

CORDLESS REAR HANDLE SAW

DGA411/ DGA412/ DGA413/ DGA414/
DGA461/ DGA462/ DGA463/DGA464/
DGA511/ DGA512/ DGA513/ DGA514

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

Cord No.	Description	Use for
1R003	Retaining ring pliers ST-2N	Assembling / disassembling Ring spring 11
1R026	Bearing setting pipe 16-8.2	Removing Ball bearing 6201DDW
1R028	Bearing setting pipe 20-12.2	Supporting Ball bearing 6201DDW, when assembling Spindle
1R029	Bearing setting pipe 23-15.2	Supporting Spiral bevel gear 37, when assembling Spindle
1R031	Bearing setting pipe 28-20.2	Supporting Labyrinth ring, when removing Spindle Supporting Labyrinth ring, when assembling Spindle
1R032	Bearing setting plate 8.2	Assembling Ball bearing 607LLB to Rotor
1R033	Bearing setting plate 10.2	Supporting Rotor, when assembling Ball bearing 629LLB
1R038	Armature holder 32 set	Fixing Rotor, when removing / fastening M6 Hex nut
1R045	Gear extractor (large)	Separating Rotor from Gear housing cover
1R164	Ring spring setting tool A	Assembling Ball bearing 6201DDW to Bearing box.
1R212—A	Tip for retaining ring pliers	Attaching to 1R003
1R212—B	Plate set (with screws)	Attaching to 1R003
1R220	Ratchet head 9.5 (for 1R219)	Tightening M6 Hex nut
1R222	Socket adapter (for 1R219)	Tightening M6 Hex nut
1R248	Round bar for arbor 22-100	Removing Felt ring 16 from Bearing box
1R252	Round bar for arbor 30-100	Mounting Felt ring 16 to Bearing box
1R254	Torque wrench shaft 2-6N.M	Tightening M6 Hex nut
1R258	V-Block	Supporting Bearing box , when removing Spindle
1R268	Spring pin extractor M3	Removing Shoulder pin 4 from Pin cap
1R269	Bearing extractor	Removing Ball bearings 607LLB/696ZZ from Rotor
1R284	Round bar for arbor 10-50	Removing Spindle from Spiral bevel gear 37
1R291	Retaining ring S and R pliers	Removing / Mounting Retaining ring R-32 / R-26.

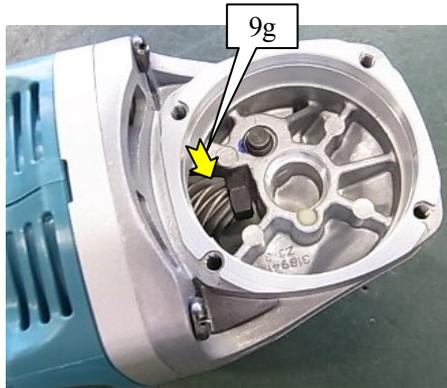
4 TIGHTENING TORQUE SPECIFICATIONS

Parts to fasten	Tightening torque[N·m]	Fastener	Q'ty
Rotor ⇔ M6 Hex nut	4.9~5.9	M6 Hex nut	1

5 LUBRICANT AND ADHESIVE APPLICATION

	Item of Lubricant	Amount of Grease	
↑	MAKITA Grease R No.00	9g to Gear room	a little amount to O ring 26

Fig. 1



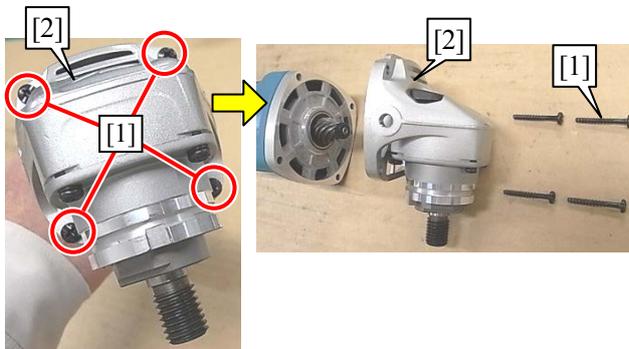
6 REPAIR

Caution: Battery have to be removed, before repairing for your safety.

