

**Model No.** ▶ BDF450

**Description** ▶ Cordless Driver Drill 13mm (1/2")

## CONCEPT AND MAIN APPLICATIONS

Model BDF450 has been developed as the 18V version of the current 14.4V Cordless driver drill Model BDF440.

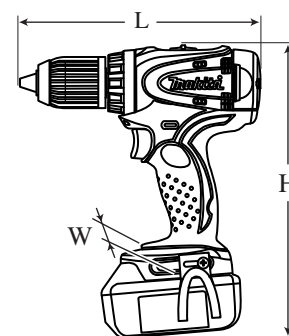
18V battery delivers powerful 240W maximum output, yet still extra-lightweight design has been achieved by using 4-pole motor and Lithium-ion battery as power unit.

Features the same advantages as BDF440 as follows:

- Rubberized soft grip contoured to perfectly fit operator hand and angled to provide best tool balance
- All metal gear construction
- Job light with afterglow function
- Single sleeve chuck

This new product will be available in the following variations.

Model No.	Battery		Charger	Offered to
	type	quantity		
BDF450	BL1830 (Li-ion 3.0Ah)	2	DC18SC	USA, Canada Mexico, Panama
BDF450SFE		2		All countries except those listed above
BDF451SFE3		3		



Dimensions: mm (")	
Length (L)	186 (7-3/8)
Width (W)	79 (3-1/8)
Height (H)	244 (9-5/8)

## ► Specification

Battery	Voltage: V		18
	Capacity: Ah		3.0
	Cell		Li-ion
Max output (W)			240
No load speed: min-1=rpm		Low/ High	0 - 400/ 0 - 1,400
Capacity of drill chuck: mm (")			1.5 - 13 (1/16 - 1/2)
Capacity: mm (")	Steel		13 (1/2)
	Wood		27 (1-1/16)
Torque setting			16 stage + drill mode
Max. clutch torque: N.m (in.lbs)			1.0 - 5.0 (8.9 - 44.3)
Max. fastening torque: N.m	Soft joint		25
	Hard joint		41
Lock torque: N.m (in.lbs)			36 (320)
Electric brake			Yes
Variable speed control			Yes
Reversing switch			Yes
Net weight*: kg (lbs)			1.7 (3.7)

\*Includes battery BL1830

## ► Standard equipment

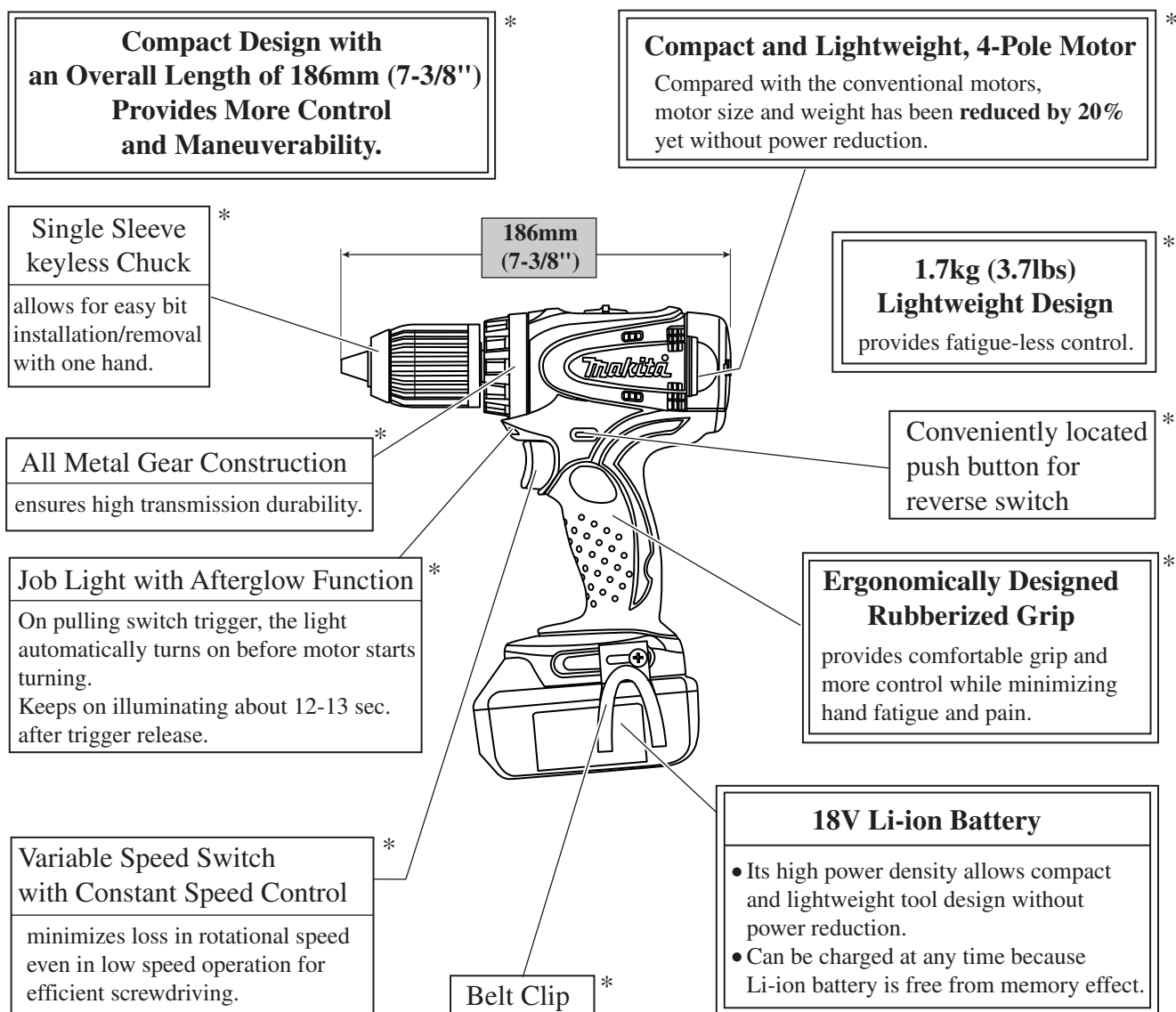
Phillips bit 2-65 ..... 1 pc Belt clip..... 1 pc Plastic carrying case ..... 1 pc

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

## ► Optional accessories

Charger DC18SC	Charger DC24SC	Assorted drill bits for wood
Charger DC24SA	Li-ion battery BL1830	Assorted drill bits for metal

