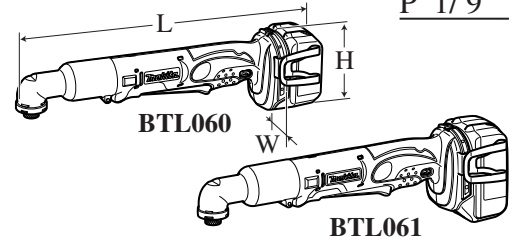


Models No. ▶ BTL060/ BTL061

Description ▶ Cordless Angle Impact Drivers 14.4V/ 18V



CONCEPT AND MAIN APPLICATIONS

Models BTL060 and BTL061 have been developed as advanced models of 6940D.

Additionally to the same high fastening performance and compact angle head as Model 6940D, feature soft grip and LED job light for more maneuverability in tight places.

Dimensions: mm (")		
	BTL060	BTL061
Length (L)	387 (15-1/4)	
Width (W)	78 (3-1/16)	
Height (H)	97 (3-13/16)	116 (4-9/16)

This product is available in the following variations.

BTL060

Model No.	Battery		Battery cover	Charger	Plastic carrying case	Offered to
	type	quantity				
BTL060	BL1430 (Li-ion 3.0Ah)	2	1	DC18RA	Yes	North America
BTL060RFE		1	No			All countries except North America
BTL060RF		No	No			All countries
BTL060Z	No	No	No	No	No	All countries

BTL061

Model No.	Battery		Battery cover	Charger	Plastic carrying case	Offered to
	type	quantity				
BTL061	BL1830 (Li-ion 3.0Ah)	2	1	DC18RA	Yes	North America
BTL061RFE		1	No			All countries except North America
BTL061RF		No	No			All countries
BTL061Z	No	No	No	No	No	All countries

All models also include the accessories listed in "Standard equipment" on next page.

► Specification

Specifications		Model	BTL060	BTL061
Battery	Voltage: V		14.4	18
	Capacity: Ah		3.0	
	Cell		Li-ion	
	Charging time: min.		22 with DC18RA	
Max output (W)			110	120
Driving shank			6.35mm (1/4") Hex	
Capacities	Machine screw		M4 - M8 (5/32 - 5/16")	
	Standard bolt		M4 - M12 (5/32 - 7/16")	
	High tensile bolt		M4 - M8 (5/32 - 5/16")	
	Coarse thread screw		22 - 75mm (7/8 - 2-31/32")	
Impacts per min.: min.-1=ipm			0 - 3,000	
No load speed: min.-1=rpm			0 - 2,000	
Max. fastening torque: N.m [kgf.cm] (in.lbs)			60 [610] (530)	
Electric brake			Yes	
Variable speed control by trigger			Yes	
Reverse switch			Yes	
LED Job light			Yes	
Net weight: kg (lbs)			1.6 (3.5)*1	1.7 (3.7)*2

*1: with Battery BL1430 *2: with Battery BL1830

See next page for Standard equipment and Optional accessories.

▶ **Standard equipment**

- Phillips bit 2-45 1
- Belt clip 1

Note: The standard equipment for the tool shown above may differ by country.

▶ **Optional accessories**

- | | | |
|---------------------|-----------------------------|---|
| Sockets | Battery BL1430 (for BTL060) | Fast charger DC18RA |
| Bits | Battery BL1830 (for BTL061) | Charger DC24SA (for North America only) |
| Socket adapter | | Charger DC24SC (for all countries except North America) |
| Straight attachment | | |
| Ratchet attachment | | |

► **Repair**

CAUTION: Remove the battery from the machine for safety before repair/ maintenance, in accordance with the instruction manual!

