause ill health (for example, cancer, birth defects, asthma and/or dermatitis); risk assessment and implementation of appropriate controls for these hazards are essential.
- Risk assessment should include dust created by the use of the tool and the potential for disturbing existing dust.
- Direct the exhaust so as to minimize disturbance of dust in a dust-filled environment.
- Where dust or fumes are created, the priority shall be to control them at the point of emission.
- All integral features or accessories for the collection, extraction or suppression of airborne dust or fumes should be correctly used and maintained in accordance with the manufacturer's instructions.

- Use respiratory protection in accordance with employer's instructions and as required by occupational health and safety regulations.

Noise hazards

- Unprotected exposure to high noise levels can cause permanent, disabling, hearing loss and other problems, such as tinnitus (ringing, buzzing, whistling or humming in the ears).
- Risk assessment and implementation of appropriate controls for these hazards are essential.
- Appropriate controls to reduce the risk may include actions such as damping materials to prevent work pieces from “ringing”.
- Use hearing protection in accordance with employer's instructions and as required by occupational health and safety regulations.
- Operate and maintain the power tool as recommended in the instruction handbook, to prevent an unnecessary increase in noise levels.
- If the power tool has a silencer, always ensure it is in place and in good working order when the power tool is operating.
- Select, maintain and replace the consumable/inserted tool as recommended in the instruction hand book, to prevent an unnecessary increase in noise.

Vibration hazards

- Exposure to vibration can cause disabling damage to the nerves and blood supply of the hands and arms.
- Keep the hands away from the nut runner sockets.
- Wear warm clothing when working in cold conditions and keep your hands warm and dry.
- If you experience numbness, tingling, pain or whitening of the skin in your fingers or hands, stop using the power tool, tell your employer and consult a physician.
- Operate and maintain the power tool as recommended in the instruction handbook, to prevent an unnecessary increase in vibration levels.
- Do not use worn or ill-fitting sockets or extensions, as this is likely to cause a substantial increase in vibration.
- Select, maintain and replace the consumable/inserted tool as recommended in the instruction handbook, to prevent an unnecessary increase in vibration levels.
- Sleeve fittings should be used where practicable.
- Support the weight of the tool in a stand, tensioner or balancer, if possible.
- Hold the tool with a light but safe grip, taking account of the required hand reaction forces, because the risk from vibration is generally greater when the grip force is higher.

Additional safety instructions for pneumatic power tool

- Air under pressure can cause severe injury
- Always shut off air supply, drain hose of air pressure and disconnect tool from air supply when not in use, before changing accessories or when making repairs

- Never direct air at yourself or anyone else.
- Whipping hoses can cause severe injury. Always check for damaged or loose hoses and fittings.
- Cold air shall be directed away from the hands.
- Do not use quick-disconnect couplings at tool inlet for impact and air-hydraulic impulse wrenches. Use hardened steel (or material with comparable shock resistance) threaded hose fittings.
- Whenever universal twist couplings (claw couplings) are used, lock pins shall be installed and whipcheck safety cables shall be used to safeguard against possible hose-to-tool and hose-and-hose connection failure.
- Do not exceed the maximum air pressure stated on the tool.
- For torque-control and continuous-rotation tools, the air pressure has a safety critical effect on performance. Therefore, requirements for length and diameter of the hose shall be specified.
- Never carry an air tool by the hose.

Steps for Torque Adjustment – Angle Series

1. Remove the angle housing kit by loosening the lock nut in counter clockwise direction.

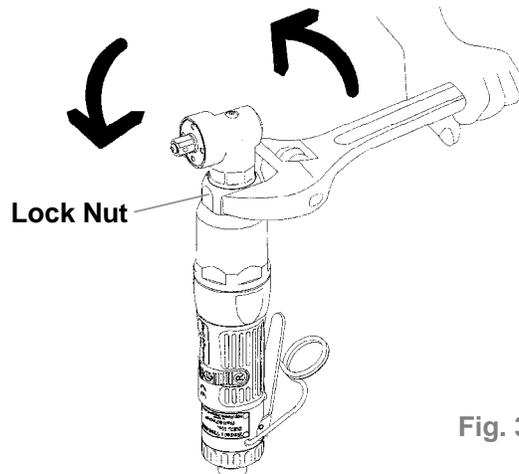


Fig. 325

2. Rotate the anvil manually; adjust the valve screw inside the pulse unit to the hole; where the screw taken off. Then, use the attached tool to adjust the torque. Torque increased by turning clockwise and vise versa.

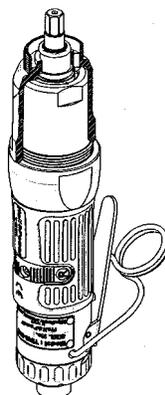


Fig. 326

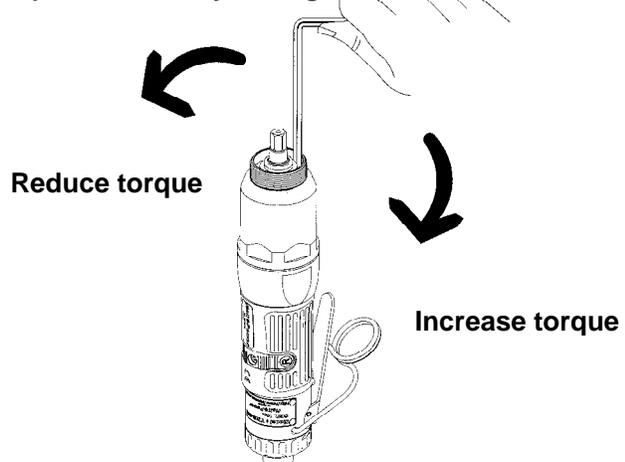


Fig. 327

3. Install the angle housing kit back by tightening the lock nut in clockwise direction to the housing.

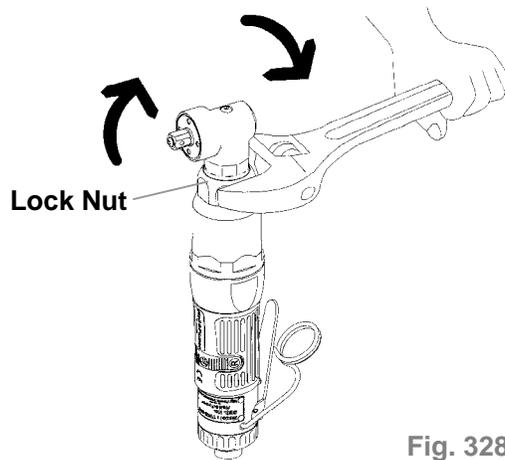


Fig. 328

DISASSEMBLY/ASSEMBLY FOR ANGLE SERIES

- FLEX-50R, FLEX-60R, FLEX-70R, FLEX-50RX, FLEX-60RX, FLEX-70RX, FLEX-70RG, FLEX-70RH, FLEX-80RH

● IMPULSE MECHANISM DISASSEMBLY

- (1) Spring Holder disassembly: (for Model No. FLEX-50RX, FLEX-60RX, FLEX-70RX)

Use an acicular piece to get the spring holder out, then take the steel ball.



The steel ball may drop off when taking out the spring holder.

Note: Handle rubber must be covered by a piece of cloth to avoid damage

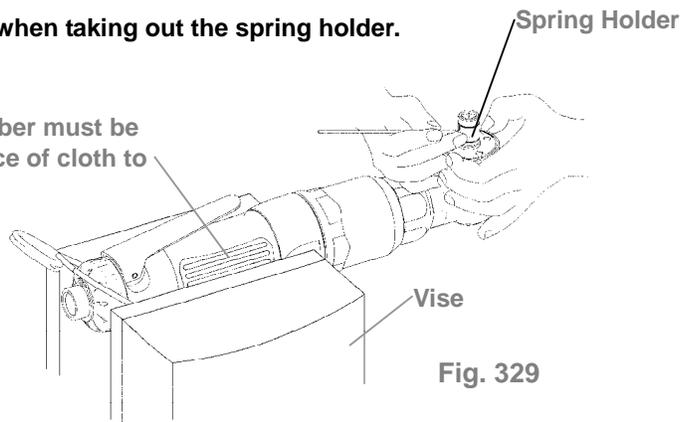


Fig. 329

- (2) Angle Housing Unit Disassembly:

- 1 Use an adjustable wrench counter clockwise to loosen the lock nut of the pulse unit housing. Then, take off the angle unit.
- 2 Use 2mm L-type wrench counter clockwise to loosen the screws.

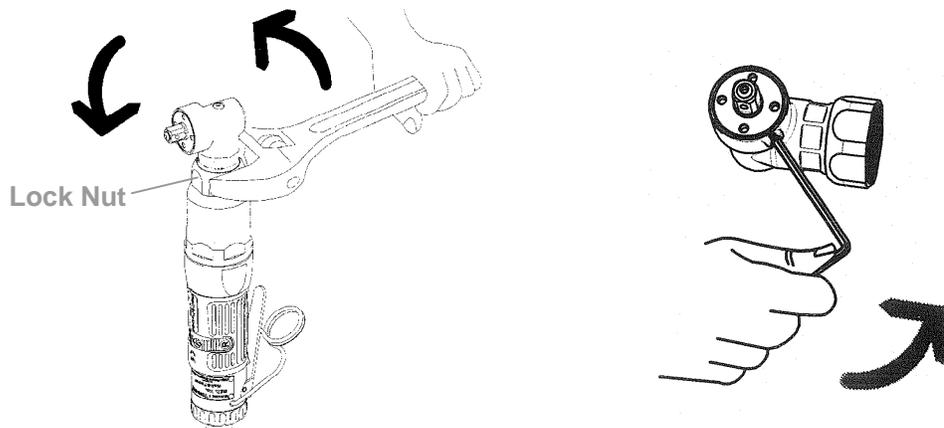


Fig. 331

- ③ Fix the angle unit. Use the torque wrench and the appliance to loosen the lock nut of the shaft gear counter clockwise. Then take off some parts. See the Table 43 for selecting the proper appliance.

NOTE: Lock-tite might be applied when assembling the gear shaft.

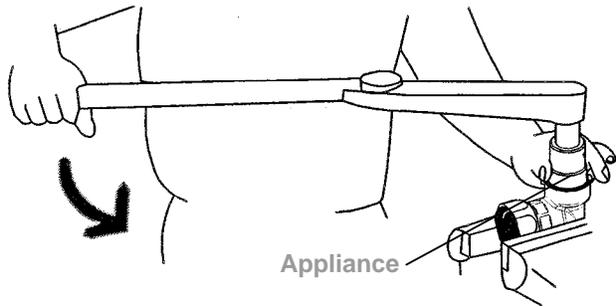


Fig. 332

Appliance No.	Apply to
63-50RRT001	FLEX-50R, FLEX-50RX FLEX-60R, FLEX-60RX FLEX-70R, FLEX-70RX
63-70RHRT001	FLEX-70RG, FLEX-70RH FLEX-80RH

Table 43

- ④ Fix the angle unit. Use the torque wrench and the appliance to loosen the lock nut of the main shaft gear counter clockwise. Then take off the remaining parts. See the Table 44 for selecting the proper appliance.

NOTE: Lock-tite might be applied when assembling the main gear shaft.

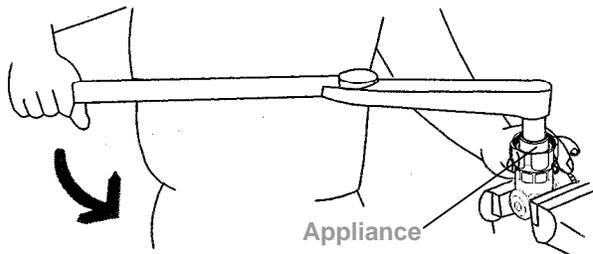


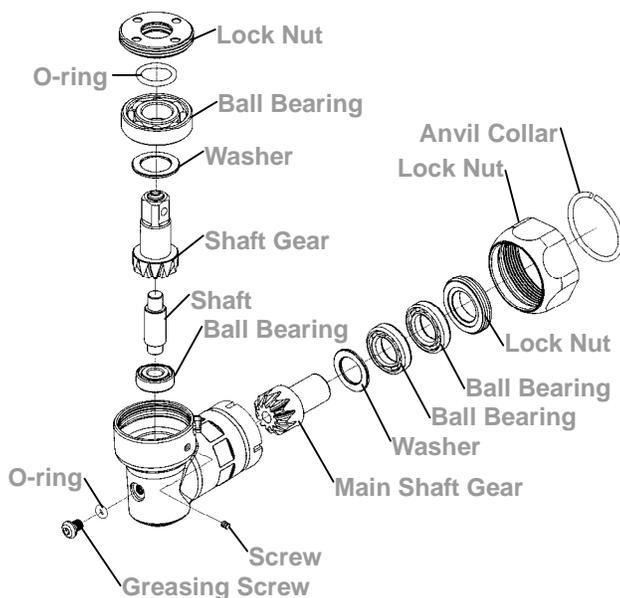
Fig. 333

Appliance No.	Apply to
63-50RRT002	FLEX-50R, FLEX-50RX FLEX-60R, FLEX-60RX FLEX-70R, FLEX-70RX
63-70RHRT002	FLEX-70RG, FLEX-70RH FLEX-80RH

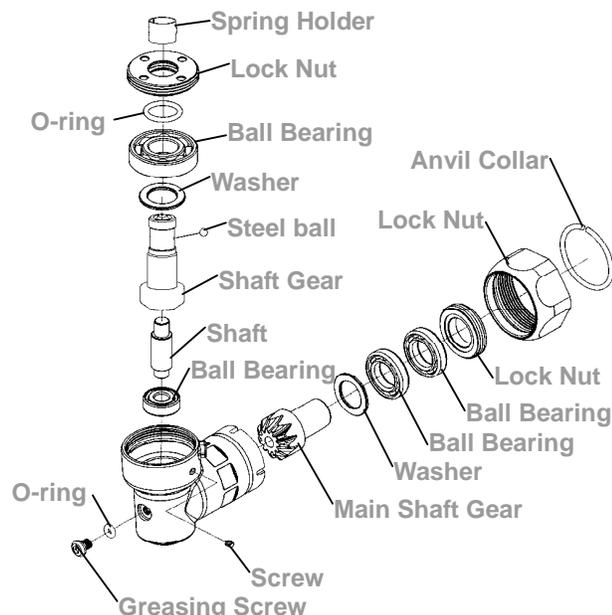
Table 44

⑤ Parts of Angle Housing Unit:

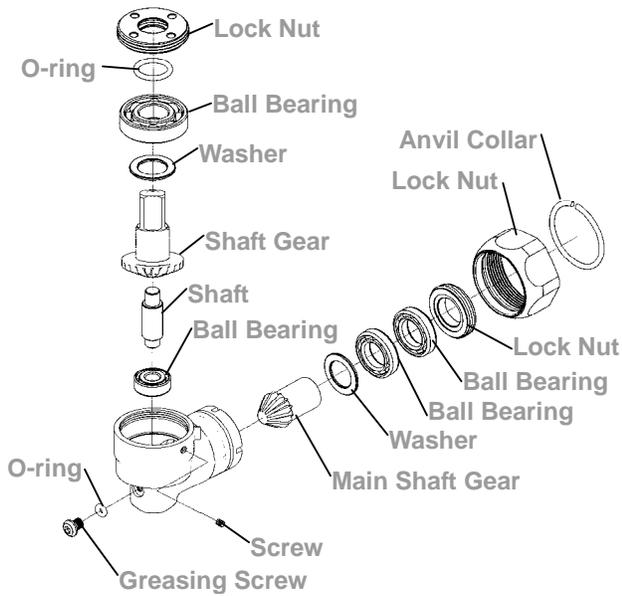
a. FLEX-50R 、 FLEX-60R 、 FLEX-70R



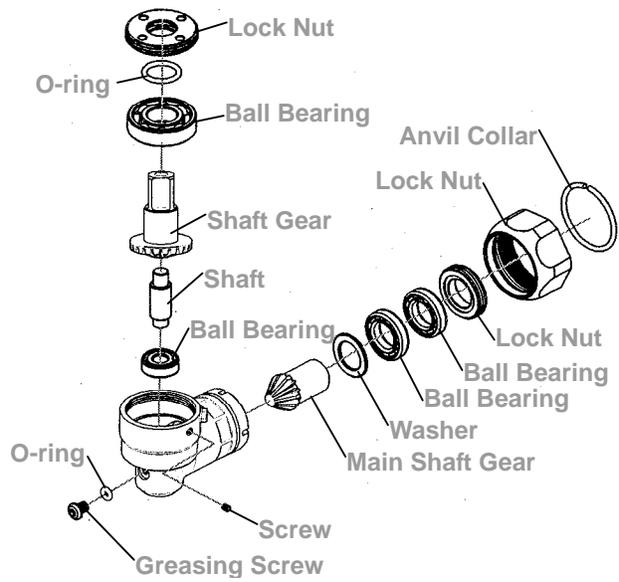
b. FLEX-50RX 、 FLEX-60RX 、 FLEX-70RX



c. FLEX-70RG · FLEX-70RH



d. FLEX-80RH



(2) Pulse Unit Housing Disassembly:

Fix the tool by a vise, use an adjustable wrench clockwise to loosen the pulse unit housing until the pulse unit housing detach from the motor housing. Then, take the pulse unit out, Fig. 334.

Note: Handle rubber must be covered by a piece of cloth to avoid damage

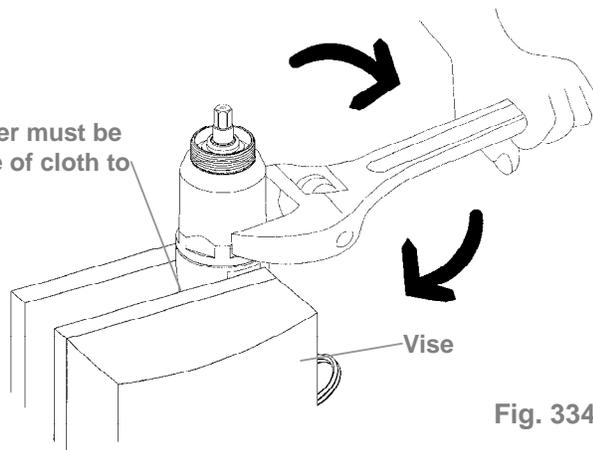


Fig. 334

(3) Pulse Unit Disassembly:

① Fix the pulse unit by a vise. Use the appliance (see Table 45) to loosen the lock nut on the pulse unit, Fig. 335.

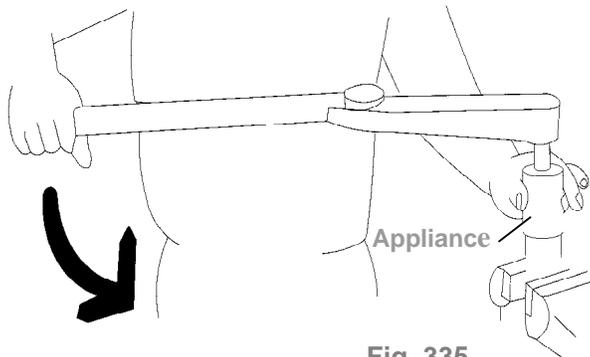


Fig. 335

Appliance No.	Apply to
63-40RT001	FLEX-50R, FLEX-50RX FLEX-60R, FLEX-60RX
63-70RT001	FLEX-70R, FLEX-70RX, FLEX-70RG, FLEX-70RH, FLEX-80RH

Table 45

Note: Lock-tite was applied on the lock nut when tools were assembled.

② Put the Appliance, see Table 46, on the anvil and tap on it slightly to detach the interior parts from the pulse unit, Fig.336.

