

TECHNICAL INFORMATION



PRODUCT

P 1 / 24

Models No. ▶ HR2450FT, HR2450T

Description ▶ 24mm (15/16") Rotary Hammer

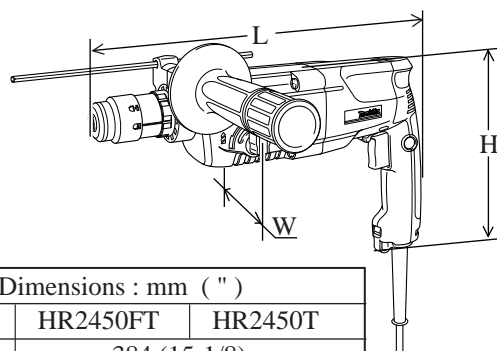
CONCEPTION AND MAIN APPLICATIONS

The above models are the advanced version of MAKITA's famous 3 -mode rotary hammer HR2450.

Each new model features :

HR2450T : possible to quickly change from the chuck for SDS-plus to keyless drill chuck mutually without any tool

HR2450FT : equipped with built in job light in addition to HR2450T's feature



Dimensions : mm (")		
Model No.	HR2450FT	HR2450T
Length (L)	384 (15-1/8)	
Height (H)	212 (8-3/8)	204 (8)
Width (W)	72 (2-13/16)	

► Specification

Voltage (V)	Current (A)	Cycle (Hz)	Continuous Rating (W)		Max. Output(W)
			Input	Output	
110	7.5	50 / 60	780	370	650
120	6.7	50 / 60	780	370	650
220	3.7	50 / 60	780	370	650
230	3.6	50 / 60	780	370	650
240	3.4	50 / 60	780	370	650

Model No.		HR2450FT	HR2450T
No load speed : (min -1= rpm)		0 - 1,100	0 - 1,100
Blows per min, :(bpm=min -1)		0 - 4,500	0 - 4,500
Single blow energy (J)		2.7	2.7
Variable switch		Yes	Yes
Reverse switch		Yes	Yes
Bit shank		SDS plus type	SDS plus type
Capacity	Concrete : mm (")	* 24 (15/16)	* 24 (15/16)
	Steel. : mm (")	13 (1/2)	13 (1/2)
	Wood : mm (")	32 (1-1/4)	32 (1-1/4)
Protection against electric shock		double insulation	double insulation
Built in job light		Yes	No
Cord length : m (ft)		** 4 (13.1)	** 4 (13.1)
Net weight :Kg (lbs)		2.6 (5.7)	2.6 (5.7)

* 25mm (1") for USA.

** 2.5m (8.2 ft) for Asia

** 2.0m (6.6 ft) for Australia

► Standard equipment

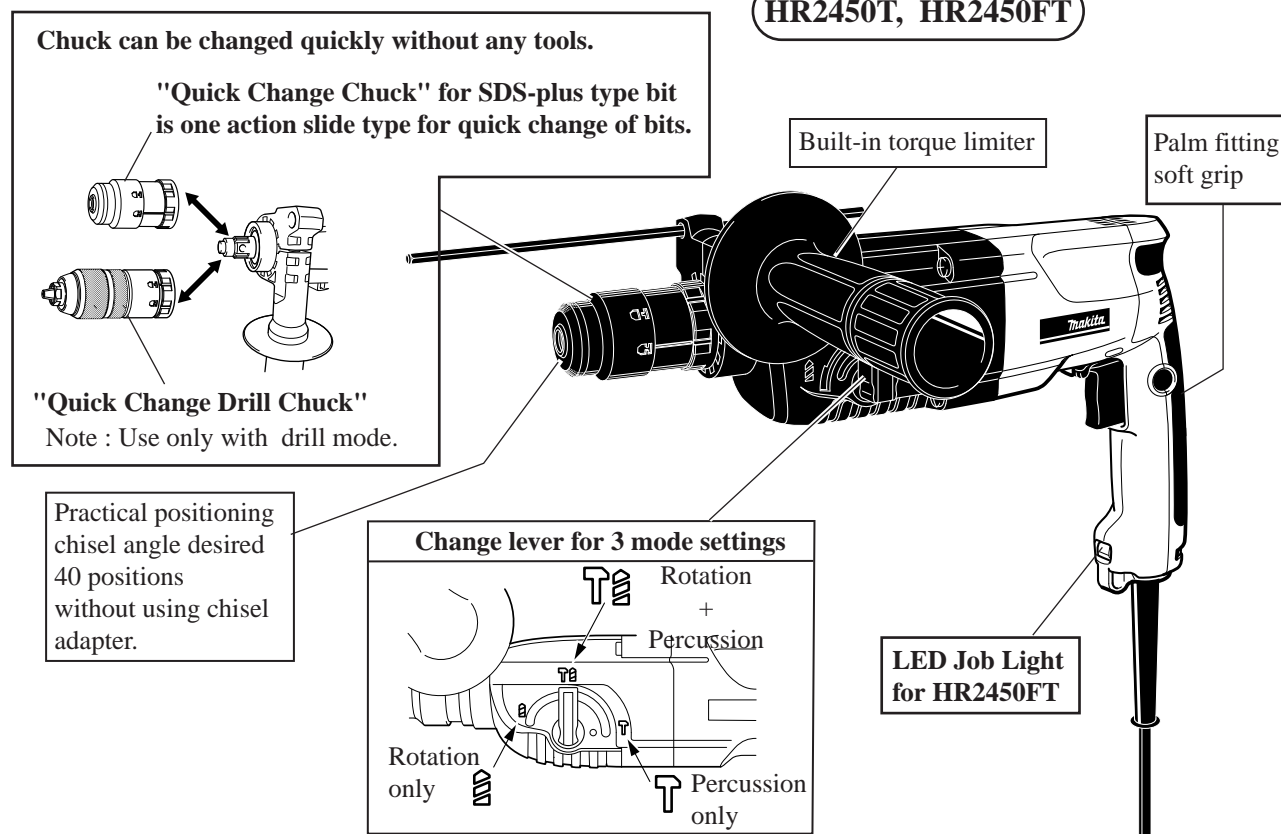
- * Stopper pole 1 pc. * Side grip 1 pc.
- * Quick change drill chuck 1 pc.
- * Plastic carrying case 1 pc.

< Note > The standard equipment for the tool shown may differ from country to country.

► Optional accessories

- * T.C.T hammer drill bits 5.5mm - 24mm (7/32" - 15/16")
- * Bull point 14mm (9/16")
- * Cold chisel 20mm (13/16")
- * Scaling chisels 38mm and 50mm (1-1/2" and 2")
- * Grooving chisels 8mm and 12mm (5/16" and 1/2")
- * Scraper assembly
- * Core bits
- * Center bits
- * Core bit adaptor
- * Rod
- * Core bits (dry type)
- * Taper shank adaptor
- * Taper shank T.C.T.hammer drill bits
- * SDS plus hammer chuck set
- * SDS plus adapter
- * Dust cups 5 and 9
- * Safety goggle
- * Bit grease
- * Blow out bulb
- * Dust extractor attachment
- * Hammer service kit

Features and benefits



Comparison of products

Specifications		Model	MAKITA				Competitor A
			HR2450T	HR2450FT	HR2450	HR2450F	Model A
Power input : W			780	780	780		620
No load speed : min-1=rpm.			0 - 1,100	0 - 1,100	0 - 1,100		0 - 870
Blows per min. : min-1=bpm.			0 - 4,500	0 - 4,500	0 - 4,500		0 - 4,850
Bit shank			SDS-plus	SDS-plus	SDS-plus		SDS-plus
Switch	Variable speed		Yes	Yes	Yes		Yes
	Reverse		Yes	Yes	Yes		Yes
Capacity	Concrete	T.C.T. hammer bit : mm (")	* 24 (15/16)	* 24 (15/16)	* 24 (15/16)		24 (15/16)
		Core bit : mm (")	54 (2-1/8)	54 (2-1/8)	54 (2-1/8)		—
		Diamond core bit : mm (")	65 (2-9/16)	65 (2-9/16)	65 (2-9/16)		68 (2-11/16)
	Steel : mm (")		13 (1/2)	13 (1/2)	13 (1/2)		13 (1/2)
	Wood : mm (")		32 (1-1/4)	32 (1-1/4)	32 (1-1/4)		30 (1-3/16)
Single bow energy : J		Catalogue	2.7	2.7	2.7		2.2
		Measured	2.7	2.7	2.7		1.9
Working mode			3 Modes	3 Modes	3 Modes		3 Modes
R : Rotation			R	R	R		R
R + P : Rotation+Percussion			R+P	R+P	R+P		R+P
P : Percussion			P	P	P		P
Angle settings for chisel etc.			Yes	Yes	Yes		Yes
LED Job light			No	Yes	No	Yes	No
Double insulation			Yes	Yes	Yes		Yes
Cord length : m (ft)			** 4 (13.1)	** 4 (13.1)	** 4 (13.1)		4 (13.1)
Dimensions	Length : mm (")		384 (15-1/8)	384 (15-1/8)	360 (14-1/8)		385 (15-1/8)
	Width : mm (")		72 (2-13/16)	72 (2-13/16)	72 (2-13/16)		70 (2-3/4)
	Height : mm (")		204 (8)	212 (8-3/8)	204 (8)	212 (8-3/8)	205 (8-1/8)
Net weight : kg (lbs)			2.6 (5.7)	2.6 (5.7)	2.4 (5.3)		2.6 (5.7)

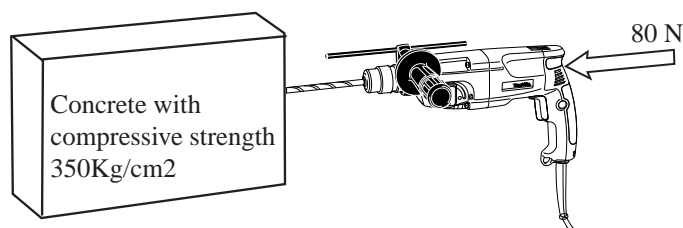
* 25mm (1") for USA.

** 2.5m (8.2) for Asia ** 2.0m (6.6) for Australia

Numbers in chart below are relative values when setting BOSCH GBH2-24DFR 's capacity as 100.

Testing conditions

- * Materials : Concrete with compressive strength, 350Kg/cm2
- * Pressure loaded to the products : 80 N
- * Working mode : Rotation+Percussion



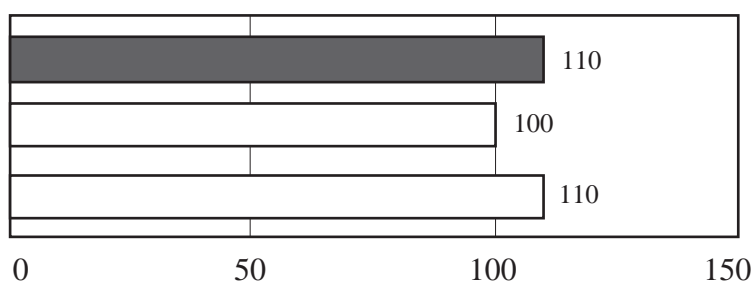
Comparison in hammer drilling

Bit diameter : 6.5mm

MAKITA HR2450FT/T

Competitor A Model A

Competitor B Model B

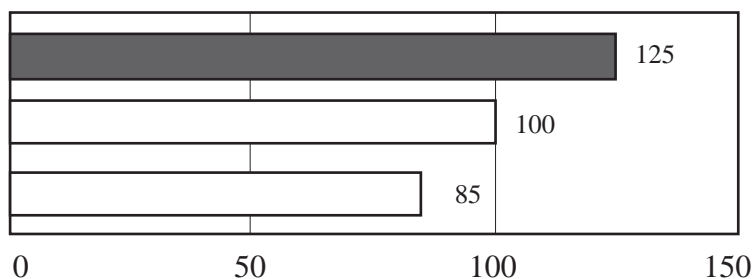


Bit diameter : 8.5mm

MAKITA HR2450FT/T

Competitor A Model A

Competitor B Model B

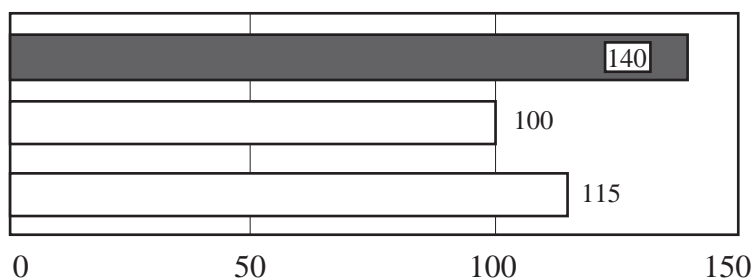


Bit diameter : 12.5mm

MAKITA HR2450FT/T

Competitor A Model A

Competitor B Model B

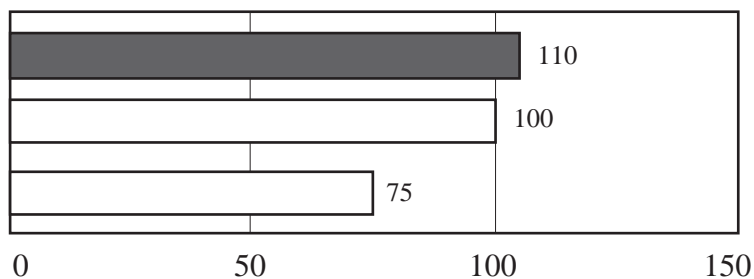


Bit diameter : 20.0mm

MAKITA HR2450FT/T

Competitor A Model A

Competitor B Model B



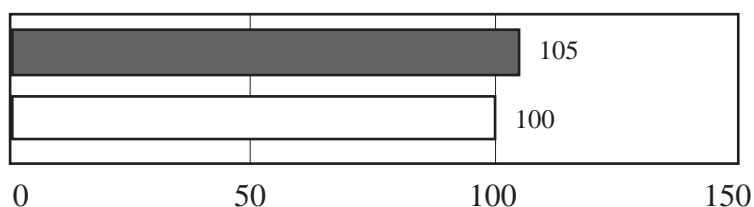
Comparison in chipping

Testing conditions

- * Materials : Concrete with compressive strength, 350Kg/cm2
- * Working mode : Percussion only
- * Pressure loaded to the products : 80 N

