



MODEL

DS 14DV

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 sleeve of the Drill Chuck **[2]** upward (FREE position) and turn it counterclockwise (when viewed from the front) to fully open the jaws of the Drill Chuck **[2]**.

Turn the Special Screw M6 x 23 **[1]** clockwise and remove it. Take care that it is left-hand threaded.

(b) Fit the hex. 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 it by tapping with a hammer or the like.

Carry out steps (a) and (b) with the main body clamped in the stock vise. It is recommended to fit a piece of cloth between the main body and the vice to protect the Housing **[32]** from scratching.

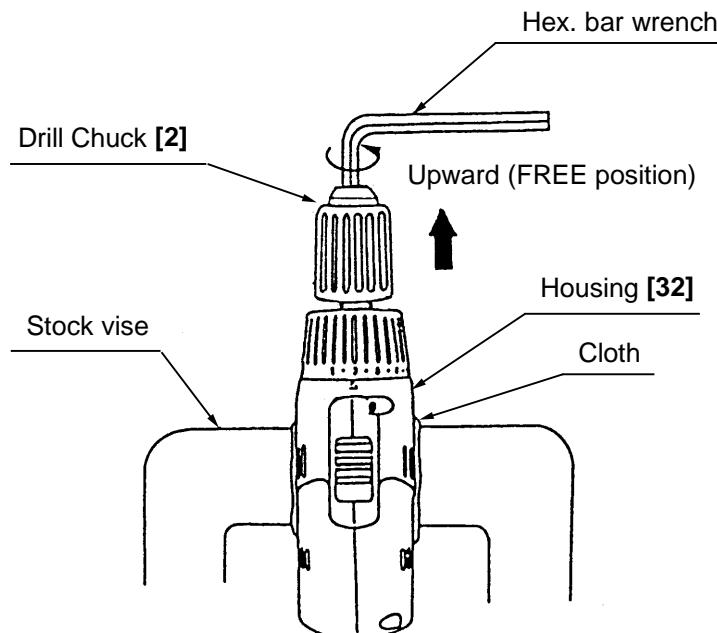


Fig. 6

(c) Align the number "1" at the Cap **[4]** with the triangle mark at the Housings (A) and (B) **[32]**.

(2) Removing Housing (B) [32].

Remove the seven Tapping Screws D3 x 16 [28] secured to the main body. Gently open Housings (A) and (B) [32] while holding the battery loading sections.

(3) With Housing (B) [32] removed, all the internal parts, assembled or separate, can be taken out.

(a) Lift the entire components from Housing (A) [32] while holding the Motor [27] 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 [27] counterclockwise until a click sound is heard when viewed from the rear and remove it from the Rear Case [17].

(d) Remove the Shift Arm [19] from the Rear Case [17] and remove the Shift Knob [38] from the Shift Arm [19].

(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 Gears (C) Set [15], Carrier [14], six Needle Rollers (C) Set [10], Lock Ring [12], and twelve Steel Balls [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 [35].

Disassembly of the Motor [27], DC Speed Control Switch [35], Motor Spacer [26] and Fin [43] removed in step (3) can be carried out in the following procedure.

Disconnect the Internal Wires [34] and [37] of Motor [27] with a soldering iron.

With one Bind Screw M3 x 7 [42] removed, the FET (Field Effect Transistor) of DC Speed Control Switch [35] and the Fin [43] can be taken apart.

Remove the two Machine Screws M4 x 6 [30] and take the Motor [27] and Motor Spacer [26] apart.

When disconnecting the Internal Wires [34] and [37] of Motor [27] from the DC Speed Control Switch [35], be sure to remove the two Machine Screws M3 x 5 [33] 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 motor unit