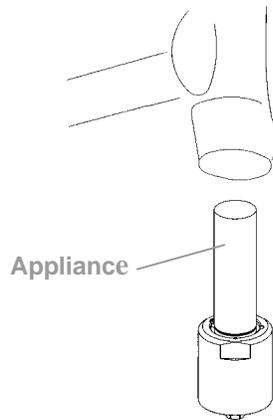


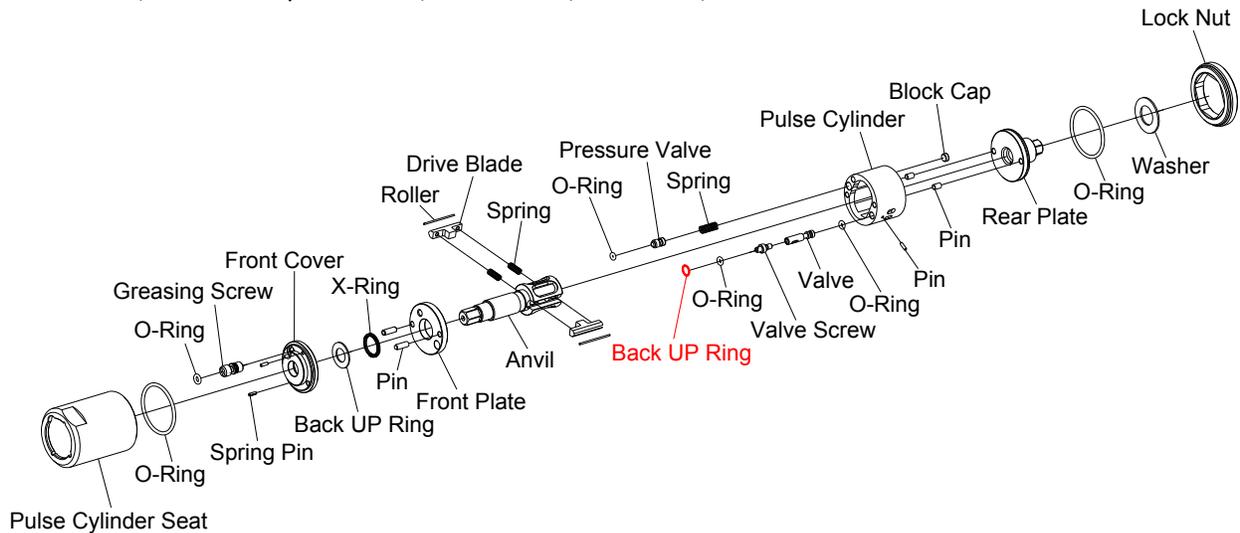
Fig. 336

Appliance No.	Apply to
63-40RT002	FLEX-50R, FLEX-50RX, FLEX-60R, FLEX-60RX, FLEX-70R, FLEX-70RX, FLEX-70RG, FLEX-70RH, FLEX-80RH

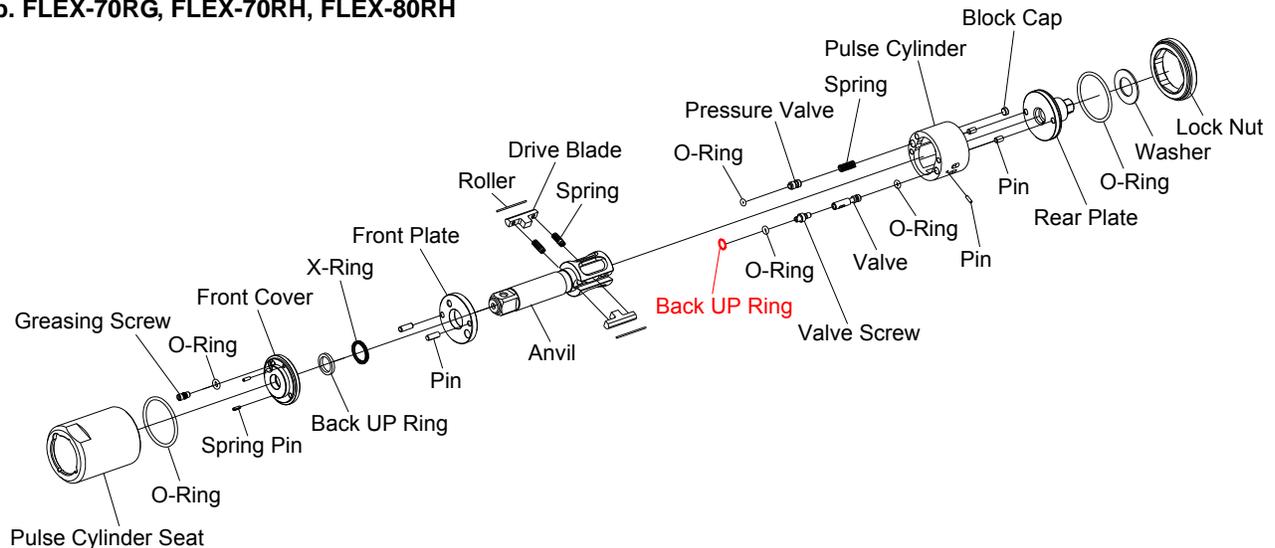
Table 46

(5) Parts of Pulse Cylinder Unit:

a. FLEX-50R, FLEX-50RX, FLEX-60R, FLEX-60RX, FLEX-70R, FLEX-70RX



b. FLEX-70RG, FLEX-70RH, FLEX-80RH



● PULSE UNIT ASSEMBLY:

(1) Pulse Cylinder Unit Assembly:

- ① Install the pins on both sides of the pulse cylinder. (Fig. 337)

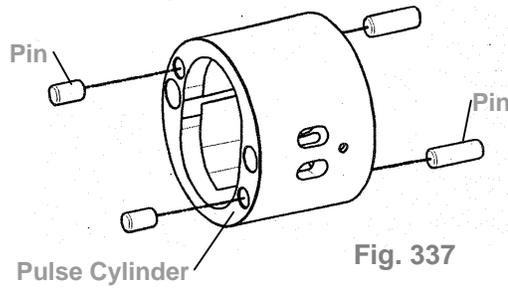


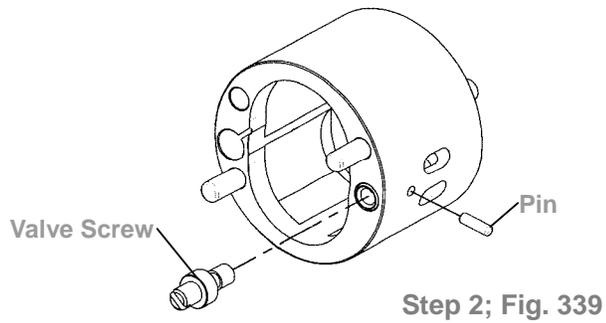
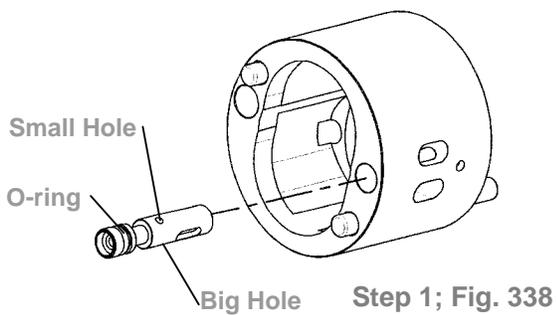
Fig. 337

- ② Sleeve the o-ring to the valve and install the valve into the big hole on the pulse cylinder. (Step 1; Fig.338)

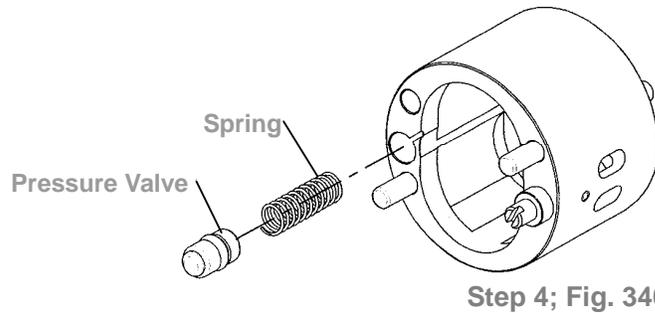
- ③ Insert the pin into the hole on the side of the pulse cylinder. (Step 2; Fig.339)

- ④ Tighten the valve screw left thread to the pressure valve. (Step 3; Fig.339)

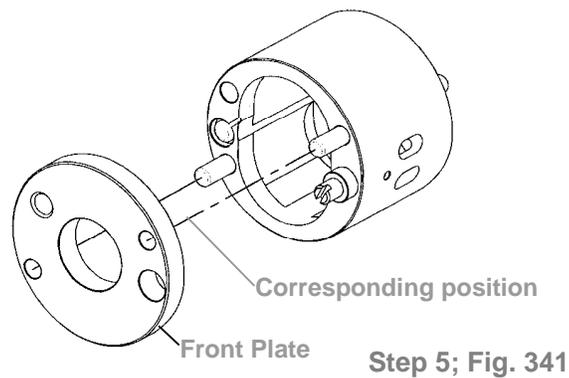
NOTE: the valve screw MUST tighten to the most bottom position certainly.



- ⑤ Put the spring into the hole then install the pressure valve that with the o-ring sleeved. (Step 4; Fig. 340)



- ⑥ Install the front plate and make sure the corresponding position with the pins. (Step 5; Fig. 341)



(2) Anvil Unit Assembly :

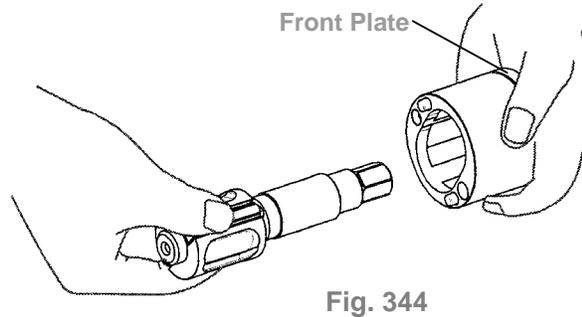
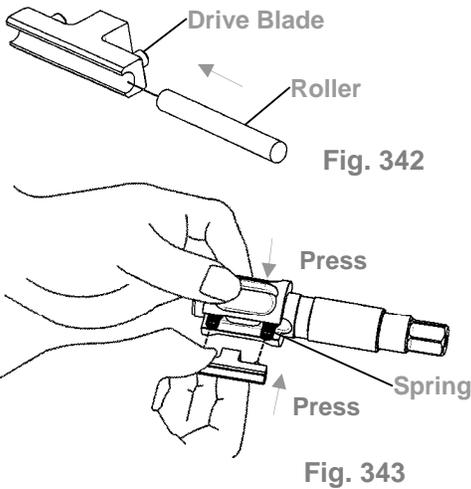
Install the roller to the drive blade, then insert the springs into the anvil and press the blades from both sides. Finally put the anvil to the pulse cylinder to complete the anvil unit assembly.

MUST follow the direction as Fig.81 showed while installing the anvil unit into the pulse cylinder; be sure to aim at the highest points by two sides of the interior pulse unit and press the two drive blades in slowly.

NOTE: IT IS RECOMMENDED TO USE THE SPECIAL FIXTURE FOR EASIER INSTALLATION OF ANVIL WITH THE ROLLER AND THE BLADE INTO THE CYLINDER (No picture showed)

FIXTURE PART No	TOOL MODEL
63-I30AST-001K	FLEX-30P
63-I40AST-001K	FLEX-40P, FLEX-50P, FLEX-60P, FLEX-40PX, FLEX-50PX, FLEX-60PX,
63-I70AST-001K	FLEX-70P
63-I90AST-001K	FLEX-90P
63-I100AST-001K	FLEX-100P
63-I130AST-001K	FLEX-130P
63-I150AST-001K	FLEX-150P
63-I180AST-001K	FLEX-180P

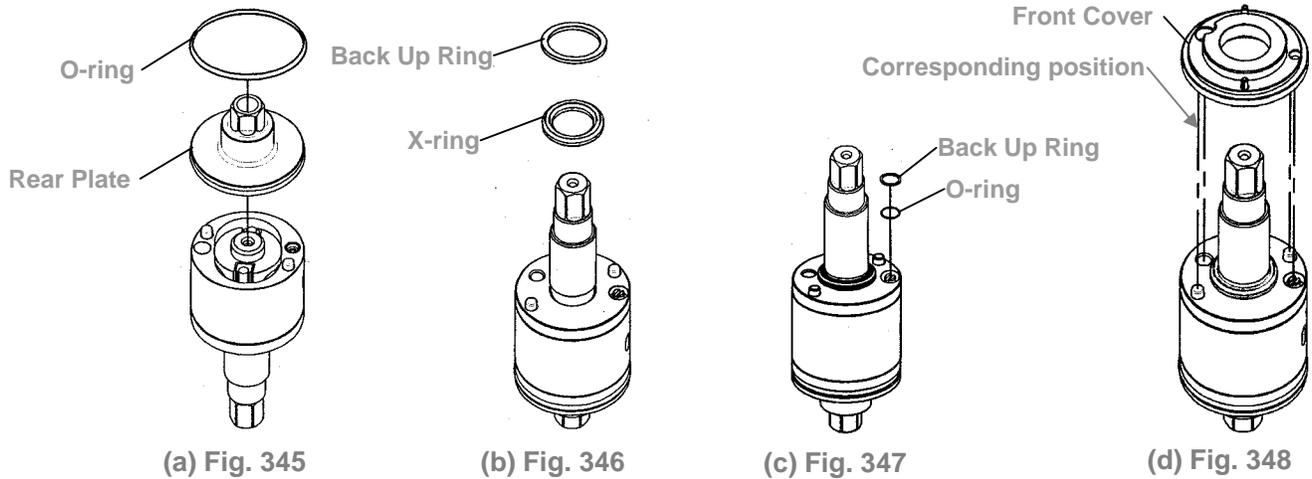
! MUST follow the direction as shown in Figure 344 while installing the anvil unit into the pulse cylinder; be sure to aim at the highest points by two sides of the interior pulse unit and press the two drive blades in slowly.



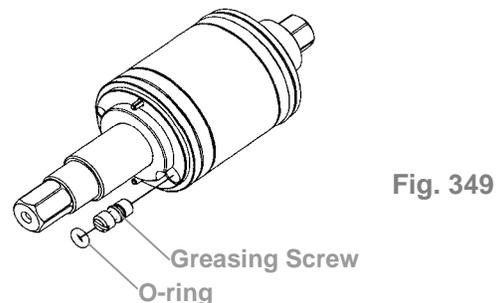
(3) Front Cover and Rear Plate of Pulse Cylinder Assembly

→ **FLEX-50R, FLEX-50RX, FLEX-60R, FLEX-60RX, FLEX-70R, FLEX-70RX**

- ① (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 345)
- (b) Put the X-ring and Back up ring on the anvil with the oil applied. (Fig. 346)
- (c) Put the Back up ring and O-ring into the Valve Screw.(Fig. 347)
- (d) Install the front cover to the pulse cylinder by the corresponding positions. (Fig. 348)



- ② After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.



→ **FLEX-70RG, FLEX-70RH, FLEX-80RH**

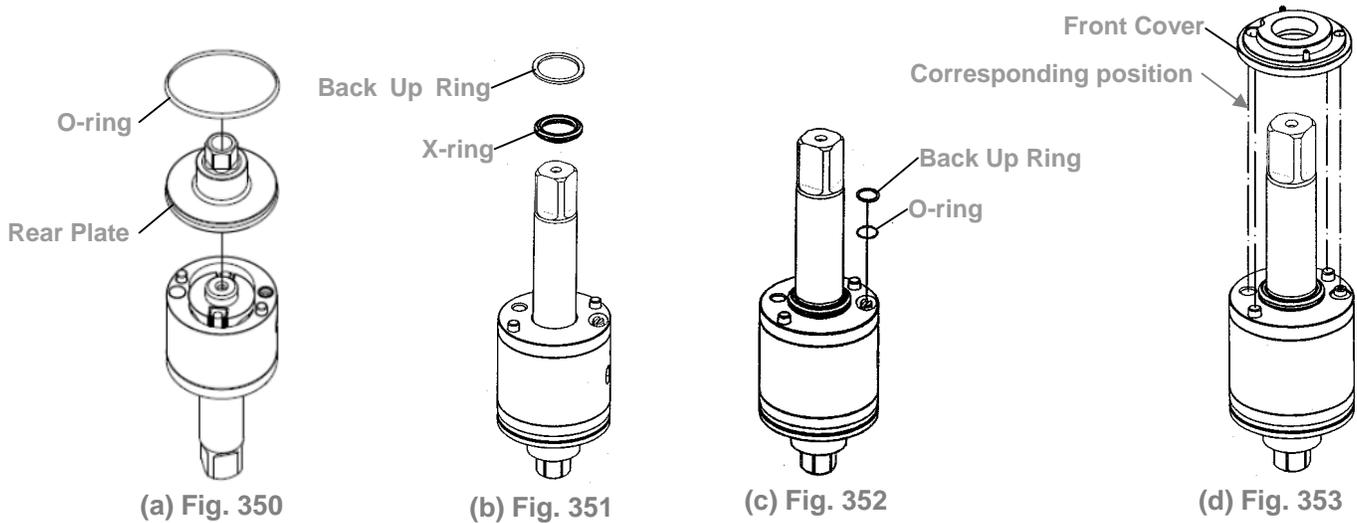
- ① (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of

the pin and the hole are corresponded. (Fig.350)

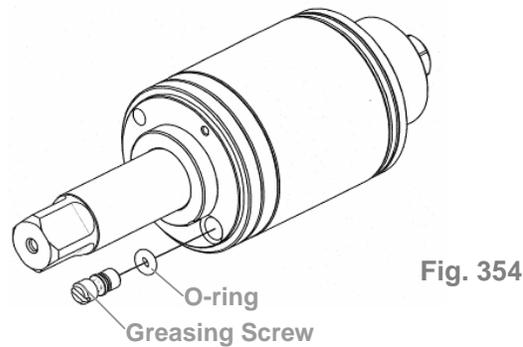
(b) Put the X-ring and Back up ring on the anvil with the oil applied. (Fig.351)

(c) Put the Back up ring and O-ring into the Valve Screw.(Fig. 352)

(d) Install the front cover to the pulse cylinder by the corresponding positions.(Fig. 353)



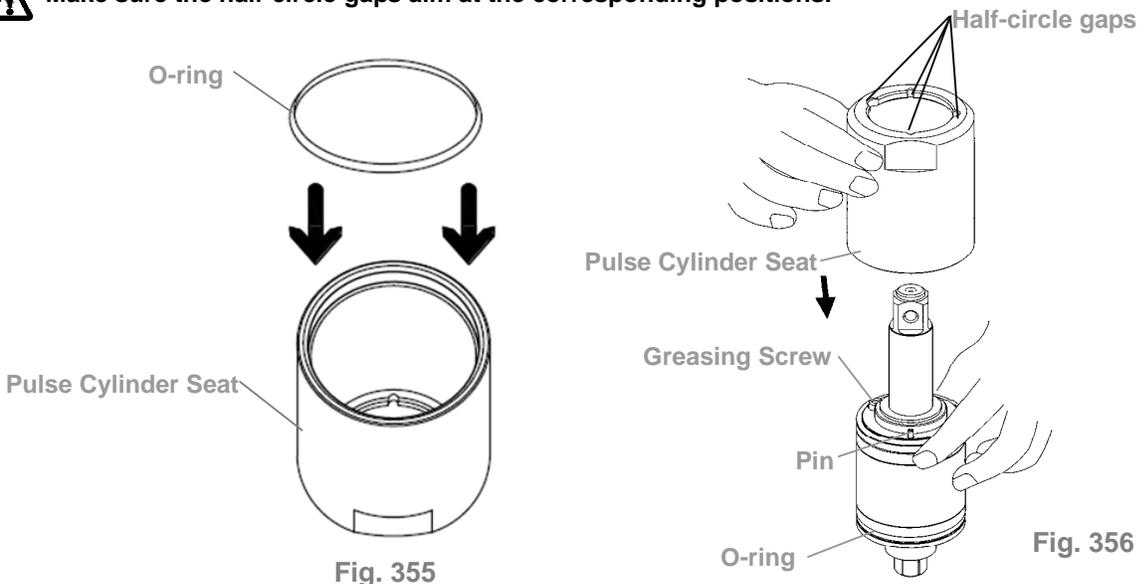
➊ After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.



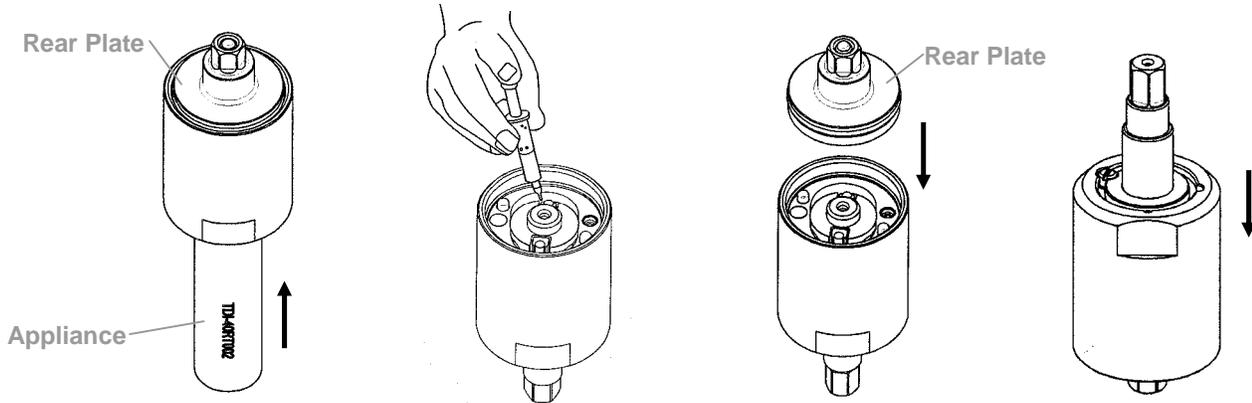
(4) Pulse Cylinder Seat and Lock Nut of Pulse Cylinder Assembly

➋ Place the o-ring inside the bottom of the pulse cylinder seat, then combine the pulse cylinder seat with the assembled pulse cylinder unit. (Fig. 355, Fig. 356)

⚠ Make sure the half-circle gaps aim at the corresponding positions.



