

# CORDLESS RIVET GUN DRV150/ DRV250

## 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:

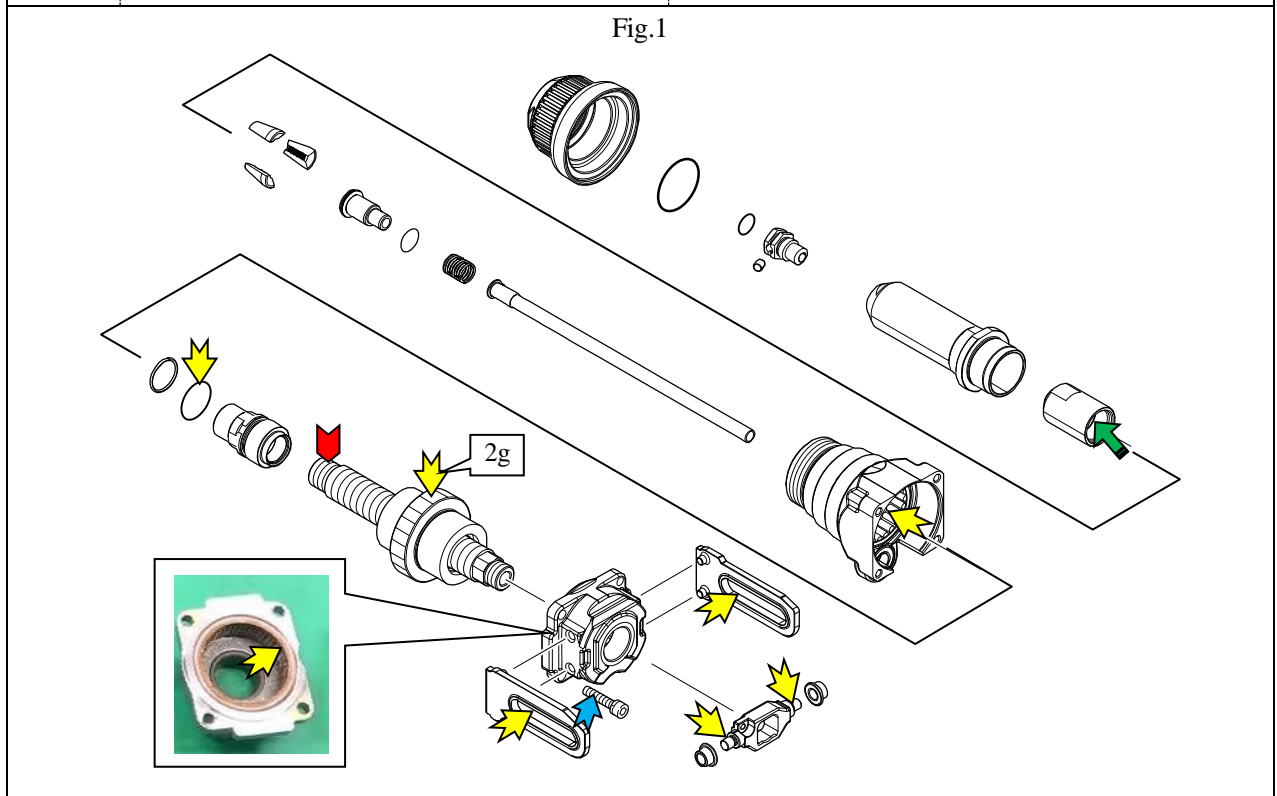
- Wear gloves.
- In order to avoid wrong reassembly, draw or write down where and how the parts are assembled, and what the parts are. It is also recommended to have boxes ready to keep disassembled parts by group.
- Handle the disassembled parts carefully. Clean and wash them properly.
- Remove Battery,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

## 3 NECESSARY REPAIRING TOOLS

NO.	Description	Use for
1R411	Push bar for lead wires	fixing Lead wires

## 4 LUBRICANT AND ADHESIVE APPLICATION

	Description	Amount
↑	Makita grease FA.No.2	Apply a little unless specified in the figure.
↑	Molybdenum disulfide lubricant	Apply Small amount to the inner surface of Jaw case. <div style="background-color: yellow; text-align: center; padding: 2px;"><b>Note</b></div> Be careful not to apply lubricant to the entire portion because it adheres to the rivet pins and the inside of Mandrel container becomes dirty.
↑	Adhesives ThreeBond 1342 (H) or Loctite 243	Wipe off the adhesive on both new and reused bolts with a carburetor cleaner and apply a small amount of ThreeBond 1342(H) or Loctite 243, because the adhesive may have deteriorated.
↑	Adhesives ThreeBond 1303B or Loctite 272	Wipe off the adhesive on reused bolts with a carburetor cleaner and apply a small amount of ThreeBond 1303B or Loctite 272.



## 5 TIGHTENING TORQUE SPECIFICATIONS

Parts to fasten			Fastener	Tightening torque (N·m)
Joint 6.4	↔	Ball screw	Ball screw	23-28*
Tube	↔	Ball screw	Ball screw	23-28
Magnet holder complete	↔	Roller shaft 6.4	M3x8 Pan head screw	0.6-0.8
Housing L	↔	Housing R	M3x20 Pan head screw	0.4-0.8

\*Adhere according to [Fig.1](#).

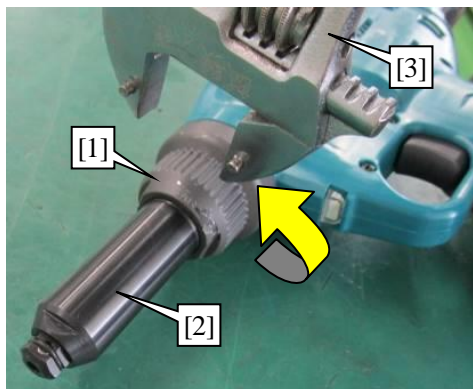
## 6 REPAIR (\*All figures are model DRV250)

### 6-1 Housing section

#### 6-1-1 Disassembling

- 1 Remove Battery and Mandrel container.

Fig.2

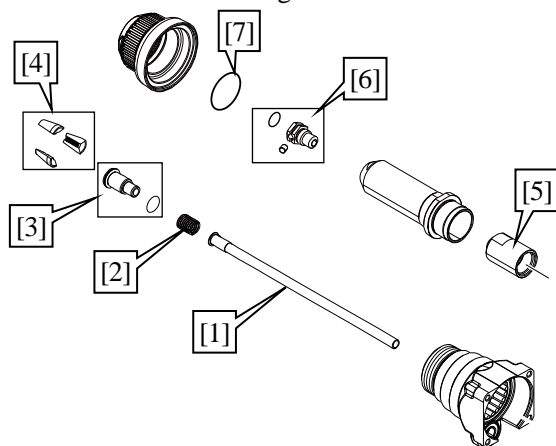


- 2 Remove Screw nut 6.4 [1], and remove Head 6.4 [2].

#### Tips

Loosen the flats of Screw nut 6.4 [1] with an adjustable wrench [3].

