

TECHNICAL INFORMATION

Model No. ▶ BDF451

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

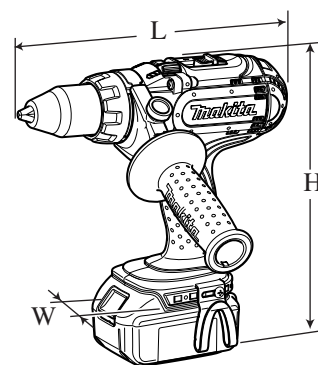
CONCEPT AND MAIN APPLICATIONS

Model BDF451 has been developed as an upgraded sister model of Model 6349D with the design concept of "More Control and Maneuverability".

Features lightweight and compact design achieved by using 4-pole motor and Lithium-ion battery as power unit.

Also features the same advantages as BDF440:

- 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



Dimensions: mm (")	
Length (L)	238 (9-3/8)
Width (W)	78 (3-1/16)
Height (H)	257 (10-1/8)

This new product will be available in the following variations.

Model No.	Battery		Charger	Offered to
	type	quantity		
BDF451	BL1830 (Li-ion 3.0Ah)	2	DC18SC	USA, Canada Mexico, Panama
BDF451SFE		2		All countries except those listed above
BDF451SFE3		3		

► Specification

Battery	Voltage: V		18
	Capacity: Ah		3.0
	Cell		Li-ion
Max output (W)			300
No load speed: min-1=rpm		1st/ 2nd/ 3rd	0 - 300/ 0 - 600/ 0 - 1,700
Capacity of drill chuck: mm (")			1.5 - 13 (1/16 - 1/2)
Capacity: mm (")		Steel	13 (1/2)
		Wood	65 (2-9/16)
Torque setting			16 stage + drill mode
Max. clutch torque: N.m (ft.lbs)			1.0 - 5.9 (0.7 - 4.3)
Max. fastening torque: N.m (ft.lbs)		Soft joint	40 (25.7)
		Hard joint	80 (59.0)
Electric brake			Yes
Variable speed control			Yes
Reversing switch			Yes
Net weight*: kg (lbs)			2.1 (4.6)

*Includes battery BL1830

► Standard equipment

Philips bit 2-45 2 pc Belt clip..... 1 pc + Screw M4x12 2 pc
Bit holder..... 1 pc Grip assembly..... 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 BL1430 Assorted drill bits for metal

► Features and benefits

Provides more control and maneuverability with an overall length shorter than our current models.

2.1 kg (4.6lbs) Lightweight Design

18V power from 12V tool weight:
0.3 - 0.6 kg lighter than the competitive model of Competitor A,
0.6 - 0.8 kg lighter than the competitive model of Competitor B;
Ensures reduced fatigue in overhead application or long continuous operation.

Durable Aluminum Gear Housing *

Easy-to-operate Speed change lever and Operation mode change lever, improved further from 6319D series models

All Metal Gear Construction *

ensures high transmission durability.

Mechanical Three-Speed Gearing *

Single Sleeve keyless Chuck *

allows for easy bit installation/removal with one hand.

Compact and Light 4-Pole Motor **

Provides High Operation Efficiency with High Torque. *

Two-Light Type Job Light with Afterglow Function

The shadow of Drill chuck cast on the work surface is minimized thanks to each light located on the right and left of the center line of the tool.

New Bit Holder Convenient for Both Right and Lefthanded Users

Attachable both on the both sides of the tool together with Belt clip simply by loosening/fastening a screw.

Anti-Slip Rubberized Side Grip

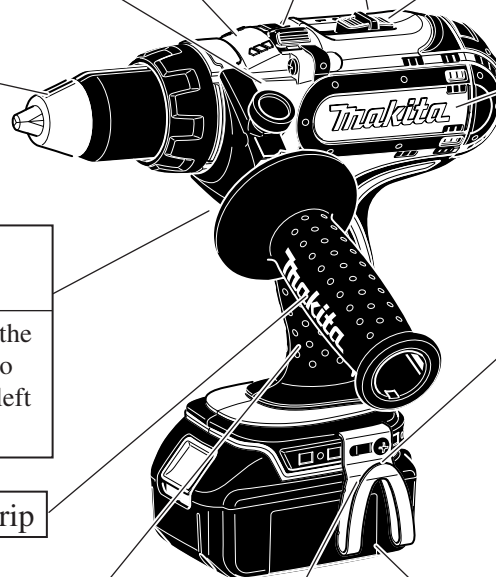
Ergonomic Rubberized Grip **

Designed according to the "standard hand size" obtained by us through actual measurement of the hands of 100 American and 100 German.

Belt Clip **

18V Li-ion Battery **

- Its high power density allows compact and lightweight tool design without power reduction.
- Can be charged at any time because Li-ion battery is free from memory effect.

