

MODEL

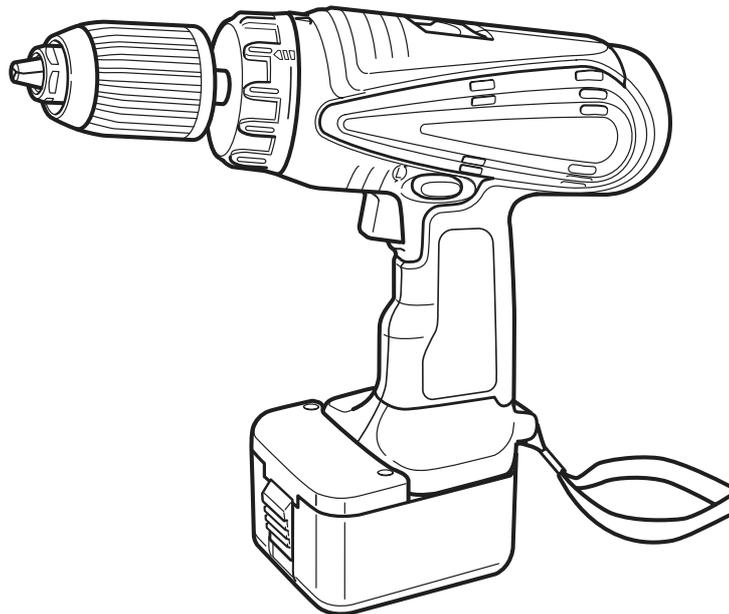
DS 12DVB2

Hitachi
Power Tools

CORDLESS DRIVER DRILL
DS 12DVB2

TECHNICAL DATA
AND
SERVICE MANUAL

D



LIST No. G804

Apr. 2004

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

REMARK:

Throughout this TECHNICAL DATA AND SERVICE MANUAL, a symbol(s) is(are) used in the place of company name(s) and model name(s) of our competitor(s). The symbol(s) utilized here is(are) as follows:

Symbol Utilized	Competitor	
	Company Name	Model Name
C	MAKITA	6317D

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1. PRODUCT NAME

Hitachi 12 V Cordless Driver Drill, Model DS 12DVB2

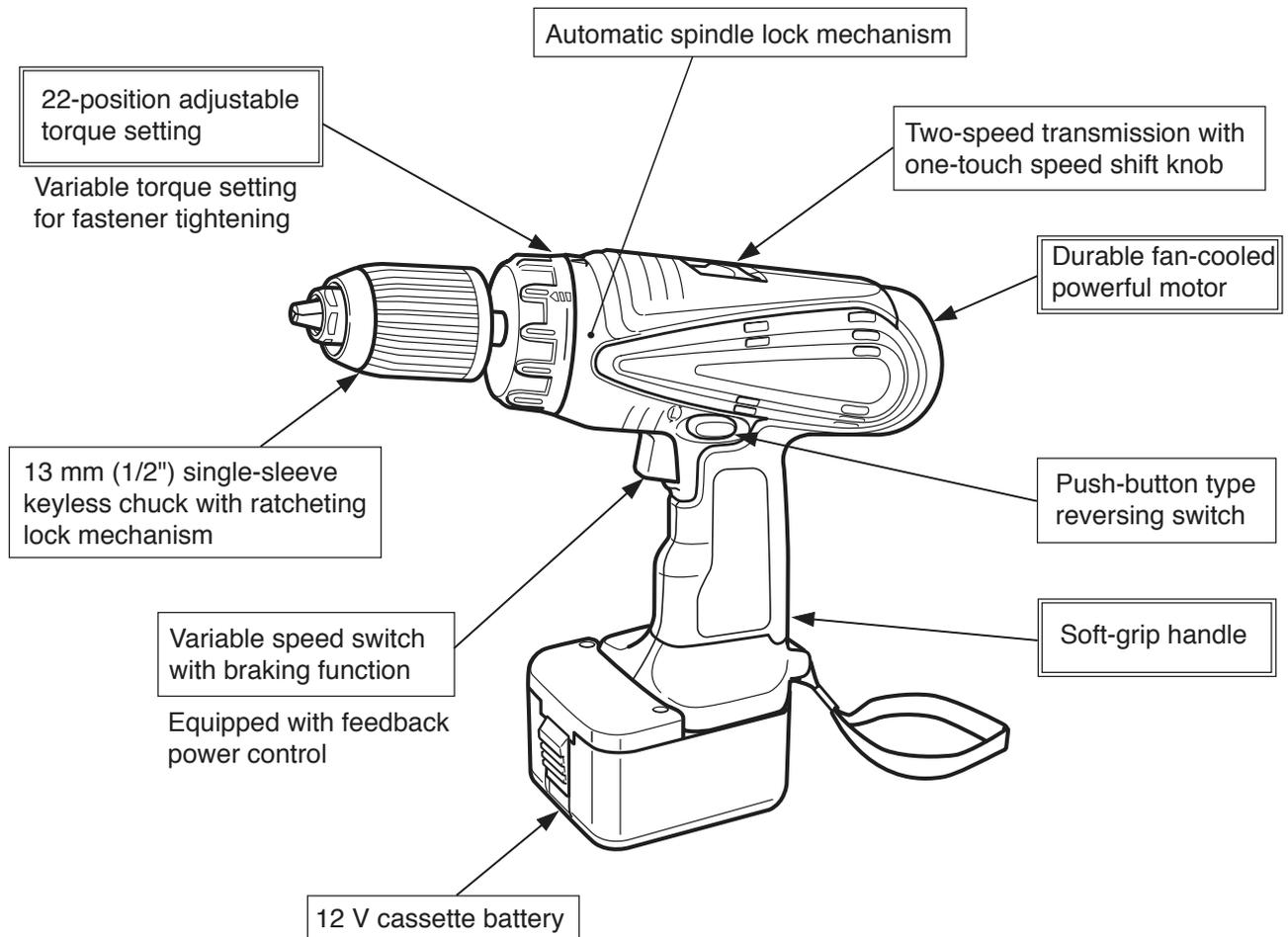
2. MARKETING OBJECTIVE

The current Model DS 12DVB is popular as a professional-use 12 V cordless driver drill. However, about two years have already passed since the sales start. To cope with this situation, the model is upgraded to the more convenient Model DS 12DVB2 equipped with an advanced case.

3. APPLICATIONS

- Tightening and loosening wood screws, self-tapping screws and machine screws
- Drilling into wood materials, plastic, mild steel and aluminum

4. SELLING POINTS



4-1. Selling Point Descriptions

4-1-1. 22-position adjustable torque setting

The torque can be set finely thanks to the adoption of the 22 clutch positions to improve the operability.

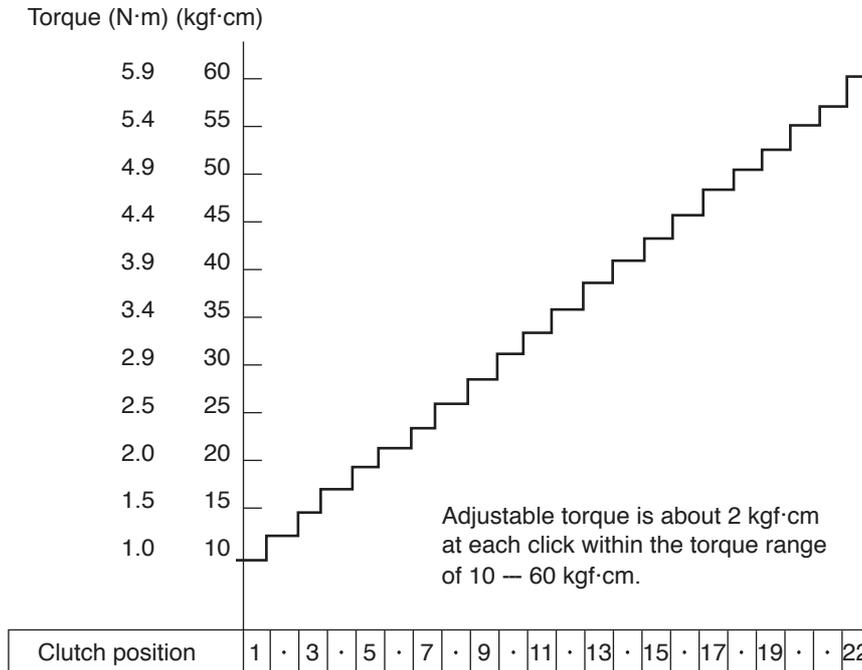


Fig. 1 Clutch torque

4-1-2. Durable fan-cooled powerful motor

The cooling fan incorporated in the motor and the air vents provided in its outer frame greatly enhance the cooling effect, ensuring improved durability in continuous operation.