[1] NECESSARY REPAIRING TOOLS

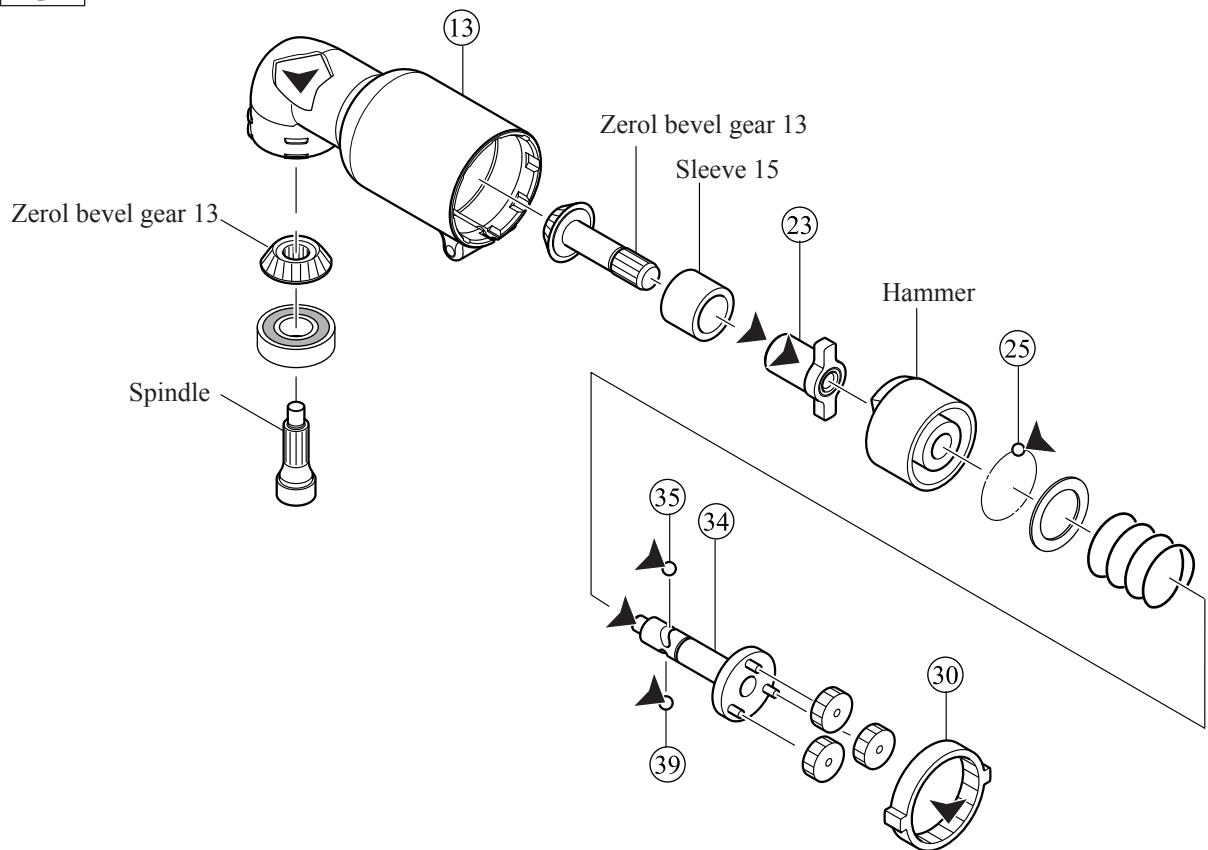
Code No.	Description	Use for
[3] -1. Angle Head Complete		
1R005	Retaining ring R pliers RT-2N	Removing/installing Retaining ring R-26
1R291	Retaining ring S and R pliers	Removing/installing Retaining rings S-10 and R-28
1R269	Bearing extractor	Removing Ball bearings and Zerol bevel gear 13
[3] -2. Bit holder Section		
1R291	Retaining ring S and R pliers	Removing/installing Ring spring 11
[3] -3. Hammer Section		
1R045	Gear extractor, large	Disassembling/assembling Hammer section
1R346	Center attachment for 1R045	
1R288	Screwdriver magnetizer	Removing Steel ball 4.8

[2] LUBRICATION and ADHESIVE APPLICATION

Apply Makita grease N. No.2 to the portions designated with the black triangle to protect parts and product from unusual abrasion. (Fig. 1)

LUBRICATION			
Item No.	Description	Lubricant	Portion to lubricate
⑬	Angle head complete	Makita grease N. No.2	Gear room for two Zerol bevel gears (Apply about 1.5g.)
⑳	Anvil		Surface that contacts Sleeve 15
			Surface of the hole that contacts Zerol bevel gear 13
㉕	Steel ball 3.5 (22 pcs)		Whole surface
⑳	Internal gear 69		Teeth portion (Apply about 1.5g.)
㉔	Spindle complete		Surface that contacts Anvil ㉓
㉕ ㉙	Steel ball 4.8 (2 pcs)		Whole surface

Fig. 1



► **Repair**

[3] DISASSEMBLY/ASSEMBLY

[3] -1. Angle Head Complete

DISASSEMBLING

- 1) Angle head complete can be removed from Housing simply by unscrewing (+) Hex bolt M5x30.
Note: If the overlapping portion of Angle head complete is deformed from abuse or a fall, Angle head complete cannot be removed from Housing by hand. In this case, remove it while expanding the slit between the bolt holes with a slotted screwdriver. (**Fig. 2**)
- 2) Remove Retaining ring R-26 using 1R005.
- 3) By striking Angle head complete straight against a flat surface of work bench or the like, the following parts can be removed as an assembly (**Fig. 3**):
 Zerol bevel gear 13, Ball bearing 6000, Sleeve 10, Ball bearing 6000LLB, Retaining ring S-10
- 4) Remove Retaining ring S-10 using 1R291, then two Ball bearings using 1R269.
- 5) Remove Rubber ring 32 from Angle head complete, then remove Retaining ring R-28 using 1R291.
- 6) Spindle section can now be removed by tapping Angle head complete.
Note: Spindle section cannot be removed if Angle head complete is deformed from abuse or a fall.
 In this case, attach an appropriate bit on Angle head complete, then clamp the bit securely in a vise.
 Spindle section can now be removed by tapping Angle head complete with plastic hammer as illustrated in **Fig. 4**.
- 7) Spindle section can be disassembled as described in **Fig. 5**.

