

# CORDLESS IMPACT DRIVER

## DTD155

## REPAIR MANUAL



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## 2 CAUTION

Repair the machine in accordance with “Instruction manual” or “Safety instructions”.

Follow the instructions described below in advance before repairing:

- Wear gloves.
- In order to avoid wrong reassembly, draw or write down where and how the parts are assembled, and what the parts are. It is also recommended to have boxes ready to keep disassembled parts by group.
- Handle the disassembled parts carefully. Clean and wash them properly.

## 3 NECESSARY REPAIRING TOOLS

Code No.	Description	Use for
1R003	Retaining ring pliers ST-2N	removing / installing Ring spring 10
1R041	Vise plate	removing/ installing Hammer case complete
1R045	Gear extractor (large)	disassembling Hammer section
1R212-A	Tip for Retaining ring pliers	use with 1R003
1R212-B	Plate set (with screws)	use with 1R003
1R223	Torque wrench shaft 20-90 N·m	installing Hammer case complete
1R224	Ratchet head 12.7 ( for 1R223)	use with 1R223
1R288	Screwdriver magnetizer	removing Steel balls
1R402-A	Digital tester	diagnosing Controller
1R402-B	Alligator clip set for tester	use with 1R402 -A
1R411	Lead wire insert	fixing Lead wires
1R412	Diagnostic jig for LED	diagnosing LED circuit
1R413	Diagnostic jig for switch	diagnosing Switch
-	Hex socket 27-50	removing / installing Hammer case complete
-	Extension bar (Square drive 12.7mm)	removing Hammer case complete

## 4 LUBRICANT AND ADHESIVE APPLICATION

Apply the following lubricants and adhesives.


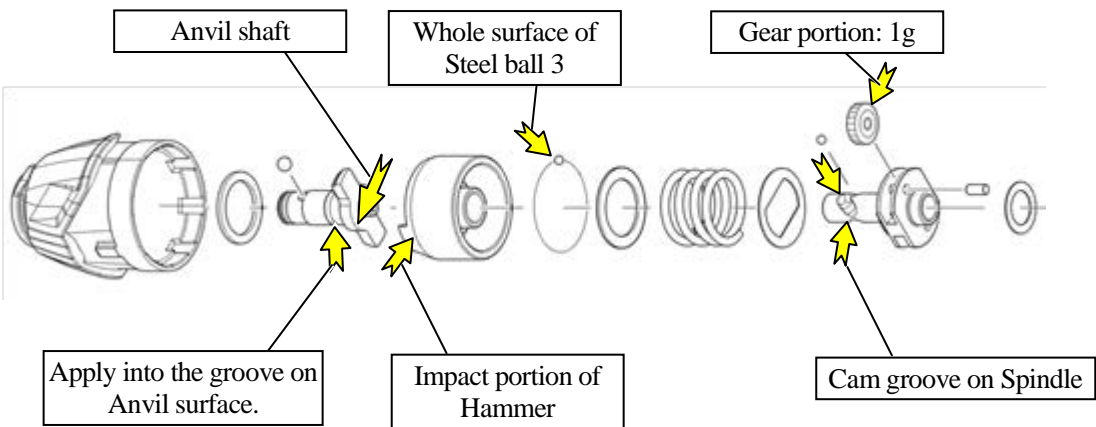
Lubricant		Amount
	Makita grease FA No.2	Gear portion 1g
		Except Gear portion a little

Fig. 1



Labels in diagram:

- Anvil shaft
- Whole surface of Steel ball 3
- Gear portion: 1g
- Apply into the groove on Anvil surface.
- Impact portion of Hammer
- Cam groove on Spindle

**5    TIGHTENING TORQUE SPECIFICATIONS**

Parts to fasten			Parts description	Tightening Torque (N•m)
Housing R complete	⇔	Housing L complete	3x16 Tapping screw	1.1-1.3
Sensor board	⇔	Stator	PT 2x6 Tapping screw	0.2-0.3
Hammer case	⇔	Bearing box	Bearing box	40.0-45.0

## 6 DISASSEMBLING/ ASSEMBLING

### 6-1 Advance preparation

Fig. 2

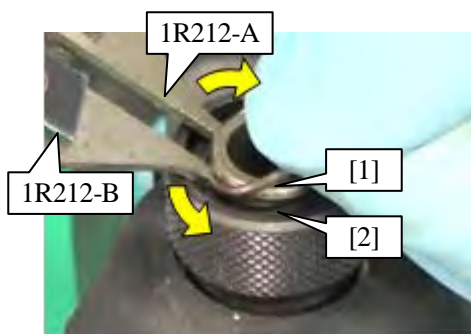


- 1 Remove Battery [1].

### 6-2 Bit sleeve

#### 6-2-1 Disassembling

Fig. 3



- 1 Using 1R003 with 1R212-A and 1R212-B attached to it, remove Ring spring 10 [1] by widening the end gap of Ring spring 10 [1].

#### Note

Press the top of Bit sleeve with your thumb and index finger so that Ring spring [1] and Flat washer 11[2] do not pop out.

Fig. 4



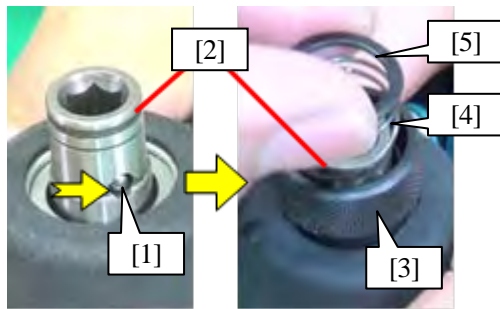
- 2 Remove Flat washer 11 [1], Compression spring 13 [2], Bit sleeve [3] and two Steel balls 3 [4].

#### Tip

Remove two Steel balls 3 [4] with a slotted screwdriver magnetized by 1R288.

## 6-2-2 Assembling

Fig. 5

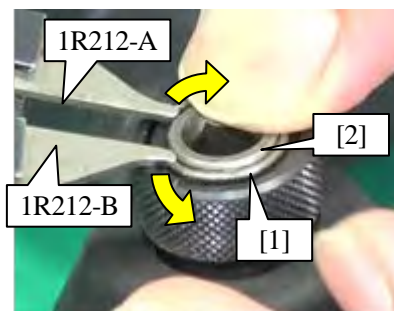


- 1 Insert two Steel balls 3 [1], one each, into the two holes of Anvil M [2] and then install Bit sleeve [3], Compression spring 13 [4] and Flat washer 11 [5] in place.

### Tip

Apply Makita grease FA No 2 to the two holes of Anvil M [2] to prevent Steel ball 3 [1] from falling off.

Fig. 6



- 2 Using 1R003 with 1R212-A and 1R212-B attached to it, install Ring spring 10 [1] by widening the end gap of Ring spring 10 [1].