4-1-3. 13 mm (1/2") single-sleeve keyless chuck with ratcheting lock mechanism

The keyless chuck facilitates fast and easy replacement of driver bits. Replacement can be carried out simply by holding the main unit with one hand, while turning the sleeve with the other hand. This model is also equipped with ratcheting lock mechanism to prevent the chuck from loosening.

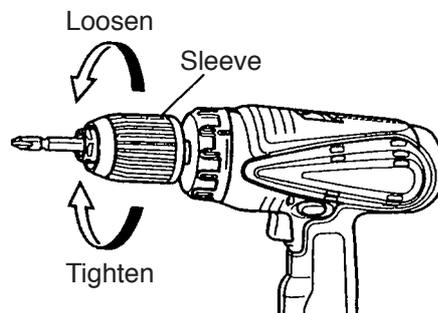


Fig. 2

4-1-4. Variable speed switch with braking function

The braking function allows the driver unit to stop rotation immediately when the trigger switch is released, which is a convenient feature during actual working. Also, the feedback system ensures a sufficiently large torque even in the variable speed range.

4-1-5. Advanced case

The new case satisfies the following demands.

- Compact and sturdy
- Refined two-tone body design
- Excellent accommodation

(Stored many accessories such as torchlight, bit set, extra batteries, long bit and various bits)

5. SPECIFICATIONS

Capacity	Screwdriver Machine screw 6 mm (1/4") Wood screw 8 dia. x 38 mm (#20 x 1-1/2") Drill Metal Mild steel 13 mm (1/2") [Thickness 1.6 mm (1/16")] Aluminum 13 mm (1/2") [Thickness 1.6 mm (1/16")] Wood 32 mm (1-1/4") [Thickness 18 mm (11/16")]																						
Keyless chuck (13VLRG-N)	Mount type Screw-on (UNF 1/2" – 20) Diameter 1.5 – 13 mm (1/16" – 1/2")																						
Rotation speed (No-load)	Low: 0 – 350/min, High: 0 – 1,300/min																						
Type of motor	DC magnet motor																						
Torque	Slip torque 1.0 – 5.9 N·m (10 – 60 kgf·cm, 8.7 – 52 in-lbs.) [22 stages] Max. torque High: 9 N·m (90 kgf·cm, 78 in-lbs.), Low: 36 N·m (367 kgf·cm, 319 in-lbs.)																						
Type of switch	Trigger switch with pushing button for forward and reverse rotation changeover (w/o stopper)																						
Handle configuration	T-type																						
Enclosure	Body Glassfiber reinforced polycarbonate resin (green) and thermoplastic elastomer (black) Battery ABS resin (black) Charger ABS resin (black)																						
Battery (Type EB 1220BL)	Sealed cylindrical nickel-cadmium storage battery Nominal voltage DC 12 V Nominal life Charging/discharging: Approx. 1,000 times (in the case of Model UC 14YFA) Nominal capacity 2.0Ah																						
Battery (Type EB 1222HL)	Sealed cylindrical nickel-metal-hydride storage battery Nominal voltage DC 12 V Nominal life Charging/discharging: Approx. 500 times (in the case of Model UC 14YFA) Nominal capacity 2.2 Ah																						
Charger (Model UC 14YFA)	Overcharge protection system: (1) Battery voltage detection (Δ^2V system) Battery voltage detection (dT/dt system) for Ni-MH battery (2) Battery surface temperature detection (thermostat or thermistor) (3) 120 minutes timer Power input: 56 W Charging time: Approx. 50 minutes [for type EB 1220BL battery at 20°C (68°F)] Approx. 55 minutes [for type EB 1222HL battery at 20°C (68°F)] Operable ambient temperature range: 0°C – 40°C (32°F – 104°F) The maximum allowable temperature of the type EB 1220BL battery is 60°C (140°F) and the type EB 1222HL battery is 45°C (113°F). Indication method of battery charging function: Pilot lamp indications <table border="1" data-bbox="402 1473 1396 1827"> <tr> <td rowspan="4">Red pilot lamp remains lit or flashes</td> <td>Prior to charging</td> <td>Blinks</td> <td>0.5 sec. ON 0.5 sec. OFF</td> <td></td> </tr> <tr> <td>During charging</td> <td>Lights</td> <td>Stays ON constantly</td> <td></td> </tr> <tr> <td>Charging completed</td> <td>Blinks</td> <td>0.5 sec. ON 0.5 sec. OFF</td> <td></td> </tr> <tr> <td>Charging not possible</td> <td>Flickers</td> <td>0.1 sec. ON 0.1 sec. OFF</td> <td>Battery or charger is faulty.</td> </tr> <tr> <td>Green pilot lamp is lit</td> <td>High battery temperature</td> <td>Lights</td> <td>Stays ON constantly</td> <td>Charging not possible because battery temperature is too high.</td> </tr> </table>	Red pilot lamp remains lit or flashes	Prior to charging	Blinks	0.5 sec. ON 0.5 sec. OFF		During charging	Lights	Stays ON constantly		Charging completed	Blinks	0.5 sec. ON 0.5 sec. OFF		Charging not possible	Flickers	0.1 sec. ON 0.1 sec. OFF	Battery or charger is faulty.	Green pilot lamp is lit	High battery temperature	Lights	Stays ON constantly	Charging not possible because battery temperature is too high.
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Green pilot lamp is lit	High battery temperature	Lights	Stays ON constantly	Charging not possible because battery temperature is too high.																			
Weight	Main body unit (including battery) 1.9 kg (4.2 lbs.) Charger unit (UC 14YFA (including cord) 0.6 kg (1.3 lbs.) Gross with charger (UC 14YFA) and case 5.4 kg (11.2 lbs.)																						
Standard accessories	Charger (UC 14YFA) 1 Extra battery 1 Phillips (plus) driver bit (No. 2) 1 Case 1																						

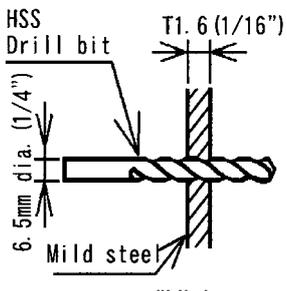
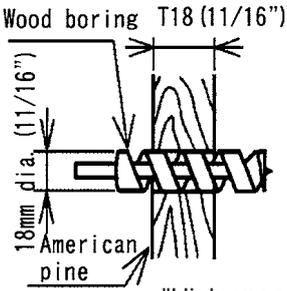
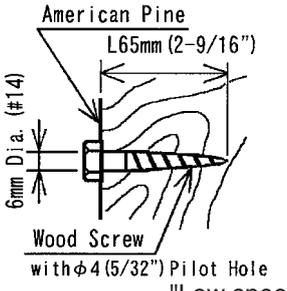
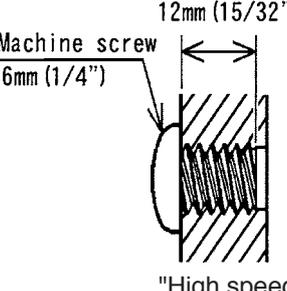
6. COMPARISONS WITH SIMILAR PRODUCTS

Maker		HITACHI		C	
Model		DS 12DVB2			
Max. capacity	Screwing	Machine screw	6 mm (1/4")	13 mm (1/2")	
		Wood screw	8 mm dia. x 38 mm (#20 x 1-1/2")	6 mm dia. x 75 mm (1/4" x 3")	
	Drilling	Mild steel	13 mm (1/2")	13 mm (1/2")	
		Aluminum	13 mm (1/2")	13 mm (1/2")	
		Soft wood	32 mm (1-1/4")	25.4 mm (1")	
Rotation speed (/min)	Low	0 – 350	0 – 400		
	High	0 – 1,300	0 – 1,300		
Slip torque		1.0 – 5.9 N·m 10 – 60 kgf·cm (8.7 – 52 in-lbs.) [22 stages]	Not indicated [16 stages]		
Max. torque		36 N·m (367 kgf·cm) (319 in-lbs.)	35 N·m (357 kgf·cm) (310 in-lbs.)		
Max. torque (hard joint) (Actually measured value)		— (46.0 N·m) (410 in-lbs.)	Not indicated (68.7 N·m) (620 in-lbs.)		
Battery	Nominal capacity	2.0/2.2 Ah	2.6 Ah		
	Nominal voltage	12 V	12 V		
	Charging time*	50/55 min.	60 min.		
Drill chuck	Capacity	13 mm (1/2")	13 mm (1/2")		
	Type	Single sleeve	Double sleeve		
	Locking device	Equipped	Equipped		
Spindle lock function		Equipped	None		
Soft-grip handle		Equipped	Equipped		
Switch	Feedback circuit	Equipped	Not indicated		
	Electric brake	Equipped	Equipped		
Dimensions	Overall length	241 mm (9-1/2")	243 mm (9-9/16")		
Weight		1.9 kg (4.2 lbs.)	2.0 kg (4.4 lbs.)		