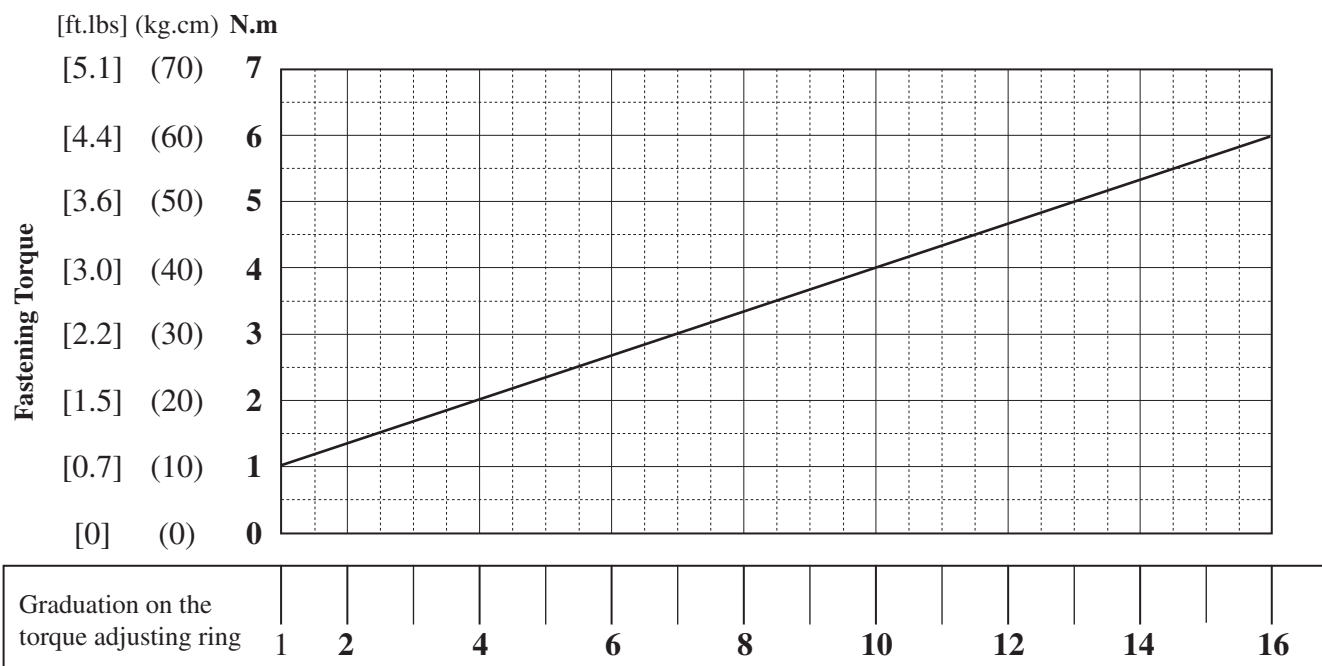


*The same advantages as 6319D series models

**The same advantages as Model BDF440

► Features and benefits

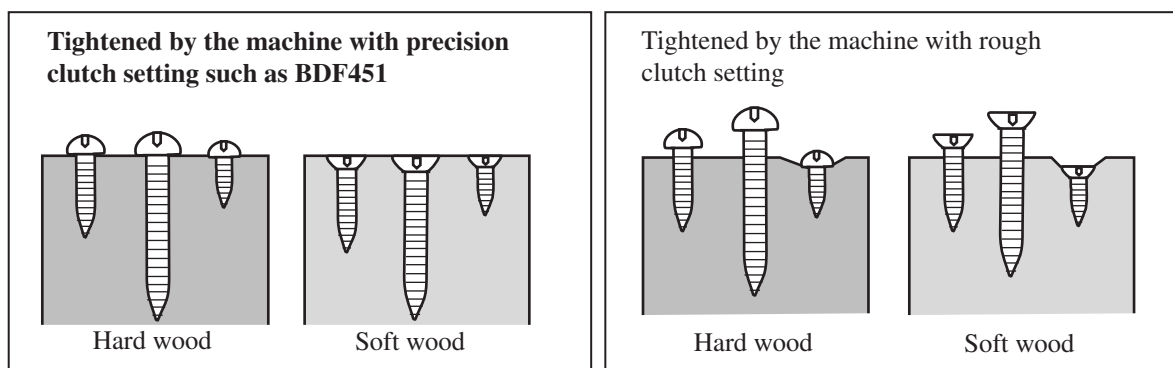
The Graduation on Torque Adjusting Ring and Corresponding Fastening Torque (The Torque When Clutch Is Disengaged=Max. clutch torque)



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>dia. 5.1 x 50mm</div> </div>		
	Wood screw	Hard wood (lauan, etc.)			
			<div> <div>dia. 3.5 x 22mm</div> <div>dia. 4.1 x 38mm</div> <div>dia. 5.1 x 50mm</div> </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