- ② Use the appliance to push out the rear plate from the pulse cylinder seat. See Table 46 in reference to the proper appliance selection. (Fig. 357)
- ③ Fill up the interior pulse cylinder with the pulse oil about 90% full by an injector. (Fig. 358)
- ④ Install the rear plate taken from the step 2 on the pulse cylinder. Note the corresponding positions! (Fig. 359)
- ⑤ Turn the assembled unit up side down so the rear plate is at the bottom. Then press the pulse cylinder seat all the way down to the fixed position. Make sure the corresponding positions are matched exactly. (Fig. 360)



- ⑥ Fix the pulse cylinder seat by a vise. Use an appliance and a torque wrench, and then turn clockwise to tighten the lock nut of the pulse cylinder. See Table 47 and 48 in reference to the proper appliance and tightness. (Note: Lock-tite needed when tightening the lock nut of the pulse cylinder)

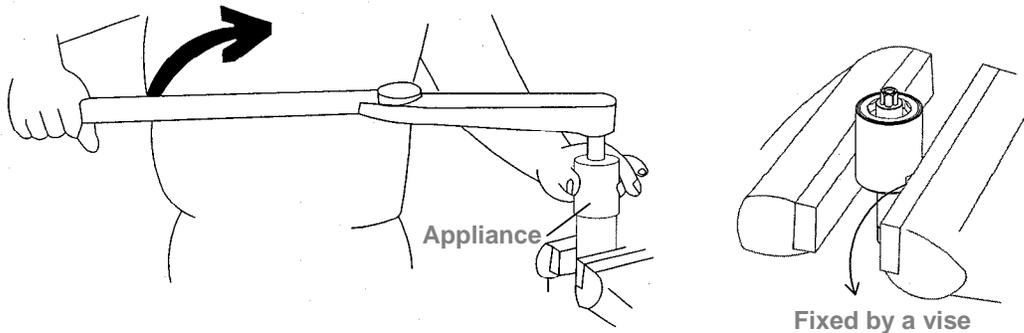


Fig. 361

Appliance No.	Apply to
63-40RT001	FLEX-50R, FLEX-50RX, FLEX-60R, FLEX-60RX
63-70RT001	FLEX-70R, FLEX-70RX, FLEX-70RG, FLEX-70RH, FLEX-80RH

Table 47

Model No.	Tighten torque	Model No.	Tighten torque
FLEX-50R	80 N.M	FLEX-70RX	100 N.M
FLEX-50RX	80 N.M	FLEX-70RG	100 N.M
FLEX-60R	80 N.M	FLEX-70RH	100 N.M
FLEX-60RX	80 N.M	FLEX-80RH	100 N.M
FLEX-70R	100 N.M		

Table 48

7 After completing the above steps, test to make sure the square drive of the anvil rotates smoothly.

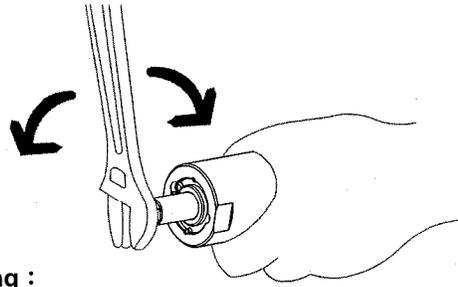


Fig. 362

(5) Steps for Pulse Cylinder Oiling :

1 Loosen the greasing screw, and fill in the authorized oil by an injector until it is full and overflow.

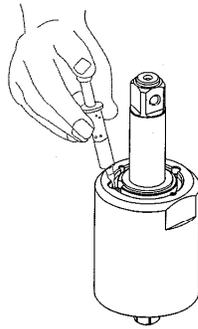


Fig. 363

2 Take the unit and dip it in an oil tank, then rotate the anvil by a wrench to release air inside, in the mean time, the unit would be full with oil completely.

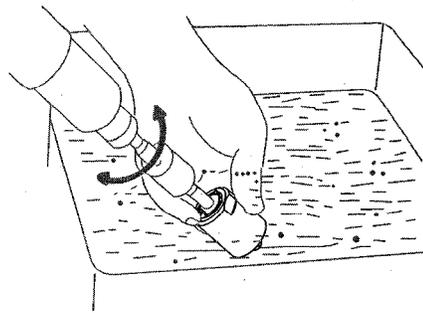


Fig. 364

3 Use the screwdriver either ,the slotted to tighten the greasing screw.

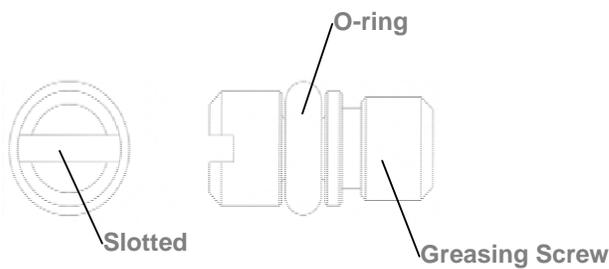
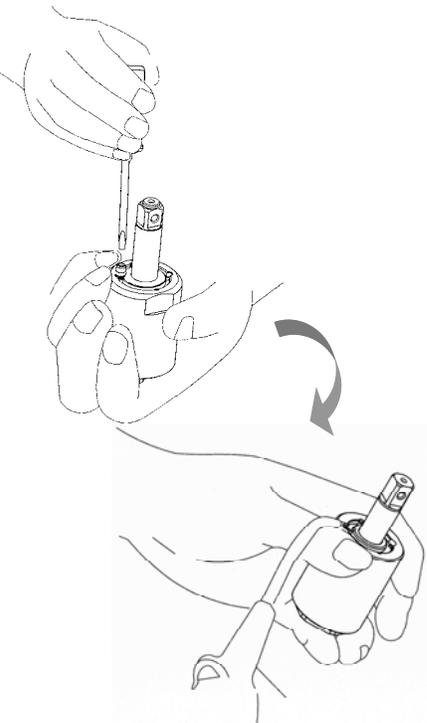


Fig. 365



4 Use an air spray gun to blow off the oil on the cylinder seat, Fig. 366.

- 5 Loosen the greasing screw again and use an injector to draw out a little amount of oil (see Table 49) . Finally, tighten the greasing screw back to the pulse cylinder unit, Fig. 367.

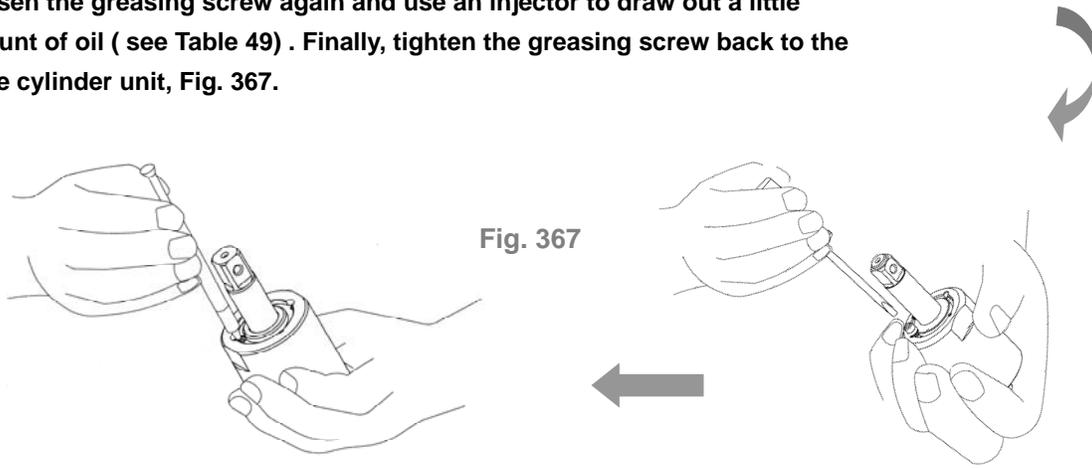


Fig. 367

Model No.	Amount of oil draw
FLEX-50R	0.35 CC
FLEX-50RX	0.35 CC
FLEX-60R	0.45 CC
FLEX-60RX	0.45 CC
FLEX-70R	0.63 CC

Model No.	Amount of oil draw
FLEX-70RX	0.63 CC
FLEX-70RG	0.63 CC
FLEX-70RH	0.63 CC
FLEX-80RH	0.6 CC

Table 49

(6) Torque Testing :

- 1 Put the washer on the front end of the anvil, then put another washer on the rear plate.

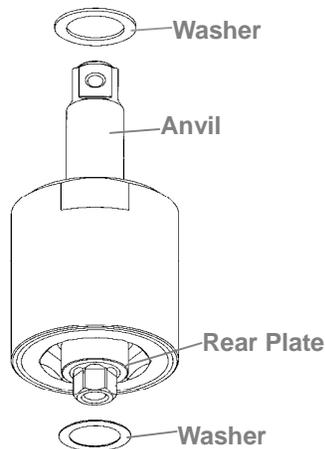


Fig. 368

② Tighten the clutch housing by hands.

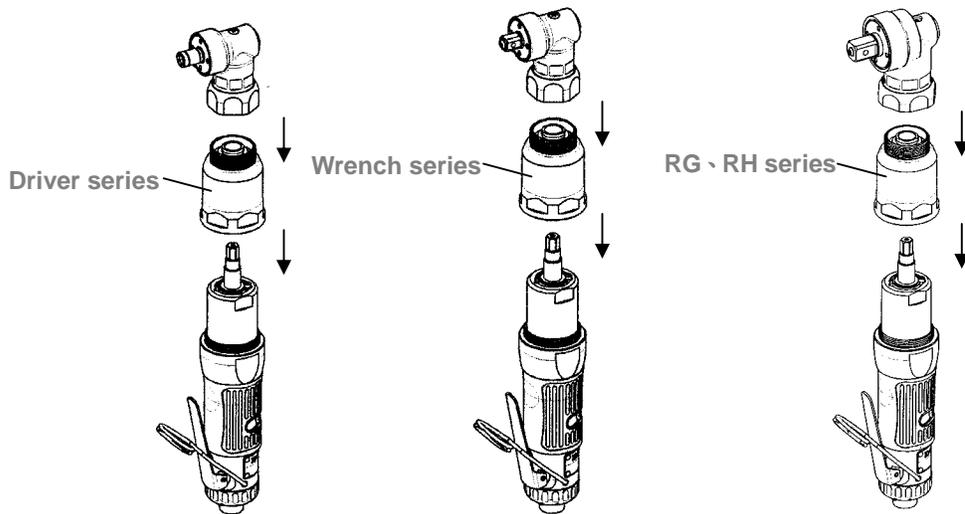


Fig. 369

③ Test the forward torque by a digital torque tester and make sure the tool pulses smoothly.

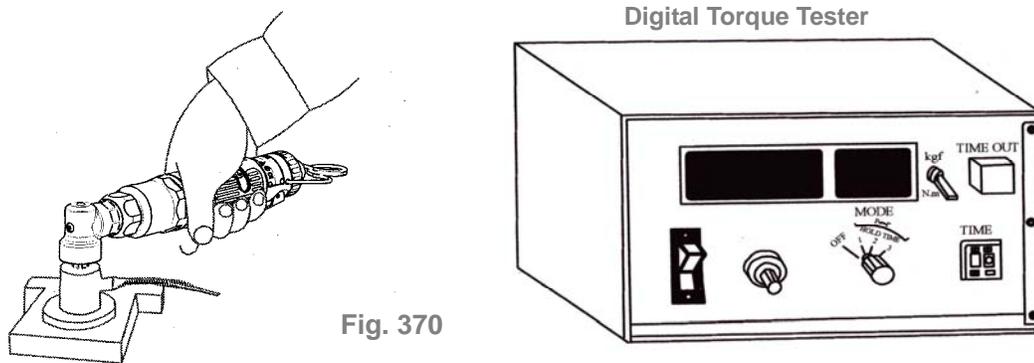


Fig. 370

Model No.	Air inlet pressure 0.6 Mpa
	N.M (at least)
FLEX-50R	17
FLEX-50RX	16
FLEX-60R	24
FLEX-60RX	22
FLEX-70R	31
FLEX-70RX	29
FLEX-70RG	50
FLEX-70RH	60
FLEX-80RH	70

Table 50

- ④ If the test result is NG (see Table 50 in reference to the torque standard), **MUST** draw out or add a little amount of oil and do the following steps:
- ① Loosen the pulse unit housing by hands.
 - ② Loosen the greasing screw.
 - ③ Draw out or add a little amount of oil.
 - ④ Tighten the greasing screw back.
 - ⑤ Tighten the pulse unit housing.
 - ⑥ Test the torque again. If the test result is still NG, repeat the Steps ①~⑥ until the standard torque is reached.

(7) Pulse Unit Housing Assembly :

Fix the housing by a vise. Turn the wrench in counter clockwise direction to tighten the pulse unit housing.

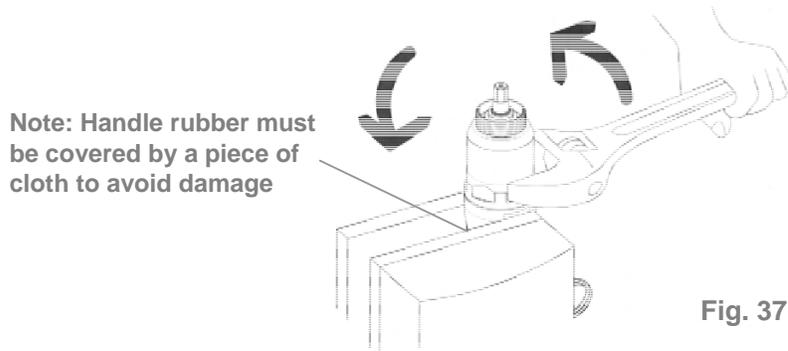


Fig. 371

(8) Angle Housing Unit Assembly:

- ① Assemble the parts in Fig. 372 one by one orderly into the angle housing. Then, fix the angle housing unit. Use the torque wrench and the appliance clockwise to tighten the lock nut of the shaft gear. See Table 51 in reference to the proper appliance selecting.

Note: (1) Make sure to apply the grease on the gear.

(2) Make sure to apply the lock-tite on the lock nut of the shaft gear.

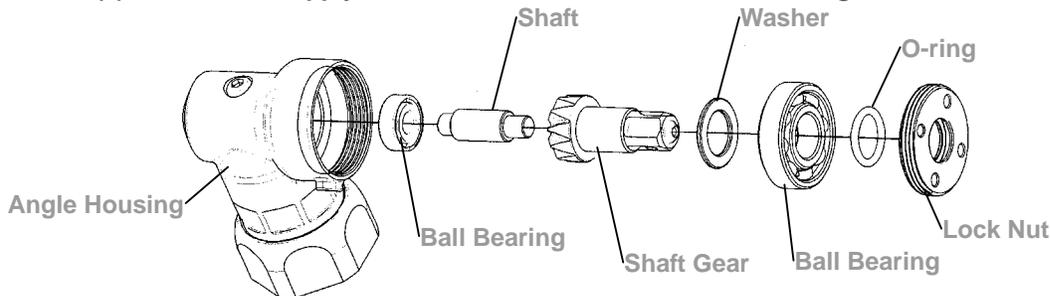


Fig. 372

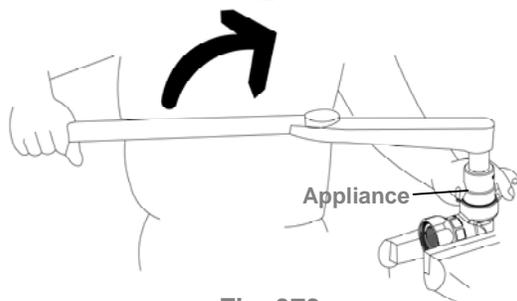


Fig. 373

Table 51

Appliance No.	Apply to
63-50RRT001	FLEX-50R, FLEX-50RX FLEX-60R, FLEX-60RX FLEX-70R, FLEX-70RX
63-70RHRT001	FLEX-70RG, FLEX-70RH FLEX-80RH

- ② Assemble the parts in Fig. 374 one by one orderly into the angle housing. Then, fix the angle housing unit. Use the torque wrench and the appliance clockwise to tighten the lock nut of the main shaft gear. See Table 52 in reference to the proper appliance selecting.

Note:(1) Make sure to apply the grease on the gear.

(2) Make sure to apply the lock-tite on the lock nut of the main shaft gear.

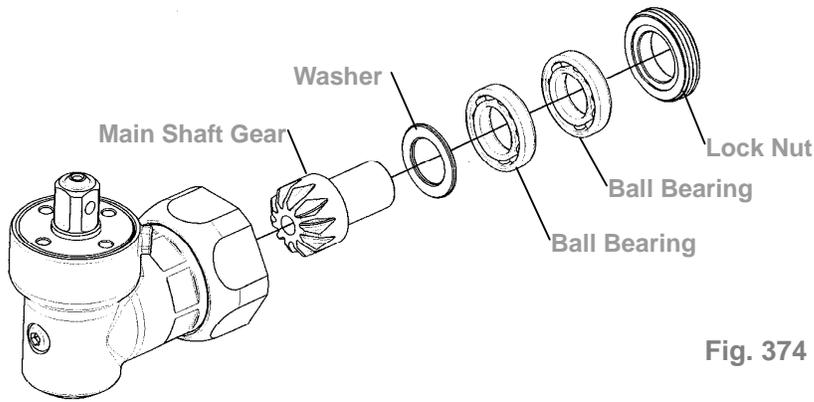


Fig. 374

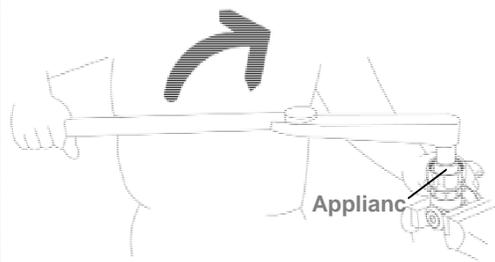


Fig.

Appliance No.	Apply to
63-50RRT002	FLEX-50R, FLEX-50RX FLEX-60R, FLEX-60RX FLEX-70R, FLEX-70RX
63-70RHRT002	FLEX-70RG, FLEX-70RH FLEX-80RH

Table 52

③ Use 2mm L-type wrench clockwise to loosen the screws.

④ Assemble the angle housing unit to the pulse unit housing and use the torque wrench clockwise to tighten it.

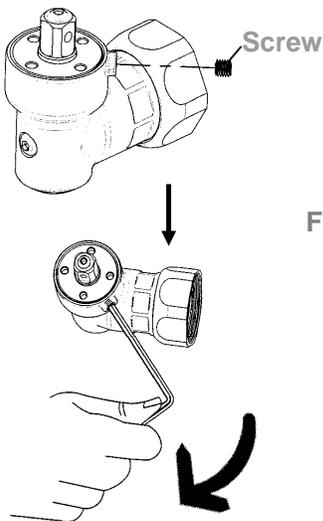


Fig. 377

Fig. 376

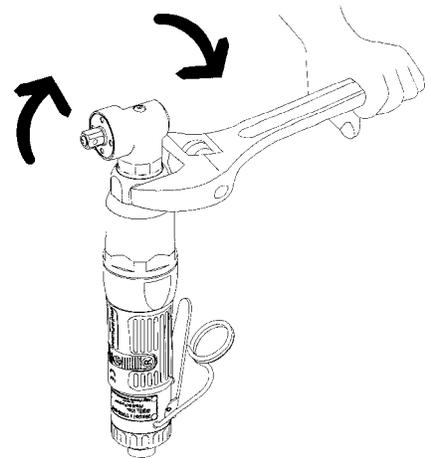


Fig. 378

- HOUSING AND MOTOR SET DISASSEMBLY:

- (1) Cylinder Unit Disassembly:

- ① Fix the tool by a vise. Use the appliance (see Table 53) to take the lock nut out of cylinder by turning clockwise.

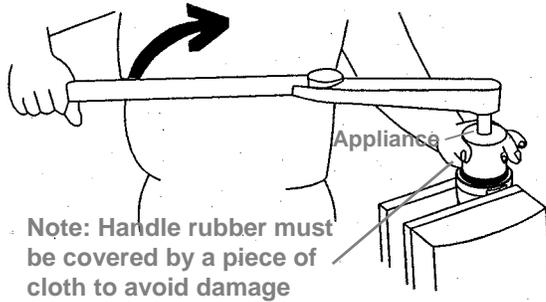


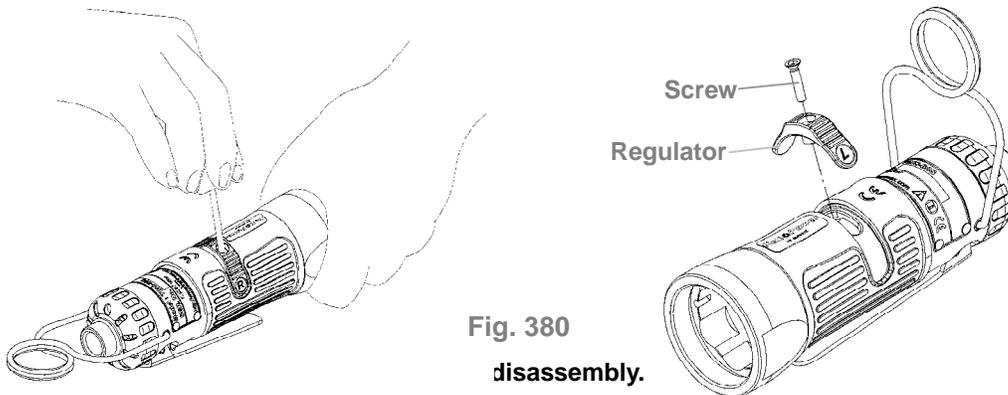
Fig. 379



Appliance No.	Apply to
63-40RT004	FLEX-50R, FLEX-50RX FLEX-60R, FLEX-60RX
63-70SRT001	FLEX-70R, FLEX-70RX FLEX-70RG, FLEX-70RH FLEX-80RH

Table 53

- ② Use a wrench to loosen the screw on the side of the motor housing and detach the parts of the regulator.



- ③ Take a cylinder unit out.

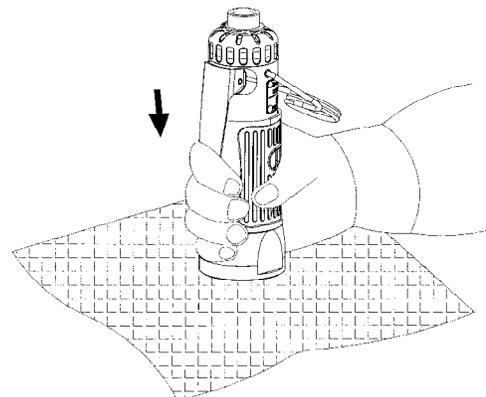


Fig. 381

④ Parts of Motor Set:

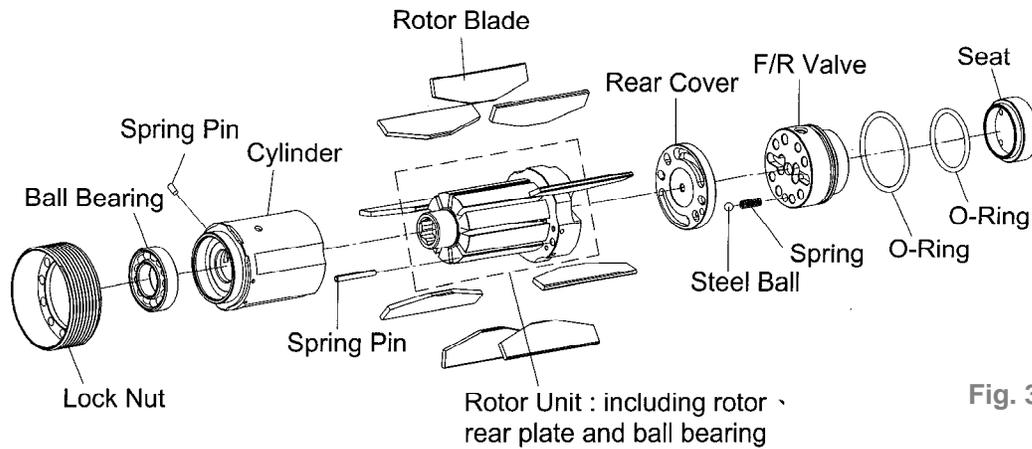


Fig. 382



The rotor and the rear end plate must be press fitted. The clearance of the two parts must be in between 0.01~ 0.02 mm. It would not be easy to assemble the two parts by repair centers in general. Therefore, as there is a need of repair on the parts of the rotor, the rear end plate, and the ball bearing, we strongly suggest replacing a complete ROTOR UNIT, which is including the rotor, the rear plate, and the ball bearing. The rotor unit would be full assembled and well-measured before delivery.