## ► Features and benefits



\*The same advantages as Model BDF440

## ► Features and benefits

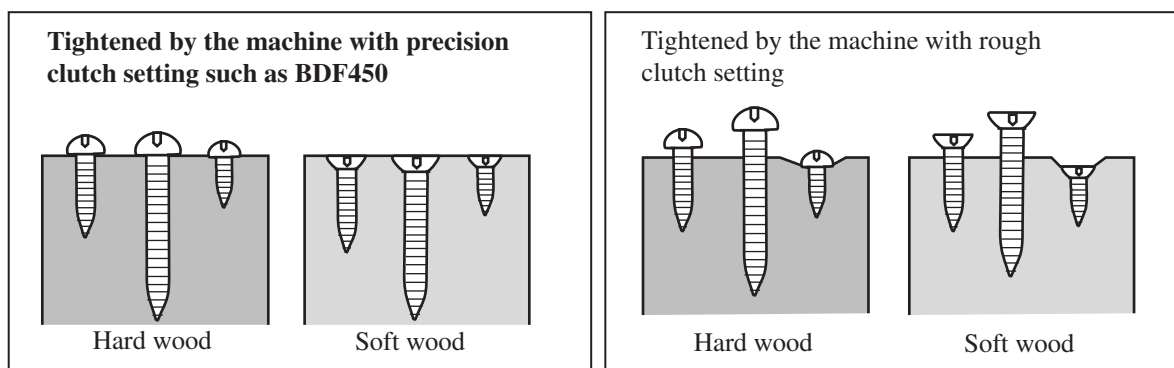
### The Graduation on Torque Adjusting Ring and Corresponding Fastening Torque (The Torque When Clutch Is Disengaged=Max. clutch torque)



Applicable screw	Machine screw		M4	M5		M6
	Wood screw	Soft wood (pine, etc.)			<div> <div>← dia. 3.5x22mm</div> <div>dia. 4.1 x 38mm</div> </div>	
		Hard wood (lauan, etc.)			<div>dia. 3.5 x 22mm</div> <div>dia. 4.1 x 38mm</div>	

#### 16 Stage torque settings allows;

- 1) to perform appropriate torque setting in tightening M4 to M6 machine screws.
- 2) in tightening wood screws, to drive the screw heads to a uniform height regardless of the screw size or the hardness of wood. (See the figures below.)



## ► Comparison of products

Model No. Specifications		Makita		Competitor A	Competitor B	Competitor C
		BDF450	BDF440	A	B	C
Battery	Voltage: V	<b>18</b>	14.4	15.6	18	18
	Capacity: Ah	<b>3.0</b>	3.0	3.5	2.0/ 3.0	2.0
	Cell	<b>Li-ion</b>	Li-ion	Ni-MH	Ni-Cd/ Ni-MH	Ni-Cd
No load speed: min-1= rpm	High	<b>0 - 1,400</b>	0 - 1,400	200 - 1,450	0 - 1,500	0 - 400
	Low	<b>0 - 400</b>	0 - 400	65 - 450	0 - 450	0 - 1,300
Type of keyless drill chuck		<b>Single sleeve</b>	Single sleeve	Single sleeve	Single sleeve	Single sleeve
Chuck Capacity: mm (")		<b>13 (1/2)</b>	13 (1/2)	13 (1/2)	13 (1/2)	13 (1/2)
Lock Torque: N.m (in.lbs)		<b>36 (320) See note below.</b>	36 (320)	44.1 (390)	51 (450)	35 (310)
Max. fastening torque: N.m	Hard joint	<b>41</b>	38	44.1	47*	42*
	Soft joint	<b>25</b>	25	31.9	30*	25*
Capacity: mm (")	Steel	<b>13 (1/2)</b>	13 (1/2)	13 (1/2)	13 (1/2)	13 (1/2)
	Wood	<b>27 (1-1/16)</b>	27 (1-1/16)	36 (1-7/16)	38 (1-1/2)	36 (1-7/16)
Torque adjustment		<b>16 + Drill mode</b>	16 + Drill mode	21 + Drill mode	17 + Drill mode	15 + Drill mode
LED Job light	Afterglow type	<b>Yes</b>	Yes	No	No	No
	Normal type					
Belt clip		<b>Yes</b>	Yes	No	No	No
Replaceable carbon brush		<b>Yes</b>	Yes	No	No	No
Soft grip		<b>Yes</b>	Yes	Yes	Yes	Yes
Dimensions: mm (")	Length	<b>186 (7-3/8)</b>	186 (7-3/8)	208 (8-3/16)	228 (9)	220 (8-5/8)
	Width	<b>79 (3-1/8)</b>	79 (3-1/8)	58 (2-1/4)	90 (3-1/2)	87 (3-7/16)
	Height	<b>244 (9-5/8)</b>	242 (9-1/2)	229 (9)	238 (9-3/8)	255 (10)
Net weight: kg (lbs)		<b>1.7 (3.7)</b>	1.6 (3.5)	2.2 (4.9)	2.4 (5.3)	N/A
Standard equipment	Phillips bit 2-65	Yes	Yes	Yes	No	Yes
	Plastic carrying case	Yes	Yes	Yes	Yes	Yes
	Belt clip	Yes	Yes	No	No	No
	Battery cover	No	No	Yes	Yes	Yes

\*No catalog value available regarding Competitor B and Competitor C; these are the actual values measured by us.

**Note:** The lock torque of 18V BDF450 is equal to that of 14.4V BDF440.

This is because these models are designed to meet the reaction torque value requirements prescribed according to grip length in European and North American safety regulations- EN60745 and UL60745.

For lock torque higher than present, either vertical grip extension of the current handle or horizontal extension by adding a side handle must be required.

Competitor A's model A and Competitor B's model B will not meet the requirements since December 2005 in Europe and since 2010 in North America.

## Comparison of products

### Performance Comparison

Numbers in charts below are relative values when the capacity of Model BDF440 is indexed at 100.

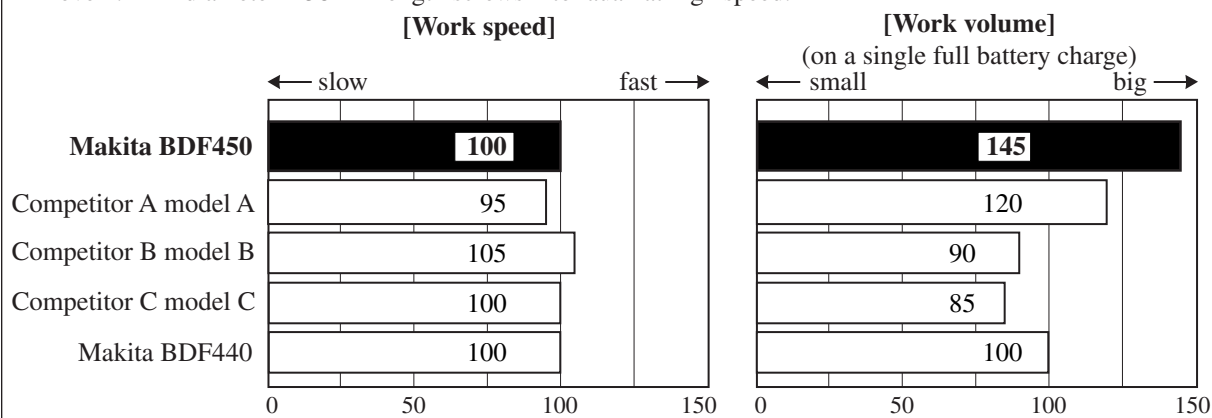
**Note:** The test results depend to a great extent on the hardness of the material, etc.