Remarks* Charging time may vary depending on the type of charger to be used.

7. WORKING PERFORMANCE PER SINGLE CHARGE

Drilling and fastening performance comparison per charge

Test conditions	Maker	Model	Working capacity (*1)				Working time (sec./pc.)
			0	*400 100	*800 200	*1200 300	
 <p>HSS Drill bit T1.6 (1/16") 6.5mm dia. (1/4") Mild steel "High speed"</p>	HITACHI	DS 12DVB2	90				6.6
	C		80 (105)				6.4
 <p>Wood boring T18 (11/16") 18mm dia. (11/16") American pine "High speed"</p>	HITACHI	DS 12DVB2	205				1.3
	C		200 (260)				1.3
 <p>American Pine L65mm (2-9/16") 6mm Dia. (#14) Wood Screw with phi 4 (5/32") Pilot Hole "Low speed"</p>	HITACHI	DS 12DVB2	80				5.8
	C		80 (105)				5.8
 <p>Machine screw 6mm (1/4") 12mm (15/32") "High speed"</p>	HITACHI	DS 12DVB2	500				0.7
	C		505 (660)				0.7

Remark* Number of machine screws fastened per charge

Remark*1 Number of holes or fasteners per charge

The above table shows an example of test data. The batteries used in this test data are as follows:

Model DS 12DVB2 and C: 2.0 Ah

The figures in parentheses () indicate the values for a 2.6-Ah battery.

As actually measured values listed in the above table may vary depending on sharpness of the drill bit, workpiece hardness (particularly in wood materials), moisture content of wood, charging condition, operator skill, etc.

This data should be used as a comparative guide only.

8. PRECAUTIONS IN SALES PROMOTION

8-1. Safety Instructions

In the interest of promoting the safest and most efficient use of the Model DS 12DVB2 Cordless Driver Drill by all of our customers, it is very important that at the time of sale, the salesperson carefully ensures that the buyer seriously recognizes the importance of the contents of the Handling Instructions, and fully understands the meaning of the precautions listed on the Caution Plate and Name Plate attached to each tool.

A. Handling instructions

Salespersons must be thoroughly familiar with the contents of the Handling Instructions in order to give pertinent advice to the customer. In particular, they must have a thorough understanding of the precautions for use of the cordless tools which are different from those of ordinary electric power tools.

(1) Before use, ensure that the unit is fully charged.

New units are not fully charged. Even if the units were fully charged at the factory, long periods of inactivity, such as during shipping, cause the storage battery to lose its charge. Customers must be instructed to fully charge the unit prior to use.

(2) Connect the Charger to an AC power outlet only.

Use of any other power source (DC outlet, fuel powered generator, etc.) will cause the Charger to overheat and burn out.

(3) Do not use any voltage increasing equipment (transformer etc.) between the power source and the Charger.

If the Charger is used with voltage higher than that indicated on the unit, it will not function properly.

(4) Conduct battery charging at an ambient temperature range of 0 °C – 40 °C (32 °F – 104 °F).

Special temperature sensitive devices are employed in the Charger to permit rapid charging. Ensure that customers are instructed to use the Charger at the indicated ambient temperature range. At temperature under 0 °C (32 °F) the thermostat will not function properly, and the storage battery may be overcharged. At temperature over 40 °C (104 °F), the storage battery cannot be sufficiently charged. The optimum temperature range is 20 °C – 25 °C (68 °F – 77 °F).

(5) The battery charger should not be used continuously.

At high ambient temperature, if over three storage batteries are charged in succession, the temperature of the coils on the transformer will rise and there is a chance that the temperature fuse inserted in the interior of the transformer will inadvertently melt. After charging one battery, please wait about 15 minutes before charging the next battery.

(6) Do not insert foreign objects into the air vents on the Charger.

The Charger case is equipped with air vents to protect the internal electronic components from overheating. Caution the customer not to allow foreign materials, such as metallic or flammable objects, to be dropped or inserted into the air vents. This could cause electrical shock, fire, or other serious hazards.

(7) Do not attempt to disassemble the Storage Battery or the Charger.

Special devices, such as a thermostat, are built into the storage battery and charger to permit rapid charging. Incorrect parts replacement and/or wiring will cause malfunctions which could result in fire or other hazards. Instruct the customer to bring these units to an authorized service center in the event repair or replacement is necessary.

(8) Disposal of the Type EB 1220BL or EB 1222HL Storage Battery

Ensure that all customers understand that Type EB 1220BL or EB 1222HL Storage Battery should be returned to the Hitachi power tool sales outlet or the authorized service center when it is no longer capable of being recharged or repaired. If thrown into a fire, the battery may explode, or, if discarded indiscriminately, leakage of the cadmium compound contained in the battery may cause environmental pollution.

B. Caution plates

(1) The following cautions are listed on the Name Plate attached to the main body of each tool.

For the U.S.A. and Canada

Warning

- To reduce the risk of injury, user must read and understand Instruction Manual.

AVERTISSEMENT

- Afin de réduire le risque de blessures, l'utilisateur doit lire et bien comprendre le mode d'emploi.

(2) The following cautions are listed on the Name Plate attached to each Type EB 1220BL or EB 1222HL Storage Battery.

For Europe, Asia and Oceania

CAUTION

- Read thoroughly HANDLING INSTRUCTIONS before use.
- Do not disassemble nor throw into fire.

For the U.S.A. and Canada

CAUTION

- For safe operation, see Instruction Manual.
- Use HITACHI charger recommended in instruction manual for recharging.

(3) The following caution is listed on the Name Plate attached to the Model UC 14YFA Charger.

For the U.S.A and Canada

CAUTION

- For safe operation, see Instruction Manual.
- Use HITACHI rechargeable batteries types EB 7, EB 9, EB 12, EB 14 series. Other types of batteries may burst causing personal injury and damage.
- Charge between 32 and 104°F. Rest 15 minutes between the charging of batteries.
- Indoor use only.
- Replace defective cord immediately.

8-2. Inherent Drawbacks of Cordless Driver Drills Requiring Particular Attention During Sales Promotion

The cordless driver drill offers many advantages; it can be used in places where no power source is available, the absence of a cord allows easy use, etc. However, any cordless tool has certain inherent drawbacks.

Salespersons must be thoroughly familiar with these drawbacks in order to properly advise the customer in the most efficient use of the tool.

A. Suggestions and precautions for the efficient use of the tool

(1) Use the Cordless Driver Drill for comparatively light work.

Because it is battery driven, the output of the motor in the cordless driver drill is rather low in comparison with conventional electric power tools. Accordingly, it is not suitable for continuous drilling of many holes in succession, or for drilling into particularly hard materials which creates a heavy load. Salespersons should recommend conventional electric power tools for such heavy work.

(2) Drilling of large diameter holes should be conducted at low speed.

Instruct the customer that drilling of large diameter holes or other work which requires particularly strong torque should be done at low speed. Because there is less torque at high speed, attempting such work at high speed will not improve working efficiency.

(3) Do not insert a foreign object into body vent holes.

The body of this tool has vent holes for improving the cooling efficiency. As a fan is built into the motor, a foreign object inserted through a vent hole may cause a failure. Please instruct customers to never insert a foreign object into the vent hole.

(4) Avoid "Locking" of the motor.

Locking of the motor will cause an overload current that could result in burning of the motor and/or rapid deterioration of the battery. Salespersons should advise the customer to immediately release the switch and stop operation if the motor becomes locked. (A jammed drill bit can be disengaged from the workpiece material by setting the switch to reverse rotation, or by manually turning the main body of the tool.)

(5) Variation in amount of work possible per charge

Although the nominal chargeable capacity of the storage batteries used with the Model DS 12DVB2 is 2.0 Ah, or 2.2 Ah, the actual capacity may vary within 10% of that value depending on the ambient temperature during use and charging, and the number of times the batteries have been recharged. It should be noted that other factors which may have a bearing on the amount of work possible per charge are the working conditions (ambient temperature, type and moisture content of the workpiece, sharpness of the drill bit, etc.) and the operational skill of the user.