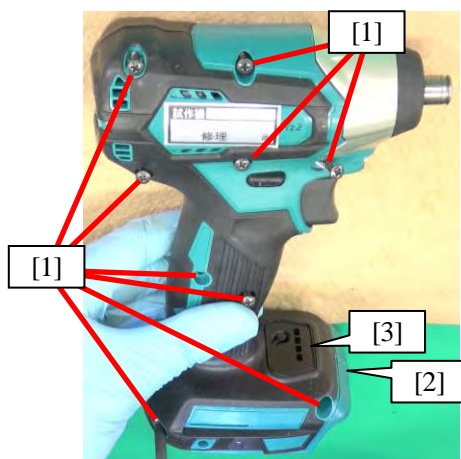
### Note

- Press the top of Bit sleeve with your thumb and index finger so that Ring spring [1] and Flat washer 11[2] do not pop out.
- Replace with new Ring spring 10 [1] if the end gap of Ring spring 10 [1] is deformed (and widened).

## 6-3 Hammer case

### 6-3-1 Disassembling

Fig. 7



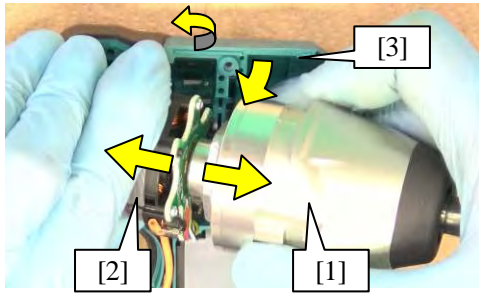
- 1 Remove Belt clip if it is attached on left or right side.

### Note

Take a note of which side it was on, because it needs to be put back in place.

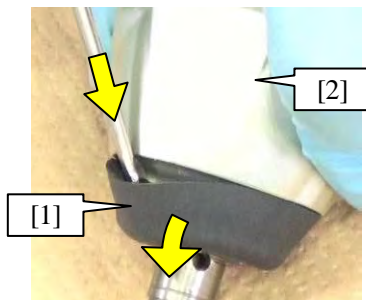
- 2 Disassemble Bit sleeve as shown in Fig. 3.
- 3 Remove nine 3x16 Tapping screws [1] to remove Housing R [2] and Switch plate [3].

Fig. 8



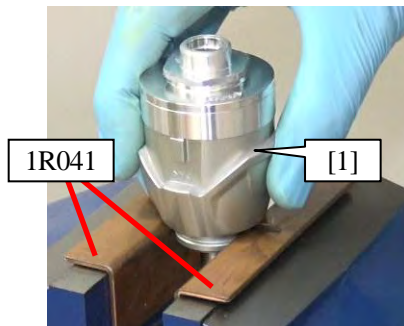
- 4 Remove Hammer case [1] and Motor section [2] together from Housing L [3], and then pull out Motor section [2] from Hammer case [1].

Fig. 9



- 5 Insert a slotted driver between Bumper [1] and Hammer case cover [2] to pry off Bumper [1].

Fig. 10

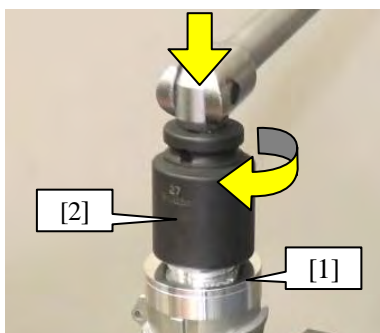


- 6 Hold the flats of Hammer case complete [1] in a vise.

Note

Hold the flats of Hammer case complete [1] in a vise with 1R041.

Fig. 11

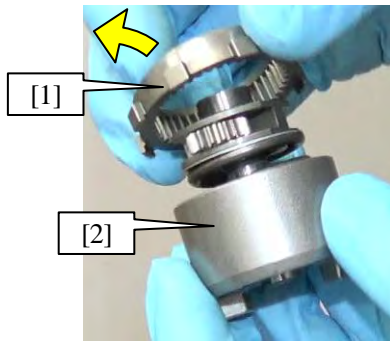


- 7 Remove Bearing box with a commercial Extension bar, to which Socket 27 [2] is attached.

Tip

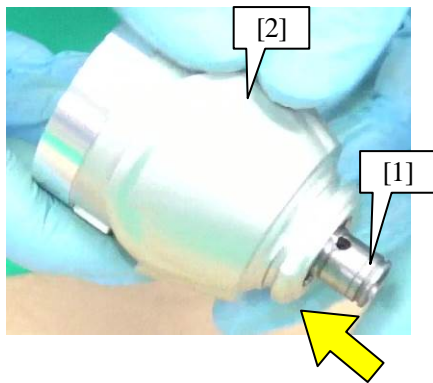
Turn Bearing box [1] clockwise to remove.

Fig. 12



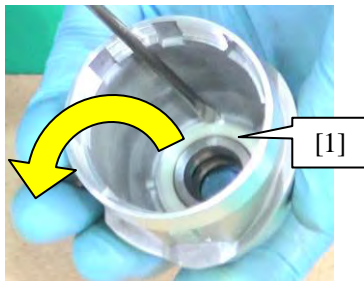
- 8 Remove Internal gear 43 [1] and Hammer section [2] from Hammer case.

Fig. 13



- 9 Push out Anvil M [1] from Hammer case [2].

Fig. 14



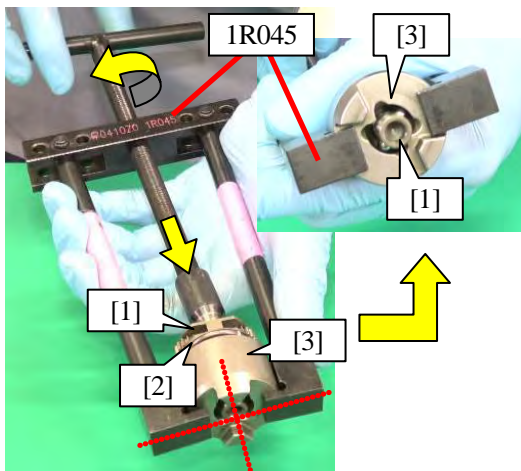
- 10 Remove Nylon washer 19 [1] with a slotted screwdriver.



## 6-4 Hammer

### 6-4-1 Disassembling

Fig. 15



- 1 Turn the handle of 1R045 clockwise to push Spindle [1] and compress Compression spring 21 [2].

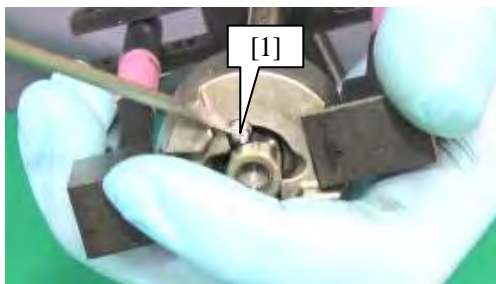
#### Tip

- Set 1R045 on Hammer [3] so that the protrusions of Hammer [3] and the claws of 1R045 cross at a right angle.
- Align the opening for Steel ball insertion with the top of Cam groove on Spindle [1] by turning 1R045.

#### Note

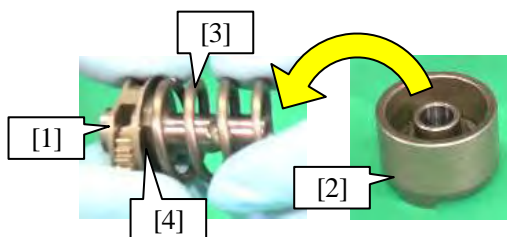
1R045 should be held securely by hand so that the claws of 1R045 do not slip off.

