MODELS

DV 18DL

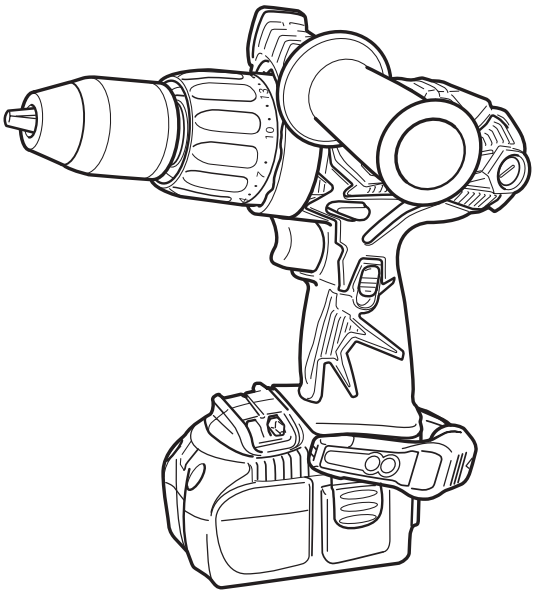
DV 14DL

Hitachi
Power Tools

D

CORDLESS IMPACT DRIVER DRILL
DV 18DL
DV 14DL

TECHNICAL DATA AND SERVICE MANUAL



LIST Nos. DV 18DL: G853
DV 14DL: G854

Jul. 2006

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-1	MAKITA	BHP451
C-2	MAKITA	BHP440

CONTENTS

1. PRODUCT NAME

Hitachi 18 V Cordless Impact Driver Drill/Cordless Hammer Drill, Model DV 18DL

Hitachi 14.4 V Cordless Impact Driver Drill/Cordless Hammer Drill, Model DV 14DL

2. MARKETING OBJECTIVE

The Models DV 18DL and DV 14DL are the excellent, top-quality cordless impact driver drills developed to reinforce our 18-V and 14.4-V product lines and also to meet the market demands. Each of these models is equipped with a lithium-ion battery. The Model DV 18DL is compact and lightweight thanks to the new cyber design. The overall length is 250 mm and the weight is 2.2 kg. While the Model DV 18DL is 3 mm shorter and 0.4 kg lighter than the conventional Model DV 18DMR, it provides the class-top maximum torque 64 N·m thanks to the optimally designed motor and mechanical unit. Features of the Models DV 18DL and DV 14DL include the following:

- Powerful motor equipped with a large radial fan
- Sturdy metal chuck and metal clutch cap
- Selectable rotation speed in four steps with the shift knob and the change lever
- Soft-grip handle widely covered with elastomer
- Angle-adjustable one-touch hook
- Replaceable carbon brushes and armature thanks to the same separate-type motor as an impact driver drill with cord
- Interchangeable with conventional NiCd or NiMH batteries

Thus the Models DV 18DL and DV 14DL are excellent in performance, operability and maintainability.

3. APPLICATIONS

- Tightening and loosening wood screw, self-tapping screw and machine screw
- Drilling into wood, plastic, mild steel and aluminum materials
- Drilling into brick and concrete block

