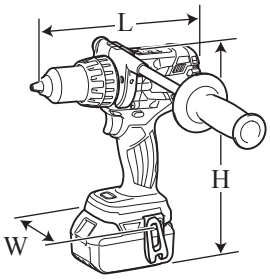
TECHNICAL INFORMATION

Model No. ► DDF481

Description ► 18V Cordless driver drill



Dimensions: mm (")	
Length (L)	205 (8-1/8)
Width (W)	79 (3-1/8)
Height (H)	249 (9-3/4)*1
	266 (10-1/2)*2

*1: with BL1815N
*2: with BL1830 or BL1840

CONCEPT AND MAIN APPLICATIONS

Model DDF481 is a supreme class cordless driver drill powered by 18V Li-ion battery of BL1815N (1.5Ah)/ BL1820 (2.0Ah)/ BL1830 (3.0Ah)/ BL1840 (4.0Ah)/ BL1850 (5.0Ah) .
Its main features are:

- Max lock torque: 125N·m. (1,090in·lbs)
- Compact tool size with an overall length of 205mm (8-1/8")
- Efficient Brushless DC motor provides higher power and productivity than that of 18V Cordless driver drill model DDF458.

Note: BL1815 is not compatible.

► Specification

Battery	Voltage: V		18
	Capacity: Ah		1.5/ 2.0/ 3.0/ 4.0/ 5.0
	Energy capacity: Wh		27/ 36/ 54/ 72/ 90
	Cell		Li-ion
	Charging time (approx.): min.		15/ 24/ 22/ 36/ 45 with DC18RC
Max output: W			640
No load speed: min^{-1}= rpm		High	0 - 2,100
		Low	0 - 550
Capacity of drill chuck: mm (")			1.5 (1/16) - 13 (1/2)
Capacity: mm (")		Steel	13 (1/2)
		Wood	76 (3)
Torque setting			21 stage + drill mode
Clutch torque setting: N·m (in·lbs)			1.0 - 10.0 (9 - 89)
Max lock torque: N·m (in·lbs)			125 (1,090)
Max fastening torque: N·m (in·lbs)		Soft joint	60 (530)
		Hard joint	115 (1,020)
Electric brake			Yes
Mechanical speed control			Yes (2 speed)
Variable speed control			Yes
Reversing switch			Yes
LED job light			Yes
Weight according to EPTA-Procedure 01/2003*3: kg (lbs)			2.4 (5.2)*1/ 2.6 (5.8)*2

*3: with Grip assembly

► Standard equipment

Battery ..... 1 or 2*4
Charger 1*4
Battery cover 1*5
+ – bit 2-45 2
Belt clip 1
(+) Screw M4x12 1
Grip assembly 1
Bit holder 1
Plastic carrying case 1

*4: Battery and charger are not supplied with "Z" model
*5: Supplied with the same quantity of extra Battery

► Optional accessories

Fast charger DC18RC
Charger DC18SD
Charger DC24SC
Automotive charger DC18SE
Quad Port Charger DC18SF
Battery BL1815N
Battery BL1820
Battery BL1830
Battery BL1840
Battery BL1850
Drill bits for wood
Drill bits for steel
Driver bits
Belt clip
Bit holder

Note: The standard equipment may vary by country or model variation.

Repair

CAUTION: Repair the machine in accordance with "Instruction manual" or "Safety instructions".

[1] NECESSARY REPAIRING TOOLS

Code No.	Description	Use for
1R264	Torque wrench	assembling Drill chuck
1R291	Retaining ring S and R pliers	removing Retaining ring (INT) R-15
1R298	Hex bar 10 with square socket	removing Drill chuck
1R359	Chuck removing tool	removing Drill chuck (If it is impossible to remove Drill chuck by the steps mentioned here)
1R404	Drill chuck removing tool	removing Drill chuck without disassembling Gear assembly
1R404-A	Frame assembly	the components of Drill chuck removing tool (1R404)
1R404-B	Frame support	
1R404-C	Pinion gear complete	
921477-5	M8x55 Hex bolt	
922127-5	M4x16 Hex socket head bolt	
---	Hex wrench 10	removing Drill chuck

[2] LUBRICATION

It is not required to lubricate, because this product has gear mechanism of factory assembled.

[3] DISASSEMBLY/ASSEMBLY

[3] -1. Drill chuck

DISASSEMBLING

Note: When Gear assembly is replaced with a new one, separate Drill chuck from Gear assembly in advance. When the repair is independent of Gear assembly, it is not necessary to separate Drill chuck from Gear assembly.

(1) Remove four 4x18 Tapping screws, and then separate Gear assembly from Housing set. (**Fig. 1**)

(2) Remove M6x22 (-) Flat head screw by turning it **clockwise** with Slotted screwdriver.
Note: Use Impact driver to unscrew M6x22 (-) Flat head screw if it cannot be removed manually. (**Fig. 2**)

(3) Engage 1R404-C with Gear teeth in Gear assembly. (**Fig. 2**)

(4) Fit two Pins 4 of 1R404-A into the holes of Gear assembly. (**Fig. 3**)
Secure Gear assembly to 1R404-A by tightening two 922127-5. (**Fig. 3**)
Be careful about each direction. (**Figs. 3 and 4**)

(5) Assemble 1R404-B to 1R404-A so that the lever portion of Gear assembly can be pushed toward 1st gear position. (**Fig. 5**)
Note: Face the flat surface of the shaft of 1R404-C to the threaded hole in 1R404-B, and pass the shaft through the hole of 1R404-B. (**Fig. 6**)

