



1. REPAIR GUIDE

Be sure to remove the batteries from the main body before servicing. Inadvertent triggering of the switch with the battery connected will result in a danger of accidental turning of the motor.

1-1. Precautions in Disassembly and Reassembly

The **[Bold]** numbers in the descriptions below correspond to the item numbers in the parts list and exploded assembly diagram.

1-1-1. Disassembly

(1) Remove the Drill Chuck **[2]**. (See Fig. 6)

- (a) Slide the Drill Chuck **[2]** Sleeve to FREE and turn it counterclockwise (when viewed in front) to fully open the jaws of the Drill Chuck **[2]**.

Turn the Special Screws M6 x 23 **[1]** clockwise and remove them. Take care as they are left-hand threaded.

- (b) Fit the Hexagonal Bar Wrench for M10 into the Drill Chuck **[2]** as indicated in Fig. 6 and remove it by turning counterclockwise. If it is difficult to loosen, use a pipe or other tool.

(Note) Do not loosen by tapping with a hammer or the like.

Carry out operations (a) through (b) with the driver unit clamped in the stock vice. It is recommended to fit a piece of cloth between the driver unit and the vice to protect the Housing **[31]** from scratching.

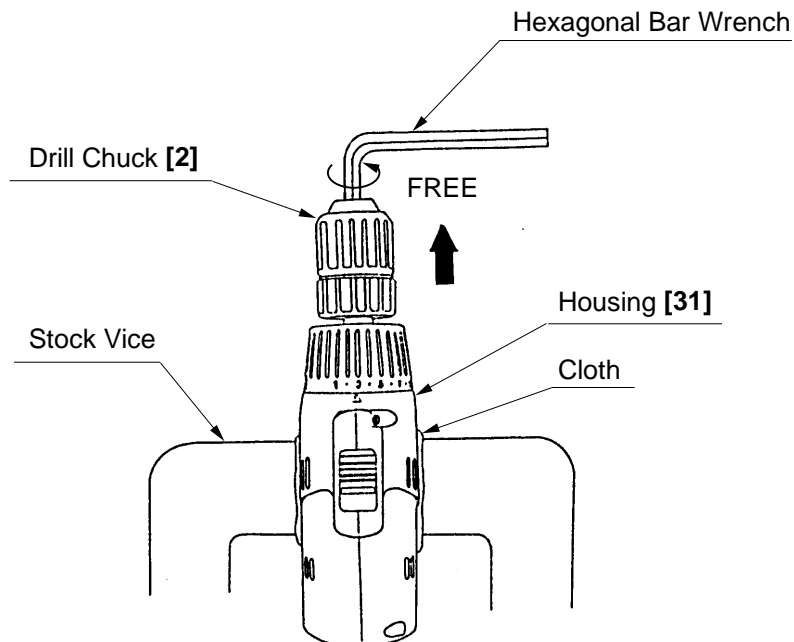


Fig. 6

- (c) Align the number "1" at the Cap **[4]** with the triangle mark at the Housings (A) and (B) **[31]**.

(2) Removing Housing (B) [31].

Remove the seven Tapping Screws D3 x 16 [27] secured to the driver unit. Gently open Housings (A) and (B) [31] while holding their battery loading sections.

(3) With Housing (B) [31] removed, all the internal parts, assembled or separate, can be taken out as they are.

(a) Lift the entire content from Housing (A) [31] while holding the Motor [26] and Cap [4].

(b) Remove the Cap [4] and the Click Spring [8] from the Front Case [9].

(Note) Take care not to remove the Nut [5] from the Front Case [9].

(c) Turn the Motor [26] until a click sound is heard on the left side when viewed in the rear and remove it from the Rear Case [17].

(d) Remove the Shift Arm [37] from the Rear Case [17] and remove the Shift Knob [38] from the Shift Arm [37].

(e) Remove the four screws D3 x 12 [18] connecting the Front Case [9] and Rear Case [17].

(f) Remove the Washer (A) [16], Ring Gear [13], Planet Gear (C) [15], Carrier [14], Needle Roller (C) [10], Lock Ring [12], and Steel Ball [11] in sequence from the Front Case [9]. Exercise care not to lose the six Needle Rollers (C) [10] and the twelve Steel Balls [11].

(4) Removing the Spring [6] and Washer (D) [7]

Since the Nut [5] is screwed into the Front Case [9], remove the Nut [5] by turning counterclockwise. With the Nut [5] removed, the Spring [6] and Washer (D) [7] can be removed from the Front Case [9].