4. SELLING POINTS

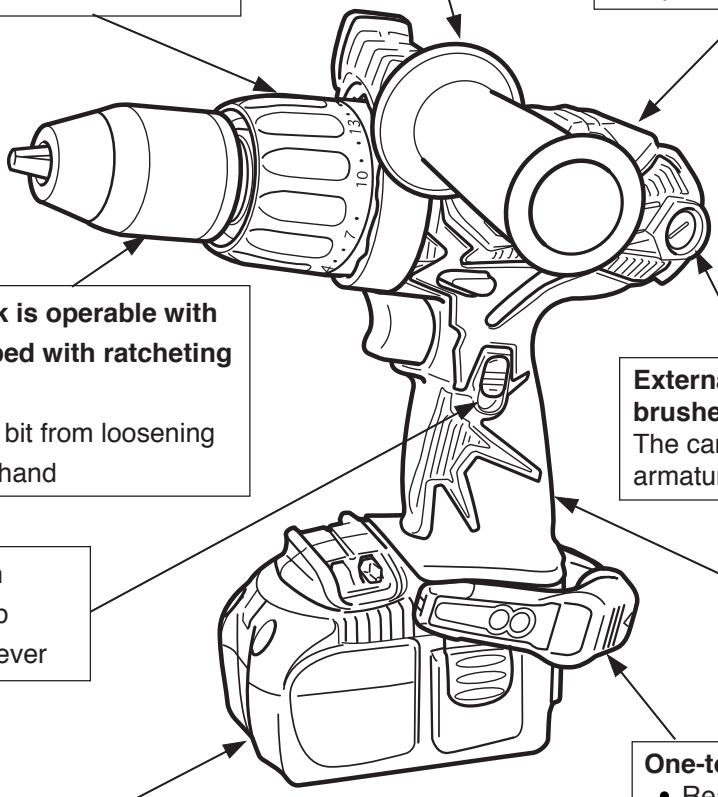
No. 1 torque: Max. torque 64 N·m (Model DV 18DL)
52 N·m (Model DV 14DL)
No. 1 compact body: Overall length 250 mm

22-position torque adjustable clutch
- Fine torque adjustment

3-mode selection
- Drill
- Impact drill
- Driver

Side handle

Improved overload durability (improved cooling efficiency)
- Large radial fan
- Optimally designed cooling air path



13 mm keyless chuck is operable with one hand and equipped with ratcheting lock mechanism
- Prevents the driver bit from loosening
- Operable with one hand

Externally replaceable carbon brushes and separate-type motor
The carbon brushes and the armature are singly replaceable.

Four-speed selection
Two-speed shift knob
Two-speed change lever

Soft-grip handle

One-touch hook
- Ready for use at anytime (angle-adjustable in 5 steps)
- Mountable on either side

New lithium-ion battery
- Light weight and stable design
- Interchangeable with conventional batteries

[Model DV 18DL]

With injection-molded case

4-1. Selling Point Descriptions

4-1-1. Compact and high power: Max. torque 64 N·m (Model DV 18DL)

While the Model DV 18DL is compact and lightweight (overall length 250 mm, weight 2.2 kg), it provides the class-top maximum torque 64 N·m thanks to the optimum design (see Tables 1 and 2). The Models DV 18DL and DV 14DL can drill large diameter holes and tighten screws effortlessly.

Table 1

Model	DV 18DL	DV 18DMR	DV 18DV	C-1
Max. torque [N·m]	64	62	45	63
Overall length [mm]	250	253	242	250
Overall height [mm]	248	248	247	257
Overall width [mm]	82	76	76	78
Weight [kg]	2.2	2.7	2.5	2.2

Table 2

Model	DV 14DL	DV 14DMR	DV 14DV	C-2
Max. torque [N·m]	52	52	39	25
Overall length [mm]	250	253	242	204
Overall height [mm]	246	245	242	242
Overall width [mm]	78	76	76	79
Weight [kg]	2.1	2.5	2.2	1.7

4-1-2. Improved overload durability (improved cooling efficiency)

The Models DV 18DL and DV 14DL are equipped with the separate-type motor. To improve the overload durability in continuous operation, the optimally designed cooling air path that is descended from the Model DS 12DM increases the cooling efficiency as well as the large radial fan increases the volume of air. (See Fig.1.)