(6) Precautions in the use of HSS Drill Bits

Although the Model DS 12DVB2 is designed for drilling capacities of 32 mm (1-1/4") in wood, and 13 mm (1/2") in aluminum and mild steel, this capability is not as efficient as conventional electric power tools. In particular, when drilling through aluminum material with a 13 mm (1/2") drill bit, the drill tends to become locked when the drill bit penetrates through the material. For this reason, the customer should be cautioned to reduce the thrust on the main body of the drill when drilling completely through the material to avoid locking the tool. Repeated locking of the drill causes excessive current flow from the batteries which not only decreases the amount of work possible per charge, but could also result in burning of the motor.

(7) Securely tighten the sleeve of the keyless chuck.

The keyless chuck may slip during operation if the shape of the drill bit shank is cylindrical depending on the surface conditions, materials, etc. Please instruct the customers to retighten the keyless chuck more securely if the keyless chuck slips during operation. The holding force of the keyless chuck is increased as the tightening force of the keyless chuck is increased. The Model DS 12DVB2 is equipped with the locking device to prevent loosening of the keyless chuck. The sleeve makes noise when tightening or loosening. This is because of the locking device and there is no problem.

(8) Avoid continuous use.

Although the Model DS 12DVB2 can bear continuous operation under certain conditions, operating conditions are different depending on material of workpiece and sharpness of the drill bit in use. Please instruct the customers to avoid continuous use of the Model DS 12DVB2 and take a pause about 15 minutes after a single charge operation as a guide.

B. Suggestions and precautions for the efficient use of the charger and storage batteries

If any of the storage batteries Types EB 1220BL and EB 1222HL is exposed to direct sunlight for an extended period or if the temperature of the battery is high immediately after it has been used in the tool, the pilot lamp (red) may not be turned on when the battery is connected to the charger. Chargeable temperature ranges of each type of battery are specified as follows.

Type EB 1220BL: from -5°C to 60°C (from 23°F to 140°F)

Type EB 1222HL: from 0°C to 45°C (from 32°F to 113°F)

In such a case, the customer should be advised to place the battery in a shaded area with a good airflow, and allow sufficient cooling before recharging. This phenomenon is common to all existing batteries that employ a thermostat. The cooling time required before charging varies from a few minutes to about 30 minutes, depending on the load, duration of use, and ambient temperature.

9. REFERENCE MATERIALS

9-1. Speed Control Mechanism

Spindle rotation speed of the Model DS 12DVB2 can be controlled by simply varying the amount by which the trigger switch is depressed. The relationship between the amount the trigger switch is depressed (in millimeters) and the rotation speed is illustrated in Fig. 3.

Note: The gradient and values illustrated in Fig. 3 are intended for reference only, and will vary slightly due to differences in the discharge condition of the battery, the ambient temperature, and individual speed-control element accuracy.

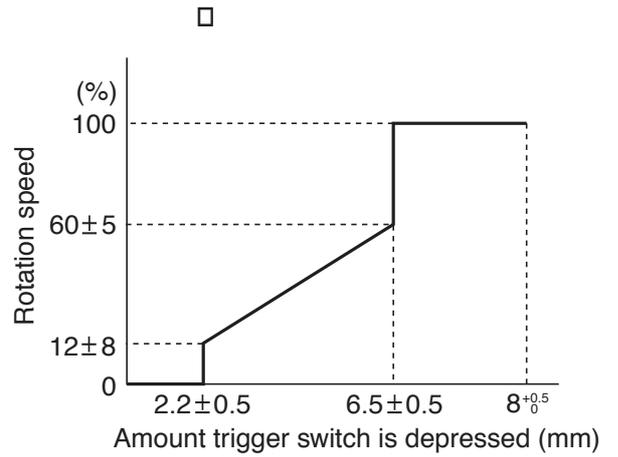


Fig. 3

10. REPAIR GUIDE

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

10-1. Precautions in 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 12DVB2.

10-1-1. Disassembly

(1) Removal of the Drill Chuck 13VLRG-N (W/O Chuck Wrench) **[2]** (See Fig. 4.)

Remove the Drill Chuck 13VLRG-N (W/O Chuck Wrench) **[2]** of the fully assembled main body in accordance with the following procedures.

- (a) Fully open the jaws of the Drill Chuck 13VLRG-N (W/O Chuck Wrench) **[2]**, and turn the Special Screw (Left Hand) M6 x 23 **[1]** clockwise and remove it. Take care that it is left-hand threaded.
- (b) Turn the hexagonal portion at the tip of the Drill Chuck 13VLRG-N (W/O Chuck Wrench) **[2]** counterclockwise with a 19-mm socket wrench to remove the Drill Chuck 13VLRG-N (W/O Chuck Wrench) **[2]** as shown in Fig. 4. If it is difficult to loosen, use a pipe extension or similar tool. 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 vise to protect Housing (A).(B) Set **[32]** from scratching.

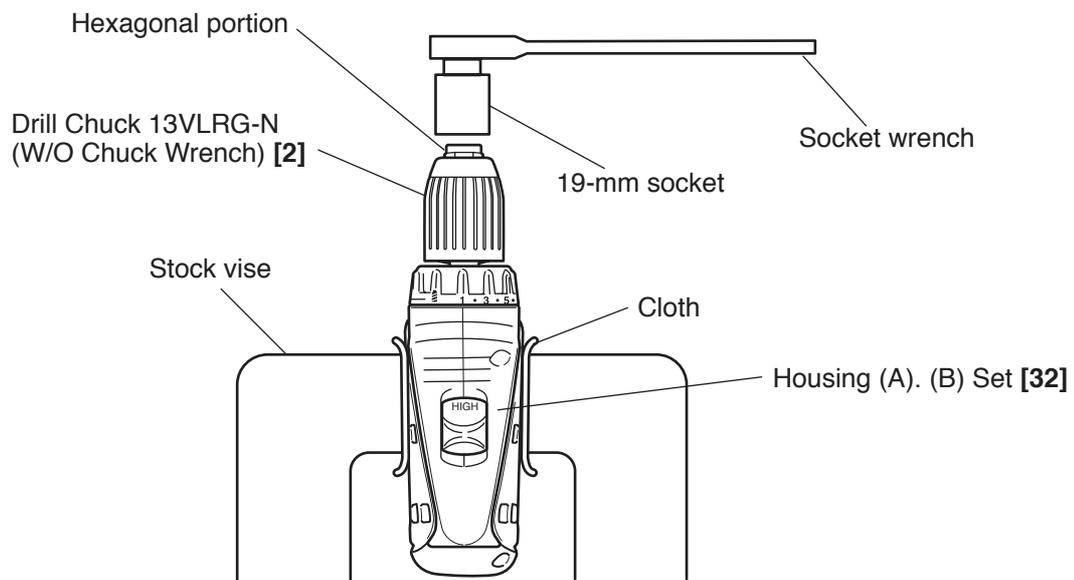


Fig. 4

(2) Removal of Housing (B) **[32]**

First, align the number "22" on the Cap **[4]** with the triangle mark on Housing (A). (B) Set **[32]**. Remove the seven Tapping Screws (W/Flange) D3 x 16 (Black) **[29]** secured to the main body. Gently open Housing (A). (B) Set **[32]** while holding their battery loading sections.

(3) After Housing (B) **[32]** has been removed, all the internal parts, assembled or separate, can be taken out as they are. Lift the entire contents from Housing (A) **[32]** while holding the Motor **[28]** and the Cap **[4]**.

(4) Disassembly of the gear unit

- (a) Remove the Cap [4] from the Front Case [9]. Take care not to remove the Nut [6] from the Front Case [9] in this operation.
- (b) Turn the Motor [28] counterclockwise when viewed from the rear and remove it from the Rear Case [17].
- (c) Remove the Shift Arm [19] from the Rear Case [17], and remove the Shift Knob [38] from the Shift Arm [19].
- (d) Remove the Screw Set D3 x 12 (4 pcs.) [18] connecting the Front Case [9] and the Rear Case [17].
- (e) Remove Washer (A) [16], Planet Gear (C) Set (3 pcs.) [15], Carrier [14], Ring Gear [13], Lock Ring [12], six Steel Balls D5 [11] and six Rollers [10] in sequence from the Front Case [9]. Take care not to lose the six Steel Balls D5 [11] and the six Rollers [10] in this operation.

(5) Removal of the Spring [7] and the Thrust Washer [8]

Turn the Nut [6] counterclockwise and remove it from the Front Case [9], then remove the Spring [7] and Thrust Washer [8] from the Front Case [9].

(Note) Do not disassemble the Front Case [9].

(6) Disassembly of the power supply unit

(Note) Do not remove the fin secured to the DC-Speed Control Switch [35] with a screw.

Remove the two Machine Screws (W/Sp. Washer) M4 x 6 or 8 [31], and take the Motor [28] and the Motor Spacer [27] apart. Disconnect the Internal Wires [33] and [34] from the Motor [28] with a soldering iron, then disconnect them from the DC-Speed Control Switch [35] with a soldering iron in the same manner.