(Note) Avoid disassembling the Front Case [9].

(5) Disassembly of the power supply unit

(Note) Do not disconnect the three FET internal wires soldered to the DC Speed Control Switch [34].

Disassembly of the Motor [26], DC Speed Control Switch [34], Motor Spacer [25] and Fin [42] removed in step (3) can be carried out in the following procedure.

Disconnect the Internal Wires [33] and [36] of Motor [26] with a soldering iron.

With one Bind Screw M3 x 7 [41] removed, the FET (Field Effect Transistor) of DC Speed Control Switch [34] and the Fin [42] can be taken apart.

Remove the two Machine Screws M4 x 6 [29] and take the Motor [26] and Motor Spacer [25] apart.

When disconnecting the Internal Wires [33] and [36] of Motor [26] from the DC Speed Control Switch [34], be sure to remove the two Machine Screws M3 x 5 [32] securing the flag-shaped terminal. (See Fig. 7)

1-1-2. Reassembly

Reassembly can generally be carried out as the reverse of the disassembly procedure, with some items to be noted as follows.

(1) Assembly of the power supply unit

(a) Be sure to perform wiring connection as indicated in the wiring diagram. (Fig. 7)

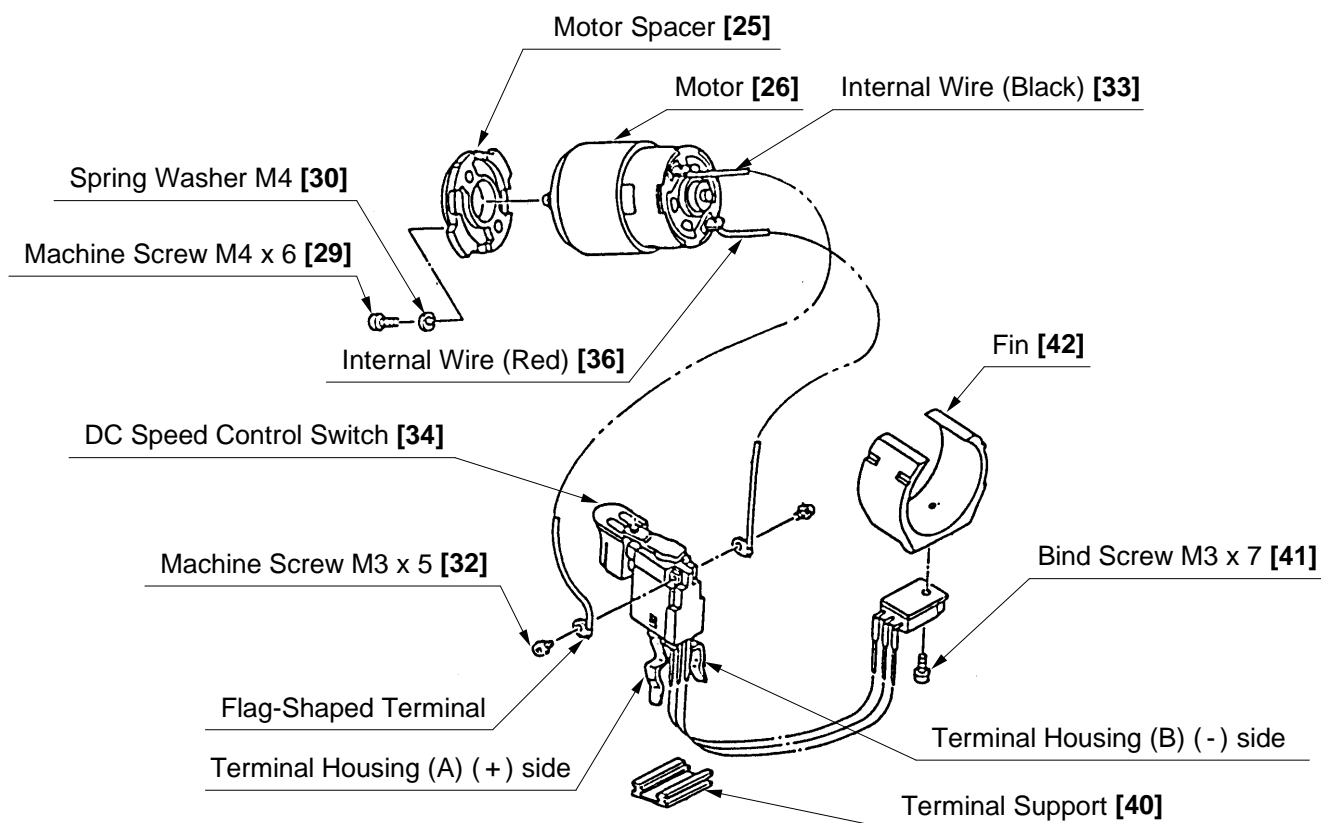


Fig. 7

(Note) Do not deform the bendable legs of the FET attached to the DC Speed Control Switch [34].