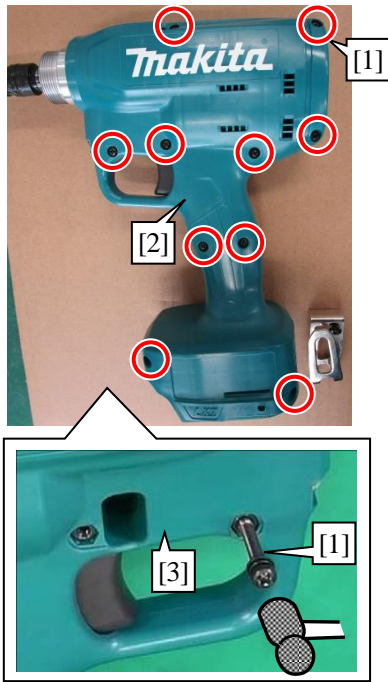
Fig.3



- 3 Remove the following parts:

- Pipe 4.6 complete [1]
- Compression spring 7 [2]
- Jaw pusher 4.5 assembly [3]
- Jaw 6.4 set [4]
- Jaw case [5]
- Nosepiece 6.4 assembly [6]
- O ring 24 [7]

Fig.4

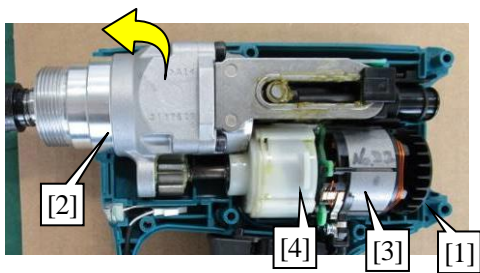


- 4 Remove M3x20 Pan head screws [1] (10 pcs) and remove Housing L [2].

Note

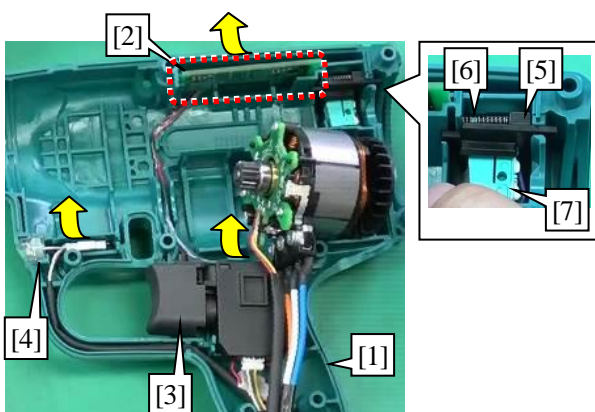
Be careful not to remove the nuts from Housing R [3].  
If removed, return back the nut by temporarily screwing it to M3x20 Pan head screw [1] and tap the screw head with a metal hammer from the outside of Housing R [3].

Fig.5



- 5 Remove Front housing section [2] and Motor section [3] from Housing R [1].
- 6 Remove Motor section [3] from Gear assembly section [4].

Fig.6

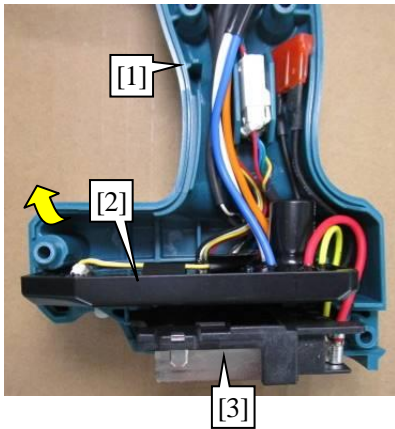


- 7 Remove the following parts from Housing R [1].
  - Hall IC circuit [2]
  - Switch [3]
  - LED circuit [4]
  - Switch lever [5]
  - Compression spring 2 [6]
  - Switch unit [7]

Tips

Lift and remove Switch unit [7] from Housing R [1] with a slotted screwdriver.

Fig.7

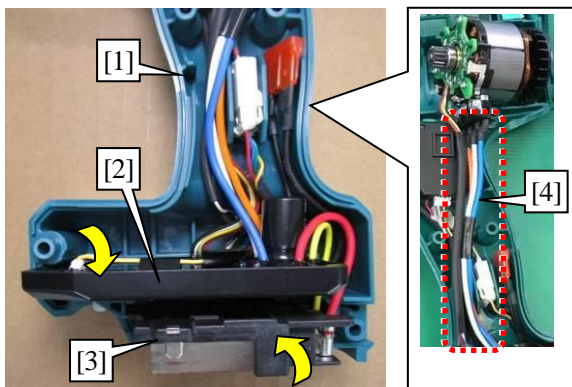


- 8 Remove the following parts from Housing R [1]:
- Controller section [2]
  - Terminal [3]

## 6-1-2 Assembling

### 1 Assemble Front housing section. (6-2-2)

Fig.8

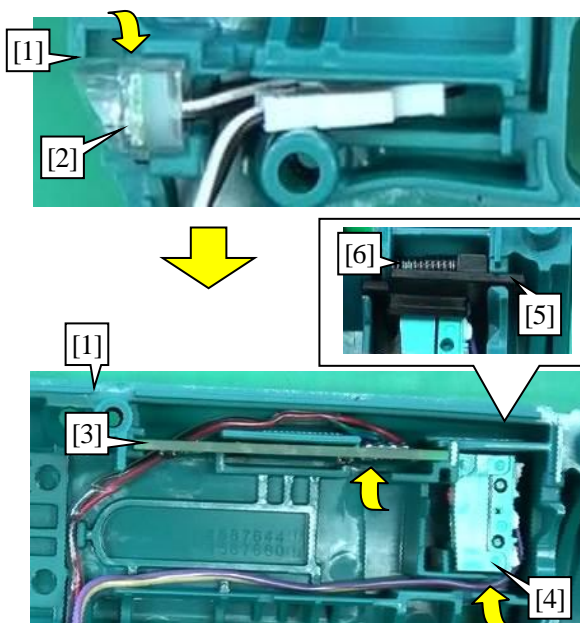


- 2 Assemble the following parts to Housing R [1]:
- Controller section [2]
  - Terminal [3]

#### Note

Be careful not to twist Lead wires [4] from Motor section.

Fig.9



- 3 Assemble the following parts to Housing R [1]:
- LED circuit [2]
  - Hall IC circuit [3]
  - Switch unit [4]
  - Switch lever [5]
  - Compression spring 2 [6]

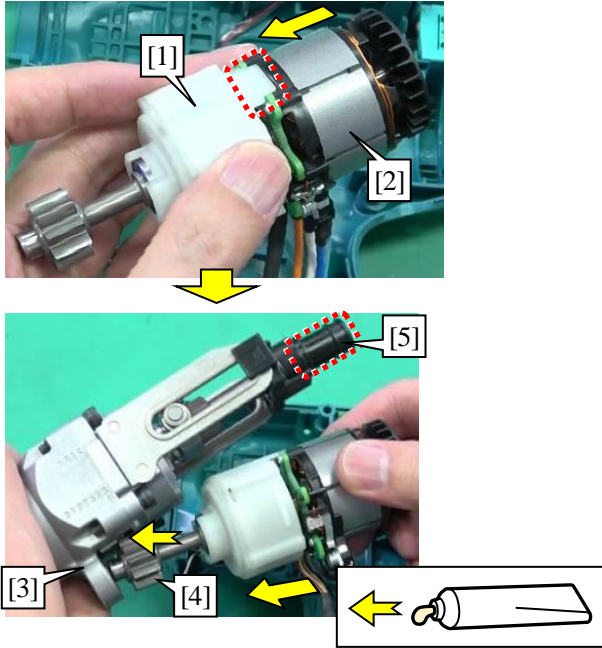
#### Note

Be careful not to bend Compression spring 2 [6].