MAKITA HR2450FT/T

Competitor A Model A



< 1 > Lubrication to the bit holder section

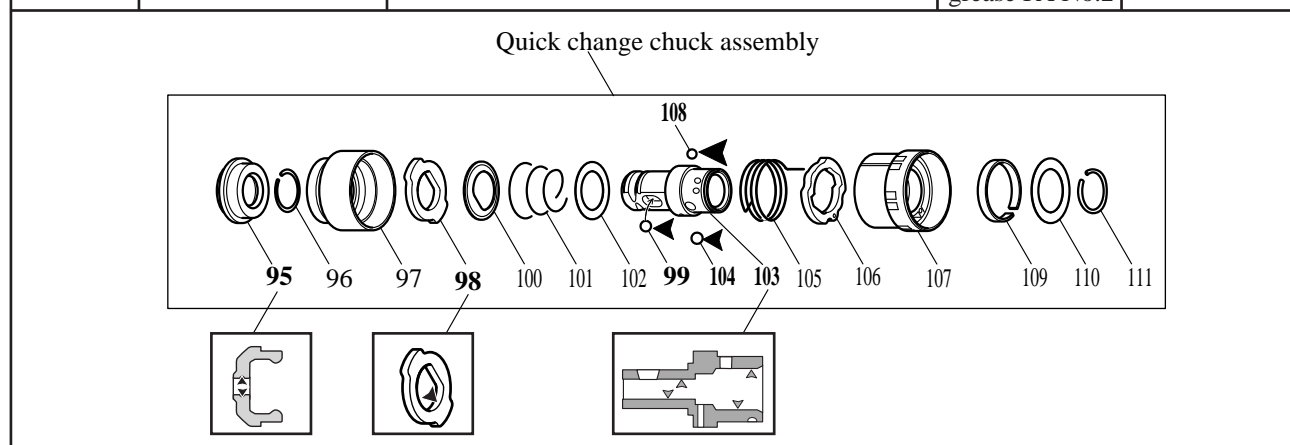
Apply MAKITA grease to the following portions to protect parts and product from unusual abrasion.

* MAKITA grease RA No.1 to the portions designated with black triangle.

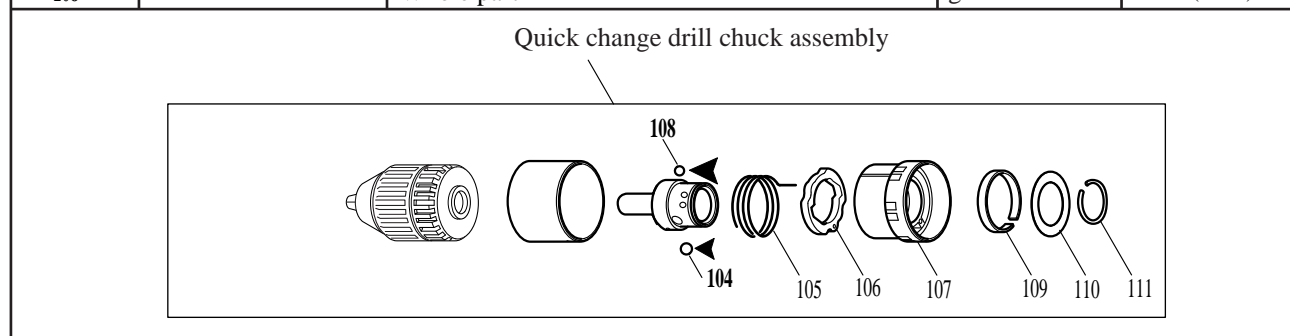
* MAKITA grease FA No. 2 to the portions designated with gray triangle.

* MAKITA hammer oil to the portions with white triangle.

Position No.	Parts item	Portion to be lubricated	MAKITA grease	Amount : g (oz)
95	Cap 35	Inner lip of bit inserting side.	MAKITA grease RA No.1	1.0 (0.04)
98	Stopper	The inside where (103) tool holder contacts.		1.0 (0.04)
99	Steel ball 7	Whole part		1.0 (0.04)
104	Steel ball 6	Whole part		1.0 (0.04)
108	Steel ball 5.0	Whole part		1.0 (0.04)
103	Tool holder	The inside where (21) tool holder guide contacts.	MAKITA grease FA No.2	1.0 (0.04)



Position No.	Parts item	Portion to be lubricated	MAKITA grease	Amount : g (oz)
104	Steel ball 6	Whole part	MAKITA grease RA No.1	1.0 (0.04)
108	Steel ball 5.0	Whole part		1.0 (0.04)



< 2 > Lubrication to the machine parts

Apply MAKITA grease to the following portions to protect parts and product from unusual abrasion.

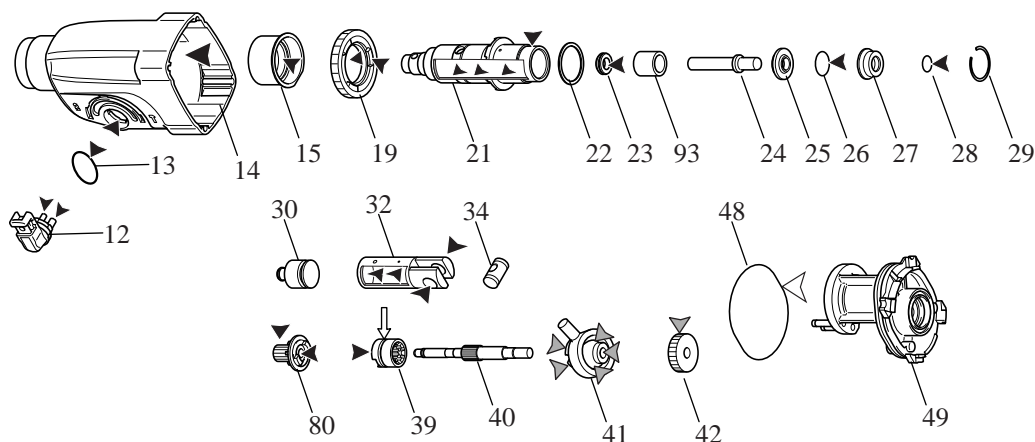
* MAKITA grease RA No.1 to the portions designated with black triangle.

* MAKITA grease FA No. 2 to the portions designated with gray triangle.

* MAKITA hammer oil to the portions designated with white triangle.

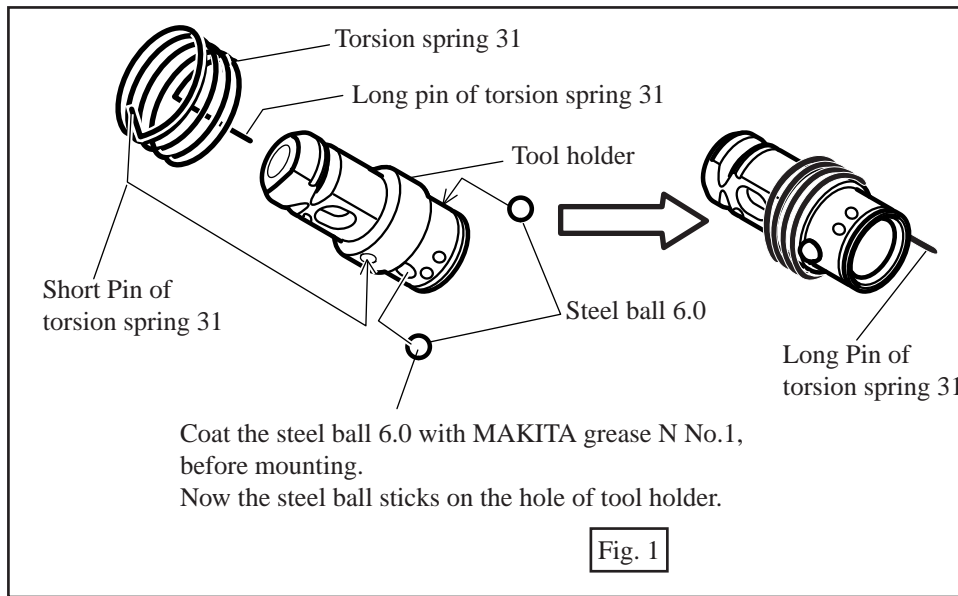
* Disulphide molybdenum alloyed grease to the portions designated with arrow.

Position No.	Parts item	Portion to be lubricated	MAKITA grease	Amount : g(oz)
12	Change lever	Top of the pins	MAKITA grease RA No.1	1.0 (0.04)
13	O ring 17	Whole portion		1.0 (0.04)
14	Gear housing	Inner portion for the mechanical parts		55 (1.91)
		Groove for mounting (13) O ring 17		1.0 (0.04)
15	Needle bearing	Inner ring		1.0 (0.04)
19	Spur gear 51	Inner portion where (21) tool holder guide contacts.		1.0 (0.04)
21	Tool holder guide	Inner portion where (32) piston cylinder contacts.		1.0 (0.04)
		The portion where (49) inner housing contacts.		1.0 (0.04)
23	X ring 9	Inner hole for reciprocating (24) impact bolt.		1.0 (0.04)
26	O ring 15	Whole portion		1.0 (0.04)
28	O ring 9	Whole portion		1.0 (0.04)
32	Piston cylinder	Accepting hole for (34) piston joint		1.0 (0.04)
		Inner portion where (30) striker reciprocates.		1.0 (0.04)
39	Clutch cam	Convex portion of cam	Disulfide molybdenum alloyed grease	1.0 (0.04)
		Whole of groove portion		0.5 (0.02)
41	Swash bearing 10	Accepting hole for (40) cam shaft	MAKITA grease FA No.2	1.0 (0.04)
		The surface where (42) helical gear 26 contacts.		1.0 (0.04)
		Convex portion of cam		1.0 (0.04)
		The portion where balls are installed		4.0 (0.14)
42	Helical gear 26	Teeth portion		
48	O ring 68	Whole portion	MAKITA hammer oil XLD	1.0 (0.04)
80	Spur gear 10	Teeth portion	MAKITA grease RA No.1	1.0 (0.04)
		Accepting hole for (40) cam shaft		1.0 (0.04)

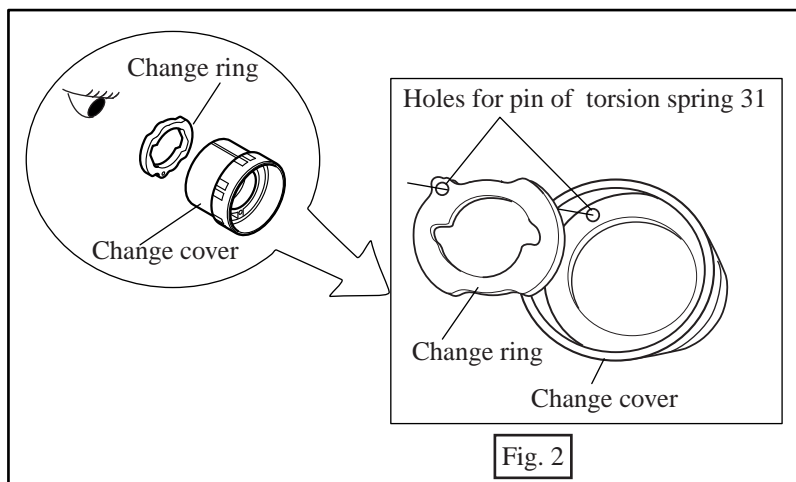


< 3 > Assembling quick change chuck

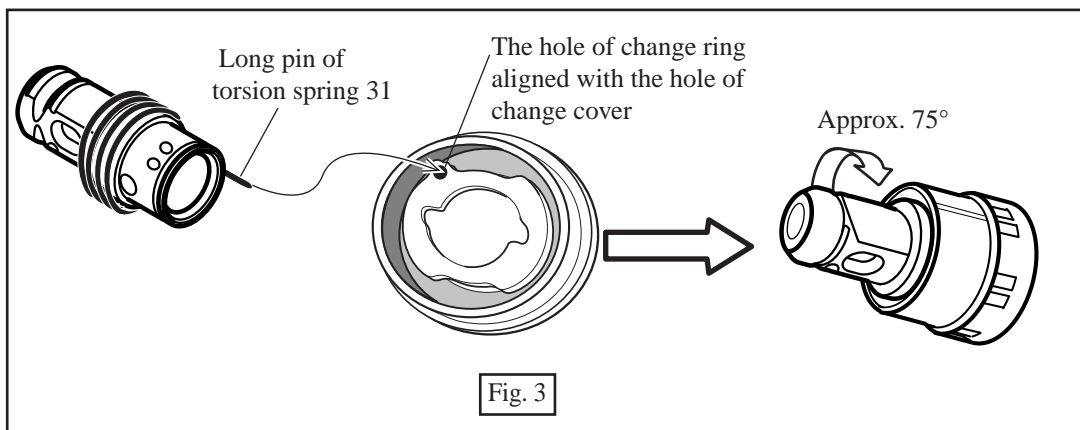
- (1) Mount torsion spring 31 by inserting pin of torsion spring 31 into the hole of tool holder and mount 2 pcs. of steel ball 6.0 to tool holder. See Fig. 1.