			North America		Europe
Model No.			Makita		Competitor A
Specifications			BDF451	6349D	Competitor C
Battery	Voltage: V		18	18	18
	Capacity: Ah		3.0	2.6 / 3.0	2.4
	Cell		Li-ion	Ni-MH	Ni-Cd
No load speed: min-1= rpm	3rd		0 - 1,700	0 - 1,700	0 - 2,000
	2nd/ High		0 - 600	0 - 600	0 - 1,400
	1st/ Low		0 - 300	0 - 300	0 - 450
Type of keyless drill chuck			Single sleeve	Single sleeve	Single sleeve
Chuck Capacity: mm (")			13 (1/2)	13 (1/2)	13 (1/2)
Reaction Torque: N.m (in.lbs)			63 (560)	63 (560)	56 (500)
Max. fastening torque: N.m	Hard joint		80	80	N/A
	Soft joint		40	40	N/A
Capacity: mm (")	Steel		13 (1/2)	13 (1/2)	13 (1/2)
	Wood		65 (2-9/16)	65 (2-9/16)	38 (1-1/2)
Dimensions: mm (")	Length		238 (9-3/8)	246 (9-11/16)	252 (9-7/8)
	Width		78 (3-1/16)	95 (3-3/4)	90 (3-1/2)
	Height		257 (10-1/8)	252 (9-7/8)	241 (9-1/2)
Net weight (catalog value): kg (lbs)			2.1 (4.6)	2.6 (5.7)	2.7 (5.9)
Metal gear housing			Yes	Yes	Yes
Replaceable carbon brush			Yes	Yes	No
Side grip			Yes	Yes	Yes
Soft grip			Yes	Yes	Yes
Bit holder			2	2	2
Built-in job light			Yes (with afterglow function)	No	No
Torque adjustment			16 + Drill mode	16 + Drill mode	22 + Drill mode

*Each net weight (catalog value) does not differ from its actual weight except for Competitor C's model, which weighs 2.9kg when it is actually measured.

► Comparison of products

Performance Comparison

Numbers in charts below are relative values when the capacity of Model 6349D is indexed at 100.

Note: 1) The test tools were powered by the battery with the following capacity;

Makita BDF451 and 6349D: 3.0Ah, Competitor A's model A: 2.4Ah, Competitor C's model C: 2.6Ah

2) The test results depend to a great extent on the hardness of the material, etc.

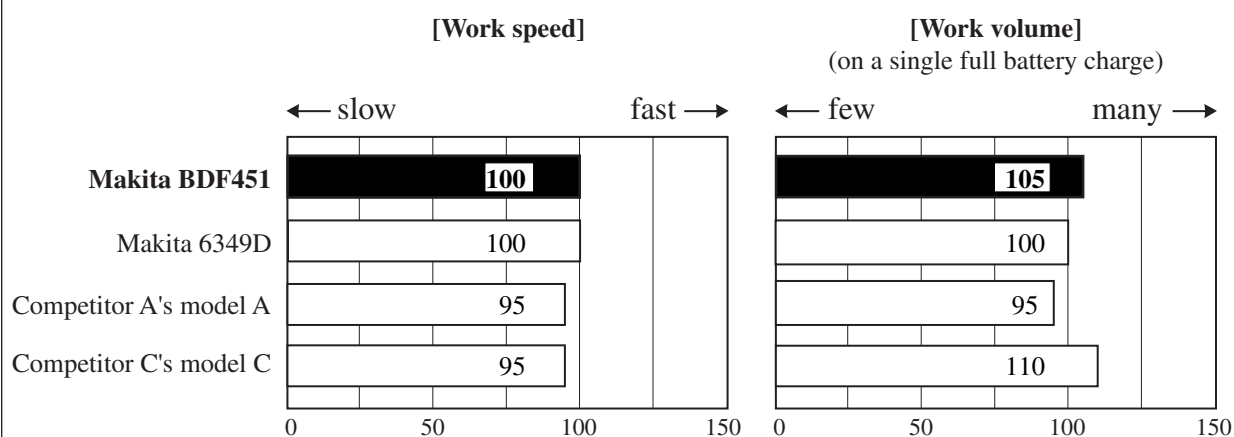
Wood Fastening

Drove 10mm (3/8") diameter lag bolts into 38mm thick SPF timber at;

2nd speed: Makita BDF451 and 6349D,

1st speed: Competitor A's model A,

Low speed: Competitor C's model C

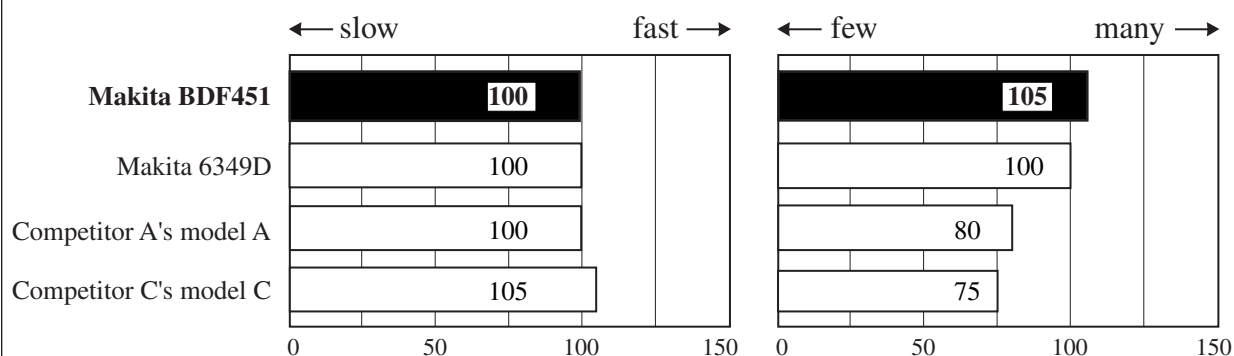


Wood Drilling

Drilled holes through 38mm thick SPF timber with 22mm (7/8) diameter flat bit at;

3rd speed: Makita BDF451 and 6349D, Competitor A's model A,

High speed: Competitor C's model C.