Fig. 2

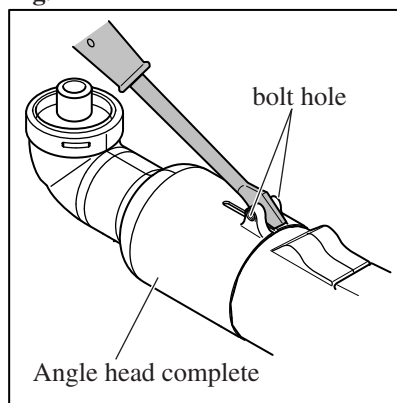


Fig. 3

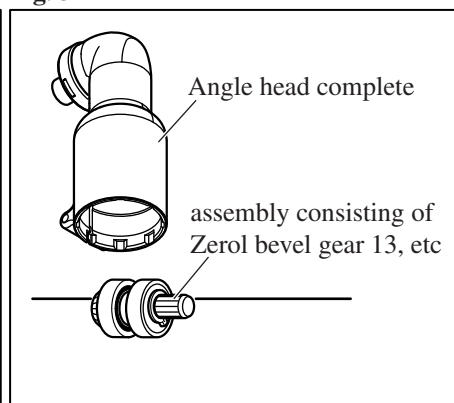


Fig. 4

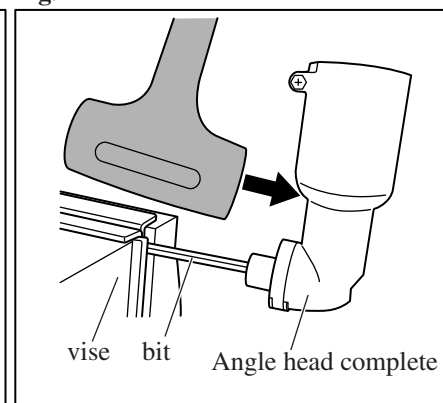


Fig. 5

- 1) Remove Ring spring 9 from Spindle by taking the following steps:
 - ① Insert an awl between the teeth of Spindle into Ring spring 9.
Note: Insert into the space on the opposite side of the ends of Ring spring 9.
 - ② Hook Ring spring 9 by moving the awl in the direction of the arrow.
Note: Ring spring 9 will be deformed when removed from Spindle.
 Be sure to use new one for assembling

- 2) Remove Zerol bevel gear 13 from Spindle by striking Spindle straight against a flat surface of work bench or the like.
 If cannot be removed, remove together with Ball bearing 6001DDW using 1R269 as illustrated below.

► **Repair**

[3] DISASSEMBLY/ASSEMBLY

[3] -2. Bit Holder Section

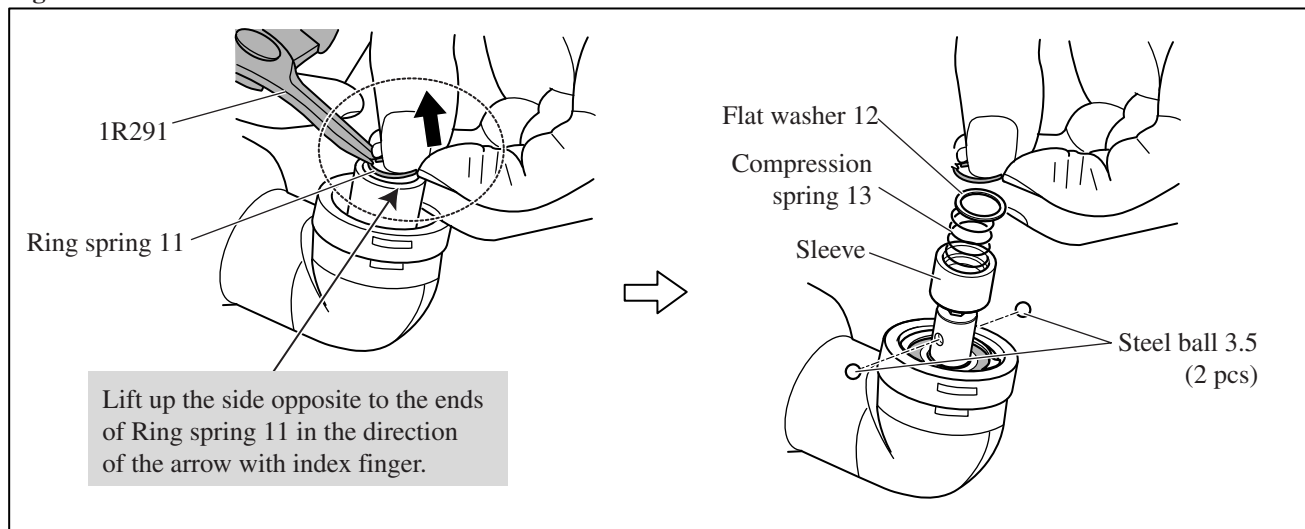
DISASSEMBLING

Open the ends of Ring spring 11 using 1R291 while pressing Ring spring 11 with the thumb of the other hand in order not to allow Flat washer 12 and Compression spring 13 to pop out.