6-1 Rotor , Ball bearings 629LLB / 607LLB, Spiral bevel gear 10

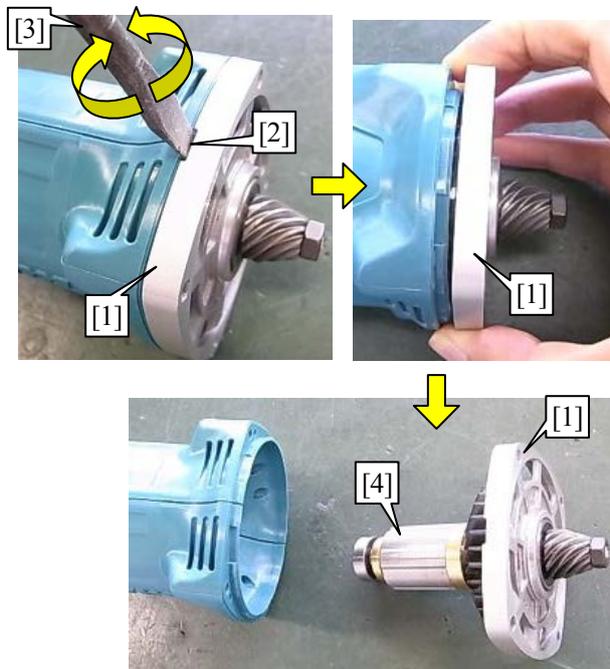
6-1-1 Disassembling

Fig. 2



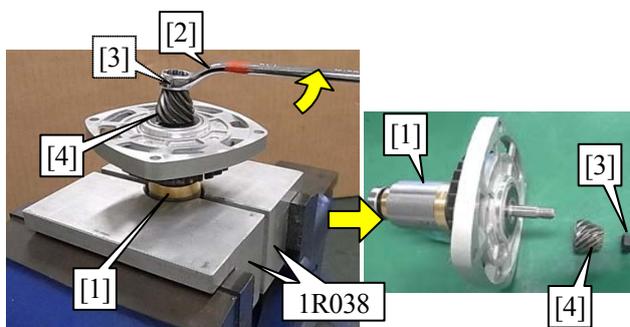
- 1 Removing 4x30 Tapping screw [1] (4 pcs.), separate Gear housing [2] from Gear housing cover.

Fig. 3



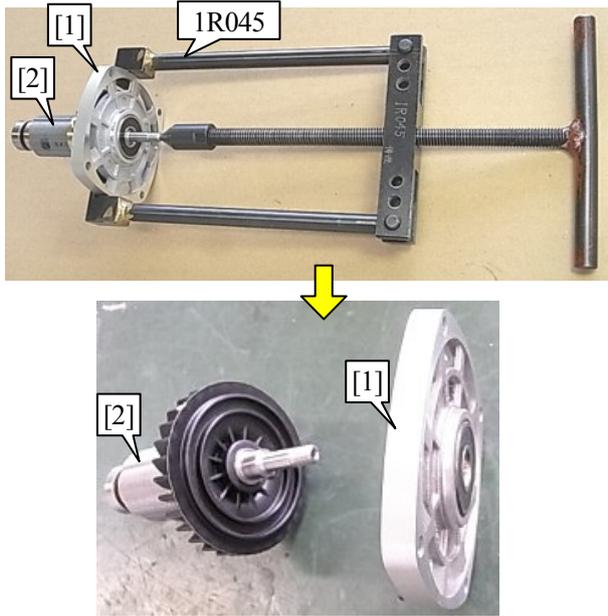
- 2 Apply Slotted head screwdriver [3] to the notch [2] of Gear housing cover [1]. And twist the screwdriver [3]. So, Gap arise between Gear housing cover [1] and Motor housing.
- 3 Pull off Gear housing cover [1]. Now, Rotor [4] comes out together with Gear housing cover [1].

Fig. 4



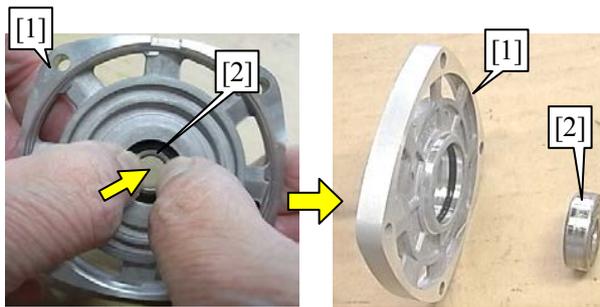
- 4 Fix Rotor [1] with 1R038 and Vise. Applying Eye wrench 10 [2] to M6 Hex nut [3], turn Eye wrench 10 [2] counter clockwise.
- 5 Now, Spiral bevel gear 10 is removed from Rotor [1].

Fig. 5



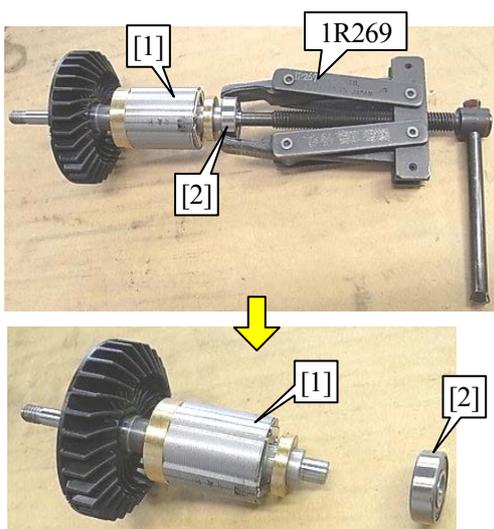
- 6 Applying 1R045 to Gear housing cover [1] and shaft of Rotor [2], turn the handle.
- 7 Now, Rotor [2] is separated from Gear housing cover[1].

Fig. 6



- 8 Ball bearing 629LLB [2] can be removed from Gear housing cover [1], by pushing it with finger.

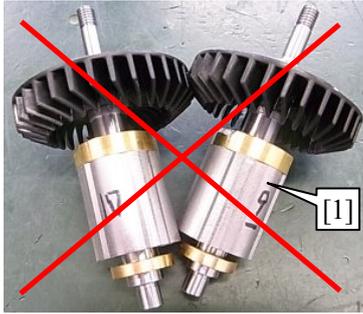
Fig. 7



- 9 Applying 1R269 to Ball bearing 607LLB and shaft of Rotor [1], turn handle. Ball bearing 607LLB [2] is removed from Rotor [1].

6-1-2 Assembling

Fig. 8

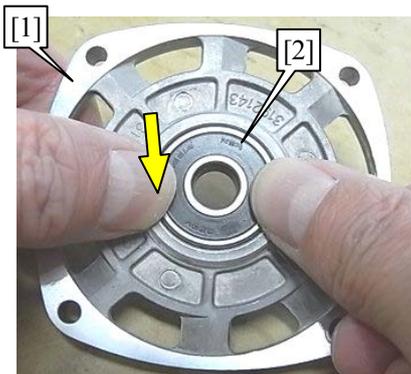


- 1 Do not put Rotors [1] contacting each other, as shown in photograph to **left**. Otherwise, fall of quality arises on Rotor [1], because of the following reasons.