(2) Air Inlet Disassembly:

Take off the snap ring from the air inlet, and then take off the exhaust deflector. Use an open wrench to open the air inlet in counter clock wise direction. All the interior parts are detached.

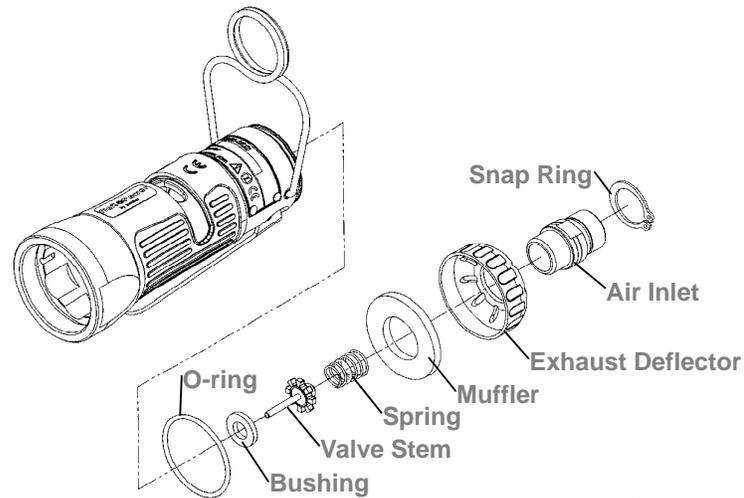


Fig. 383

(3) Trigger Set Disassembly:

Remove the spring pin from the trigger to detach the interior parts. And then, remove the housing rubber and the hanger to complete the disassembly.

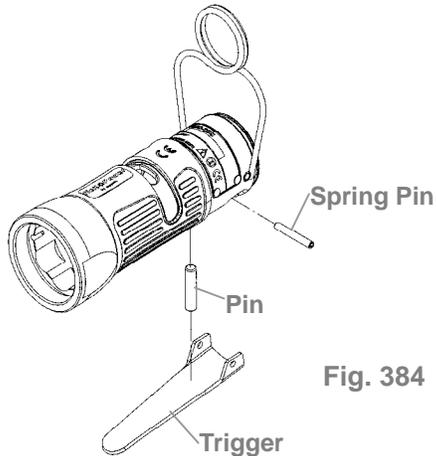


Fig. 384

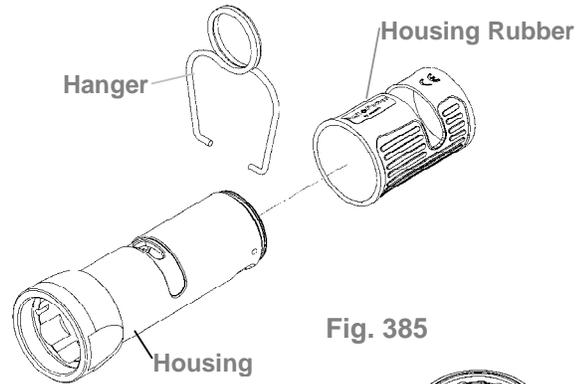


Fig. 385

● HOUSING AND MOTOR SET ASSEMBLY:

(1) Cylinder Unit Assembly

- ❶ Place the rotor blades into the rotor. Insert the spring pin A and B into the cylinder. Make sure the pins aim at the pin holes when putting the cylinder down.

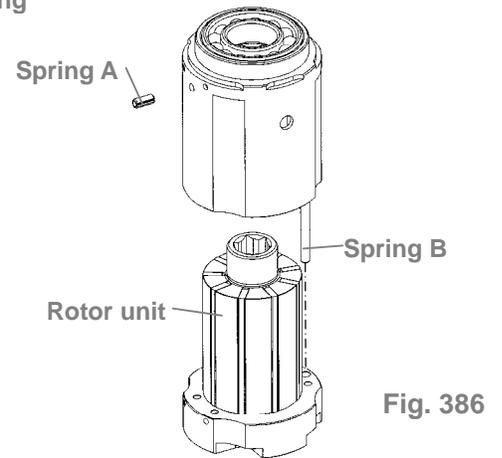


Fig. 386

- ❷ Make the groove of the air inlet plate toward the rear end plate and assemble. Make sure the holes aim at the pin while assembling, Fig. 387.
- ❸ Assemble the regulator with the rotor- air inlet unit. Make sure the steel balls of the regulator are placed on the holes of the air inlet plate. Then, place the seat with the o-ring sleeved on the regulator. Assembly is completed.

⚠ Apply the lubricator between parts while assembling.

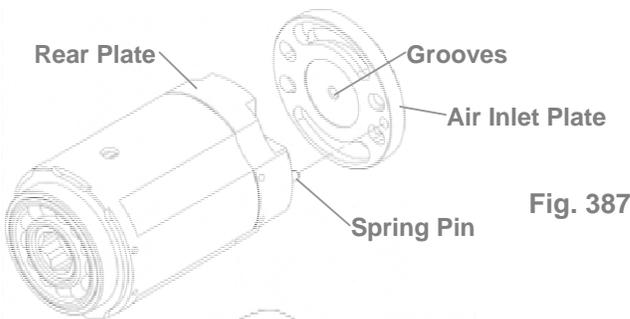


Fig. 387

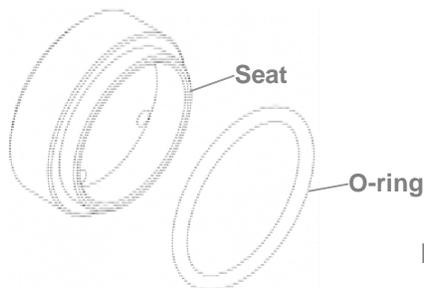


Fig. 388

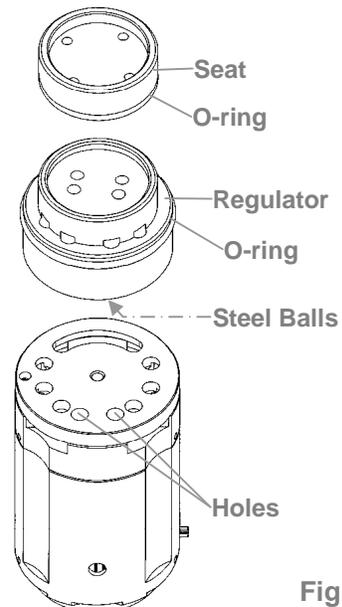


Fig. 389

(2) Housing, Motor set unit and Lock Nut of Cylinder Assembly:

- ❶ Put the housing rubber on the housing.
- ❷ Install the motor set into the housing. Make sure the direction is correct, i.e. the spring pin on the side of the cylinder aims at the hole inside the housing.
- ❸ Have the hole on the regulator aim at the screw hole on the side of the F/R valve and make sure the screw is tightened into the regulator and the F/R valve.

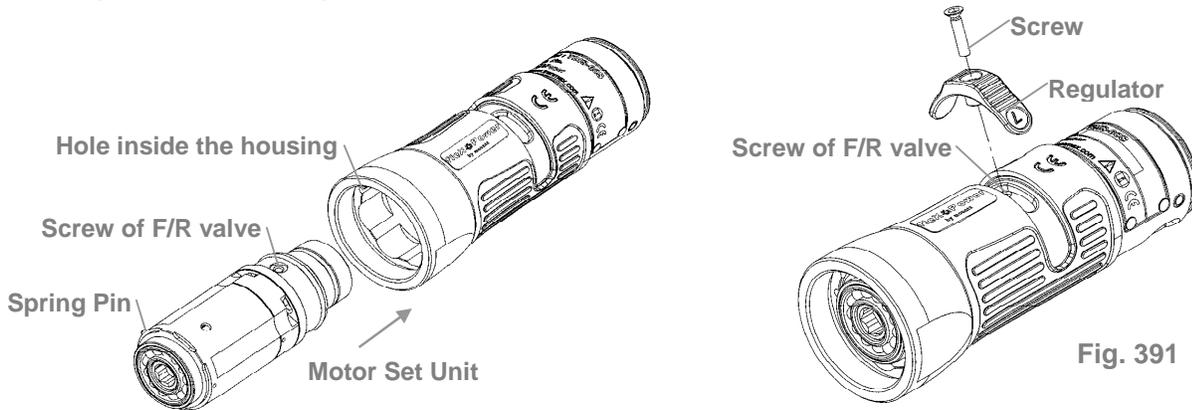


Fig. 391

- ❹ Fix the tool by a vise. Place the lock nut of the cylinder nut and tighten by the appliance in counter clockwise direction to complete the assembly. See the Table 54 and 55 in reference to appliance use and tighten torque.

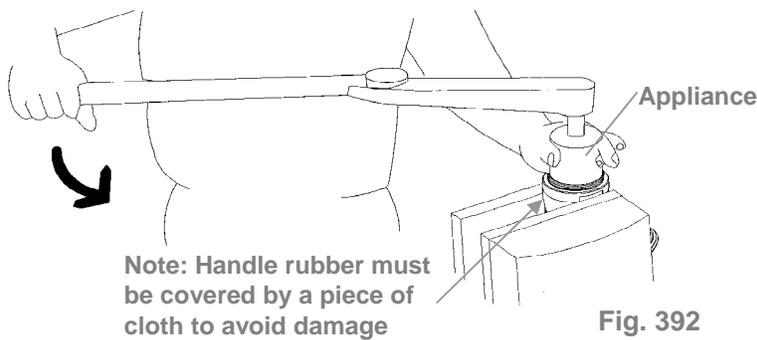


Fig. 392

(3) Housing and Air Inlet Assembly:

Install and tighten the parts of air inlet one by one and in order. (NOTE: Apply the Lock-tite on the threads of air inlet before assembly)

Model No.	Tighten torque
FLEX-50R	40 N.M
FLEX-50RX	40 N.M
FLEX-60R	40 N.M
FLEX-60RX	40 N.M
FLEX-70R	40 N.M
FLEX-70RX	40 N.M
FLEX-70RG	40 N.M
FLEX-70RH	40 N.M
FLEX-80RH	40 N.M

Table 55

Appliance No.	Apply to
63-40RT004	FLEX-50R, FLEX-50RX FLEX-60R, FLEX-60RX
63-70SRT001	FLEX-70R, FLEX-70RX, FLEX-70RG, FLEX-70RH, FLEX-80RH

Table 54

(4) Housing and Trigger Set Assembly:

Install the parts of the trigger set orderly (see Fig. 394 drawing for reference). Then, Insert the spring pins to fix all the parts. And, install the hanger to complete the assembly.

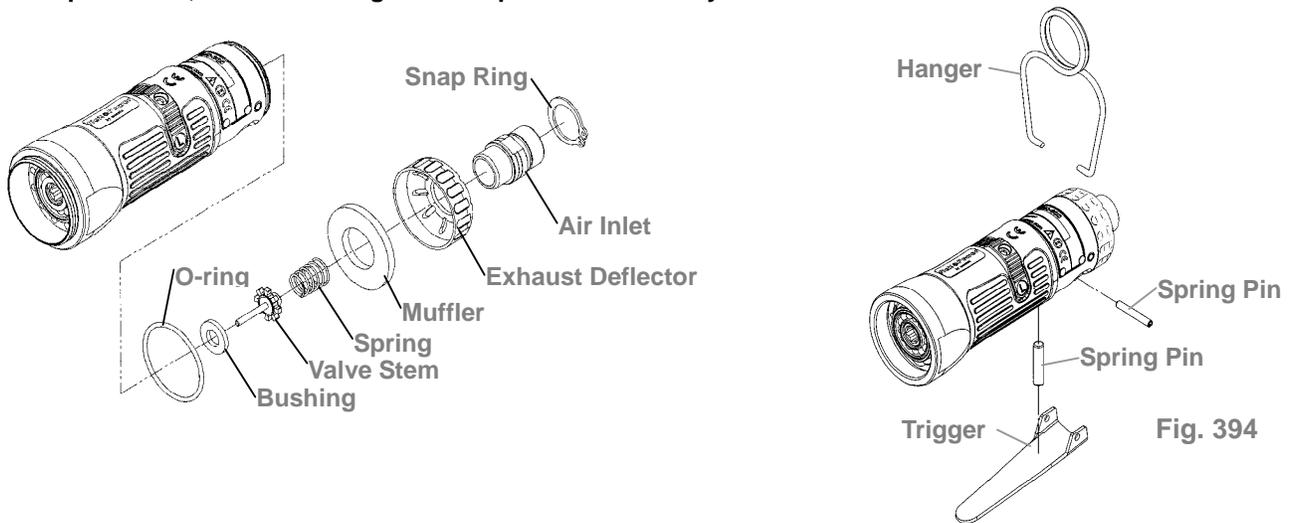


Fig. 394



After all the assembly is complete, test to make sure the anvil rotates smoothly, then connect the air hose to test the torque.

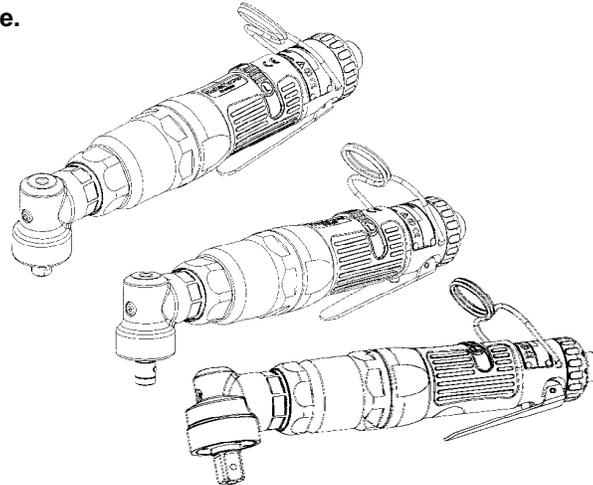


Fig. 395

MODEL	Bolt Capacity	Inserted Tools
FLEX-50RX FLEX-60RX FLEX-70RX	M6-M8 M8 M8	 Unit : mm
FLEX-50R ~ FLEX-70R and FLEX-70RG		3/8" power sockets
FLEX-70RH		1/2" power sockets

General safety rules

- For multiple hazards, read and understand the safety instructions before installing, operating, repairing, maintaining, changing accessories on, or working near the power tool. Failure to do so can result in serious bodily injury.
- Only qualified and trained operators should install, adjust or use the power tool.
- Do not modify this power tool. Modifications can reduce the effectiveness of safety

measures and increase the risks to the operator.

- Do not discard the safety instructions; give them to the operator.
- Do not use the power tool if it has been damaged.
- Tools shall be inspected periodically to verify that the ratings and markings are legibly marked on the tool. The employer/user shall contact the manufacturer to obtain replacement marking labels when necessary.

Projectile hazards

- Be aware that failure of the work piece, of accessories or even of the inserted tool itself can generate high-velocity projectiles.
- Always wear impact-resistant eye protection during the operation of the power tool.
- The grade of protection required should be assessed for each use.
- Ensure that the work piece is securely fixed.

Entanglement hazards

- Entanglement hazards can result in choking, scalping and/or lacerations if loose clothing, personal jewelry, neck ware, hair or gloves are not kept away from the tool and accessories.
- Gloves can become entangled with the rotating drive, causing severed or broken fingers.
- Rotating drive sockets and drive extensions can easily entangle rubber-coated or metal-reinforced gloves.
- Do not wear loose-fitting gloves or gloves with cut or frayed fingers.
- Never hold the drive, socket or drive extension.
- Keep hands away from rotating drives.

Operating hazards

- The use of the tool can expose the operator's hands to hazards including crushing, impacts, cuts, abrasions and heat. Wear suitable gloves to protect hands.
- Operators and maintenance personnel shall be physically able to handle the bulk, weight and power of the tool.
- Hold the tool correctly; be ready to counteract normal or sudden movements and have both hands available.
- Maintain a balanced body position and secure footing.
- In cases where the means to absorb the reaction torque are requested, it is recommended to use a suspension arm whenever possible. If that is not possible, side handles are recommended for straight case and pistol-grip tools. Reaction bars are recommended for angle nut runners. In any case, it is recommended to use a means to absorb the reaction torque above 4 Nm for straight tools, above 10 Nm for pistol-grip tools, and above 60 Nm for angle nut runners.
- Release the start-and-stop device in the case of an interruption of the energy supply.
- Use only lubricants recommended by the manufacturer.
- Fingers can be crushed in open-ended crow-foot nut runners.

- Do not use in confined spaces and beware of crushing hands between tool and work piece, especially when unscrewing.

Repetitive motions hazards

- When using a power tool, the operator can experience discomfort in the hands, arms, shoulders, neck, or other parts of the body.
- While using a power tool, the operator should adopt a comfortable posture whilst maintaining secure footing and avoiding awkward or off-balanced postures. The operator should change posture during extended tasks, which can help avoid discomfort and fatigue.
- If the operator experiences symptoms such as persistent or recurring discomfort, pain, throbbing, aching, tingling, numbness, burning sensations or stiffness, these warning signs should not be ignored. The operator should tell the employer and consult a
- qualified health professional.

Accessory hazards

- Disconnect the power tool from the energy supply before changing the inserted tool or accessory.
- Do not touch sockets or accessories during impacting, as this increases the risk of cuts, burns or vibration injuries.
- Use only sizes and types of accessories and consumables that are recommended by the power tool manufacturer.
- Use only impact-wrench-rated sockets in good condition, as poor condition or hand sockets and accessories used with impact wrenches can shatter and become a projectile.

Workplace hazards

- Slips, trips and falls are major causes of workplace injury. Be aware of slippery surfaces caused by the use of the tool and also of trip hazards caused by the air line or hydraulic hose.
- Proceed with care in unfamiliar surroundings. Hidden hazards, such as electricity or other utility lines, can exist.
- The power tool is not intended for use in potentially explosive atmospheres and is not
- insulated against coming into contact with electric power.
- Make sure there are no electrical cables, gas pipes, etc., that can cause a hazard if damaged by use of the tool.

Dust and fume hazards

- Dust and fumes generated when using power tools can cause ill health (for example, cancer, birth defects, asthma and/or dermatitis); risk assessment and implementation of appropriate controls for these hazards are essential.
- Risk assessment should include dust created by the use of the tool and the potential for disturbing existing dust.
- Direct the exhaust so as to minimize disturbance of dust in a dust-filled environment.

- Where dust or fumes are created, the priority shall be to control them at the point of emission.
- All integral features or accessories for the collection, extraction or suppression of airborne dust or fumes should be correctly used and maintained in accordance with the manufacturer's instructions.
- Use respiratory protection in accordance with employer's instructions and as required by occupational health and safety regulations.

Noise hazards

- Unprotected exposure to high noise levels can cause permanent, disabling, hearing loss and other problems, such as tinnitus (ringing, buzzing, whistling or humming in the ears).
- Risk assessment and implementation of appropriate controls for these hazards are essential.
- Appropriate controls to reduce the risk may include actions such as damping materials to prevent work pieces from “ringing”.
- Use hearing protection in accordance with employer's instructions and as required by occupational health and safety regulations.
- Operate and maintain the power tool as recommended in the instruction handbook, to prevent an unnecessary increase in noise levels.
- If the power tool has a silencer, always ensure it is in place and in good working order when the power tool is operating.
- Select, maintain and replace the consumable/inserted tool as recommended in the instruction hand book, to prevent an unnecessary increase in noise.

Vibration hazards

- Exposure to vibration can cause disabling damage to the nerves and blood supply of the hands and arms.
- Keep the hands away from the nut runner sockets.
- Wear warm clothing when working in cold conditions and keep your hands warm and dry.
- If you experience numbness, tingling, pain or whitening of the skin in your fingers or hands, stop using the power tool, tell your employer and consult a physician.
- Operate and maintain the power tool as recommended in the instruction handbook, to prevent an unnecessary increase in vibration levels.
- Do not use worn or ill-fitting sockets or extensions, as this is likely to cause a substantial increase in vibration.
- Select, maintain and replace the consumable/inserted tool as recommended in the instruction handbook, to prevent an unnecessary increase in vibration levels.
- Sleeve fittings should be used where practicable.
- Support the weight of the tool in a stand, tensioner or balancer, if possible.
- Hold the tool with a light but safe grip, taking account of the required hand reaction forces, because the risk from vibration is generally greater when the grip force is higher.

Additional safety instructions for pneumatic power tool

- Air under pressure can cause severe injury
- Always shut off air supply, drain hose of air pressure and disconnect tool from air supply when not in use, before changing accessories or when making repairs
- Never direct air at yourself or anyone else.
- Whipping hoses can cause severe injury. Always check for damaged or loose hoses and fittings.
- Cold air shall be directed away from the hands.
- Do not use quick-disconnect couplings at tool inlet for impact and air-hydraulic impulse wrenches. Use hardened steel (or material with comparable shock resistance) threaded hose fittings.
- Whenever universal twist couplings (claw couplings) are used, lock pins shall be installed and whipcheck safety cables shall be used to safeguard against possible hose-to-tool and hose-and-hose connection failure.
- Do not exceed the maximum air pressure stated on the tool.
- For torque-control and continuous-rotation tools, the air pressure has a safety critical effect on performance. Therefore, requirements for length and diameter of the hose shall be specified.
- Never carry an air tool by the hose.