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

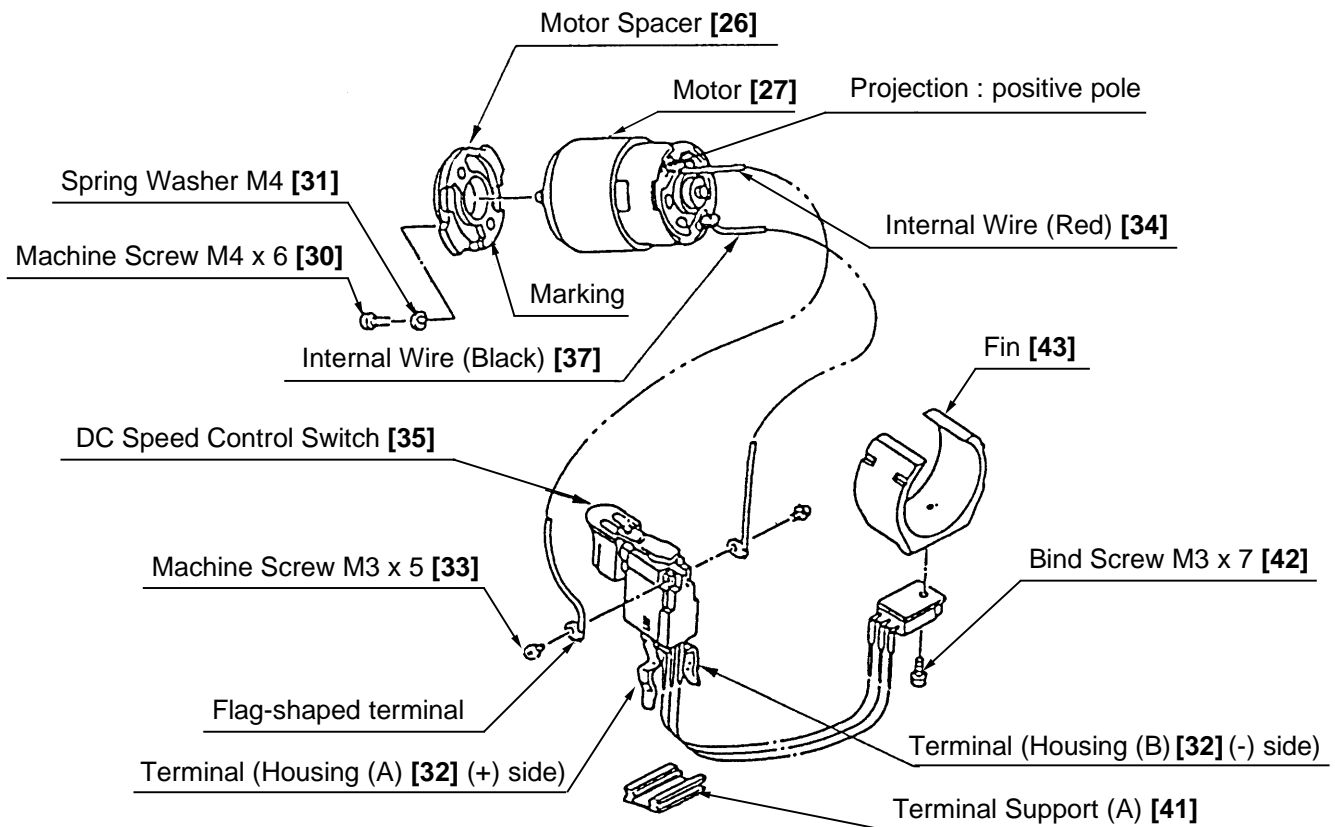


Fig. 7

(Note) Do not deform the legs of the FET forcibly.

(b) Pay attention to the polarity of the Motor [27] when soldering the Internal Wires [34] and [37] to the Motor [27]. The projected side of the Motor [27] is positive. (Fig. 8)

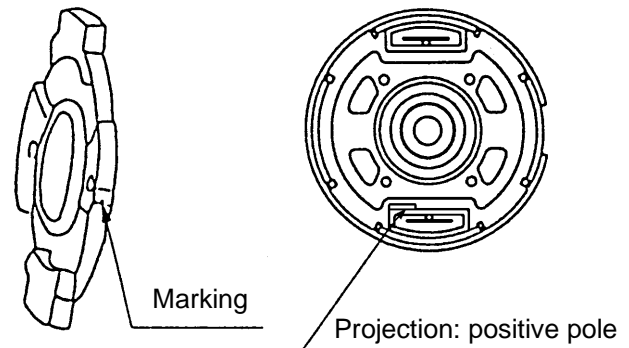


Fig. 8

(Note) When mounting the Motor Spacer [26] to the Motor [27], tighten the two Machine Screws M4 x 6 [30] with the Spring Washer M4 [31] so that the Motor Spacer [27] is mounted to the pinion side of the Motor [27] and that the marking of Motor Spacer [26] is positioned 180° opposite direction against the projection of the Motor [27].