By lifting up Ring spring 11 carefully as described in **Fig. 6**, the following parts can be removed:

Flat washer 12, Compression spring 13, Sleeve, Steel ball 3.5 (2 pcs)

Fig. 6



[3] -3. Hammer Section

DISASSEMBLING

- 1) Remove Angle head complete by unscrewing (+) Hex bolt M5x30.
- 2) Remove Housing R by unscrewing eight 4x18 Tapping screws. (**Fig. 7**)
- 3) Remove Switch lever from Housing L, then by levering up DC Motor with slotted screwdriver as illustrated in **Fig. 8**, the following parts can be removed from Housing L as an assembly: DC Motor, Gear section, Hammer section
- 4) The assembly can be disassembled by hand except Hammer section. (**Fig. 9**)

Fig. 7

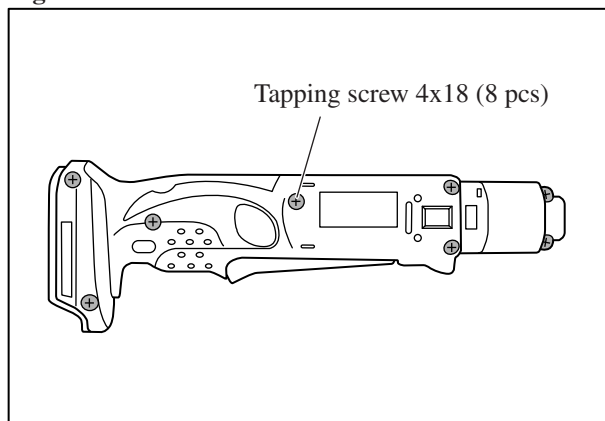


Fig. 8

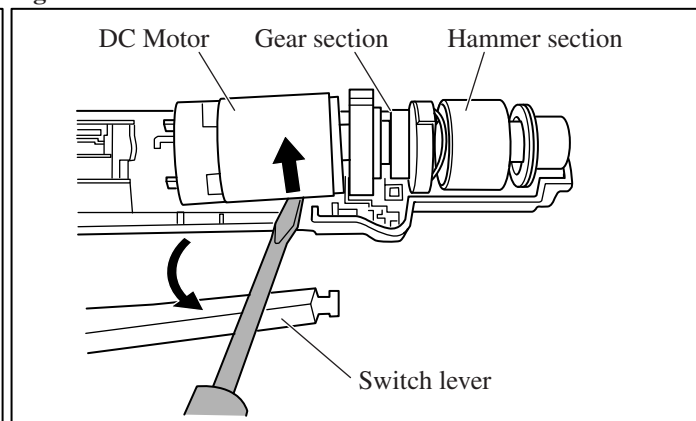
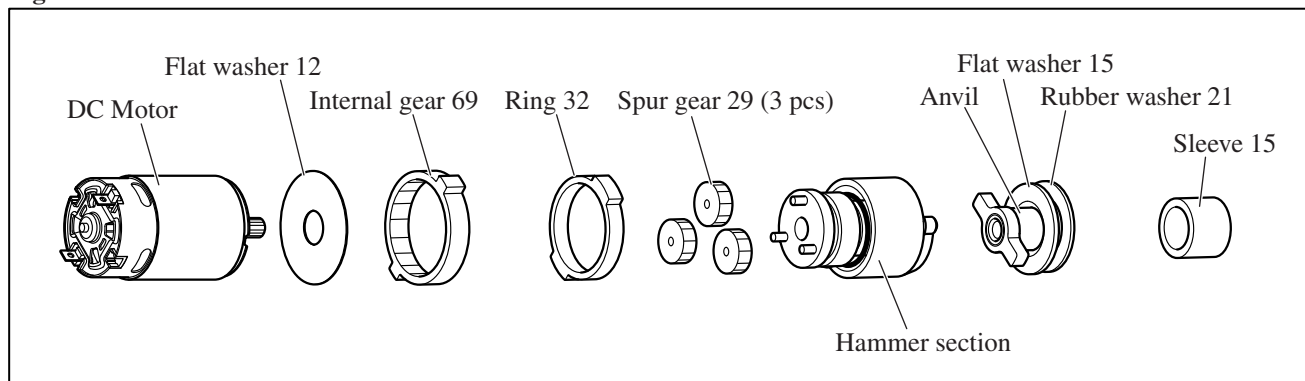


Fig. 9



► **Repair**

[3] DISASSEMBLY/ASSEMBLY

[3] -3. Hammer Section (cont.)