#### Tips

Route Lead wires in Housing R with 1R411 or soft wood bar, etc.

Fig.10



- 4 Assemble Gear assembly section [1] and Motor section [2].
- 5 Apply the specified grease to Spur gear 10 [4], and assemble Spur gear 10 to Gear housing section [3].

**Note**

Note that Tube guide B [5] is apt to fall off.

Fig.11



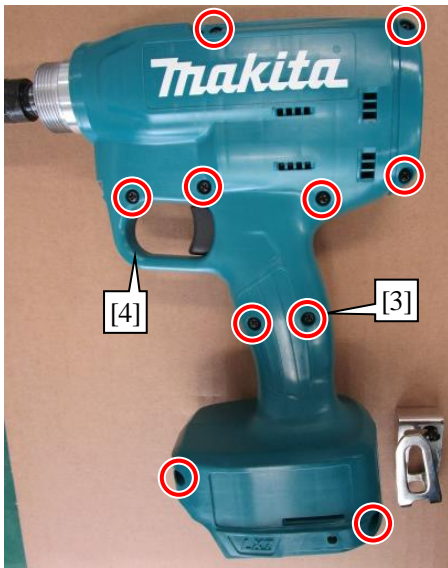
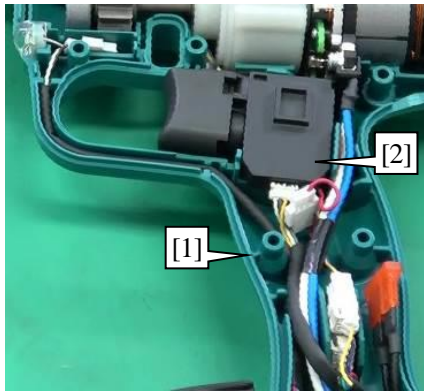
- 6 Assemble Front housing section [2] and Motor section [3] as a set to Housing R [1].

**Note**

Be careful not to pinch Lead wires.



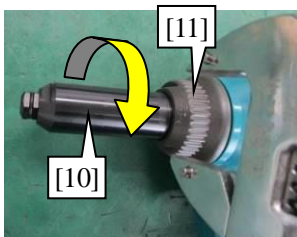
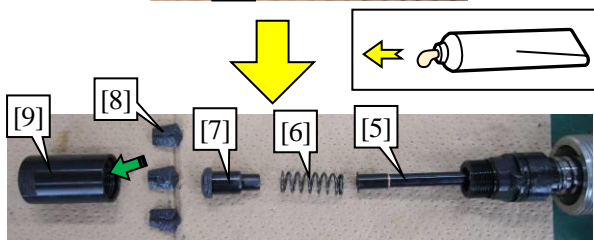
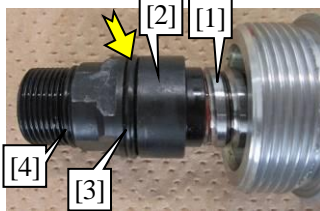
Fig.12



- 7 Assemble Switch [2] to Housing R [1].
- 8 Assemble Housing L [4] with M3x20 Pan head screws [3] (10 pcs).

Note
Be careful not to pinch Lead wires.
Tips
Tighten M3x20 Pan head screws [3] (10 pcs) from the center of Housing L [4].

Fig.13



- 9 Tighten Joint 6.4 [2] to Ball screw [1], then assemble the following parts:

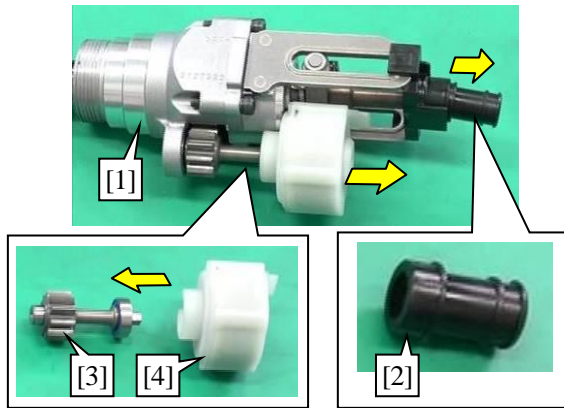
- O ring 17 [3]
- O ring 14.5 [4]
- Pipe 4.6 [5]
- Compression spring 7 [6]
- Jaw pusher 4.5 assembly [7]
- Jaw 6.4 set [8]
- Jaw case [9]
- Head 6.4 [10]
- Screw nut 6.4 [11]

Note
• Apply the specified grease to O ring 17 [3].
• Apply the specified grease to the inner diameter of Jaw case [9].

**6-2 Front housing section**  
**6-2-1 Disassembling**

**1** Disassemble Housing section. (6-1-1)

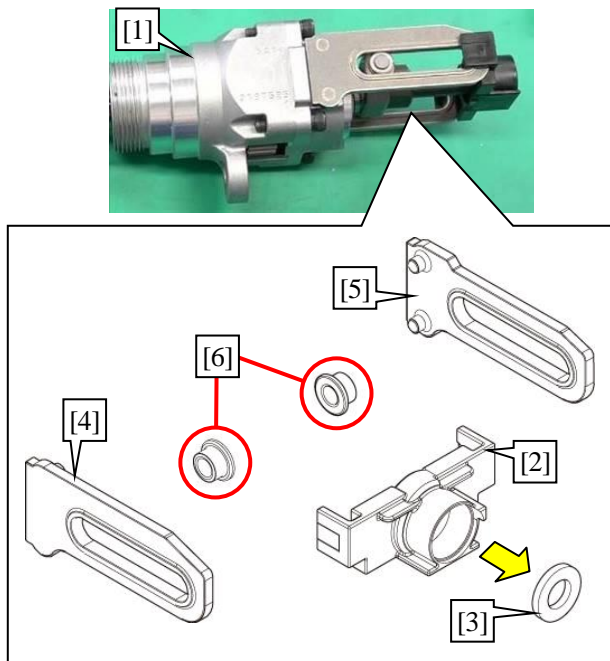
Fig.14



**2** Remove the following parts from Front housing section [1]:

- Tube guide B [2]
- Spur gear 10 [3]
- Gear assembly [4]

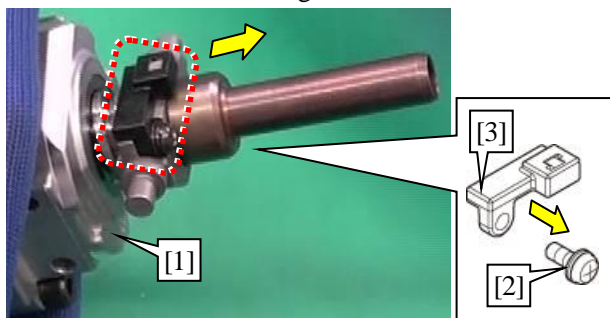
Fig.15



**3** Remove the following parts from Front housing section [1]:

- Tube guide A [2]
- Felt ring 8 [3]
- Guide plate L [4]
- Guide plate R [5]
- Rings 5 [6] (2 pcs)