Fig. 16



- 2 Remove two Steel balls 4.8 [1] by inserting a slotted screwdriver magnetized by 1R288.

Fig. 17

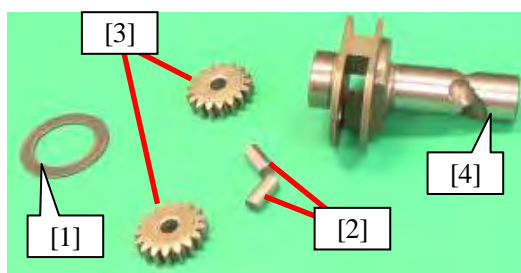


- 3 Turn 1R045 counterclockwise to loosen Hammer [2] and then take out Spindle and related parts [1] from Hammer [2] and remove Compression spring 21 [3] and Washer 21 [4].

#### Tip

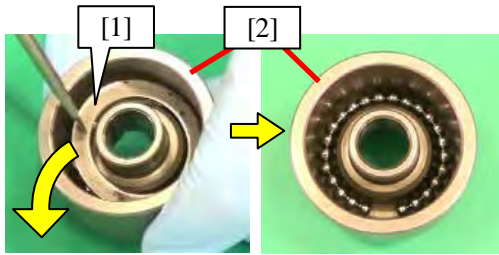
When removing Spindle [1] from Hammer [2], place them with Hammer [2] side down so that Steel balls 3 (24 pcs) do not fall down.

Fig. 18



- 4 Spindle section can be disassembled into Flat washer 12 [1], two Pins 3.5 [2], two Spur gears 17 [3] and Spindle [4].

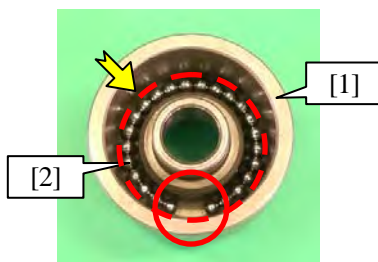
Fig. 19



- 5 Remove Flat washer 20 [1] from Hammer [2] with a slotted screwdriver magnetized by 1R288

## 6-4-2 Assembling

Fig. 20

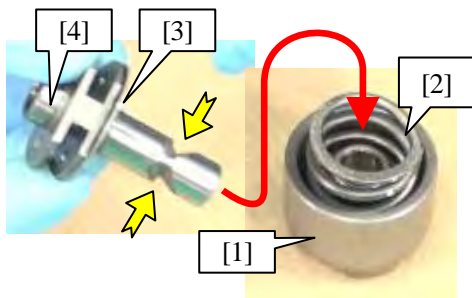


- 1 Apply Makita grease FA No.2 inside after putting Steel balls 3 [2] in the groove of Hammer [1].

### Note

Twenty-four Steel balls 3 [2] are put in the groove of Hammer [1] as shown left. There is a gap equivalent to the size of one Steel ball 3 [2].

Fig. 21

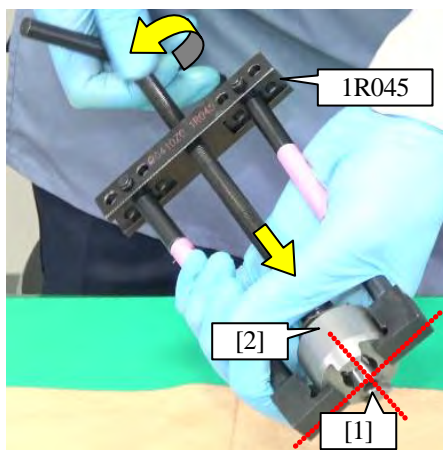


- 2 Install Flat washer 20, Compression spring 21 [2], Washer 21 [3] and Spindle [4] on Hammer [1].

### Tip

Apply Makita grease FA No.2 to Cam grooves on Spindle [4] where Steel balls 4.8 are put.

Fig. 22



- 3 Turn the handle of 1R045 clockwise to push Spindle [1] and compress Compression spring 21.

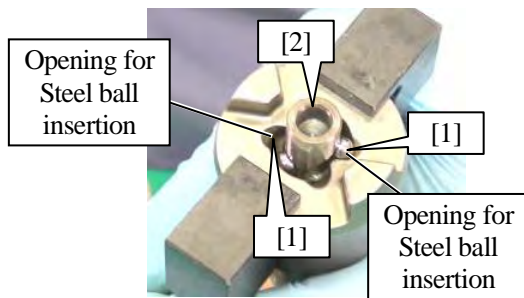
### Tip

- Set 1R045 on Hammer [2] so that the protrusions of Hammer [2] and the claws of 1R045 cross at a right angle.
- Align the opening for Steel ball insertion with the top of Cam groove on Spindle [1] by turning 1R045.

### Note

1R045 should be held securely by hand so that the claws of 1R045 do not slip off.

Fig. 23

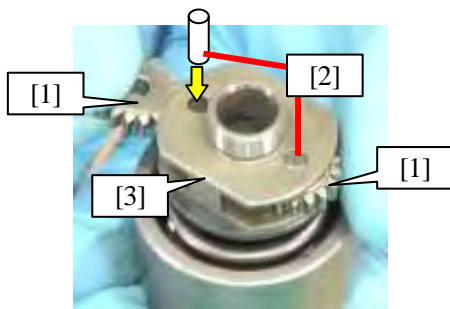


- 4 Insert two Steel balls 4.8 [1], one each, into each of the two Cam groove of Spindle [2].

Note

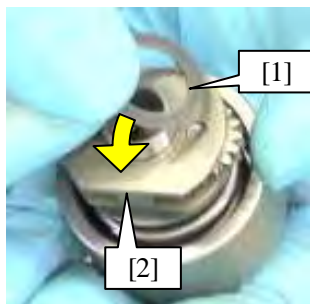
Don't insert two Steel balls into one of the two grooves.

Fig. 24



- 5 After removing 1R045, install two Spur gears 17 [1] and two Pins 3.5 [2] on Spindle [3].

Fig. 25



- 6 Install Flat washer 12 [1] on Spindle [2].

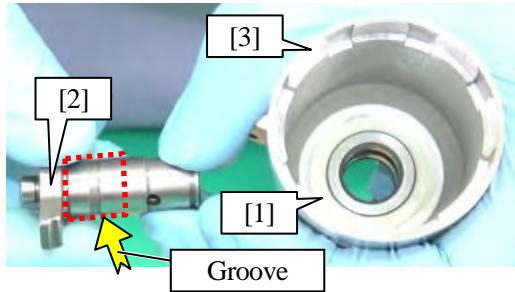
Tip

Apply Makita grease FA No 2 to Flat washer 12 [1] to prevent it from falling off.

