



MODEL DS 14DVA

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 the danger of accidental turning of the motor.

1-1. Precautions on Disassembly and Reassembly

The **[Bold]** numbers in the description below correspond to the item numbers in the Parts List and exploded assembly diagram for the Model DS 14DVA.

1-1-1. Disassembly

(1) Removal of Housing (B) **[33]**.

Remove the eight Tapping Screws (W/Flange) D3 × 16 **[28]** secured to the driver unit. Gently open Housings (A) and (B) **[33]** while holding their battery loading sections.

(2) After Housing (B) **[33]** has been removed, all the internal parts, assembled or separated, can be taken out as they are.

Lift the entire contents from Housing (A) **[33]** while holding the Motor **[27]** and Cap **[6]**.

(3) Removal of the Drill Chuck **[2]**. (See Fig. 1.)

(a) Turn the Motor **[27]** counterclockwise (when viewed from the rear) and remove it from the Rear Case **[17]**. Remove the Shift Knob **[39]** from the Shift Arm **[18]**. Take care not to remove the Shift Arm **[18]** from the Rear Case **[17]** in this operation.

(b) Mount the motor spacer (an accessory of the special repair tool J-292, Code No. 316379 is recommended) to the assembly of the Drill Chuck **[2]**, Cap **[6]**, Front Case **[11]** and Rear Case **[17]** and then mount it to the special repair tool J-292 clamped in the vise as illustrated in Fig. 1. In this operation, check that the pinion press-fitted in the special repair tool J-292 and Planet Gear (A) **[23]** are engaged properly.

(c) Turn the Cap **[6]** clockwise (when viewed from the front) until it can turn no further. In this position the drill mark "◁〰〰〰" on the Cap **[6]** is positioned to the Shift Arm **[18]** side. Secure the Slide Ring Gear **[19]** to the Front Case **[11]** side with the Shift Arm **[18]**.

(d) Turn the sleeve of the Drill Chuck **[2]** counterclockwise (when viewed from the front) to fully open the jaws of the Drill Chuck **[2]**. Turn the Special Screw M6 × 23 **[1]** clockwise and remove it. (Note that the Special Screw is left-hand threaded.)

(e) Fit the hexagonal bar wrench for M10 into the Drill Chuck **[2]** as illustrated in Fig. 1 and remove the Drill Chuck by turning the hexagonal bar wrench counterclockwise.

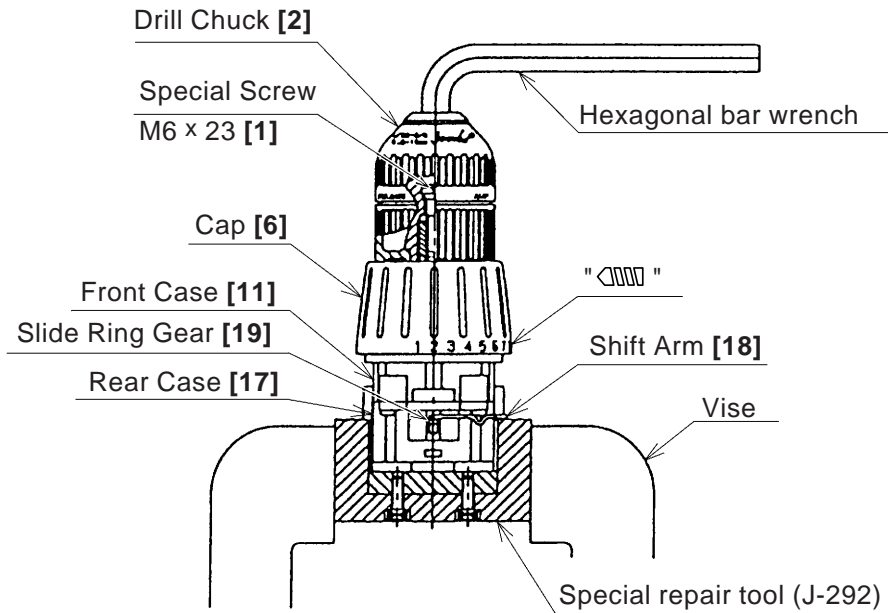


Fig. 1

(4) Disassembly of the gear unit.