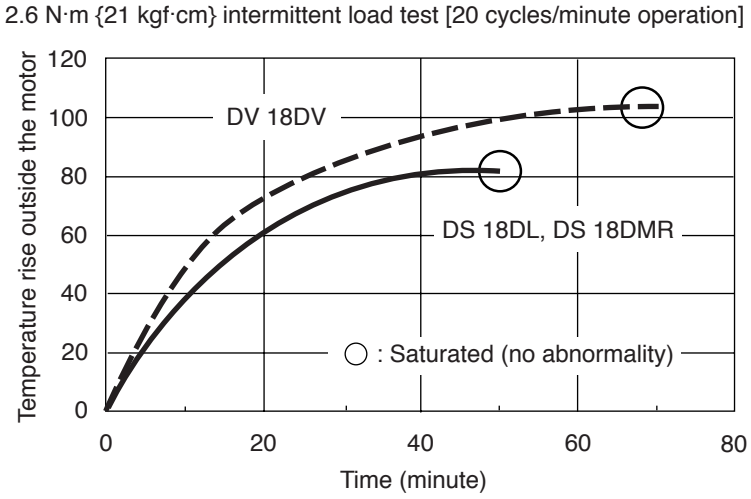


Fig. 1 Curves of motor temperature rise

4-1-3. 22-position torque adjustable clutch

The 22-stage clutch ensures fine torque adjustment. (See Table 3.) The tightening torque is selectable up to 7 N·m. The wider torque selectable range extends the range of applicable works.

Table 3

Clutch cap position	Tightening torque
1	1.5 ± 0.5 N·m {15 ± 5 kgf·cm}
4	2.3 ± 0.6 N·m {23 ± 6 kgf·cm}
7	3.0 ± 0.7 N·m {31 ± 7 kgf·cm}
10	3.8 ± 0.8 N·m {39 ± 8 kgf·cm}
19	6.2 ± 0.9 N·m {62 ± 9 kgf·cm}
22	7 ± 1.0 N·m {70 ± 10 kgf·cm}

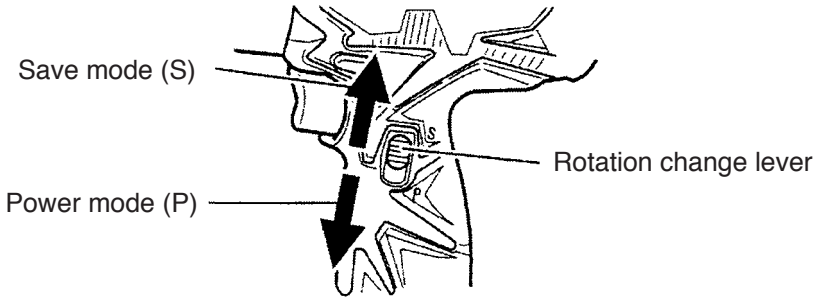
*There may be difference in operation depending on the screw shapes and workpieces. Perform a test before actual driving.

4-1-4. 13 mm keyless chuck is operable with one hand and equipped with ratcheting lock mechanism

The sleeve can be turned with one hand. The driver bits can be easily replaced by holding the main unit with one hand while turning the sleeve with other hand. The Models DV 18DL and DV 14DL are also equipped with the ratcheting lock mechanism to prevent the sleeve from loosening during operation. A simple twist until a click is heard locks the sleeve tight.

4-1-5. Four-speed selection

The rotation speed is selectable from four steps with the shift knob (two-speed gear) and the rotation change lever (two-speed switch) for various applications such as tightening small-diameter screws and drilling.
When the rotation change lever is slid to the lower side, the power mode (P) is set and when slid to the upper side, the save mode (S) is set.



4-1-6. Soft-grip handle

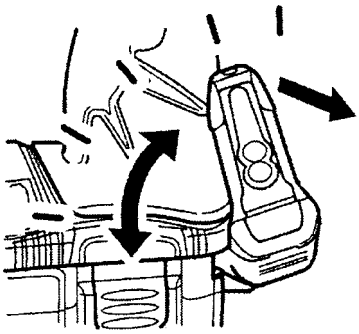
The handles are widely covered with soft-touch elastomer (rubber-like soft resin). It is slip-resistant and securely fits in the palm of a hand even if the gripping hand sweats.

4-1-7. One-touch hook

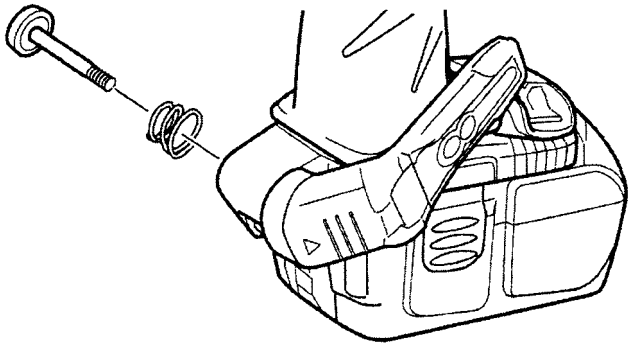
(1) The hook can be quickly slid out whenever necessary and slid in when not necessary.