## 6-5 Hammer case

### 6-5-1 Assembling

Fig. 26

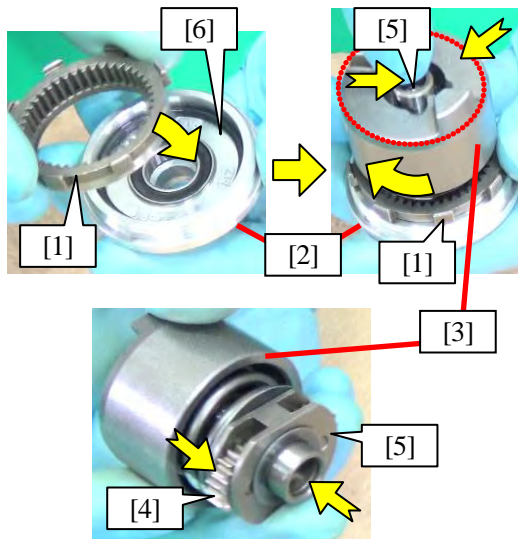


- 1 Assemble Nylon washer 19 [1] and Anvil M [2] to Hammer case [3].

#### Tip

Apply Makita grease FA No.2 to the groove on the surface of Anvil M [2].

Fig. 27



- 2 Install Internal gear 43 [1] on Bearing box [2], and then install Hammer section [3] on Internal gear 43 [1].

#### Tip

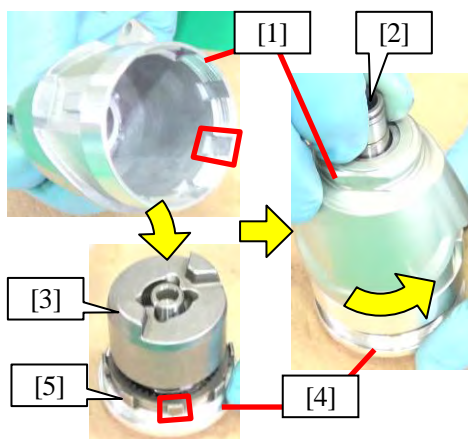
Apply Makita grease FA No.2 to the following portions:

- Surface of two Spur gears 17 [4]
- Top hole of Spindle [5]
- Surface of Hammer [3] surrounding Spindle [5]

#### Note

- Check that O ring 33 [6] is inserted in Bearing box [2].
- Check that Hammer section [3] rotates without wobbling.

Fig. 28

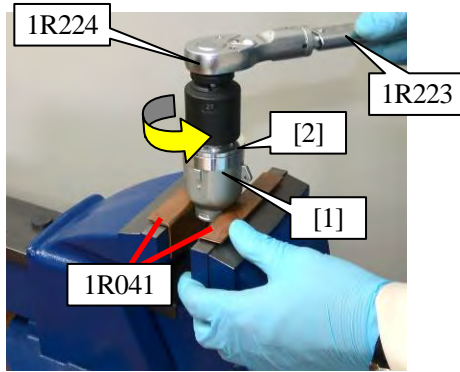


- 3 Holding Anvil M [2], install Hammer case [1] on Hammer section [3]. And then assemble them to Bearing box [4].

#### Tip

- Engage concave portions of Hammer case [1] and convex portion of Internal gear 43 [5].
- If the projections of Hammer [3] interfere with the T-shaped anvil portion of Anvil M [2], turn Anvil M together with Hammer case a little to engage Hammer case section and Internal gear section completely.

Fig. 29



- 4 Clamp the flats of Hammer case [1] in a vise. Attach Hex socket 27-50 to 1R224. And then fasten Bearing box [2] to Hammer case [1] with 1R223 to a tightening torque of 40.0- 45.0 N·m.

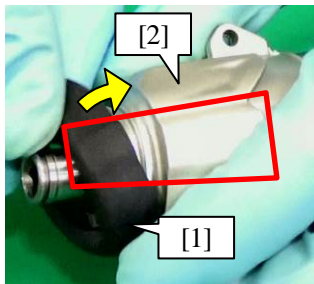
**Tip**

Turn Bearing box [2] counterclockwise.

**Note**

Insert 1R041 between Hammer case and the vise.

Fig. 30



- 5 Install Bumper [1] on Hammer case [2].

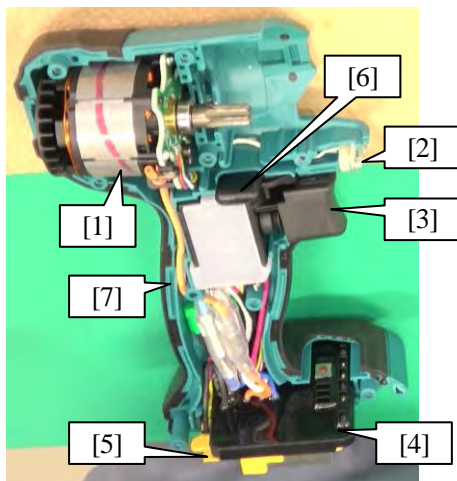
**Note**

Check that there is no gap between Bumper [1] and Hammer case [2].

## 6-6 Rotor and other electric parts

### 6-6-1 Disassembling

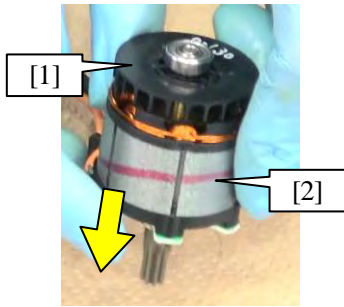
Fig. 31



- 1 From Housing L [7], remove the assembly of the following parts: Motor section [1], LED circuit [2], Switch [3], Controller [4], Terminal [5] and F/R change lever [6].



Fig. 32



**2** Remove Rotor [1] from Stator [2].

**Tip**

Push Rotor [1] against workbench.

Push down Stator [2] to remove Rotor [1] from Stator [2].

Fig. 33

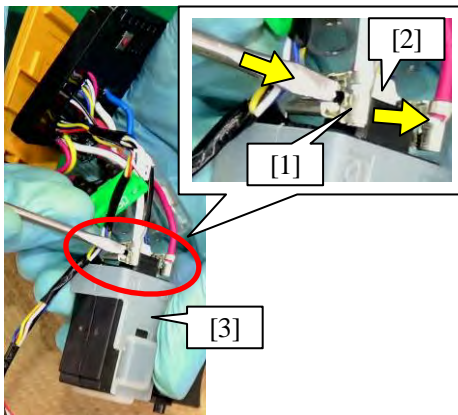


**Note**

When handling or storing multiple Rotors, be sure to keep a proper distance between Rotors. Because Rotor has strong magnet force, 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. 34

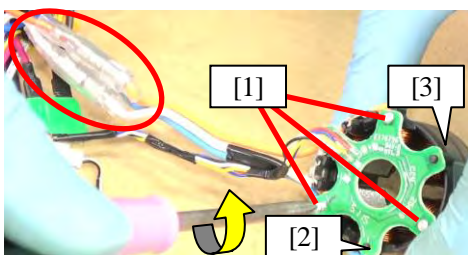


**3** Remove Switch [3] from Controller by disconnecting two Flag receptacles [1] and Connector [2].

**Tip**

- Remove Flag receptacles [1] while releasing lock with a slotted screwdriver or the like.
- Diagnose Switch with 1R413.