Remove the Shift Arm [18] from the Rear Case [17], then remove the four Screws Set D3 x 12 [4] connecting the Front Case [11] and the Rear Case [17]. Remove Washer (A) [16], Planet Gear (C) Set [15], the Carrier [14], the Ring Gear [13] and the six Steel Balls [12] from the Front Case [11] in order. Take care not to lose the six Steel Balls [12] in this operation.

(5) Disassembly of the clutch unit.

Remove the two Screws Set D3 x 12 [4], then remove the Plate [5], the Cap [6], the Clutch Plate [7], the Spring [8], the Spring Holder [9] and the Thrust Plate [10].

(Note) Do not remove the Front Case [11].

(6) Disassembly of the power supply unit.

(Note) Do not disconnect the three FET internal wires soldered to the DC-Speed Control Switch [36]. Disassembly of the Motor [27], the DC-Speed Control Switch [36], the Motor Spacer [26] and the Fin [43] removed in step (3) can be carried out in the following procedure.

- ① Disconnect the Internal Wires [35] and [38] of the Motor [27] with a soldering iron.
- ② With one Bind Screw M3 x 7 [42] removed, the FET (Field Effect Transistor) of the DC-Speed Control Switch [36] and the Fin [43] can be taken apart.
- ③ Remove the two Machine Screws M4 x 6 [30], and take the Motor [27] and the Motor Spacer [26] apart. When removing the Internal Wires [35] and [38] of the Motor [27] from the DC-Speed Control Switch [36], be sure to remove the two Machine Screws M3 x 5 [34] securing the flag-shaped terminal. (See Fig. 2.)

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) Reassembly of the power supply unit

(a) Be sure to perform wiring connections as indicated in the wiring diagram. (See Fig. 2.)