Caution

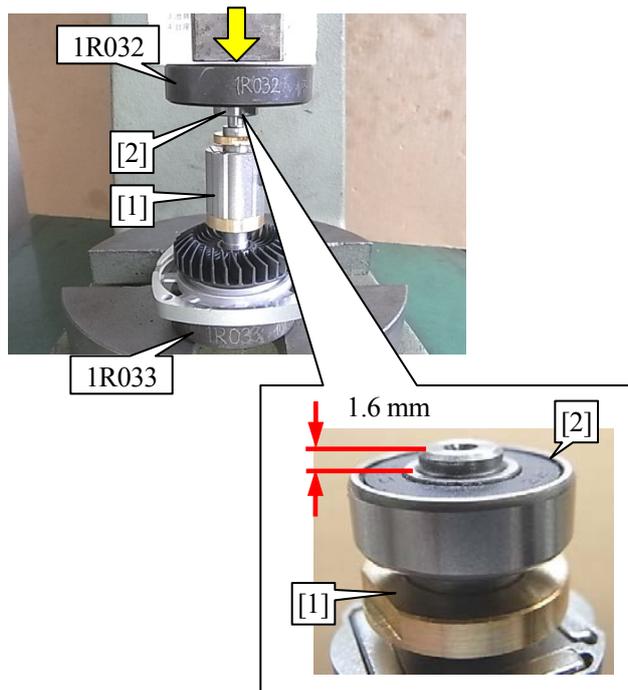
- Decreasing of magnet force each other from the contact portion.
- Rotors are violently dragged each other by incredible strong magnetic force. Consequently, damages on Fan, body of Rotor and crack of internal portion may arise
- Iron chips and dust can shift easily to the another Rotor by strong magnetic force. And the machine to which such Rotor is mounted may have trouble on Stator and other parts.

Fig. 9



- 2 Assemble Ball bearing 629LLB [2], by pushing into Bearing box portion of Gear housing cover [1]

Fig. 10

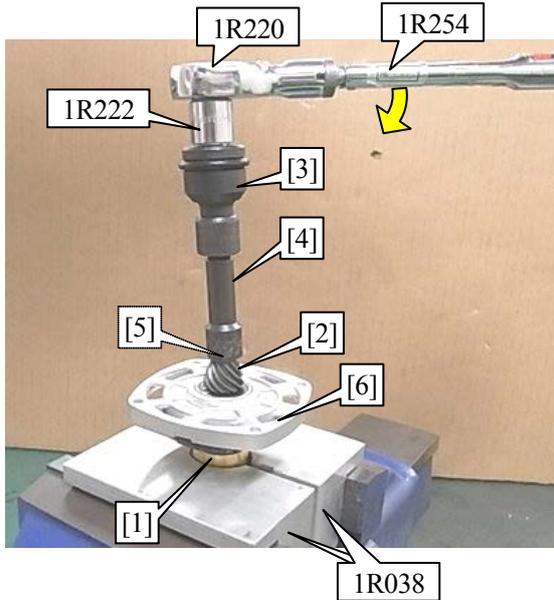


- 3 Put Gear housing cover on 1R033, aligning the Ball bearing 629LLB in Fig. 9 to center hole of 1R033. And stand Rotor [1] on Gear housing cover inserting into the Ball bearing 629LLB.
- 4 And then setting Ball bearing 607LLB to shaft of Rotor [1], put 1R032 on the Ball bearing 607LLB, and press with Arbor press, until it stops.

Tips

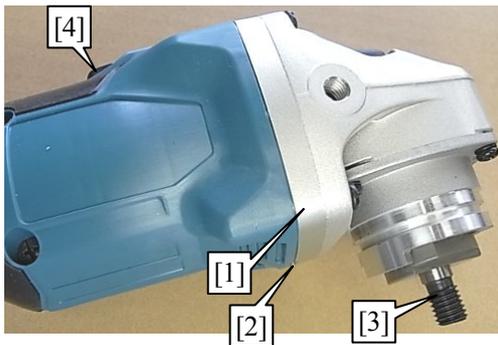
In case of precisely assembled Ball bearing 607LLB, shaft of Rotor [1] protrudes by 1.6 mm from Ball bearing 607LLB.

Fig. 11



- 5 Fixing Rotor with 1R038 and vise, set Spiral bevel gear 10 [2] to Rotor, passing shaft of Rotor [1] through Spiral bevel gear 10 [2].
- 6 Pre-setting fastening torque of 1R254 to 4.9~5.9N.m, attach 1R220, 1R222, Bit adapter assembly and Socket bit 10 to 1R254.
- 7 And then turn M6 Hex nut [5] with the above 1R254 clockwise until it stops. Now, assemble of Rotor section has been finished.

Fig. 12



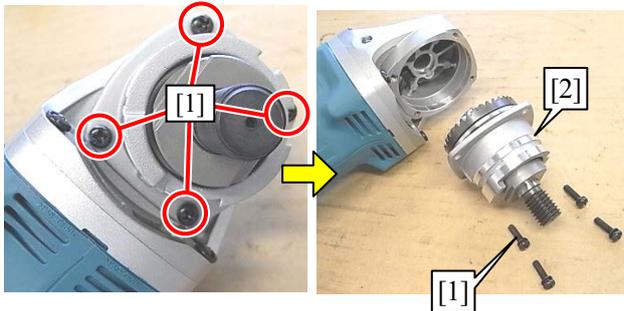
- 8 Mount Gear housing cover [1] together with Rotor to Motor housing, facing the notch [2] portion to the opposite side to Switch lever [4].
- 9 Mount Gear housing facing Spindle [3] to the opposite side to Switch lever [4].