► 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 1st speed, and Action mode change lever in Drill mode as illustrated in **Fig. 1**. Holding the machine on work bench firmly, turn Drill chuck counter clockwise by tapping the hex wrench. Now Drill chuck can be removed from Spindle. (**Fig. 2**)

Fig. 1

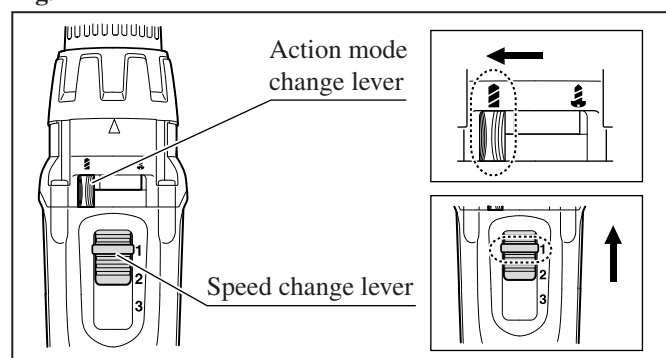
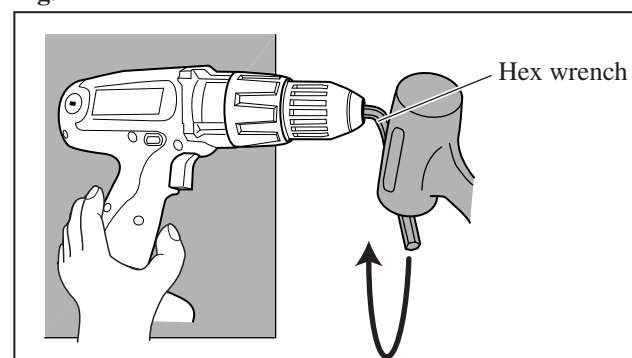


Fig. 2



ASSEMBLING

- 1) Make sure that Flat washer 13 is set in place before installing Drill chuck. (**Fig. 3**)
- 1) Turn Drill chuck clockwise until it sits on the end of the threaded portion of Spindle. (**Fig. 4**)
- 2) See **Fig. 5**. Insert a hex wrench into drill chuck, and fix the other end of hex wrench in vise. Install battery. Then set the Action mode change lever in Drill mode, the Speed change lever in 1st speed, and F/R change lever in Forward 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 chuck screw, apply threadlocker to threaded portion.

Fig. 3

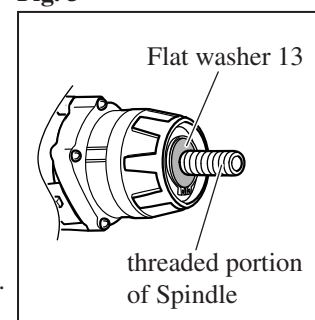


Fig. 4

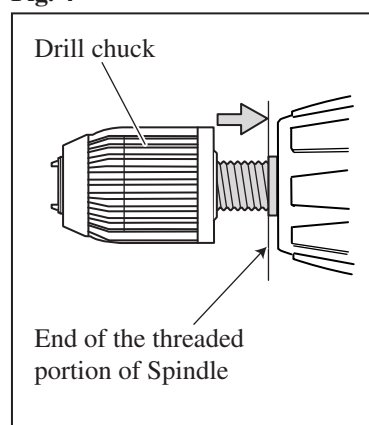
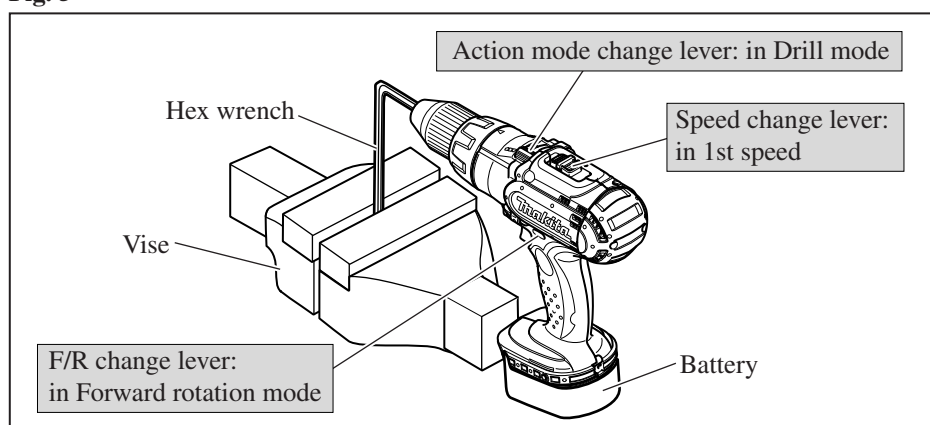