10-1-2. 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. 5.)

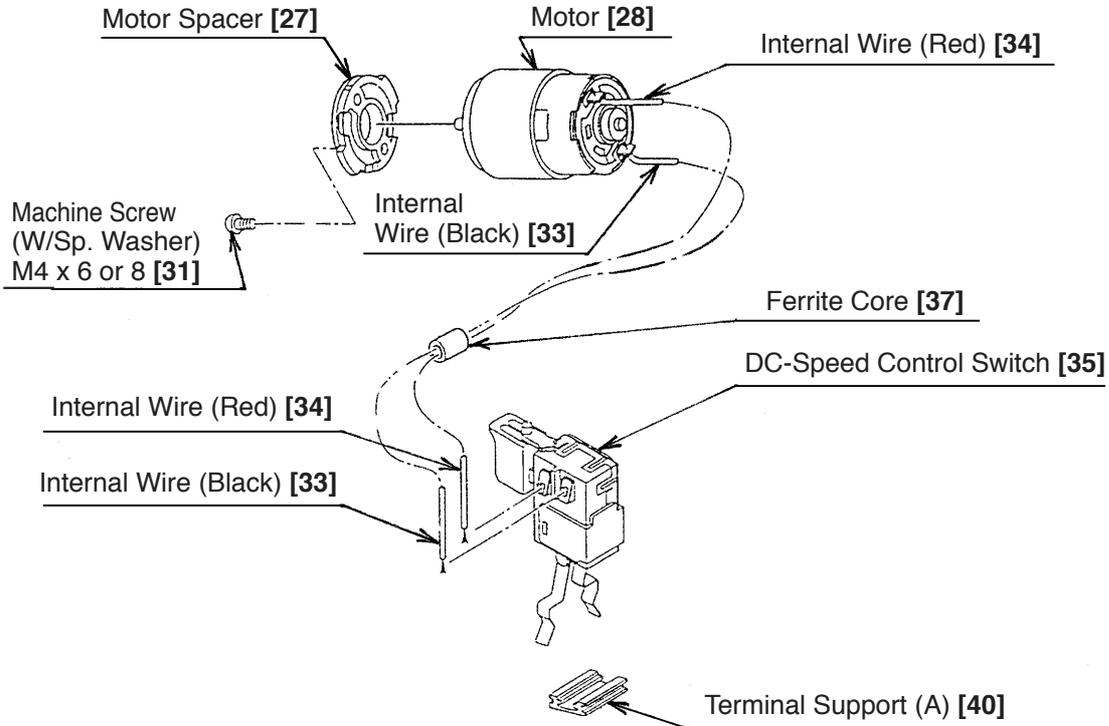


Fig. 5

(b) Pay attention to the polarity of the Motor [28] when soldering Internal Wires [33] and [34] to the Motor [28].

The red-marked side of the Motor [28] is positive. (See Fig. 6.)

(c) Apply grease (Hitachi Motor Grease No. 29, Code No. 930035 is recommended) to the pinion press-fitted on the Motor [28] shaft.

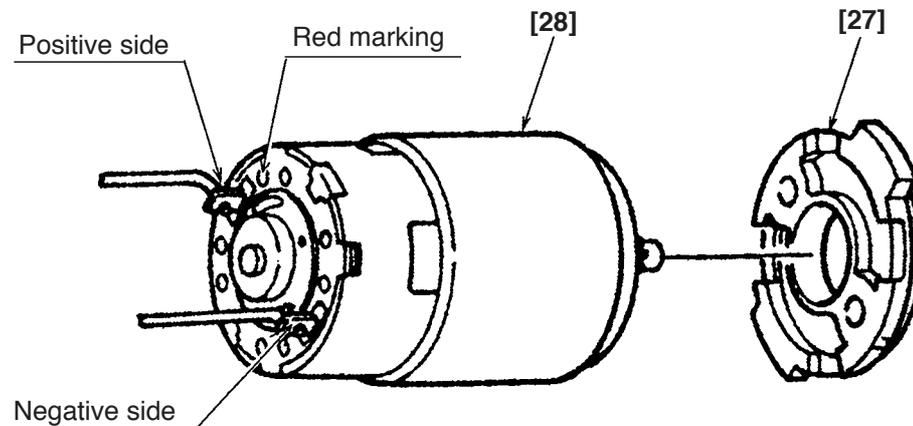


Fig. 6

(2) Reassembly of the clutch unit

Mount the Thrust Washer [8], Spring [7] and Nut [6] to the Front Case [9].

Screw the Nut [6] in the Front Case [9] about one and a quarter turns. (See Fig. 7.)

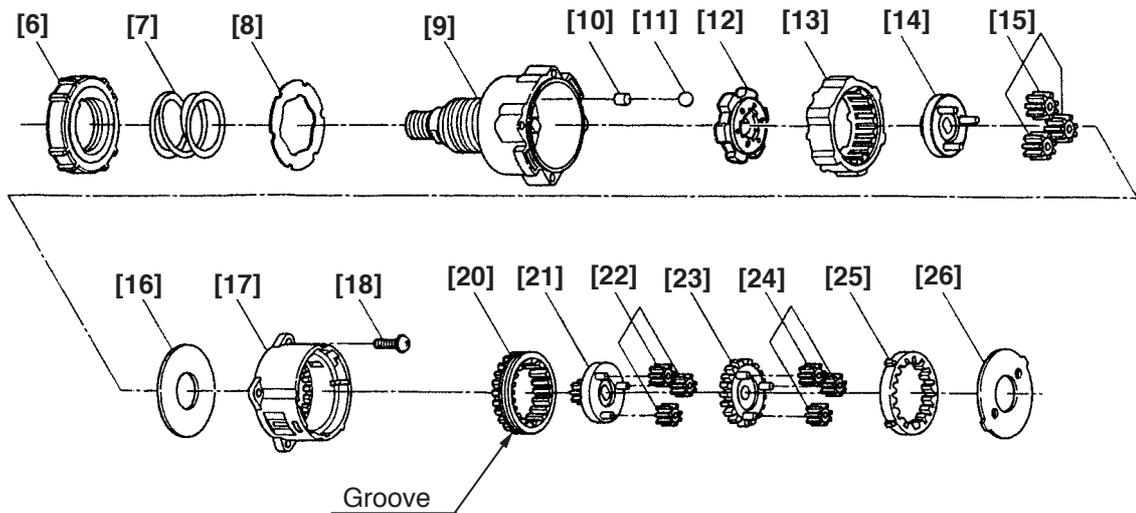


Fig. 7

(3) Reassembly of the gear unit

(a) Apply grease approx. 1.2 g (Hitachi Motor Grease No. 29, Code No. 930035) to the shaded portion in the Front Case [9]. (See Fig. 8.)

(NOTE) Be sure to apply grease to the shaded portion in the Front Case [9]. Otherwise, the spindle lock may not work properly.

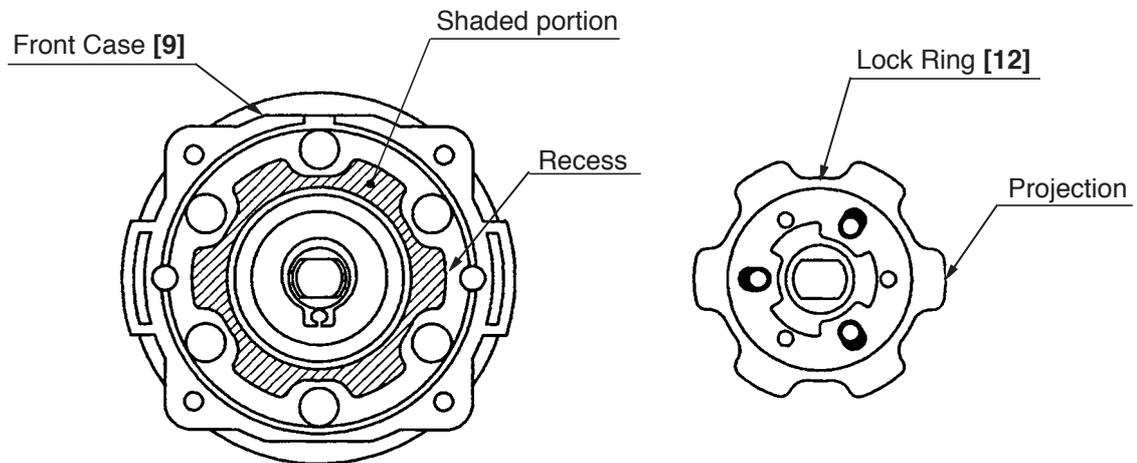


Fig. 8

(b) Apply grease (Hitachi Motor Grease No. 29, Code No. 930035) to the meshing parts of the gear.