- (b) Pay attention to the polarity of the Motor [26] when soldering the Internal Wires [33] and [36] to the Motor [26]. The projected side of the Motor [26] is positive. (Fig. 8)

(Note) When installing the Motor Spacer [25] to the Motor [26], align the positive terminal of the Motor [26] with the marking on the Motor Spacer [25] and tighten with the Machine Screw M4 x 6 [29] and the Spring Washer 4 [30].

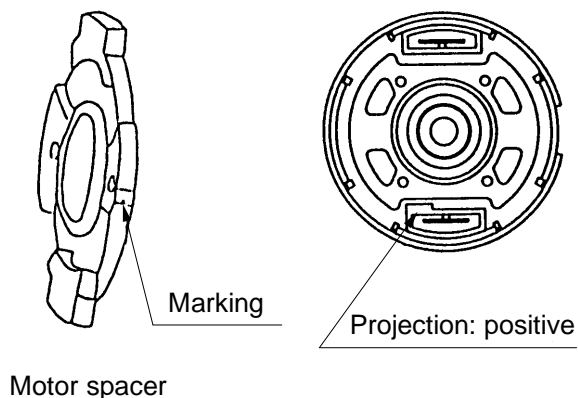


Fig. 8

- (c) Apply grease (Hitachi motor grease No. 29) to the pinion pressed into the Motor [26].

(2) Reassembly of the clutch unit

- (a) Install the Washer (D) [7] and the Spring [6] into the Front Case [9]. (See Fig. 9)

When installing Washer (D) [7] into the Front Case [9], align the notch of Washer (D) [7] with the projection on the Front Case [9].

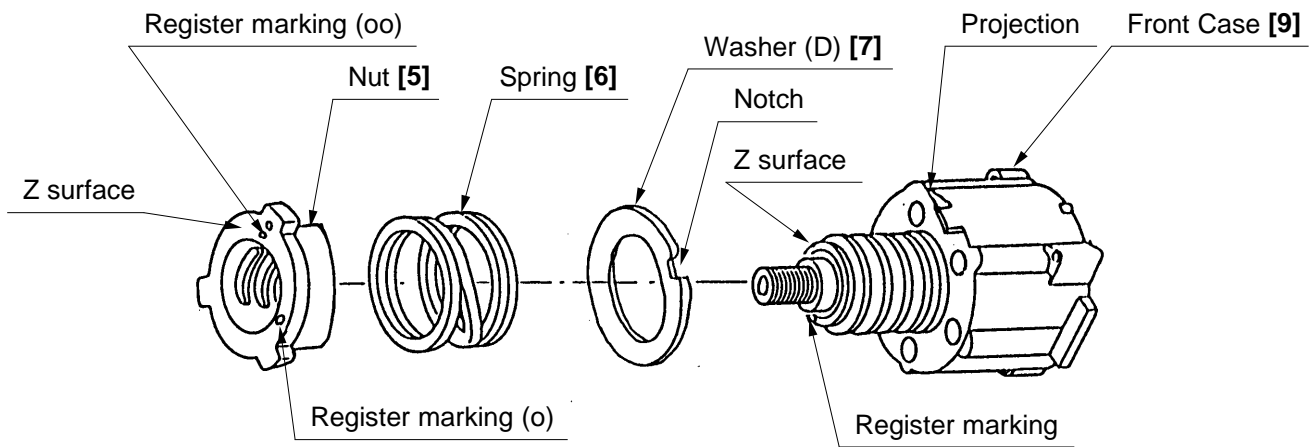


Fig. 9

- (b) Screw the Nut [5] into the Front Case [9]. (See Fig. 10)

Align the register marking (o) at the Nut [5] with the register marking on the Front Case [9] and start screwing on the Nut. Turn the Nut [5] clockwise by about 1-1/4 turn and screw it in until the register marking (oo) at Nut [5] is brought into alignment with the register marking at the Front Case [9].

Make sure that the Z surfaces of Nut [5] and Front Case [9] are generally flush.