DISASSEMBLING

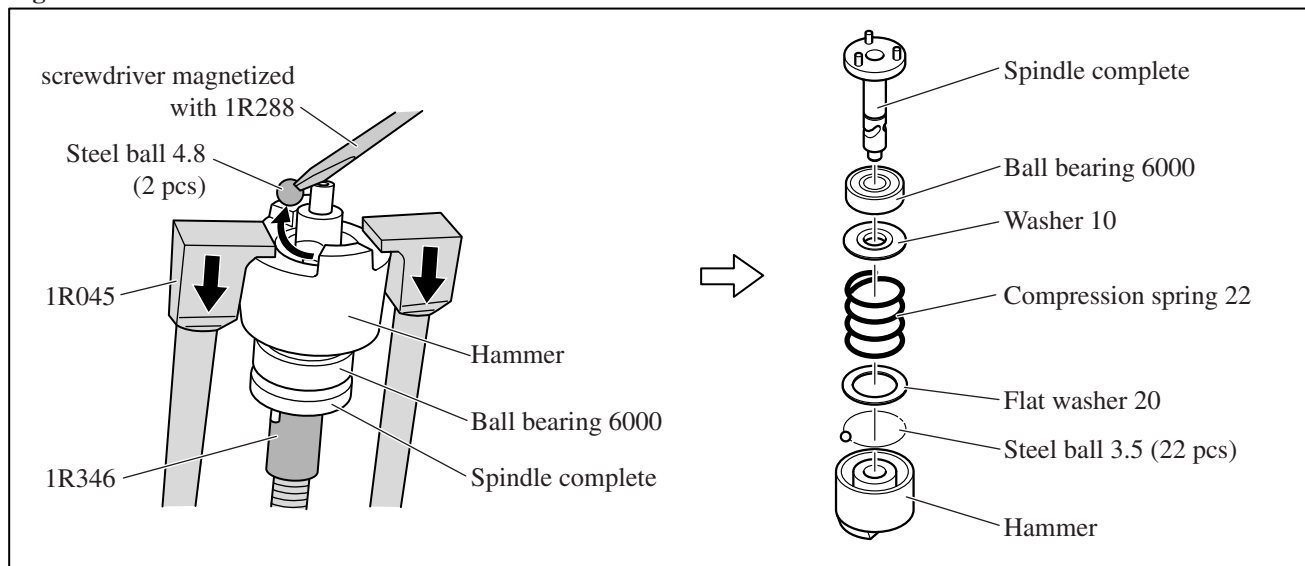
5) Attach 1R045 and 1R346 to Hammer, and pull Hammer towards 1R346 as illustrated to **left in Fig. 10**.

Then remove Steel ball 4.8 (2 pcs) from Spindle using screwdriver magnetized with 1R288.

Hammer section can now be disassembled as illustrated to **right in Fig. 10**.

Note: When detaching 1R045 and 1R346 from Hammer, be sure to turn over Hammer section to put Hammer on the bottom side. Otherwise, Steel ball 3.5 (22 pcs) in Hammer will scatter around.

