

MODEL

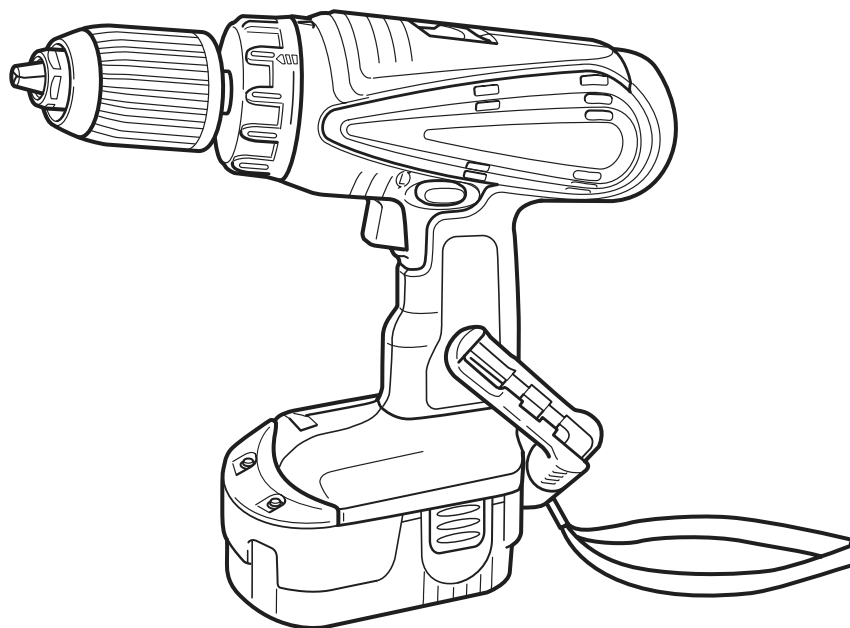
DS 18DVB2

Hitachi
Power Tools

CORDLESS DRIVER DRILL
DS 18DVB2

TECHNICAL DATA
AND
SERVICE MANUAL

D



LIST No. G806

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	6347D



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1. PRODUCT NAME

Hitachi 18 V Cordless Driver Drill, Model DS 18DVB2

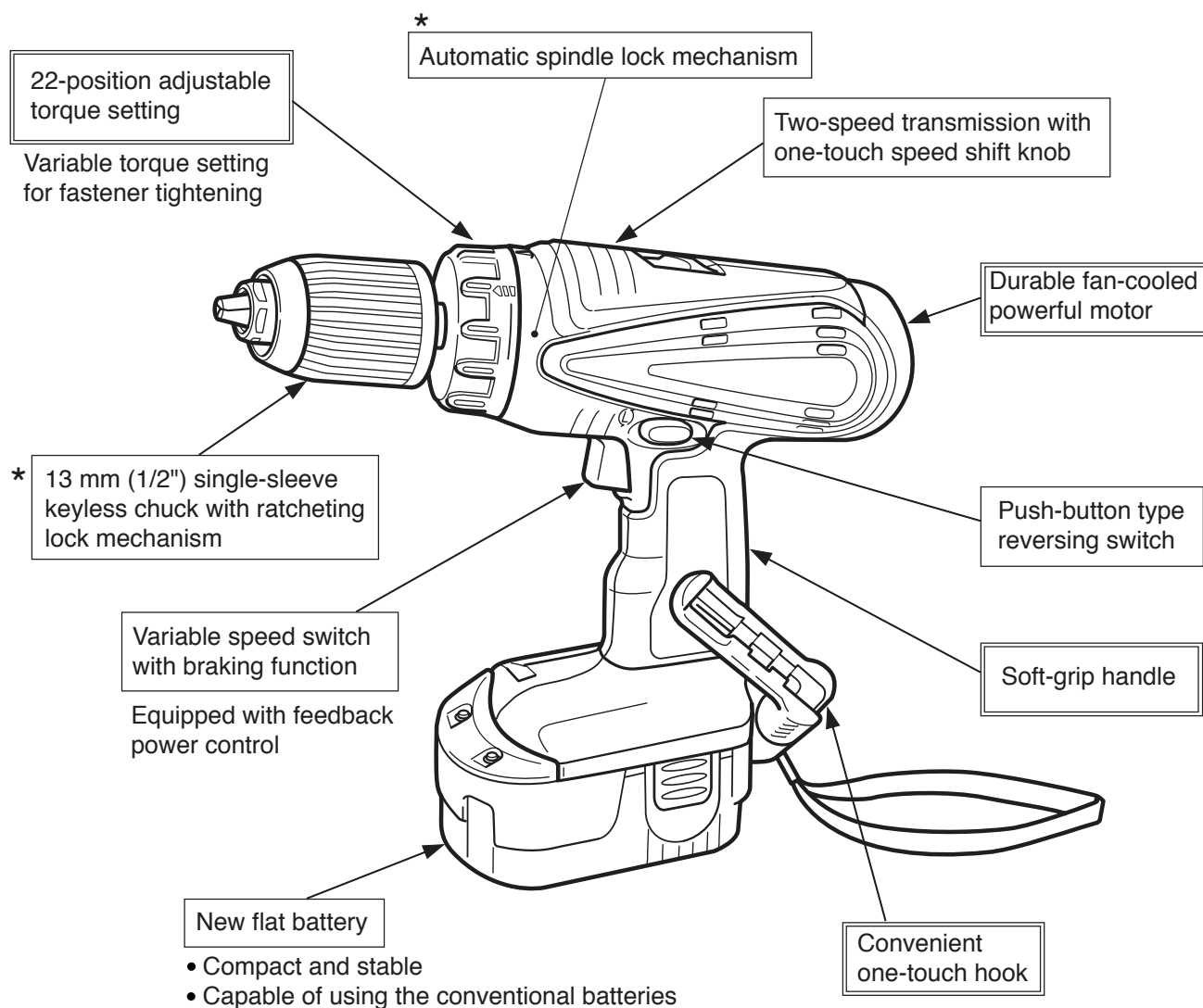
2. MARKETING OBJECTIVE

The current Model DS 18DVB is popular as a professional-use 18 V cordless driver drill. However, about three years have already passed since the sales start. To cope with this situation, the model is upgraded to the more convenient Model DS 18DVB2 equipped with a convenient hook and 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



* 13 mm (1/2") double-sleeve keyless chuck specification: The automatic spindle lock mechanism is not provided.

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.

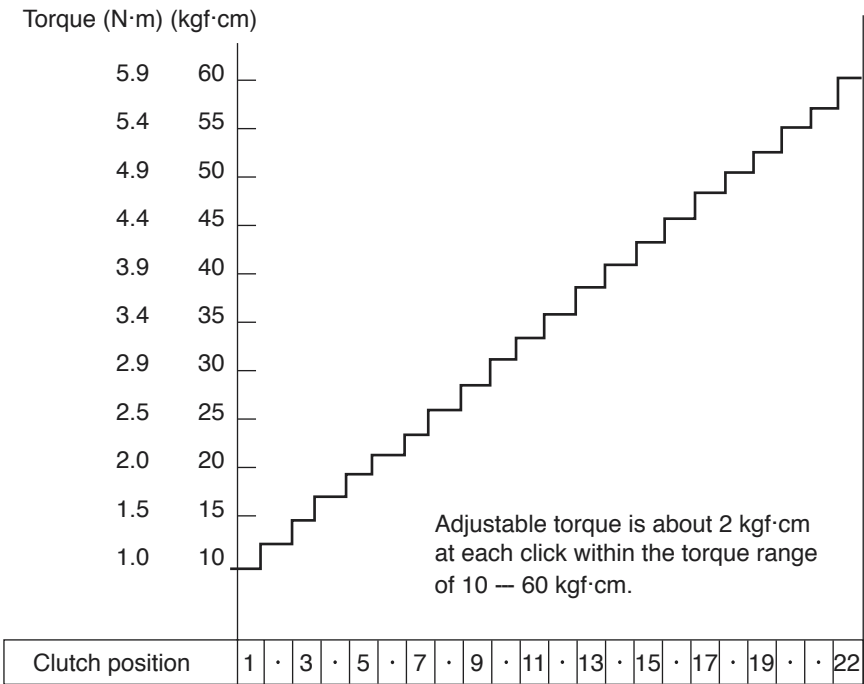


Fig. 1 Clutch torque

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 (Type: 13VLRG-N)

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.