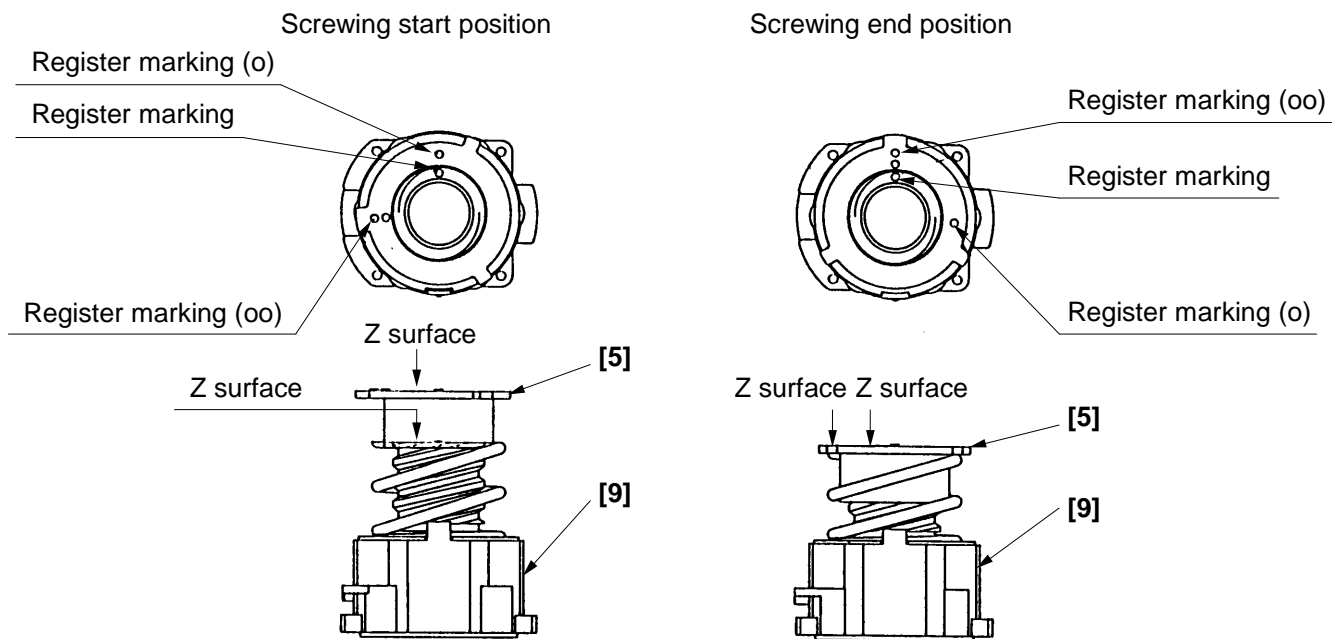


Fig. 10

- (3) Reassembly of manual driver mechanism

- (a) Install the Lock Ring [12] into the Front Case [9].

Assemble so that the projections on the Lock Ring [12] engage with the recesses in the Front Case [9]. Make sure that the flat plane of the Lock Ring [12] faces the Front Case [9].

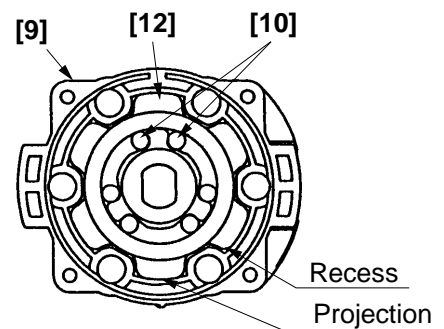


Fig. 11

(b) Install the six Needle Rollers (C). (See Fig. 11)

(Note) Exercise care to keep the Lock Ring's **[12]** internal circumference and Needle Rollers (C) **[10]** free from grease when assembling manual driver mechanism.

(4) Reassembly of the gearing

(a) Apply grease (Hitachi motor grease No. 29) to the meshing parts of the gearing.

(b) Install the parts series from Steel Ball **[11]** to Washer (B) **[24]** to the assembly from step (3). (See Fig. 12)

(i) Note the direction of the groove when installing the Slide Ring Gear **[19]** so that the groove is on the Motor side.