DISASSEMBLY/ASSEMBLY FOR ANGLE SERIES

- FLEXS-50R, FLEXS-60R, FLEXS-70R, FLEXS-50RX, FLEXS-60RX, FLEXS-70RX, FLEXS-70RG, FLEXS-70RH, FLEXS-80RH

● IMPULSE MECHANISM DISASSEMBLY

(1) Spring Holder disassembly: (for Model No. FLEXS-50RX, FLEXS-60RX, FLEXS-70RX)

Use an acicular piece to get the spring holder out, then take the steel ball.



The steel ball may drop off when taking out the spring holder.

Note: Handle rubber must be covered by a piece of cloth to avoid damage

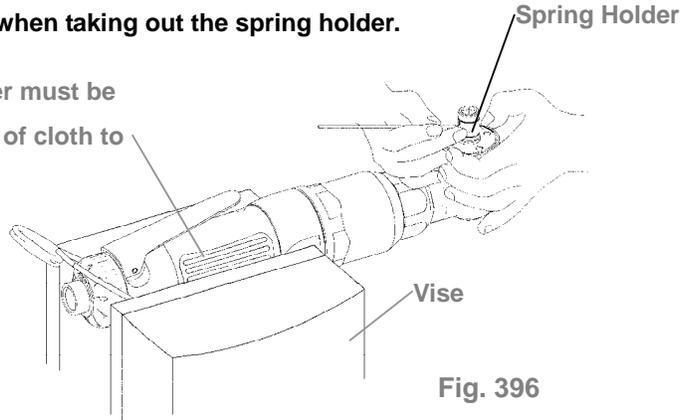


Fig. 396

(2) Angle Housing Unit Disassembly:

- ① Use an adjustable wrench counterclockwise to loosen the lock nut of the pulse unit housing. Then, take off the angle unit.
- ② Use 2mm L-type wrench counterclockwise to loosen the screws.

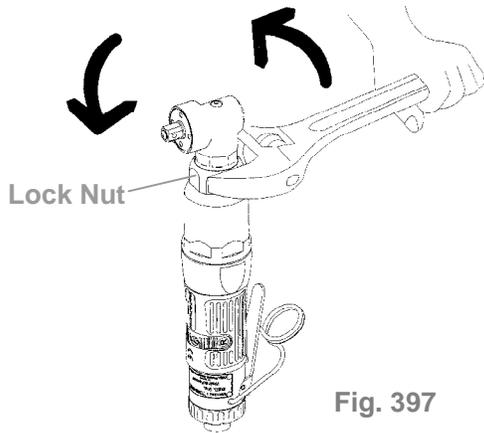


Fig. 397

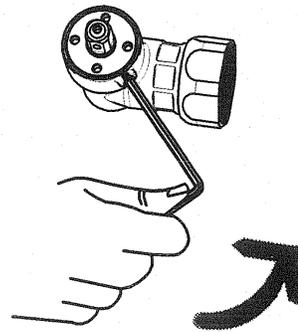


Fig. 398

- ③ Fix the angle unit. Use the torque wrench and the appliance to loosen the lock nut of the shaft gear counterclockwise. Then take off some parts. See the Table 56 for selecting the proper appliance.

NOTE: Lock-tite might be applied when assembling the gear shaft.

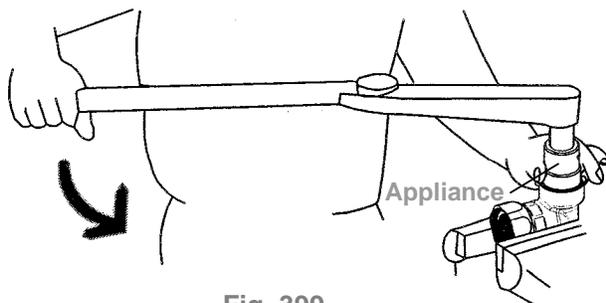


Fig. 399

Appliance No.	Apply to
63-50RRT001	FLEXS-50R, FLEXS-50RX FLEXS-60R, FLEXS-60RX FLEXS-70R, FLEXS-70RX
63-70RHRT001	FLEXS-70RG, FLEXS-70RH FLEXS-80RH

Table 56

④ Fix the angle unit. Use the torque wrench and the appliance to loosen the lock nut of the main shaft gear counterclockwise. Then take off the remaining parts. See the Table 57 for selecting the proper appliance.

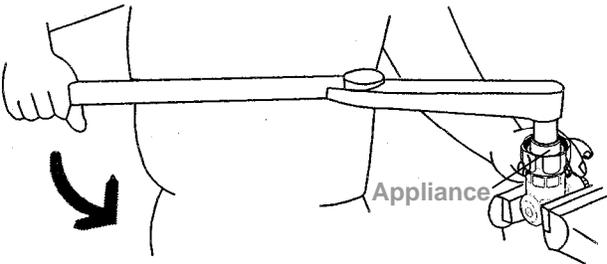


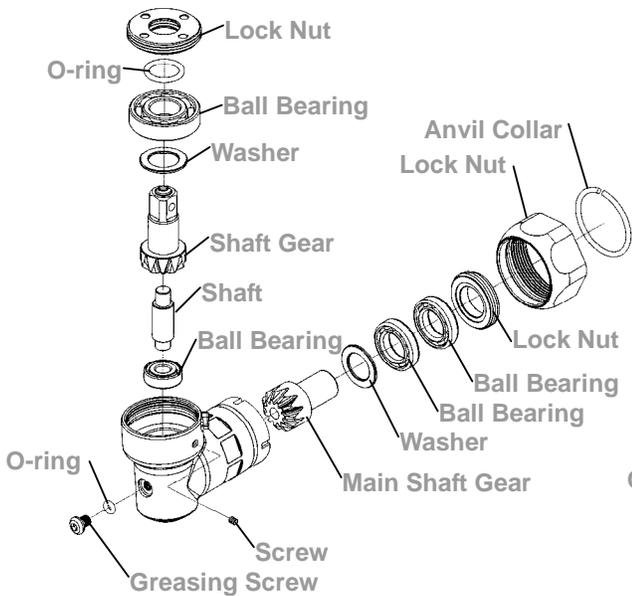
Fig. 400

Appliance No.	Apply to
63-50RRT002	FLEXS-50R, FLEXS-50RX FLEXS-60R, FLEXS-60RX FLEXS-70R, FLEXS-70RX
63-70RHRT002	FLEXS-70RG, FLEXS-70RH FLEXS-80RH

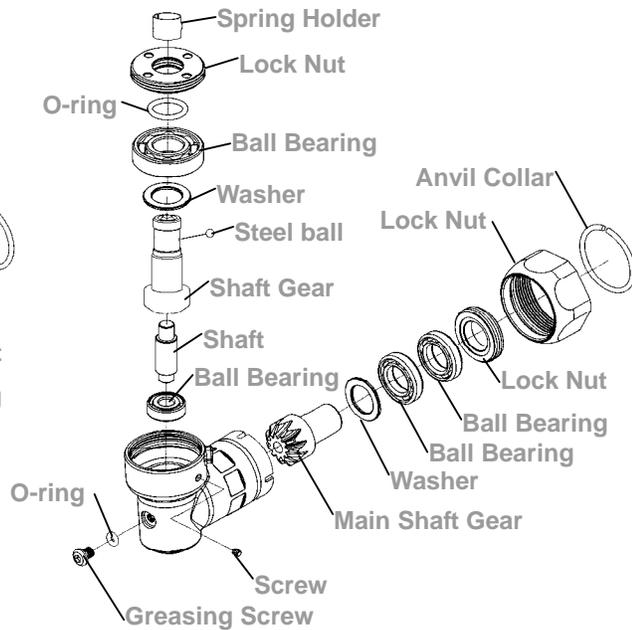
Table 57

⑤ Parts of Angle Housing Unit:

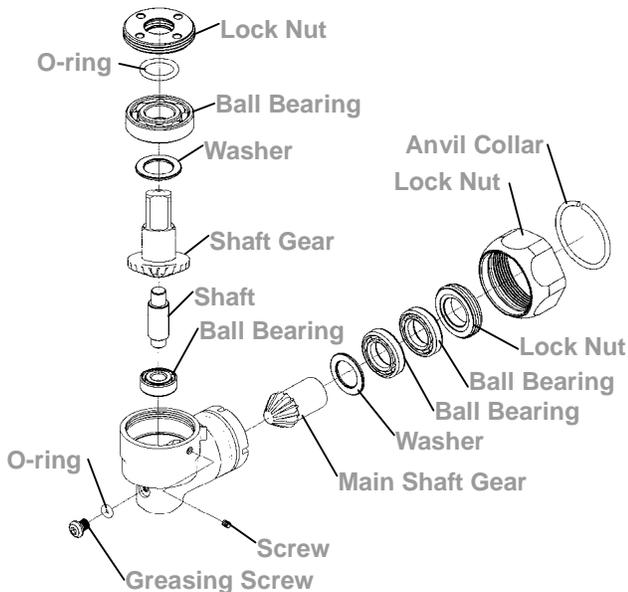
a. FLEXS-50R、FLEXS-60R、FLEXS-70R



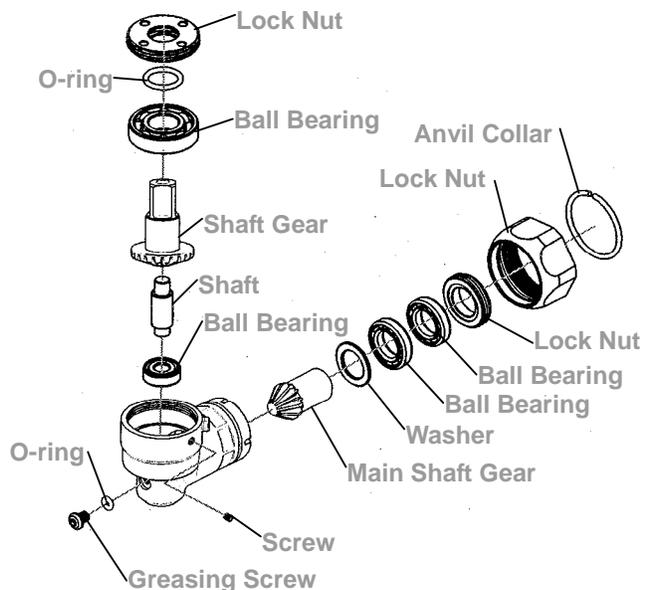
b. FLEXS-50RX、FLEXS-60RX、FLEXS-70RX



c. FLEXS-70RG、FLEXS-70RH



d. FLEXS-80RH



(3) Pulse Unit Housing Disassembly:

Fix the tool by a vise, use an adjustable wrench clockwise to loosen the pulse unit housing until the pulse unit housing detach from the motor housing. Then, take the pulse unit out, Fig. 401.

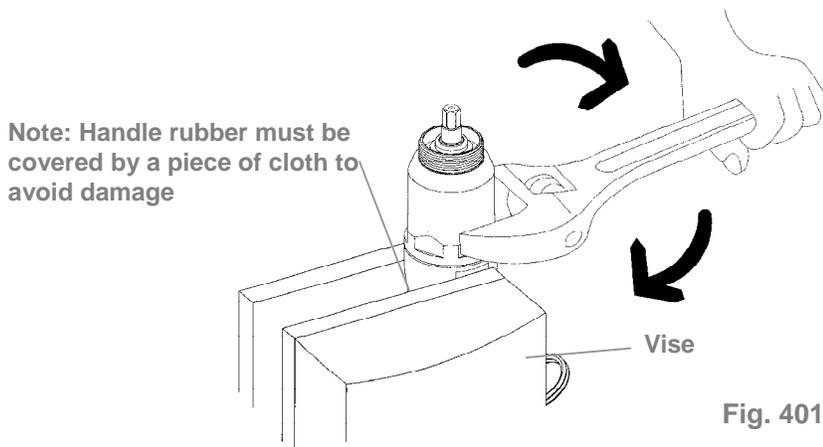


Fig. 401

(4) Pulse Unit Disassembly:

① Fix the pulse unit by a vise. Use the appliance (see Table 58) to loosen the lock nut on the pulse unit, Fig. 402.

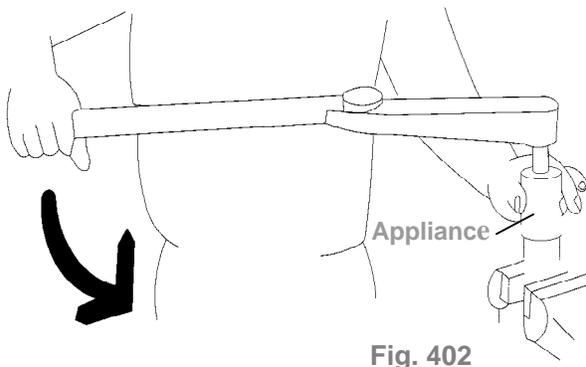


Fig. 402

Appliance No.	Apply to
63-40RT001	FLEXS-50R, FLEXS-50RX FLEXS-60R, FLEXS-60RX
63-70RT001	FLEXS-70R, FLEXS-70RX FLEXS-70RG, FLEXS-70RH FLEXS-80RH

Table 58

Note: Lock-tite was applied on the lock nut when tools were assembled.

② Put the Appliance, see Table 59, on the anvil and tap on it slightly to detach the interior parts from the pulse unit, Fig. 403.

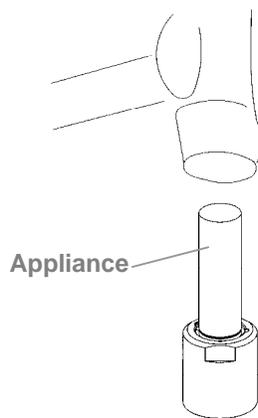


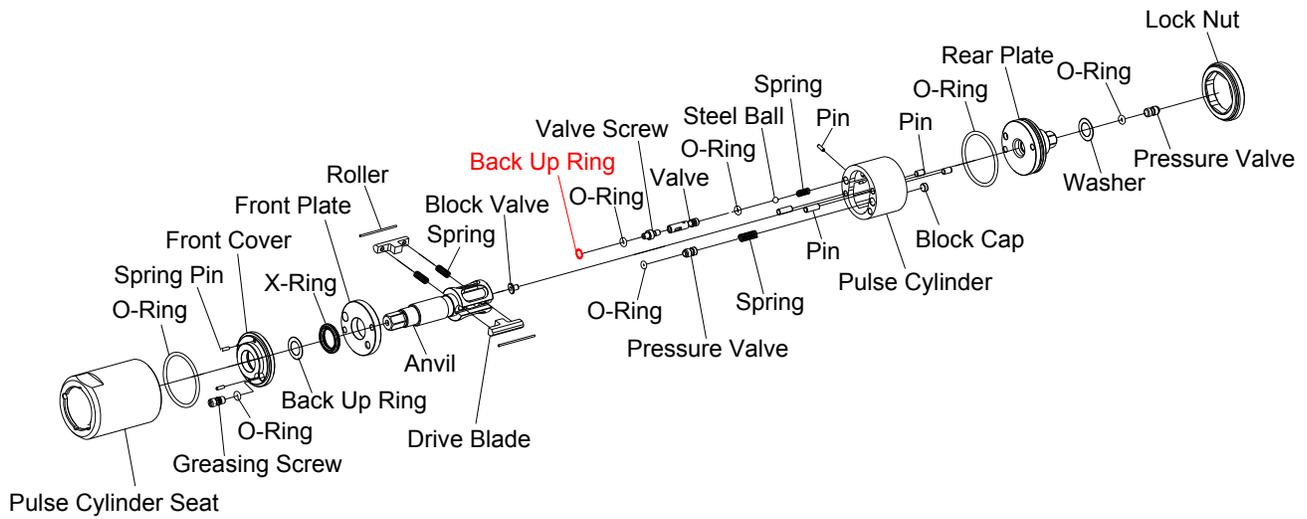
Fig. 403

Appliance No.	Apply to
63-40RT002	FLEXS-50R, FLEXS-50RX FLEXS-60R, FLEXS-60RX FLEXS-70R, FLEXS-70RX FLEXS-70RG, FLEXS-70RH FLEXS-80RH

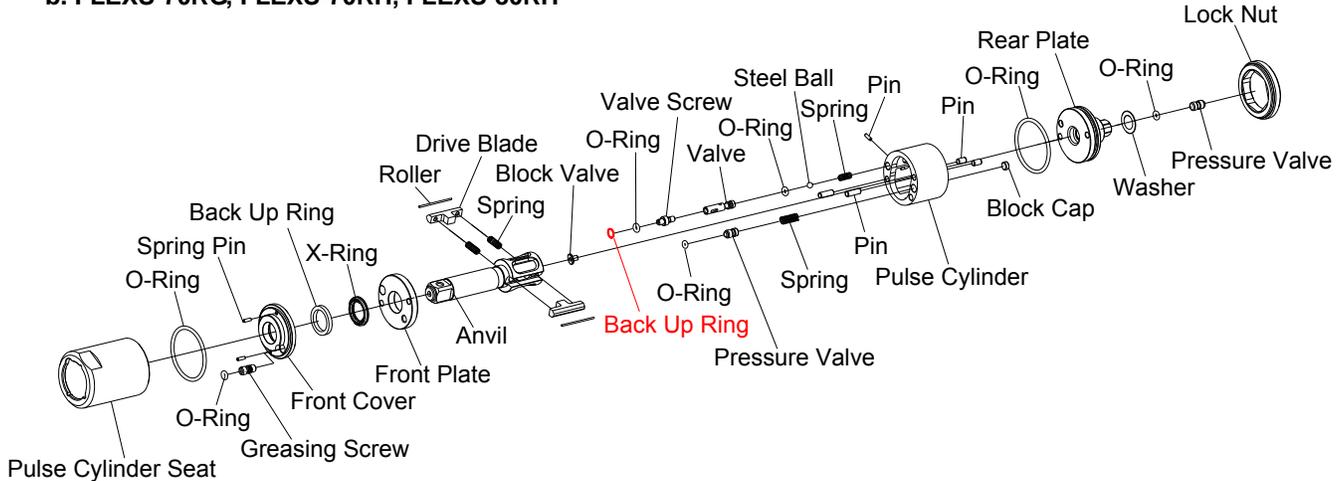
Table 59

3 Parts of Pulse Cylinder Unit:

a. FLEXS-50R, FLEXS-50RX, FLEXS-60R, FLEXS-60RX, FLEXS-70R, FLEXS-70RX



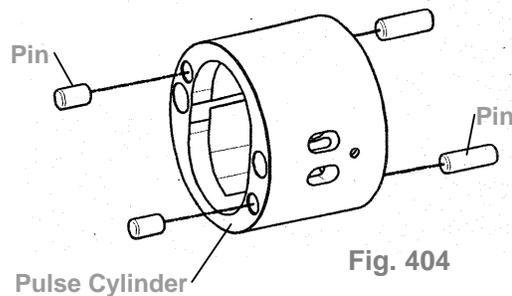
b. FLEXS-70RG, FLEXS-70RH, FLEXS-80RH



● PULSE UNIT ASSEMBLY:

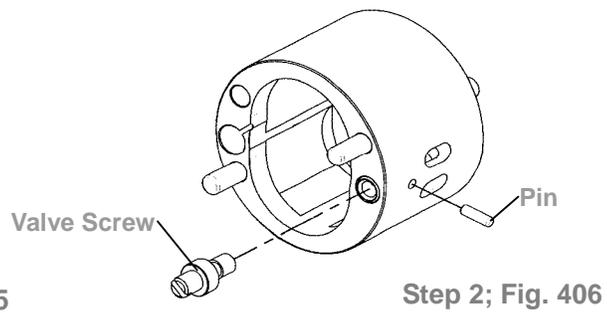
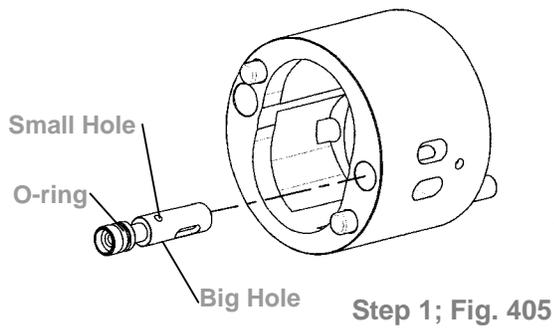
(1) Pulse Cylinder Unit Assembly:

- ① Install the pins on both sides of the pulse cylinder. (Fig. 404)

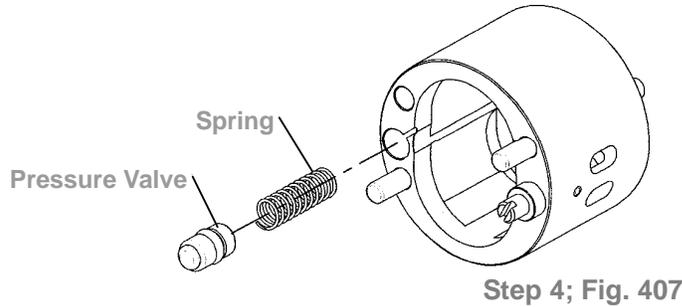


- ② Sleeve the o-ring to the valve and install the valve into the big hole on the pulse cylinder. (Step 1; Fig.405)
- ③ Insert the pin into the hole on the side of the pulse cylinder. (Step 2; Fig.406)
- ④ Tighten the valve screw left thread to the pressure valve. (Step 3; Fig.406)

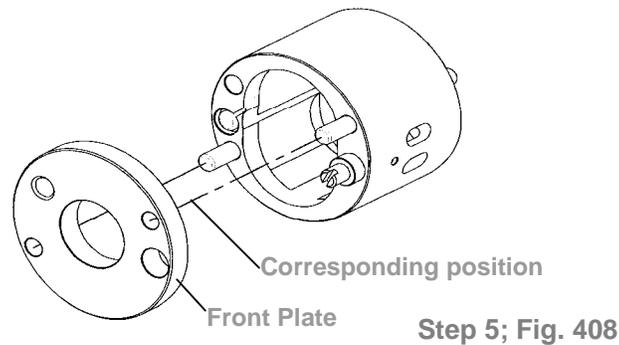
NOTE: the valve screw **MUST** tighten to the most bottom position certainly.