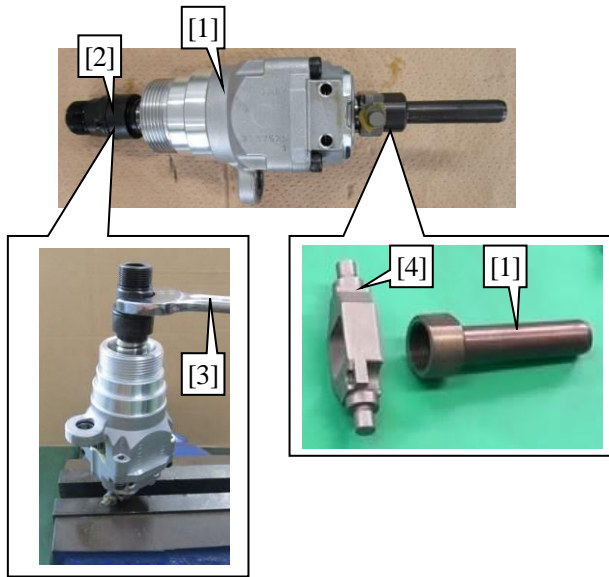
Fig.16



**4** Remove the following parts from Front housing section [1]:

- M3x8 Pan head screw [2]
- Magnet holder complete [3]

Fig.17



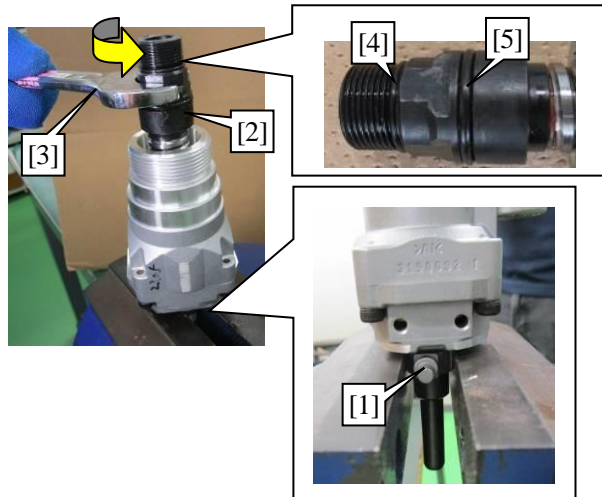
5 Hold the flats of Tube [1] with a vise, turn the square portion of Joint 6.4 [2] counterclockwise to loosen with Wrench 17 [3], then remove the following parts:

- Tube [1]
- Roller shaft 6.4 [4]

**Tips**

As an alternative, hold the square portion of Joint 6.4 [2] with a vise, and remove the flats of Tube with Wrench 17.

Fig.18

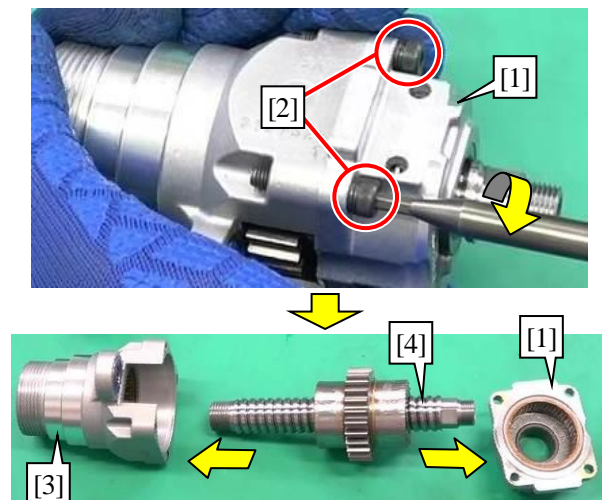


6 Hold Roller shaft 6.4 [1] with a vise, and remove the square portion of Joint 6.4 with Wrench 17.

**Tips**

Joint 6.4 [2] has a high-strength adhesive. If it is not loosened, remove O ring 14.5 [4] and O ring 17 [5], then remove the joint by heating the adhesive portions with Heat gun.

Fig.19



7 Remove M4x16 Hex. socket head bolts [2] (4 pcs) from Rear housing [1].

8 Remove Front housing [3], Rear housing [1] and Ball screw [4].

**Tips**

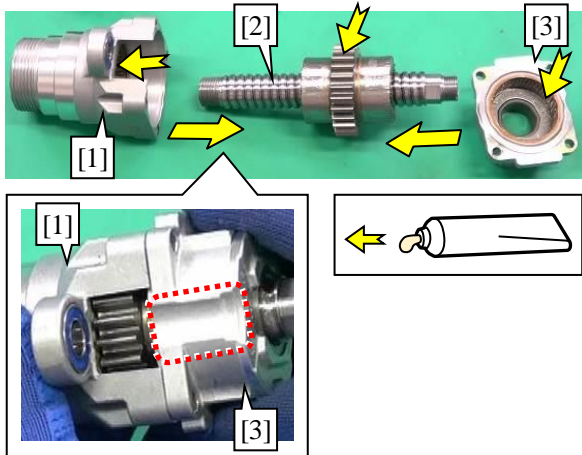
M4x16 Hex. socket head bolts [2] (4 pcs) are tightened with adhesive, so first loosen it manually.

**Note**

Ball screw [4] has many steel balls inside and cannot be assembled once disassembled. Therefore, do not remove Gear on Nut section from the screw.

## 6-2-2 Assembling

Fig.20

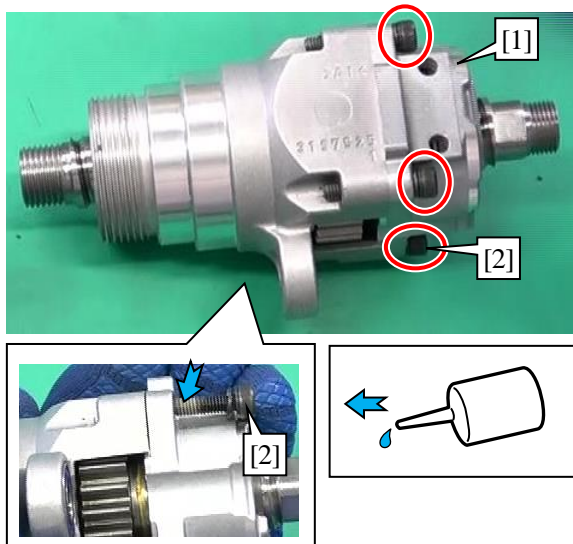


- 1 Apply the specified grease to Front housing [1] and Needle bearing of Rear housing [3] on both sides of the gear portion of Ball screw [2], then assemble them.

### Note

- Ball screw [4] has many steel balls inside and cannot be assembled once disassembled. Therefore, do not remove Gear on Nut section from the screw.
- Be careful with the orientation of Rear housing [3] and align the concave surface with the gear side.

Fig.21

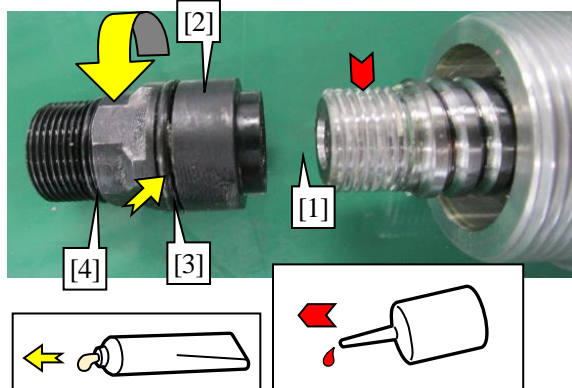


- 2 Tighten M4x16 Hex. socket head bolts [2] (4 pcs) to Rear housing [1].