The test is implemented with the following kinds of batteries;

Makita: 3.0Ah, Competitor A: 3.5Ah, Competitor B: 2.0Ah, Competitor C: 2.0Ah

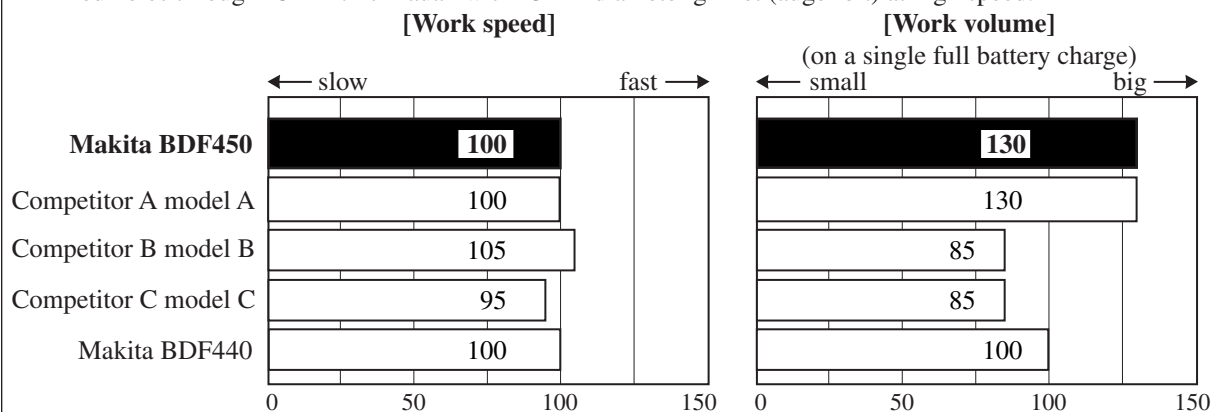
#### Wood Fastening

Drove 4.1mm diameter x 38mm length screws into lauan at high speed.



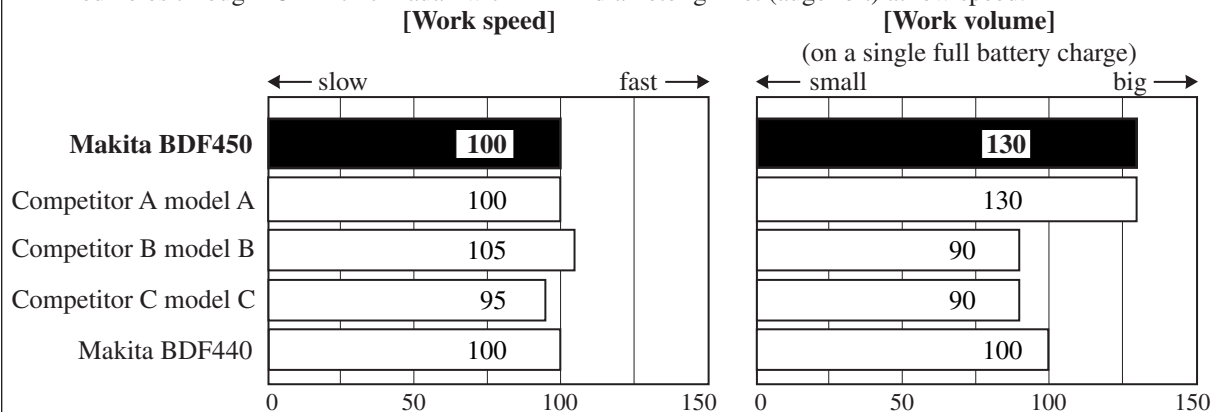
#### Wood Drilling- Test 1

Drilled holes through 25mm thick lauan with 15mm diameter gimlet (auger bit) at high speed.



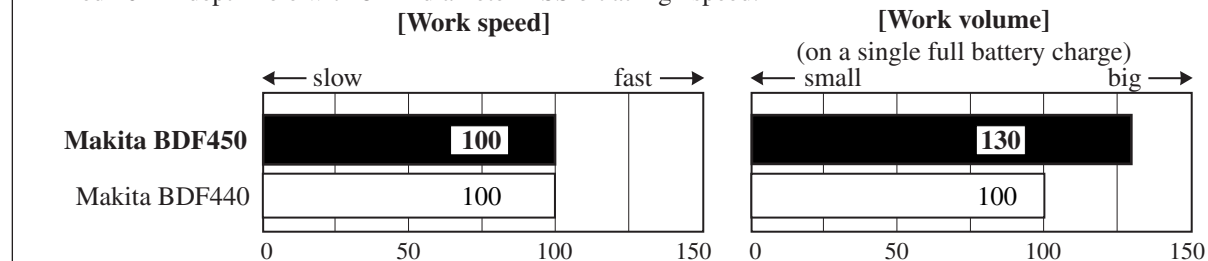
#### Wood Drilling- Test 2

Drilled holes through 25mm thick lauan with 24mm diameter gimlet (auger bit) at low speed.



#### Mortar Drilling- Test

Drilled 40mm depth hole with 8mm diameter HSS bit at high speed.



## ► Repair

**CAUTION: Remove the battery cartridge from the machine for safety before repair/maintenance !**

### [1] NECESSARY REPAIRING TOOLS

Description	Use for
Hex wrench 10	Removing /mounting Drill chuck
Plastic hammer	Removing Drill chuck

### [2] LUBRICATION

It is not required to lubricate the gear section because the portion is replaced as a factory-lubricated gear unit.