(2) The hook is mountable on either side using a flat-blade screwdriver or a coin.

(3) The angle of the hook is adjustable in five steps.



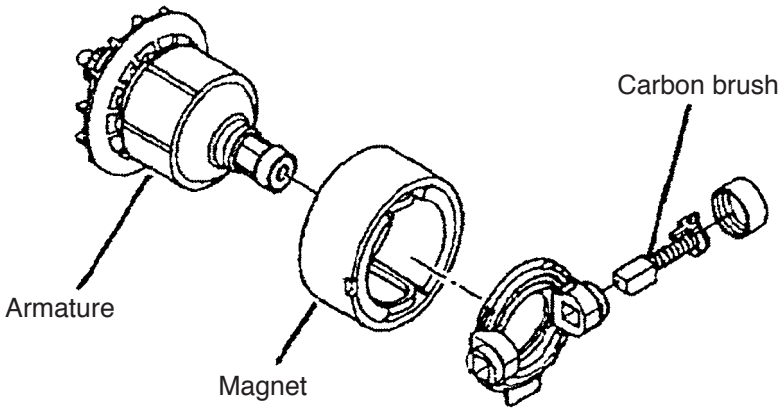
Angle-adjustable in 5 steps



Mountable on either side

4-1-8. Externally replaceable carbon brushes and separate-type motor

The carbon brushes are replaceable from the outside. In addition, the armature is singly replaceable through the adoption of the separate-type motor that is the same as a driver drill with a power cord. Thus the Models DV 18DL and DV 14DL are easier to maintain.



Separate-type motor
[Models DV 18DL and DV 14DL]

4-1-9. New Lithium-ion battery

Each of the Types EBM 1830 and EBL 1430 lithium-ion batteries is equipped with the overdischarge protection circuit, overload protection circuit, and voltage monitoring circuit for each cell to prevent reduction of the battery life due to overdischarge (overuse) or overcharge (excessive charging) of the battery.

The number of charging/discharging is about 1,500.

Precautions for use of the Types EBM 1830 and EBL 1430 lithium-ion batteries

Each of the Types EBM 1830 and EBL 1430 lithium-ion batteries is equipped with a protective function that automatically stops output to extend the battery life. The motor may stop automatically in either of the following case ① or ② even if the switch is depressed continuously during operation. This is because the protective function is activated. The battery is not faulty.

① The motor may stop automatically when the remaining battery level is low (when the battery voltage is decreased to about 12 V (Type EBM 1830)/when decreased to about 8 V (Type EBL 1430)). Charge the battery immediately in such case.

② The motor may stop if the Model DV 18DL/DV 14DL is overloaded. In such case, release the switch and eliminate the cause of the overload problem. Then the Model DV 18DL/DV 14DL is operable.

Please instruct the customers on the above precautions.

4-1-10. Others

The Models DV 18DL and DV 14DL have the following features common to the previous models.

- The terminal is movable according to the movement of the battery to prevent damage to the contact portion.
- The contact between the housing and the battery is changed from line contact to surface contact to minimize rattling due to wear.