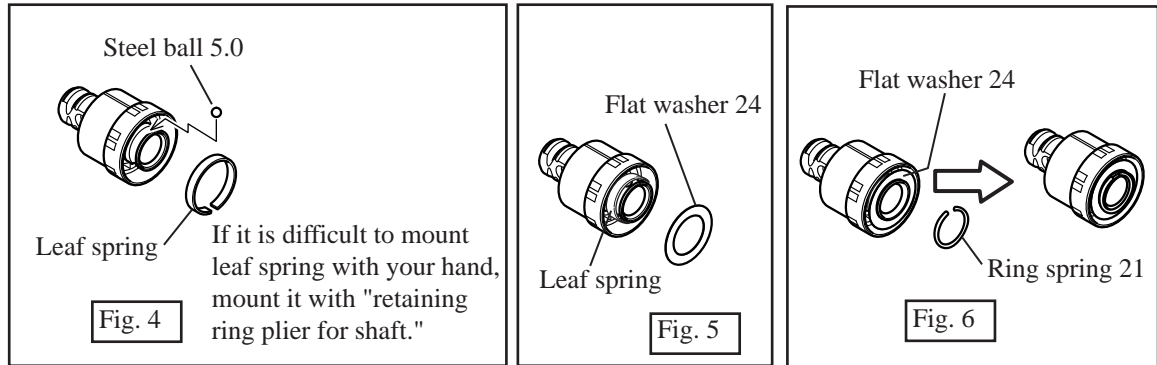
- (2) Mount change ring to the inside of change cover while aligning the hole of change ring with the hole of change cover. See Fig. 2.



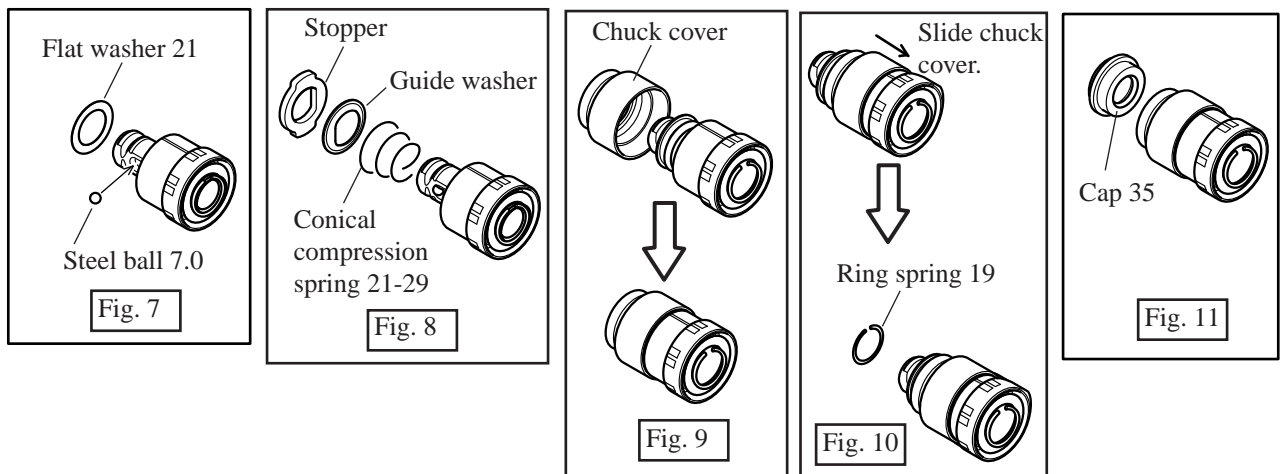
- (3) Mount tool holder to change cover by passing the long pin of torsion spring 31 through the holes of change ring and change cover. And turn the tool holder approx. by 75°. See Fig. 3.



- (4) Mount steel ball 5.0 to the space between change cover and tool holder. And secure the steel ball 5.0 with leaf spring. See Fig. 4.
- (5) Mount flat washer 24. See Fig. 5.
- (6) Secure flat washer 24 with ring spring 21. See Fig. 6.

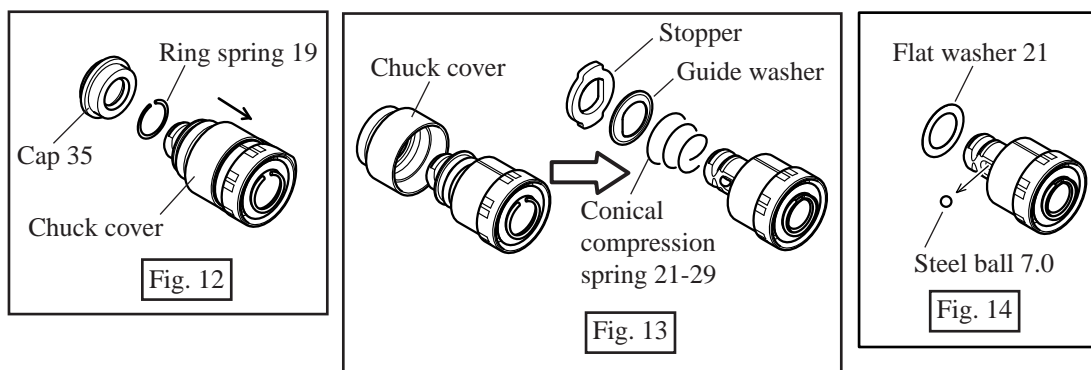


- (7) Mount flat washer 2. And then mount steel ball 7.0 to the hole of tool holder. See Fig. 7.
Coat the steel ball 7.0 with MAKITA grease N No.1, before mounting.
Now the steel ball sticks on the hole of tool holder.
- (8) Mount conical compression spring 21-29, guide washer and stopper. See Fig. 8.
- (9) Mount chuck cover. See Fig. 9.
- (10) While sliding the chuck cover in the direction designated with arrow, mount ring spring 19. See Fig. 10.
Now the parts mounted in Fig. 7, Fig. 8 and Fig.9 have been secured with the ring spring 19.
- (11) Mount cap 35 as illustrated in Fig. 11.

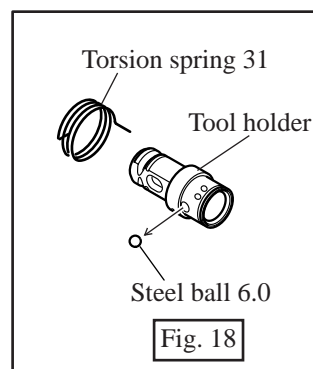
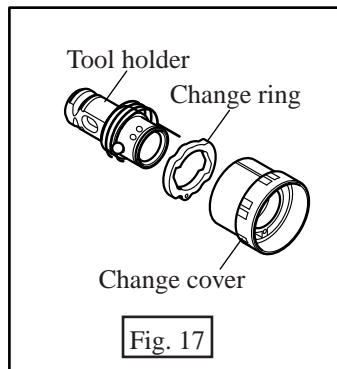
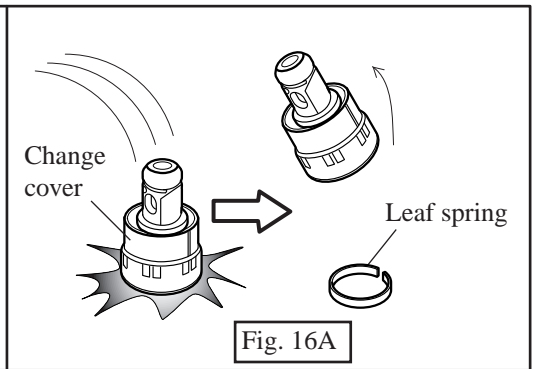
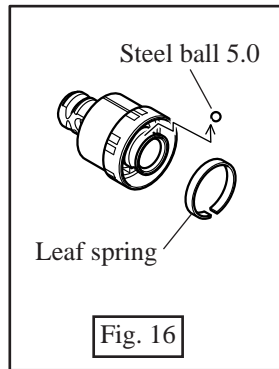
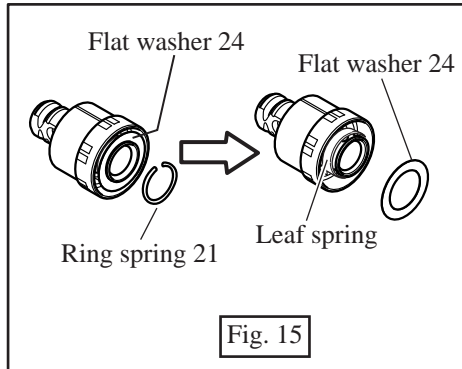


< 4 > Disassembling quick change chuck

- (1) Remove cap 35 while sliding chuck cover in the direction designated with arrow. See Fig. 12.
- (2) Remove ring spring 19, keeping the chuck cover in the slid position. See Fig. 12.
- (3) Remove chuck cover, stopper, guide washer, conical compression spring 21-29. See Fig. 13.
- (4) Remove steel ball 7.0 and flat washer 21. See Fig. 14.

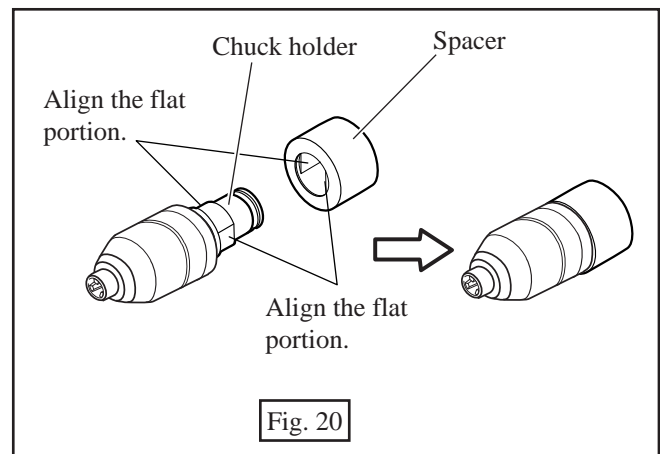
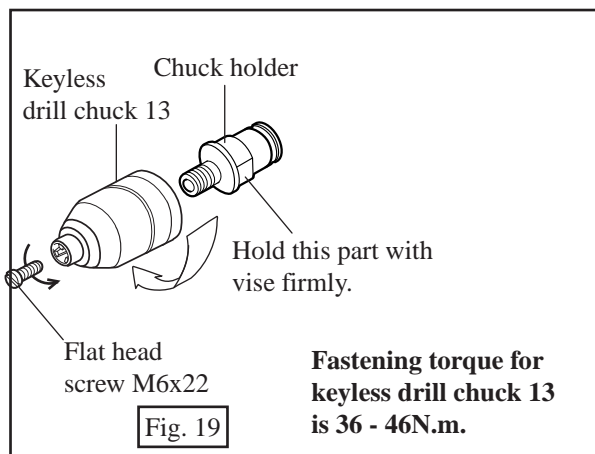


- (5) Remove ring spring 21. Then, flat washer 24 can be removed from tool holder. See Fig. 15.
- (6) Remove leaf spring with No.1R212 "Retaining Ring Plier". Then, steel ball 5.0 can be removed from tool holder. See Fig. 16.
If it is difficult to remove leaf spring with No.1R212 "Retaining Ring Plier", slightly knock the change cover to the working table several times. Then, leaf spring can be removed. See Fig. 16A.
- (7) Remove tool holder and change ring from change cover. See Fig. 17.
- (8) Remove torsion spring 31 and steel ball 6.0 from tool holder. See Fig. 18.