(For Models DS 13V2 and DS 10DV2, the mounting of motor spacer is the same direction as the projection of motor).

(c) Apply grease (Hitachi Motor Grease No. 29) to the pinion pressed onto the Motor [27].

(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].

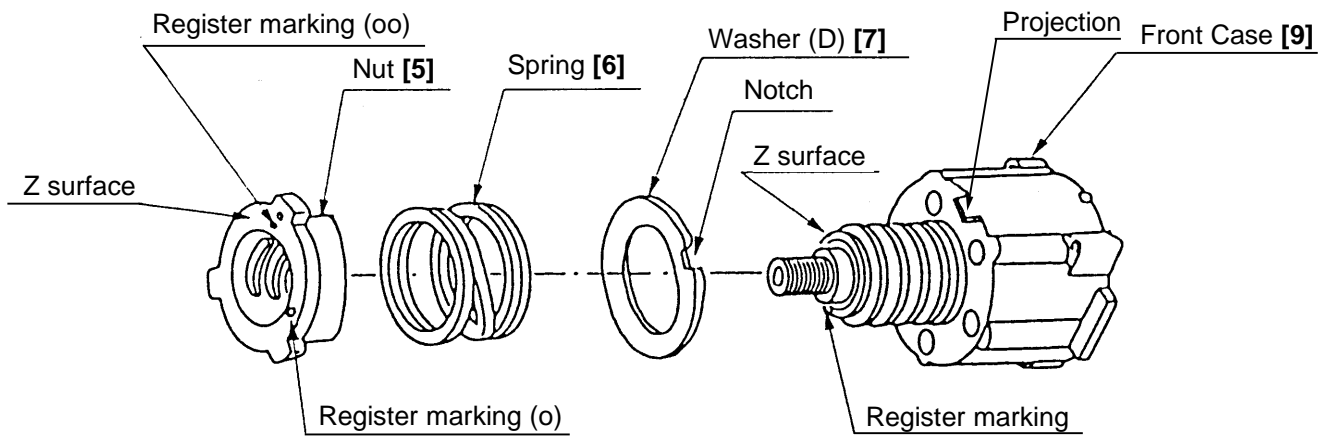


Fig. 9

(b) Screw the Nut [5] onto 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.