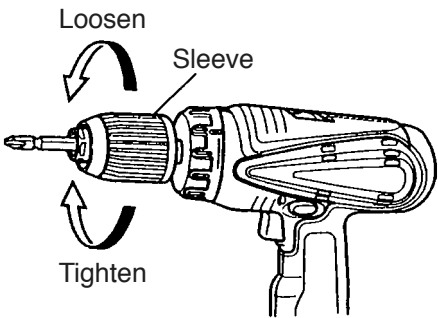


Fig. 2

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. One-touch hook

The one-touch hook has the following functions:

- It can be used as a hook for suspending from a waist belt when required by the nature of the work.
- It can be used as a bit holder for holding a spare bit.

① Using as a hook

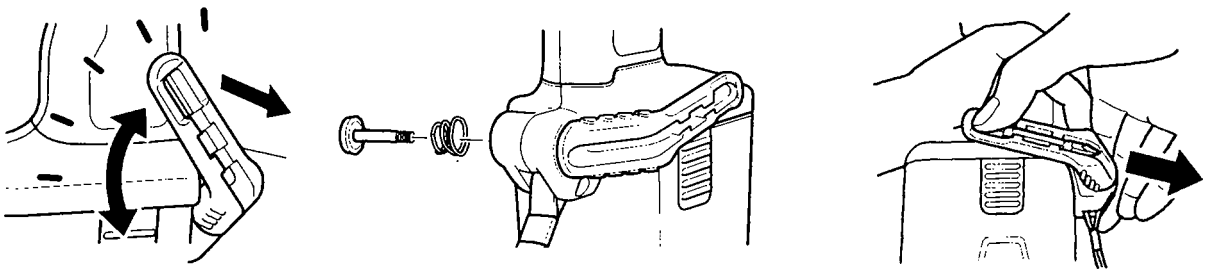
- The hook can be quickly slid out and in when not needed.
- The hook is mountable on either side to cope with the use by both right-handed and left-handed persons.

This hook can be mounted by using a flat-blade screwdriver or a coin.

- The angle of the hook is adjustable in five steps between 0° and 80°. The hook can be adjusted to the optimum position according to the weight of the bit in use.

② Using as a bit holder

- The hook can hold a bit. It is very convenient for holding a spare bit.



4-1-6. Light equipped hook (Patent applied for)

The light equipped hook has the following two functions:

- It can be used as a hook for suspending from a waist belt when required by the nature of the work.
- It can be used as an auxiliary light for such operations as tightening screws in a dark place.

① Using as a hook

A hook is convenient if there is no place to put the driver drill temporarily. Although various kinds of hooks are on the market, the standard accessory hook featuring the following is very convenient.

- The hook can be quickly slid out and in when not needed.
- The hook is mountable on either side to cope with the use by both right-handed and left-handed persons.

This hook can be mounted by using a flat-blade screwdriver or a coin.

- The angle of the hook is adjustable in five steps between 0° and 80°. The hook can be adjusted to the optimum position according to the weight of the bit in use.

② Using as an auxiliary light

When tightening screws in a dark place such as an attic or in the evening, it allows a clear view of the work area by lighting. As the well-reputed one-touch hook doubles as a light, it does not become a hindrance to the operation. In addition, lighting in a slant direction minimizes casting a shadow of the bit or the operator's hand.

- Light function is usable at any time:

A switch exclusive to the light is provided. The light is not glaring in the daytime. It can be lighted without turning the bit.

- Lighting in a slant direction:

It minimizes casting a shadow of the operator's hand when holding a screw.

- Yellow LED: It is easy on the eyes and legible.

- Automatic turning-off circuit is built in:

Even if the operator omitted turning off the light, it automatically turns off after 15 minutes.

Two N-size 1.5-V manganese batteries come standard with the light.

Nominal life: 300 cycles of 3-minute operation (as a guide)

600 cycles of 3-minute operation when using two alkali batteries on the market (as a guide)

Refer to the Instruction Manual for replacement of the batteries.

- This hook (battery type) is mountable on either side and the angle is easily adjustable.

4-1-7. 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 75 mm (#20 x 3") 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 38 mm (1-1/2") [Thickness 18 mm (11/16")]																	
Keyless chuck (Single sleeve) (13VLRG-N)	Mount type Screw-on (UNF 1/2" – 20) Diameter 1.5 – 13 mm (1/16" – 1/2")																	
Keyless chuck (Double sleeve) (13VLRJ-N)	Mount type Screw-on (UNF 1/2" – 20) Diameter 1.5 – 13 mm (1/16" – 1/2")																	
Rotation speed (No-load)	Low: 0 – 400 /min, High: 0 – 1,400 /min																	
Type of motor	DC magnet motor																	
Torque	Slip torque 1.0 – 5.9 N·m (10 – 60 kgf·cm, 9 – 52 in-lbs.) [22 stages] Max. torque High: 11 N·m (110 kgf·cm, 96 in-lbs.) Low: 45 N·m (460 kgf·cm, 400 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 Glassfiber reinforced polyamide resin (black) Charger ABS resin (black)																	
Battery (Type EB 1814SL/ EB 1820L)	Sealed cylindrical nickel-cadmium storage battery Nominal voltage DC 18 V Nominal life Charging/discharging: Approx. 500/1,000 times (in the case of Model UC 24YFA) Nominal Capacity 1.4/2.0 Ah																	
Battery (Type EB 1826HL/ EB1830HL)	Sealed cylindrical nickel-metal-hydride storage battery Nominal voltage DC 18 V Nominal life Charging/discharging: Approx. 500 times (in the case of Model UC 24YFA) Nominal Capacity 2.6/3.0 Ah																	
Charger (Model UC 24YFA)	Overcharge protection system: (1) Battery voltage detection (Δ ² V system) (2) Battery surface temperature detection (thermostat or thermistor) (3) 120 minutes timer Power input: 90 W Charging time: Approx. 50 minutes [for type EB 1820L battery at 20°C (68°F)] Approx. 60 minutes [for type EB 1826HL battery at 20°C (68°F)] Approx. 70 minutes [for type EB 1830HL 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 1820L battery is 60°C (140°F) and the type EB 1826HL or EB 1830HL battery is 45°C (113°F). Indication method of battery charging function: <div>Pilot lamp indications</div> <table><tr><td rowspan="4">Red pilot lamp remains lit or flashes</td><td>Prior to charging</td><td>Blinks 0.5 sec. ON 0.5 sec. OFF </td><td></td></tr><tr><td>During charging</td><td>Lights Stays ON constantly </td><td></td></tr><tr><td>Charging completed</td><td>Blinks 0.5 sec. ON 0.5 sec. OFF </td><td></td></tr><tr><td>Charging not possible</td><td>Flickers 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 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.
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.															