(ii) Install the Front Case **[9]** and Rear Case **[17]** together with the marking on the Front Case **[9]** aligned with the Rear Case **[17]** marking. (See Fig. 15)

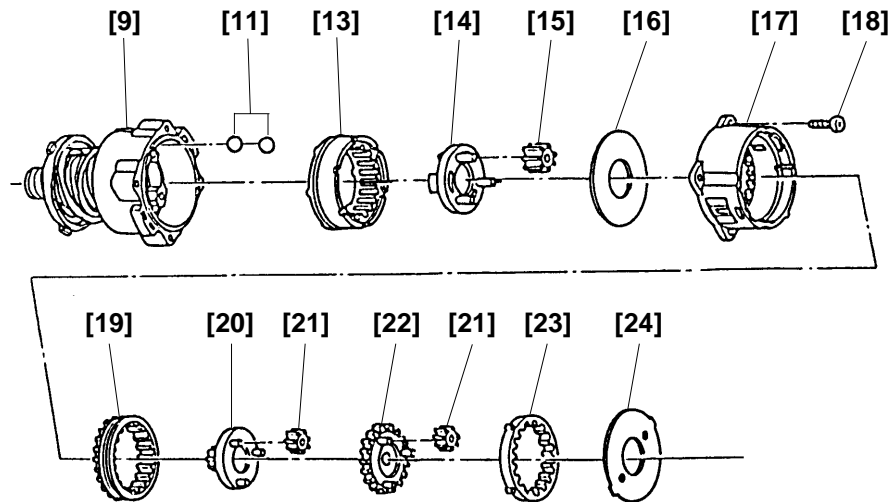


Fig. 12

Install Washer (B) **[24]** in the Rear Case **[17]** with the projection of Washer (B) **[24]** engaged with the recess in the Rear Case **[17]**, and turn Washer (B) **[24]** clockwise until it can turn no further. (See Fig. 13)

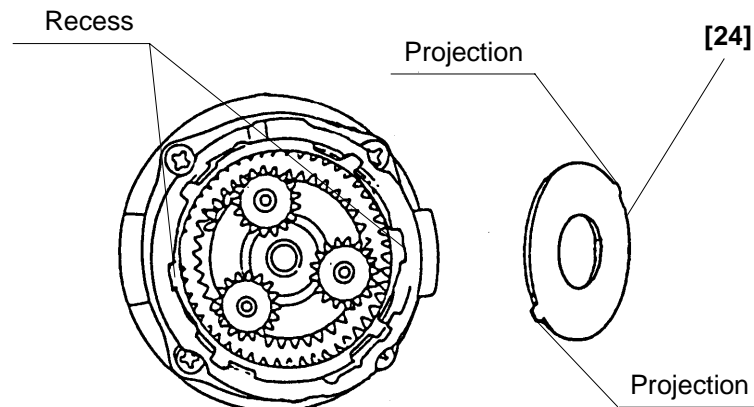


Fig. 13

(c) Install the Click Spring [8] and Cap [4] into the assembly from step (b). (See Fig. 14)

(i) Insert the projection of the Crick Spring [8] into the hole in the Front Case [9].

(ii) Install the Cap [4].

One of the three projections on the Nut [5] and one of the three recesses inside the Cap [4] are wider. Assemble the Nut and Cap together with the wider projection of the Nut [5] engaged in the wider recess of the Cap [4]. (The wider recess in the Cap [4] is positioned at the number "1" when viewed from outside.)