6-2 Spiral bevel gear 37, Bearing box section

6-2-1 Disassembling

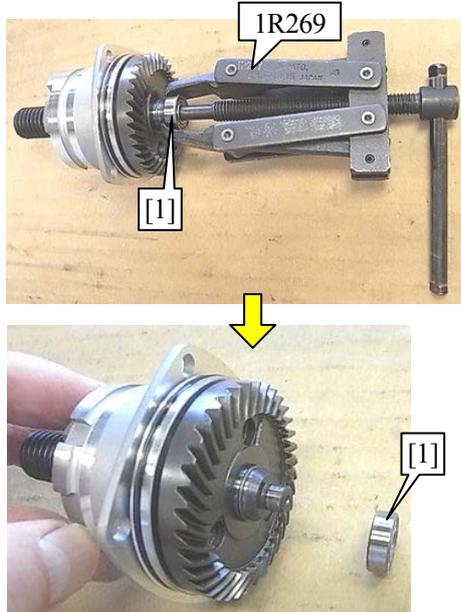
※ No need to disassemble Motor section to repair Spiral bevel gear 37, Bearing box section

Fig. 13



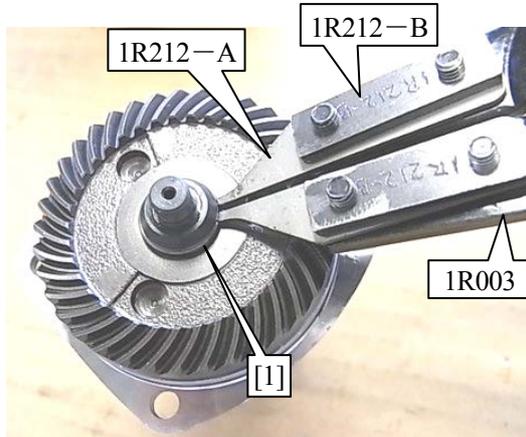
- 1 Unscrewing four M4 x 14 Pan head screws[1] (4 pcs) , separate Bearing box from Gear housing.

Fig. 14



- 2 Applying 1R269 to Ball bearing 696ZZ [1] and Spindle], turn Handle of 1R269.
- 3 Now, Ball bearing 696ZZ [1] is removed from spindle.

Fig. 15



- 4 Attaching 1R212-B and 1R212-A to 1R003, remove Ring spring 11[1] with the 1R003.

6-2-1 Disassembling

< Note >

These series models can be assorted in two types viewing from “electric brake”. And the parts assembled to Bearing box and Spindle is different from each other. See the list below.

products with electric brake		products without electric brake	
Model No.	used parts in Bearing box and Spindle	Model No.	used parts in Bearing box and Spindle
DGA413	Lead flange to Spindle	DGA411	Labyrinth ring to Spindle
DGA414		DGA412	
DGA463	Felt ring 16 under Ball bearing 6201DDW	DGA461	Flat washer 12 under Ball bearing 6201DDW
DGA464		DGA462	
DGA513		DGA511	
DGA514		DGA512	

6-2-1-1 With electric brake

Available for DGA413, DGA414, DGA463, DGA464, DGA513, DGA514

<p style="text-align: center;">Fig. 16</p> <p style="text-align: center;">Wider than the width of Lead flange [47]</p>	<ol style="list-style-type: none"> 1. Set Bearing box [23] on 1R258. See left illustration. <p>< Note ></p> <ul style="list-style-type: none"> * Set 1R258, keeping so enough distance, that Lead flange [47] do not touch any side of 1R258. * Do not put protruded portion of Bearing box [23], circled with red dot line, on 1R258. <ol style="list-style-type: none"> 2. Putting 1R032 on Spiral bevel gear 37 [18], give shock to 1R032. So, Spindle [26] has been shifted to the position where its press fit is loosened.
<p style="text-align: center;">Fig. 17</p>	<ol style="list-style-type: none"> 3. Applying 1R284 to the Spindle [26], push the 1R284 with Arbor press. 4. Spindle [26] is removed together with Lead flange [47], and Spiral bevel gear [18] is removed from Bearing box [23].
<p style="text-align: center;">Fig. 18</p>	<ol style="list-style-type: none"> 5. Using 1R291, remove Retaining ring R-32.

6-2-1-1 With electric brake

<p>Fig. 19</p>	<p>6. Remove Ball bearing 6201DDW [20], pushing it toward Spiral bevel gear side using 1R026.</p> <p style="text-align: center;">< Tips ></p> <p>Ball bearing 6201DDW has been broken in the step of Fig.16.</p>
<p>Fig. 20</p>	<p>7. Remove Felt ring 16 [21], pushing it toward Spiral bevel gear side using 1R248.</p>
<p>Fig. 21</p>	<p>8. Removing Retaining ring R-26 [25] with 1R291, separate Lead flange [47] from Spindle [26].</p>