5. SPECIFICATIONS

5-1. Model DV 18DL

Capacity		Screw driving Machine screw ..... 6 mm (1/4") Wood screw ..... 8 mm dia. x 100 mm (#20 x 4") Drilling Brick ..... 16 mm (5/8") [Depth 30 mm (1-1/4")] 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 ..... 50 mm (2") [Thickness 18 mm (11/16")]
Keyless chuck (13VLRL-N)		Mount type ..... Screw-on (UNF 1/2" — 20) Diameter..... 1.5 — 13 mm (1/16" — 1/2")
Rotation speed (No-load)		Low: 0 — 200/400/min, High: 0 — 900/1,800/min.
Torque		Slip torque ..... 1.5 – 7 N·m (15 – 70 kgf·cm, 13 – 61 in-lbs.) [22 stages] Max. torque ..... Low: 64 N·m (653 kgf·cm, 570 in-lbs.), High: 14 N·m (143 kgf·cm, 124 in-lbs.)
Type of motor		Fan cooled DC magnet motor
Type of switch		Trigger switch with push button for forward and reverse rotation changeover (with brake)
Handle configuration		T-type (with soft-grip handle)
Enclosure		Body ..... Glassfiber reinforced polycarbonate resin (black) and thermoplastic elastomer (green) Battery ..... Glassfiber reinforced polycarbonate resin (black) Charger ... ABS resin (black)
Battery (Type EBM 1830)		Sealed cylindrical lithium-ion storage battery Nominal voltage ..... DC 18V Nominal life ..... Charging/discharging: Approx. 1,500 times Nominal capacity ..... 3.0 Ah
Charger (Model UC 18YRL)		Overcharge protection system: (1) Battery voltage detection (- △V system) Battery temperature detection (dT/dt system) for Ni-MH and SUPER Ni-MH batteries (2) Battery surface temperature detection (thermistor) (3) 120-minute timer (4) Stop current detection (Li-ion batteries) Power input: 95 W Charging time: Approx. 45 minutes [for Type EBM 1830 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 EBM 1830 battery is 50˚C (122˚F)

Indication method of battery charging function

Indication of the pilot lamp				
Charge status lamp (Red)	Before charging	Blinks (Red)	0.5 sec. ON 0.5 sec. OFF	
	While charging	Lights (Red)	Stays ON continuously	
	Charging completed	Blinks (Red)	0.5 sec. ON 0.5 sec. OFF	
	Charging impossible	Flickers (Red)	0.1 sec. ON 0.1 sec. OFF	Malfunction in the battery or the charger.
Overheat lamp (Green)	Overheat standby	Lights (Green)	Stays ON continuously	Battery overheated. Unable to charge. (Charging will commence when battery is cooled.)

NOTE: When standby for cooling the battery, the Model UC 18YRL cools the overheated battery by the cooling fan.

Weight	Net	Main body unit (including battery) ..... 2.2 kg (4.8 lbs.) Charger unit (UC 18YRL, including cord) ..... 0.6 kg (1.3 lbs.)
	Gross	DV 18DL (2 MRK) ..... 6.4 kg (14.1 lbs.)
Standard accessories	(2MRK)	Charger (UC 18YRL) ..... 1 Battery (EBM 1830) ..... 2 Phillips (plus) driver bit (No. 2) ..... 1 Side handle ..... 1 Case (injection-molded) 1

5-2. Model DV 14DL

Capacity		Screw driving Machine screw ..... 6 mm (1/4") Wood screw ..... 8 mm dia. x 75 mm (#20 x 3") Drilling Brick ..... 14 mm (9/16") [Depth 30 mm (1-1/4")] 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 ..... 45 mm (1-25/32") [Thickness 18 mm (11/16")]
Keyless chuck (13VLRL-N)		Mount type ..... Screw-on (UNF 1/2" — 20) Diameter ..... 1.5 — 13 mm (1/16" — 1/2")
Rotation speed (No-load)		Low: 0 — 200/400/min., High: 0 — 850/1,750/min.
Torque		Slip torque ..... 1.5 – 7.0 N·m (15 – 70 kgf·cm, 13 – 61 in-lbs.) [22 stages] Max. torque ..... Low: 52 N·m (530 kgf·cm, 460 in-lbs.), High: 12 N·m (122 kgf·cm, 89 in-lbs.)
Type of motor		Fan cooled DC magnet motor
Type of switch		Trigger switch with push button for forward and reverse rotation changeover (with brake)
Handle configuration		T-type (with soft-grip handle)
Enclosure		Body ..... Glassfiber reinforced polycarbonate resin (black) and thermoplastic elastomer (green) Battery ..... Glassfiber reinforced polycarbonate resin (black) Charger ... ABS resin (black)
Battery (Type EBL 1430)		Sealed cylindrical nickel-cadmium storage battery Nominal voltage ..... DC 14.4V Nominal life ..... Charging/discharging: Approx. 1,500 times Nominal capacity ..... 3.0 Ah
Charger (Model UC 18YRL)		Overcharge protection system: (1) Battery voltage detection (- △V system) Battery temperature detection (dT/dt system) for Ni-MH and SUPER Ni-MH batteries (2) Battery surface temperature detection (thermistor) (3) 120-minute timer (4) Stop current detection (Li-ion batteries) Power input: 95 W Charging time: Approx. 45 minutes [for Type EBL 1430 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 EBL 1430 battery is 50˚C (122˚F)