Charger (Model UC 18SD)		<p>Overcharge protection system: A thermistor monitors the storage battery surface temperature. When a specified temperature is detected, indicating that charging is completed, an electronic control circuit turns off the power to prevent overcharging.</p> <p>Power input: 70 W Charging time: Approx. 60 minutes [for type EB 1814SL battery at 20°C (60°F)] Operable ambient temperature range: 10°C – 40°C (50°F – 104°F) The maximum allowable temperature of the type EB 1814SL battery is 40°C (104°F) Indication method: Pilot lamp indicator of battery charging Function: ON During charging OFF Charging completed</p>
Weight	Net	Main body unit (including battery) 2.4 kg (5.3 lbs.) Charger unit (UC 24YFA, including cord) 0.6 kg (1.3 lbs.) Charger unit (UC 18SD, including cord) 1.6 kg (3.5 lbs.)
	Gross	DS 18DVB2 (2HLFK/2BLFK) 6.3 kg (13.8 lbs.) DS 18DVB2 (2SLSK) 6.6 kg (14.5 lbs.) DS 18DVB2 (2SLSX) 9.2 kg (20.2 lbs.)
Standard accessories	DS 18DVB2 (2HLFK/2BLFK)	Charger (UC 24YFA) 1 Extra battery 1 Phillips (plus) driver bit (No. 2) 1 Case 1
	DS 18DVB2 (2SLSK)	Charger (UC 18SD) 1 Extra battery 1 Phillips (plus) driver bit (No. 2) 1 Case 1
	DS 18DVB2 (2SLSX)	Charger (UC 18SD) 1 Extra battery 1 Phillips (plus) driver bit (No. 2) 1 Case 1 Torchlight (Flashlight) 1 Bit set 1 Case 1

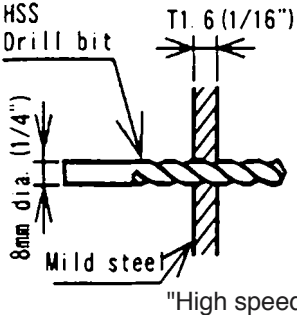
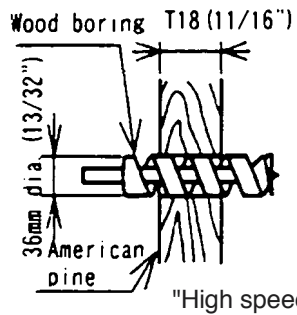
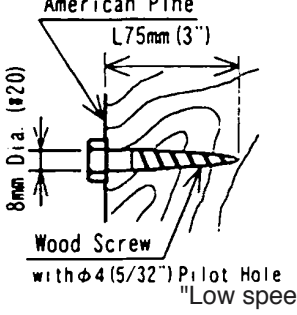
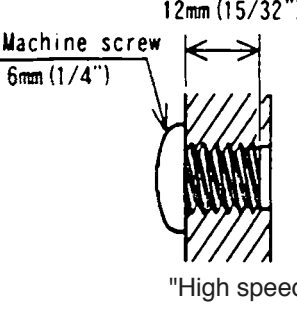
6. COMPARISONS WITH SIMILAR PRODUCTS

Maker			HITACHI	C
Model			DS 18DVB2	
Max. capacity	Screwing	Machine screw	6 mm (1/4")	13 mm (1/2")
		Wood screw	8 mm dia. x 75 mm (#20 x 3")	10 mm dia. x 89 mm (3/8" x 3-1/2")
	Drilling	Mild steel	13 mm (1/2")	13 mm (1/2")
		Aluminum	13 mm (1/2")	Not indicated
		Soft wood	38 mm (1-1/2")	38 mm (1-1/2")
Rotation speed (/min)		Low	0 – 400	0 – 400
		High	0 – 1,400	0 – 1,300
Slip torque			1.0 – 5.9 N·m 10 – 60 kgf·cm (9 – 52 in-lbs.) [22 stages]	Not indicated [16 stages]
Max. torque			45 N·m (460 kgf·cm) (400 in-lbs.)	45 N·m (460 kgf·cm) (400 in-lbs.)
Max. torque (hard joint)			—	80 N·m (720 in-lbs.)
(Actual measured value)			(61.0 N·m) (550 in-lbs.)	(70.9 N·m) (640 in-lbs.)
Battery		Nominal capacity	1.4/2.0/2.6/3.0 Ah	2.6 Ah
		Nominal voltage	18 V	18 V
		Charging time*	50/60/70 min.	60 min.
Drill chuck		Capacity	13 mm (1/2")	13 mm (1/2")
		Type	Single sleeve/Double sleeve	Double sleeve
		Locking device	Equipped/None	Equipped
Spindle lock function			Equipped/None	None
Soft-grip handle			Equipped	Equipped
Switch		Feedback circuit	Equipped	Not indicated
		Electric brake	Equipped	Equipped
One touch hook			Equipped	None
Dimensions		Overall length	241 mm (9-1/2")	243 mm (9-9/16")
Weight			2.4 kg (5.3 lbs.)	2.4 kg (5.3 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") 8mm dia. (1/4") Mild steel "High speed"</p>	HITACHI	DS 18DVB2	70				13.6
	C		70 (90)				12
 <p>Wood boring T18 (1 1/16") 36mm dia. (1 3/8") American pine "High speed"</p>	HITACHI	DS 18DVB2	100				3.6
	C		115 (150)				3.2
 <p>American Pine L75mm (3") 8mm Dia. (5/16") Wood Screw with $\phi 4 (5/32")$ Pilot Hole "Low speed"</p>	HITACHI	DS 18DVB2	120				5.3
	C		115 (150)				5.3
 <p>Machine screw 6mm (1/4") 12mm (15/32") "High speed"</p>	HITACHI	DS 18DVB2	770				0.5
	C		910 (1180)				0.5

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:

Models DS 18DVB2 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 18DVB2 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 1814SL, EB 1820L, EB 1826HL or EB 1830HL Storage Battery

Ensure that all customers understand that Type EB 1814SL, EB 1820L, EB 1826HL or EB 1830HL Storage Battery should be returned to the Hitachi power tool sales outlet or the authorized service center when they are no longer capable of being recharged or repaired. If thrown into a fire, the batteries 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 1814SL, EB 1820L, EB 1826HL or EB 1830HL Storage Battery.

For Europe

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 24YFA Charger.

For the U.S.A and Canada

CAUTION

- For safe operation, see Instruction Manual.
- Charge HITACHI rechargeable batteries types EB 7, EB 9, EB 12, EB 14, EB 18 series and EB 24B. Other types of batteries may burst causing personal injury and damage.
- Charge between 32 and 104 °F.
- 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 18DVB2 is 1.4 Ah, 2.0 Ah, 2.6 Ah or 3.0 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 18DVB2 is designed for drilling capacities of 38 mm (1-1/2") 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 18DVB2 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 18DVB2 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 18DVB2 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 1814SL, EB 1820L, EB 1826HL and EB 1830HL 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.

Types EB 1814SL and EB 1820L: from -5°C to 60°C (from 23°F to 140°F)

Types EB 1826HL and EB 1830HL: 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 18DVB2 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.