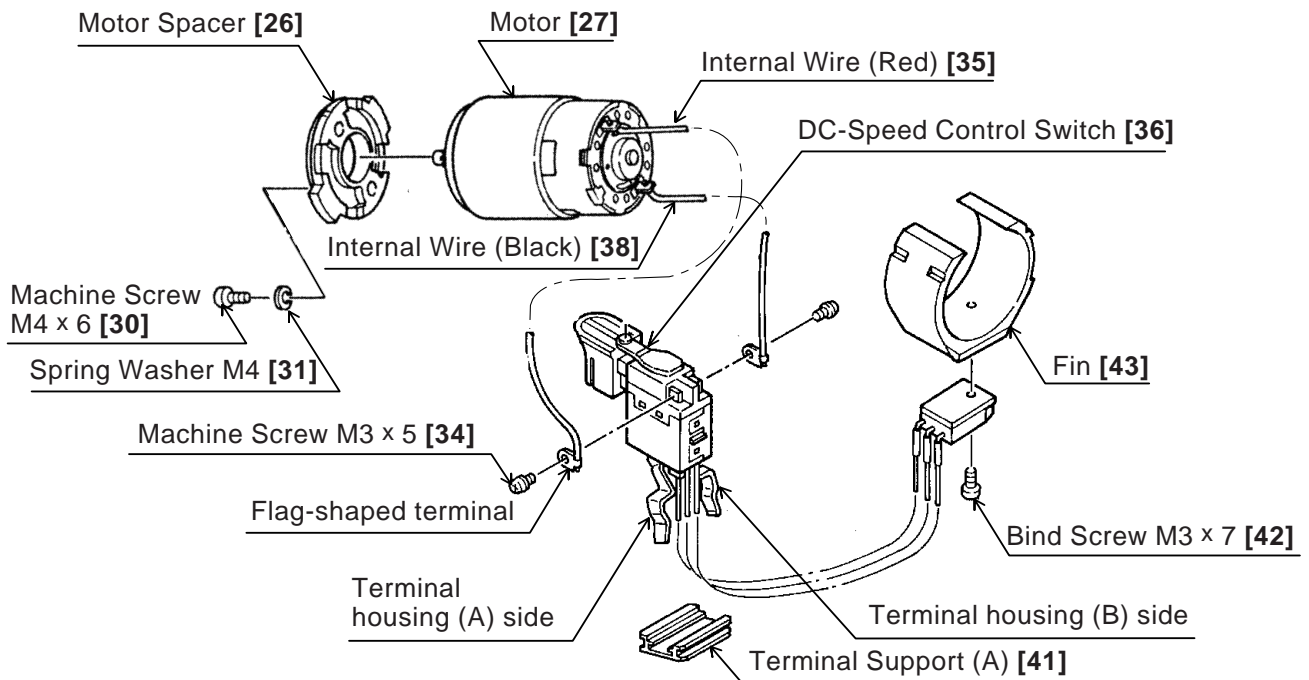


Fig. 2

(Note) Do not deform the bondable legs of the FET attached to the DC-Speed Control Switch [36].

(b) Pay attention to the polarity of the Motor [27] when soldering the Internal Wires [35] and [38] to the Motor [27]. The red marking side of the Motor [27] is positive. (See Fig. 3.)

(Note) When installing the Motor Spacer [26] to the Motor [27], tighten with the Machine Screw M4 x 6 [30] and the Spring Washer M4 [31].

(c) Apply grease (Hitachi Motor Grease No. 29) to the pinion press-fitted on the Motor [27] shaft.

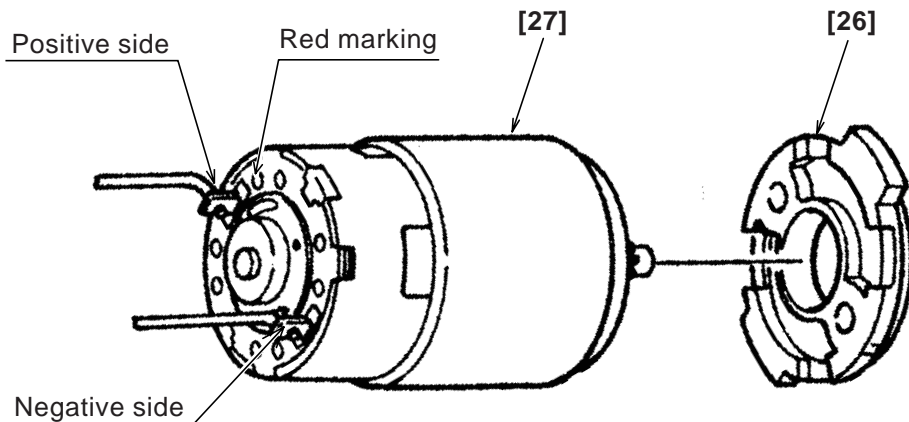


Fig. 3

(2) Reassembly of the clutch unit (See Fig. 4.)

- (a) Apply grease (Hitachi Motor Grease No. 29) to the sliding portion of the Front Case [11] and the Clutch Plate [7] and the stepped portion of the Cap [6].
- (b) Reassemble the Screw [4] through the Front Case [11] as follows.
 - (i) When installing the Clutch Plate [7] into the Front Case [11], align the projection on the Front Case [11] with the notch of the Clutch Plate [7]. (See Fig. 5.)