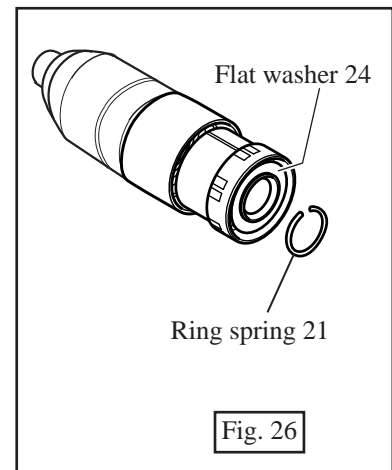
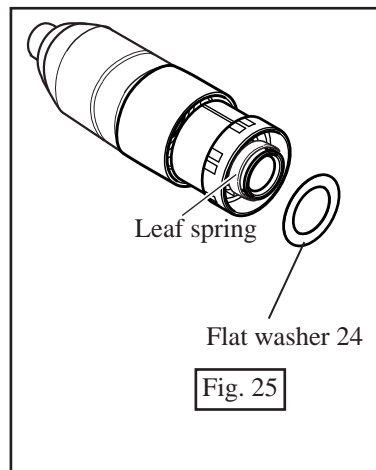
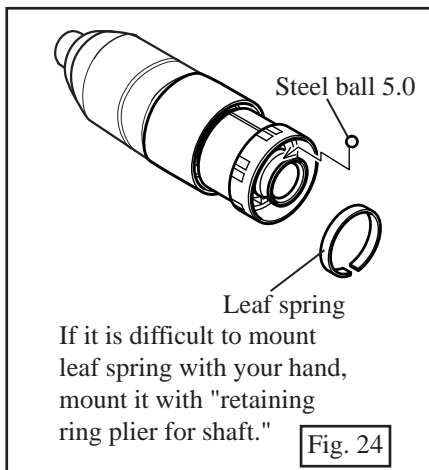
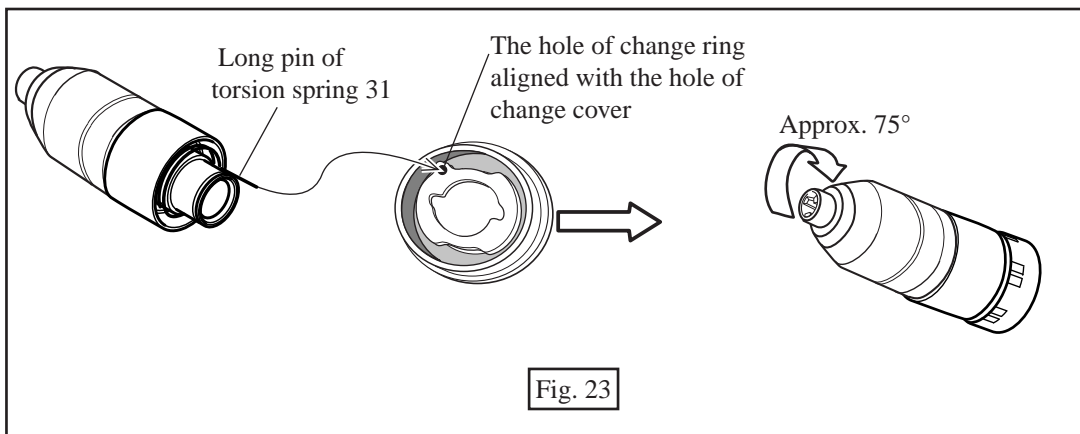
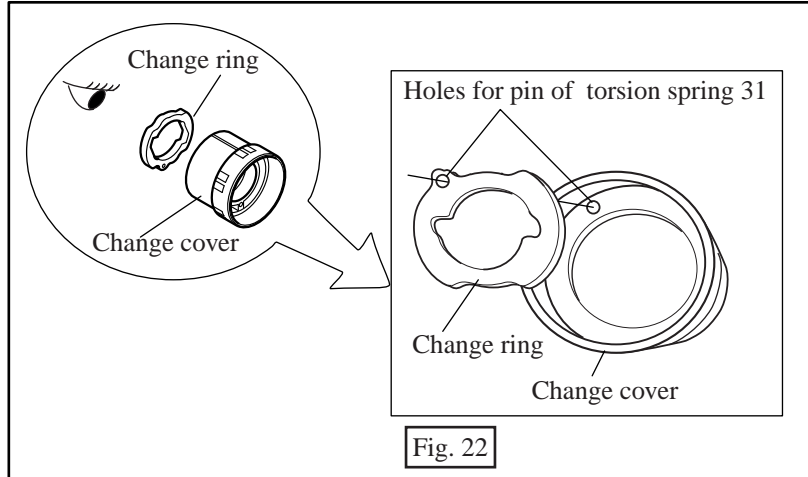
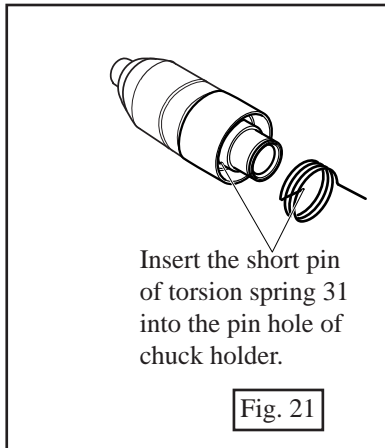


< 5 > Assembling quick change drill chuck

- (1) Mount keyless drill chuck 13 to chuck holder by turning it clockwise. See Fig. 19.
- (2) Secure the keyless drill chuck by turning flat head screw M6x22 counter-clockwise. See Fig. 19.
- (3) Mount the keyless drill chuck, while aligning the flat portion of chuck holder with the flat portion of spacer. See Fig. 20.



- (4) Mount torsion spring 31 to the chuck holder by inserting its short pin into the pin hole of chuck holder.
See Fig. 21.
- (5) Mount change ring to the inside of change cover while aligning the hole of change ring with the hole of change cover. See Fig. 22.
- (6) Keyless drill chuck 13 to change cover by passing the long pin of torsion spring 31 through the holes of change ring and change cover. And turn the keyless drill chuck 13 approx. by 75°. See Fig. 23.
- (7) Mount steel ball 5.0 to the space between change cover and chuck holder. And secure the steel ball 5.0 with leaf spring. See Fig. 24.
- (8) Mount flat washer 24. See Fig. 25.
- (9) Secure flat washer 24 with ring spring 21. See Fig. 26.



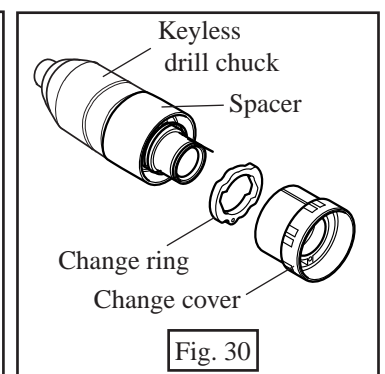
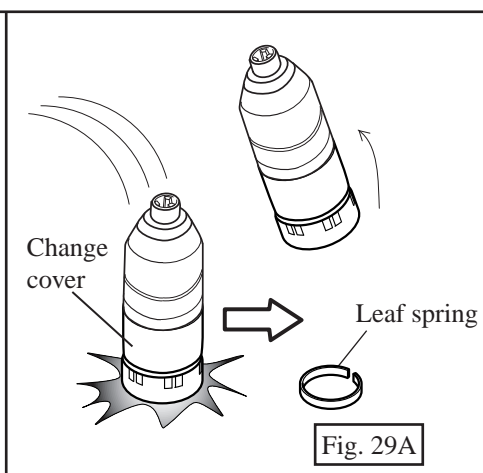
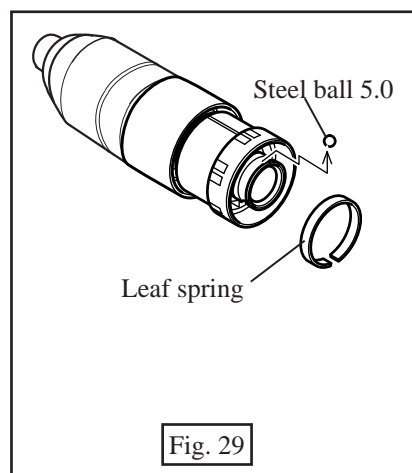
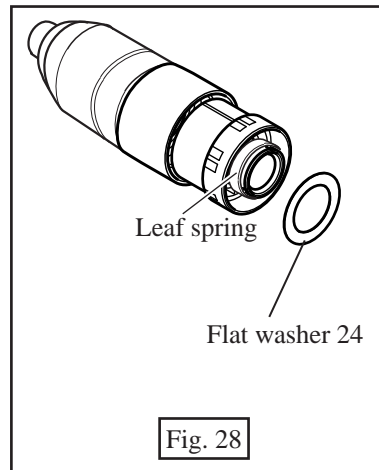
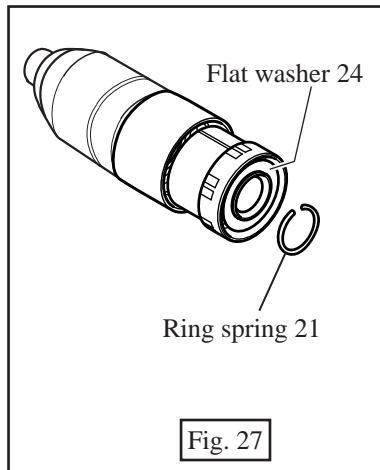
< 6 > Disassembling quick change drill chuck

(1) Remove ring spring 21. Then, flat washer 24 can be removed from chuck holder. See Fig. 27 and Fig. 28.

(2) Remove leaf spring with No.1R212 "Retaining Ring Plier". Then, steel ball 5.0 can be removed from chuck holder. See Fig. 29.

If it is difficult to remove leaf spring with No.1R212 "Retaining Ring Plier", slightly knock the change cover to the working table several times. Then, leaf spring can be removed. See Fig. 29A.

(3) Remove keyless drill chuck with spacer and change ring from change cover. See Fig. 30.

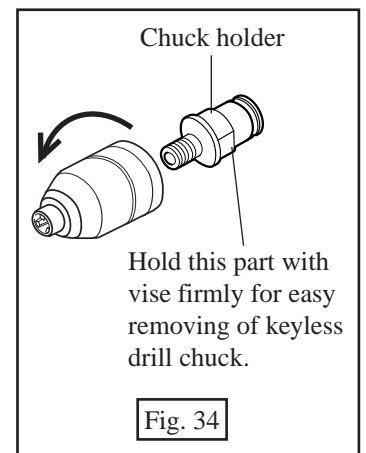
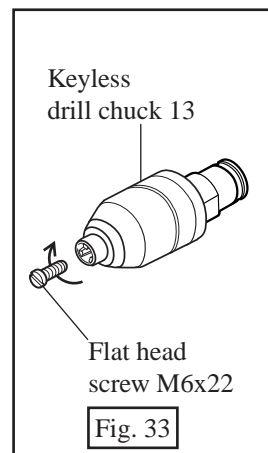
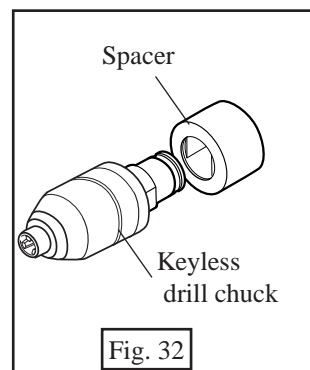
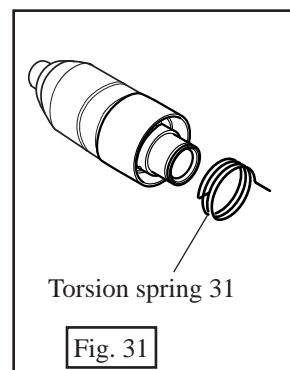


(4) Remove torsion spring 31 from chuck holder. See Fig. 31.

(5) Remove spacer from chuck holder. See Fig. 32.

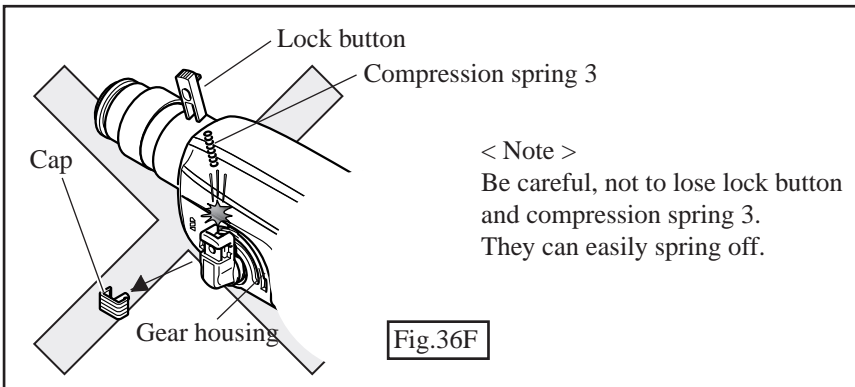
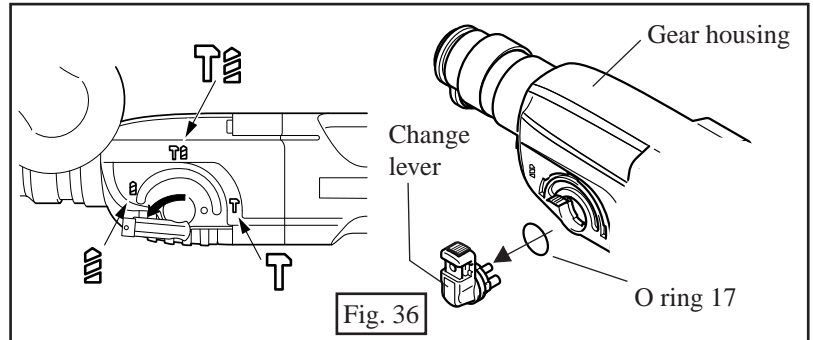
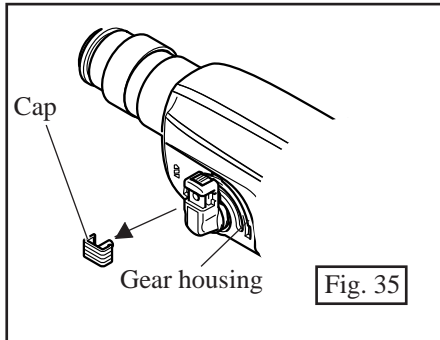
(6) Remove flat head screw M6x22 by tuning it clockwise. See Fig. 33.

(7) Remove keyless drill chuck 13 by tuning it counter clockwise. See Fig. 34.