Fig. 10

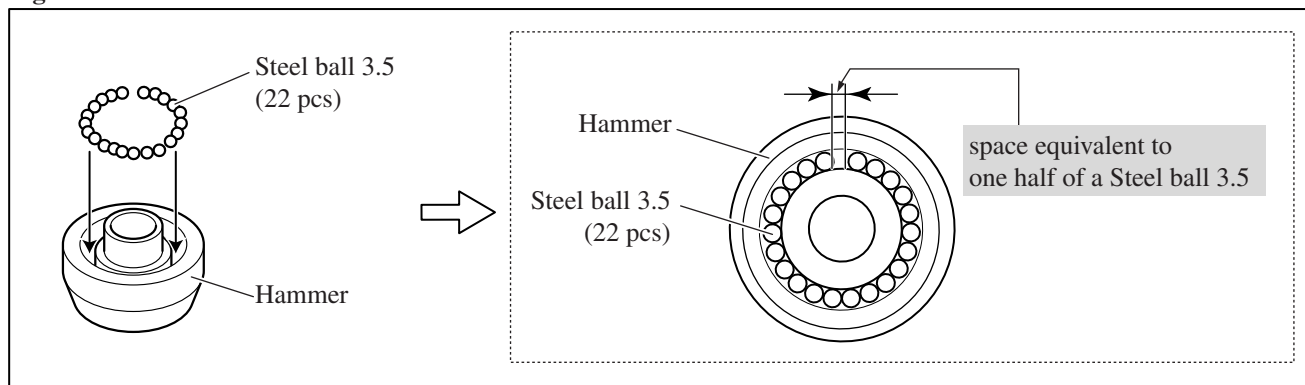


ASSEMBLING

Do the reverse of the disassembling steps

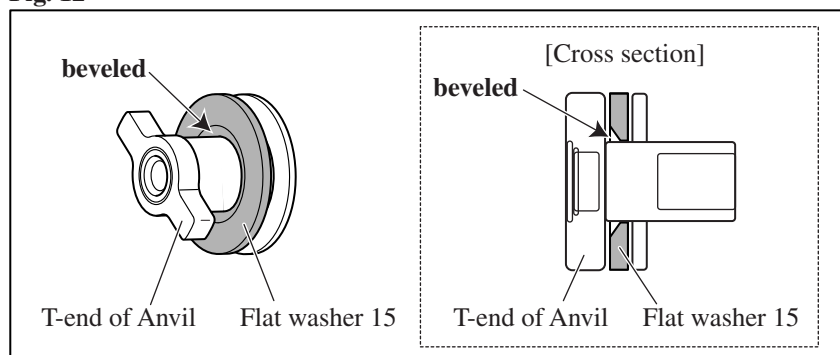
Note 1: As illustrated to **right in Fig. 11**, the groove inside Hammer is designed to have a space equivalent to one half of a Steel ball 3.5 when twenty-two Steel balls are correctly installed.

Fig. 11



Note 2: Flat washer 15 is not reversible when assembled to Anvil. The center hole of Flat washer 15 is beveled on one face, and plain on the other. Be sure to place the beveled face on the T-end of Anvil. (**Fig. 12**)

Fig. 12



► Repair

[3] DISASSEMBLY/ASSEMBLY

[3] -3. Hammer Section (cont.)

ASSEMBLING

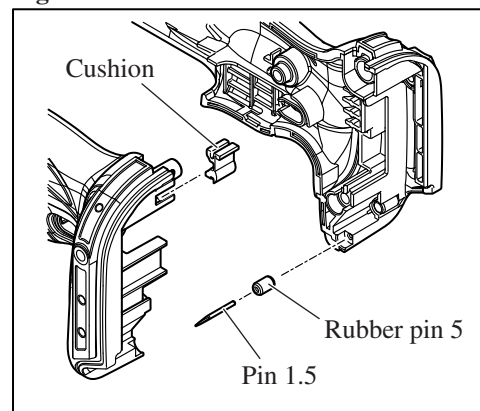
Note 3: Internal gear 69 is reversible when assembled to Housing L although there is a notch on one of the two protrusions.

Note 4: When assembling DC Motor to Gear section, do not force the pinion gear of DC Motor into Gear section.

Be sure to insert the pinion gear into three Spur gears (Spur gear 29) while engaging them. Otherwise, DC Motor will run slower with occasional siren-like noise. In this case, disassemble the machine again, and insert the pinion gear correctly as described above.

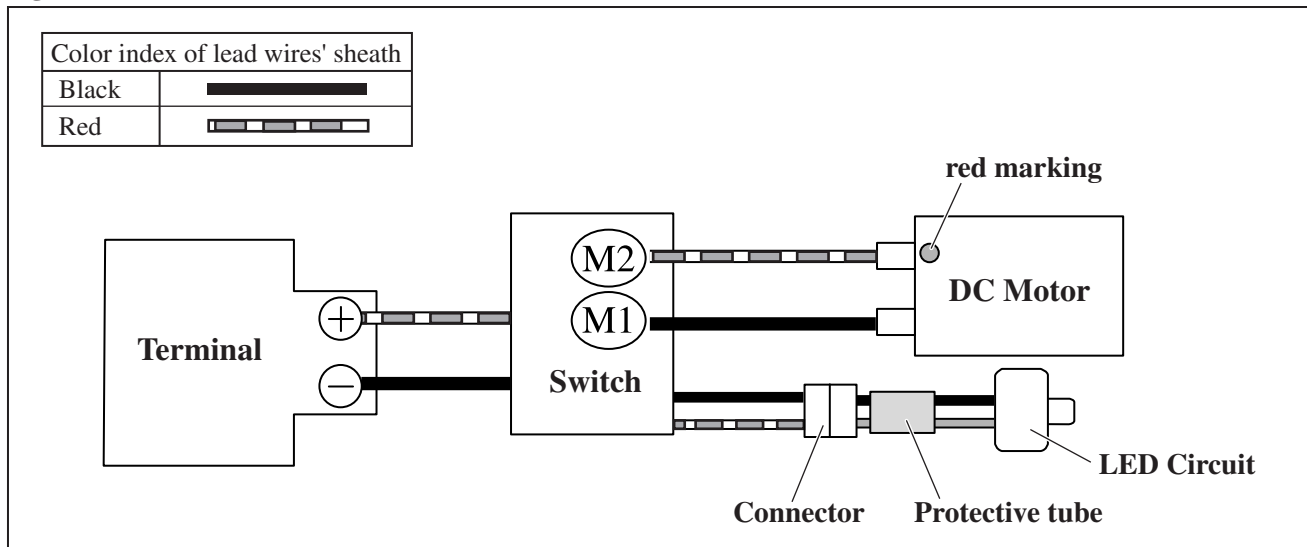
Note 5: Do not forget to put the following parts in place before assembling Housing R to Housing L (**Fig. 13**): Cushion, Pin 1.5, Rubber pin 5