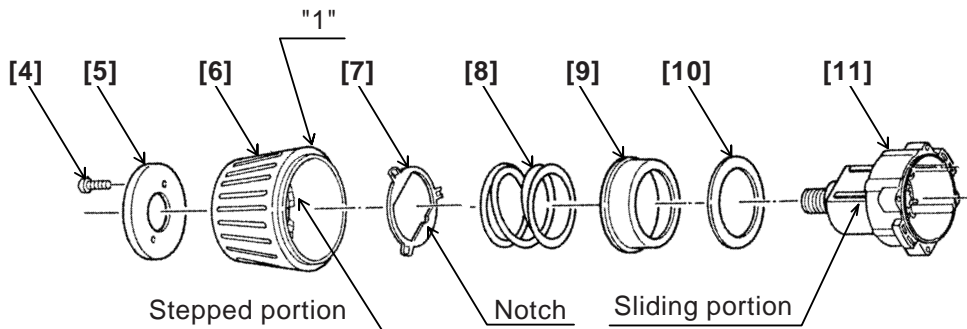


Fig. 4

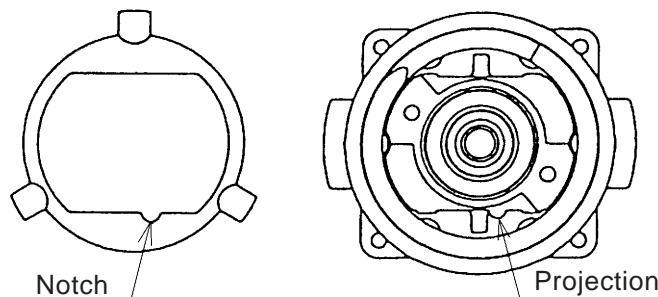


Fig. 5

- (ii) When installing the Cap [6] to the assembly reassembled in step (i), be careful of the position of the numbers on the Cap [6] and the notch of the Clutch Plate [7]. The indication "1" of the Cap [6] must be on the opposite side of the notch of the Clutch Plate [7]. (See Fig. 4.)

(3) Reassembly of the gear unit

- (a) Apply grease (Hitachi Motor Grease No. 29) to the meshing parts of the gear.
- (b) Install the parts series from the Steel Ball [12] to Washer (B) [25] into the assembly reassembled in step (2). (See Fig. 6.)
 - (i) Note the direction of the groove when installing the Slide Ring Gear [19] so that the groove is on the Motor [27] side.
 - (ii) Install the Front Case [11] and the Rear Case [17] together with the marking on the Front Case [11] aligned with the marking on the Rear Case [17]. (See Fig. 8.)

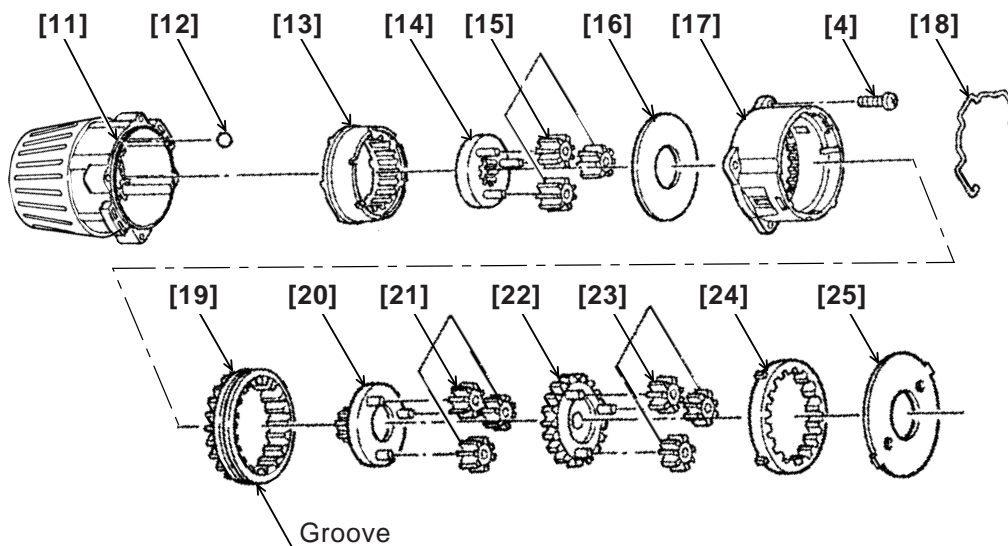


Fig. 6

- (iii) Install Washer (B) [25] in the Rear Case [17] with the projection of Washer (B) [25] engaged with the recess in the Rear Case [17], and turn Washer (B) [25] clockwise until it can turn no further. (See Fig. 7.)