Fig. 5



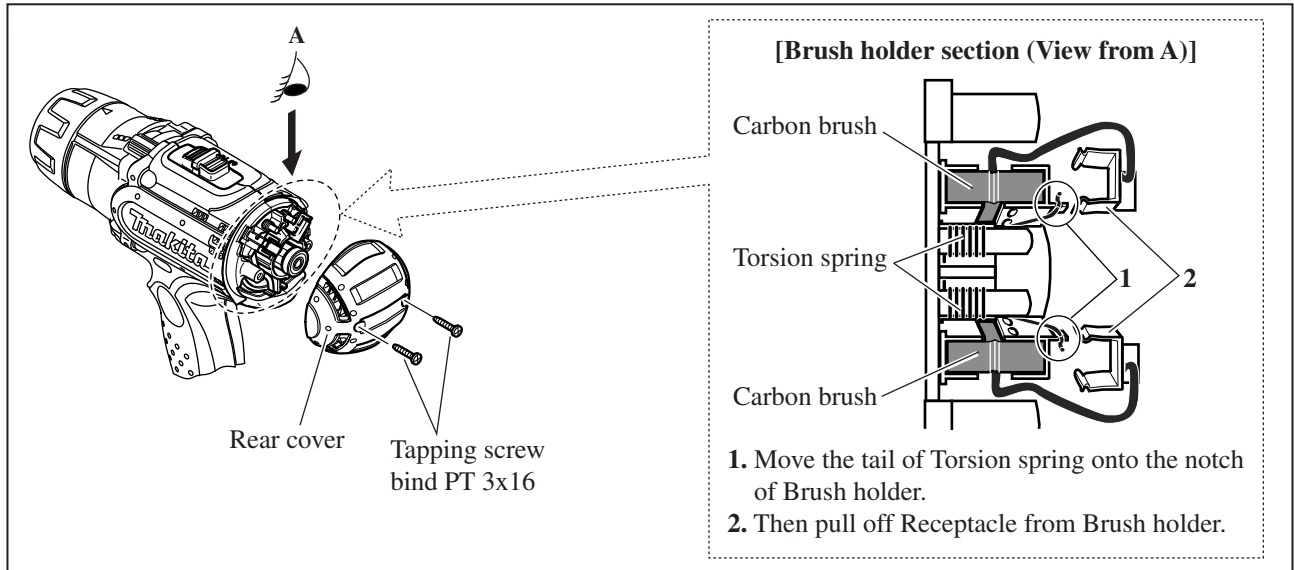
► Repair

[3] -2. Gear Assembly and Motor Section

DISASSEMBLING

- 1) Remove Rear cover and take off Carbon brush from Brush holder complete. (Fig. 6)

Fig. 6



- 2) Unscrew four PT4x20 Tapping screws to disconnect Gear assembly from Housing. Then by removing eight PT3x16 Tapping screws, separate Housing R from Housing L. (Fig. 7)
- 3) Pull off Heat sink from Yoke unit of the Motor section. Then remove the assembly of the Gear section and the Motor section from housing L. (Fig. 8)
- 3) Remove Brush holder complete from Armature, then separate the Motor section from the Gear section. (Fig. 9)
- 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. 10)