(c) Install the six Rollers [10] and six Steel Balls D5 [11] into the assembly reassembled in step (2).

(See Fig. 7.)

(d) 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]. (See Figs. 8 and 9.)

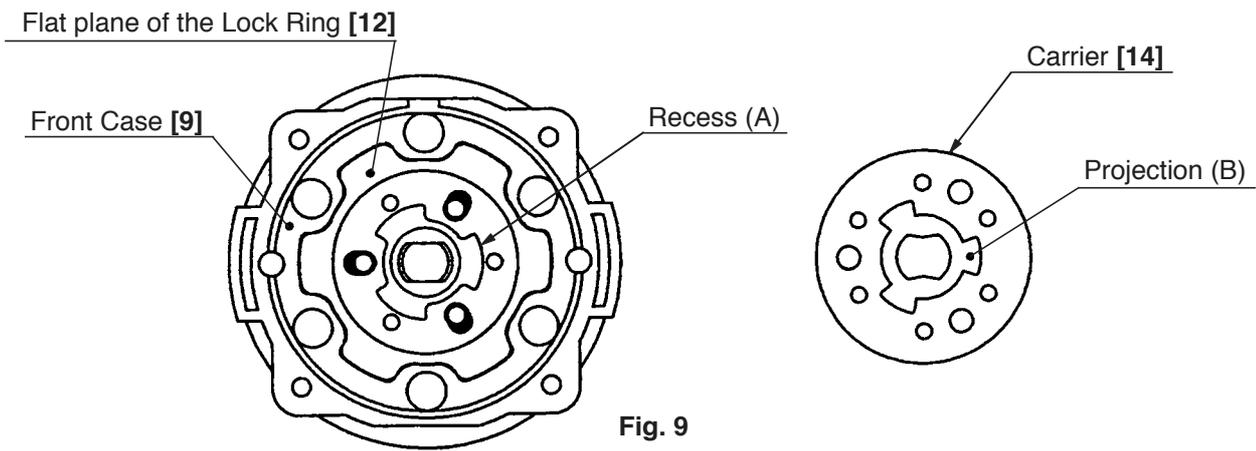


Fig. 9

(e) Install the Carrier [14]

Assemble so that recess (A) on the Lock Ring [12] is aligned with projection (B) on the Carrier [14]. (Be careful of the direction.) Then make sure that the flat plane of the spindle faces the flat plane of the Carrier [14]. If assembled in wrong direction, the flat plane of the spindle may be stopped at the position about 2 mm lower than the flat plane of the Carrier [14]. (See Figs. 9 and 10.)

(NOTE) When reassembling the Carrier [14] to the Lock Ring [12], never apply the grease between the plate of the Lock Ring [12] and the Carrier [14]. Otherwise, the spindle lock may not work properly.

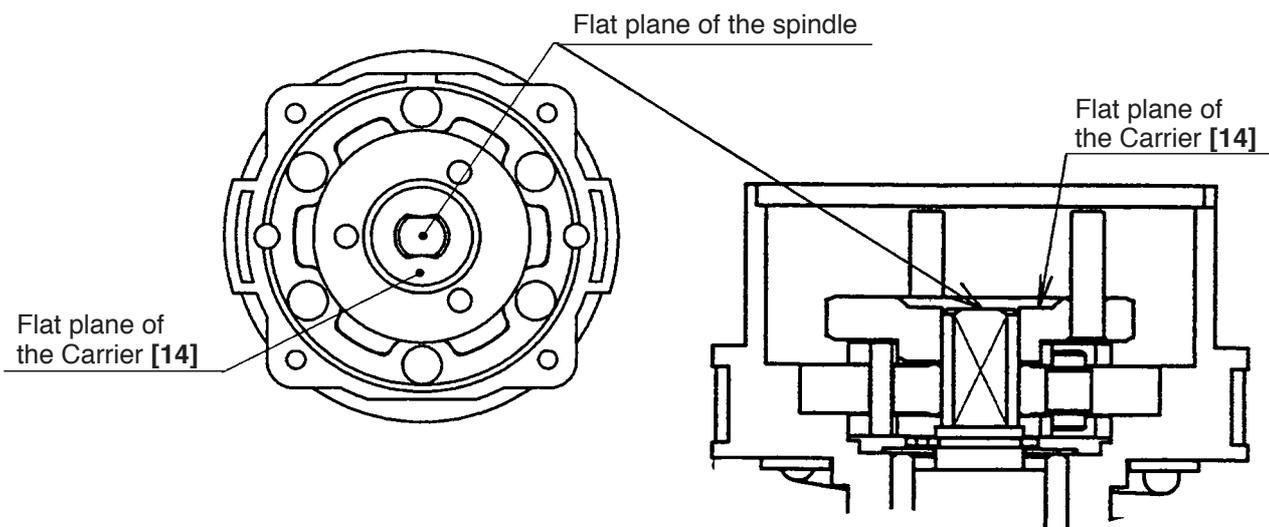


Fig. 10

- (f) Install the Ring Gear [13] and Washer (B) [26] of Planet Gear (C) Set [15] into the assembly assembled in step (3) (e). (See Fig. 7.)
- (i) Note the direction of the groove when installing the Slide Ring Gear [20] so that the groove faces toward the Motor [28].
- (ii) Install Washer (B) [26] in the Rear Case [17] with the projections of Washer (B) [26] engaged with the recesses in the Rear Case [17], and turn Washer (B) [26] clockwise until it can turn no further. (See Fig. 11.)

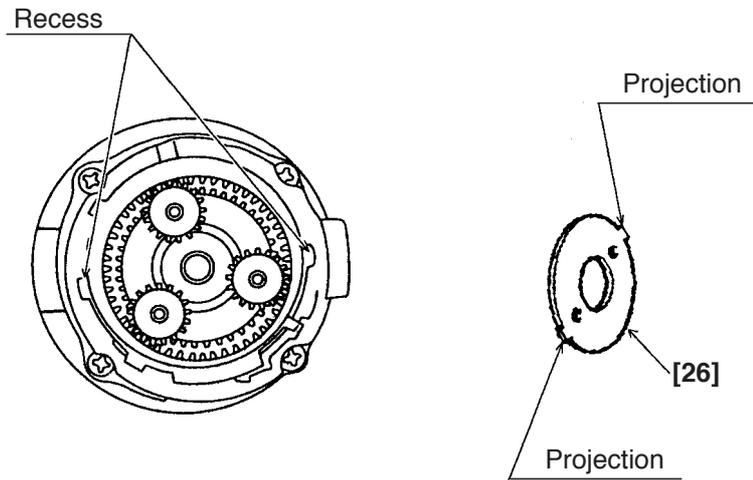


Fig. 11

- (g) Install the Click Spring [5] and the Cap [4] to the assembly reassembled in step (f). (See Fig. 12.)
- (i) Insert the ridge and the projections of the Click Spring [5] into the holes of the Cap [4].
- (ii) When the Nut [6] is screwed in the Front Case [9] about one and a quarter turns, the three projections of the Nut [6] and the marking of the Rear Case [17] are positioned as shown in Fig. 12. Mount the Cap [4] aligning the ridge of the Click Spring [5] with the three projections of the Nut [6].

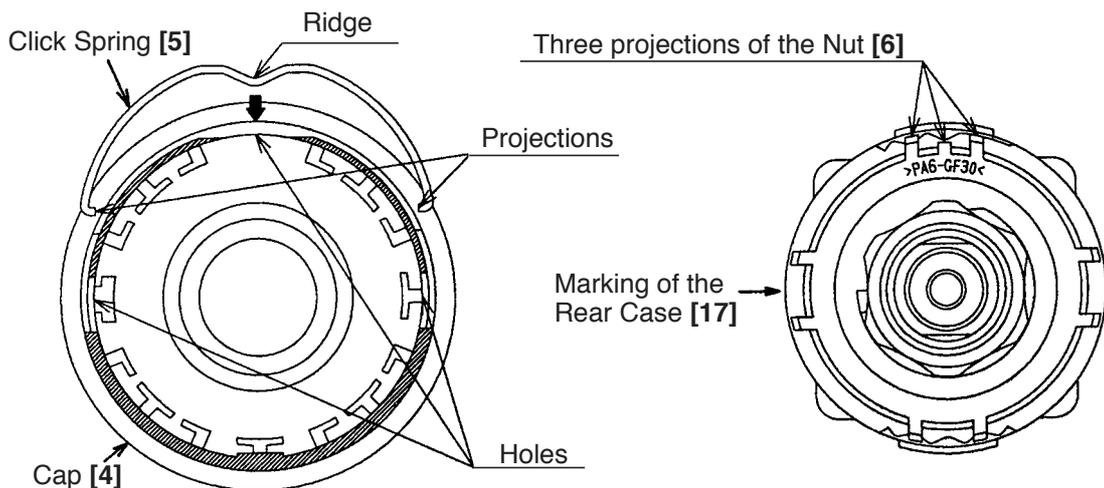


Fig. 12

(h) Install the Shift Arm [19] into the assembly reassembled in step (g).