6-2-1-2 Without electric brake

Available for DGA411, DGA412, DGA461, DGA462 DGA511, DGA512

<p style="text-align: center;">Fig. 22</p>	<ol style="list-style-type: none"> 1. Put Bearing box section on 1R031, aligning Labyrinth ring [25] to the edge of 1R031. 2. Put 1R032 on Spiral bevel gear 37 [18]. And give shock to the 1R032. So, Spindle [26] has been shifted to the position where its press fit is loosened.
<p style="text-align: center;">Fig. 23</p>	<ol style="list-style-type: none"> 3. Applying 1R284 to the Spindle [26], push the 1R284 with Arbor press. 4. Spindle [26] is removed, and Labyrinth ring [25] and Spiral bevel gear 37 [18] are separated from Bearing box [23].
<p style="text-align: center;">Fig. 24</p>	<ol style="list-style-type: none"> 5. Using 1R291, remove Retaining ring R-32.
<p style="text-align: center;">Fig. 25</p>	<ol style="list-style-type: none"> 6. Applying 1R026 to Flat washer 12 [21], push with Arbor press toward Spiral bevel gear side. 7. Now, Ball bearing 6201DDW [20] and Flat washer 12 [21] are removed. <div style="border: 1px solid black; background-color: #e0e0e0; padding: 5px; text-align: center; margin-top: 10px;"> <p>< Tips ></p> <p>Ball bearing 6201DDW has been broken in the step of Fig. 22.</p> </div>

6-2-2 Assembling

6-2-2-1 With electric brake

Available for DGA413, DGA414, DGA463, DGA464, DGA513, DGA514

<p>Fig. 26</p>	<p>1. Insert Spindle [26] into Lead flange [47] and fix the Spindle to Lead flange [47] with Retaining ring R-26 [25].</p>
<p>Fig. 27</p>	<p>2. Assemble Felt ring 16 [21], by pushing with 1R252 until it stops.</p>
<p>Fig. 28</p>	<div style="border: 1px solid black; background-color: #e0e0e0; padding: 5px; text-align: center;"> <p>< Tips ></p> </div> <p>Fresh Ball bearing 6201DDW has to be assembled.</p> <p>3. Applying small diameter end of 1R164, circled with red dot line, to Ball bearing 6201DDW [20], press with Arbor press.</p>
<p>Fig. 29</p>	<p>4. Secure Ball bearing 6201DDW with Retaining ring R-32 [19], using 1R291.</p>

6-2-2-1 With electric brake

<p>Fig. 30</p>	<ol style="list-style-type: none"> Put Bearing box section on 1R028, aligning the Ball bearing 6201DDW to the edge of 1R028. And assemble Spindle [26] by pressing with Arbor press. Put Spiral bevel gear 37 [18] on 1R029, press Spindle [26] with Arbor press. Now, Spiral bevel gear 37 [18] has been assembled to Spindle [26].
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6-2-2-2 Without electric brake

Available for DGA411, DGA412, DGA461, DGA462, DGA511, DGA512

<p>Fig. 31</p>	<ol style="list-style-type: none"> Pass Spindle [6] through Labyrinth ring [25]. Put Bearing box section on 1R031, aligning the Labyrinth ring [25] to the edge of 1R031. And assemble Spindle [26] by pressing with Arbor press.
<p>Fig. 32</p>	<ol style="list-style-type: none"> Put Flat washer 12 [21] in Bearing box. <div style="border: 1px solid black; background-color: #e0e0e0; padding: 5px; text-align: center;"> <p>< Tips ></p> <p>Fresh Ball bearing 6201DDW has to be assembled.</p> </div> <ol style="list-style-type: none"> Press Ball bearing 6201DDW [20] with Arbor press, applying small diameter side of 1R164, circled with red dot line, to the Ball bearing.
<p>Fig. 33</p>	<ol style="list-style-type: none"> Assemble Retaining ring R-32 with 1R291.

6-2-2-2 Without electric brake

<p style="text-align: center;">Fig. 34</p>	<p>6. Put Bearing box section on 1R028, aligning the Ball bearing 6201DDW to the edge of 1R028. And assemble Spindle [26] by pressing with Arbor press.</p> <p>7. Putting Spiral bevel gear 37 [18] on 1R029, press Spindle [26] with Arbor press.</p>
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The following steps are available for all of this series models.

<p style="text-align: center;">Fig. 35</p>	<ol style="list-style-type: none">1. Attach 1R212-A and 1R212-B to 1R003.2. Assemble Ring spring 11 [17] using the 1R003.
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<p style="text-align: center;">Fig. 36</p>	<ol style="list-style-type: none">3. Mount Ball bearing 696ZZ [16], by pressing with Arbor press.
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6-3 Switch knob, Switch lever

The following steps are available for all of this series models.

<p>Fig. 41</p>	<ol style="list-style-type: none">1. Assemble Torsion spring 2 [37] to Lever [36].2. Assemble Pin 2 [38], by passing it through Lever [36].
<p>Fig. 42</p>	<ol style="list-style-type: none">3. Insert Lever section into the loop formed hole of Switch lever [35].4. Fit the arm of Lever to the groove of Switch lever [35], while turning the Lever section so that its protrusion [2] faces to Switch knob assemble side.
<p>Fig. 43</p>	<ol style="list-style-type: none">5. Assemble Switch knob [34] to Switch lever [35].