### [3] DISASSEMBLY/ASSEMBLY

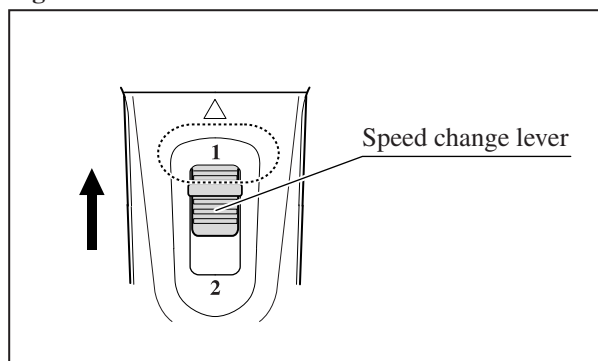
#### [3] -1. Drill Chuck

##### DISASSEMBLING

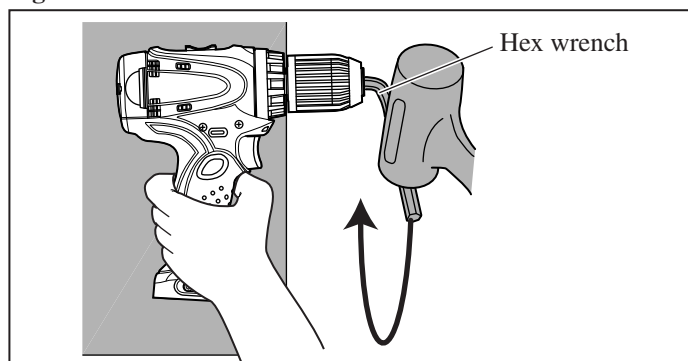
**Note:** It is required to remove Drill chuck when replacing Gear assembly, but you need not when replacing only Housing.

- 1) Open the jaws of Drill chuck fully, and remove the chuck screw (Flat head screw M6x22, left-handed and threadlocker coated) by turning **clockwise** with impact driver in Forward rotation mode.
- 2) Insert a hex wrench into Drill chuck. Then set the Speed change lever in Low speed as illustrated in **Fig. 1**.  
Holding the machine on work bench firmly, turn Drill chuck counterclockwise by tapping the hex wrench. (**Fig. 2**)  
Now Drill chuck can be removed from Spindle.

**Fig. 1**



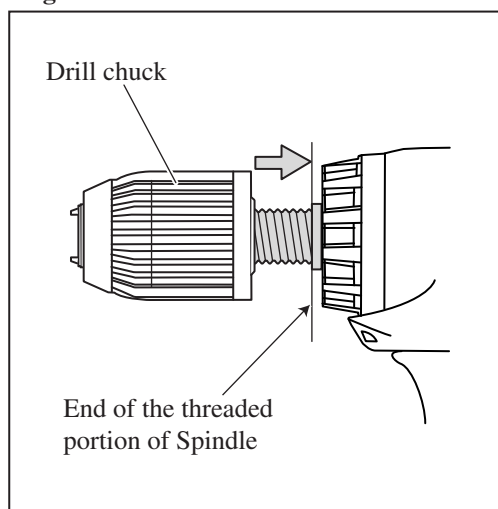
**Fig. 2**



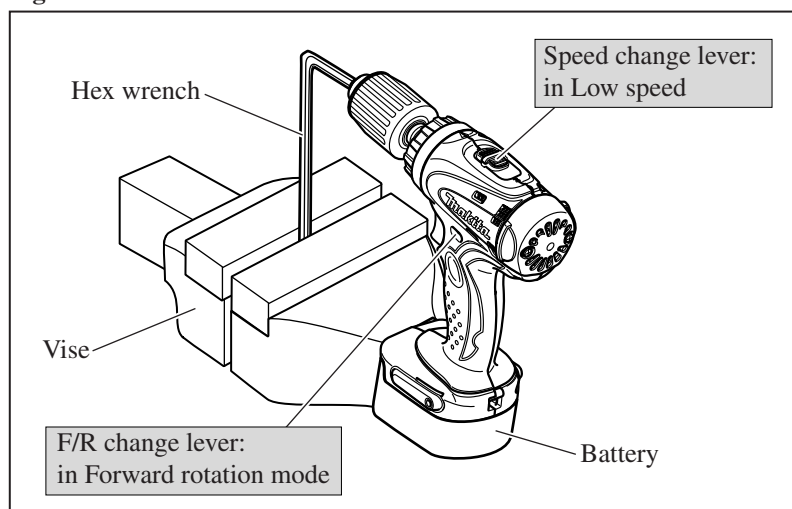
##### ASSEMBLING

- 1) Turn Drill chuck clockwise until it sits on the end of the threaded portion of Spindle. (**Fig. 3**)
- 2) See **Fig. 4**. Insert a hex wrench into drill chuck, and fix the other end of hex wrench in vise. Install battery. Then set the Speed change lever in Low speed, and F/R change lever in Forward (clockwise) rotation mode.
- 3) Slowly pull the switch trigger to rotate Spindle until the motor is locked.  
**Note:** Pull the trigger so that Spindle reaches full speed in one second.  
**Important:** Be sure to release the switch trigger just after Spindle is locked.
- 4) Secure Drill chuck with the chuck screw by turning **counterclockwise** with impact driver.  
**Note:** If you reuse the removed Flat head screw M6x22, apply threadlocker to threaded portion.

**Fig. 3**



**Fig. 4**



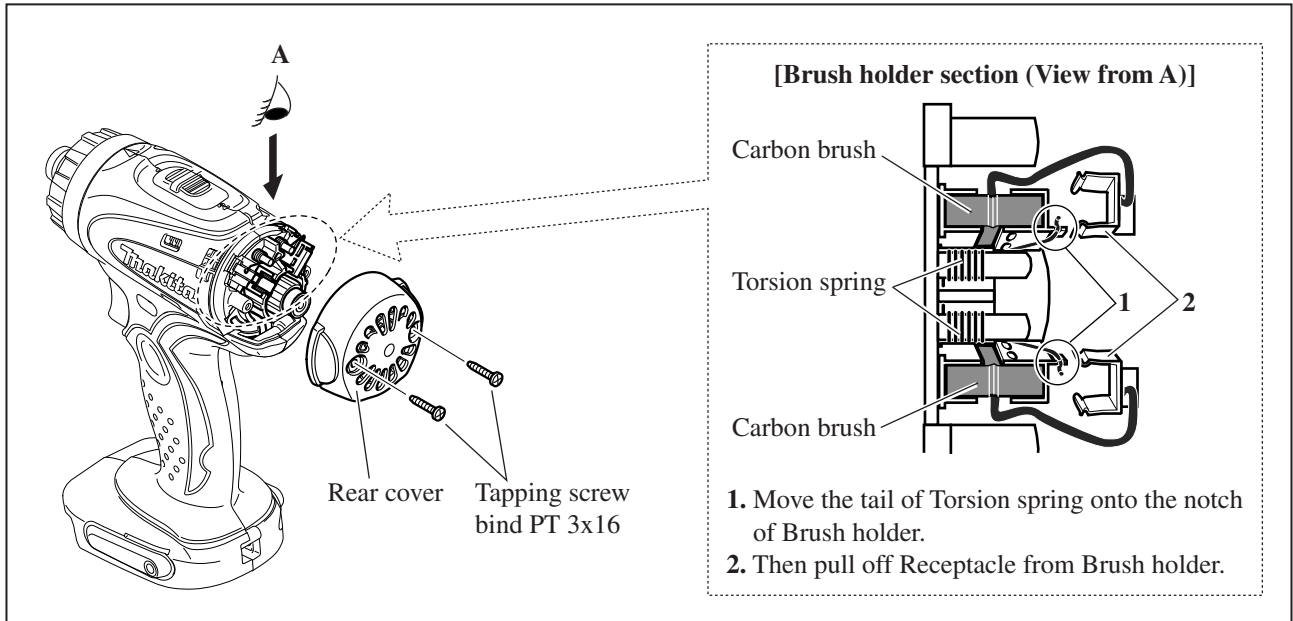
## ► Repair

### [3] -2. Gear Assembly and Motor Section

#### DISASSEMBLING

1) Remove Rear cover and take off Carbon brush from Brush holder complete. (Fig. 5)