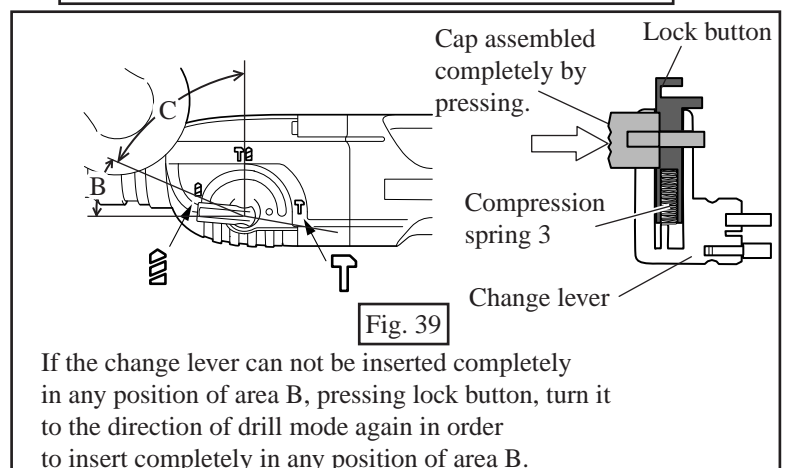
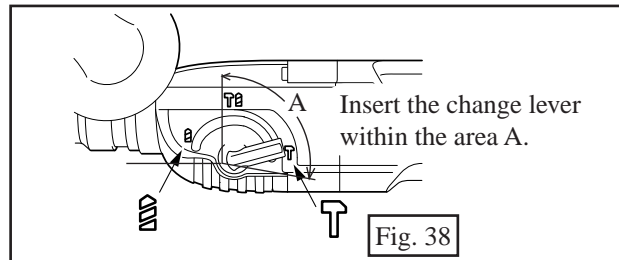
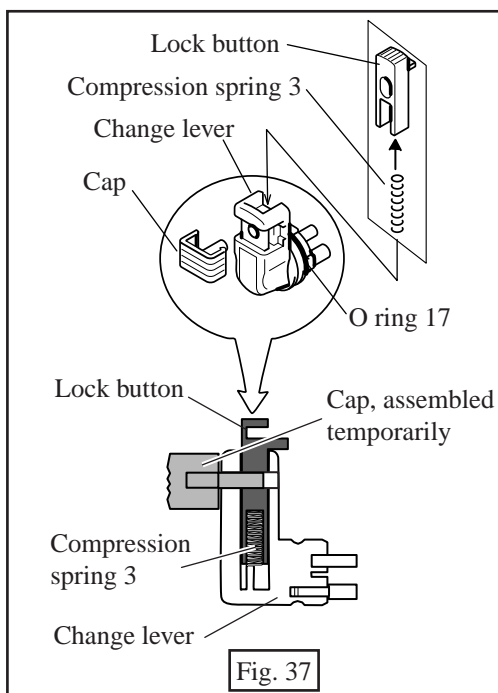
< 7 > Disassembling change lever

- (1) Separate cap from change lever. See Fig. 35.
- (2) Fully turn change lever in the direction of drill mode. Then, change lever can be pulled out from gear housing. See Fig. 36.



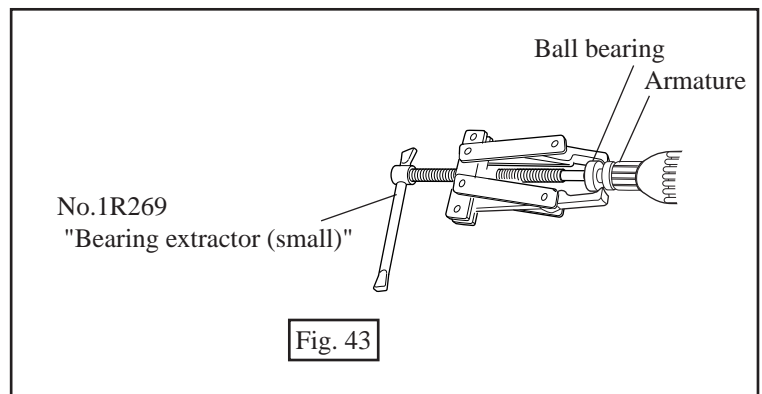
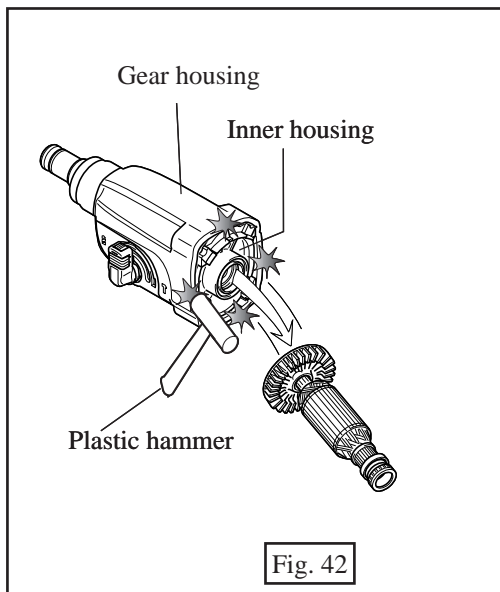
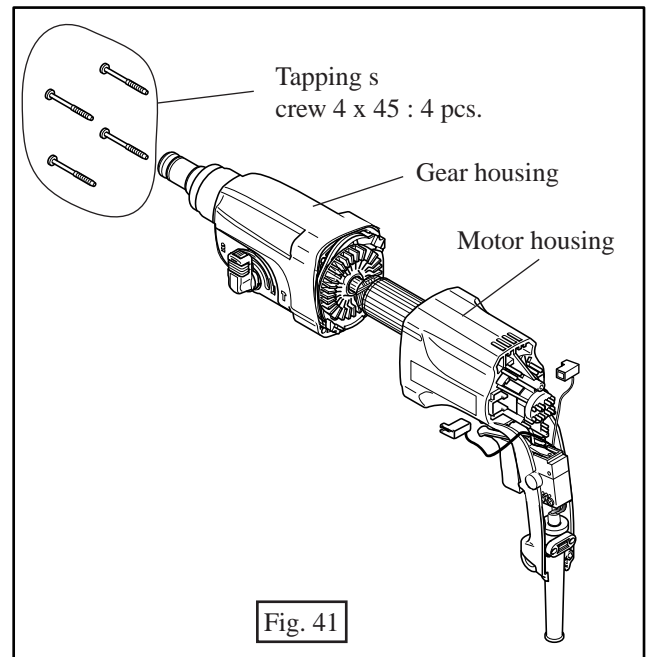
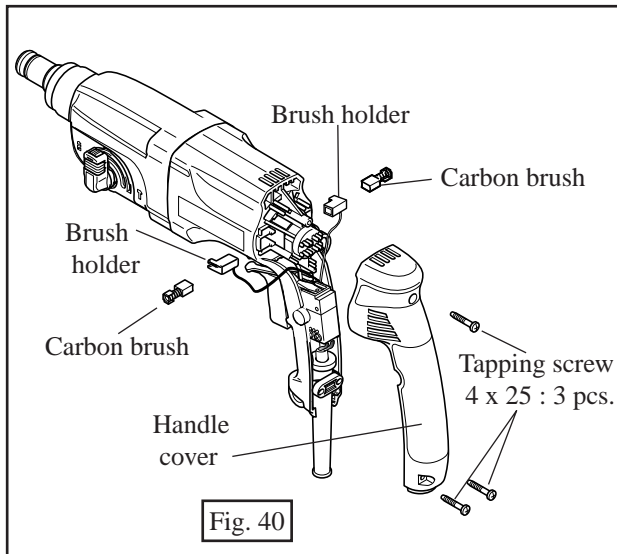
< 8 > Assembling change lever

- (1) Apply grease to the pin of change lever and O ring 17. Refer to "< 2 > Lubrication to the machine parts" in page 5.
- (2) Assemble compression spring 3 and lock button to change lever. And temporarily assemble cap to the position illustrated in Fig. 37 in order to stop springing off of lock button. Do not forget to assemble O ring 17. See Fig. 37.
- (3) Insert the change lever in which compression spring 3 and lock button have been temporarily fixed with cap, into the assembling hole of gear housing. See Fig. 38. The change lever can not be inserted completely in this stage.
- (4) Pressing the change lever, turn it in the direction of drill mode. Then, it can be inserted completely in any position of area B. See Fig. 39.
- (5) Turn the change lever to the area C. See Fig. 39. And assemble cap completely to the original position of change lever, by pressing to gear housing side.



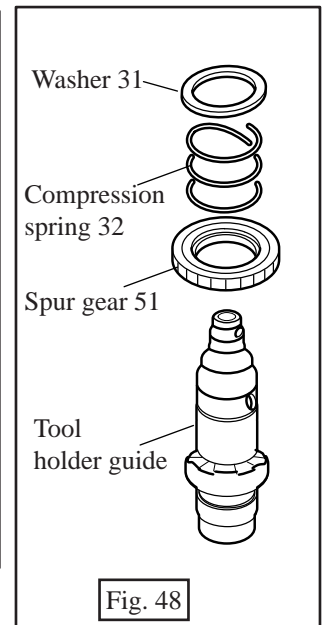
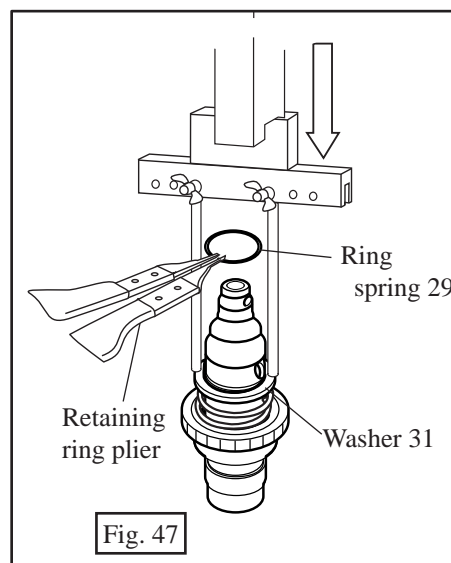
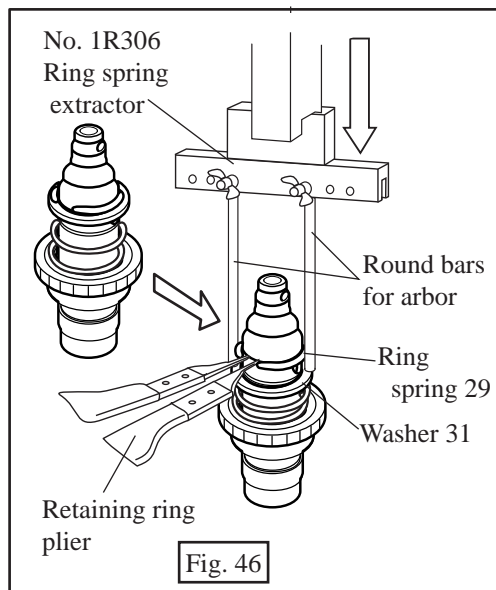
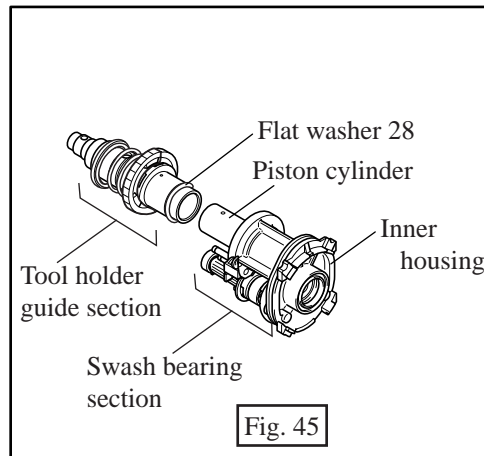
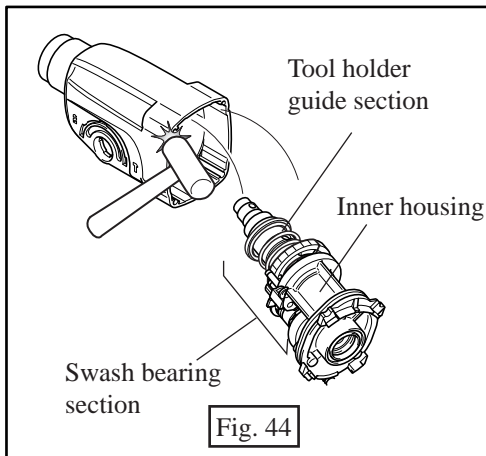
< 9 > Disassembling armature

1. Remove handle cover by unscrewing 3 pcs. of tapping screw 4 x 45. And remove carbon brushes as illustrated in Fig. 40.
2. Separate gear housing together with armature, from motor housing by unscrewing 4 pcs. of tapping screw 4 x 45 as illustrated in Fig. 41.
3. Slightly hitting the edge of gear housing with plastic hammer, remove armature from inner housing assembled in gear housing. See Fig. 42.
4. Ball bearings of fan side and commutator side can be removed with No.1R269 "Bearing extractor (small)". See Fig. 43.



< 10 > Disassembling tool holder guide section

- (1) After removing change lever (See page 11), separate gear housing from motor housing as illustrated in Fig. 40 and Fig. 41 in page 12.
- (2) Remove inner housing as illustrated in Fig. 44.
- (3) Separate tool holder guide section from inner housing. See Fig. 45.
- (4) Remove ring spring 29, while pressing washer 31 which covers ring spring 29, toward the spur gear 51 side. See Fig. 46 and 47. After removing ring spring 29, reduce pressure on the washer 31 slowly.
- (5) Remove washer 31, compression spring 32 and spur gear 51 form tool holder guide. See Fig. 48.