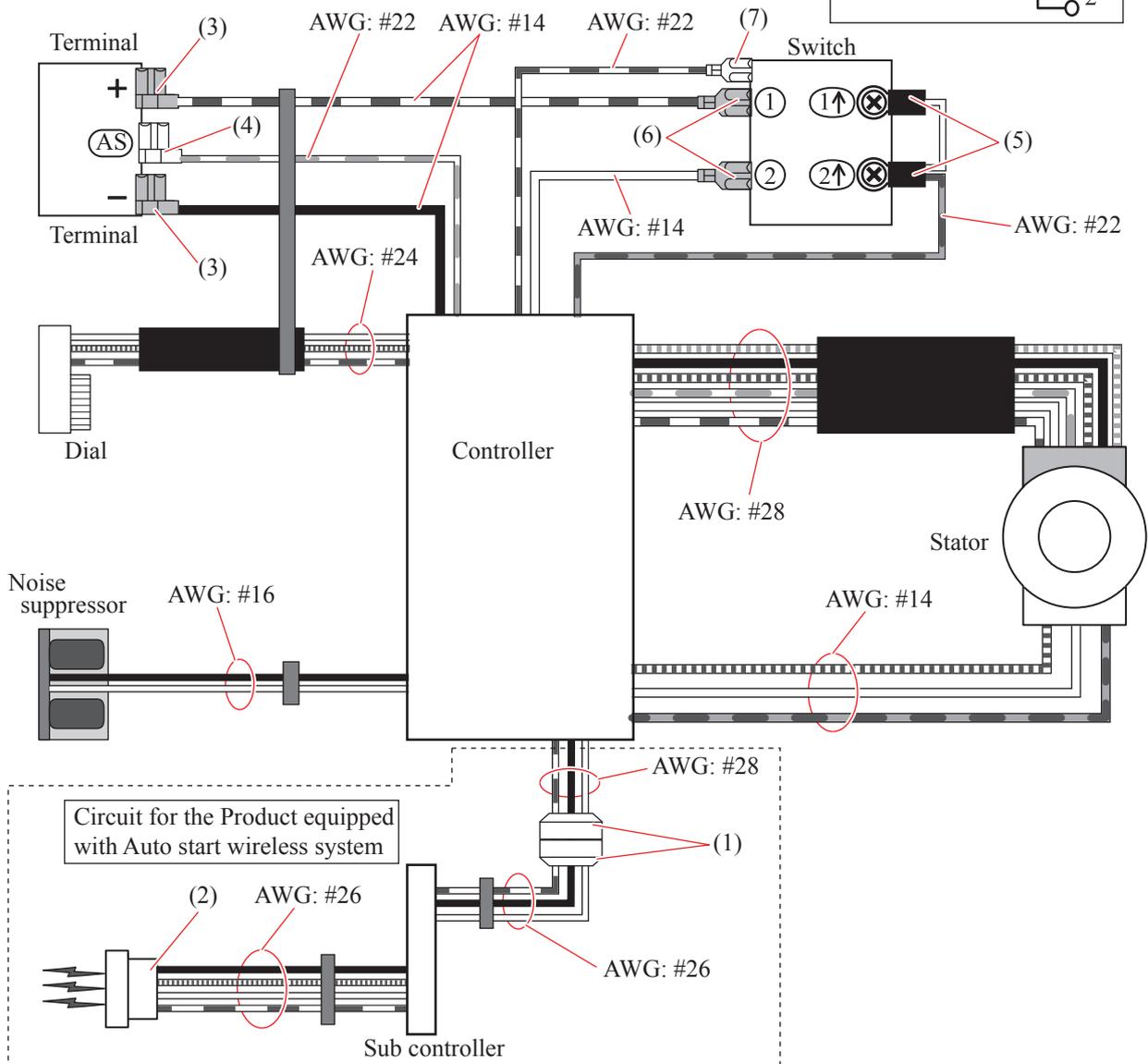
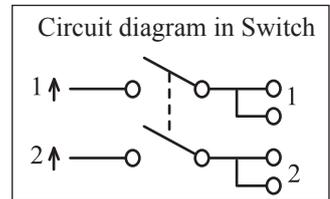
7. CIRCUIT DIAGRAM