Indication method of battery charging function

Indication of the pilot lamp				
Charge status lamp (Red)	Before charging	Blinks (Red)	0.5 sec. ON 0.5 sec. OFF	
	While charging	Lights (Red)	Stays ON continuously	
	Charging completed	Blinks (Red)	0.5 sec. ON 0.5 sec. OFF	
	Charging impossible	Flickers (Red)	0.1 sec. ON 0.1 sec. OFF	Malfunction in the battery or the charger.
Overheat lamp (Green)	Overheat standby	Lights (Green)	Stays ON continuously	Battery overheated. Unable to charge. (Charging will commence when battery is cooled.)

NOTE: When standby for cooling the battery, the Model UC 18YRL cools the overheated battery by the cooling fan.

Weight	Net	Main body unit (including battery) ..... 2.1 kg (4.6 lbs.) Charger unit (UC 18YRL, including cord) ..... 0.6 kg (1.3 lbs.)
	Gross	DV 14DL (2 LRK) ..... 6.2 kg (13.7 lbs.)
Standard accessories	(2LRK)	Charger (UC 18YRL) ..... 1 Battery (EBL 1430) ..... 2 Phillips (plus) driver bit (No. 2) ..... 1 Side handle ..... 1 Case (injection-molded) 1

6. COMPARISONS WITH SIMILAR PRODUCTS

6-1. Model DV 18DL

Maker				HITACHI		C-1
Model				DV 18DL	DV 18DMR	
Max. capacity	Screw driving	Machine screw		6 mm (1/4")	6 mm (1/4")	6 mm (1/4")
		Wood screw		8 mm dia. x 100 mm (# 20 x 4")	8 mm dia. x 100 mm (# 20 x 4")	10 mm dia. x 89 mm (3/8" x 3-1/2")
	Drilling	Brick		16 mm (5/8")	16 mm (5/8")	16 mm (5/8")
		Mild steel		13 mm (1/2")	13 mm (1/2")	13 mm (1/2")
		Aluminum		13 mm (1/2")	13 mm (1/2")	13 mm (1/2")
		Soft wood		50 mm (2")	50 mm (2")	65 mm (2-9/16")
Rotation speed		Low	Save mode	0 — 200/min.	None	Low: 0 — 300/min.
			Power mode	0 — 400/min.	0 — 400/min.	Medium: 0 — 600/min.
		High	Save mode	0 — 900/min.	None	
			Power mode	0 — 1,800/min.	0 — 1,800/min.	High: 0 — 1,700/min.
Impact rate		Low	Save mode	0 — 2,400/min.	None	Low: 0 — 4,500/min.
			Power mode	0 — 4,800/min.	0 — 4,800/min.	Medium: 0 — 9,000/min.
		High	Save mode	0 — 10,800/min.	None	
			Power mode	0 — 21,600/min.	0 — 21,600/min.	High: 0 — 25,500/min.
Slip torque				1.5 — 7.0 N·m (15 — 70 kgf·cm) (13 — 61 in-lbs.) [22 positions]	1.5 — 7.0 N·m (15 — 70 kgf·cm) (13 — 61 in-lbs.) [22 positions]	Not indicated [16 positions]
Max. torque				64 N·m (653 kgf·cm) (570 in-lbs.)	62 N·m (633 kgf·cm) (550 in-lbs.)	63 N·m (643 kgf·cm) (558 in-lbs.)
Max. torque (hard) (actually measured value)				86 N·m (881 kgf·cm) (766 in-lbs.)	86 N·m (881 kgf·cm) (766 in-lbs.)	80 N·m (820 kgf·cm) (713 in-lbs.)
Drill chuck	Type			Single sleeve	Single sleeve	Single sleeve
	Capacity			13 mm (1/2")	13 mm (1/2")	13 mm (1/2")
	Outer material			Metal	Metal	Metal
	Locking device			Equipped	Equipped	Equipped
Switch	Type			Variable speed	Variable speed	Variable speed
	Feedback circuit			Equipped	Equipped	Equipped
	Electric brake			Equipped	Equipped	Equipped
Automatic spindle lock				Equipped	Equipped	Equipped
Reversing switch				Push-button	Push-button	Push-button
Replaceable carbon brushes				Equipped	Equipped	Equipped
Replaceable armature				Equipped	Equipped	Equipped
Handle shape				T-type	T-type	T-type
Soft-grip handle				Equipped	Equipped	Equipped
Side handle				Equipped	Equipped	Equipped
Belt hook				Equipped	Equipped	Equipped
Strap				Equipped (Except for USA)	Equipped	None
Battery	Nominal capacity			3.0 Ah	2.0/2.4/2.6/3.0 Ah	3.0 Ah
	Nominal voltage			18 V	18 V	18 V
	Charging time*			45 min.	50/60/70 min. or 28 min.	45 min.
Dimensions	Overall length			250 mm (9-27/32")	253 mm (9-61/64")	250 mm (9-27/32")
	Overall height			248 mm (9-49/64")	248 mm (9-49/64")	257 mm (10-1/8")
	Overall width			82 mm (3-15/64")	76 mm (3")	78 mm (3-5/64")
Weight				2.2 kg (4.8 lbs.)	2.7 kg (6.0 lbs.)	2.2 kg (4.8 lbs.)