### Note

- Apply the specified adhesives to M4x16 Hex. socket head bolts [2] (4 pcs).

Fig.22

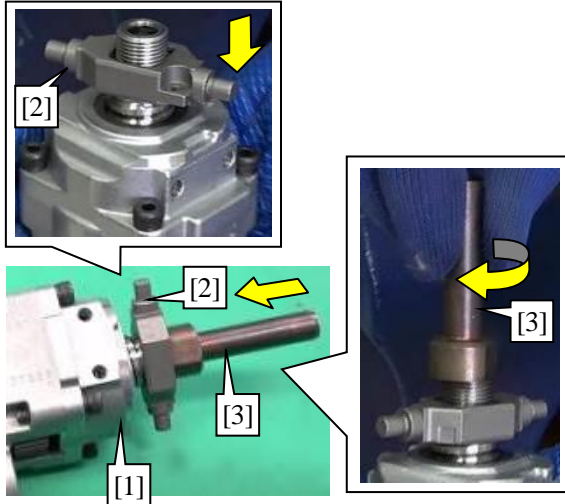


- 3 Assemble Joint 6.4 [2] to Ball screw [1].
- 4 Assemble O ring 17 [3] and O ring 14.5 [4] to Joint 6.4 [2].

### Note

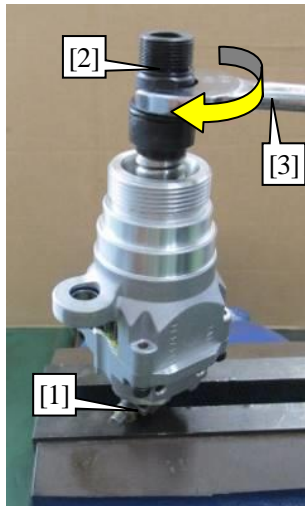
- Apply the specified adhesive to Ball screw [1].
- Apply the specified grease to O ring 17 [3].

Fig.23



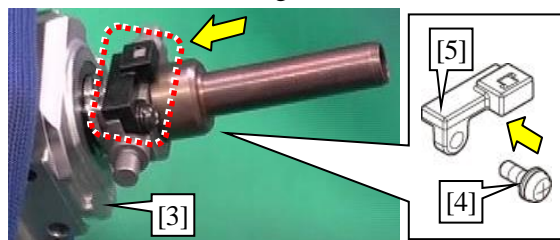
- 5 Assemble the following parts to Ball screw of Front housing section [1]:
- Roller shaft 6.4 [2]
  - Tube [3]

Fig.24



- 6 Hold the flats of Tube [1] with a vise, then tighten the square portion of Joint 6.4 [2] with Wrench 17 [3].

Fig.25

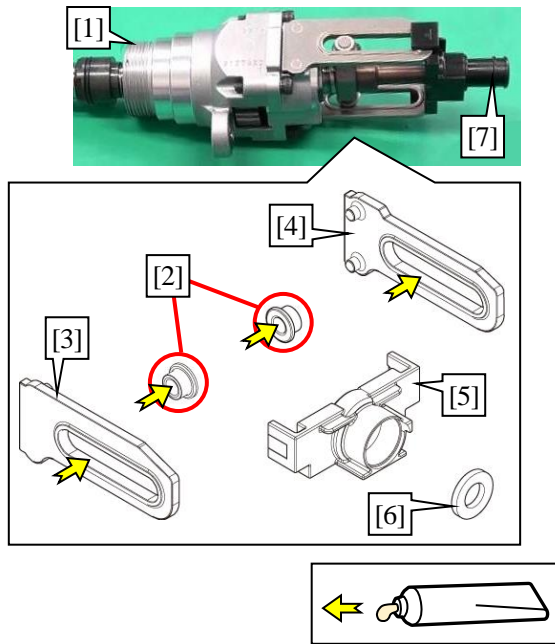


- 7 Assemble the following parts to Front housing section [3].
- M3x8 Pan head screw [4]
  - Magnet holder complete [5]

**Note**

Be careful with the orientation of Magnet holder [5].

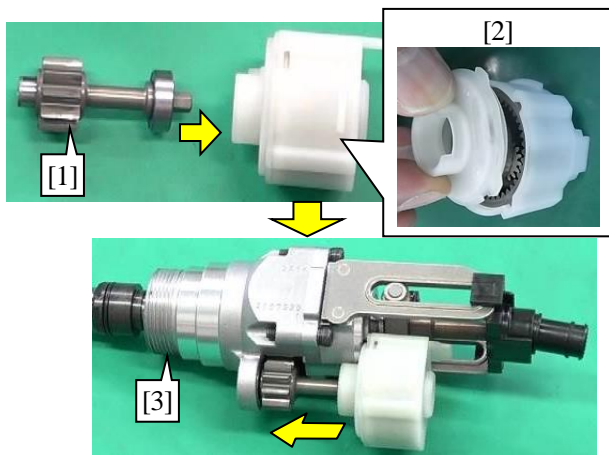
Fig.26



8 Assemble the following parts to Front housing section [1].

- Rings 5 [2] (2 pcs) ... Apply the specified grease to the inner diameter.
- Guide plate L [3] ... Apply the specified grease to the long hole.
- Guide plate R [4] ... Apply the specified grease to the long hole.
- Tube guide A [5]
- Felt ring 8 [6]
- Tube guide B [7]

Fig.27



9 Assemble Spur gear 10 [1] and Gear assembly [2].

**Note**

Be careful not to remove the lid of Gear assembly [2]. In case the lid is removed, rotate it clockwise to assemble as shown in [2].

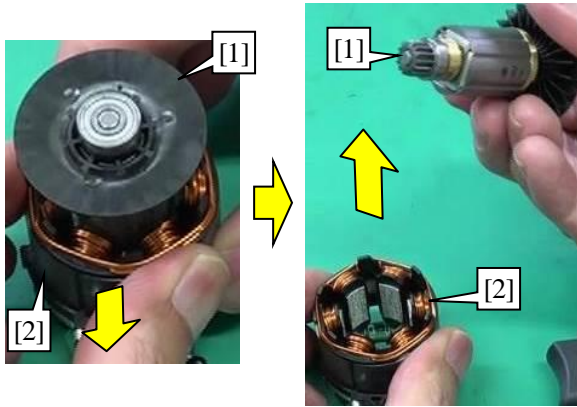
10 Assemble to Front housing section [3].