Fig. 35

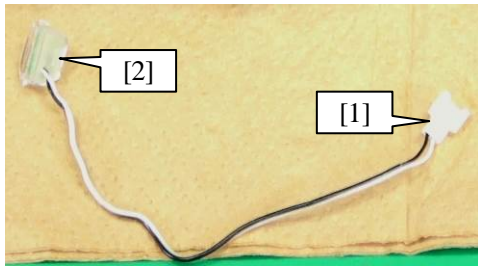


**4** To remove Stator [3] from Controller, first disconnect three Straight terminals, and then remove Sensor board [2] from Stator [3] by removing three PT 2x6 Tapping screws [1] with a No.1 Phillips screwdriver.

**Tip**

Straight terminals can be easily removed with a help of Pliers or the like.

Fig. 36

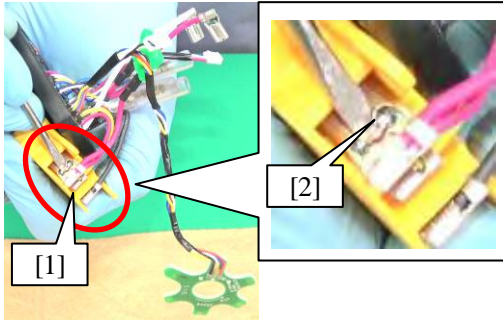


- 5** Remove LED circuit [2] from Controller by disconnecting Connector [1].

**Tip**

If LED does not light up, check it with 1R412.

Fig. 37



- 6** Remove Terminal [1] from Controller by disconnecting three Flag receptacles [2].

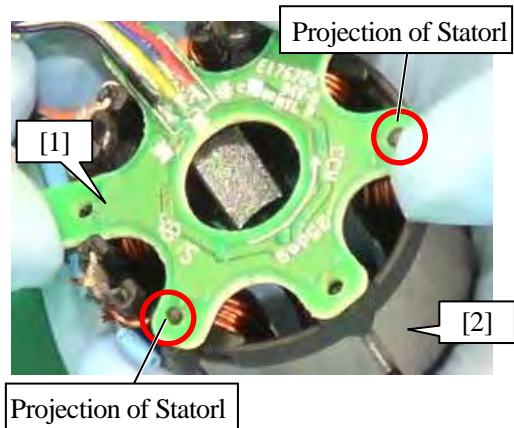
**Tip**

Remove Flag receptacles [2] while releasing lock with a slotted screwdriver or the like.

6-6-2 Assembling

- 1 Assemble by reversing the disassembly procedure.

Fig. 38

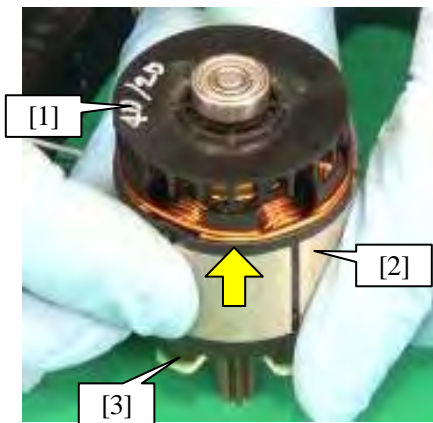


- 2 Fix Sensor board [1] of Controller with three PT 2x6 Tapping screws.

Tip

- The orientation of Sensor board [1] matters. The black sensor element side should face towards Stator [2].
- Holes of Sensor board [1] and two projections of Stator [2] should be engaged.

Fig. 39



- 3 Insert Rotor [1] into Stator [2].

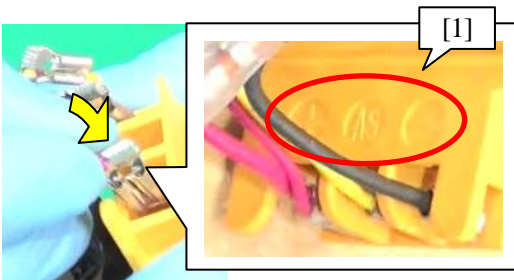
Tip

Push the drive-end of Rotor [1] against workbench. Insert Rotor [1] into Stator [2] by lifting up Stator [2] slowly.

Note

- Before assembling, blow off iron powder from Rotor [1] with an air duster to prevent abnormal rotation.
- Don't insert Rotor [1] forcefully into Stator [2] because Sensor board [3] may get broken.

Fig. 40

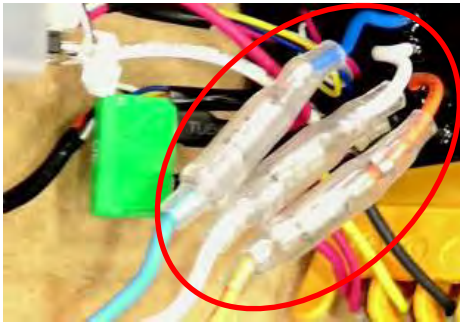


- 4 Connect three Straight terminals to Terminal [1] as follows:

- + (left).....Red
- AS (center) ... Yellow
- - (right) .....Black



Fig. 41

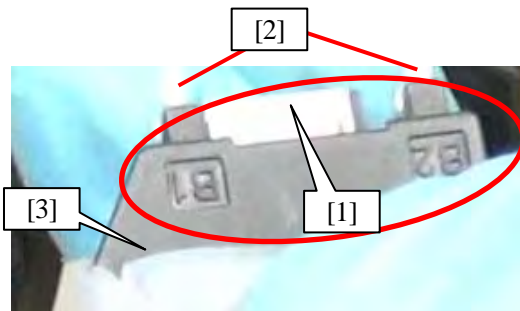


- 5** Connect three Straight terminals between Controller and Stator correctly. Connect wires of similar colors

**Note**

Insert three Straight terminals firmly because loose connection leads to abnormal rotation.

Fig. 42

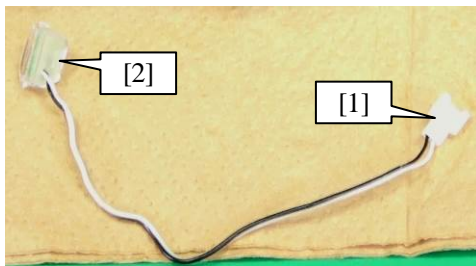


- 6** Flip the cover of Switch [3], then insert Connector into Connector socket [1] and then connect two Flag terminals [2] to Switch; connect Red terminal to B1 and White terminal to B2.

**Note**

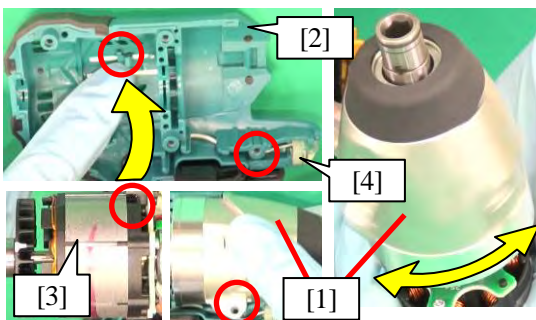
Be careful not to twist Lead wires.

Fig. 43



- 7** Connect Connector [1] of LED circuit [2] to Controller.

Fig. 44



- 8** Install Hammer case [1] on Motor section and then assemble them to Housing L [2].