Fig. 1

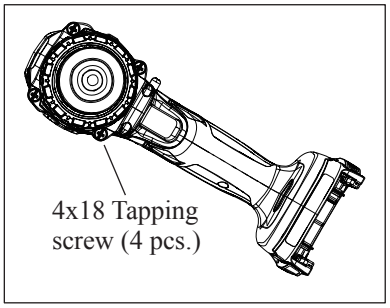


Fig. 2

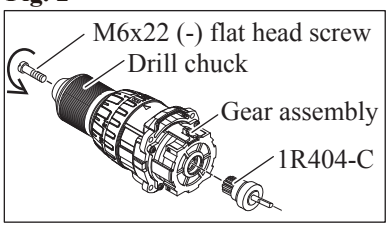


Fig. 3

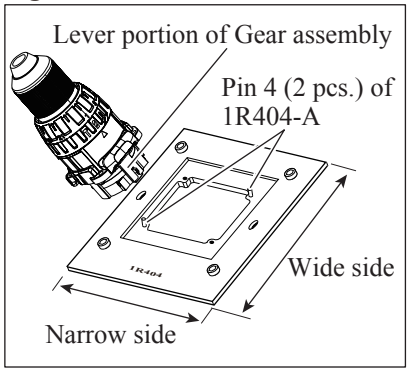


Fig. 4

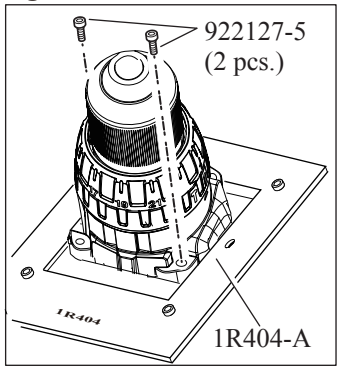


Fig. 5

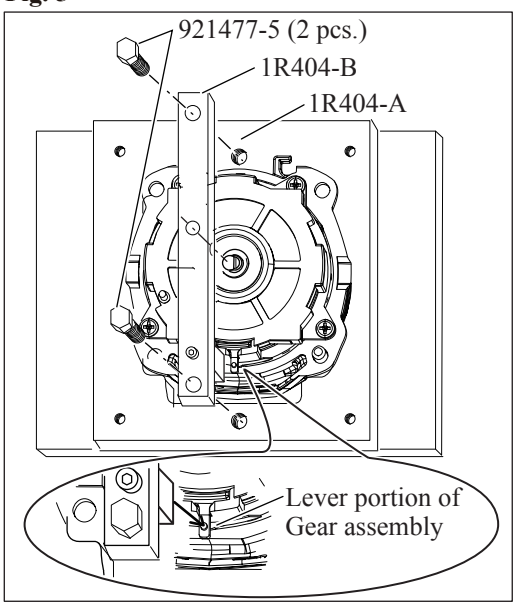
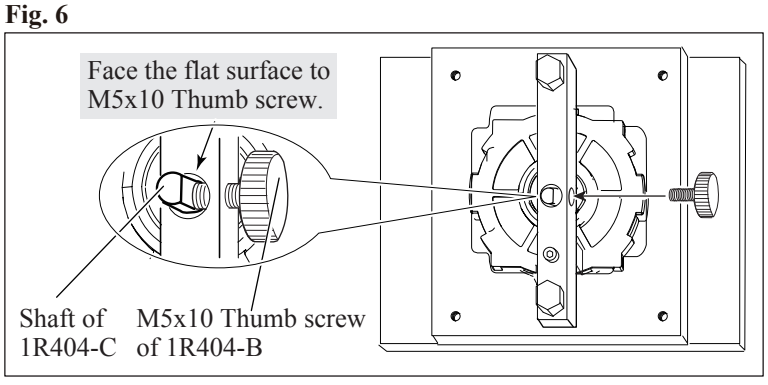


Fig. 6



Repair

[3] DISASSEMBLY/ASSEMBLY
[3]-1. Drill chuck (cont.)

DISASSEMBLING

(6) Set the lever portion of Gear assembly to 1st gear position. (**Fig. 6**)
(7) Set Gear assembly in drill mode. (Refer to **Fig. 7**.)
Tighten two 921477-5 evenly while keeping 1R404-B parallel with 1R404-A, and then tighten M5x10 Thumb screw of 1R404-B. (**Fig. 6**)
(8) Hold 1R404 in Vise as drawn in **Fig. 7**.
Secure a commercial hex wrench to Drill chuck and attach a long pipe to the wrench. (**Fig. 8**)
(9) Turn the pipe counterclockwise to remove Drill chuck. (**Fig. 8**)
Note: When it is impossible to remove Drill chuck, try the steps with 1R359 mentioned in Makita repair tool list.

Fig. 7

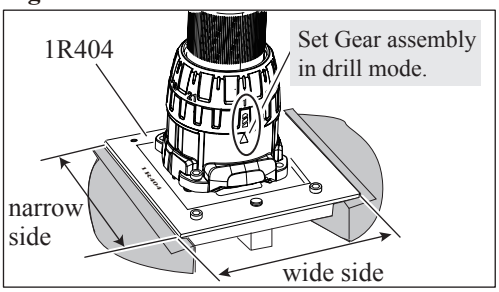


Fig. 6

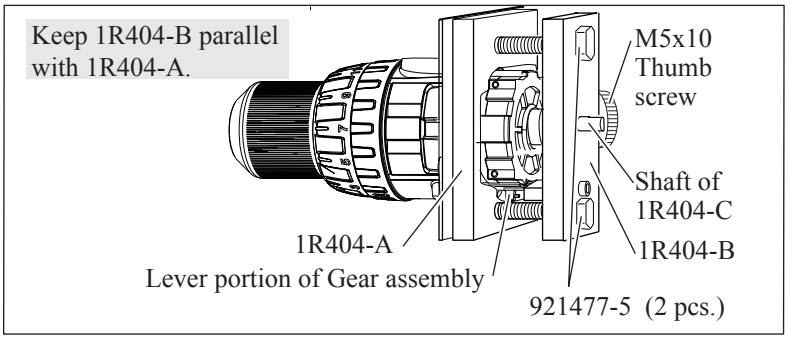
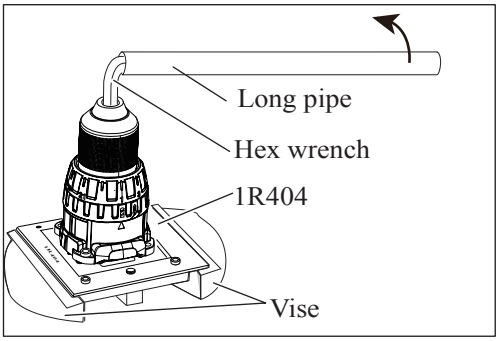


Fig. 8



ASSEMBLING

Assemble by reversing the disassembly procedure.
Note: • Remove away rust resistant oil from the spindle thread of Gear assembly, and then apply Loctite 272 to the thread. (**Fig. 9**)
• Set Gear assembly to drill mode and low gear mode. Hold Gear assembly with 1R404 and 1R298 with Drill chuck as drawn in **Fig. 10**. Then, turn Drill chuck clockwise with 1R264 to tightening torque 90 - 95 N·m (920 - 970 kgf·cm).
• M6x22 (-) flat head screw is thread locker type.
When it is reused, apply ThreeBond 1342(H)/ Loctite 243 to the thread and tighten the screw.

Fig. 9

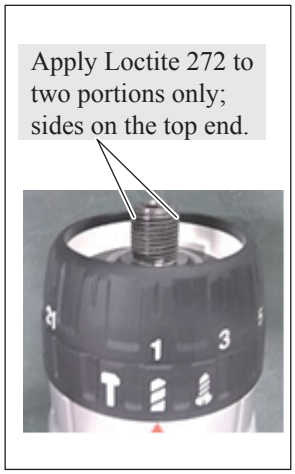
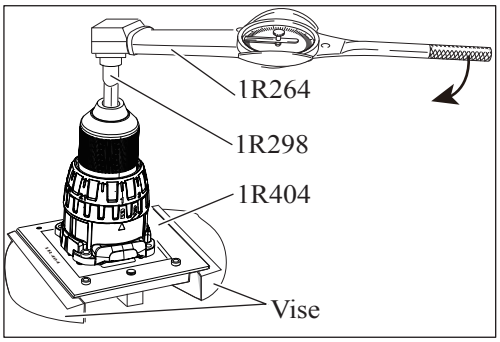


Fig. 10



► Repair

[3] DISASSEMBLY/ASSEMBLY

[3]-2. Gear assembly, Rotor, Stator assembly, Speed change lever assembly (cont.)