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

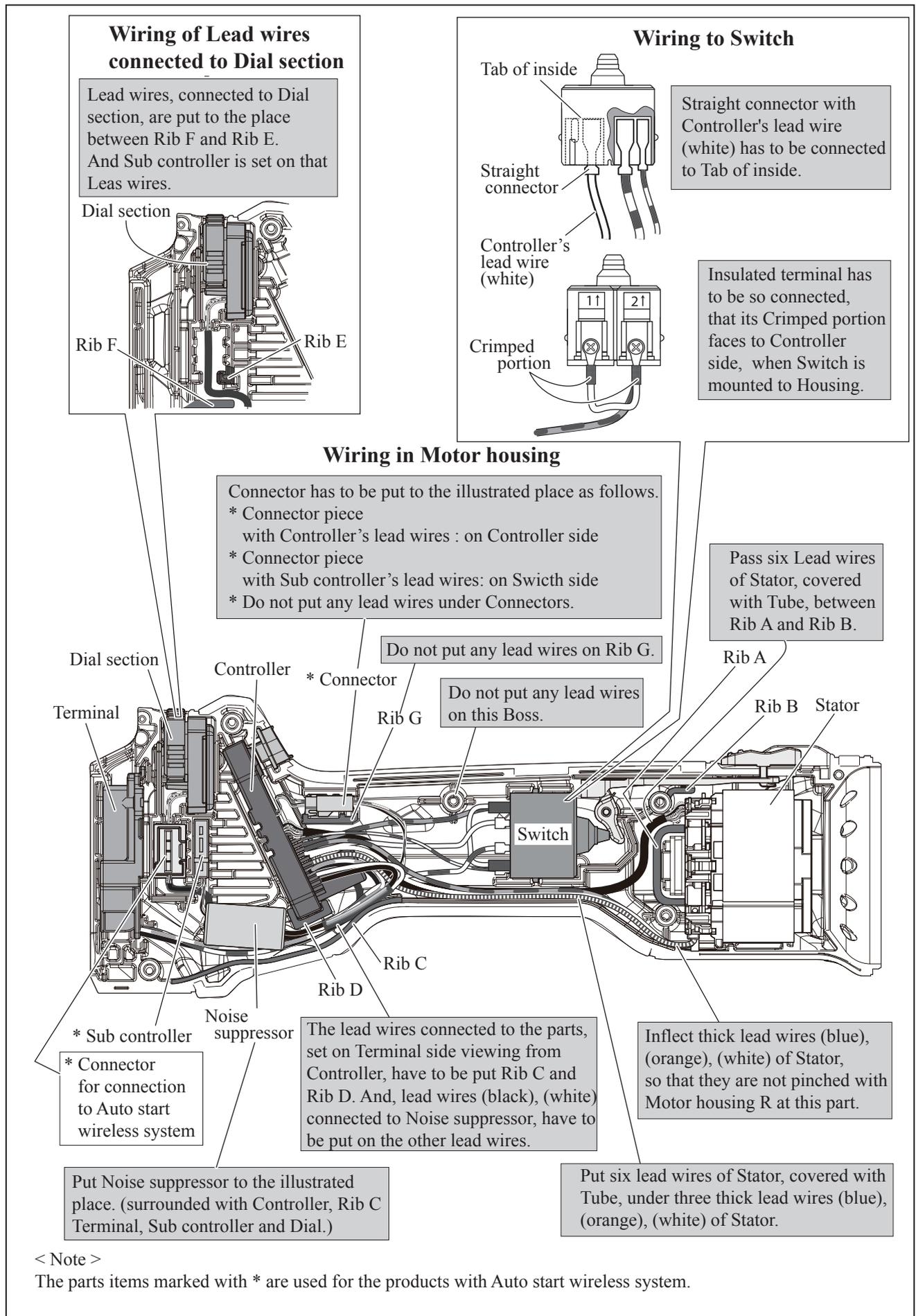
Item No.	Symbol of electrical parts	Descriptions.
(1)		Connector
(2)		Connector for connection to Auto start wireless system
(3)		Flag connector with Lock # 250 t = 0.8
(4)		Flag connector with Lock # 187 t = 0.8
(5)		Insulated terminal (M3.5 Screw)
(6)		Straight connector with Lock # 187 t = 0.8
(7)		Straight connector without Lock #110 t = 0.8

< Note >

AWG: American Wire Gage



8. WIRING DIAGRAM



9. TROUBLESHOOTING

9-1 Test for short-circuit in FET (Field Effect Transistor) of Controller

Trouble on Controller can be checked with Tester as follows.

(1) Set Tester to Diode mode.

(2) Removing Battery from the machine, lock Switch trigger to ON position.

(3) Contact black probe with (+) Terminal. And red probe, with (-) Terminal. Wait, until the Tester designates stable figure.

< Note >
Connect Probes as follows, when checking Controller with 1R402-A.
* Red probe to (-) pole of terminal
* Black probe to (+) pole of terminal
In case of reverse connection, 1R402-A can not indicate the correct figure.

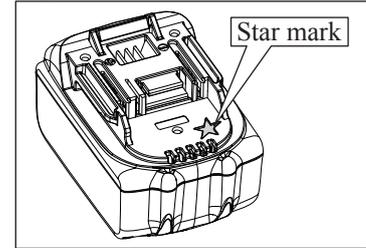
It is recommended to attach 1R402-B to the probe of 1R402-A for easy clipping Terminals.

(4) Controller is **in order**, if the Tester designates **0.8V ± 0.1V**.
And if the figure is designated, deviating from the above, Field effect transistor built in Controller, has any trouble, and **the Controller has to be replaced** together with Stator.

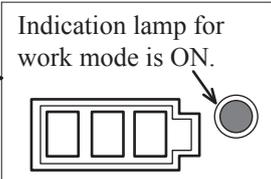
9-2 9-2 Flowchart of Troubleshooting

- (1) Use the full charged battery which has the star mark. (Fig. T-1)
- (2) Check conditions of the mechanical section, Rotor to Stator rub, Connectors, Lead wires, etc. , when Motor housing set are disassembled.
- (3) Do the running test by repeating 10 times while operating speed control dial in order to reproduce symptoms easily.

Fig. T-1

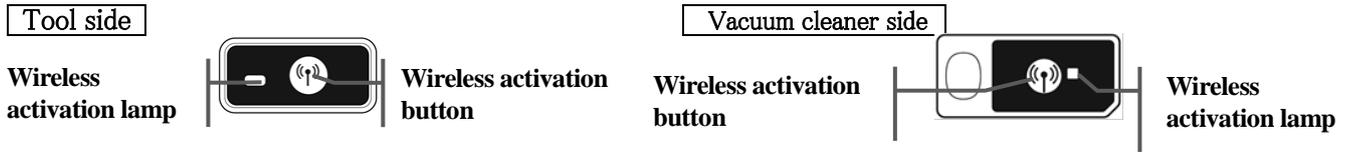


Check the items from top of the following list. (Description of the item is referred to “ 7. Circuit diagram”.)
Make re-check, after corrective action, returning to the start of Trouble shooting.