Fig. 7

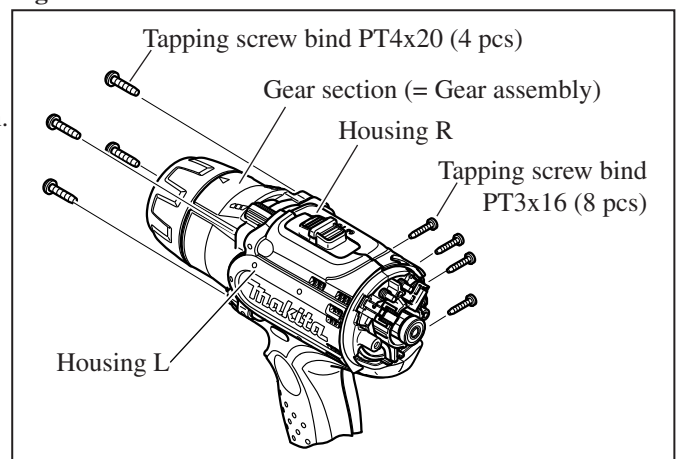


Fig. 8

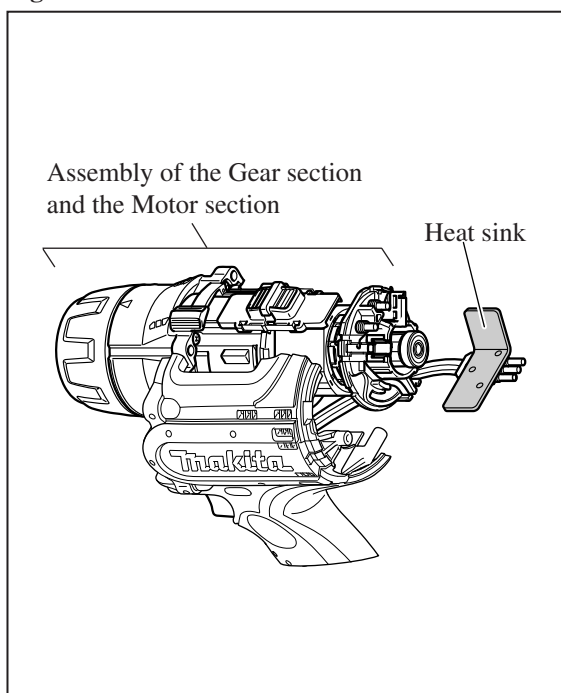


Fig. 9

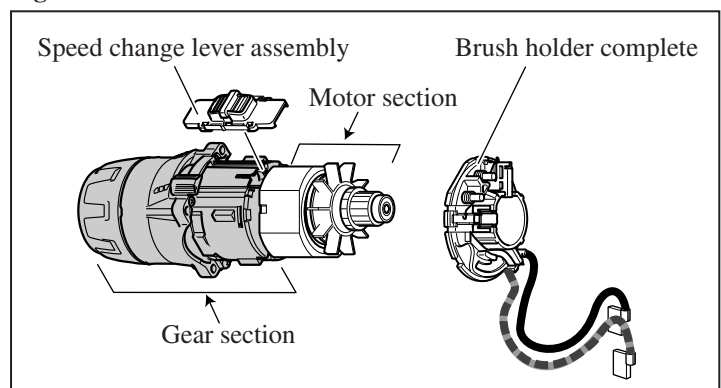
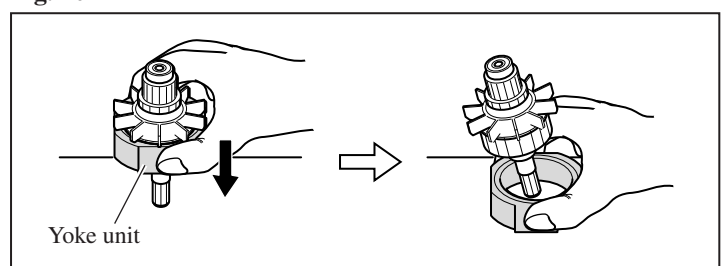


Fig. 10



► 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

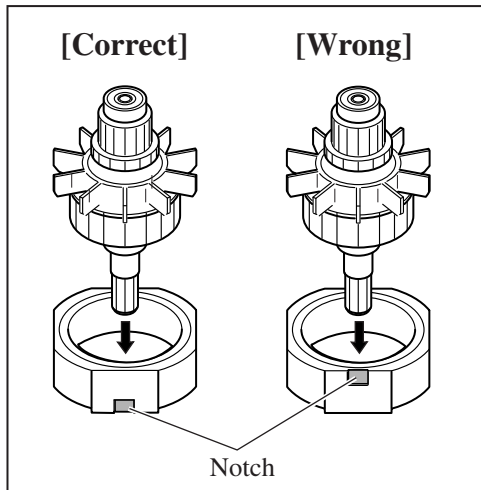
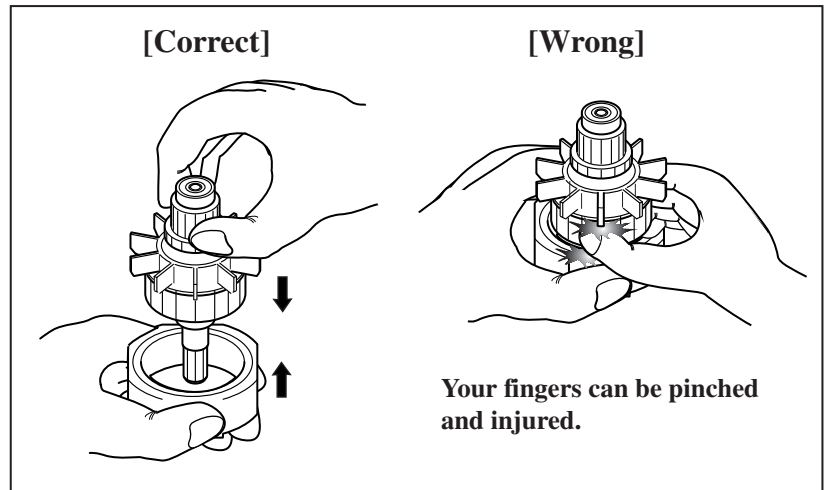


Fig. 10



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 Leaf springs and two Compression springs are set in place on Speed change lever as illustrated in **Fig. 12**.