DISASSEMBLING

(1) Remove nine Bind PT3x14 tapping screws and four 4x18 Tapping screw, and then separate Rear cover and Housing R from Housing L. (**Fig. 1 of the previous page and Fig. 11**)
(2) Remove the following parts from Housing L at a time. (**Fig. 12**)
- Gear assembly with Drill chuck
- Motor section
- Speed change lever assembly

(3) Remove Speed change lever assembly from Gear assembly, and then separate Motor section from Gear assembly. (**Fig. 13**)
(4) Put Rotor section on a workbench so that the drive end of Rotor touches the workbench.
Press Stator down to separate from Rotor. (**Fig. 14**)

Fig. 11

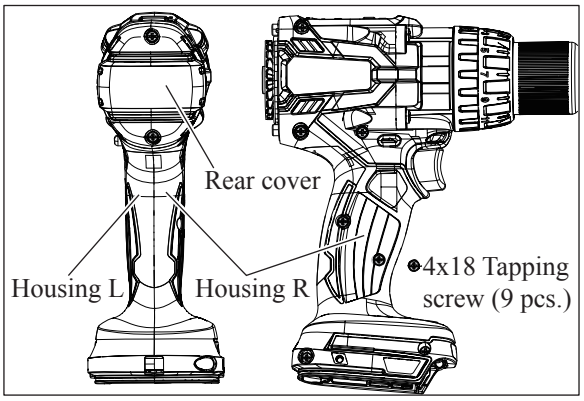


Fig. 12

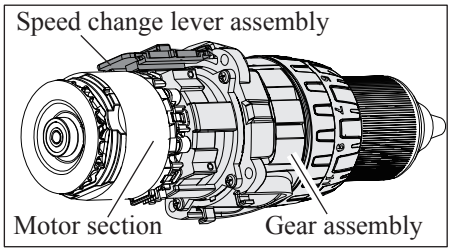


Fig. 13

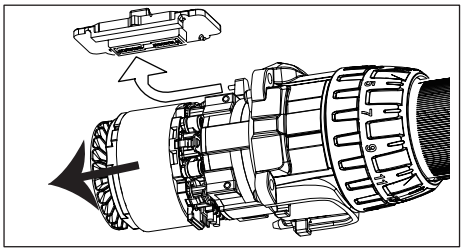
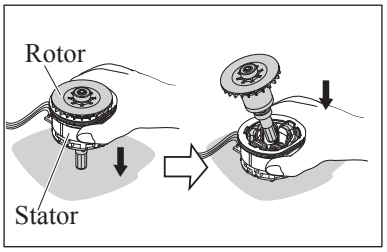


Fig. 14



Caution for Handling of Rotor

When handling or storing multiple Rotors, be sure to keep a proper distance between Rotors as shown in **Fig. 15.**
because Rotor is a strong magnet, failure to follow this instruction could result in:
- Finger injury caused by pinching between Rotors pulling each other
- Magnetic loss of Rotors or damage on the magnet portion of Rotor. (**Fig. 16**)

Fig. 15

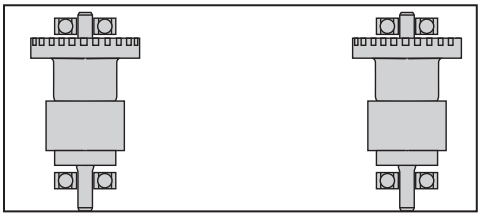
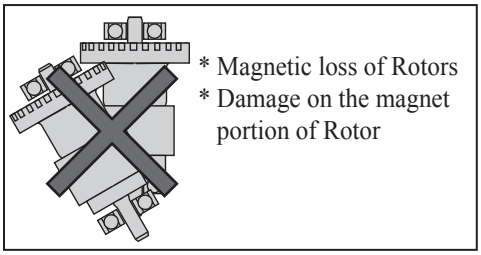


Fig. 16



► Repair

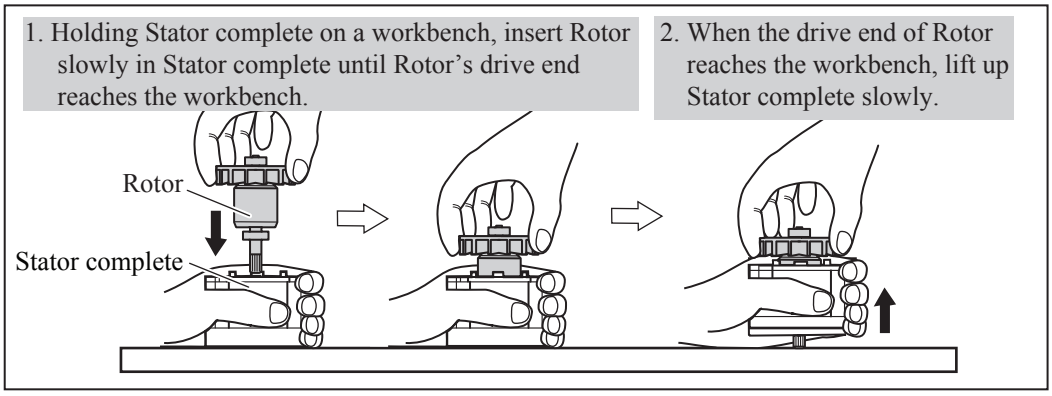
[3] DISASSEMBLY/ASSEMBLY

[3]-2. Gear assembly, Rotor, Stator assembly, Speed change lever assembly (cont.)

ASSEMBLING

(1) Put Rotor into Stator complete as drawn in **Fig. 17**.

Fig. 17



(2) Make sure that Rotor's gear engages with the super gears of Gear assembly to rotate them smoothly, and push Rotor section (Rotor and Stator) fully in Gear assembly, (**Fig. 18**)

(3) Assemble Speed change lever assembly as drawn in **Fig. 19**.

Fig. 18

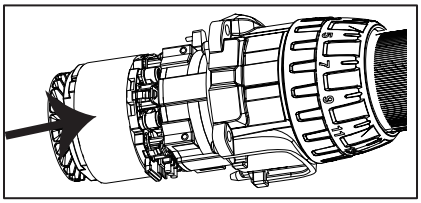
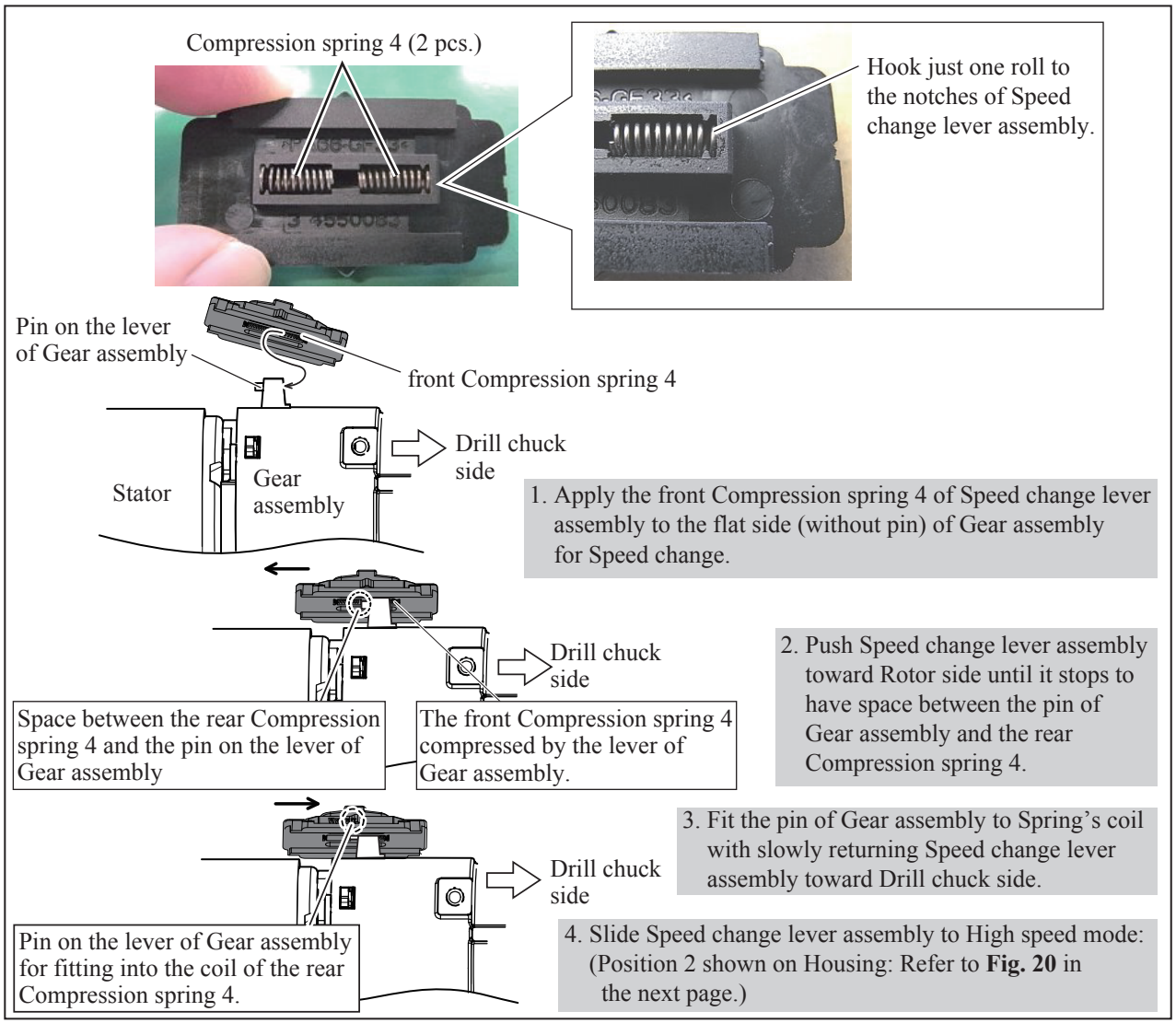