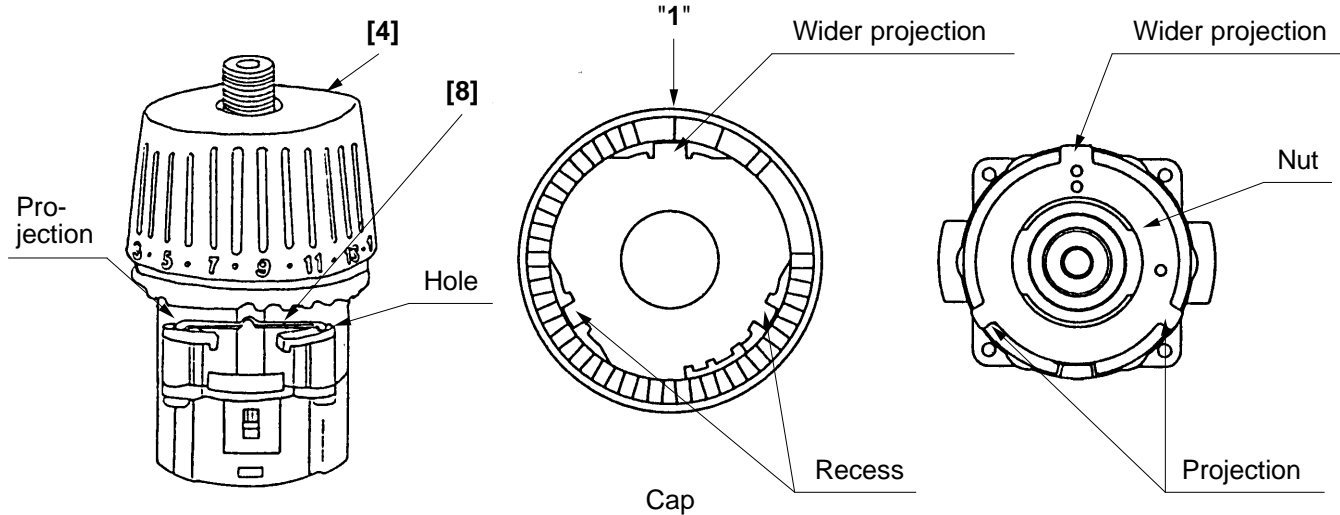


Fig. 14

(d) Install the Shift Arm [37] and the Shift Knob [38] into the assembly from step (c).

(i) With the ridge at the Shift Arm [37] set on the Motor side, first install them on the unmarked side of the assembly from step (c).

Then insert the projection on the Shift Arm [37] into the hole in the Rear Case [17] and make sure that the projection is fitted into the recess in the Slide Ring Gear [19] mounted within the Rear Case [17].

(ii) When installing the Shift Knob [38] into the Shift Arm [37], note that the LOW mark on the Shift Knob [38] is on the Motor side with the Shift Arm [37] engaged with the recess in the Shift Knob [38].

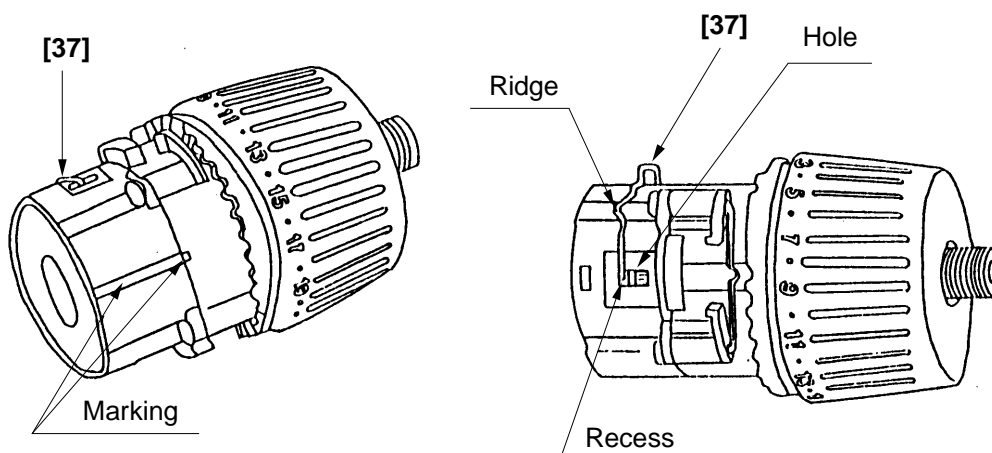


Fig. 15

- (e) Install the assembly in (1) and the assembly from (d) together. (See Fig. 16)

Fit the projection on the Motor Spacer [25] into the recess in the Rear Case [17] while making sure that the marking on assembly (d) is aligned with the marking on the Motor Spacer [25], and turn the Motor Spacer clockwise when viewed from the rear of the Motor [26] until it can no further turn. During installation, make sure that the pinion pressed into the Motor [26] and Planet Gear (A) [21] mesh properly.

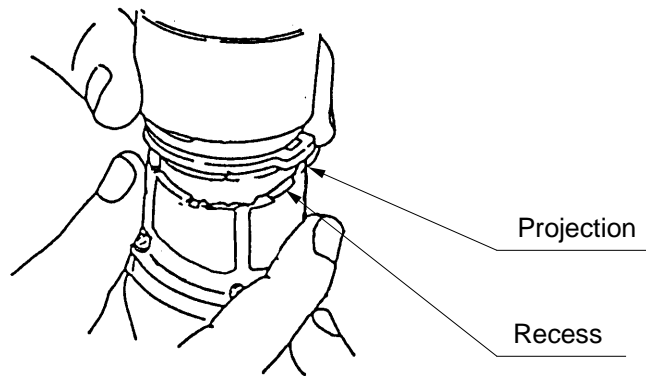


Fig. 16

- (f) Install the Pushing Button [35] into Housing (B) [31]. (See Fig. 17)

- (g) Install the assembly from (e) into Housing (A) [31].