Fig. 11

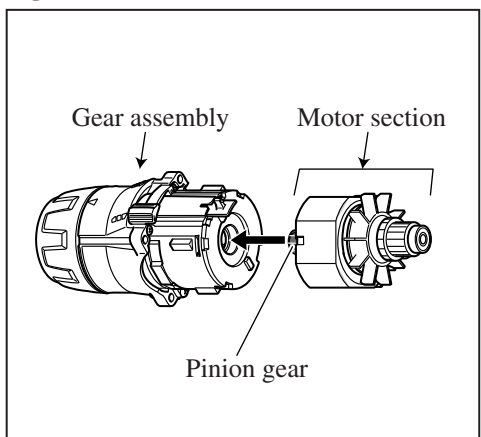
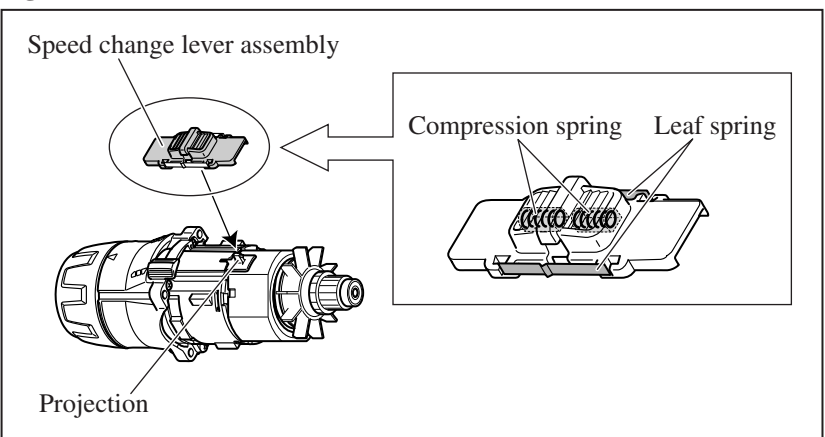
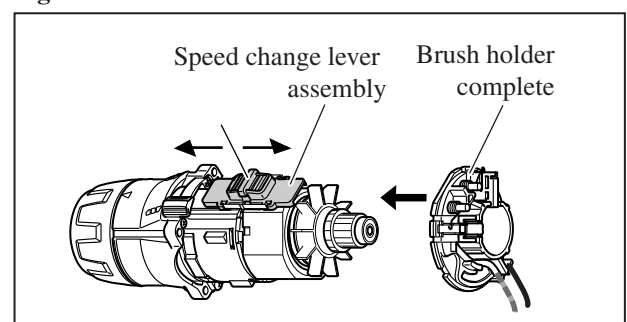


Fig. 12



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. 13



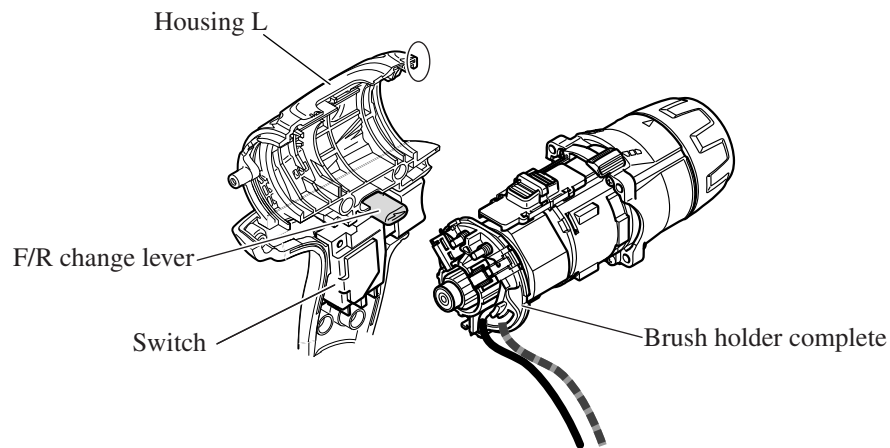
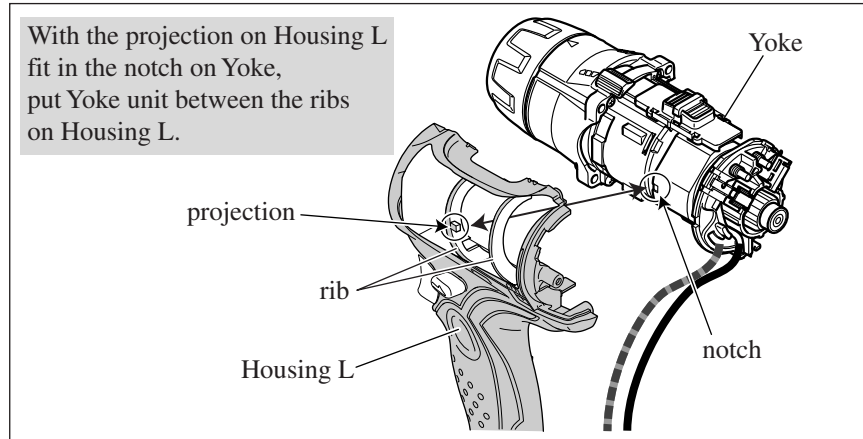
► Repair

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

ASSEMBLING

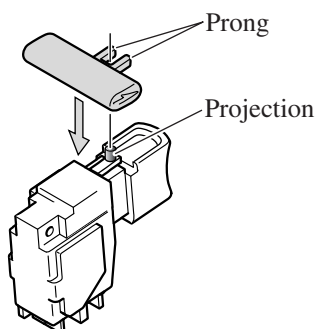
5) Assemble the unit of the Gear section and the Motor section as illustrated in **Fig. 14**.