Fig. 5



2) Separate Housing R from Housing L, then remove the assembly of the Gear section and the Motor section. (Fig. 6)

3) Remove Brush holder complete from Armature, then separate the Motor section from the Gear section. (Fig. 7)

4) Put the Motor section on a work bench so that the drive end of Armature touches the work bench.

Then separate yoke unit from armature by pulling it down towards the work bench. (Fig. 8)

Fig. 6

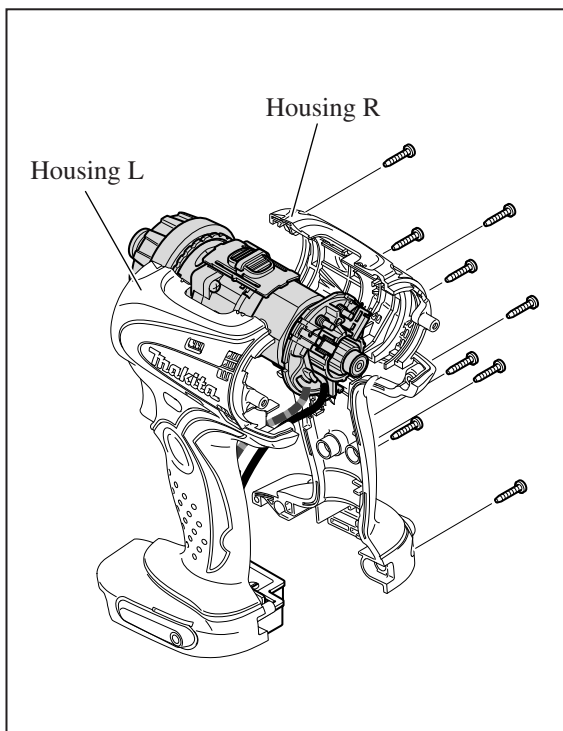


Fig. 7

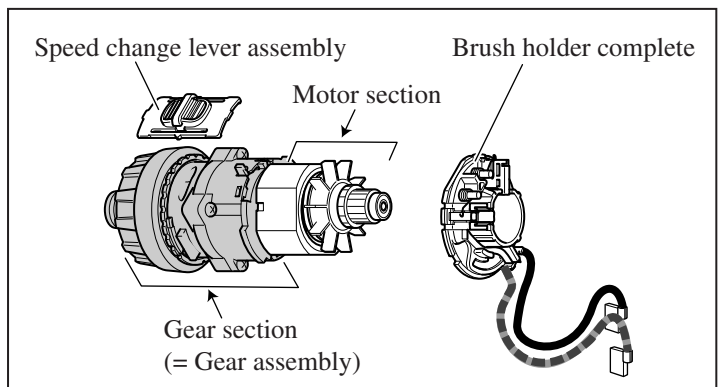
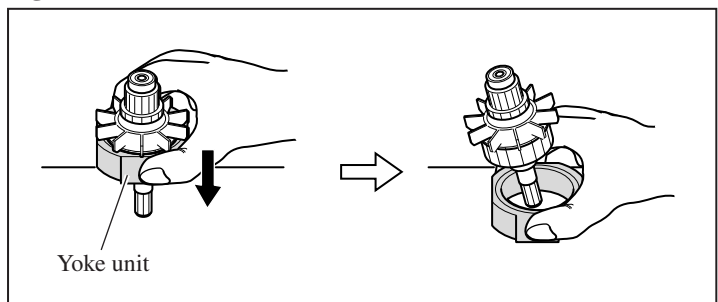


Fig. 8



## ► Repair

### [3] -2. Gear Assembly and Motor Section (cont.)

#### ASSEMBLING

#### 1) Assemble the motor section.

**Note 1.** Yoke unit is not reversible when assembled to Armature. Be sure to assemble so that the notch in Yoke unit is positioned on the drive-end of Armature as illustrated to **left in Fig. 9**. If assembled wrong, the Motor section cannot be assembled to Housing (L).

**Note 2.** Because Yoke unit is a strong magnet, when assembling Armature to Yoke unit, be sure to hold the commutator portion as illustrated to **left in Fig. 10**. Do not hold the Armature core as illustrated to right or your fingers will be pinched between Yoke unit and the fan of Armature that is pulled strongly by the magnet force.

Fig. 9

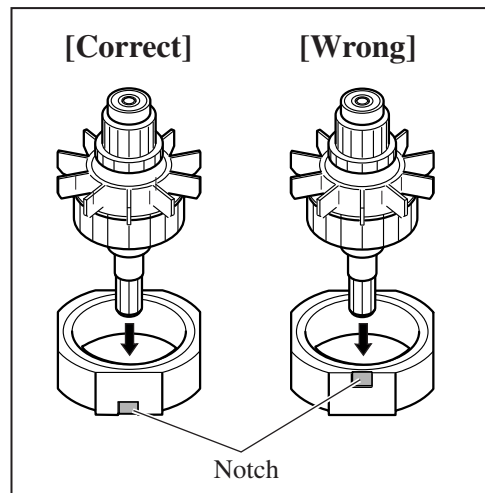
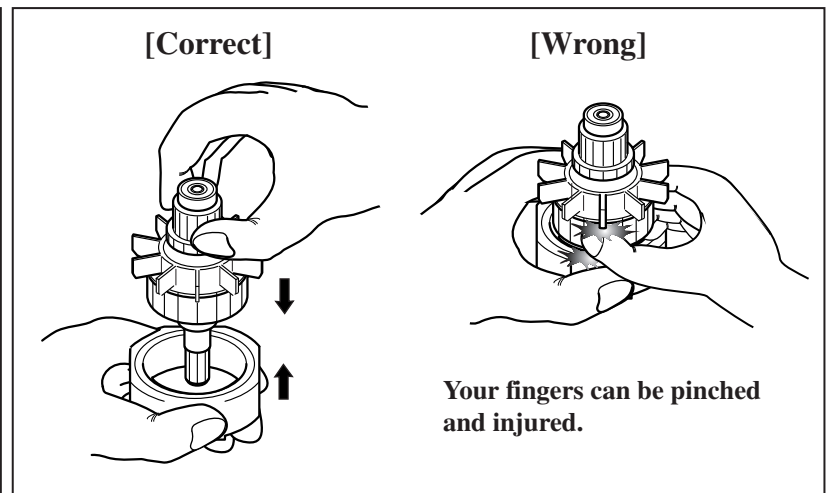


Fig. 10



#### 2) Insert the pinion gear on Armature shaft into Gear assembly, and engage it with the plant gears in Gear assembly. Making sure that the pinion gear is engaged in Gear assembly, push Armature into Gear assembly. (Fig. 11)

#### 3) See Fig. 12. Assemble Speed change lever assembly to the protrusion on Gear assembly.

**Note:** Before installing Gear assembly, make sure that two Compression springs are set in place in the groove on the back of Speed change lever.