5 Put the spring into the hole then install the pressure valve that with the o-ring sleeved.(Step 4; Fig. 407)



6 Install the front plate and make sure the corresponding position with the pins. (Step 5; Fig. 408)



(2) Anvil Unit Assembly :

Install the roller to the drive blade, then insert the springs into the anvil and press the blades from both sides. Finally put the anvil to the pulse cylinder to complete the anvil unit assembly.

! MUST follow the direction as shown in Figure 411 while installing the anvil unit into the pulse cylinder; be sure to aim at the highest points by two sides of the interior pulse unit and press the two drive blades in slowly.

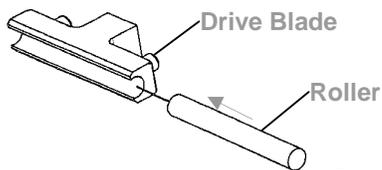


Fig. 410

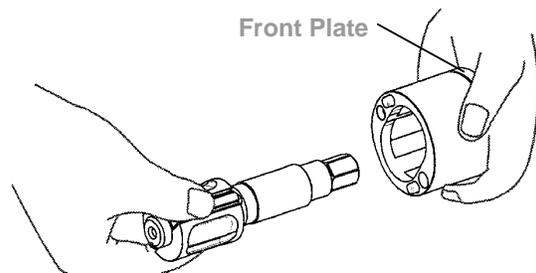
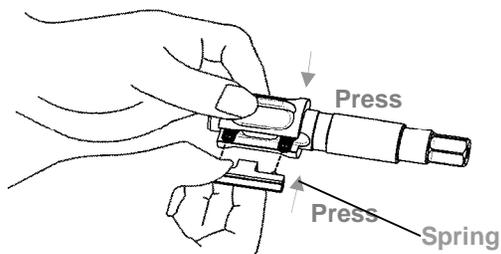
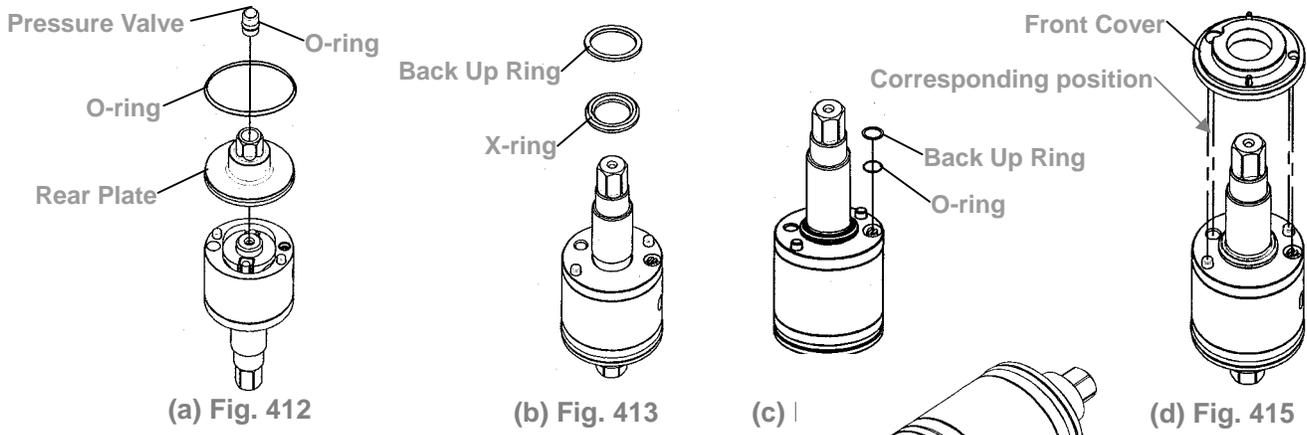


Fig. 411

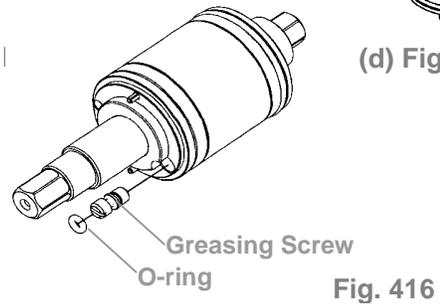
(3) Front Cover and Rear Plate of Pulse Cylinder Assembly

→ **FLEXS-50R, FLEXS-50RX, FLEXS-60R, FLEXS-60RX, FLEXS-70R, FLEXS-70RX**

- ① (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 412) Then, plug the pressure valve with the convex facing outside in the hole on the rear plate.
- (b) Put the X-ring and Back up ring on the anvil with the oil applied. (Fig. 413)
- (c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 414)
- (d) Install the front cover to the pulse cylinder by the corresponding positions. (Fig. 415)

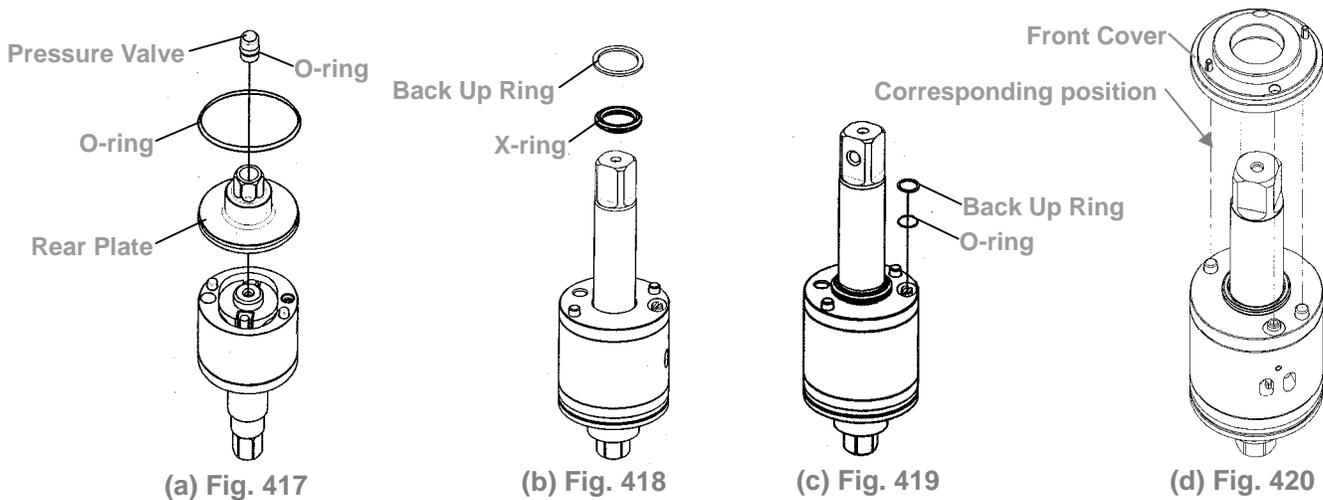


- ② After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened. (Fig. 416)

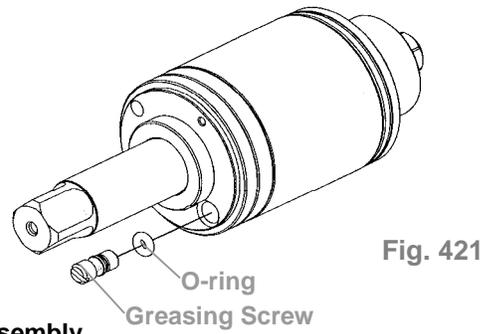


→ **FLEXS-70RG, FLEXS-70RH, FLEXS-80RH**

- ① (a) Put the O-ring on the Rear Plate and install the rear plate to the pulse cylinder, Be sure the positions of the pin and the hole are corresponded. (Fig. 417) Then, plug the pressure valve with the convex facing outside in the hole on the rear plate.
- (b) Put the X-ring and Back up ring on the anvil with the oil applied. (Fig. 418)
- (c) Put the Back up ring and O-ring into the Valve Screw. (Fig. 419)
- (d) Install the front cover to the pulse cylinder by the corresponding positions. (Fig. 420)



- ② After installing the front cover, put the o-ring on the greasing screw, then tighten the greasing screw but release it a little bit after completely tightened.



(4) Pulse Cylinder Seat and Lock Nut of Pulse Cylinder Assembly

- ① Place the o-ring inside the bottom of the pulse cylinder seat, then combine the pulse cylinder seat with the assembled pulse cylinder unit. (Fig. 422, Fig. 423)

⚠ Make sure the half-circle gaps aim at the corresponding positions.

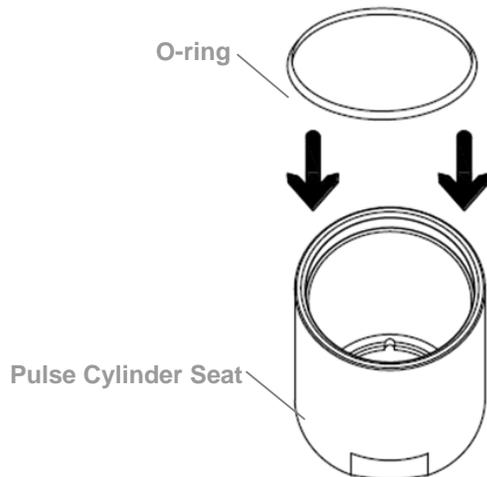


Fig. 422

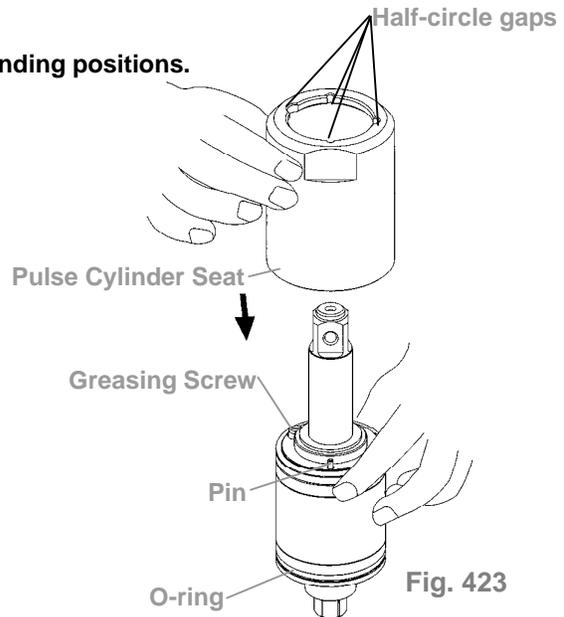


Fig. 423

- ② Use the appliance to push out the rear plate from the pulse cylinder seat. See Table 55 in reference to the proper appliance selection. (Fig.424)
- ③ Fill up the interior pulse cylinder with the pulse oil about 90% full by an injector. Put the steel ball and the valve spring into the hole on the pulse cylinder in order. (Fig. 425)
- ④ Put the block valve into the rear plate taken out at Step 2, and then install the rear plate to the pulse cylinder. Make sure the positions of the pins and the holes are exactly matched. (Fig.426)
- ⑤ Turn the assembled unit up side down so the rear plate is at the bottom. Then press the pulse cylinder seat all the way down to the fixed position. Make sure the corresponding positions are matched exactly.

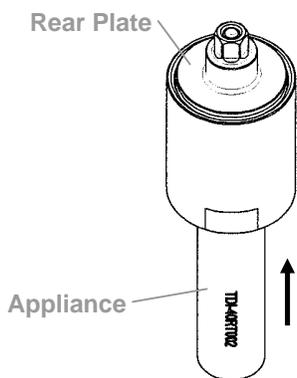


Fig. 424

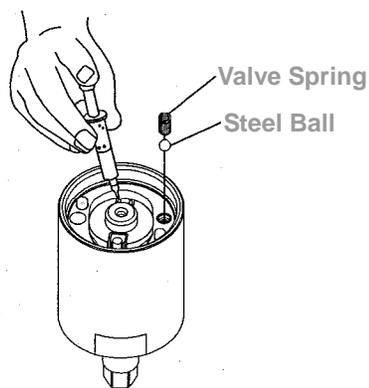


Fig. 425

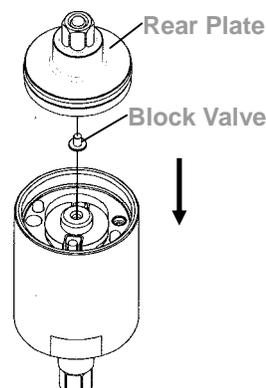


Fig. 426

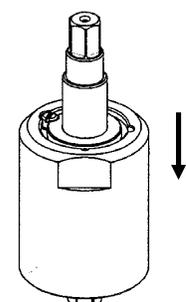


Fig. 427

- ⑥ Fix the pulse cylinder seat by a vise. Use an appliance and a torque wrench, and then turn clockwise to tighten the lock nut of the pulse cylinder. See Table 60 and 61 in reference to the proper appliance and tightness. (Note: Lock-tite needed when tightening the lock nut of the pulse cylinder)

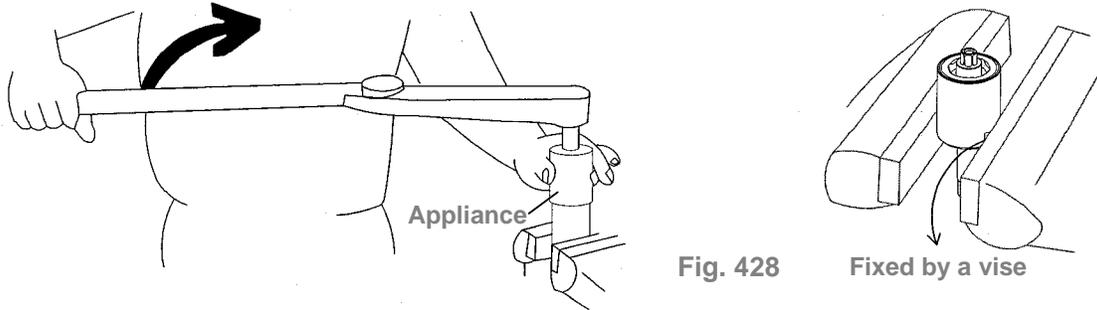


Fig. 428

Fixed by a vise

Appliance No.	Apply to
63-40RT001	FLEXS-50R, FLEXS-50RX FLEXS-60R, FLEXS-60RX
63-70RT001	FLEXS-70R, FLEXS-70RX, FLEXS-70RG FLEXS-70RH, FLEXS-80RH

Table 60

Model No.	Tighten torque
FLEXS-50R	80 N.M
FLEXS-50RX	80 N.M
FLEXS-60R	80 N.M
FLEXS-60RX	80 N.M
FLEXS-70R	100 N.M

Model No.	Tighten torque
FLEXS-70RX	100 N.M
FLEXS-70RG	100 N.M
FLEXS-70RH	100 N.M
FLEXS-80RH	100 N.M

Table 61

- ⑦ After completing the above steps, test to make sure the square drive of the anvil rotates smoothly.

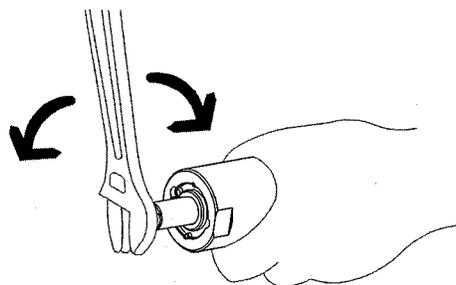


Fig. 429

(5) Steps for Pulse Cylinder Oiling :

- ① Loosen the greasing screw, and fill in the authorized oil by an injector until it is full and overflow.

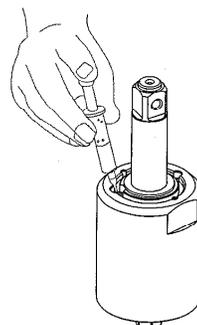


Fig. 430

- ② Take the unit and dip it in an oil tank, then rotate the anvil by a wrench to release air inside, in the mean time, the unit would be full with oil completely.

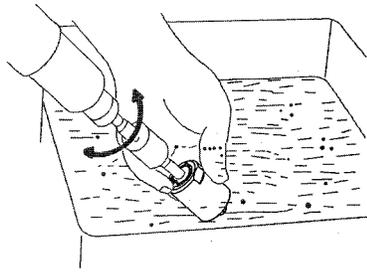


Fig. 431

- ③ Use the screwdriver either ,the slotted to tighten the greasing screw, Fig. 432.

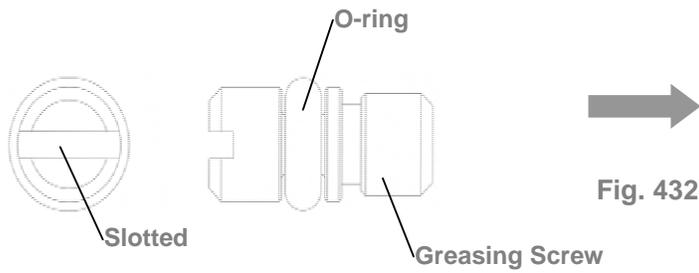
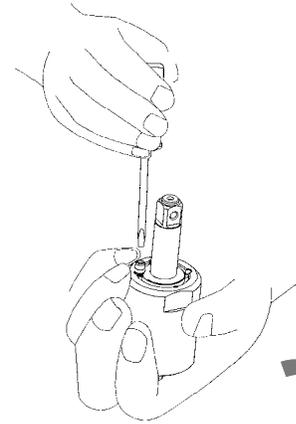


Fig. 432



- ④ Use an air spray gun to blow off the oil on the cylinder seat, Fig. 433.



Fig. 433

- ⑤ Loosen the greasing screw again and use an injector to draw out a little amount of oil (see Table 62) . Finally, tighten the greasing screw back to the pulse cylinder unit, Fig. 434.



Fig. 434

Model No.	Amount of oil draw
FLEXS-50R	0.3 CC
FLEXS-50RX	0.3 CC
FLEXS-60R	0.43 CC
FLEXS-60RX	0.4 CC
FLEXS-70R	0.6 CC

Model No.	Amount of oil draw
FLEXS-70RX	0.6 CC
FLEXS-70RG	0.6 CC
FLEXS-70RH	0.6 CC
FLEXS-80RH	0.6 CC

Table 62

(6) Torque Testing :

- ① Put the washer on the front end of the anvil, then put another washer on the rear plate.

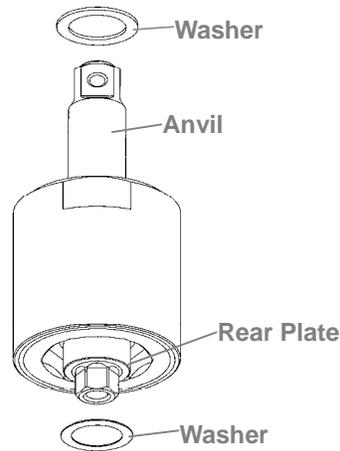


Fig. 435

- ② Tighten the clutch housing by hands.

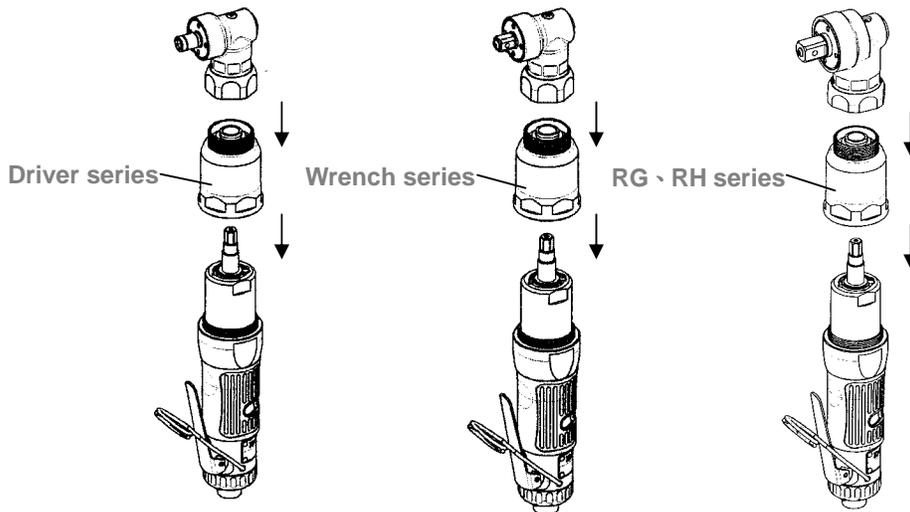


Fig. 436

③ Test the forward torque by a digital torque tester and make sure the tool pulses smoothly.

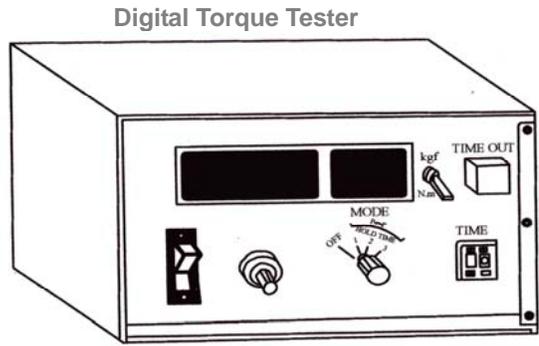
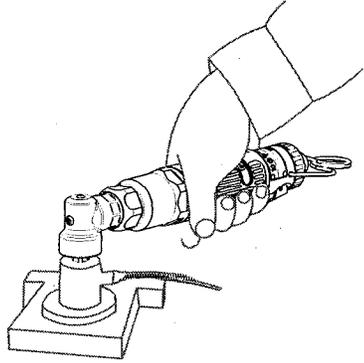


Fig. 437

Model No.	Air inlet pressure 0.6 Mpa
	N.M (at least)
FLEXS-50R	17
FLEXS-50RX	16
FLEXS-60R	24
FLEXS-60RX	22
FLEXS-70R	31
FLEXS-70RX	29
FLEXS-70RG	50
FLEXS-70RH	60
FLEXS-80RH	70

Table 63

④ If the test result is NG (see Table 63 in reference to the torque standard), MUST draw out or add a little amount of oil and do the following steps:

- ① Loosen the pulse unit housing by hands.
- ② Loosen the greasing screw.
- ③ Draw out or add a little amount of oil.
- ④ Tighten the greasing screw back.
- ⑤ Tighten the pulse unit housing.
- ⑥ Test the torque again. If the test result is still NG, repeat the Steps ①~⑥ until the standard torque is reached.