Fig. 19



Repair

[3] DISASSEMBLY/ASSEMBLY

[3]-2. Gear assembly, Rotor, Stator assembly, Speed change lever assembly (cont.)

(4) Assemble Motor section with Gear assembly and Speed change lever assembly to Housing L at a time. And assemble Switch and F/R change lever to Housing L. (**Fig. 20**) Then, assemble Housing R to Housing L.

(5) Assemble Rear cover to Housing set. (**Figs. 21 and Fig. 11 of page 4**) and tighten nine PT3x16 Tapping screws to fasten Housing L, Housing R and Rear cover.

Fig. 20

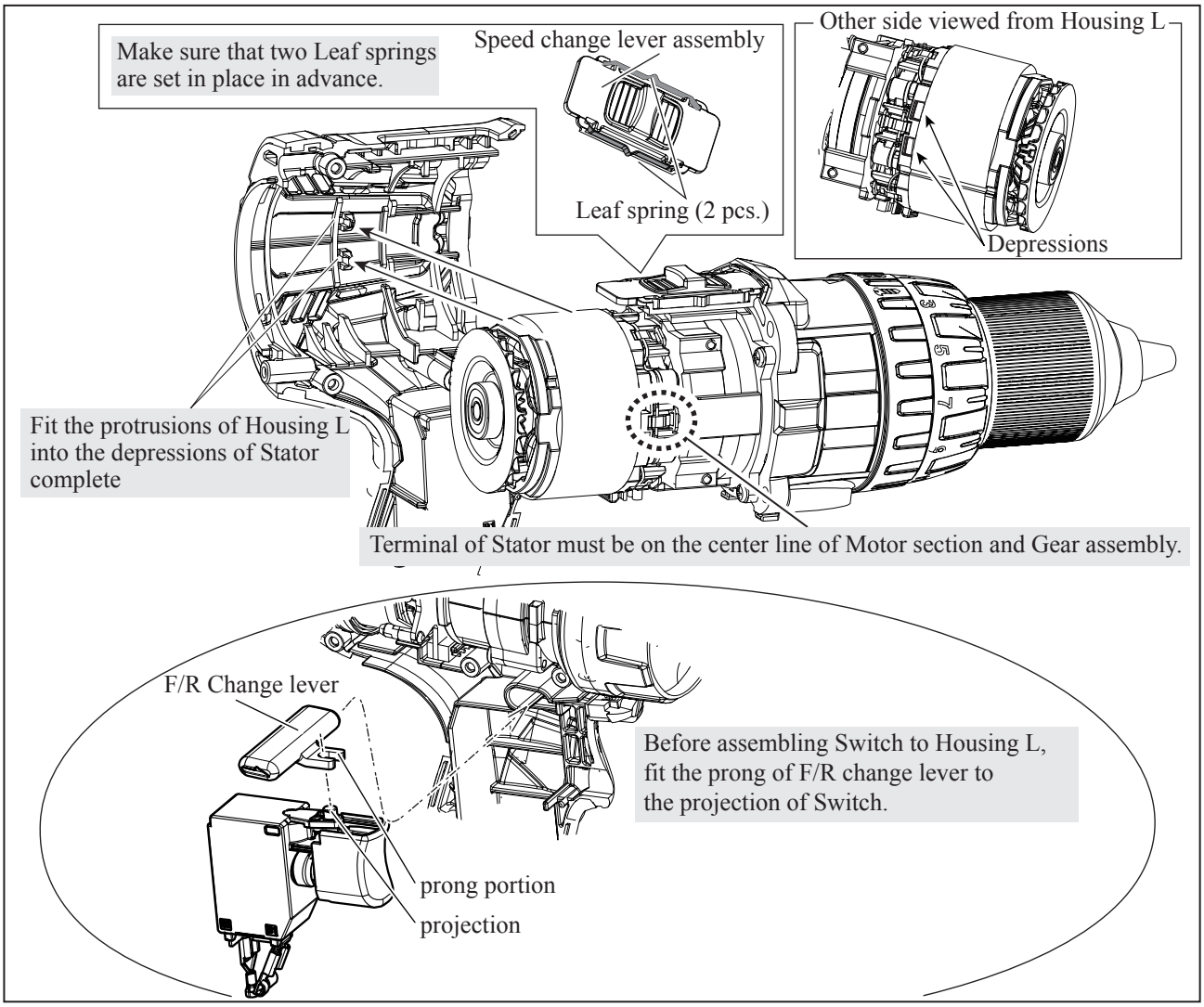
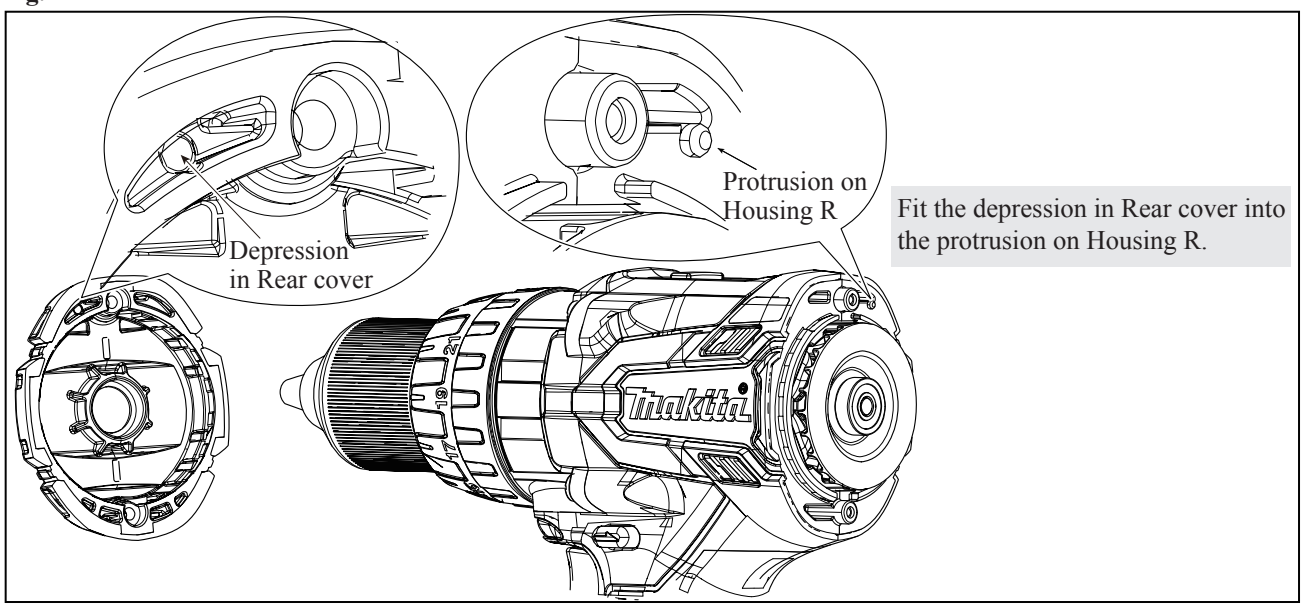


Fig. 21



Repair

[3] DISASSEMBLY/ASSEMBLY

[3]-2. Gear assembly, Rotor, Stator assembly, Speed change lever assembly (cont.)