#### 4) Slide Speed change lever assembly to the position of either "low" or "high". Then assemble Brush holder complete to the Motor section. (Fig. 13)

Fig. 11

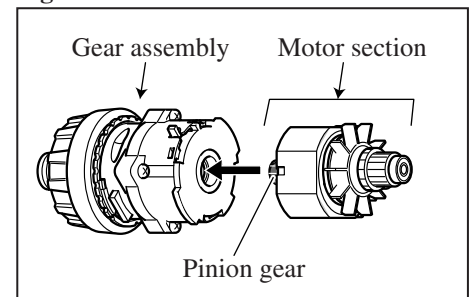


Fig. 12

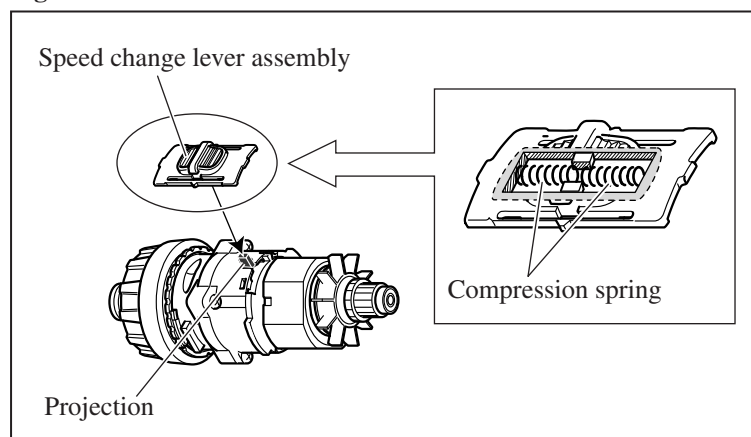
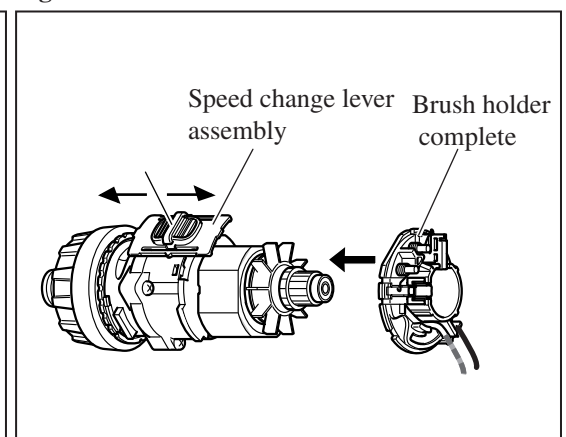


Fig. 13



## ► Repair

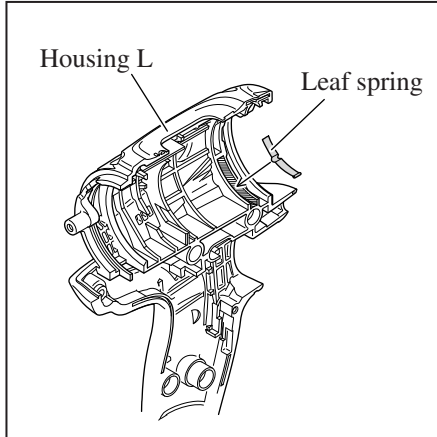
### [3] -2. Gear Assembly and Motor Section (cont.)

#### ASSEMBLING

5) Assemble Leaf spring to Housing L. (**Fig. 14**)

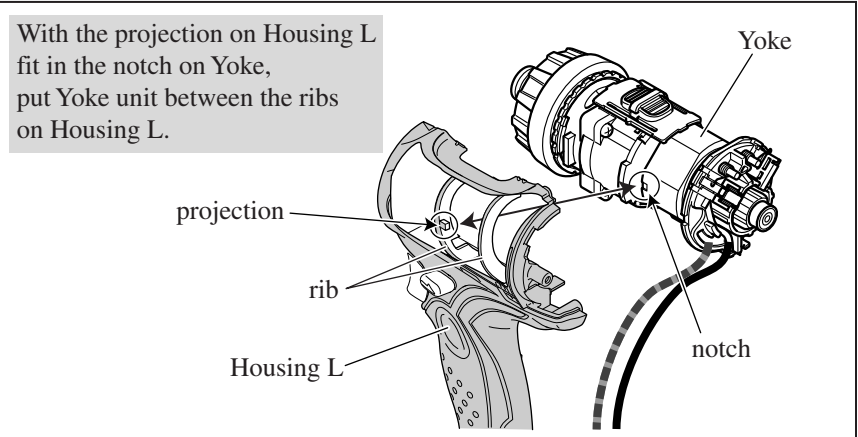
6) Assemble the unit of the Gear section and the Motor section as illustrated in **Fig. 15, 16**.