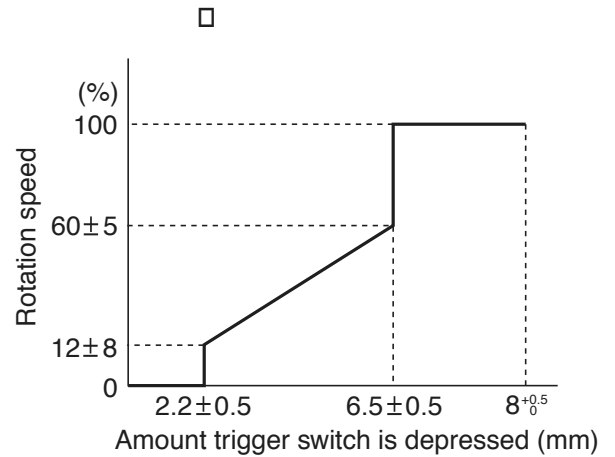


Fig. 3

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 18DVB2.

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.

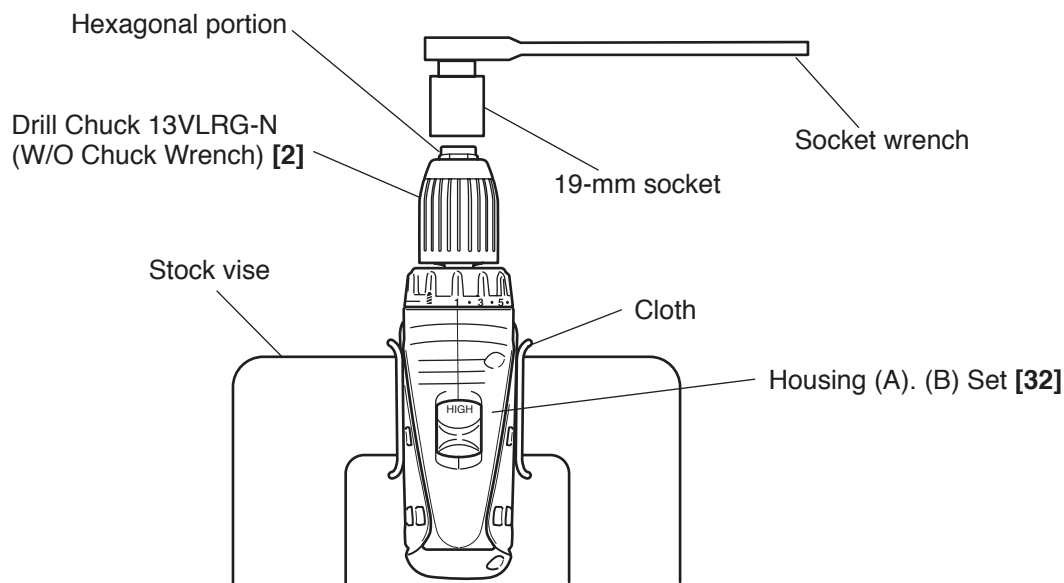


Fig. 4

(2) Removal of the Drill Chuck 13VLRJ-N (W/O Chuck Wrench) [2] (See Fig. 5.)

Remove the Drill Chuck 13VLRJ-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 13VLRJ-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) Fix the hexagonal bar wrench M10 into the Drill Chuck 13VLRJ-N (W/O Chuck Wrench) [2] as indicated in Fig. 5. Next, apply a wrench 14 mm (Special repair tool, Code No. 873929) to the flat surfaces on the spindle to hold it steady, and remove it by turning counterclockwise. If it is difficult to loosen, use a pipe extension or similar tool.

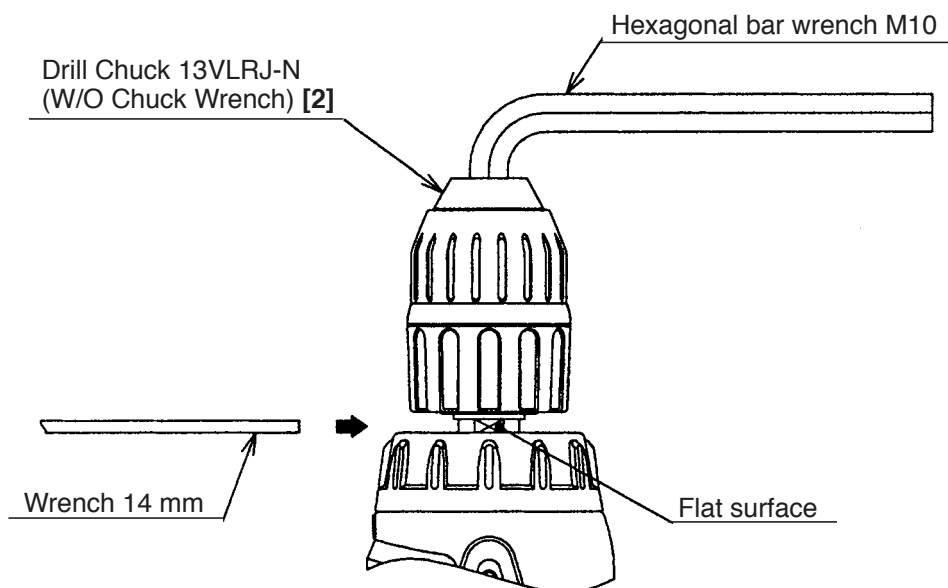


Fig. 5

(3) 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 eight 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.

- (4) 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 Cap [4].

(5) 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 or Spacer Washer [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.

(6) 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].

(7) 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 [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. 6.)

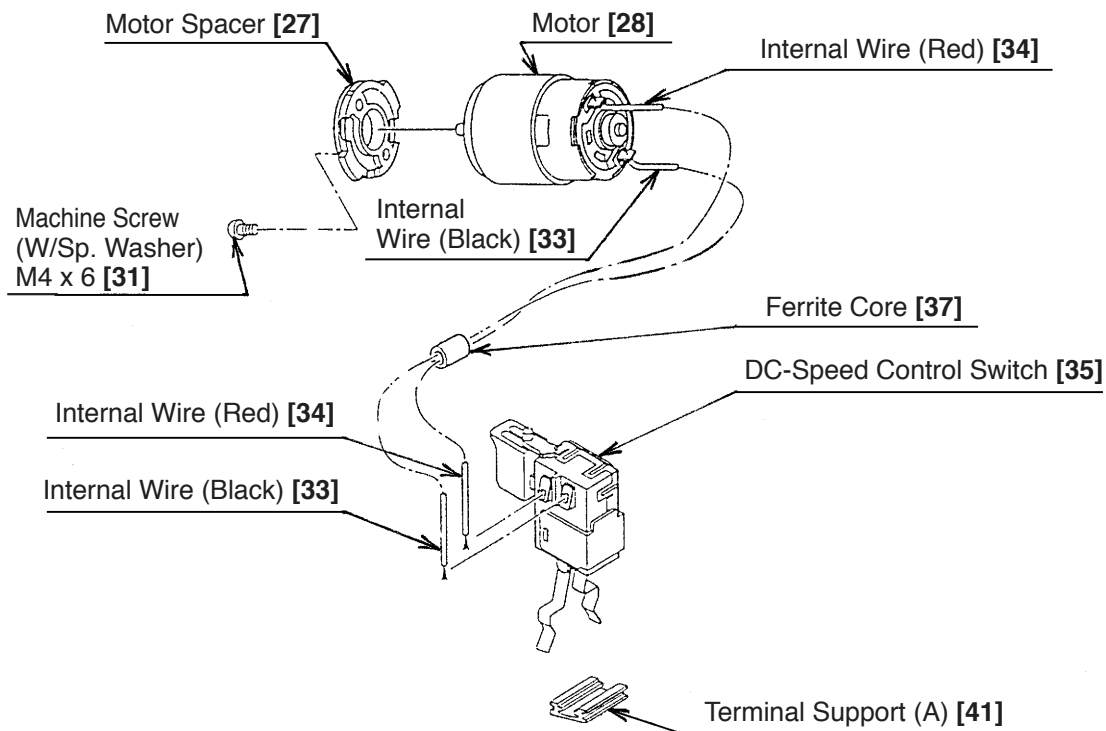


Fig. 6

- (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. 7.)
- (c) Apply grease (Hitachi Motor Grease No. 29, Code No. 930035 is recommended) to the pinion press-fitted on the Motor [28] shaft.