With the ridge at the Shift Arm [19] facing the Motor [28] side, first install them on the unmarked side of the assembly reassembled in step (g). Then insert the projections on the Shift Arm [19] into the holes in the Rear Case [17] and make sure that the projections are fitted into the grooves in the Slide Ring Gear [20] mounted within the Rear Case [17]. (See Fig. 13.)

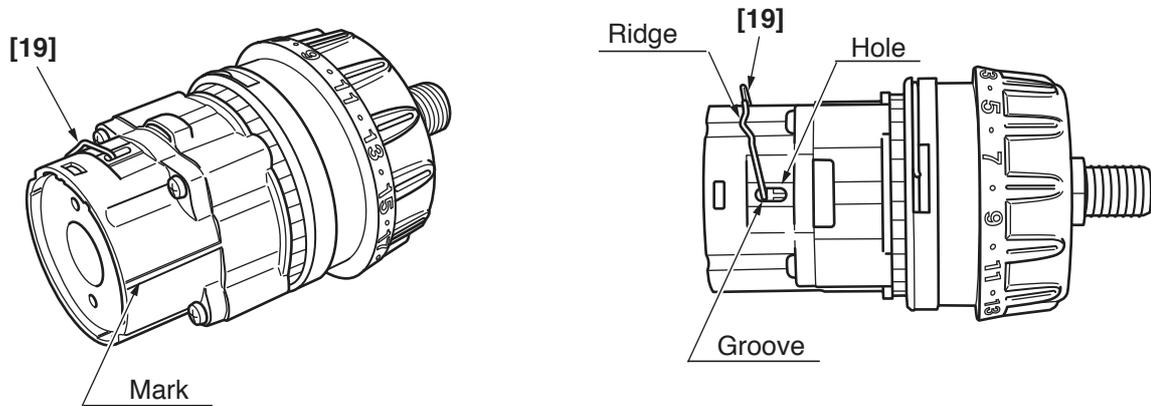


Fig. 13

(i) Install the Drill Chuck 13VLRG-N (W/O Chuck Wrench) [2].

Install the Drill Chuck 13VLRG-N (W/O Chuck Wrench) [2] using a socket wrench 19 mm etc. and secure it with the Special Screw (Left Hand) M6 x 23 [1].

(j) Install the Shift Knob [38] into the assembly reassembled in step (i).

When installing the Shift Knob [38] into the Shift Arm [19], note that the "LOW" mark on the Shift Knob [38] faces the Motor [28] with the Shift Arm [19] engaged with the recess in the Shift Knob [38].

(k) Install the assembly reassembled in step (1) and the assembly reassembled in step (j) together.

(See Fig. 14.)

Fit the projection on the Motor Spacer [27] into the recess in the Rear Case [17] while ensuring that the Shift Knob [38] is aligned with the positive side of the Motor [28] and turn the Motor Spacer [27] clockwise when viewed from the rear of the Motor [28] until it can turn no further. During installation, make sure that the pinion press-fitted onto the shaft of the Motor [28] and Planet Gear (A) Set (3 pcs.) [24] mesh properly.

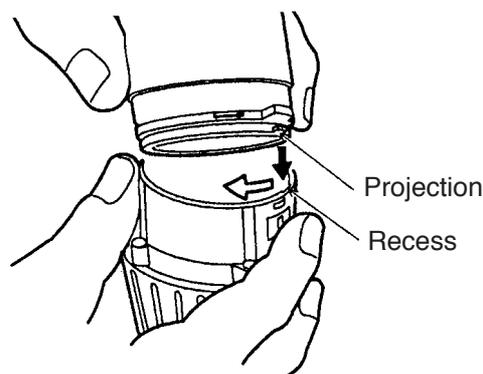


Fig. 14

(4) Installation of the assembly reassembled in step (3) into Housing (A). (B) Set [32]

(a) Install the Pushing Button [36] into Housing (B) [32]. (See Fig. 15.)

(b) Install the assembly reassembled in step (3) into Housing (A) [32]. Note that the projections on the Front Case [9] and the Motor Spacer [27] are engaged in the recesses in Housing (A) [32], and the projection on Housing (A) [32] is engaged in the groove of the Cap [4]. (See Fig. 16.)

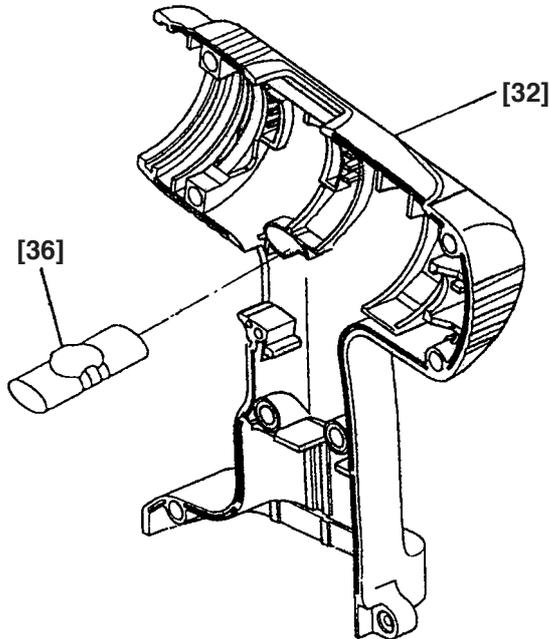


Fig. 15

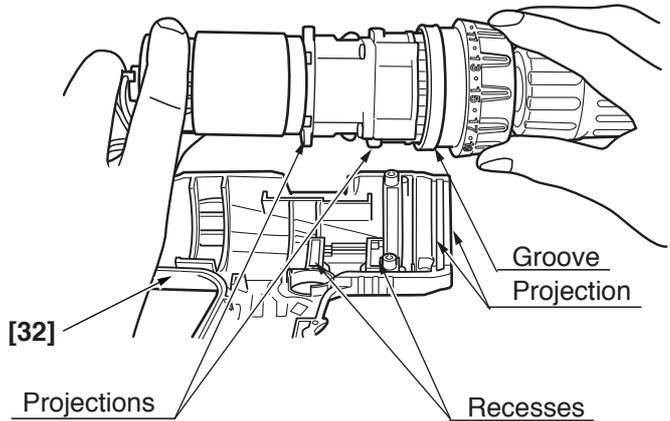


Fig. 16

(c) Set the assembly reassembled in step (b) to Housing (B) [32] and secure it with the seven Tapping Screws (W/Flange) D3 x 16 (Black) [29].

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

When the assembly procedure up to step (c) is completed, ensure that the number "1" on the Cap [4] and the drill mark "◁▷▷▷" are in alignment with the triangle mark on Housing (A). (B) Set [32]. If the Cap [4] turns loosely, correctly re-install the Click Spring [5] as it is improperly installed. If the number "1" on the Cap [4] or the drill mark "◁▷▷▷" cannot reach the triangle mark on Housing (A). (B) Set [32], correctly re-install the Cap [4] referring to step (3) (c), as it is improperly installed.

(5) Other precautions in reassembly

(a) When the assembly procedure is completed, make sure that the turning direction of the Drill Chuck 13VLRG-N (W/O Chuck Wrench) [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 13VLRG-N (W/O Chuck Wrench) [2] should turn clockwise when viewed from the rear (opposite side of the Drill Chuck 13VLRG-N (W/O Chuck Wrench) [2]). Also make sure that the turning speed of the Drill Chuck 13VLRG-N (W/O Chuck Wrench) [2] switches between "HIGH" and "LOW" by switching over the Shift Knob [38]. Switch on and off the Model DS 12DVB using the battery. Then turn the Drill Chuck 13VLRG-N (W/O Chuck Wrench) [2] by hand in forward and reverse direction to check that the spindle lock properly works in either direction within a half rotation. Make sure that the run-out of the Drill Chuck 13VLRG-N (W/O Chuck Wrench) [2] holding a 12 mm dia. test bar is below 0.8 mm at a distance of 110 mm from the chuck end.

(b) The tightening torque of each screw is given below.