**Note**

- Check Hammer case [1] rotates without wobbling.
- Engage the groove of Stator [3] and the projection of Housing L [2]. Engage the hole of Hammer case [1] and that of Housing L [2].

**Tip**

Route LED Lead wire [4] under all other Lead wires.

Fig. 45

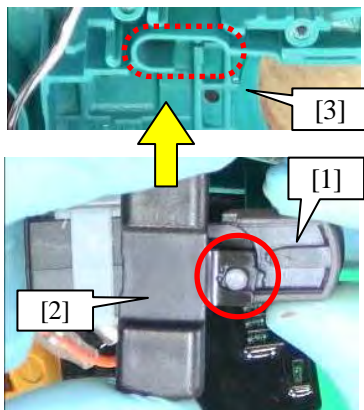


- 9 Install Controller [1], Terminal [2], Switch plate [3] on Housing L [4].

Tip

Put each Lead wire into the grooves of Housing and Lead wire holders with 1R411.

Fig. 46

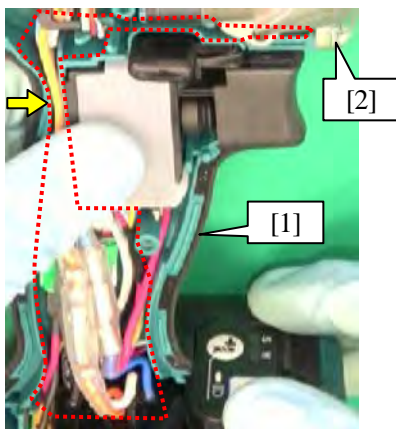


- 10 Install Switch [1] with F/R change lever [2] on Housing L [3].

Tip

Be careful with the orientation of F/R change lever [2].

Fig. 47

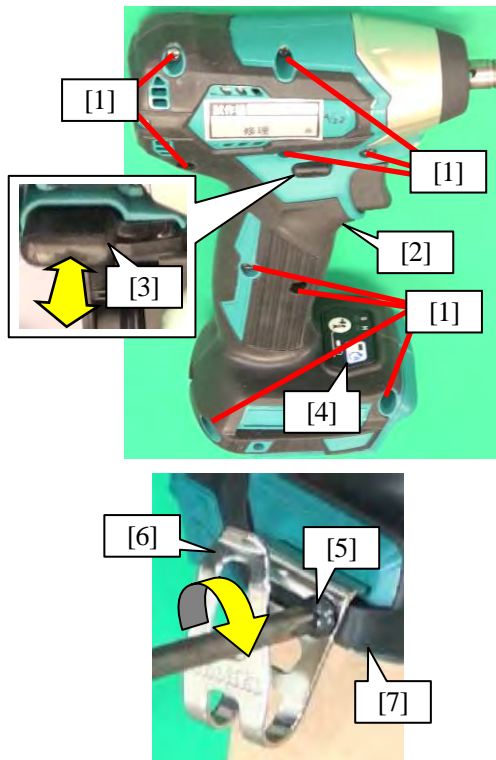


- 11 Put LED Lead wire and Straight terminal into Housing L [1] with 1R411.

Tip

- In order to prevent thin Lead wires from coming off, first route thin Lead wires of LED circuit [2] and Sensor board in the grooves of Housing L [1], and then route thick Lead wires on the thin Lead wires..
- It will make wiring easier to put the three Lead wires of Straight terminals in the following order: Blue, White, Orange.

Fig. 48



- 12** Fasten Housing R [2] to Housing L by tightening nine 3x16 Tapping screws [1].

**Note**

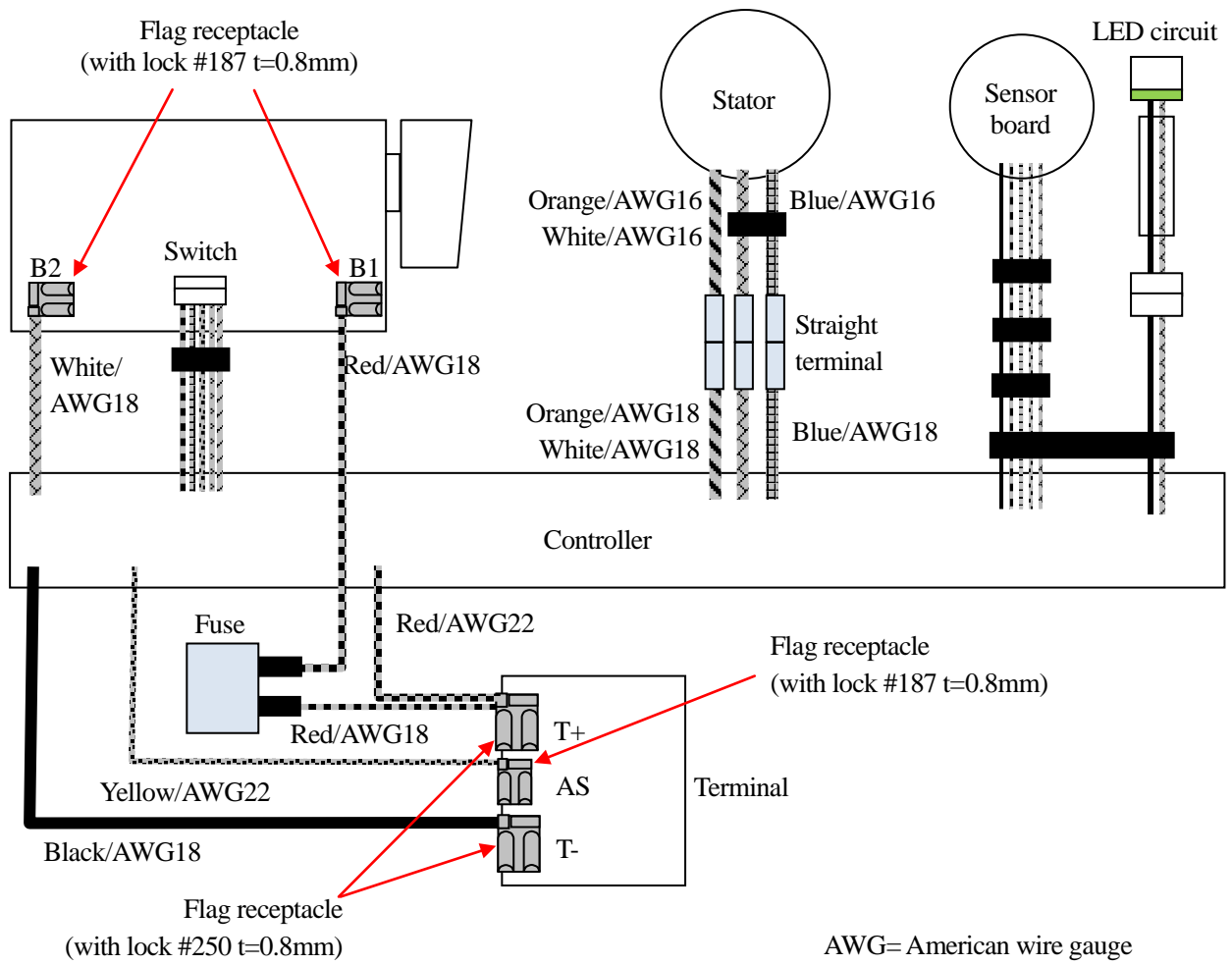
Check the following points before fastening Housing R:

- Lead wires are not pinched between Housings L and R.
- F/R change lever [3] moves normally.
- Switch plate [4] is set in place.