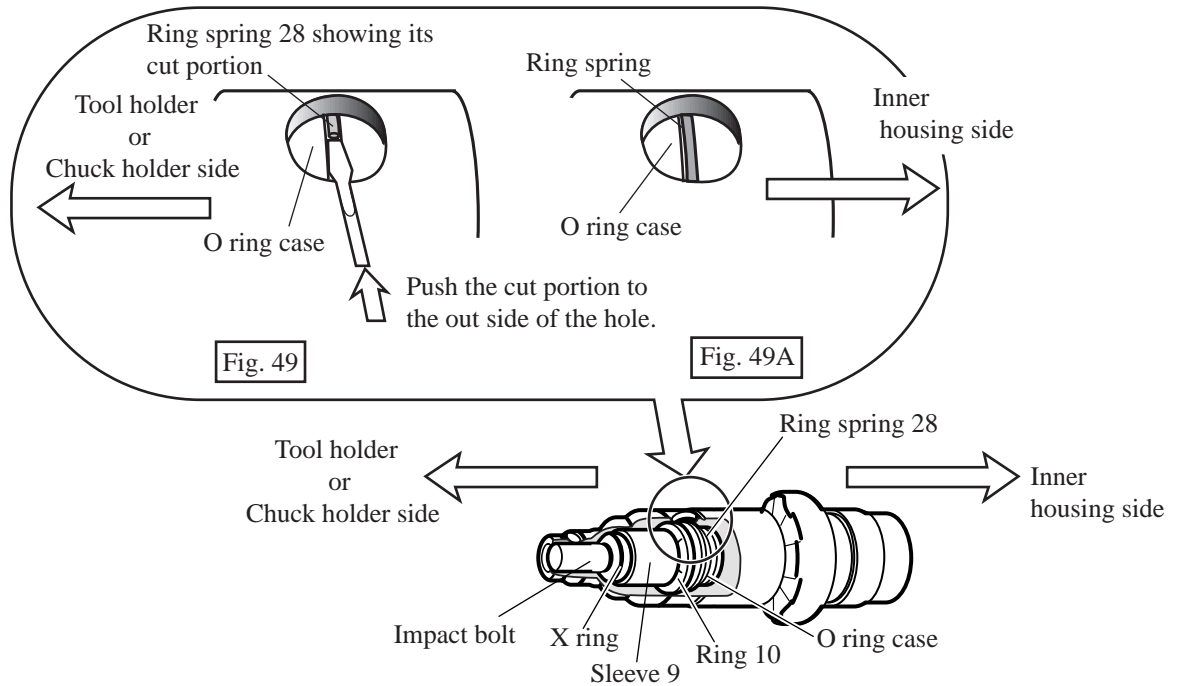


< 11 > Assembling tool holder guide section

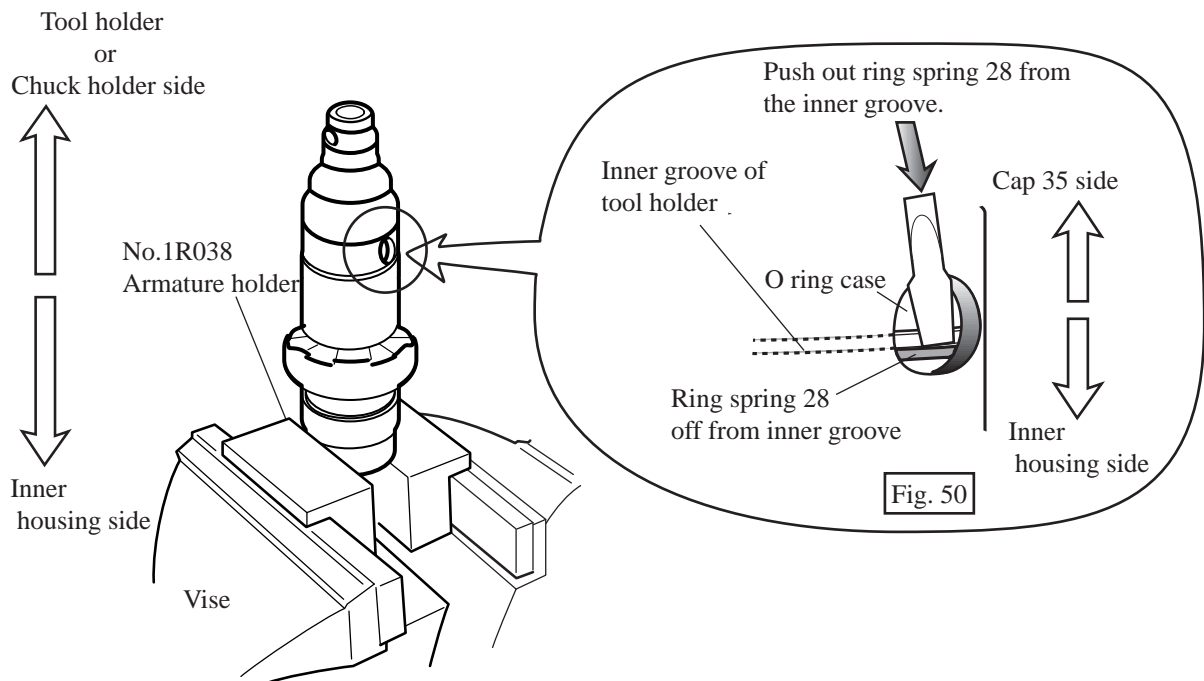
- (1) Apply grease to spur gear 51 and tool holder guide referring to "< 2 > Lubrication to the machine parts" in page 5.
- (2) Mount spur gear 51, compression spring 32 and washer 31. See Fig. 48.
- (3) Pressing the washer 31 toward the spur gear 51 side, with arbor press, mount ring spring 29 as illustrated in Fig. 47 and Fig. 46. And mount flat washer 28 to the position illustrated in Fig. 45.
- (4) Insert piston cylinder of swash bearing section into tool holder guide. And insert tool holder section into inner housing as illustrated in Fig. 45.

< 12 > Disassembling impact bolt

- (1) Referring to "< 10 > Disassembling tool holder guide section" in page 13, remove ring spring 29, washer 31, compression spring 32 and spur gear 51 from tool holder guide. See Fig. 44, 45, 46, 47 and Fig. 48.
- (2) Push the cut portion of ring spring 28 to the out side of the hole as illustrated in Fig. 49 and Fig. 49A.

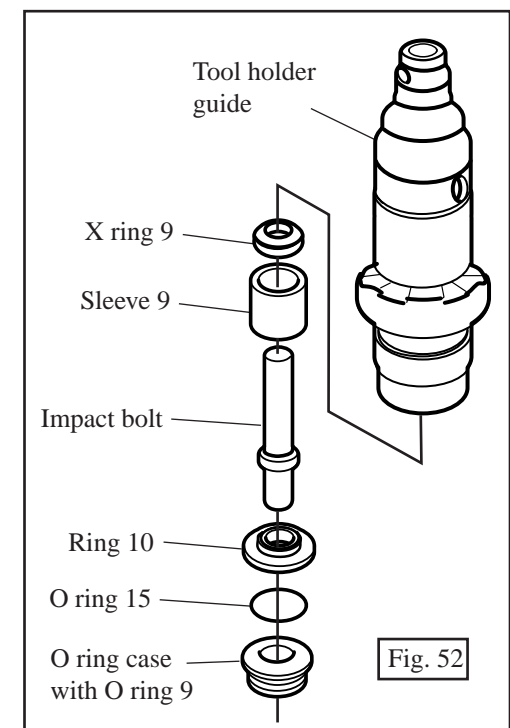
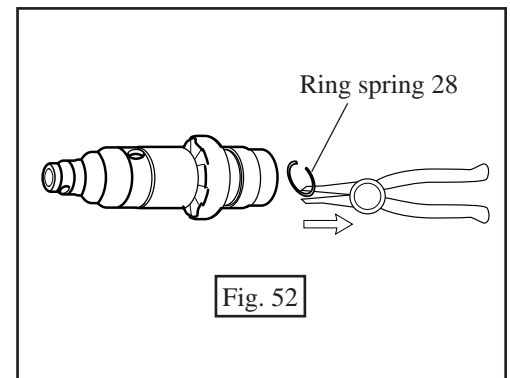
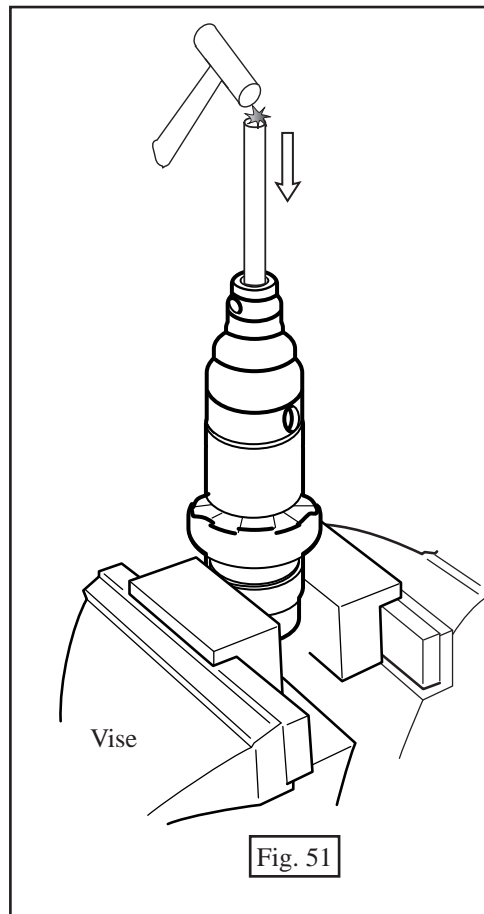


3. Hold tool holder with "No.1R038 Armature holder" and vise. Insert screwdriver between ring spring 28 and O ring case, and push out ring spring 28 from the inner groove as illustrated in Fig. 50.



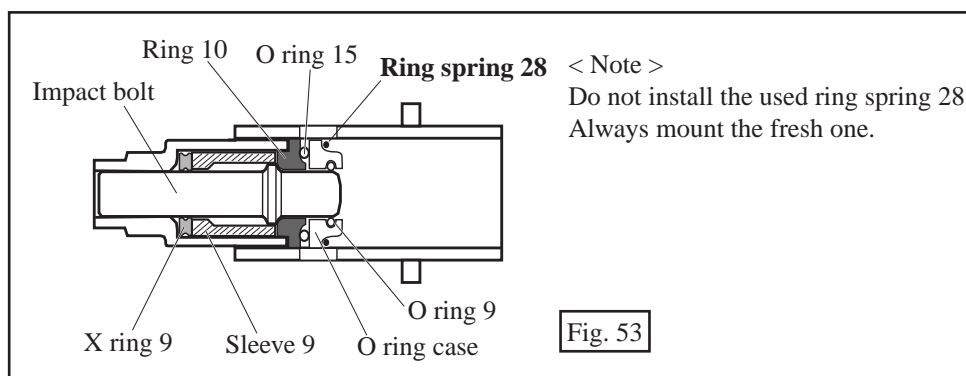
4. Insert "No.1R236 Round bar for arbor" and push the inner parts of tool holder guide as deep as possible toward the inner housing side. See Fig. 51
5. Pick up ring spring 28 with plier and take off it from tool holder guide as illustrated in Fig. 52.
6. The following parts can be removed from tool holder guide as illustrated in Fig. 53.

- * O ring case with O ring 9
- * O ring 15
- * Ring 10
- * Impact bolt
- * Sleeve 9
- * X ring 9



< 13 > Assembling impact bolt

1. Apply grease to the following parts referring to "< 2 > Lubrication to the machine parts" in page 5
 - * Tool holder guide
 - * O ring 9 to be mounted to the O ring box
 - * X ring 9
 - * O ring 15
2. Insert X ring 9, sleeve 9, impact bolt, ring 10, O ring 15 and O ring case with O ring 9 into tool holder.
3. Assemble ring spring 28 to the inner groove of tool holder by pushing it with screwdriver. Ring spring 28 has to be mounted as illustrated in Fig. 53.

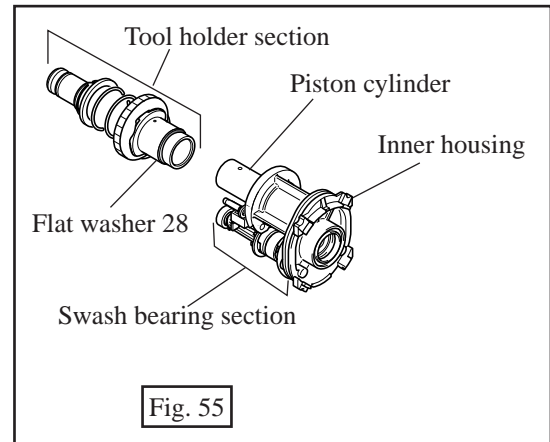
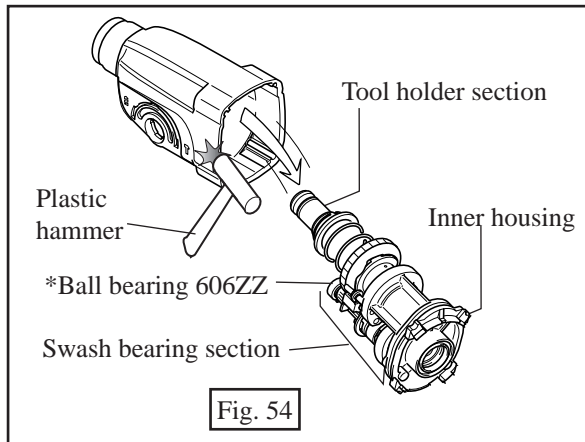


< 14 > Disassembling swash bearing

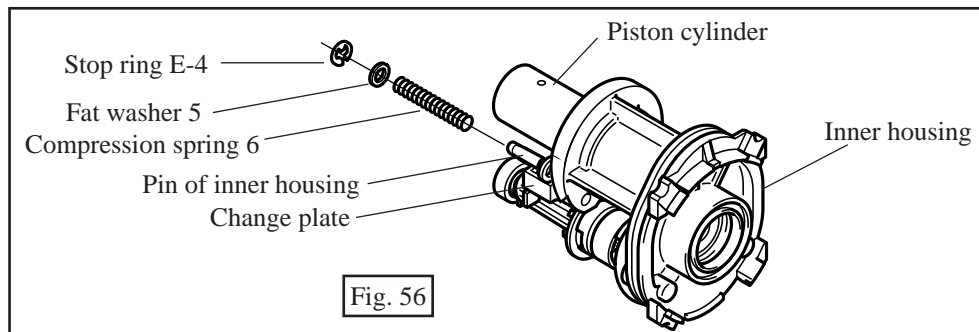
- (1) Referring to at page 8, disassemble the product in the order of Fig.40, Fig.41, Fig.42, Fig.44 and Fig. 45 in page 12 and 13.