1 Assemble Housing section. (6-1-2)

**6-3 Electrical parts section**  
**6-3-1 Disassembling**

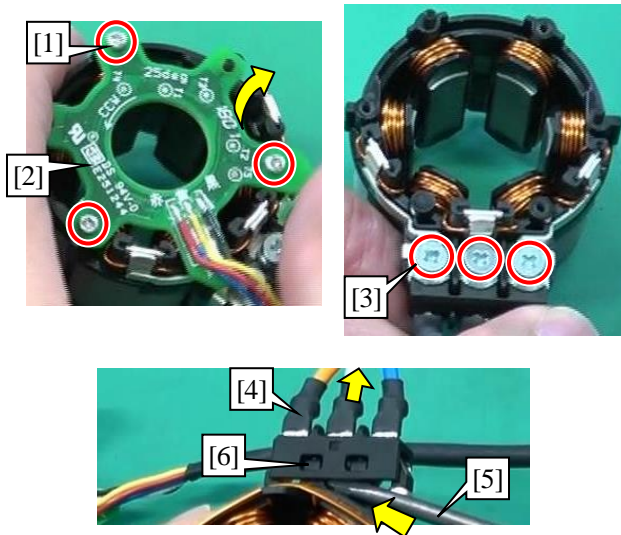
**1** Disassemble Front housing section. (6-2-1)

Fig.28



- 2** Press the drive end [1] of Rotor against a workbench, then remove Rotor from Stator [2] by pushing down Stator [2] to the workbench.

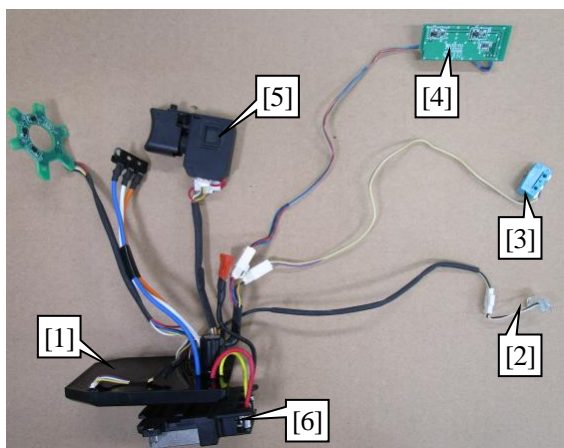
Fig.29



- 3** Remove 2x6 PT tapping screws [1] (3 pcs) with a No.1 Phillips screwdriver from Stator, and then remove Printed circuit board [2].
- 4** Remove M3x6 Flat head screws [3] (3 pcs) with a No.1 Phillips screwdriver from Stator, and then remove Receptacle [4].

<b>Tips</b>
Remove Receptacle [4] by prying it up with a slotted screwdriver [5] to release the locking tabs [6].
<b>Note</b>
Be careful not to strip the head of 2x6 PT tapping screw [1] and M3x6 Flat head screw [3].

Fig.30

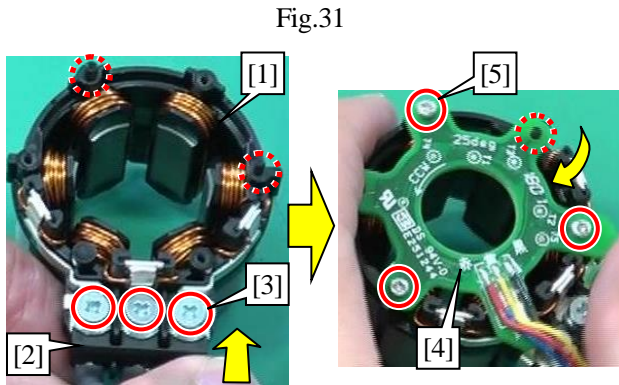


- 5** Remove the following parts from Controller [1].
- LED circuit [2]
  - Switch unit [3]
  - Hall IC circuit [4]
  - Switch [5]
  - Terminal [6]

<b>Tips</b>
Remove Flag receptacles with lock [6] (3 pcs) by prying it up with a slotted screwdriver to release the locking tabs.

## 6-3-2 Assembling

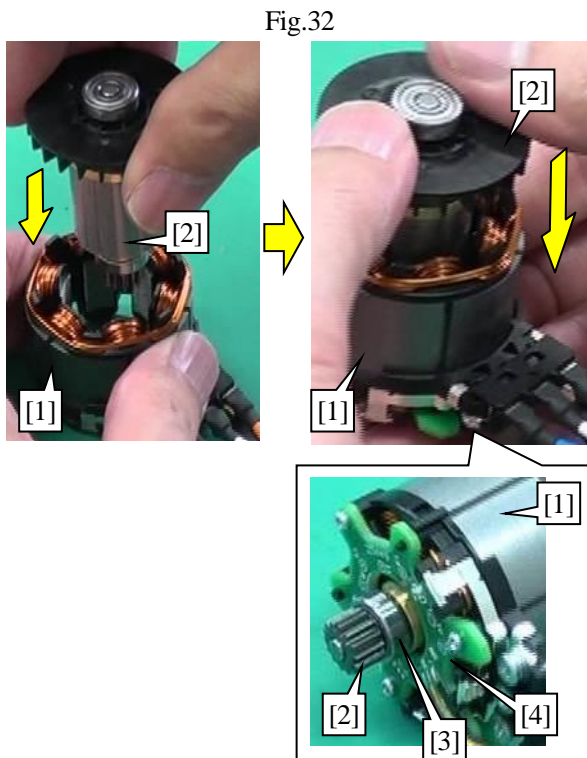
- 1 Set the electrical parts in place. (According to [7: circuit diagram](#) and [8: wiring diagram](#))



Note
Be careful with the orientation of Receptacles of Terminal.

- 2 Assemble Terminal unit [2] to Stator [1] by tightening M3x6 Flat head screws [3] (3 pcs) with a No.1 Phillips screwdriver.
- 3 Assemble Printed circuit board [4] to Stator [1] to tighten 2x6 PT tapping screws [5] (3 pcs) with a No.1 Phillips screwdriver.

Note
<ul style="list-style-type: none"> <li>• Be careful not to strip the head of M3x6 Flat head screw [3] and 2x6 PT tapping screw [5].</li> <li>• Insert Printed circuit board [4] into the projection of Stator [1]. Be careful with the orientation.</li> </ul>



- 4 Place Printed circuit board side of Stator [1] on a workbench, and insert Rotor [2] into Stator [1] while pressing Stator to the workbench.
- 5 Lift Stator [1] and push Rotor [2] into Stator.