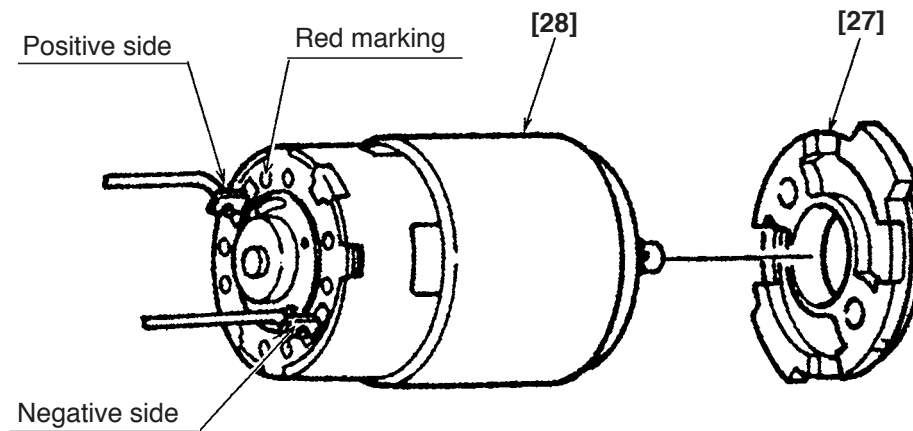


Fig. 7

(2) Reassembly of the clutch unit (with spindle lock mechanism)

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. 8.)

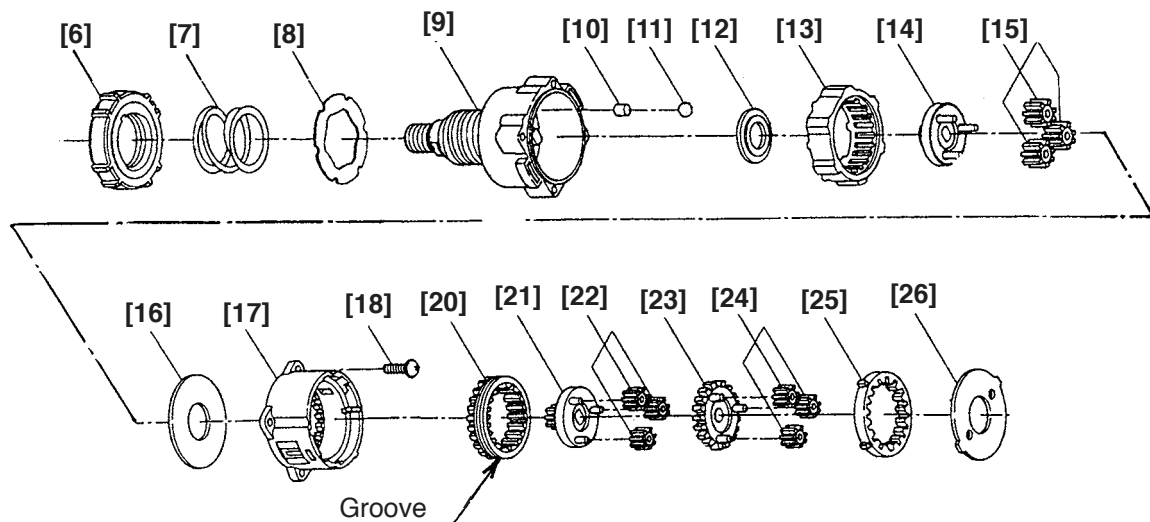


Fig. 8

(3) Reassembly of the gear unit (with spindle lock mechanism)

(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. 9.)

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

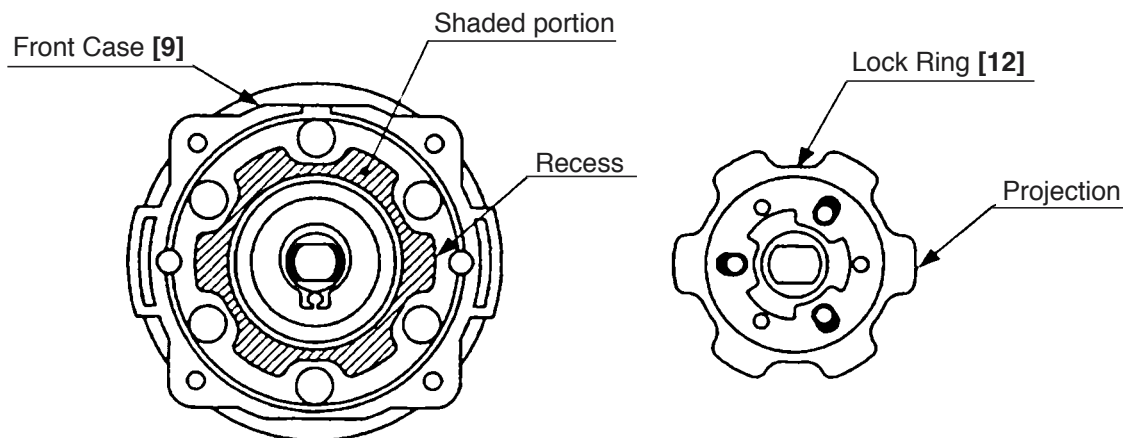


Fig. 9

(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. 8.)

(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. 9 and 10.)

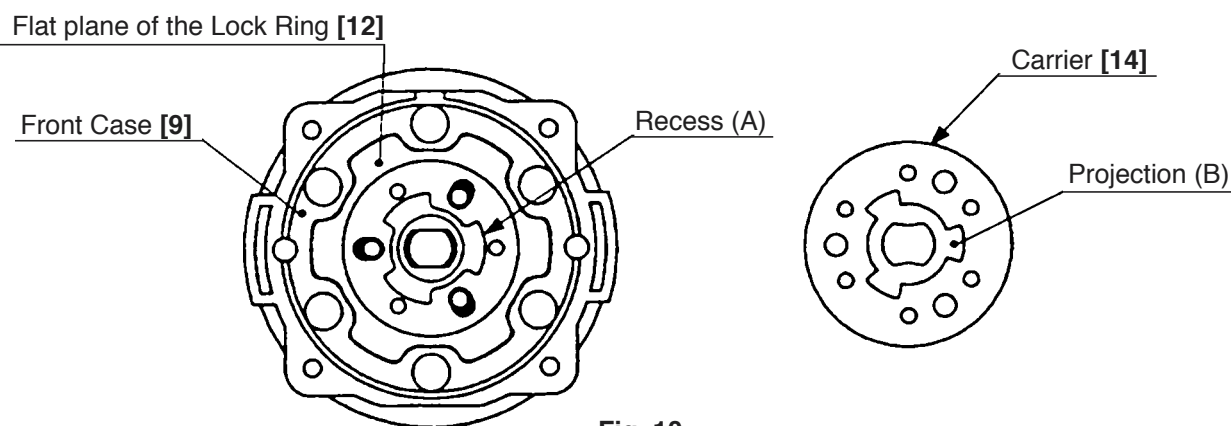


Fig. 10

(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. 10 and 11.)