Note: • Be sure to route the lead wires for LED circuit to the space between ribs of Gear assembly after setting Gear assembly in place. (**Fig. 22**)
If the routing is done before assembling Gear assembly, the breakage or pinching of the lead wires will happen.
• When Housing L are fastened to Housing R, the clearance is left because of the existence of Gear assembly in Housing L and Housing R. Therefore, clamp them with a waterpump pliers carefully. (**Fig. 23**)

Fig. 22

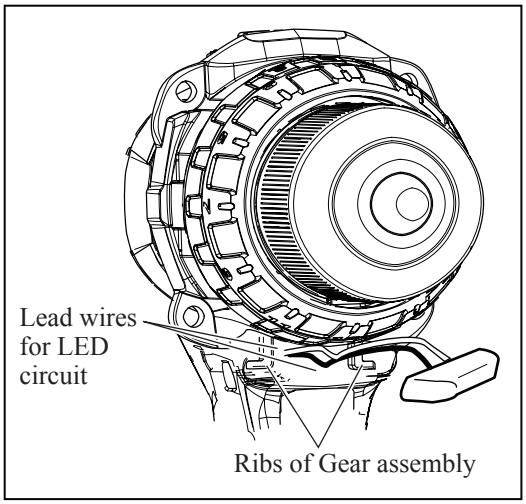
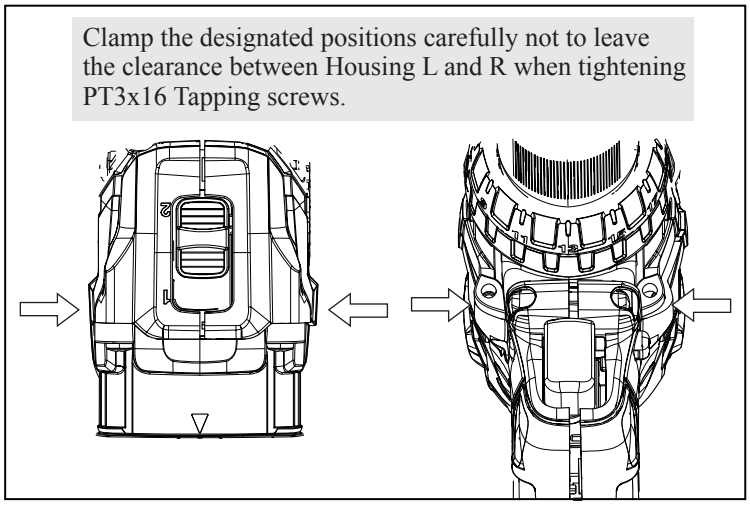


Fig. 23



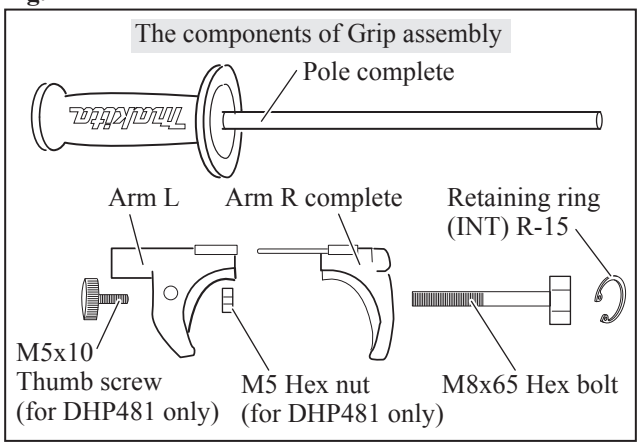
[3]-3. Grip assembly

DISASSEMBLING

Refer to **Fig. 24** for the components of Grip assembly.
(1) Remove Retaining ring (INT) R-15 with 1R291.
(2) Remove M8x65 Hex bolt from Pole complete by turning the bolt counterclockwise.
(3) Remove Arm R complete from Arm L.
(4) Remove Arm L from Pole complete by turning the arm clockwise.

Note: Grip assembly for DHP481 has M5x10 Thumb screw and M5 Hex nut, and therefore, the grip is different from that of DDF481. Loosening the thumb screw will cause the M5 Hex nut to be removed from Arm L. Be careful about the loss of the M5 Hex nut when DHP481 is disassembled.

Fig. 24



ASSEMBLING

(1) Screw Pole complete in Arm L to the full.
(2) Insert the rod of Arm complete R into the hole of Arm L. (**Fig. 25**)
(3) Connect the male thread of M8x65 Hex bolt with the female thread of Pole complete as drawn in **Fig. 26**.
(4) Set Retaining ring (INT) R-15 in place of Arm R complete.