**Fig. 14**

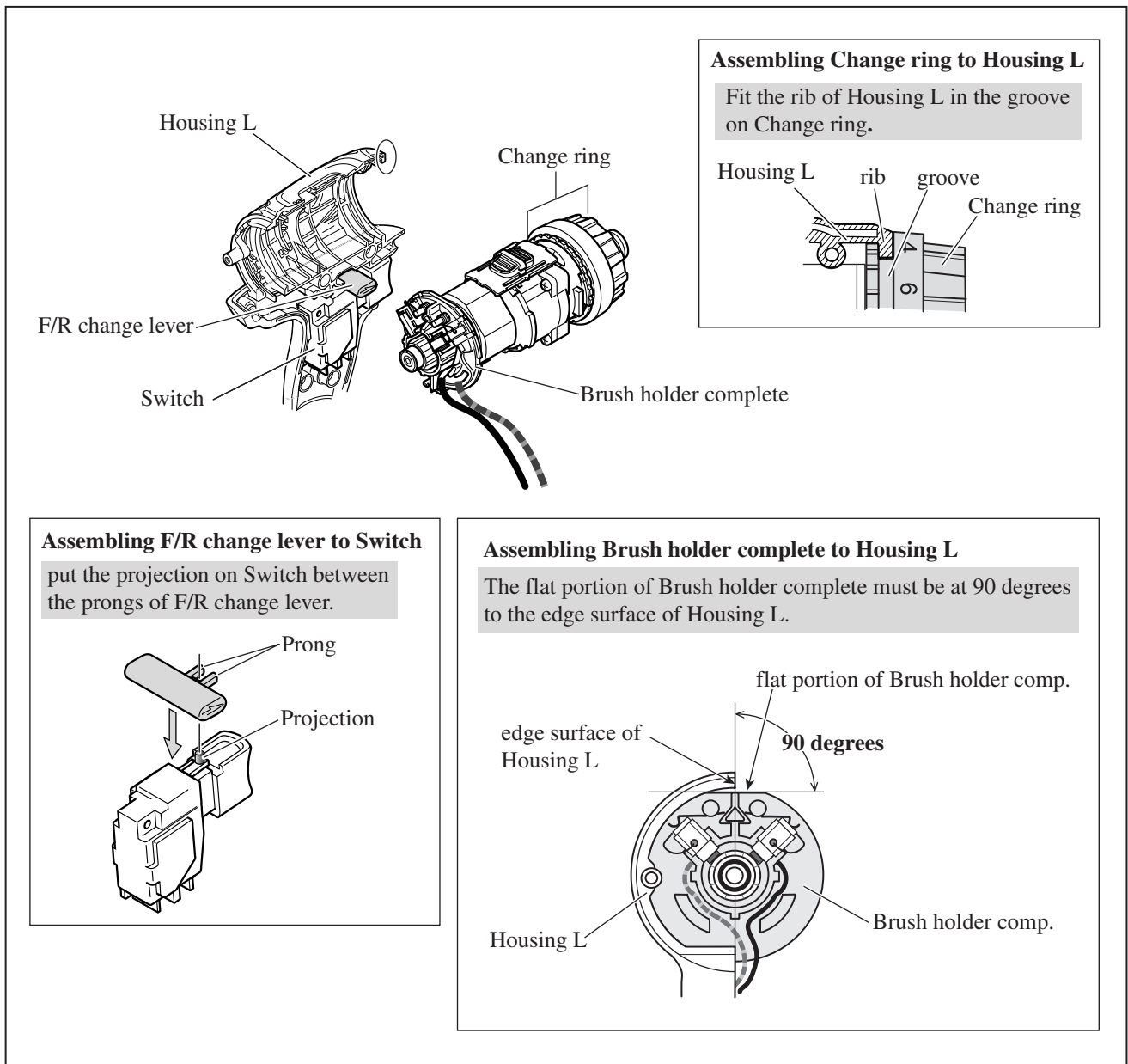


**Fig. 15**

With the projection on Housing L fit in the notch on Yoke, put Yoke unit between the ribs on Housing L.



**Fig. 16**



## ► Repair

### [3] -2. Gear Assembly and Motor Section (cont.)

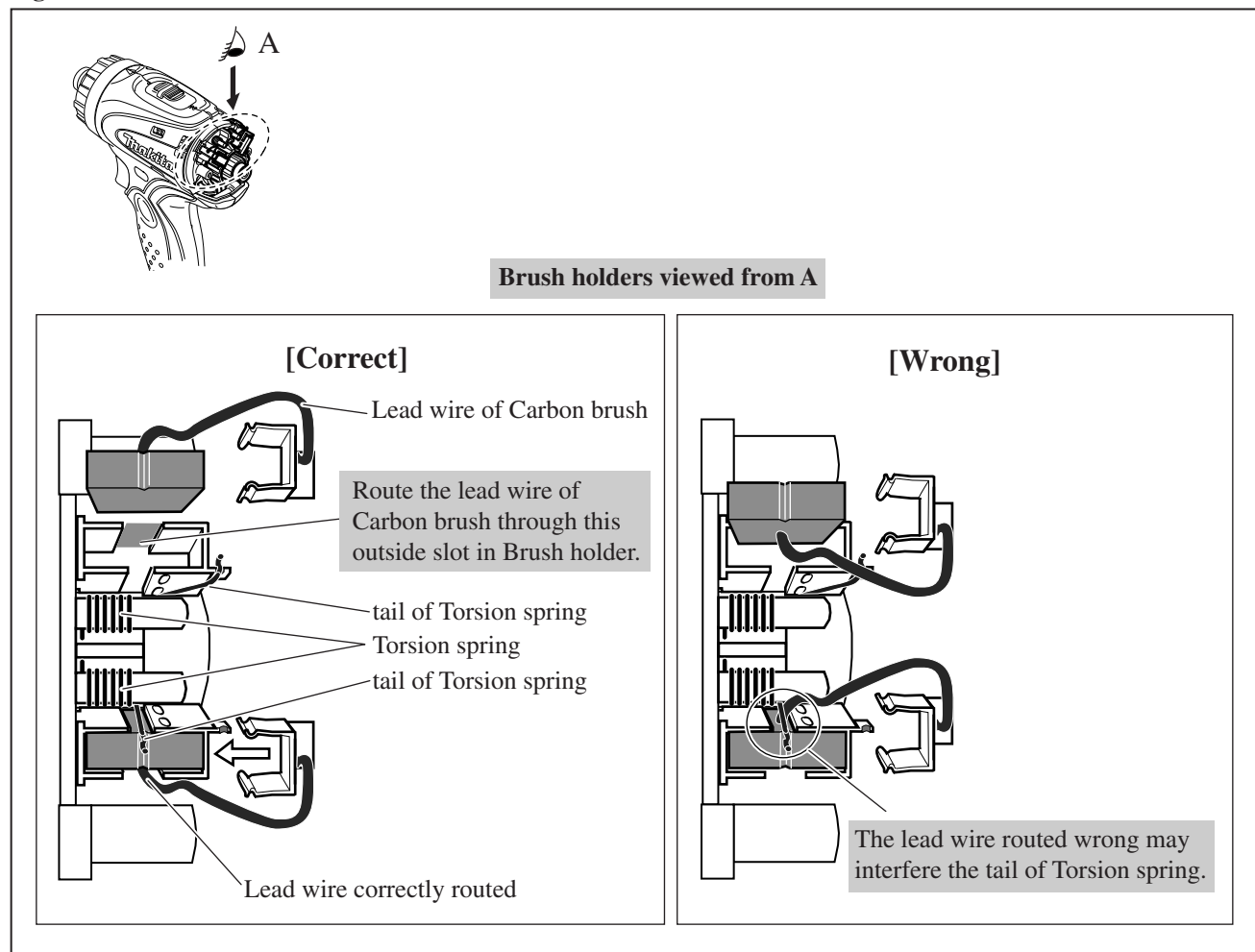
#### ASSEMBLING

7) Assemble Housing R to Housing L. (Fig. 6)