(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.

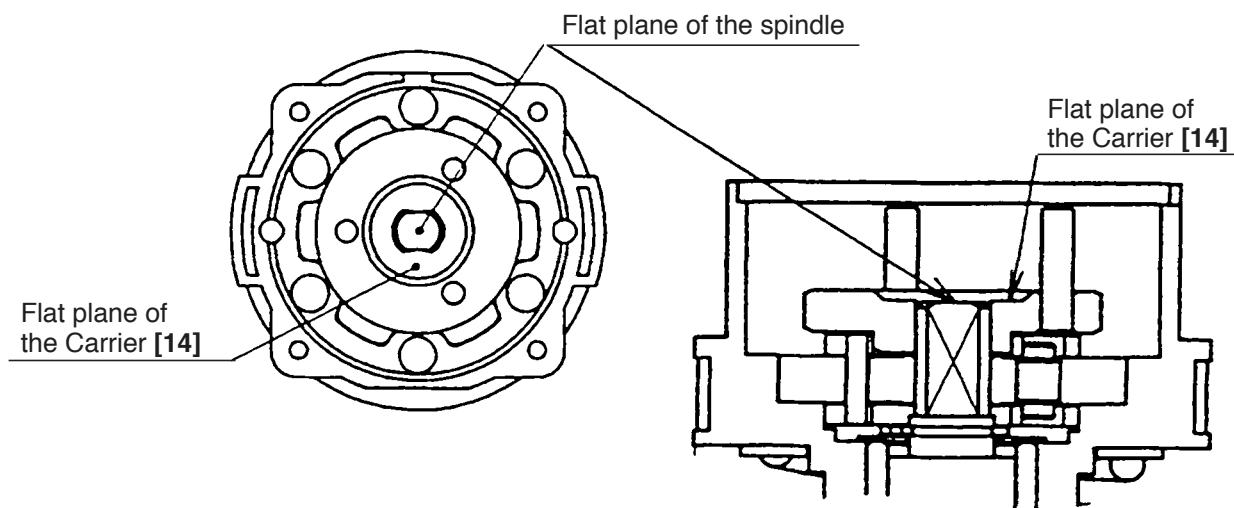


Fig. 11

- (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. 8.)
- (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. 12.)

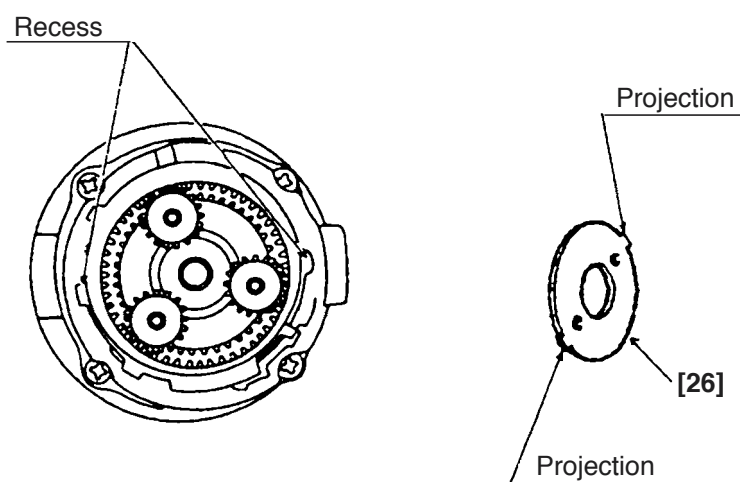


Fig. 12

(4) Reassembly of the clutch unit (without spindle lock mechanism)

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.

(5) Reassembly of the gear unit (without spindle lock mechanism)

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

(b) Install the parts series from the six Rollers [10] to Washer (B) [26] into the assembly reassembled in step (4). (See Fig. 13.)

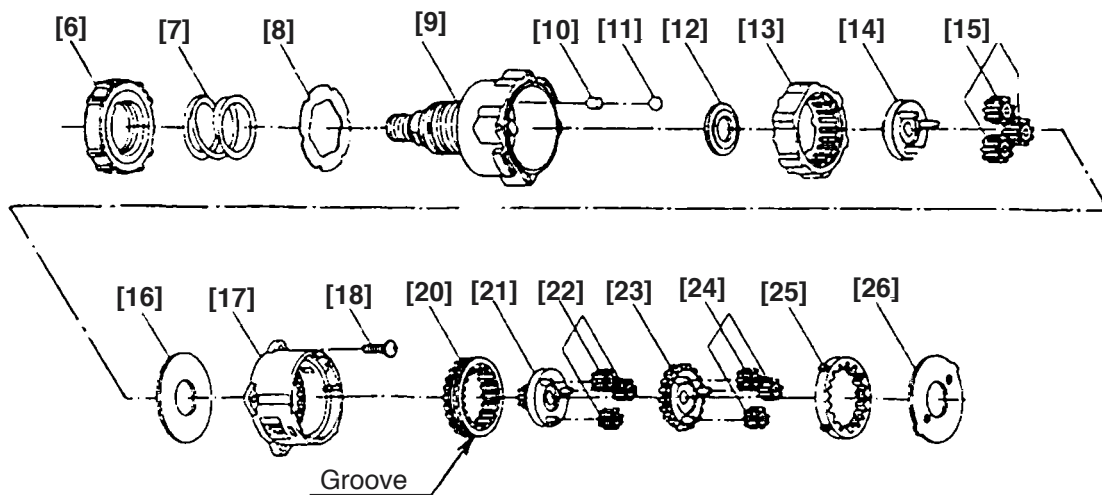


Fig. 13

(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. 14.)

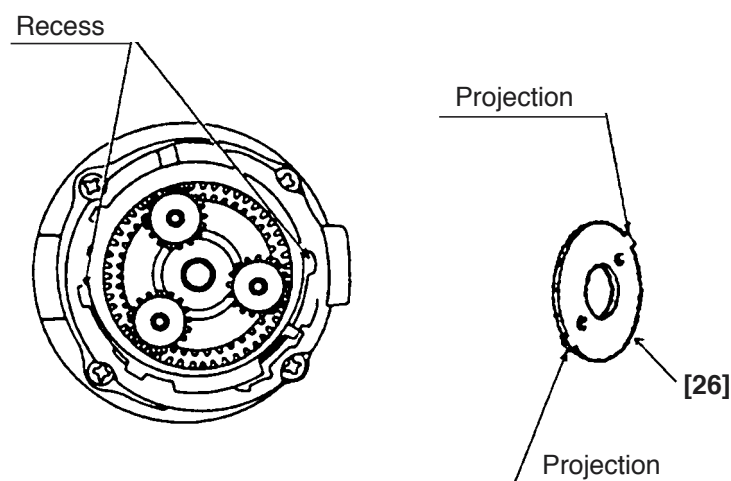


Fig. 14

- (c) Install the Click Spring [5] and the Cap [4] to the assembly reassembled in step (b). (See Fig. 15.)
- (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. 15. Mount the Cap [4] aligning the ridge of the Click Spring [5] with the three projections of the Nut [6].