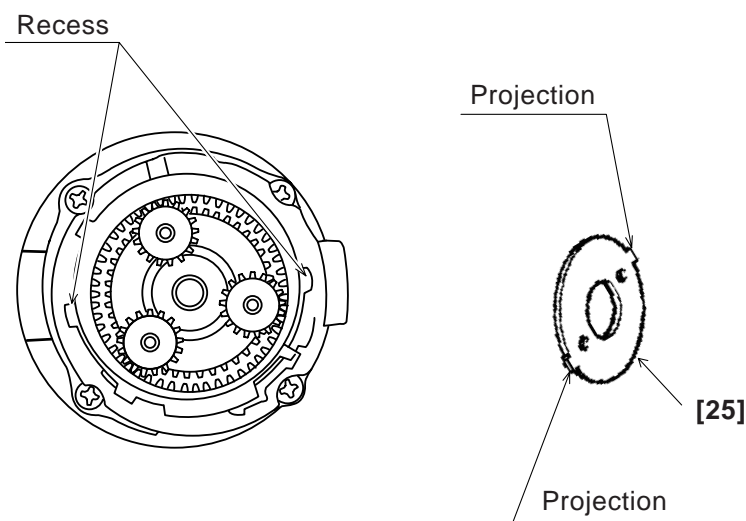


Fig. 7

- (c) Install the Shift Arm [18] into the assembly reassembled in step (3) (b).

- (i) With the ridge at the Shift Arm [18] set on the Motor [27] side, first install them on the unmarked side of the assembly reassembled in step (3) (b). Then insert the projection on the Shift Arm [18] 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]. (See Fig. 8.)

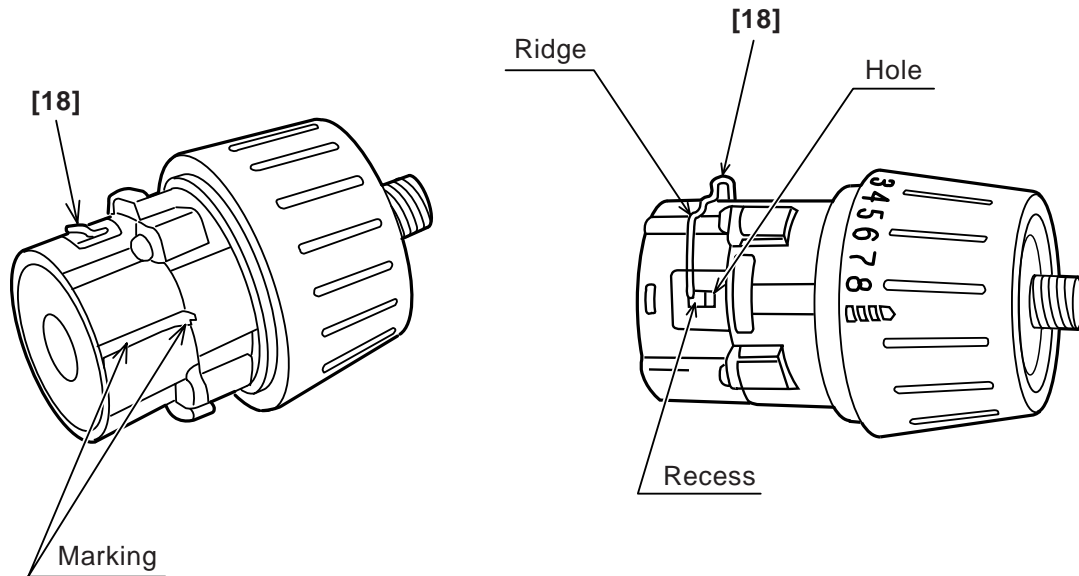


Fig. 8

- (d) Install the Drill Chuck **[2]**.