Fig. 13



► **Circuit diagram**

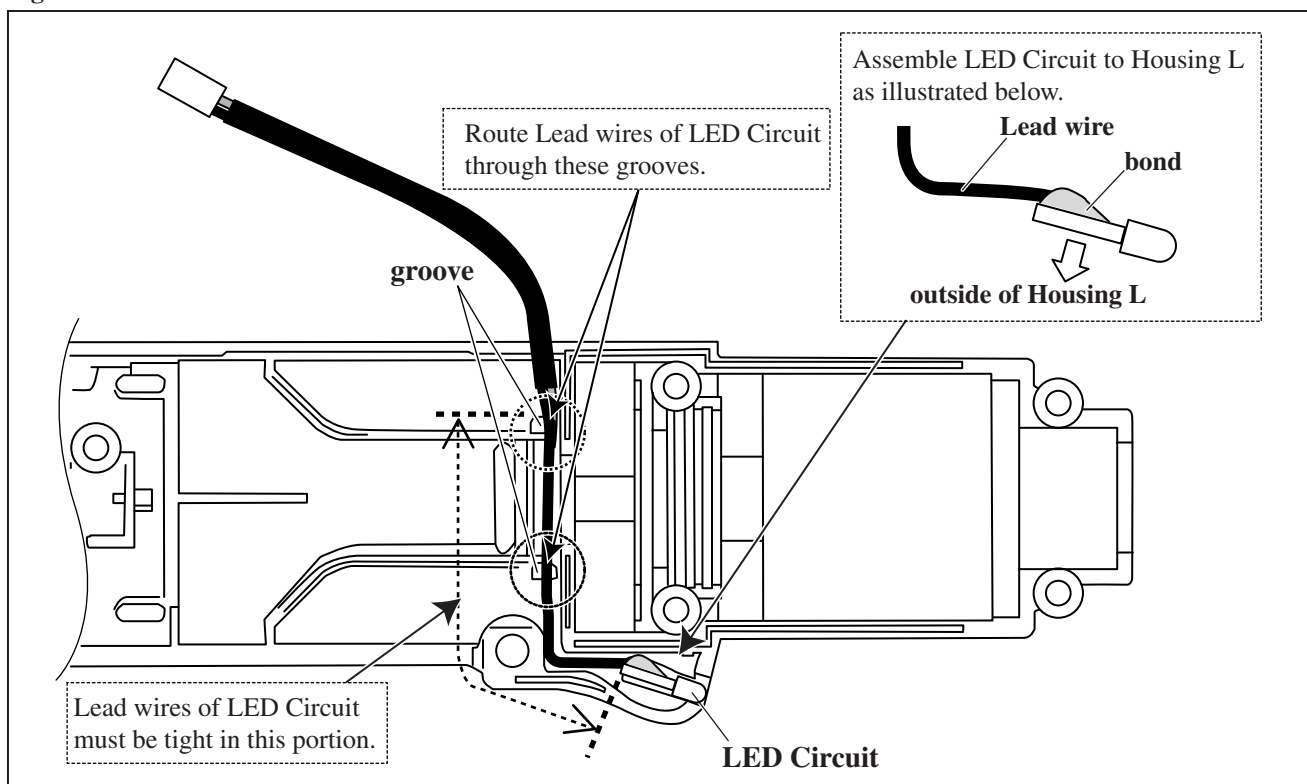
Fig. D-1



► **Wiring diagram**

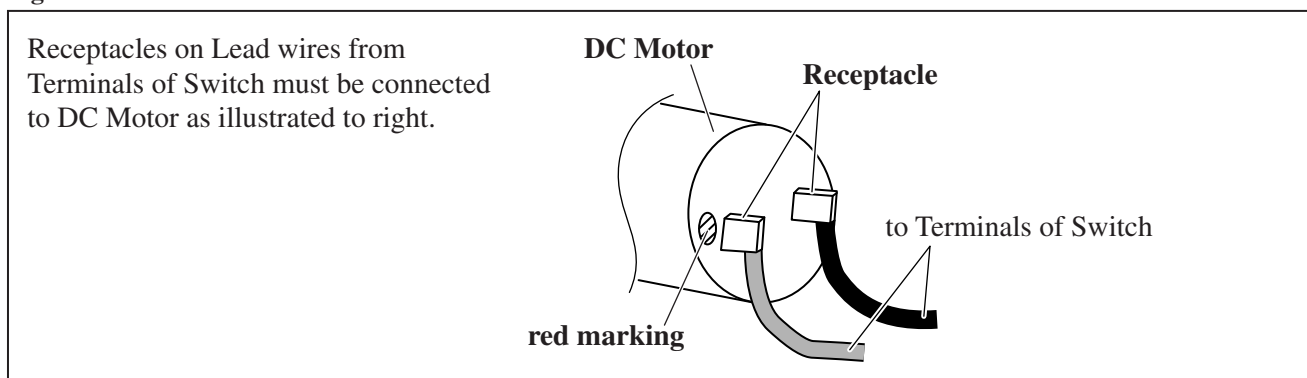
[1] Assembling LED Circuit to Housing L

Fig. D-2