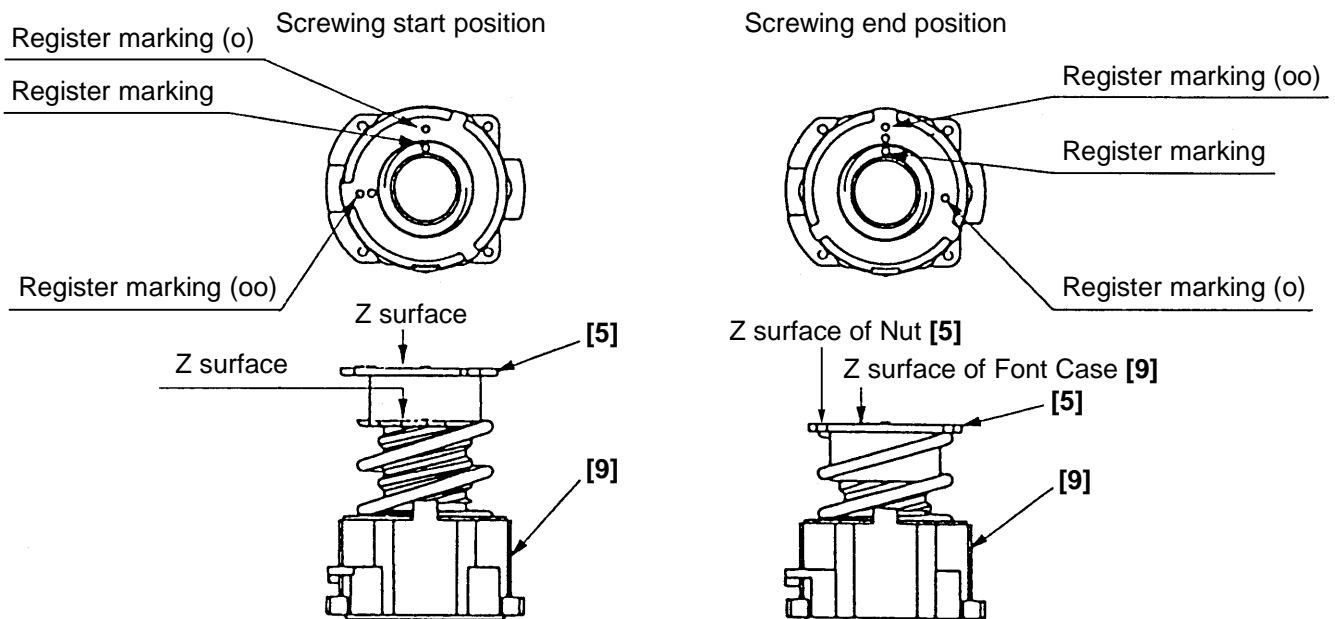


Fig. 10

(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].

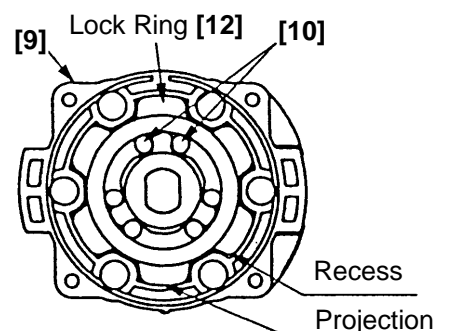


Fig. 11

(b) Install the six Needle Rollers (C) **[12]**. (See Fig. 11)

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

(4) Reassembly of gear box unit

(a) Apply grease (Hitachi Motor Grease No. 29) to the teeth of gear.

(b) Install the parts from Steel Ball **[11]** to Washer (B) **[25]** in the order shown in Fig. 12.

(i) Note the direction of the groove when installing the Slide Ring Gear **[20]** so that the groove is on the Motor **[27]** side.

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

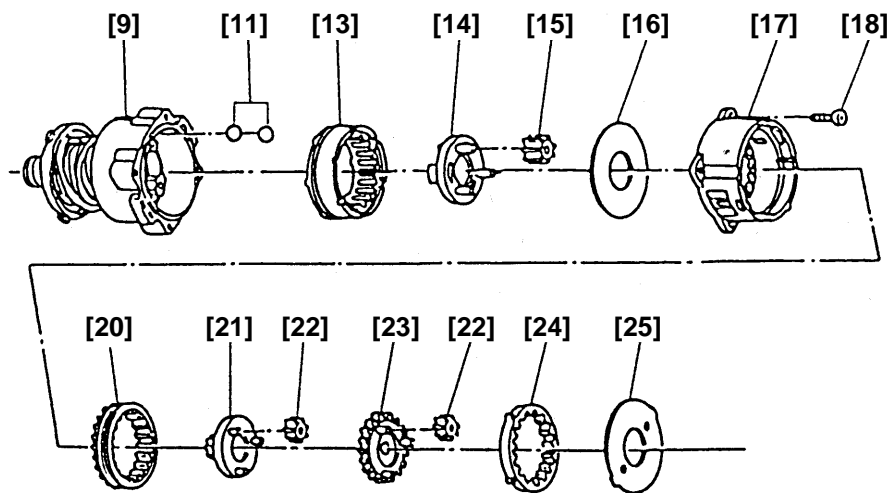


Fig. 12

Install Washer (B) **[25]** in the Rear Case **[17]** so that the projection of Washer (B) **[25]** is engaged with the recess in the Rear Case **[17]**, and turn Washer (B) **[25]** clockwise until it can turn no further. (See Fig. 13)