Install the Drill Chuck **[2]** with the special repair tool (J-292) and secure it with the Special Screw M6 × 23 **[1]**.

- (e) Install the Shift Knob **[39]** into the reassembled state in step (d).

When installing the Shift Knob **[39]** into the Shift Arm **[18]**, note that the "LOW" mark on the Shift Knob **[39]** is on the Motor **[27]** side with the Shift Arm **[18]** engaged with the recess in the Shift Knob **[39]**.

- (f) Install the reassembled state in step (1) and the reassembled state in step (e) together. (See Fig. 9.)

Fit the projection on the Motor Spacer **[26]** into the recess in the Rear Case **[17]** while ensuring that the marking on the assembly from step (e) is aligned with the negative terminal of the Motor **[27]** 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 is press-fitted onto the Motor **[27]** shaft and Planet Gear (A) **[23]** mesh properly.

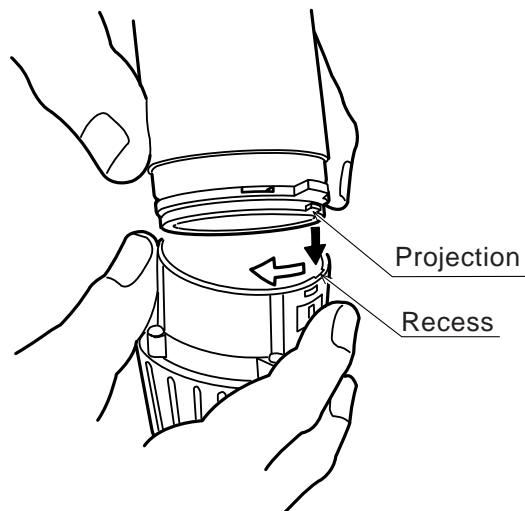


Fig. 9

(4) Installation of the reassembled state in step (3) into Housing (A) and (B) **[33]**.

(a) Install the Pushing Button **[37]** into Housing (B) **[33]**. (See Fig. 10.)

(b) Install the reassembled state in step (3) into Housing (A) **[33]**. Note that the projections on the Front Case **[11]** and the Motor Spacer **[26]** are engaged in the recess in Housing (A) **[33]**. (See Fig. 11.)

(c) Set the reassembled state in step (b) to Housing (B) **[33]** and secure it with the eight Tapping Screws (W/Flange) D3 x 16 **[28]**.

(d) Verify proper operation of the Cap **[6]**.

When the assembly procedure up to step (c) is completed, ensure that the number "1" on the Cap **[6]** and the drill mark "1" are in alignment with the triangle mark on Housings (A) and (B) **[33]**. If the number "1" on the Cap **[6]** or drill mark "1" cannot reach the triangle mark on Housing (A) and (B) **[33]**, correctly re-install the Cap **[6]** referring to step (2) (b) as it is improperly installed.