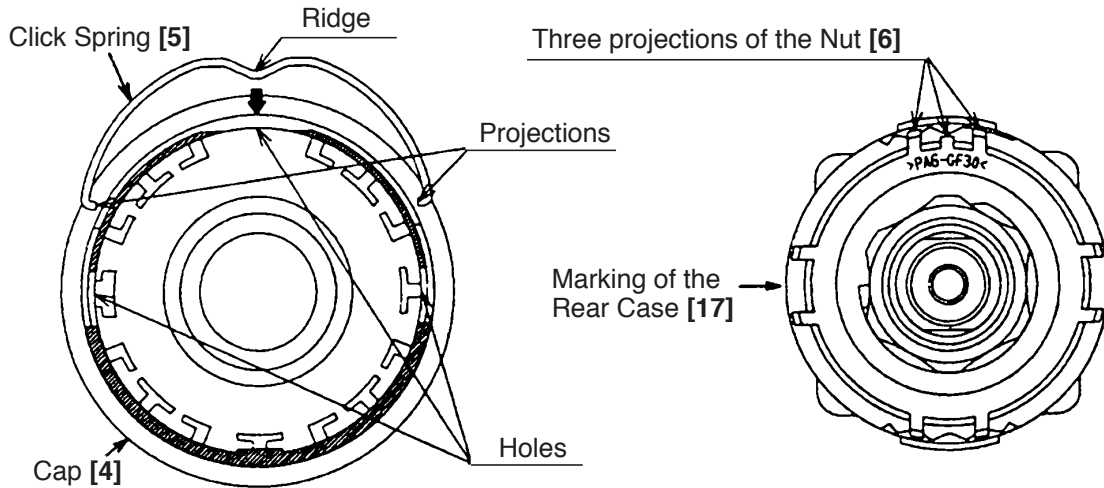


Fig. 15

- (d) Install the Shift Arm [19] into the assembly reassembled in step (c).
- 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 (c). 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. 16.)

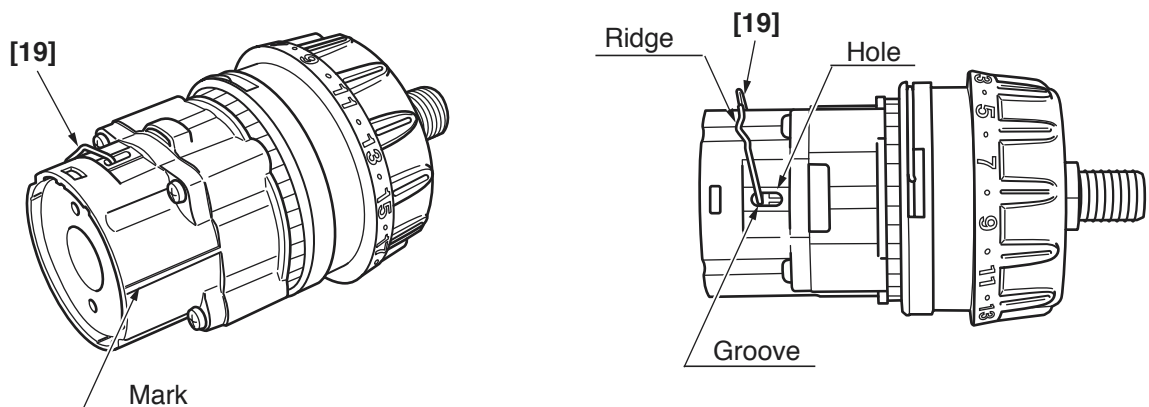


Fig. 16

(e) Install the Drill Chuck [2].

Install the Drill Chuck [2] using a wench 14 mm (Special repair tool, Code No. 873929) and secure it with the Special Screw (Left Hand) M6 x 23 [1].

(f) Install the Shift Knob [38] into the assembly reassembled in step (e).

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].

(g) Install the assembly reassembled in step (1) and the assembly reassembled in step (f) together. (See Fig. 17.)

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.

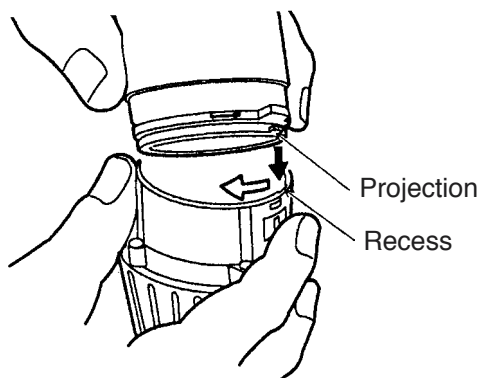


Fig. 17

(6) Installation of the assembly reassembled in step (5) into Housing (A). (B) Set [32]

(a) Install the Pushing Button [36] into Housing (B) [32]. (See Fig. 18.)

(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. 19.)

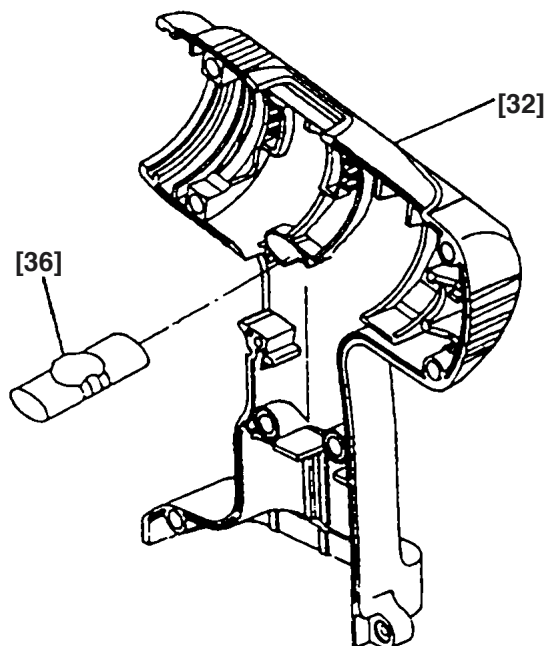


Fig. 18

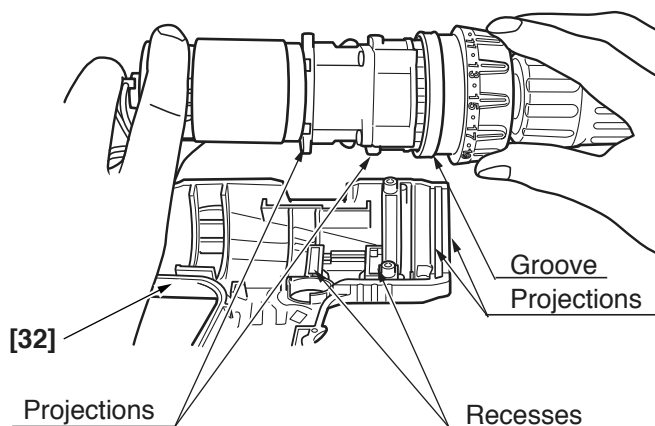


Fig. 19

(c) Set the assembly reassembled in step (b) to Housing (B) **[32]** and secure it with the eight 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.

(7) 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 **[36]**. When the Pushing Button **[36]** 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 **[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 110 mm from the chuck end. In case of spindle lock mechanism equipped, make sure that the spindle lock properly works in either direction within a half rotation by turning the drill chuck by hand in forward and reverse direction.