[2] Connecting Lead Wires to DC Motor

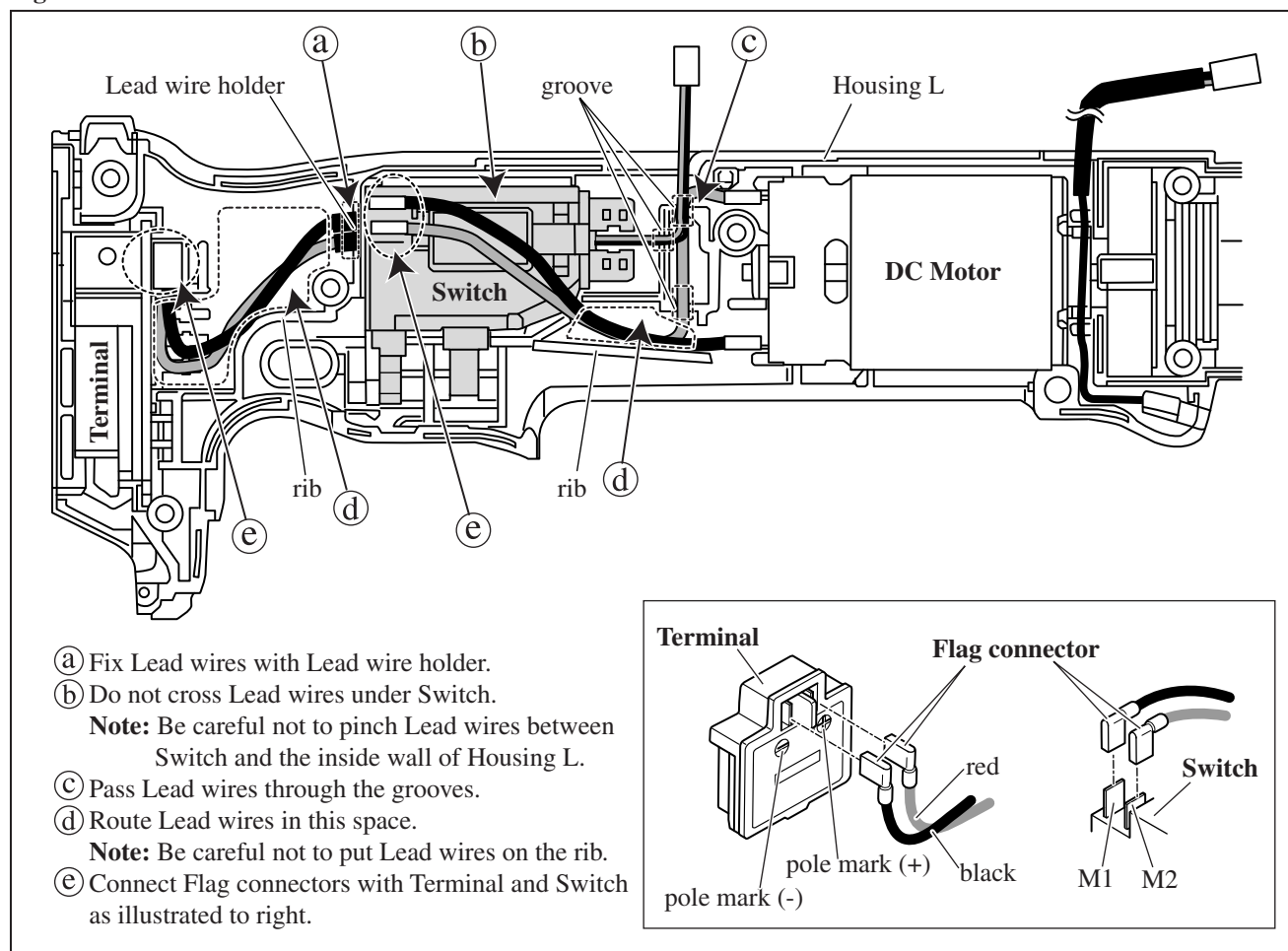
Fig. D-3



▶ Wiring diagram

[3] Before Connecting Switch to LED Circuit

Fig. D-4



[3] After Connecting Switch to LED Circuit

Fig. D-5