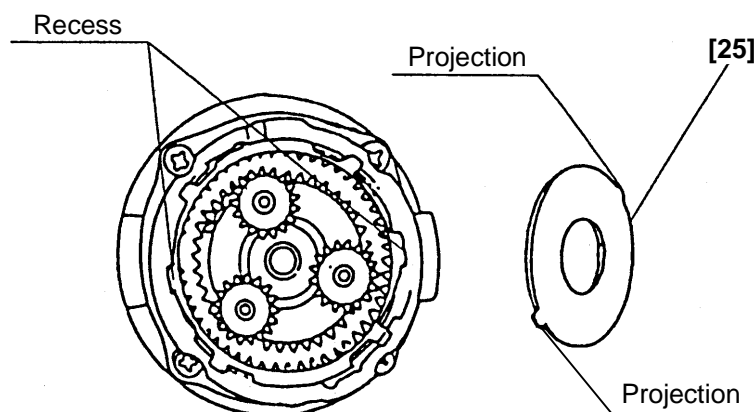


Fig. 13

(c) Install the Click Spring [8] and Cap [4]. (See Fig. 14)

(i) Insert the tip of the Click 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 [5] and Cap [4] so that the wider projection of the Nut [5] is 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.)

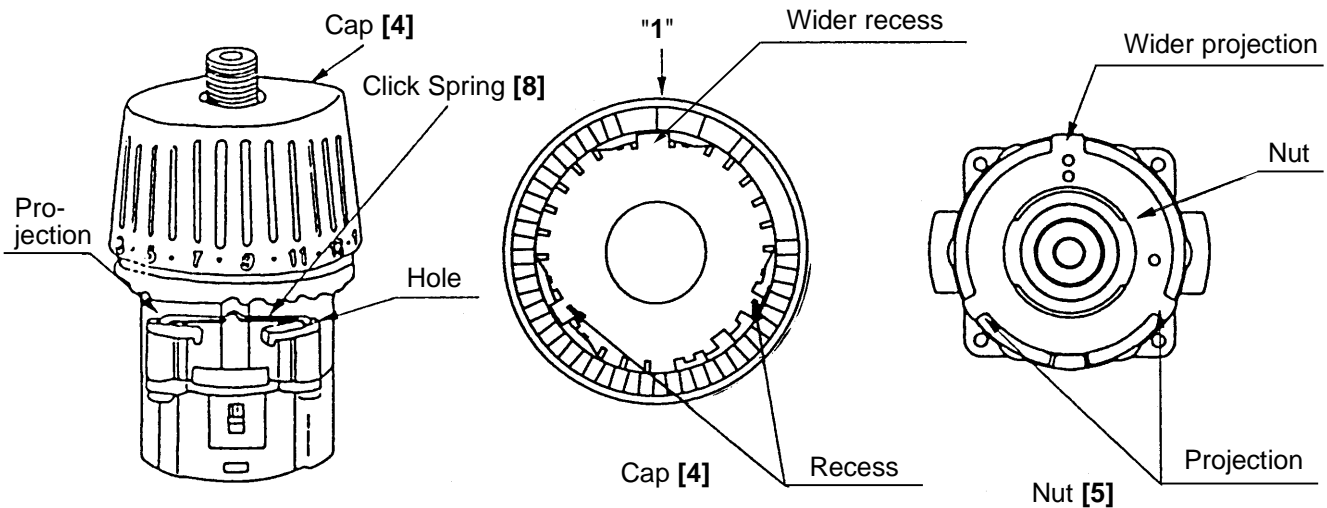


Fig. 14

(d) Install the Shift Arm [19] and the Shift Knob [38].

(i) With the ridge at the Shift Arm [19] set on the Motor [27] side, first install them on the unmarked side of the assembly from step (c).

Then insert the tip of the Shift Arm [19] into the hole in the Rear Case [17] and make sure that the ridge is fitted into the groove in the Slide Ring Gear [20] mounted within the Rear Case [17].

(ii) When installing the Shift Knob [38] into the Shift Arm [19], note that the LOW mark on the Shift Knob [38] is on the Motor side with the Shift Arm [19] engaged with the recess in the Shift Knob [38].