Fig. 25

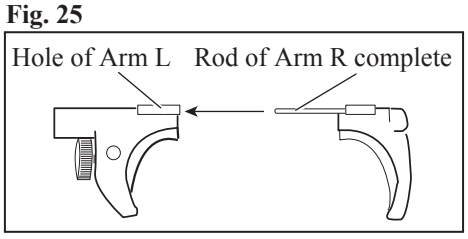
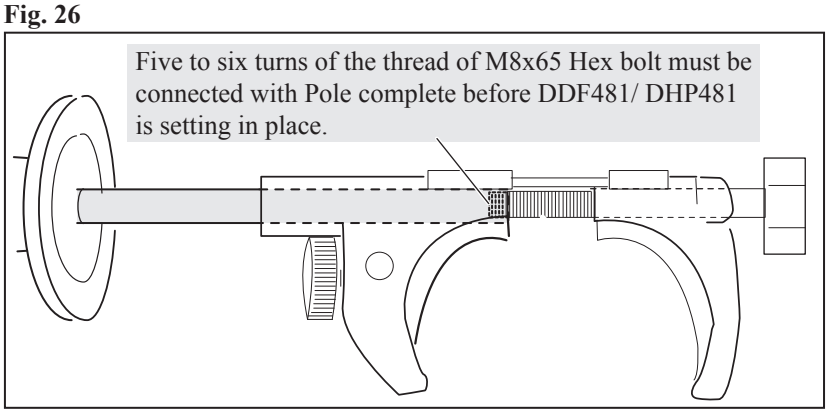
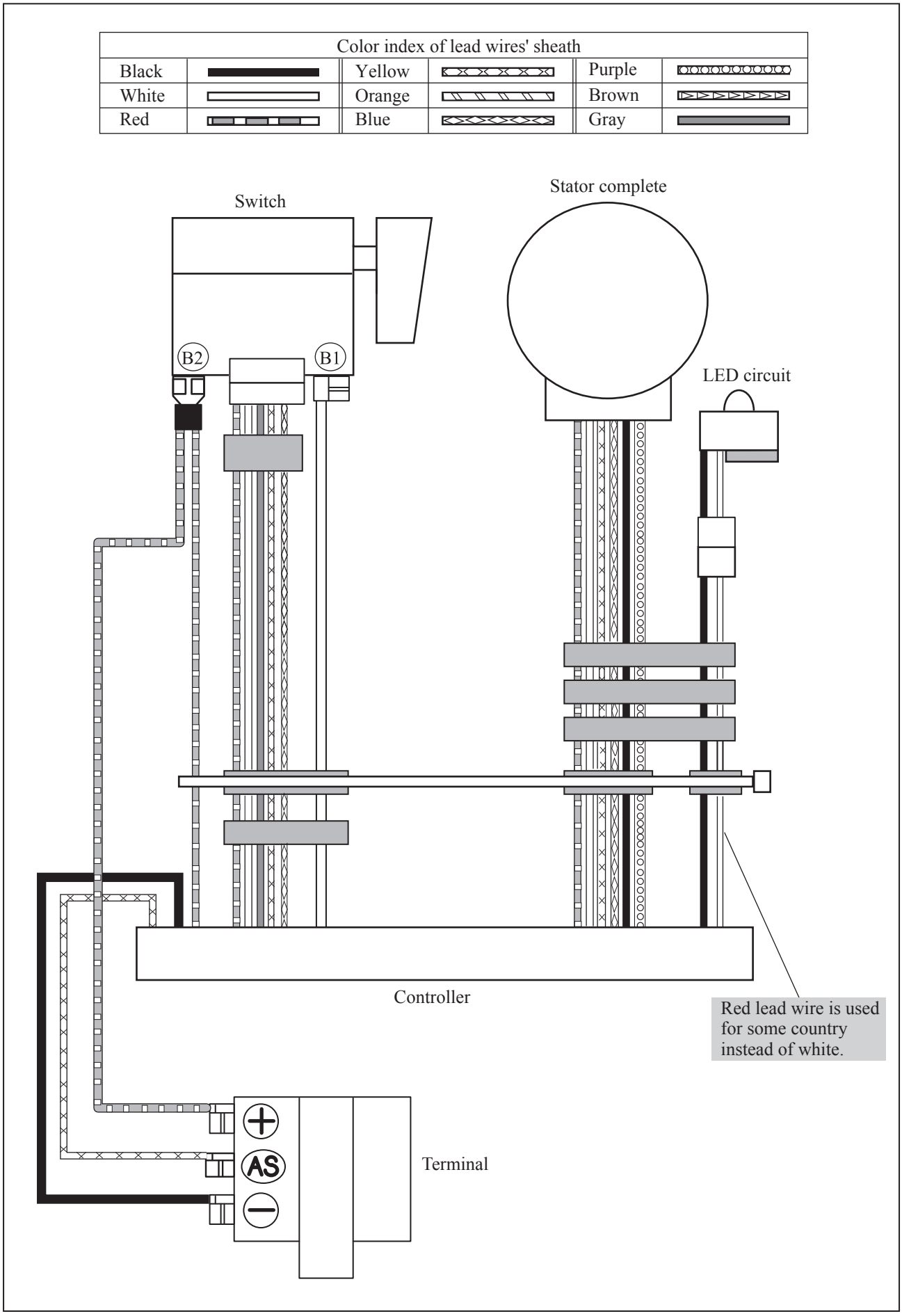