Note that the projections on the Front Case [9] and the Motor Spacer [25] are engaged in the recess in Housing (A) [31] and the projection on Housing (A) [31] is engaged in the groove in the Cap [4]. (See Fig. 18)

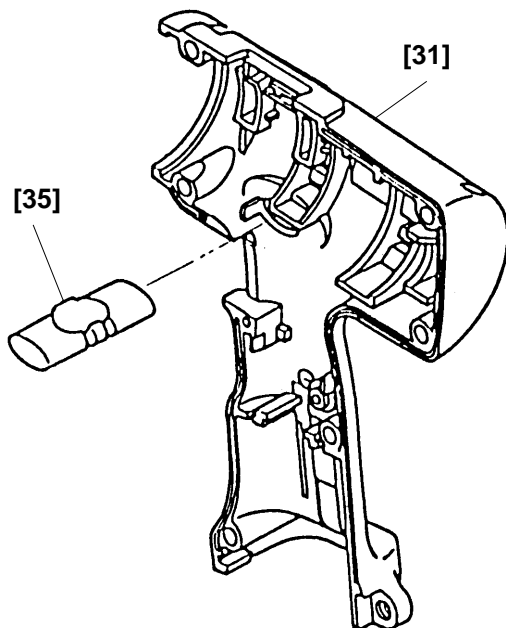


Fig. 17

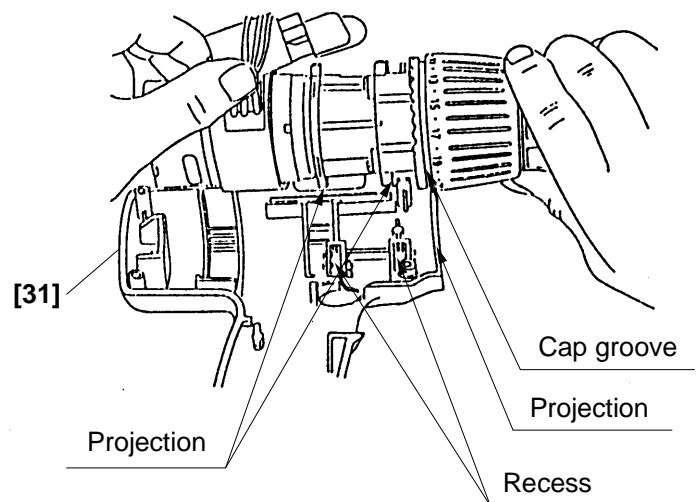


Fig. 18

Set the assembly from (f) to Housing (A) [31] and secure it with the seven Tapping Screws D3 x 16 [27].

- (i) Verify proper operation of the Cap [4].

When the assembly procedure up to step (g) is complete, make sure that the number "1" on Cap [4] and the drill mark "◁▨▨" on the Housing are in alignment with the triangle mark on the Housing and that the Cap [4] is able to turn at a moderate speed.

If the cap motion is jerky or loose, check to see if the Click Spring [8] is properly installed. If the number "1" on the Cap [4] or drill mark "◁▨▨" should not reach the triangle marking on Housing (A), (B) [31], correctly re-install the Cap [4] referring to step (4) (c) as it is improperly installed.

- (h) Clamp the assembly from step (g) in a stock vice, install the Drill Chuck [2] and tighten with the Special Screw M6 x 23 [1].

(5) Other precautions during assembly

- (a) When the assembly procedure is complete, make sure that the turning direction of the Drill Chuck [2] corresponds to the position of the Pushing Button [35]. When the Pushing Button [35] is pressed from the (R)-marked side, the Drill Chuck [2] should turn clockwise when viewed from the rear (handle end of the drill). Also make sure that the Drill Chuck turning speed switches between High and Low by switching the Shift Knob [38].

Make sure that the run-out of the Drill Chuck [2] holding a 12 mm dia. test bar is below 0.8 mm at a distance of 100 mm from the chuck end.

- (b) While Housings (B) [31] of DS 13DV2 and DS 10DV2 are of the same external shape, there is a difference in that the battery loading section at the DS 10DV2 Housing (B) [31] is formed with a projection, with no such projection at the battery loading section of the DS 13DV2 Housing. Exercise care when carrying out assembly. (See Fig. 19)