*: Charging time varies depending on the type of charger to be used.

6-2. Model DV 14DL

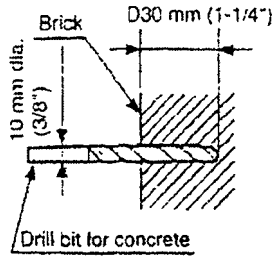
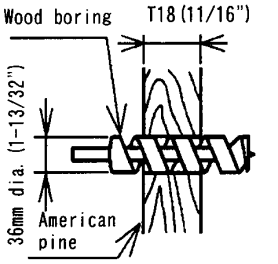
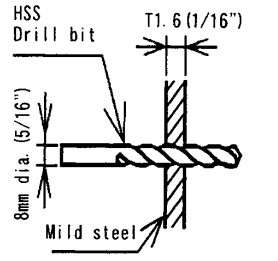
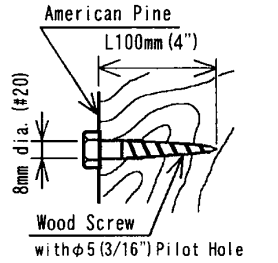
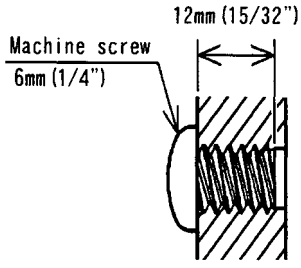
Maker				HITACHI		C-2
Model				DV 14DL	DV 14DMR	
Max. capacity	Screw driving	Machine screw		6 mm (1/4")	6 mm (1/4")	6 mm (1/4")
		Wood screw		8 mm dia. x 75 mm (# 20 x 3")	8 mm dia. x 75 mm (# 20 x 3")	6.8 mm dia. x 50 mm (17/64" x 1-31/32")
	Drilling	Brick		14 mm (9/16")	14 mm (9/16")	13 mm (1/2")
		Mild steel		13 mm (1/2")	13 mm (1/2")	13 mm (1/2")
		Aluminum		13 mm (1/2")	13 mm (1/2")	13 mm (1/2")
		Soft wood		45 mm (1-49/64")	45 mm (1-49/64")	27 mm (1-1/16")
Rotation speed		Low	Save mode	0 — 200/min.	None	Low: 0 — 400/min.
			Power mode	0 — 400/min.	0 — 400/min.	None
		High	Save mode	0 — 850/min.	None	
			Power mode	0 — 1,750/min.	0 — 1,750/min.	High: 0 — 1,400/min.
Impact rate		Low	Save mode	0 — 2,400/min.	None	Low: 0 — 6,000/min.
			Power mode	0 — 4,800/min.	0 — 4,800/min.	None
		High	Save mode	0 — 10,200/min.	None	
			Power mode	0 — 21,000/min.	0 — 21,000/min.	High: 0 — 21,000/min.
Slip torque				1.5 — 7.0 N·m (15 — 70 kgf·cm) (13 — 61 in-lbs.) [22 positions]	1.5 — 7.0 N·m (15 — 70 kgf·cm) (13 — 61 in-lbs.) [22 positions]	Not indicated [16 positions]
Max. torque				52 N·m (530 kgf·cm) (460 in-lbs.)	52 N·m (530 kgf·cm) (460 in-lbs.)	25 N·m (255 kgf·cm) (221 in-lbs.)
Max. torque (hard) (actually measured value)				75 N·m (764 kgf·cm) (664 in-lbs.)	75 N·m (764 kgf·cm) (664 in-lbs.)	41 N·m (713 kgf·cm) (620 in-lbs.)
Drill chuck	Type			Single sleeve	Single sleeve	Single sleeve
	Capacity			13 mm (1/2")	13 mm (1/2")	13 mm (1/2")
	Outer material			Metal	Metal	Plastic
	Locking device			Equipped	Equipped	Equipped