Fig. 26



Circuit diagram

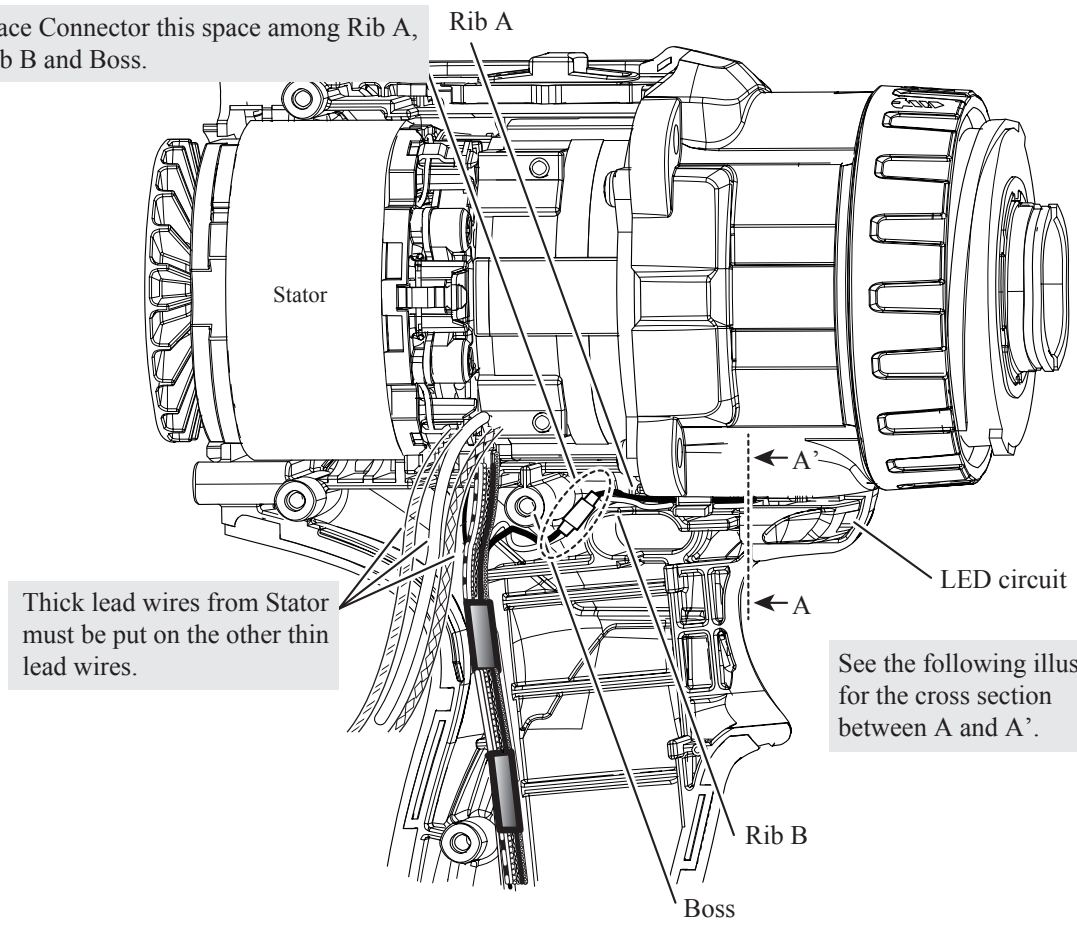
Fig. D-1



Wiring diagram

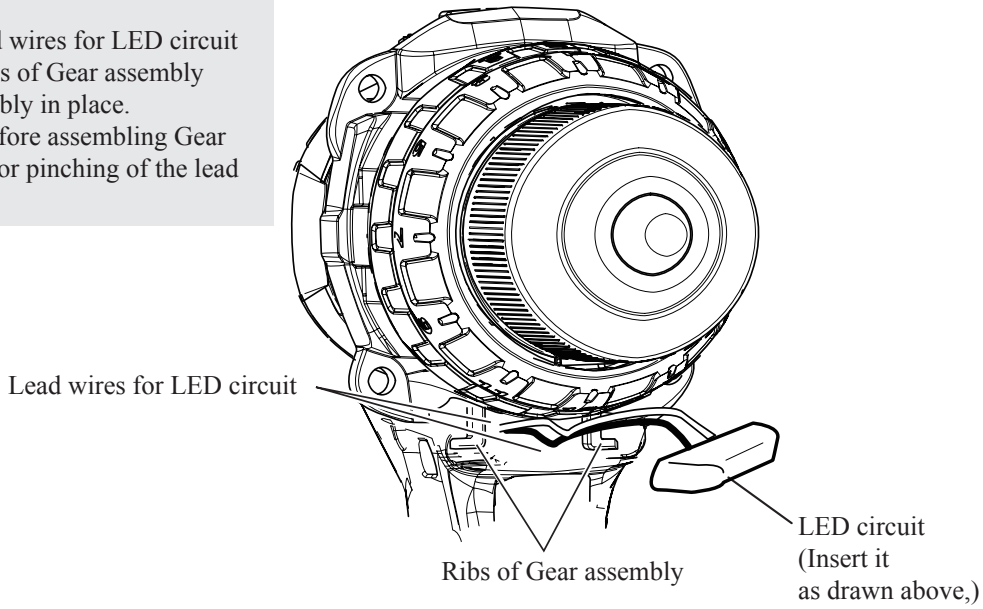
Fig. D-2

View before setting Switch and F/ R change lever in place



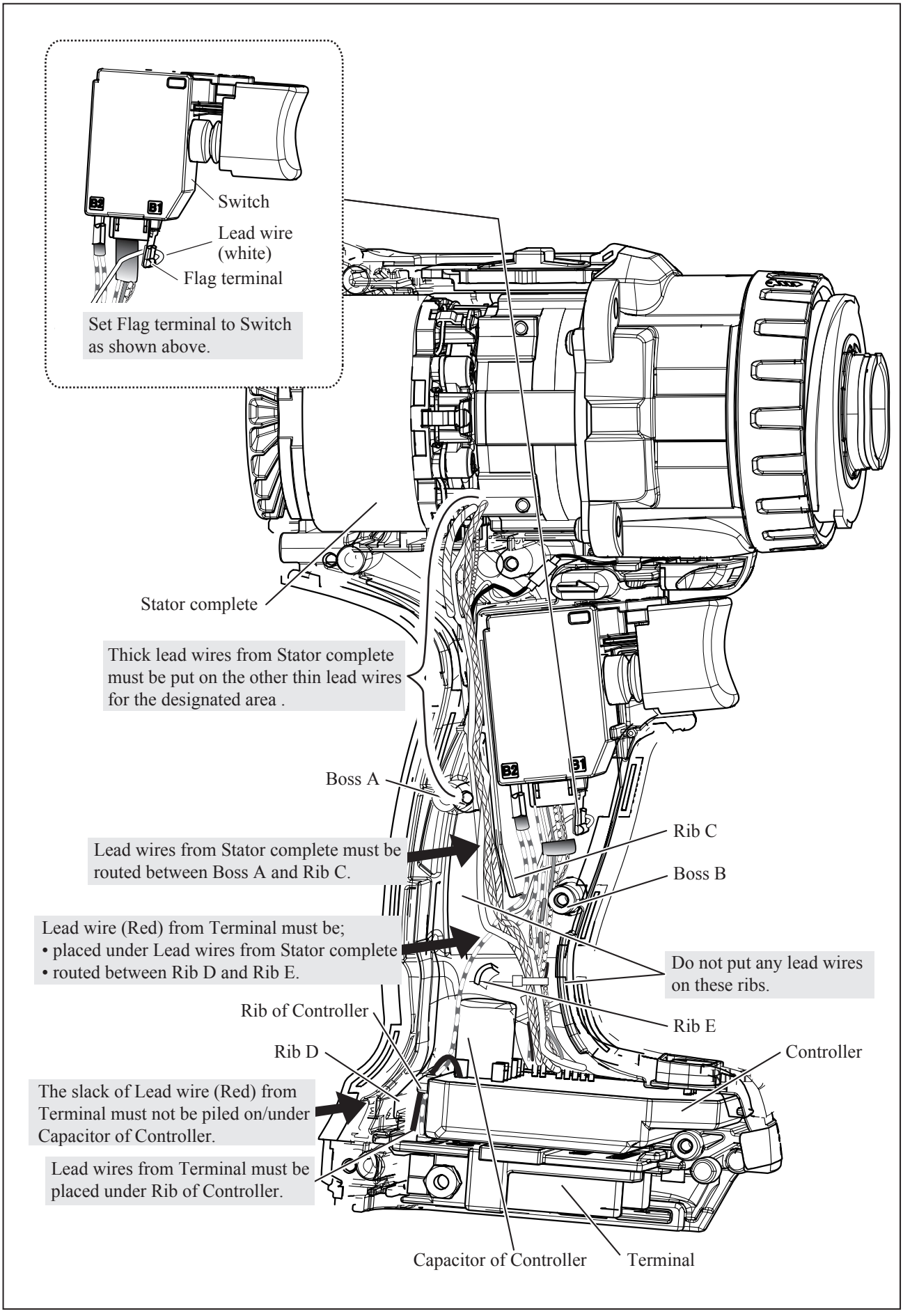
Front view around the lead wires for LED circuit after setting Gear assembly in place

Note:
Be sure to route the lead wires for LED circuit to the space between ribs of Gear assembly after setting Gear assembly in place.
If the routing is done before assembling Gear assembly, the breakage or pinching of the lead wires will happen.



Wiring diagram

Fig. D-3



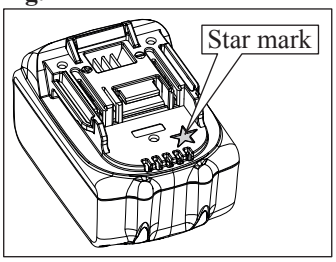
Trouble shooting

Whenever you find any trouble in your machine, first, refer to this list to check the machine for solution.

Note in Repairing

(1) Use the full charged battery which has the star mark. (**Fig. D-4**)
(2) When Housing is disassembled, check the conditions of the electrical parts (Connectors, Lead wires, Switches, etc.), Armature, Stator, Gear section, etc.
(3) Do the running test in Low speed mode (when the trigger is being pulled just a little) to check the following functions by repeating 10 times;
- F/R change lever • Operation mode change ring • High/Low speed change lever
- Variable speed control trigger

Fig. D-4



Check List for Trouble Shooting

Check the items from the top of the following list. (Description of the item is referred to Circuit diagram in **Fig. D-1**.)
Change Stator complete if your problem cannot be solved although its corrective action has been carried out.

Symptom	Cause	Corrective action
LED indicator lamps are on. → No	Controller is broken.	Replace Stator complete. (See the next page.)
LED indicator lamps are on. → Yes; Rotation speed can be changed. Forward/ Reverse rotation are OK → No	Connectors are in incomplete connection.	Connect it firmly.
	Lead wires are broken.	Check Lead wires, or replace it.
	Switch is broken.	Replace Switch.
Rotation speed can be changed. Forward/ Reverse rotation are OK → Yes; Motor runs when the machine is switched on. In case of running inconstantly, go to "No". → Yes	Connectors are in incomplete connection.	Connect it firmly.
Motor runs when the machine is switched on. In case of running inconstantly, go to "No". → No; LED job light are on. → No	Lead wires are broken.	Check Lead wires, or replace it.
	LED circuit is broken.	Replace LED circuit.
	Switch is broken.	Replace Switch.
LED job light are on. → Yes; The machine does not have any trouble.		
LED indicator lamps are on. → No	Switch is broken.	Replace Switch.
	Terminal is broken.	Check Terminal, or replace it.
	Controller is broken.	Replace Stator complete.
LED indicator lamps are on. → Yes; LED job light are on. → No	Connectors are in incomplete connection.	Connect it firmly.
	Lead wires are broken.	Check Lead wires, or replace it.
	Switch is broken.	Replace Switch.
	LED is broken.	Replace LED.
LED job light are on. → Yes; Rotor is rubbed to Stator. → No	Controller is broken.	Replace Stator complete. (See the next page.)
Rotor is rubbed to Stator. → Yes	Rotor is broken.	Replace Rotor.
	Stator is broken.	Replace Stator complete.