And separate inner housing together with tool holder section and swash bearing section from gear housing as illustrated in Fig. 54. Ball bearing 606ZZ can remain in gear housing in this stage. If so, refer to Fig. 59 at page 17.

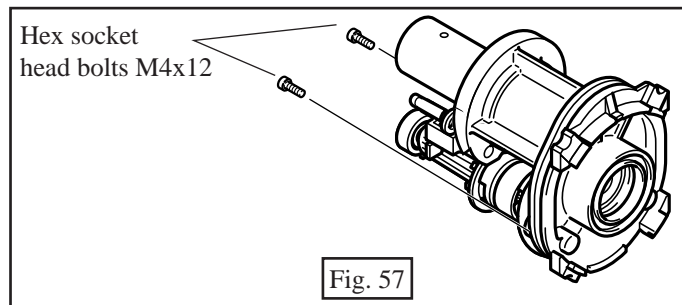
- (2) Separate tool holder section from inner housing as illustrated in Fig. 55.



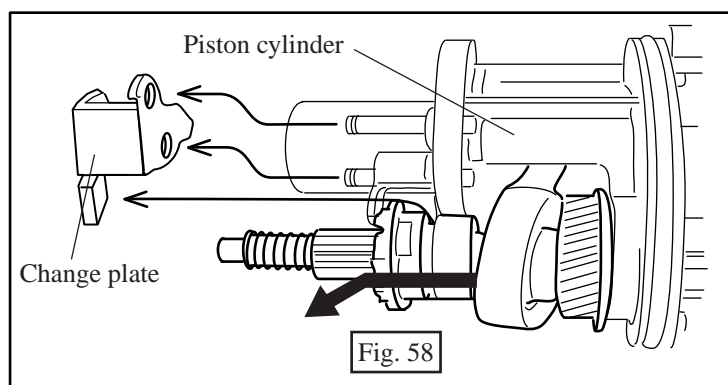
- (3) Remove stop ring E-4, flat washer 5 and compression spring 6 with which change plate is fixed, from the pin of inner housing as illustrated in Fig. 56.



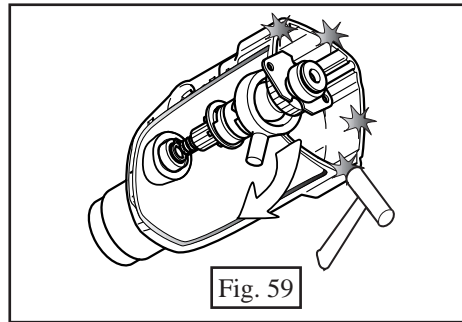
- (4) Swash bearing section is held in inner housing with bearing retainer which is fastened with 2 pcs. of hex socket head bolts M4x12. Take off these hex socket head bolts M4x12 for disassembling swash bearing section. See Fig. 57.



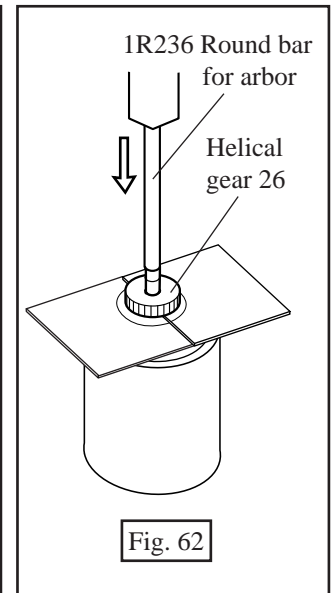
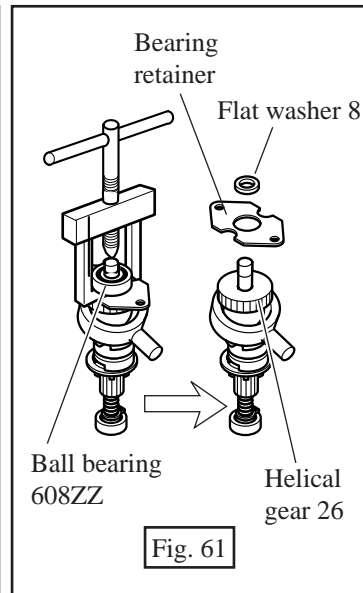
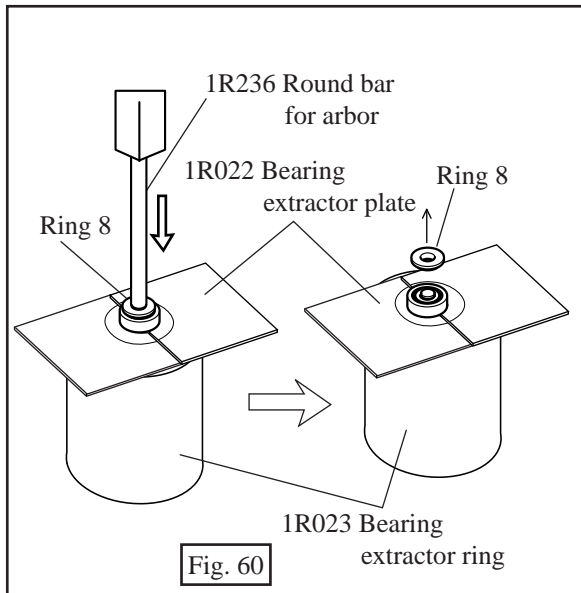
- (5) Bring piston cylinder to the dead point. And , twist the the swash bearing section, while pulling off them from inner housing. Then swash bearing section and change plate can be removed from piston cylinder. See Fig. 58.



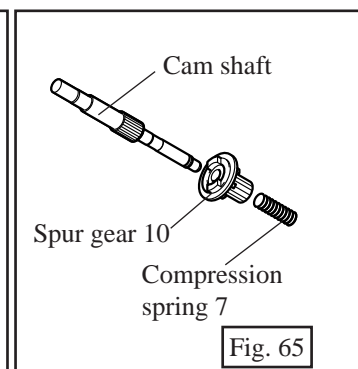
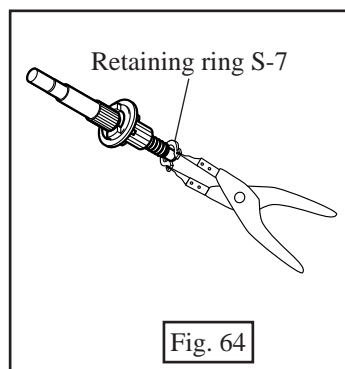
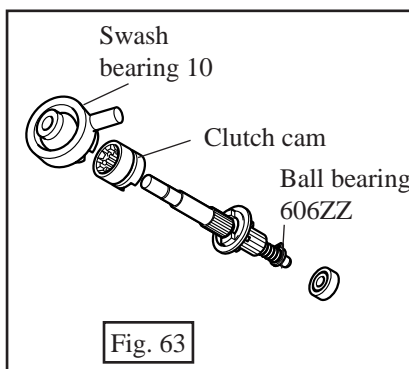
- (6) Reassemble swash bearing section temporarily to gear housing, and hold gear housing as illustrated in Fig. 59. So, swash bearing section tilts in the direction of arrow. Keeping the illustrated position, remove swash bearing section by striking the edge of gear housing with plastic hammer. So, ball bearing 606ZZ can be removed together with swash bearing section.



- (7) Swash bearing section can not be disassembled in one action by pressing cam shaft with arbor press, because retaining ring S-7 is mounted between ball bearing 606ZZ and compression spring 7. Take the following steps for disassembling swash bearing section.
1. Remove ring 8 by pressing cam shaft with arbor press as illustrated in Fig. 60.
 2. Remove ball bearing 608ZZ with bearing extractor as illustrated in Fig. 61. Then flat washer 8 and bearing retainer can be removed from cam shaft.
 3. Remove helical gear 26 by pressing cam shaft with arbor press as illustrated in Fig. 62.

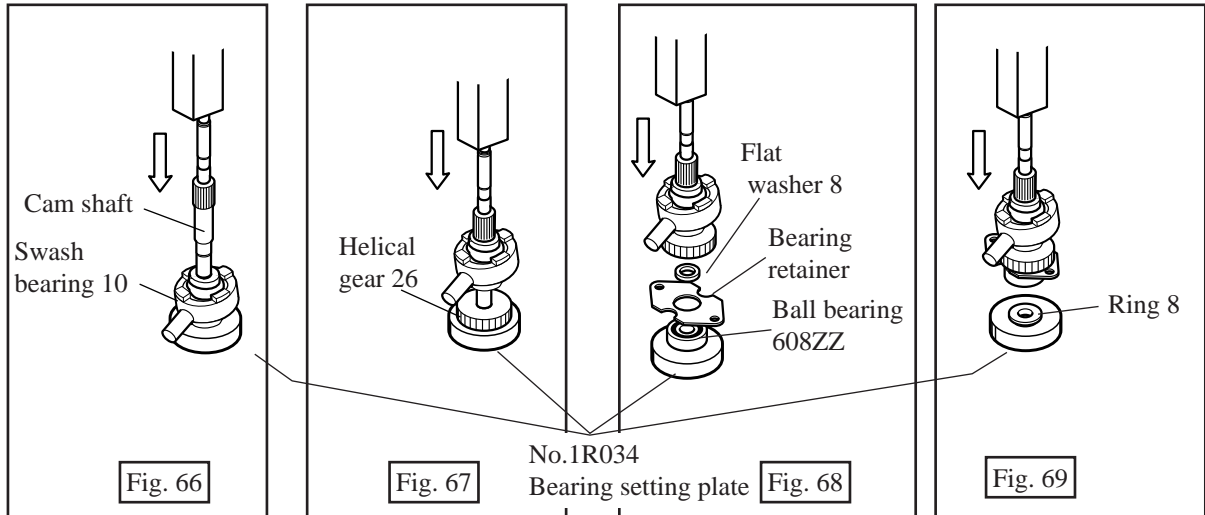


4. Remove swash bearing 10 and clutch cam as illustrated in Fig. 63. And remove ball bearing 606ZZ with bearing extractor as illustrated in Fig. 63.
5. Disassemble retaining ring S-7 with retaining ring plier as illustrated in Fig. 64.
6. Separated compression spring 7 and spur gear 10 from cam shaft as illustrated in Fig. 65.



< 15 > Assembling swash bearing section

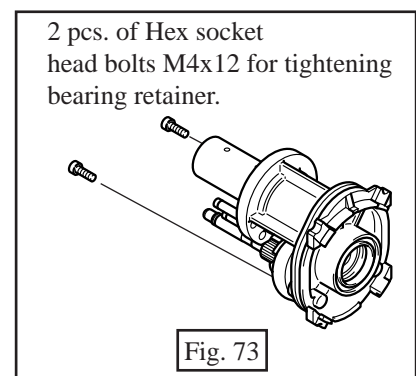
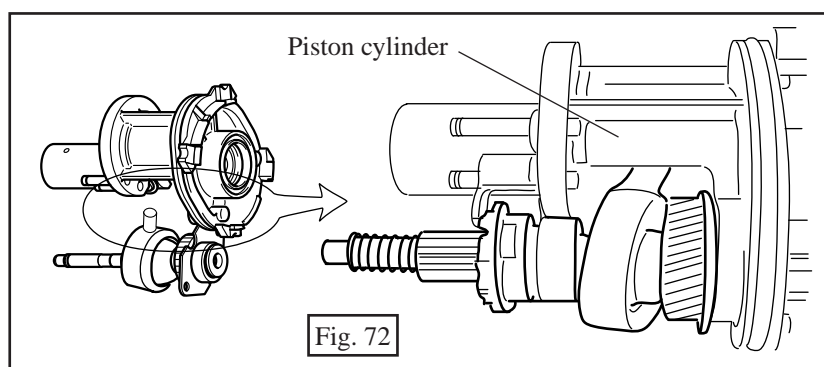
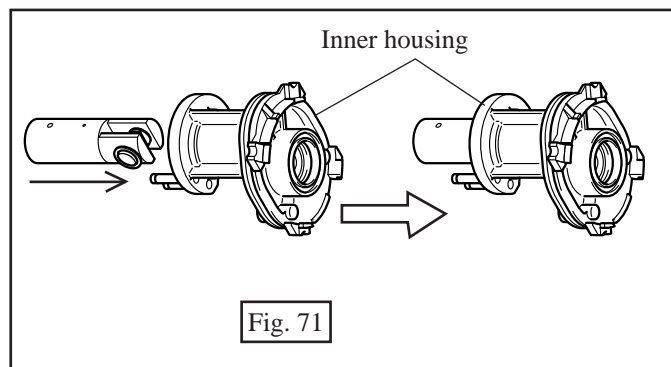
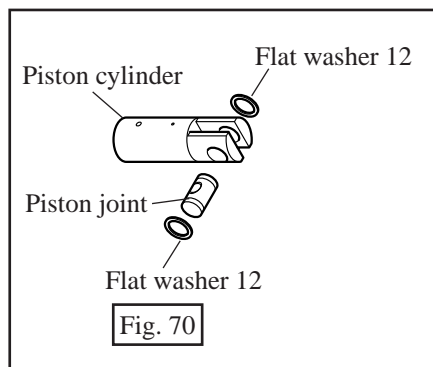
- (1) Apply grease to the parts of swash bearing section referring to "< 2 > Lubrication to the machine parts" in page 5.
- (2) Assemble swash bearing 10 by pressing cam shaft with arbor press as illustrated in Fig. 66.
- (3) Assemble helical gear 26 by pressing cam shaft with arbor press as illustrated in Fig. 67.
- (4) Assemble flat washer 8, bearing retainer and ball bearing 608ZZ by pressing cam shaft with arbor press as illustrated in Fig. 68.
- (5) Assemble ring 8 by pressing cam shaft with arbor press as illustrated in Fig. 69.