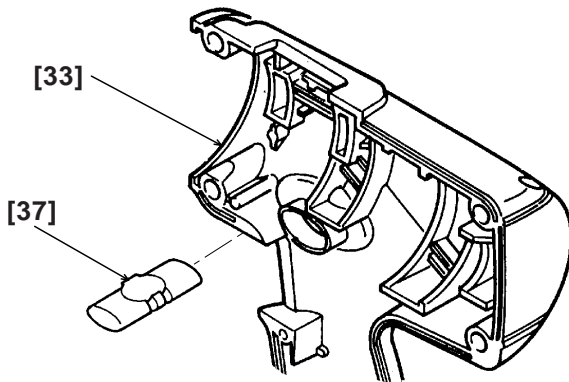


Fig. 10

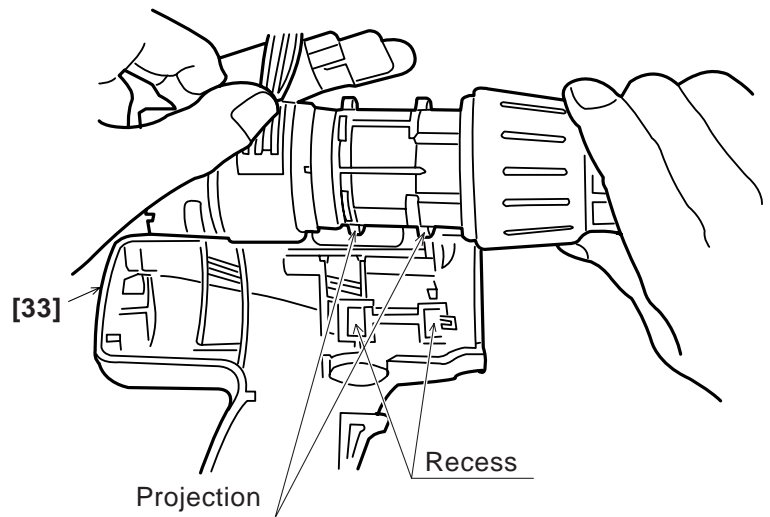


Fig. 11

(5) Other precautions in reassembly

- (a) When the assembly procedure is completed, make sure that the turning direction of the Drill Chuck [2] corresponds to the position of the Pushing Button [37]. When the Pushing Button [37] is pressed from the (R)-marked side, the Drill Chuck [2] should turn clockwise when viewed from the rear (opposite side of the Drill Chuck [2]). Also make sure that the turning speed of the Drill Chuck [2] switches between "HIGH" and "LOW" by switching over the Shift Knob [39].

Make sure that the run-out of the Drill Chuck [2] holding a 12 mm dia. test bar (Special repair tool, Code No. 305715) is below 0.8 mm at a distance of 100 mm from the chuck end.

- (b) Tightening torque of each screw is given below.

Machine Screw M3 × 5 [34] : 0.3 – 0.5 N·m (3 – 4 kgf·cm, 2.6 – 3.5 in-lbs)

Bind Screw M3 × 7 [42] : 0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in-lbs)

Machine Screw M4 × 6 [30] : 1.1 – 1.9 N·m (11 – 19 kgf·cm, 9.5 – 16.5 in-lbs)

Screw Set D3 × 12 [4] : 0.6 – 1.0 N·m (6 – 10 kgf·cm, 5.2 – 8.7 in-lbs)

Drill Chuck [2] : 12.7 – 16.7 N·m (130 – 170 kgf·cm, 113 – 148 in-lbs)

Special Screw M6 × 23 [1] : 3.9 – 4.9 N·m (40 – 50 kgf·cm, 34.7 – 43.4 in-lbs)

Tapping Screw D3 × 16 [28] : 1.1 – 1.9 N·m (11 – 19 kgf·cm, 9.5 – 16.5 in-lbs)

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

Refer to the Technical Data and Service Manual for precautions in disassembly and reassembly of the battery charger Model UC 14YF or UC 14YF2.

2. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
DS 14DVA	General Assembly							
		Work Flow						
		Spring		<div> <div>Housing</div> <div>(A).(B) Set</div> <div>Motor</div> <div>Cap</div> <div>DC-Speed</div> <div>Control Switch</div> <div>Shift Arm</div> <div>Fin</div> </div>				
				<div> <div>(Gear Box Ass'y)</div> <div>Front Case</div> <div>Ring Gear</div> <div>Carrier</div> <div>First Ring Gear</div> <div>Planet Gear</div> <div>(A) Set</div> <div>Pinion (B)</div> <div>Pinion (C)</div> <div>Slide Ring Gear</div> <div>Planet Gear</div> <div>(C) Set</div> <div>Rear Case</div> </div>				