- 13** Fasten Belt clip [6] back to its original position (left or right side of Housing [7]) with M4x12 Truss head screw [5].

## 7 CIRCUIT DIAGRAM

Fig. 49



## 8 WIRING DIAGRAM

Fig. 50

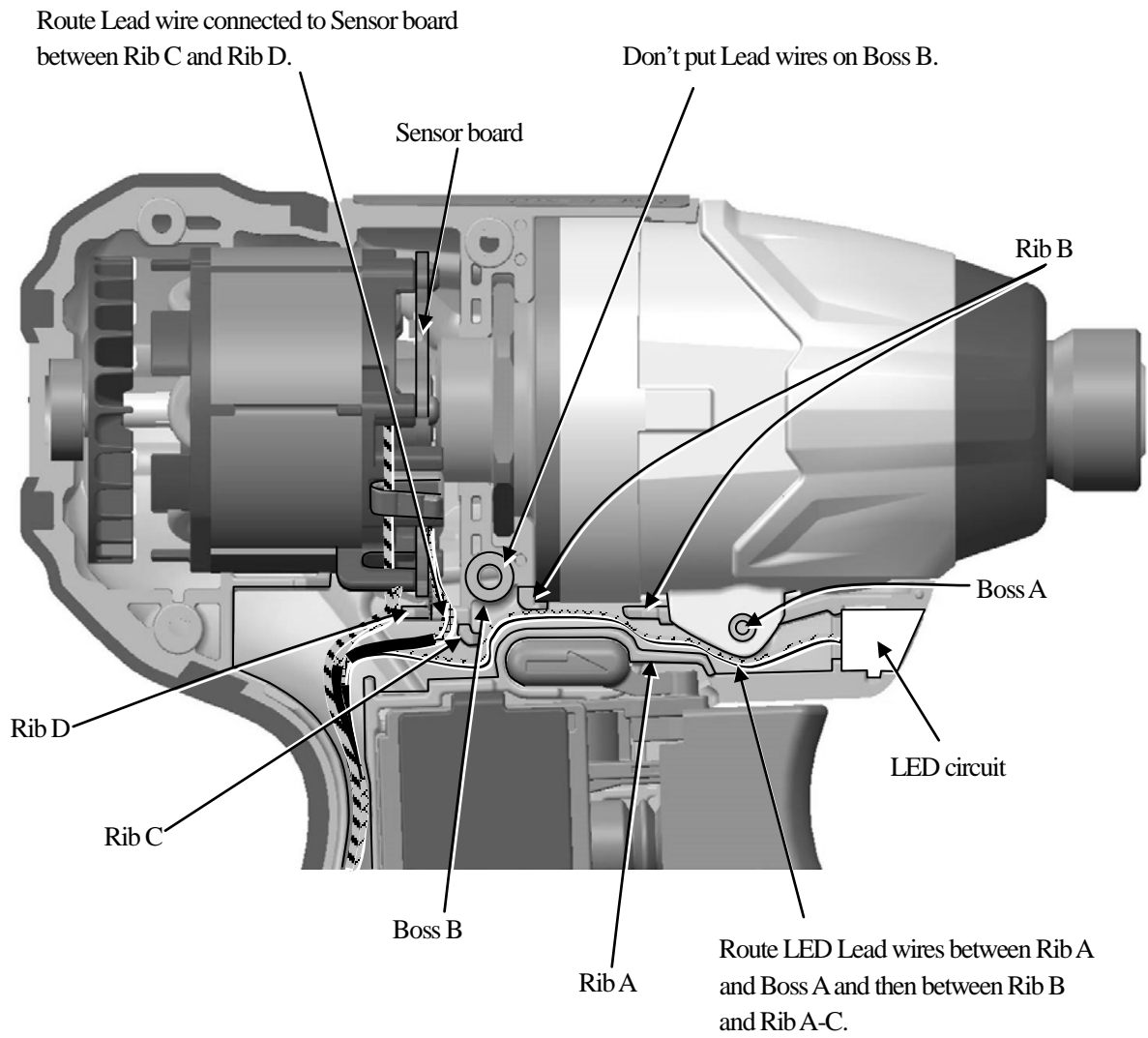
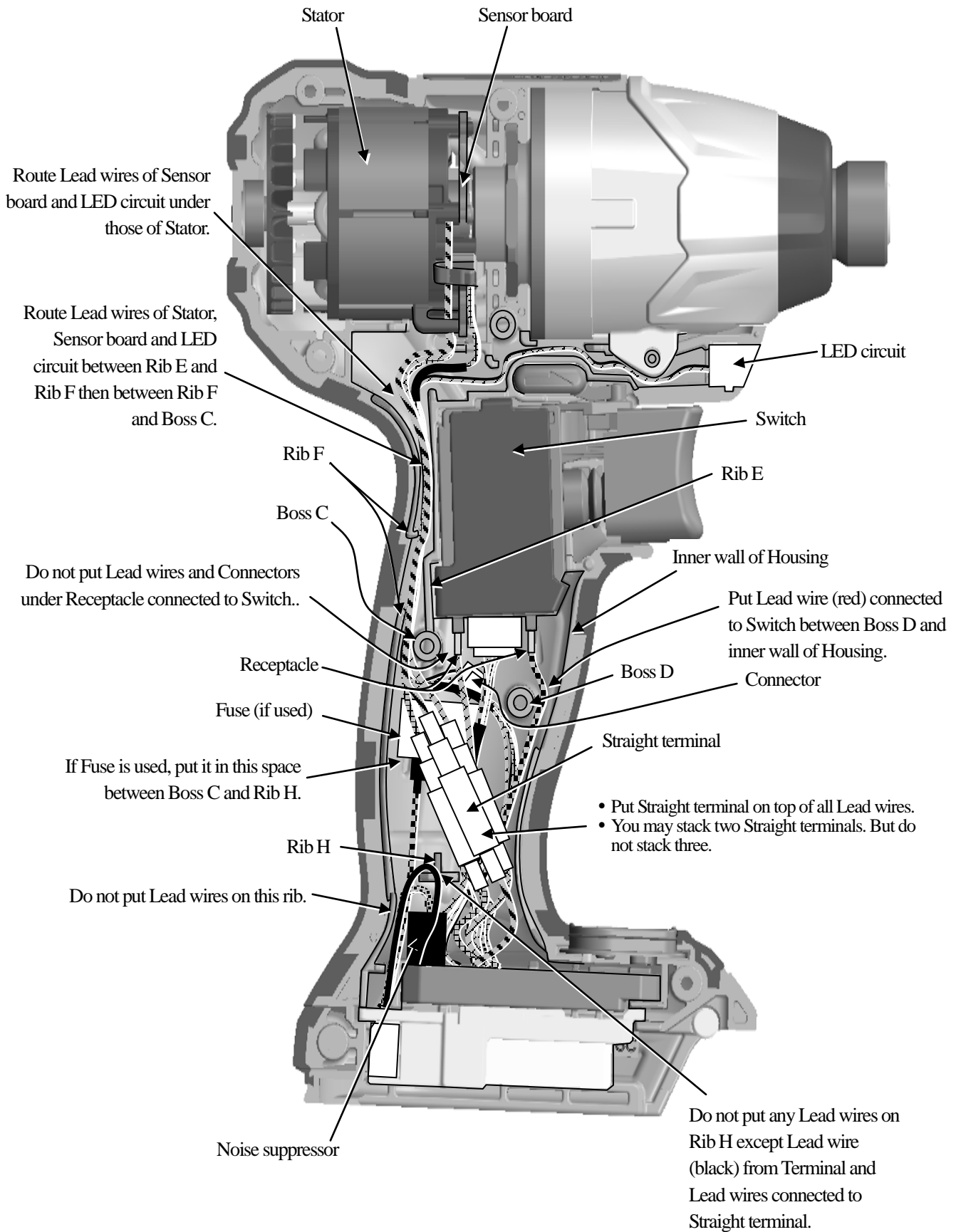