(7) Pulse Unit Housing Assembly :

Fix the housing by a vise. Turn the wrench in counter clockwise direction to tighten the pulse unit housing.

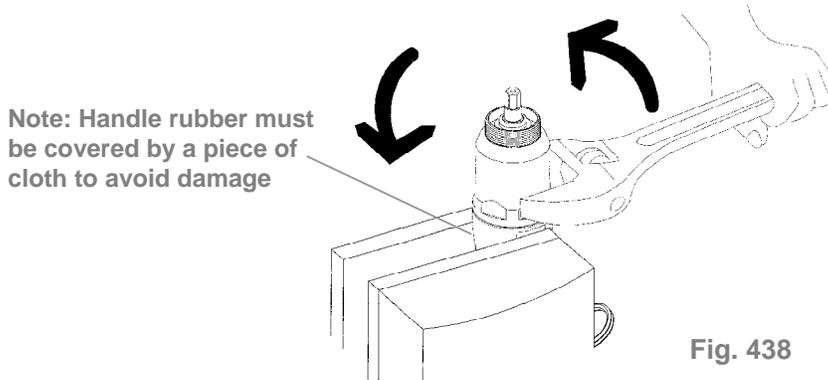


Fig. 438

(8) Angle Housing Unit Assembly:

- ① Assemble the parts in Fig. 439 one by one orderly into the angle housing. Then, fix the angle housing unit. Use the torque wrench and the appliance clockwise to tighten the lock nut of the shaft gear. See Table 64 in reference to the proper appliance selecting.

Note: (1) Make sure to apply the grease on the gear.

(2) Make sure to apply the lock-tite on the lock nut of the shaft gear.

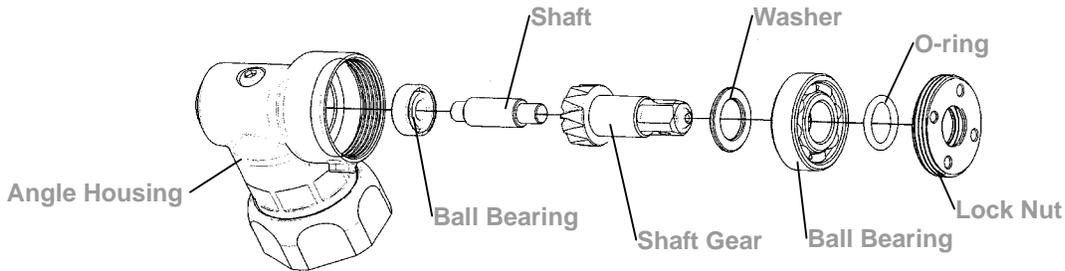


Fig. 439

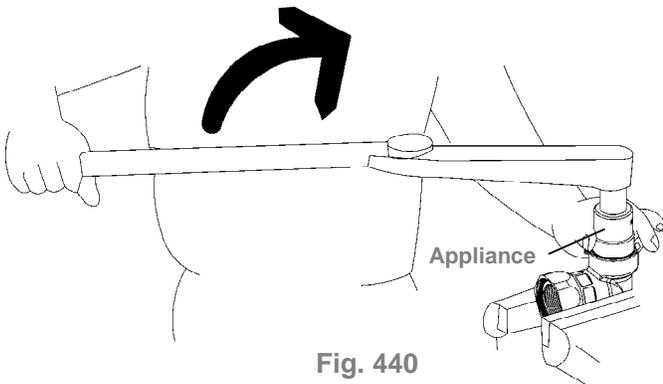


Fig. 440

Appliance No.	Apply to
63-50RRT001	FLEXS-50R, FLEXS-50RX FLEXS-60R, FLEXS-60RX FLEXS-70R, FLEXS-70RX
63-70RHRT001	FLEXS-70RG, FLEXS-70RH FLEXS-80RH

Table 64

- ② Assemble the parts in Fig. 441 one by one orderly into the angle housing. Then, fix the angle housing unit. Use the torque wrench and the appliance clockwise to tighten the lock nut of the main shaft gear. See Table 65 in reference to the proper appliance selecting.

Note:(1) Make sure to apply the grease on the gear.

(2) Make sure to apply the lock-tite on the lock nut of the main shaft gear.

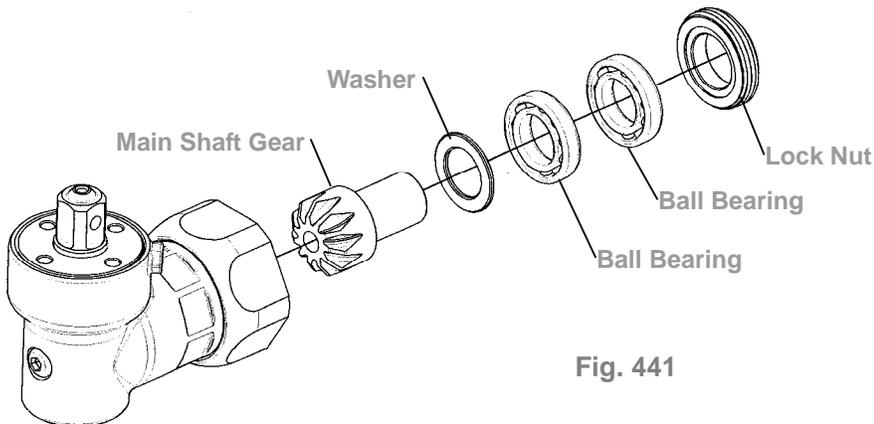


Fig. 441

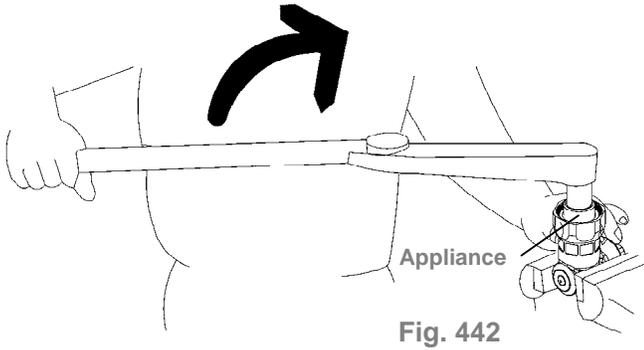


Fig. 442

Appliance No.	Apply to
63-50RR002	FLEXS-50R, FLEXS-50RX FLEXS-60R, FLEXS-60RX FLEXS-70R, FLEXS-70RX
63-70RHRT002	FLEXS-70RG, FLEXS-70RH FLEXS-80RH

Table 65

- ③ Use 2mm L-type wrench clockwise to loosen the screws.
- ④ Assemble the angle housing unit to the pulse unit housing and use the torque wrench clockwise to tighten it.

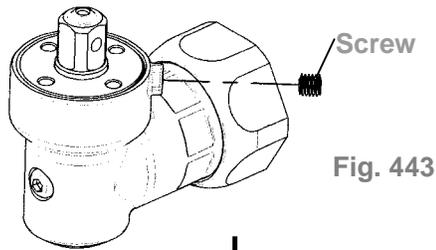


Fig. 443

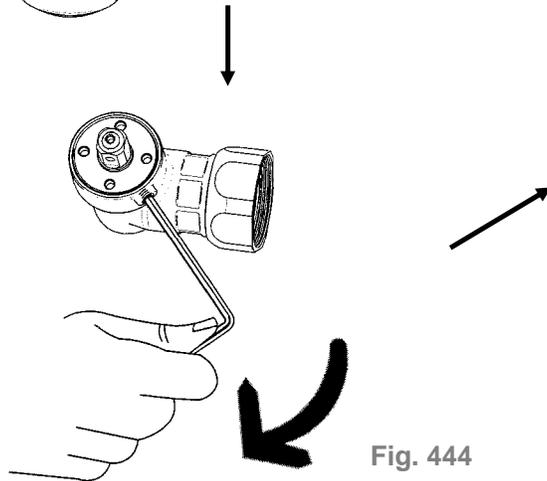


Fig. 444

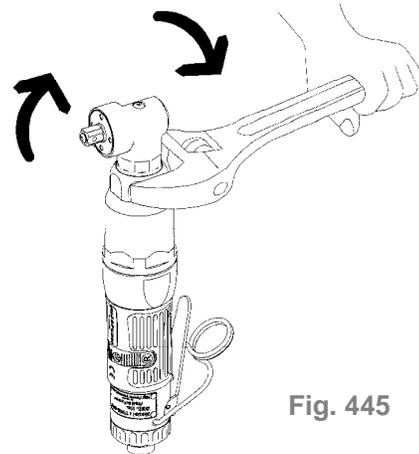


Fig. 445

● HOUSING AND MOTOR SET DISASSEMBLY:

(1) Cylinder Unit Disassembly:

- ① Fix the tool by a vise. Use the appliance (see Table 66) to take the lock nut out of cylinder by turning clockwise.

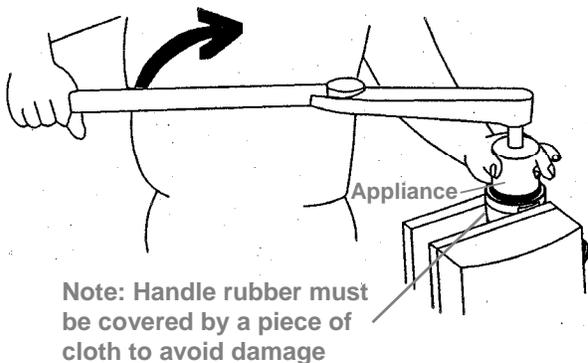


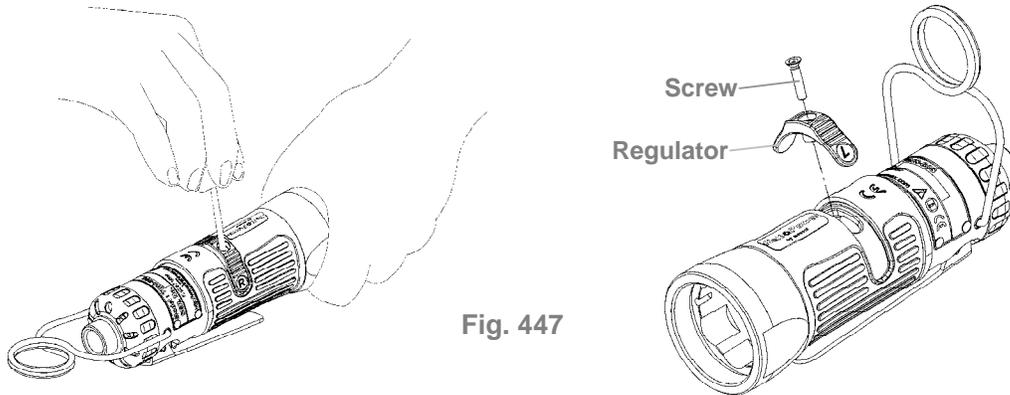
Fig. 446



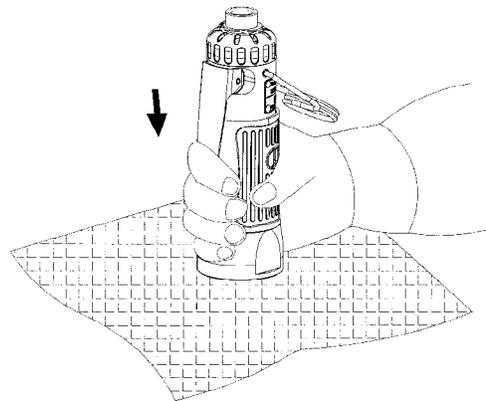
Appliance No.	Apply to
63-40RT004	FLEXS-50R, FLEXS-50RX FLEXS-60R, FLEXS-60RX
63-70SRT001	FLEXS-70R, FLEXS-70RX FLEXS-70RG, FLEXS-70RH FLEXS-80RH

Table 66

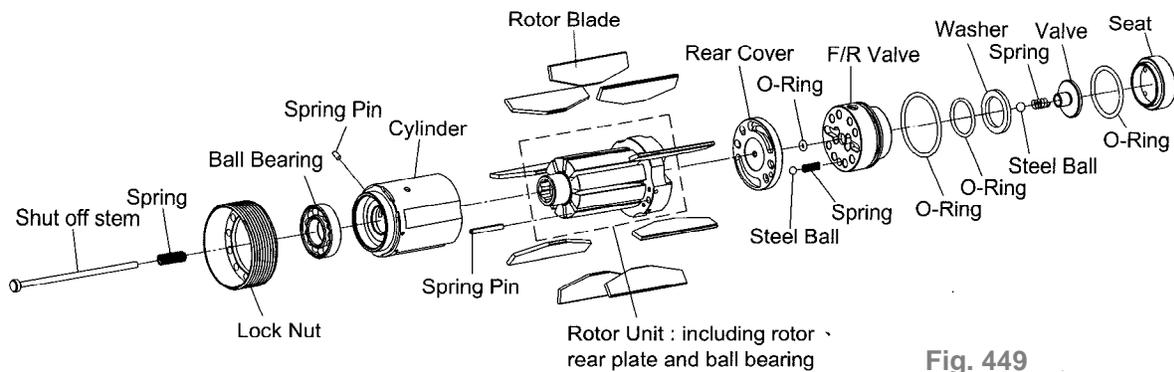
② Use a wrench to loosen the screw on the side of the motor housing and detach the parts of the regulator.



③ Take a piece of cloth and lay it on a table before disassembly. Hold the housing downward to detach the cylinder unit out.



④ Parts of Motor Set:





The rotor and the rear end plate must be press fitted. The clearance of the two parts must be in between 0.01~ 0.02 mm. It would not be easy to assemble the two parts by repair centers in general. Therefore, as there is a need of repair on the parts of the rotor, the rear end plate, and the ball bearing, we strongly suggest replacing a complete ROTOR UNIT, which is including the rotor, the rear plate, and the ball bearing. The rotor unit would be full assembled and well-measured before delivery.

(2) Air Inlet Disassembly:

Take off the snap ring from the air inlet, and then take off the exhaust deflector. Use an open wrench to open the air inlet in counter clock wise direction. All the interior parts are detached.

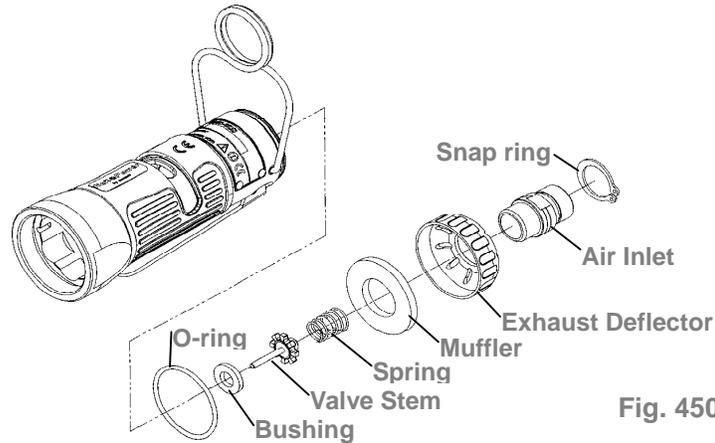


Fig. 450

(3) Trigger Set Disassembly:

Remove the spring pin from the trigger to detach the interior parts. And then, remove the housing rubber and the hanger to complete the disassembly.

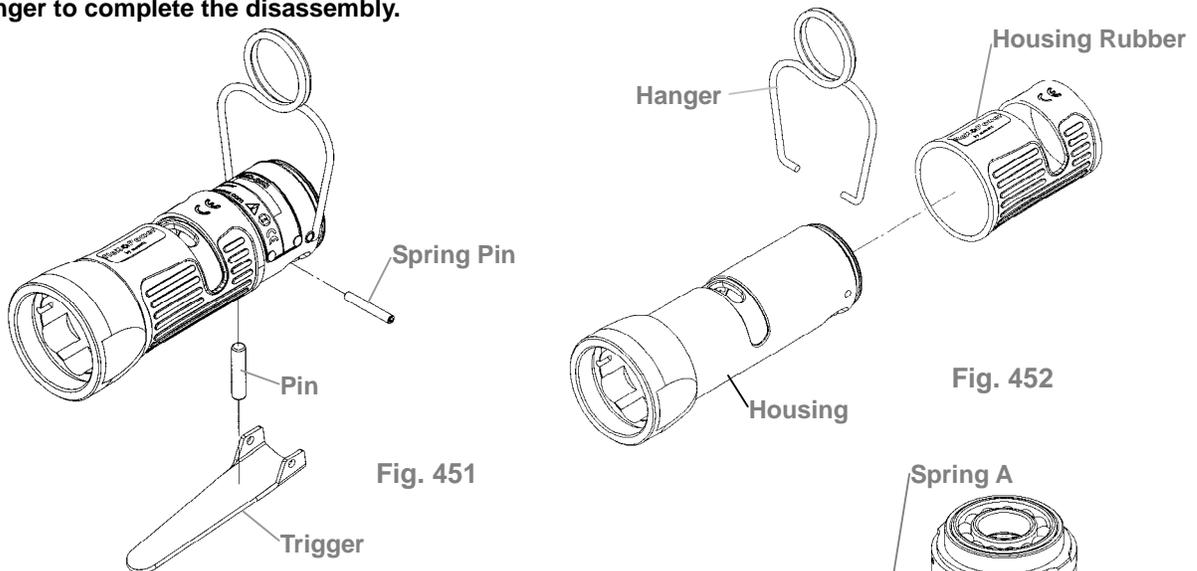


Fig. 451

Fig. 452

● **HOUSING AND MOTOR SET ASSEMBLY:**

(1) Cylinder Unit Assembly

- ① Place the rotor blades into the rotor. Insert the spring pin A and B into the cylinder. Make sure the pins aim at the pin holes when putting the cylinder down.

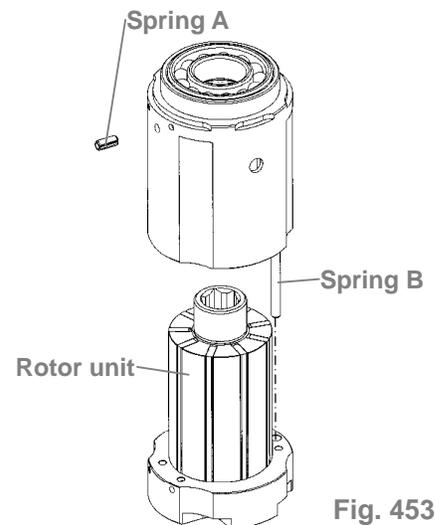


Fig. 453

- ② Place the o-ring into the groove of the F/R valve unit. And then, place the steel ball on the F/R valve unit into any hole on the air inlet plate.

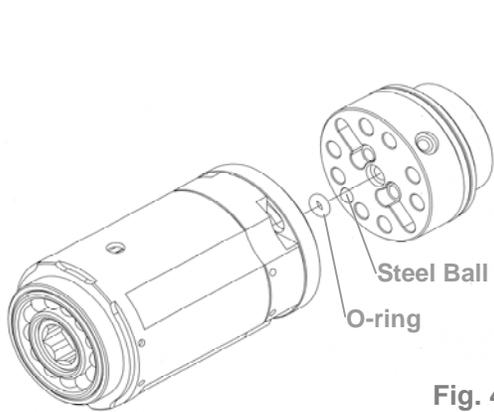


Fig. 454

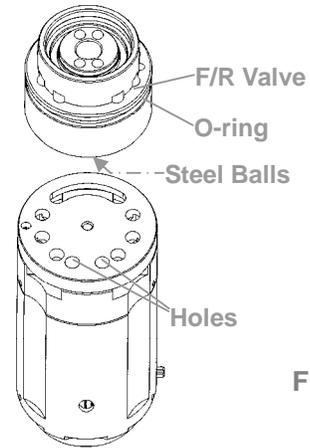


Fig. 455

- ③ Assemble the regulator with the rotor- air inlet unit. Make sure the steel balls of the regulator are placed on the holes of the air inlet plate. Then, place the seat with the o-ring sleeved on the regulator. Assembly is completed.

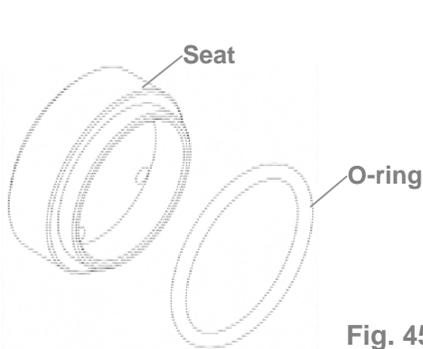


Fig. 456

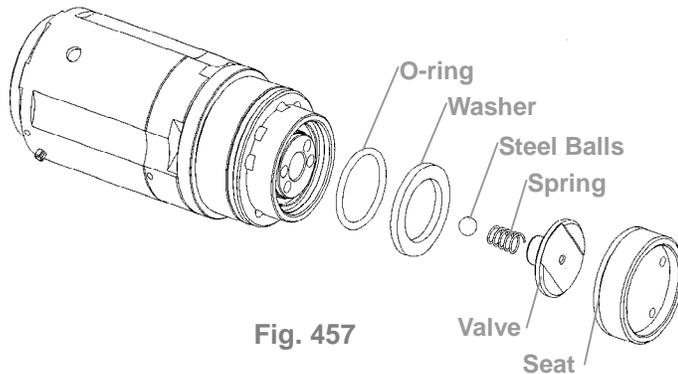


Fig. 457

⚠ Apply the lubricator between parts while assembling.