Symptom	Cause	Corrective action
The Tester designate $0.8V \pm 0.1V$? Got to Yes, if Tester is not prepared.	No Breakage of Controller	Replace Controller.
Indication lamp for work mode is ON. 	Yes Mechanical trouble	Check the mechanical section.
	Yes Breakage of Controller	Replace Stator complete.
All of three Battery fuel lamps are ON.	No Breakage of Controller	Replace Stator complete.
	Yes Speed can be changed variably corresponding to operation of Dial.	
Pull the Switch trigger repeating 10 times in order to make running test. In case of running inconstantly, go to “No”.	No Breakage of Controller	Replace Stator complete.
	Yes The machine does not have any trouble.	
Battery fuel lamp is ON.	No Incomplete connection of Connectors	Check the connected condition of Connectors.
	No Disconnection of Lead wires	Check the Lead wires, or replace the Lead wires.
	No Switch is broken.	Replace Switch.
< Note > Controller is a component parts of Stator complete. In case of breakage of Controller, Stator has to be replaced together with Controller.	Yes Trouble in Terminal	Check the Terminal, or replace with fresh one
	Yes Breakage of Controller	Replace Stator complete.
Rotor to Stator Rub is recognized.	No Incomplete connection of Connectors	Check the connected condition of Connectors.
	No Disconnection of Lead wires	Check the Lead wires, or replace the Lead wires.
	Yes Breakage of Controller	Replace Stator complete.
	Yes Rotor is broken.	Replace Rotor.
< Note > Do not replace Controller singly. Controller is a component parts of Stator complete.	Yes Stator is broken.	Replace Stator complete.
	Yes Breakage of Controller	Replace Stator complete.
If the machine shows same symptom, in spite of the above corrective actions	Breakage of Controller	Replace Stator complete.

9-3 Wireless activation (For DGA412/ DGA462/ DGA512/ DGA414/ DGA464/ DGA514)

When checking the wireless activation, be sure to prepare an our wireless supported tool (Circular saw, etc.).
Check Step 1 (9-3-1) to Step 3 (9-3-3) in order and if some troubles happen, refer to 9-3-4.



9-3-1 Step1: Preparation for Wireless activation

Supported tool
Install battery/batteries. Wireless activation lamp lights up in red, and then the lamp turns off.

Push the wireless activation button briefly. And then the wireless activation lamp blinks in blue.

Vacuum cleaner
Install battery/batteries or plug in the machine

Set the stand-by switch to "AUTO"

The wireless activation lamp lights in red and then blinks in blue.

9-3-2 Step2: Tool registration

Supported tool
Press the wireless activation button for some seconds, and then the wireless activation lamp blinks in green.

After the wireless activation lamp starts blinking in green, release your finger.

Vacuum cleaner
Press the wireless activation button for some seconds, and then the wireless activation lamp blinks in green.

After the wireless activation lamp starts blinking in green, release your finger.



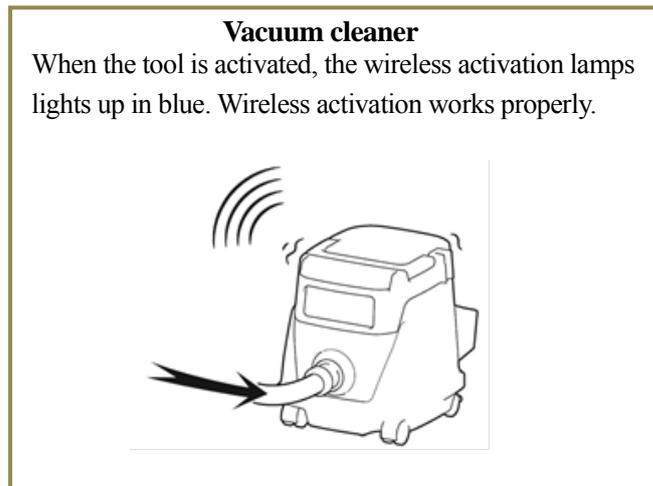
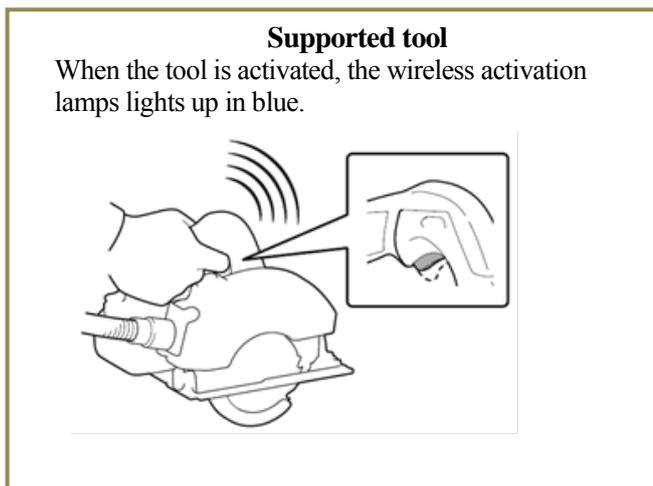
If the cleaner and the tool are linked successfully, the wireless activation lamps will light up in green for 2 seconds and start blinking in blue.

Registration has been completed.

If the wireless activation lamp does not light up in green, restart from Step 1 (9-3-1). If all else fails, go to 9-3-4.

9-3-3 Step3 : Checking wireless activation

The tool and cleaner should be separated about 5m each other.



9-3-4 Check target in trouble

Supported tool

Step	Defective parts	Corrective action
1, 2, 3	Wireless unit	check, replace
1, 3	Connector connection failure	check, clean
1, 3	Sub controller	check, replace
1, 3	Controller	check, replace

Vacuum cleaner

Step	Defective parts	Corrective action
1	Power switch	check, replace
1, 2, 3	Wireless unit complete	check, replace
1, 3	Controller	check, replace