Fig. 14



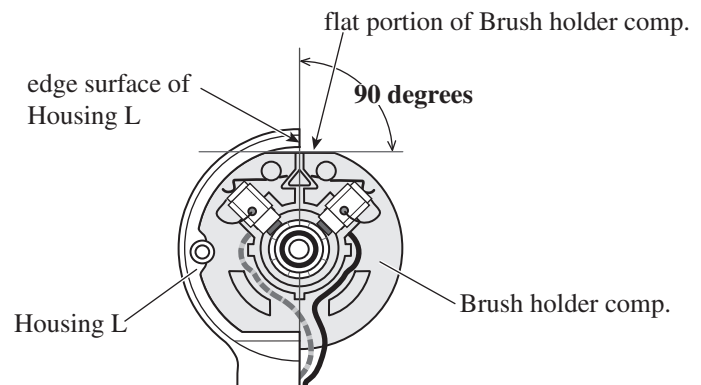
Assembling F/R change lever to Switch

put the projection on Switch between the prongs of F/R change lever.



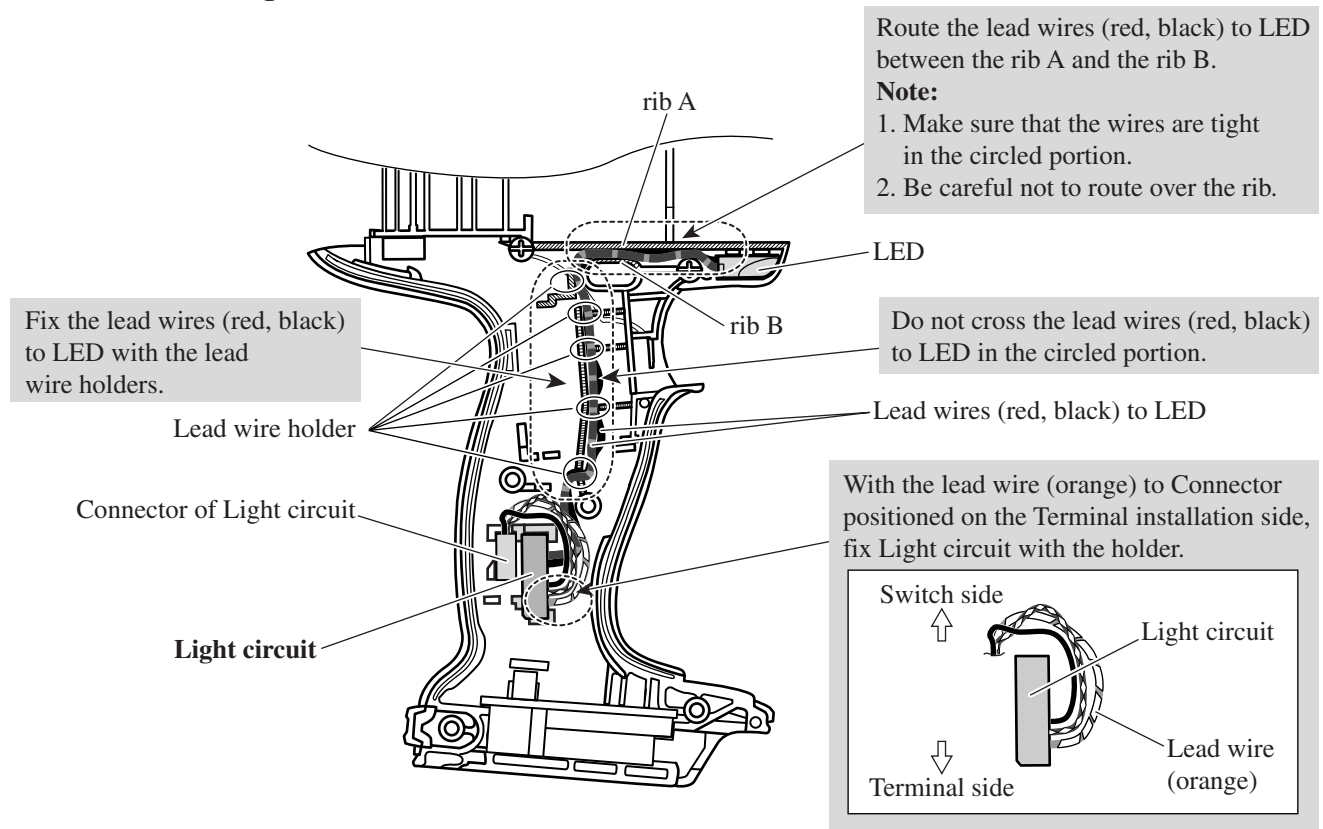
Assembling Brush holder complete to Housing L

The flat portion of Brush holder complete must be at 90 degrees to the edge surface of Housing L.



► Wiring diagram

[1] Lead Wires of Light Circuit



[2] Lead Wires of Switch, Brush Holder Complete and FET