Trouble shooting

Test for recognizing the trouble on FET (Field effect transistor) in Controller

(1) Set Digital tester (1R402) in the diode mode (⊣▶⊢ mark on the tester: Refer to **Fig. D-5.**)
(2) Switch, Terminal, Controller and Stator are connected each other as drawn in **Fig. D-6**.
Do the following steps.
Test 1: Attach Black tester bar to the terminal of white lead wire end on B1 terminal of Switch. (**Fig. D-7**.)
Attach Red tester bar to one of UVW terminal connected with Red, White, Blue lead wires. (**Fig. D-8**)
Check the figure in the tester.
Test 2: Attach Red tester bar to minus terminal of Terminal (connected with black lead wire). (**Fig. D-9**)
Attach Black tester bar to one of UVW terminal connected with Red, White, Blue lead wires. (**Fig. D-10**)
There is no fault on FET of Controller if the tester indicates within **0.39V - 0.41V** in both Test 1 and Test 2.
If either Test 1 or Test 2 results in the improper figure, **Controller is broken**. Change Stator complete.

Fig. D-5

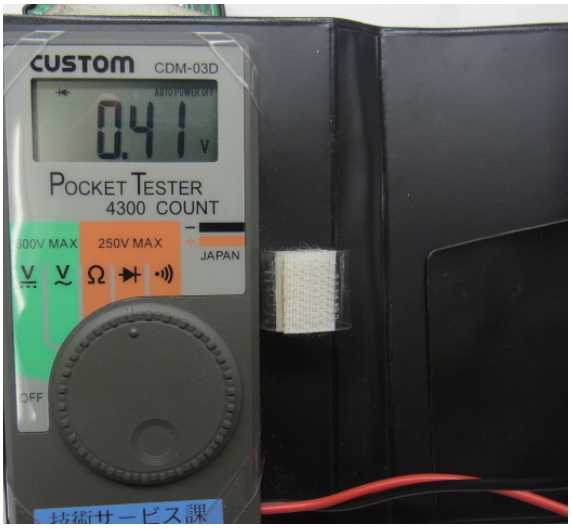


Fig. D-6

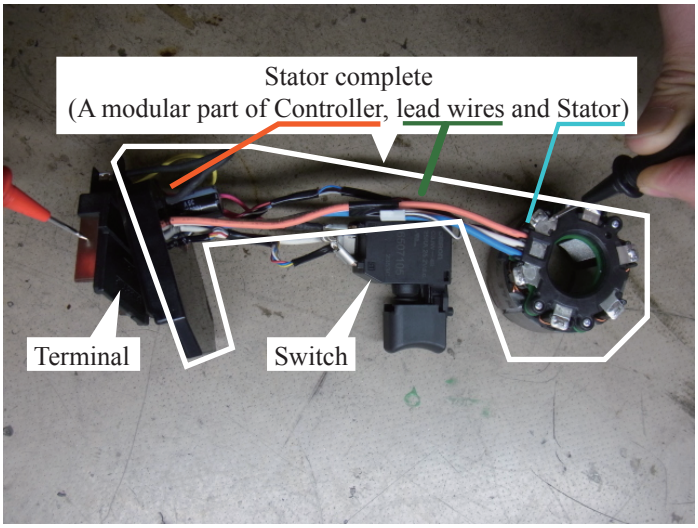


Fig. D-7

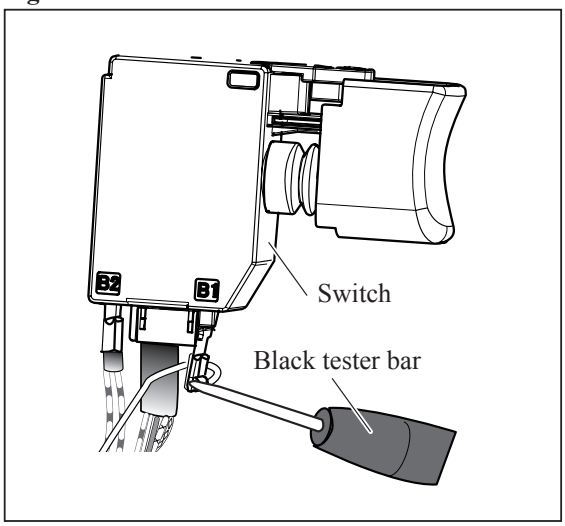


Fig. D-8

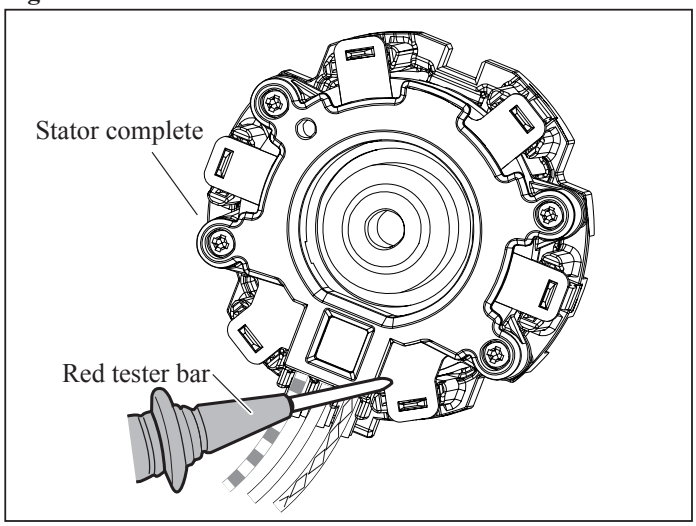


Fig. D-9

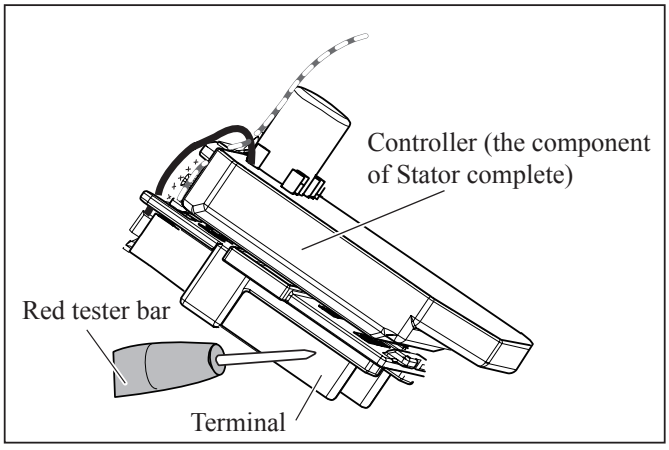
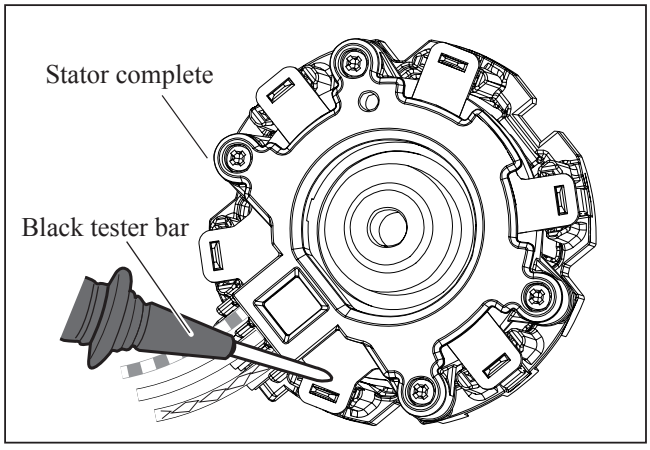



Fig. D-10