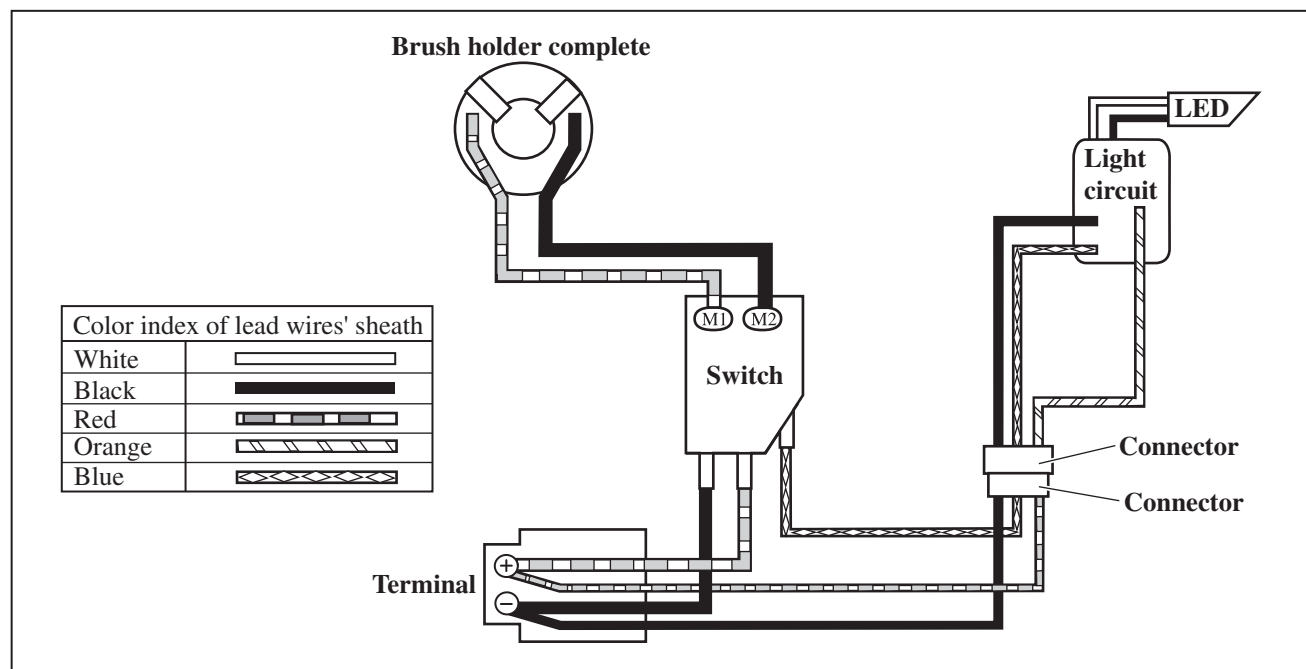
8) Install Carbon brush. (Fig. 17)

9) Mount Rear cover.

Fig. 17

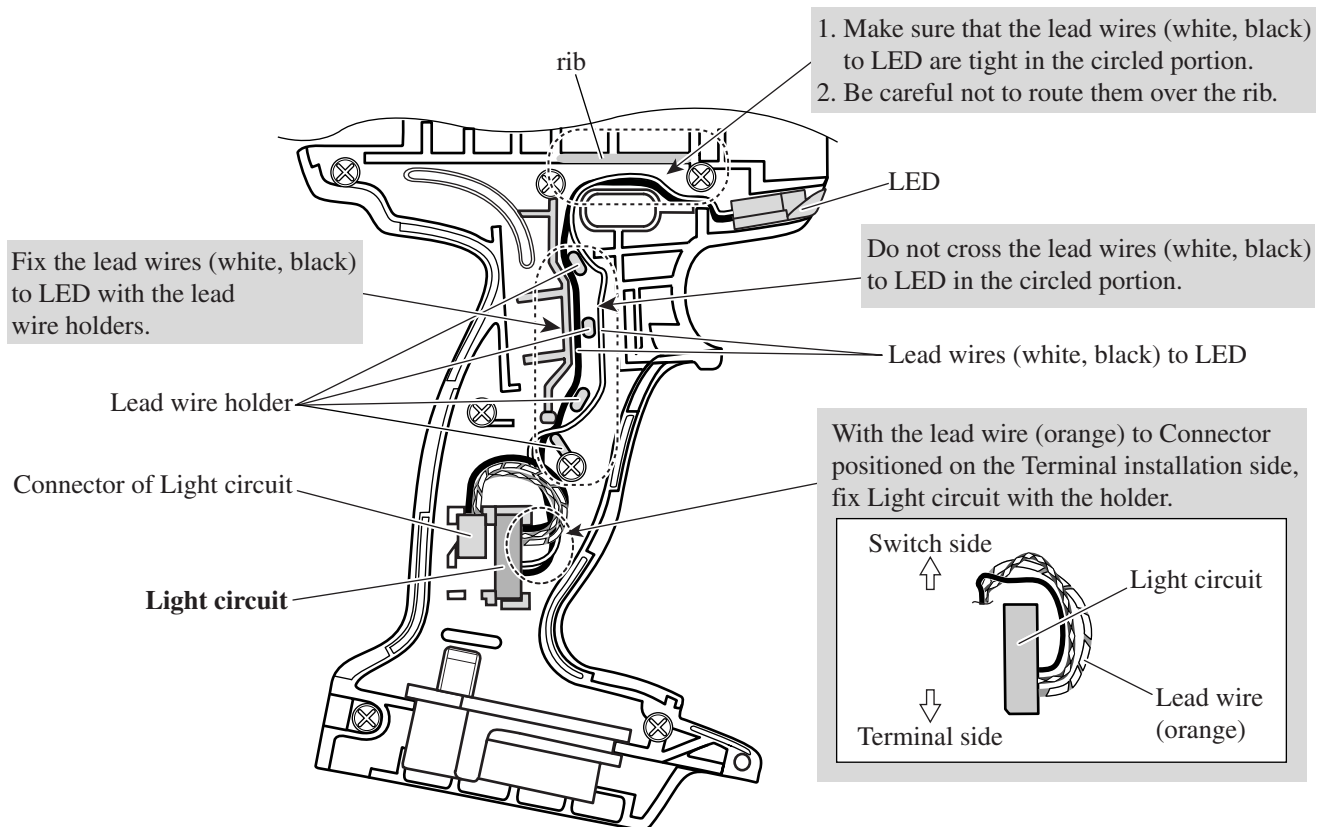


## ► Circuit diagram



## ► Wiring diagram

### [1] Lead Wires of Light Circuit



### [2] Lead Wires of Switch and Brush Holder Complete