Special Screw (Left Hand) M6 x 23 [1]	: 2.9 – 3.9 N·m (30 – 40 kgf·cm, 26.1– 34.8 in-lbs.)
Drill Chuck 13VLRG-N (W/O Chuck Wrench) [2]	: 17.7 – 21.6 N·m (180 – 220 kgf·cm, 156 – 191 in-lbs.)
Screw Set D3 x 12 (4 pcs.) [18]	: 0.6 – 1.0 N·m (6 – 10 kgf·cm, 5.2 – 8.7 in-lbs.)
Machine Screw (W/Sp. Washer) M4 x 6 or 8 [31]	: 1.1 – 1.9 N·m (11 – 19 kgf·cm, 9.5 – 16.5 in-lbs.)
Tapping Screw (W/Flange) D3 x 16 (Black) [29]	: 1.1 – 1.9 N·m (11 – 19 kgf·cm, 9.5 – 16.5 in-lbs.)

10-2. Precautions in Disassembly and Reassembly of Battery Charger

Please refer to the Technical Data and Service Manual for precautions in disassembly and reassembly of the Battery Charger UC 14YFA.

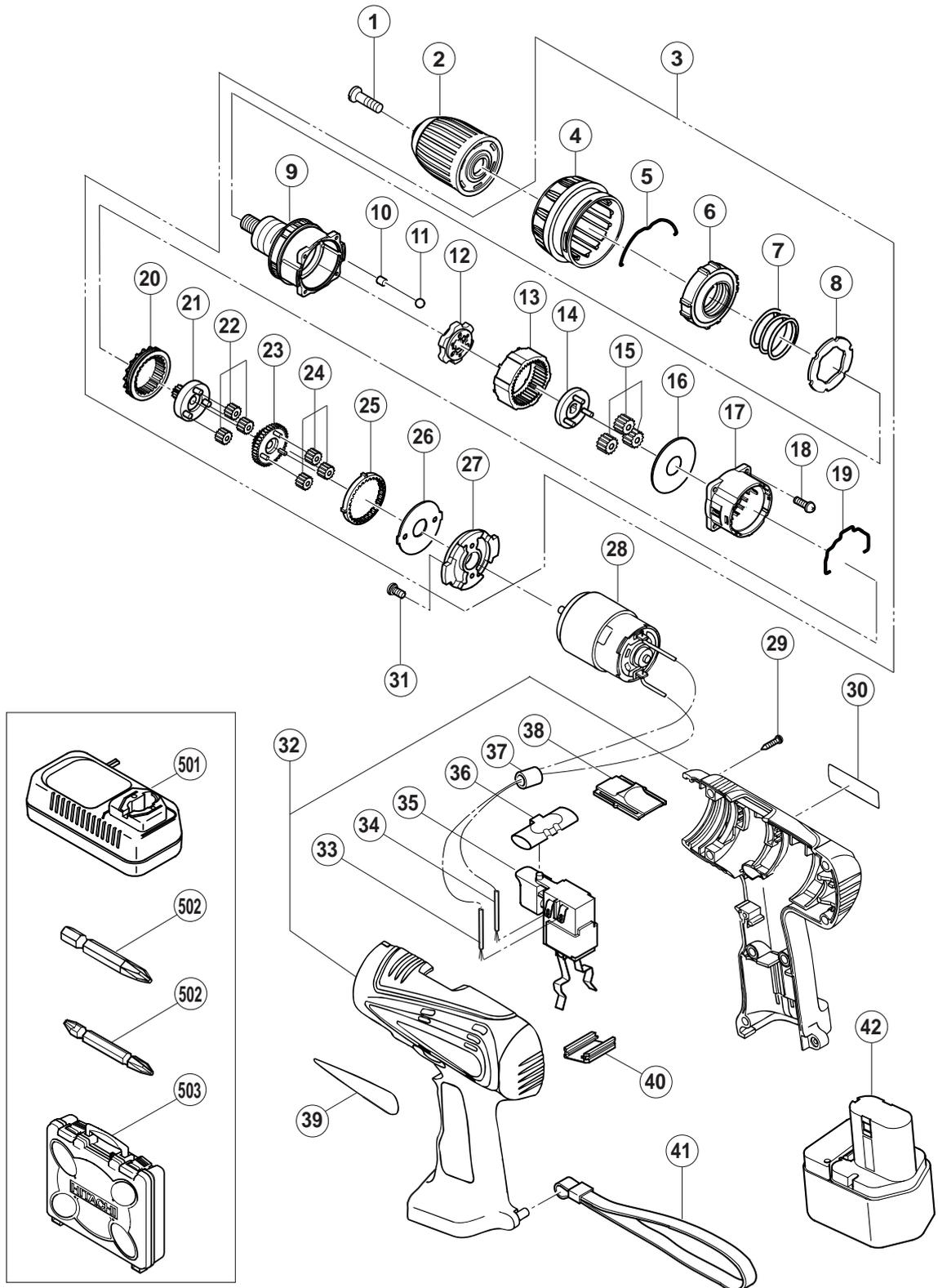
11. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		10	20	30	40	50	60
	Fixed							
DS12DVB2		Work Flow						
		General Assembly	Hook Ass'y Drill Chuck (W/O Chuck Wrench)	Housing (A).(B) Set Motor DC-Speed Control Switch Shift Knob Gear Box Ass'y Cap Click Spring Nut Spring Front Case Lock Ring or Space Washer Ring Gear Carrier Planet Gear (C) Set Rear Case Shift Arm Slide Ring Gear Pinion (C) Planet Gear (B) Set Pinion (B) Planet Gear (A) Set First Ring Gear				

ELECTRIC TOOL PARTS LIST

CORDLESS DRIVER DRILL
Model DS 12DVB2

2004 • 4 • 20
(E1)



PARTS

DS 12DVB2

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
1	311-959	SPECIAL SCREW (LEFT HAND) M6X23	1		
2	320-684	DRILL CHUCK 13VLRG-N (W/O CHUCK WRENCH)	1		
3	320-926	GEAR BOX ASS'Y	1	INCLUD. 4-27	
4	319-755	CAP	1		
5	319-754	CLICK SPRING	1		
6	319-743	NUT	1		
7	319-742	SPRING	1		
8	319-741	THRUST WASHER	1		
9	320-927	FRONT CASE	1		
10	319-744	ROLLER	6		
11	306-936	STEEL BALL D5	6		
12	320-928	LOCK RING	1		
13	319-745	RING GEAR	1		
14	320-929	CARRIER	1		
15	319-769	PLANET GEAR (C) SET (3 PCS.)	3		
16	312-704	WASHER (A)	1		
17	319-748	REAR CASE	1		
18	312-712	SCREW SET D3X12 (4 PCS.)	4		
19	319-753	SHIFT ARM	1		
20	319-750	SLIDE RING GEAR	1		
21	319-749	PINION (C)	1		
22	319-768	PLANET GEAR (B) SET (3 PCS.)	3		
23	319-751	PINION (B)	1		
24	319-767	PLANET GEAR (A) SET (3 PCS.)	3		
25	319-752	FIRST RING GEAR	1		
26	312-716	WASHER (B)	1		
27	316-955	MOTOR SPACER	1		
28	320-931	MOTOR	1		
29	313-687	TAPPING SCREW (W/FLANGE) D3X16 (BLACK)	7		
30		NAME PLATE	1		
*	31	958-523	MACHINE SCREW (W/SP. WASHER) M4X8	2	
*	31	317-333	MACHINE SCREW (W/SP. WASHER) M4X6	2	FOR USA, CAN, AUS, NZL
	32	320-930	HOUSING (A).(B) SET	1	
*	33	320-159	INTERNAL WIRE (BLACK) 160L	1	
*	33	319-759	INTERNAL WIRE (BLACK) 100L	1	FOR USA, CAN, AUS, NZL
	34	319-758	INTERNAL WIRE (RED) 130L	1	
	35	318-245	DC-SPEED CONTROL SWITCH	1	
	36	319-760	PUSHING BUTTON	1	
*	37	318-247	FERRITE CORE	1	EXCEPT FOR USA, CAN, AUS, NZL
	38	318-234	SHIFT KNOB	1	
	39		HITACHI LABEL	1	
	40	315-141	TERMINAL SUPPORT (A)	1	
	41	306-952	STRAP (BLACK)	1	
*	42	320-387	BATTERY EB 1220BL (W/ENGLISH N.P.)	2	
*	42	320-386	BATTERY EB 1220BL (W/ENGLISH N.P.)	2	FOR USA, CAN
*	42	320-685	BATTERY EB 1220BL (W/ENGLISH N.P.)	2	FOR NZL
*	42	320-686	BATTERY EB 1222HL (W/ENGLISH N.P.)	2	FOR BEL