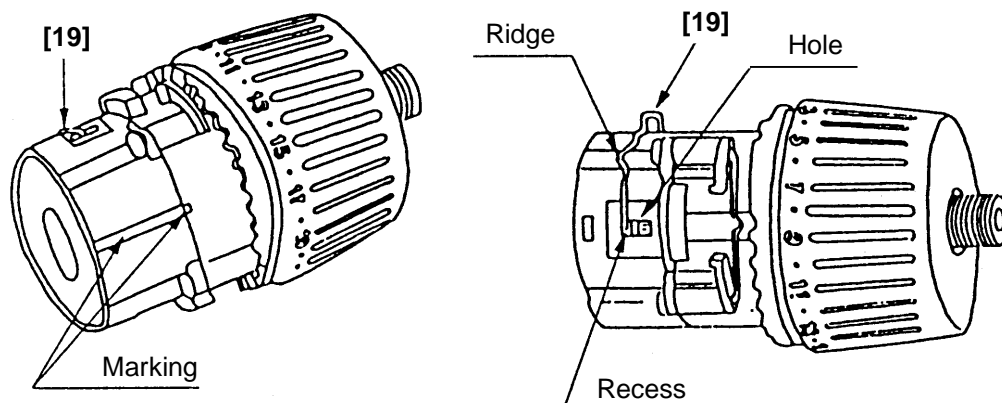


Fig. 15

(e) Assemble the motor unit and gear box unit together. (See Fig. 16)

it the projection on the Motor Spacer [26] into the recess in the Rear Case [17] while making sure that the marking on the gear box unit is aligned with the marking on the Motor Spacer [26], and turn the Motor Spacer [26] clockwise when viewed from the rear of the Motor [27] until it can turn no further. During installation, make sure that the pinion pressed into the Motor [27] and Planet Gear (A) set [22] mesh properly.

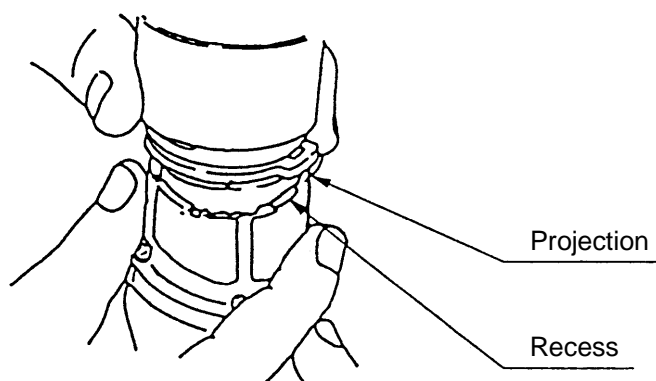


Fig. 16

(f) Install the Pushing Button [36] into Housing (B) [32]. (See Fig. 17)

(g) Install the Housing (A) (B) [32].

Note that the projections on the Front Case [9] and the Motor Spacer [26] are engaged in the recess in Housing (A) [32] and the groove in the Cap [4] is engaged in the projection on Housing (A) [32]. (See Fig. 18)