(2) Housing, Motor set unit and Lock Nut of Cylinder Assembly:

- ① Sleeve the housing rubber to the housing.
- ② Install the motor set into the housing. Make sure the direction is correct, i.e. the spring pin on the side of the cylinder aims at the hole inside the housing.
- ③ Have the hole on the regulator knob aim at the screw hole on the side of the F/R valve and make sure the screw is tightened into the regulator and the F/R valve.

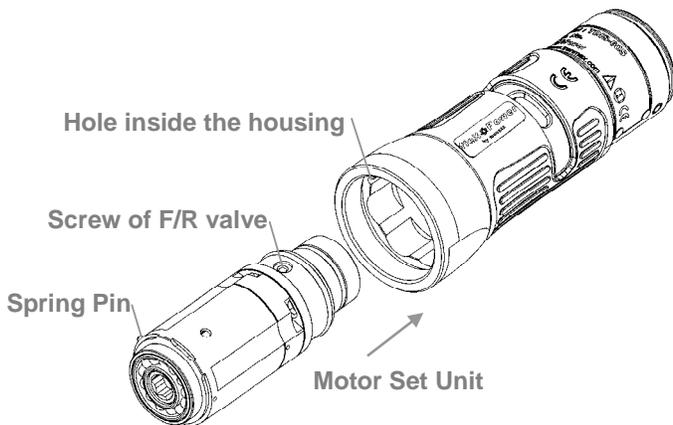


Fig. 458

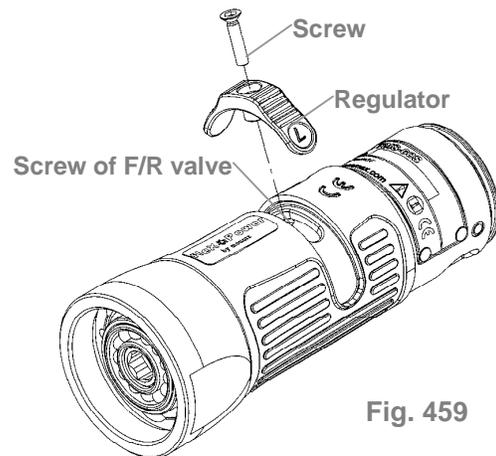


Fig. 459

④ Fix the tool by a vise. Place the lock nut of the cylinder nut and tighten by the appliance in counter clockwise direction to complete the assembly. See the Table 67 and 68 in reference to appliance use and tighten torque.

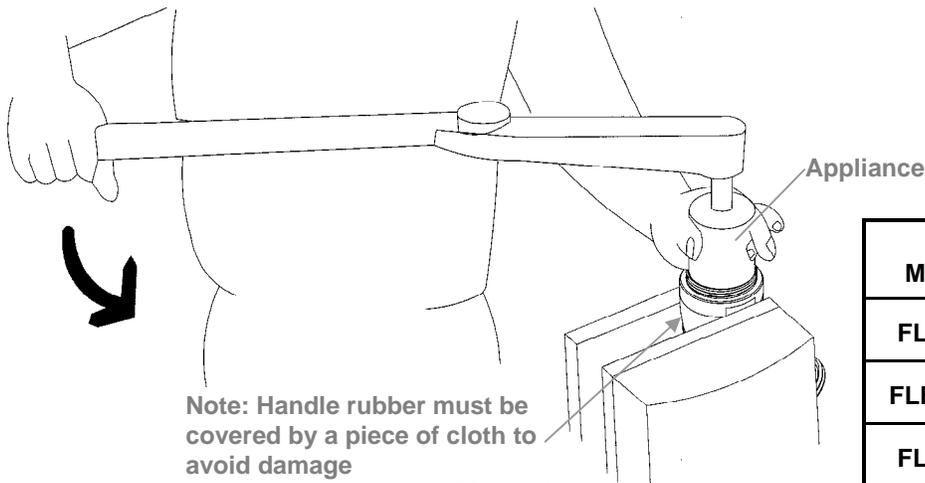


Fig. 460

Appliance No.	Apply to
63-40RT004	FLEXS-50R, FLEXS-50RX FLEXS-60R, FLEXS-60RX
63-70SRT001	FLEXS-70R, FLEXS-70RX FLEXS-70RG, FLEXS-70RH FLEXS-80RH

Table 67

Model No.	Tighten torque
FLEXS-50R	40 N.M
FLEXS-50RX	40 N.M
FLEXS-60R	40 N.M
FLEXS-60RX	40 N.M
FLEXS-70R	40 N.M
FLEXS-70RX	40 N.M
FLEXS-70RG	40 N.M
FLEXS-70RH	40 N.M
FLEXS-80RH	40 N.M

Table 68

(3) Housing and Air Inlet Assembly:

Install and tighten the parts of air inlet one by one and in order. (NOTE: Apply the Lock-tite on the threads of air inlet before assembly)

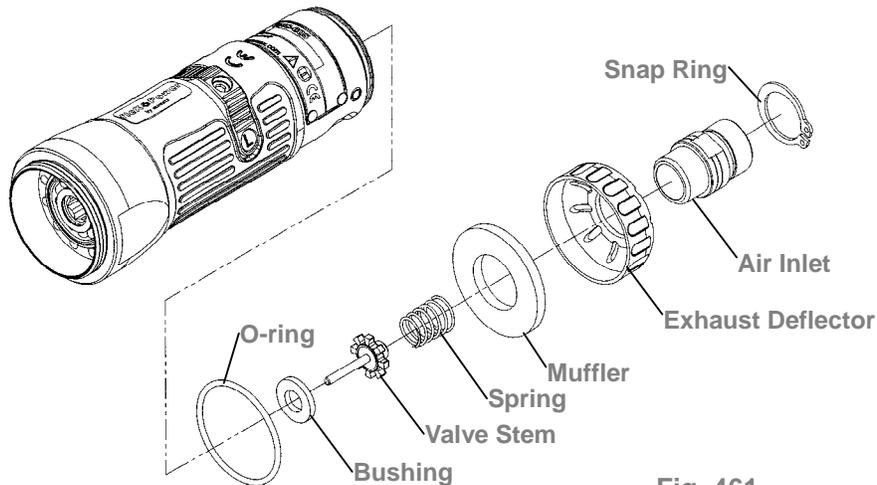
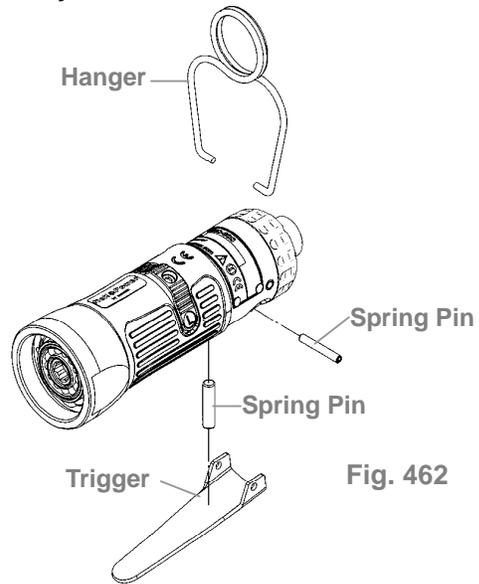


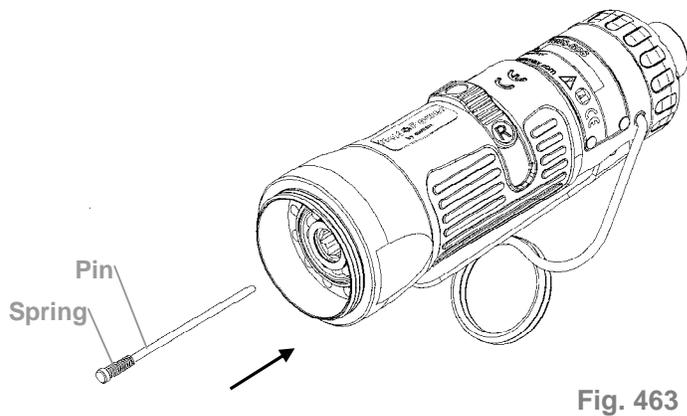
Fig. 461

(4) Housing and Trigger Set Assembly:

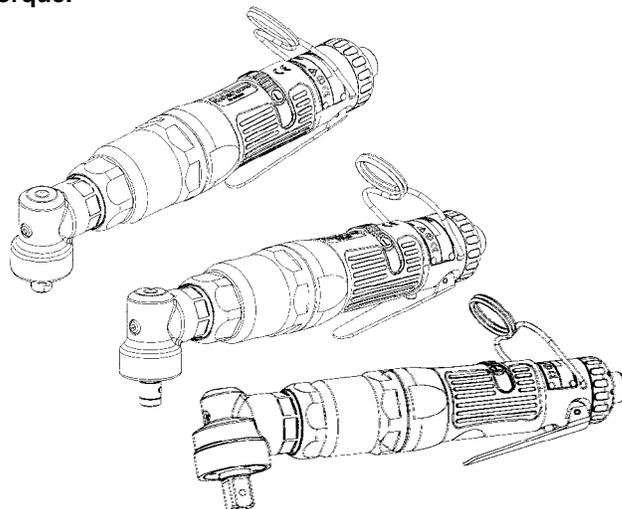
Install the parts of the trigger set orderly (see Fig. 462 drawing for reference). Then, Insert the spring pins to fix all the parts. And, install the hanger to complete the assembly.

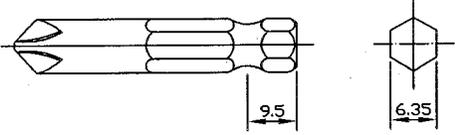


(5) Put the spring on the pin, and then install into the assembled housing.



After all the assembly is complete, test to make sure the anvil rotates smoothly, then connect the air hose to test the torque.



MODEL	Bolt Capacity	Inserted Tools
FLEXS-50RX FLEXS-60RX FLEXS-70RX	M6-M8 M8 M8	 <p style="text-align: right;">Unit : mm</p>
FLEXS-50R ~ FLEXS-70R and FLEXS-70RG		3/8" power sockets
FLEXS-70RH		1/2" power sockets

General safety rules

- For multiple hazards, read and understand the safety instructions before installing, operating, repairing, maintaining, changing accessories on, or working near the power tool. Failure to do so can result in serious bodily injury.
- Only qualified and trained operators should install, adjust or use the power tool.
- Do not modify this power tool. Modifications can reduce the effectiveness of safety measures and increase the risks to the operator.
- Do not discard the safety instructions; give them to the operator.
- Do not use the power tool if it has been damaged.
- Tools shall be inspected periodically to verify that the ratings and markings are legibly marked on the tool. The employer/user shall contact the manufacturer to obtain replacement marking labels when necessary.

Projectile hazards

- Be aware that failure of the work piece, of accessories or even of the inserted tool itself can generate high-velocity projectiles.
- Always wear impact-resistant eye protection during the operation of the power tool.
- The grade of protection required should be assessed for each use.
- Ensure that the work piece is securely fixed.

Entanglement hazards

- Entanglement hazards can result in choking, scalping and/or lacerations if loose clothing, personal jewelry, neck ware, hair or gloves are not kept away from the tool and accessories.
- Gloves can become entangled with the rotating drive, causing severed or broken fingers.
- Rotating drive sockets and drive extensions can easily entangle rubber-coated or metal-reinforced gloves.
- Do not wear loose-fitting gloves or gloves with cut or frayed fingers.
- Never hold the drive, socket or drive extension.
- Keep hands away from rotating drives.

Operating hazards

- The use of the tool can expose the operator's hands to hazards including crushing, impacts, cuts, abrasions and heat. Wear suitable gloves to protect hands.
- Operators and maintenance personnel shall be physically able to handle the bulk, weight and power of the tool.
- Hold the tool correctly; be ready to counteract normal or sudden movements and have both hands available.
- Maintain a balanced body position and secure footing.
- In cases where the means to absorb the reaction torque are requested, it is recommended to use a suspension arm whenever possible. If that is not possible, side handles are recommended for straight case and pistol-grip tools. Reaction bars are recommended for angle nut runners. In any case, it is recommended to use a means to absorb the reaction torque above 4 Nm for straight tools, above 10 Nm for pistol-grip tools, and above 60 Nm for angle nut runners.
- Release the start-and-stop device in the case of an interruption of the energy supply.
- Use only lubricants recommended by the manufacturer.
- Fingers can be crushed in open-ended crow-foot nut runners.
- Do not use in confined spaces and beware of crushing hands between tool and work piece, especially when unscrewing.

Repetitive motions hazards

- When using a power tool, the operator can experience discomfort in the hands, arms, shoulders, neck, or other parts of the body.
- While using a power tool, the operator should adopt a comfortable posture whilst maintaining secure footing and avoiding awkward or off-balanced postures. The operator should change posture during extended tasks, which can help avoid discomfort and fatigue.
- If the operator experiences symptoms such as persistent or recurring discomfort, pain, throbbing, aching, tingling, numbness, burning sensations or stiffness, these warning signs should not be ignored. The operator should tell the employer and consult a
- qualified health professional.

Accessory hazards

- Disconnect the power tool from the energy supply before changing the inserted tool or accessory.
- Do not touch sockets or accessories during impacting, as this increases the risk of cuts, burns or vibration injuries.
- Use only sizes and types of accessories and consumables that are recommended by the power tool manufacturer.
- Use only impact-wrench-rated sockets in good condition, as poor condition or hand sockets and accessories used with impact wrenches can shatter and become a projectile.

Workplace hazards

- Slips, trips and falls are major causes of workplace injury. Be aware of slippery surfaces caused by the use of the tool and also of trip hazards caused by the air line or hydraulic hose.
- Proceed with care in unfamiliar surroundings. Hidden hazards, such as electricity or other utility lines, can exist.
- The power tool is not intended for use in potentially explosive atmospheres and is not insulated against coming into contact with electric power.
- Make sure there are no electrical cables, gas pipes, etc., that can cause a hazard if damaged by use of the tool.

Dust and fume hazards

- Dust and fumes generated when using power tools can cause ill health (for example, cancer, birth defects, asthma and/or dermatitis); risk assessment and implementation of appropriate controls for these hazards are essential.
- Risk assessment should include dust created by the use of the tool and the potential for disturbing existing dust.
- Direct the exhaust so as to minimize disturbance of dust in a dust-filled environment.
- Where dust or fumes are created, the priority shall be to control them at the point of emission.
- All integral features or accessories for the collection, extraction or suppression of airborne dust or fumes should be correctly used and maintained in accordance with the manufacturer's instructions.
- Use respiratory protection in accordance with employer's instructions and as required by occupational health and safety regulations.

Noise hazards

- Unprotected exposure to high noise levels can cause permanent, disabling, hearing loss and other problems, such as tinnitus (ringing, buzzing, whistling or humming in the ears).
- Risk assessment and implementation of appropriate controls for these hazards are essential.
- Appropriate controls to reduce the risk may include actions such as damping materials to prevent work pieces from “ringing”.
- Use hearing protection in accordance with employer's instructions and as required by occupational health and safety regulations.
- Operate and maintain the power tool as recommended in the instruction handbook, to prevent an unnecessary increase in noise levels.
- If the power tool has a silencer, always ensure it is in place and in good working order when the power tool is operating.
- Select, maintain and replace the consumable/inserted tool as recommended in the instruction hand book, to prevent an unnecessary increase in noise.

Vibration hazards

- Exposure to vibration can cause disabling damage to the nerves and blood supply of

the hands and arms.

- Keep the hands away from the nut runner sockets.
- Wear warm clothing when working in cold conditions and keep your hands warm and dry.
- If you experience numbness, tingling, pain or whitening of the skin in your fingers or hands, stop using the power tool, tell your employer and consult a physician.
- Operate and maintain the power tool as recommended in the instruction handbook, to prevent an unnecessary increase in vibration levels.
- Do not use worn or ill-fitting sockets or extensions, as this is likely to cause a substantial increase in vibration.
- Select, maintain and replace the consumable/inserted tool as recommended in the instruction handbook, to prevent an unnecessary increase in vibration levels.
- Sleeve fittings should be used where practicable.
- Support the weight of the tool in a stand, tensioner or balancer, if possible.
- Hold the tool with a light but safe grip, taking account of the required hand reaction forces, because the risk from vibration is generally greater when the grip force is higher.

Additional safety instructions for pneumatic power tool

- Air under pressure can cause severe injury
- Always shut off air supply, drain hose of air pressure and disconnect tool from air supply when not in use, before changing accessories or when making repairs
- Never direct air at yourself or anyone else.
- Whipping hoses can cause severe injury. Always check for damaged or loose hoses and fittings.
- Cold air shall be directed away from the hands.
- Do not use quick-disconnect couplings at tool inlet for impact and air-hydraulic impulse wrenches. Use hardened steel (or material with comparable shock resistance) threaded hose fittings.
- Whenever universal twist couplings (claw couplings) are used, lock pins shall be installed and whipcheck safety cables shall be used to safeguard against possible hose-to-tool and hose-and-hose connection failure.
- Do not exceed the maximum air pressure stated on the tool.
- For torque-control and continuous-rotation tools, the air pressure has a safety critical effect on performance. Therefore, requirements for length and diameter of the hose shall be specified.
- Never carry an air tool by the hose.

RECOMMENDATIONS FOR SERVICE

The pulse tool requires regular maintenance to ensure the tool operates at optimal performance. The type of routine maintenance and the frequency is dependent on the application and how the tool is used. The pulse tool requires preventive maintenance like oil changes and have the parts inspected periodically. Regular oil changes will increase the life cycle of the tool, reduce maintenance costs and allow the tool operate properly.

When is first service required? There are several factors that influence the maintenance schedule: 1) Type of application, 2) The torque setting within the torque range of the pulse tool, and 3) The number of cycles the tool is used daily, weekly and monthly.

1) The first service is recommended at 250,000 pulse-seconds. The oil needs to be changed. Inspect all the soft parts of the pulse unit (the soft parts are referenced as the "Repair Kit" - see parts list document for that model). The Repair Kit includes all the necessary parts and it is recommend to be performed every six months at minimum, based upon use of the tool.

2) The second service is recommended at 500,000 pulse-seconds. The oil needs to be changed. All soft parts of the pulse unit need to be replaced (the soft parts are referenced as the "Repair Kit" - see parts list document for that model). Inspect the hard parts of the pulse tool (the hard parts are referenced as the "Service Kit" - see parts list document for that model). This maintenance service may occur once or twice a year at minimum, based upon use of the tool.

It is recommended that after 250,000 pulse-seconds the pulse tool should be evaluated for general performance and oil condition as part of its standard preventive maintenance. If the tool fails before the 250,000 pulses-seconds then the pulse unit needs to be rebuilt, with the "Repair Kit" and "Service Kit" (see parts list document for that model). **Note!** Always it is important to make sure the tool has clean, dry and lubricated air at the recommended pressure supplied to it.

A pulse-second is not every second the tool is running, only when it's "pulsing" and applying torque. Typically, the tool does not start pulsing until after the fastener is snug, unless there's considerable prevailing torque. When operating the tool on the fastener, start counting once the tool begins pulsing. You can use a watch with a second hand and time it until the tool automatically shuts-off. Use the information to calculate how many pulse-seconds the tool performs per application each day. Then perform some basic math to calculate the tool's maintenance schedule. Use this formula.

Pulsing Seconds ÷ Total of Pulsing Time = No Cycles

Note! Please include the rework, reverse, or retightening time involved on the operation to calculate the accurate pulsing time. Here is an example:

Pulsing Time = 2 seconds

Pulses- seconds recommended = 250,000

250,000 pulses-sec ÷ 2 sec = 125,000 cycles

Taking the example above, to estimate the maintenance period can be follow by the following

No of Fasteners	Pulsing Time per Fastener	No of parts assembled per day	Calculation	No of days to inspect the tool
7	2 seconds	300	125,000 /(300*7) = 59	59 days

Regularly the hard joint pulse in average 0.5 sec, and the soft joint is average is 2 seconds, based on the above example, if the tool has not drop-off the performance, the service to change the oil fluid is after approximately 59 work days. However the application can be expose of extreme conditions (poor air supply, extended pulsing times, torque setting at the high end of tool range, high number of cycles), the maintenances intervals may need to be reduced.

Trouble Shooting

Trouble	Cause	Solution
No Shut-off occurs	Overfill oil or missing oil in the pulse unit	Draw or add the amount of oil needed.
	Push rod or spring worn out	Replace the push rod and spring.
	Low Air pressure or incorrect hose size and air fittings	Adjust desired air pressure when the tool is running freely. Select the correct hose size and the air fittings, according to the tool model.
	Missing Cap (rear plate)	Replace the parts.
	Oil and/or O-rings broke down	Change the oil O-rings if worn out or bad condition.
Premature Shut-off or uncompleted rundown	Excess of oil in the pulse unit	Draw the excess of oil from the pulse unit.
	Torque setting	Adjust the target torque as recommended.
	Extensions or extra length sockets	Use sleeve drive sockets for extension or different length need.
	Join characteristic	Use a bigger model or a non-shut off tool, if the joint is soft or there is a prevailing torque.
Inconsistence torque output or low Torque	Low air pressure or fluctuates	Adjust desired air pressure when the tool is running freely.
	Lack of CFM on the air motor	Check the air compressor capacity.
	Dry blades of the air motor	Lubricate the air motor and recommended to add two or three drops per week.
	Oil and/or O-rings broke down	Change the oil O-rings if are worn out or bad conditions.
Low RPM's	Low air pressure or fluctuates	Adjust desired air pressure when the tool is running freely.
	Dry blades of the air motor	Lubricate the air motor and recommended to add two or three drops per week.

Service Centers

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