Fig. 51



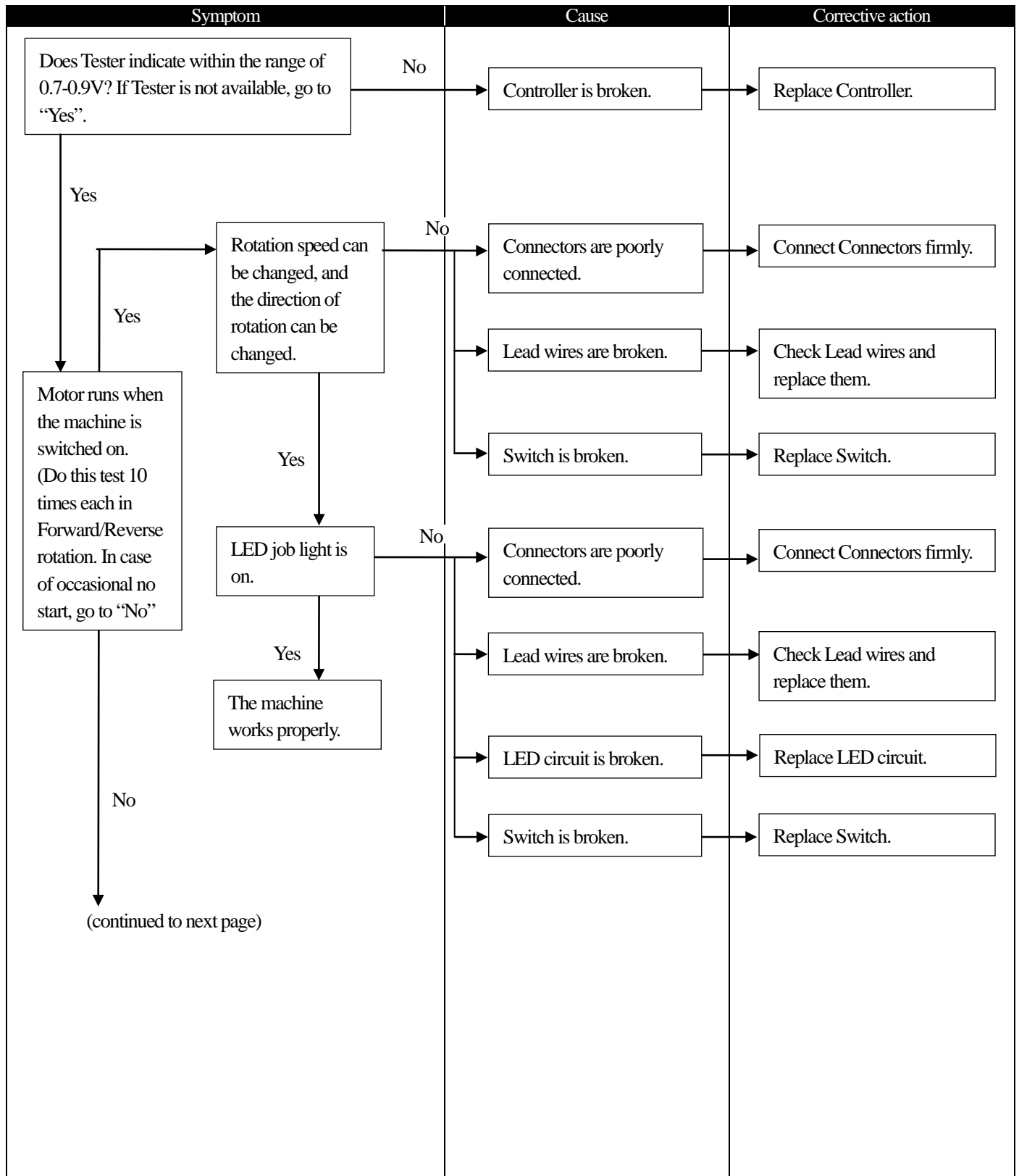
## **9 TROUBLE SHOOTING**

### **9-1 Note in Repairing**

- (1) Use a fully charged CXT battery.
- (2) When Housing is disassembled, check the conditions of small electrical parts (Connectors, Lead wires, Switches, etc.), Rotor, Stator, Gear section, etc.
- (3) Do the running test at the lowest speed (with the trigger being pulled just a little bit) to check the function of the following parts: F/R change lever, Switch plate, Variable speed control trigger. Be sure to repeat the same test 10 times to make a correct diagnosis.

## 9-2 Flowchart of Troubleshooting

Check the items from the top to the bottom of the following list. (Description of the item is referred to Circuit diagram)  
After corrective action, return to the start of Troubleshooting and re-check again.





Symptom	Cause	Corrective action
<div> <div>No</div> <div>LED job light is on.</div> <div>Yes</div> <div>There are scrape marks on Rotor.</div> <div>Yes</div> <div>The machine still shows the same symptom in spite of the above corrective actions.</div> </div>	Connectors are poorly connected.	Connect Connectors firmly.
	Lead wires are broken.	Check Lead wires and replace them.
	Switch is broken.	Replace Switch.
	LED circuit is broken.	Replace LED circuit.
	Controller is broken.	Replace Controller.
	Rotor is broken.	Replace Rotor.
	Stator is broken.	Replace Stator.
	Controller is broken.	Replace Controller.

### 9-3 Short-circuit test on FET (Field Effect Transistor) of controller

Trouble on Controller can be checked with Digital tester as follows.

Fig. 52



- 1 Set Digital tester (1R402-A) to the Diode mode.

Fig. 53



- 2 After removing the battery from the machine, pull Switch trigger and hold it in the "ON" position with tape or the like.

Fig. 54



- 3 Attach Black probe to the plus pole of Terminal, and Red probe to the minus pole.

#### Note

Be careful not to attach the probes to the wrong Terminals.

- 4 Wait until the voltage value shown on the tester is stable , and then check the value. There is no problem with FET of Controller if the value is within the range of 0.7V -0.9V. If the value is 0V or 0.4V approx., Controller is broken. Replace it with a new one.