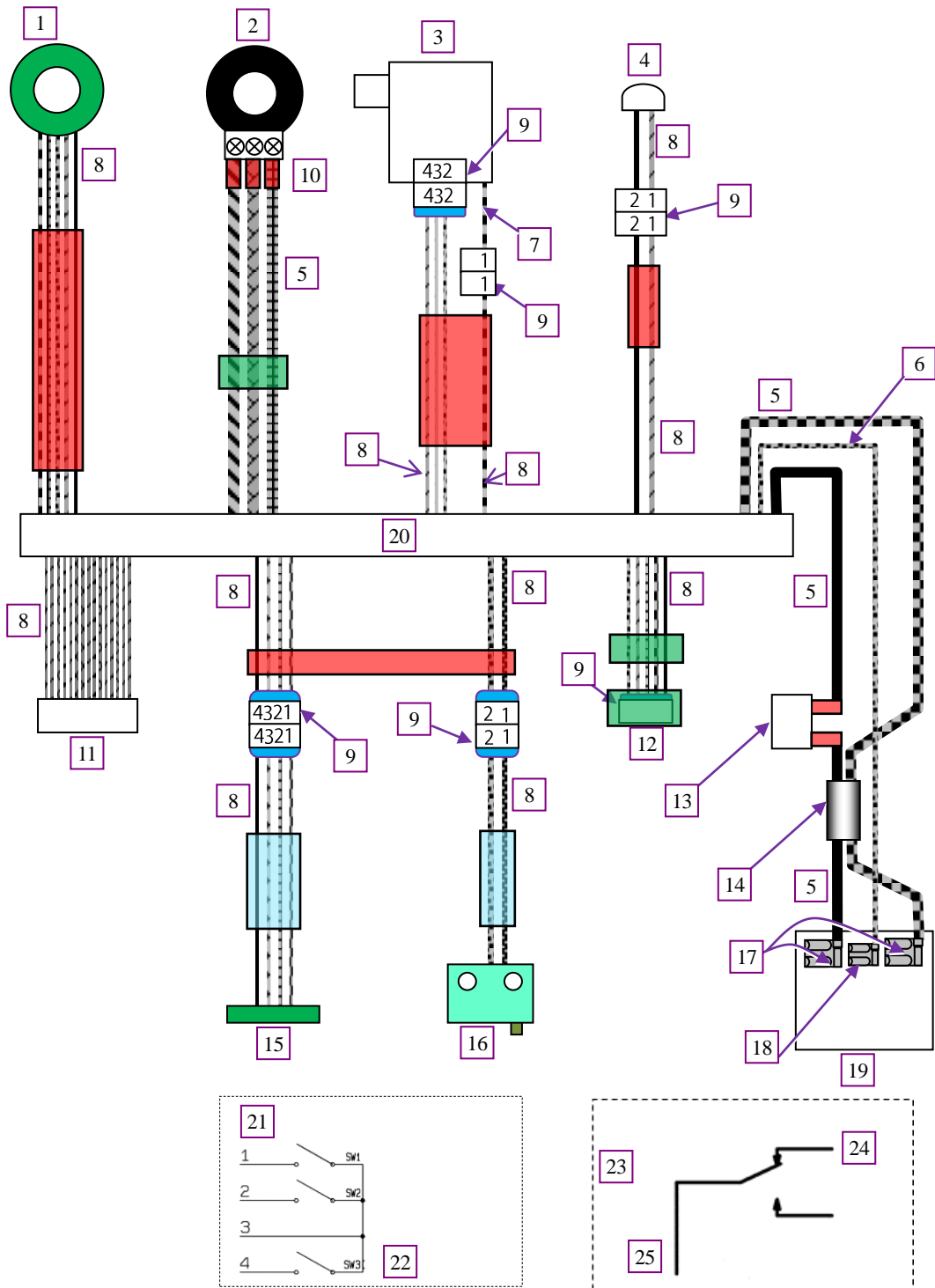
Note
If Rotor [2] is pushed into the bottom of Stator [1], Printed circuit board of Stator may be damaged. Therefore, do not force Rotor into Stator. Assemble them so that Ball bearing [3] of Rotor comes out from Printed circuit board [4].



# 7 CIRCUIT DIAGRAM

Fig. 33

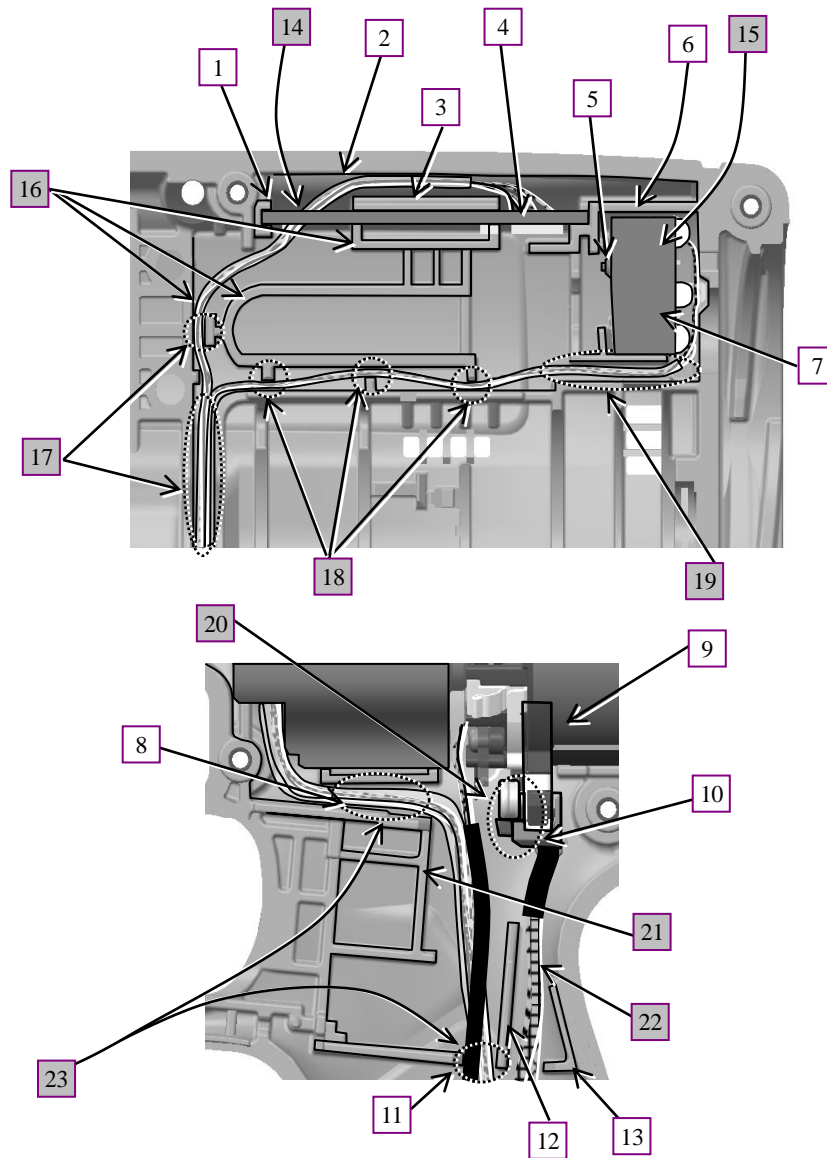
Color index of lead wires' sheath			
White		Gray	
Blue		Green	
Yellow		Black	
Red		Purple	
Orange			



1	Sensor board	14	Line filter (if used)
2	Stator	15	Hall IC circuit
3	Switch	16	Switch unit
4	LED circuit	17	Flag receptacle with lock (#250, t=0.8)
5	AWG16	18	Flag receptacle with lock (#187, t=0.8)
6	AWG22	19	Terminal
7	AWG24	20	Controller
8	AWG28	21	Main switch circuit diagram
9	Connector	22	Reversing switch
10	Terminal unit	23	Switch unit circuit diagram
11	Pulling force adjusting section (if used)	24	Yellow
12	For software writing (if used)	25	Purple
13	Fuse		