(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 (With spindle lock) [2]	: 17.7 – 21.6 N·m (180 – 220 kgf·cm, 156 – 191 in-lbs.)
Drill Chuck (Without spindle lock) [2]	: 12.7 – 16.7 N·m (130 – 170 kgf·cm, 113 – 148 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 [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 24YFA or UC 18SD.

11. STANDARD REPAIR TIME (UNIT) SCHEDULES

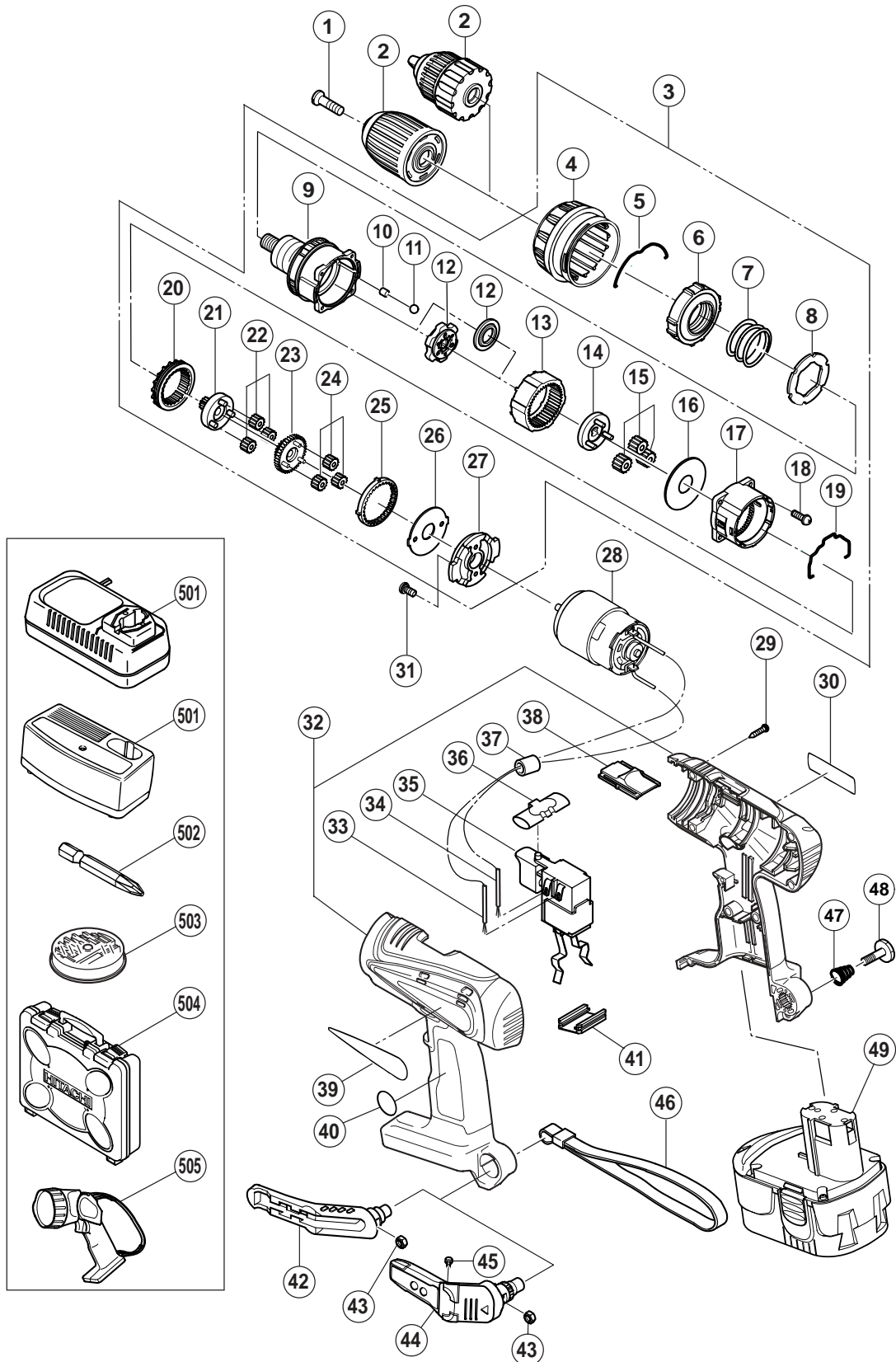
MODEL	Variable		10	20	30	40	50	60
	Fixed							
DS18DVB2		Work Flow						
		Hook Ass'y		Housing (A).(B) Set Motor DC-Speed Control Switch Shift Knob				
		General Assembly						
		Drill Chuck (W/O Chuck Wrench)		Gear Box Ass'y Cap Click Spring Nut Spring Front Case Lock Ring or Space Washer Ring Gear 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 18DVB2

2004 • 4 • 30

(E1)



PARTS

DS 18DVB2

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	
*	2	322-625	DRILL CHUCK 13VLRJ-N (W/O CHUCK WRENCH)	1	FOR CHN
*	3	323-013	GEAR BOX ASS'Y	1	INCLUD. 4-27
*	3	323-017	GEAR BOX ASS'Y	1	INCLUD. 4-27 FOR CHN
	4	319-755	CAP	1	
	5	319-754	CLICK SPRING	1	
	6	319-743	NUT	1	
	7	323-015	SPRING	1	
	8	319-741	THRUST WASHER	1	
*	9	323-014	FRONT CASE	1	
*	9	323-018	FRONT CASE	1	FOR CHN
	10	319-744	ROLLER	6	
	11	306-936	STEEL BALL D5	6	
*	12	320-928	LOCK RING	1	
*	12	319-746	SPACER WASHER	1	FOR CHN
	13	319-745	RING GEAR	1	
*	14	320-929	CARRIER	1	
*	14	319-747	CARRIER	1	FOR CHN
	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	319-756	MOTOR	1	
	29	313-687	TAPPING SCREW (W/FLANGE) D3X16 (BLACK)	8	
	30		NAME PLATE	1	
	31	317-333	MACHINE SCREW (W/SP. WASHER) M4X6	2	
	32	322-503	HOUSING (A).(B) SET	1	
*	33	319-759	INTERNAL WIRE (BLACK) 100L	1	
*	33	320-159	INTERNAL WIRE (BLACK) 160L	1	EXCEPT FOR CHN, NZL, AUS, USA, CAN
	34	319-758	INTERNAL WIRE (RED) 130L	1	
	35	320-091	DC-SPEED CONTROL SWITCH	1	
	36	319-760	PUSHING BUTTON	1	
*	37	318-247	FERRITE CORE	1	EXCEPT FOR CHN, NZL, AUS, USA, CAN
	38	318-234	SHIFT KNOB	1	
	39		HITACHI LABEL	1	
*	40		LABEL (B)	1	FOR CHN
	41	315-141	TERMINAL SUPPORT (A)	1	
*	42	320-287	HOOK ASS'Y	1	INCLUD. 43
	43	320-288	V-LOCK NUT M5	1	
*	44	321-918	HOOK ASS'Y (W/LIGHT)	1	INCLUD. 43, 45
	45	321-672	TAPPING SCREW D2X6	2	

PARTS

DS 18DVB2

[illegible]

STANDARD ACCESSORIES

DS 18DVB2

[illegible]

OPTIONAL ACCESSORIES

[illegible]