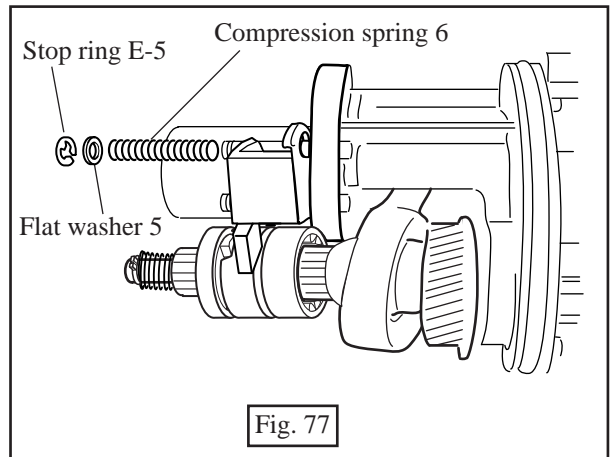
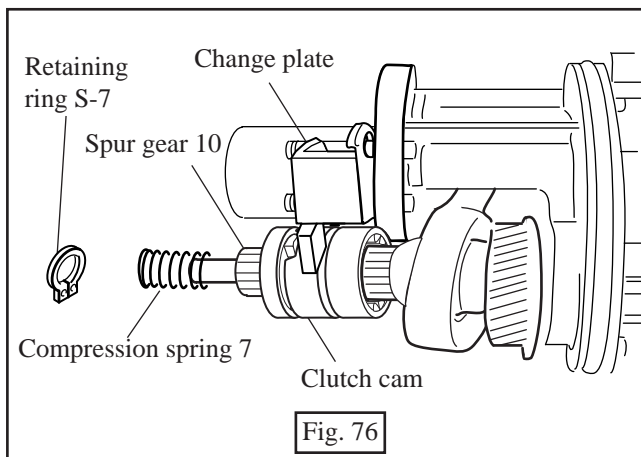
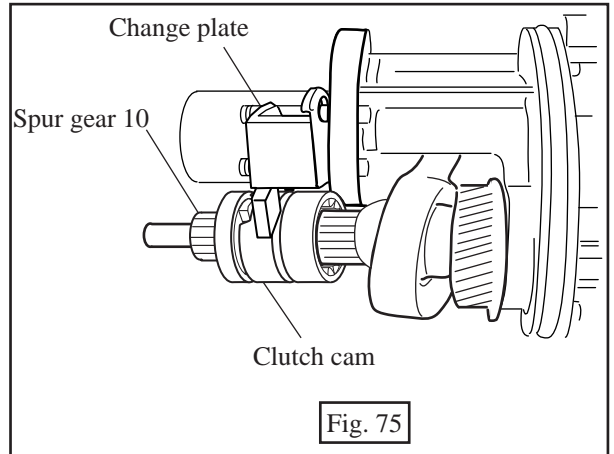
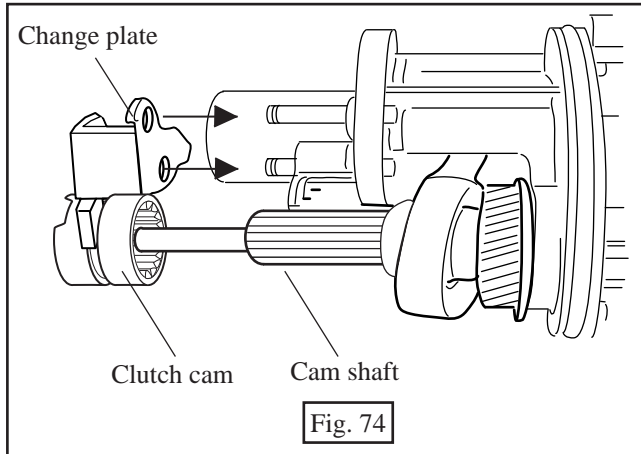
< 16 > Assembling swash bearing section to piston cylinder

- (1) Apply MAKITA grease to piston cylinder and swash bearing 10 referring to "< 2 > Lubrication to the machine parts" in page 5.
- (2) Mount 2 pcs. of flat washer 12 and piston joint to piston cylinder as illustrated in Fig. 70.
- (3) Insert the above piston cylinder into inner housing as illustrated in Fig. 71.
- (4) Bringing piston cylinder to the dead point for swash bearing 10, mount swash bearing 10 to piston cylinder by inserting its pole into the hole of piston joint as illustrated in Fig. 72.
- (5) Fasten bearing retainer which has been assembled to swash bearing section, with adhesive hex socket head bolt M4x12, onto inner housing as illustrated in Fig. 73.

<Note> Do not fasten with the used hex socket head bolt M4x12. Always use the fresh adhesive hex socket head bolt M4x12

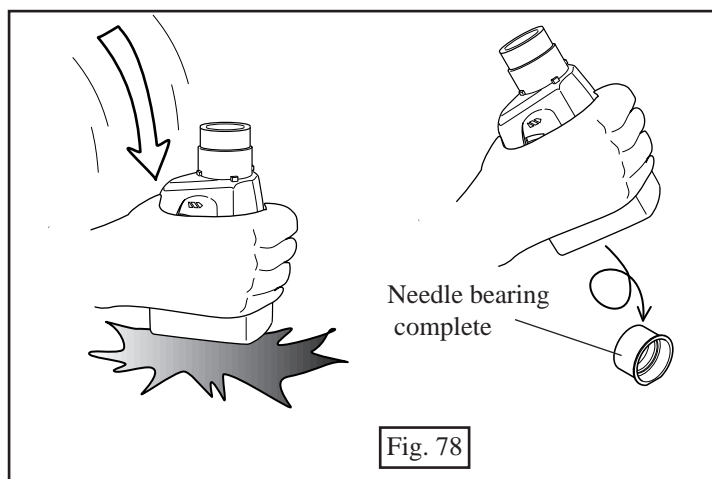


- (6) Set change plate in the groove of clutch cam, and assemble the clutch cam with change plate to cam shaft as illustrated in Fig. 74.
- (7) Assemble spur gear 10 to cam shaft as illustrated in Fig. 75.
- (8) Assemble compression spring 7 to cam shaft, and secure the parts on cam shaft with retaining ring S-7 as illustrated in Fig. 76.
- (9) Assemble compression spring 6 and flat washer 5 to the pin of inner housing. And secure them with stop ring E-5 as illustrated in Fig. 77.
- (10) Apply 55g of MAKITA grease RA No.1 in gear housing.



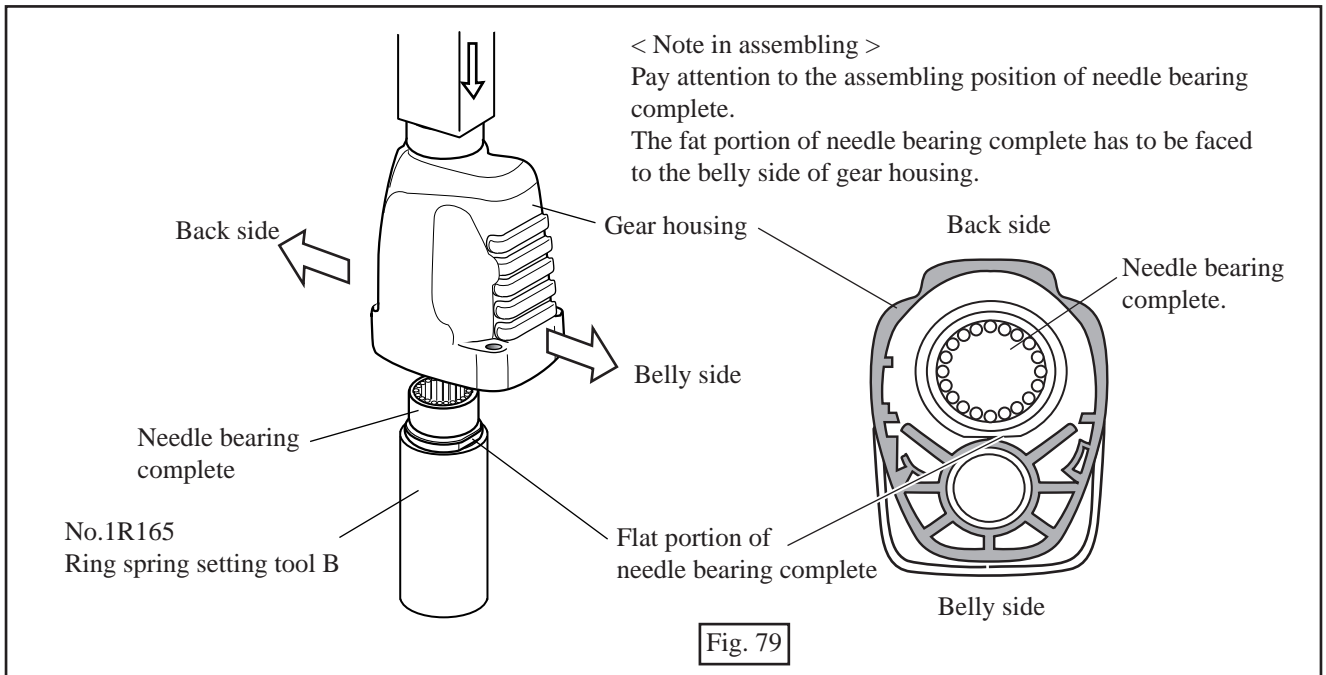
< 17 > Removing needle bearing complete

Strike the work table with gear housing. Then needle bearing complete can be separated from gear housing as illustrated in Fig. 78.



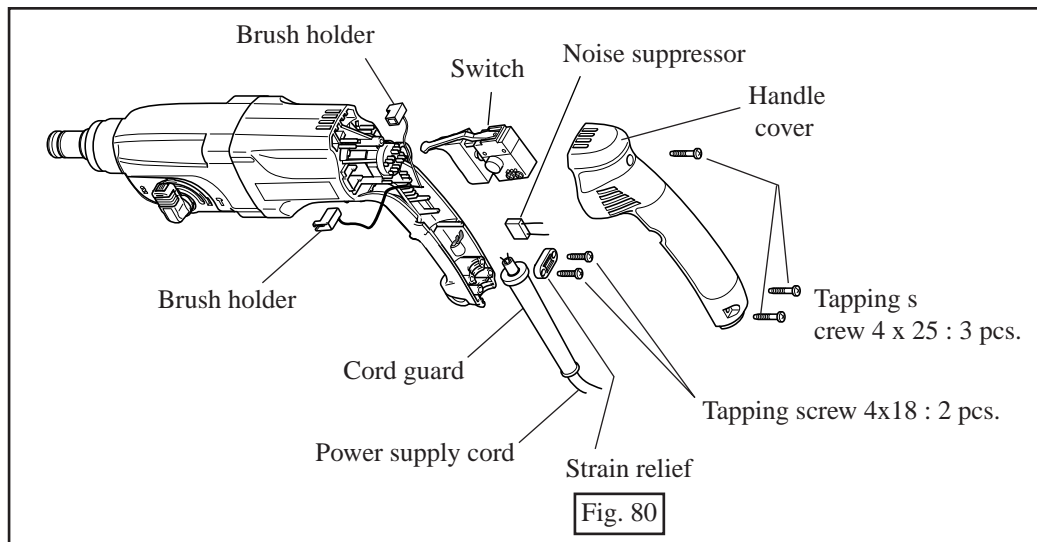
< 18 > Assembling needle bearing complete

1. Apply MAKITA grease RA No.1 to the inside of needle bearing complete.
2. Putting needle bearing complete on No.1R165 "Ring spring setting tool B" press gear housing onto the needle bearing complete with arbor press as illustrated in Fig. 79.



< 19 > Replacing electrical parts in handle

Disassemble handle cover by unscrewing 3 pcs. of tapping screws 4x25, and disassemble strain relief by unscrewing 2 pcs. of tapping screws 4x18 as illustrated in Fig.80.
Then, switch, noise suppressor, power supply cord, etc. can be replaced.



< 18 > Maintenance

It is recommended to change the following parts, when replacing carbon brushes. See Fig. 81.