**8 WIRING DIAGRAM**  
**8-1 Housing section 1**

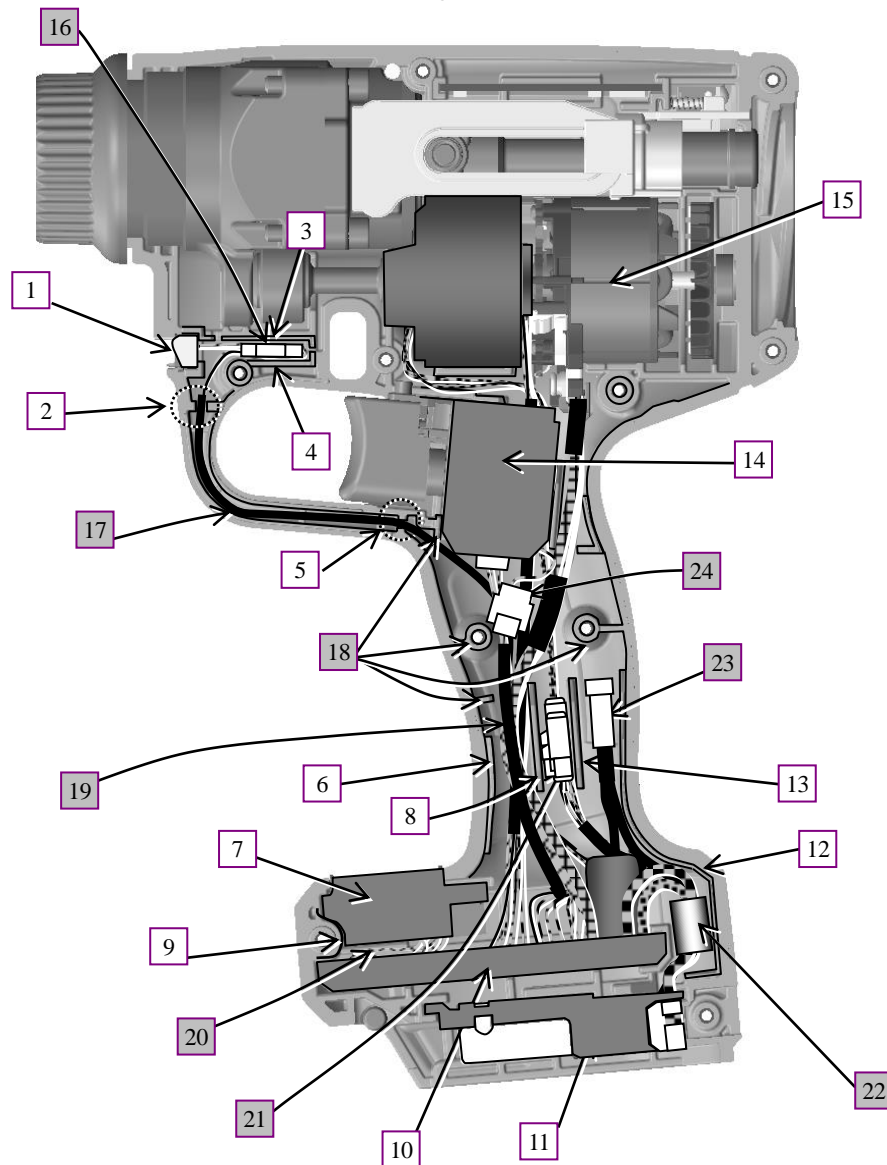
Fig. 34



1	Rib D	8	Groove A
2	Rib C	9	Stator
3	Rib B	10	Terminal unit
4	Hall IC circuit	11	Groove B
5	Projection portion	12	Rib E
6	Rib A	13	Rib F
7	Switch unit		
14	Route Lead wires of Hall IC circuit between Rib B and Rib C, Rib B and Rib D.		
15	Assemble Switch unit so that the projection of Switch unit faces to Rib A side.		
16	Be careful not to put Lead wires on these ribs.		
17	Fix Lead wires of Hall IC circuit in these grooves.		
18	Fix Lead wires of Switch unit in these grooves.		
19	Fix Lead wires of Switch unit in this groove.		
20	The following Lead wires should not be pinched between Terminal unit and Motor housing. <ul style="list-style-type: none"> <li>• Lead wires of Hall IC circuit</li> <li>• Lead wires of Switch unit</li> <li>• Lead wires of Stator with tube</li> </ul>		
21	Be careful not to put Lead wires on this rib.		
22	Route Lead wires (Blue, White, Orange) between Rib E and Rib F.		
23	Fix the following Lead wires in Groove A and Groove B. <ul style="list-style-type: none"> <li>• Lead wires of Hall IC circuit</li> <li>• Lead wires of Switch unit</li> <li>• Lead wires of Stator with tube.</li> </ul>		

## 8-2 Housing section 2

Fig. 35



1	LED circuit	9	Rib M
2	Groove C	10	Controller
3	Rib G	11	Terminal
4	Rib H	12	Rib L
5	Groove D	13	Rib K
6	Rib I	14	Switch
7	Pulling force adjusting section (if used)	15	Stator
8	Rib J		
16	Put Connector of LED circuit in the space between Rib G and Rib H.		
17	Fix Lead wires of LED circuit in Groove C and Groove D.		
18	Be careful not to put Lead wires on these bosses and ribs.		
19	Pass the following Lead wires between Rib I and Rib J. <ul style="list-style-type: none"> <li>• Lead wires of LED circuit</li> <li>• Lead wires of Switch</li> <li>• Lead wires of Stator</li> </ul>		
20	Be careful not to put Lead wires of Pulling force adjusting section (if used) on Rib M and Controller.		
21	Put Connector (2 pins and 4 pins) in the space between Rib J and Rib K.		
22	Put Line filter (if used) in the space between Rib L and Controller.		
23	Put Fuse in the space between Rib K and Rib L.		
24	Be careful not to put Connector of Switch on these boss and Switch.		

## 9 TROUBLESHOOTING

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

### 9-1 Note for Repairing

The content may vary depending on the model.

- 1 Use a full charged battery which has a star mark.
- 2 When Housing is disassembled, check the conditions of the electrical parts (Connectors, Lead wires, Switches, etc.), Rotor, Stator, Gear section, etc.
- 3 Use the following Repairing tools for diagnosing LED and Switch.

Repairing tools	Purpose
1R412	For checking whether LED lights up

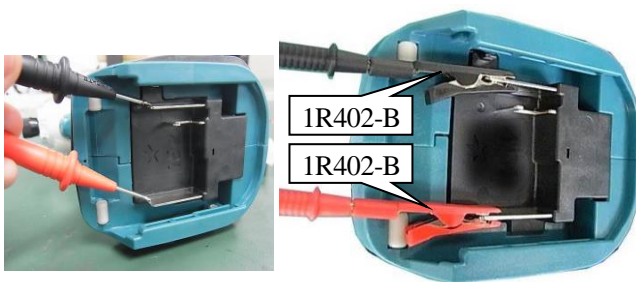
### 9-2 Test for checking the short-circuit in FET (Field Effect Transistor) of controller

Fig. 36



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

Fig. 37



- 2 Connect Black probe to the plus pole of Terminal, and Red probe to the minus pole.

- 3 Wait until the figure on Tester gets stable.
- 4 Controller is in order if Tester indicates  $1.1 \pm 0.2V$ . If Tester indicates 0V, 0.4V or 0.8V approx., Controller is broken. Replace it with a new one.

### 9-3 Flowchart for Troubleshooting

Check the items in the following flowchart in order from the top to bottom. (Description of the item is referred to CIRCUIT DIAGRAM in Fig. 33.) After corrective action, return to the start of Troubleshooting and re-check again.