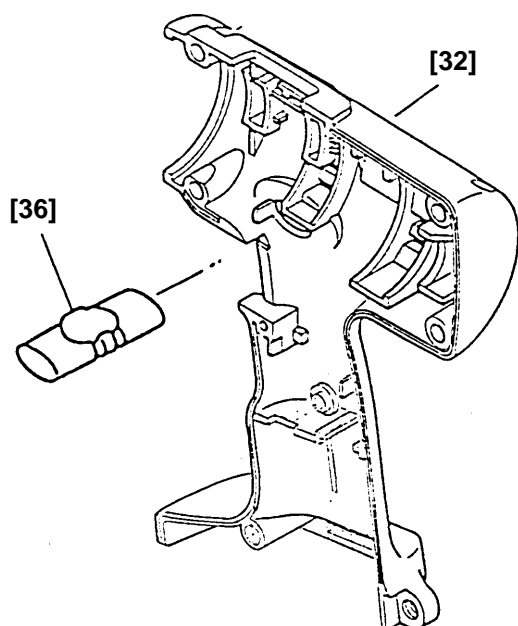


Fig. 17

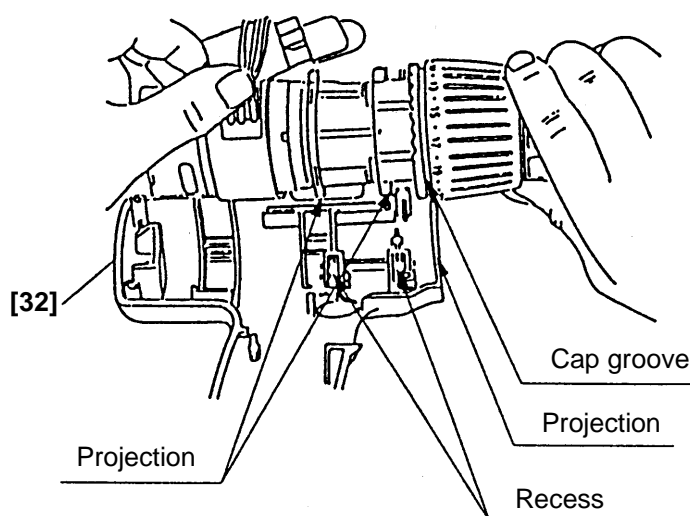




Fig. 18

Then, install the Housing (A) [32] and secure it with the seven Tapping Screws D3 x 16 [28].

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

After completing the gear box unit, make sure that the number "1" on Cap **[4]** and the drill mark "  " on the Cap **[4]** are in alignment with the triangle mark on the Housing (A) (B) **[32]** and that the Cap **[4]** is able to turn smoothly.

If the cap motion is jerky or loose, check 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) **[32]**, correctly re-install the Cap **[4]** referring to steps (4) (c) as it is improperly installed.

(h) Clamp the main body in a stock vise, install the Drill Chuck **[2]** and tighten with the Special Screw M6 x 23 **[1]**.

(5) Other precautions during assembly

(a) When the assembly is completed, make sure that the turning direction of the Drill Chuck **[2]** corresponds to the position of the Pushing Button **[36]**. When the Pushing Button **[36]** is pressed from the (R)-marked side, the Drill Chuck **[2]** should rotate clockwise when viewed from the rear. Also make sure that the Drill Chuck **[2]** rotates correctly after changing the Shift Knob **[38]** between High and Low.

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 front of the Drill Chuck **[2]**.

(b) Tightening torques.

| | | |
|---------------|---------------------|---|
| Tapping Screw | D3 x 16 [28] | 1.1 - 1.9 Nm (11 - 19 kgfcm, 9.5 - 16.5 in-lbs.) |
| Special Screw | M6 x 23 [1] | 3.9 - 4.9 Nm (40 - 50 kgfcm, 34.7 - 43.4 in-lbs.) |
| Bind Screw | M3 x 7 [42] | 0.5 - 0.8 Nm (5 - 8 kgfcm, 4.3 - 6.9 in-lbs.) |
| Machine Screw | M3 x 5 [33] | 0.3 - 0.5 Nm (3 - 4 kgfcm, 2.6 - 3.5 in-lbs.) |
| Machine Screw | M4 x 6 [30] | 1.1 - 1.9 Nm (11 - 19 kgfcm, 9.5 - 16.5 in-lbs.) |
| Drill Chuck | [2] | 17.7 - 21.6 Nm (180 - 220 kgfcm, 156 - 191 in-lbs.) |
| Screw | D3 x 12 [18] | 0.6 - 1.0 Nm (6 - 10 kgfcm, 5.2 - 8.7 in-lbs.) |

1-2. Precautions in Disassembly and Reassembly of Battery Charger

Please refer to the Technical Data and Service Manual (No. F813) for precautions on disassembly and reassembly of the battery charger UC 14YF.

2. STANDARD REPAIR TIME (UNIT) SCHEDULES

| Model | Variable | | 10 | 20 | 30 | 40 | 50 | 60 |
|---------|------------------|------------|----|--|----|----|----|----|
| | Fixed | | | | | | | |
| DS 14DV | General Assembly | Work Flow | | | | | | |
| | | Fixed Cost | | Housing (A)(B) Set Motor Cap DC Speed Control Switch Nut Shift Arm Fin (Gear Box Unit) Front Case Lock Ring Ring Gear Carrier First Ring Gear Planet Gear (A) Set Pinion (B) Pinion (C) Slide Ring Gear Planet Gear (C) Set Rear Case | | | | |