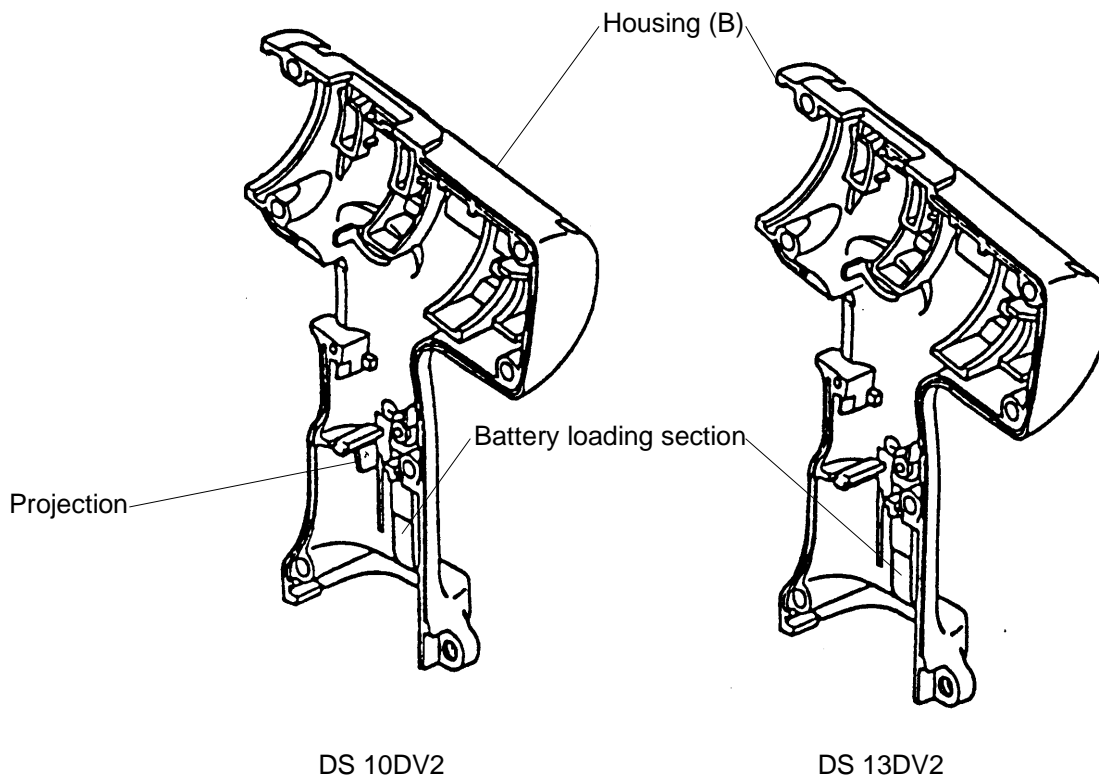


Fig. 19

(c) Tightening torque of each screw is given below.

Tapping Screw	D3 x 16	[27]	1.08 - 1.86 Nm (11 - 19 kgfcm, 9.6 - 16.5 in-lbs.)
Special Screw	M6 x 23	[1]	3.92 - 4.90 Nm (40 - 50 kgfcm, 34.7 - 43.4 in-lbs.)
Bind Screw	M3 x 7	[41]	0.49 - 0.78 Nm (5 - 8 kgfcm, 4.3 - 6.9 in-lbs.)
Machine Screw	M3 x 5	[32]	0.29 - 0.39 Nm (3 - 4 kgfcm, 2.6 - 3.5 in-lbs.)
Machine Screw	M4 x 6	[29]	1.08 - 1.86 Nm (11 - 19 kgfcm, 9.6 - 16.5 in-lbs.)
Drill Chuck		[2]	17.6 - 21.6 Nm (180 - 220 kgfcm, 156 - 191 in-lbs.)
Screw	D3 x 12	[18]	0.59 - 0.98 Nm (6 - 10 kgfcm, 5.2 - 8.7 in-lbs.)

1-2. Precautions in Disassembly and Reassembly of Battery

Please refer to the Technical Data and Service Manual (No. E878) for precautions on disassembly and reassembly of the battery charger UC 12YD.

2. STANDARD REPAIR TIME (UNIT) SCHEDULES

Model	Fixed	Variable	10	20	30	40	50	60
DS 13DV2			Work Flow					
		General Assembly						
	Fixed Cost							
	Keyless chuck	0 min.						
	Others	20 min.						
				Housing (A)(B)Set Motor Spacer DC speed control switch Pushing button Shift arm Shift knob Fin	Cap Nut Spring Washer (D)			
				<Gear Box Ass'y> Keyless chuck Motor spacer Washer (B) First ring gear Planet gear (A) set Pinion (B) Pinion (C) Slide ring gear	Front case Needle roller (C) set Steel ball Lock ring Carrier Planet gear (C) set Washer (A) Rear case			