Switch	Type			Variable speed	Variable speed	Variable speed
	Feedback circuit			Equipped	Equipped	Equipped
	Electric brake			Equipped	Equipped	Equipped
Automatic spindle lock				Equipped	Equipped	Equipped
Reversing switch				Push-button	Push-button	Push-button
Replaceable carbon brushes				Equipped	Equipped	Equipped
Replaceable armature				Equipped	Equipped	Equipped
Handle shape				T-type	T-type	T-type
Soft-grip handle				Equipped	Equipped	Equipped
Side handle				Equipped	Equipped	Equipped
Belt hook				Equipped	Equipped	Equipped
Strap				Equipped	Equipped	Equipped
Battery	Nominal capacity			3.0 Ah	2.0/2.6/3.0 Ah	3.0 Ah
	Nominal voltage			14.4 V	14.4 V	14.4 V
	Charging time*			45 min.	50/60/70 min.	45 min.
Dimensions	Overall length			250 mm (9-27/32")	253 mm (9-61/64")	204 mm (8-1/32")
	Overall height			246 mm (9-11/16")	245 mm (9-41/64")	242 mm (9-17/32")
	Overall width			78 mm (3-5/64")	76 mm (3")	79 mm (3-7/64")
Weight				2.1 kg (4.6 lbs.)	2.5 kg (5.5 lbs.)	1.7 kg (3.8 lbs.)

*: Charging time varies depending on the type of charger to be used.

7. WORKING PERFORMANCE PER SINGLE CHARGE

7-1. Model DV 18DL

Drilling and fastening performance comparison per charge

Type of work	Maker	Model name	Working capacity (*) 0 100 200 300 400 / 0 *600 *1200 *1800 *2400	Driling speed (sec./pc.)
 < High speed >	HITACHI	DV 18DL	130	5.5
		DV 18DMR	130	5.5
	C – 1		120	6.0
 < Low speed >	HITACHI	DV 18DL	130	3.7
		DV 18DMR	130	3.7
	C – 1		140	3.5
 < High speed >	HITACHI	DV 18DL	180	4.4
		DV 18DMR	180	4.4
	C – 1		205	3.5
 < Low speed >	HITACHI	DV 18DL	50	7.0
		DV 18DMR	50	7.0
	C – 1		55	6.5
	HITACHI	DV 18DL	*1370	0.4
		DV 18DMR	*1370	0.4
	C – 1		*1510	0.5

*: Number of holes or fasteners per charge

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

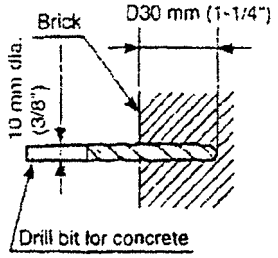
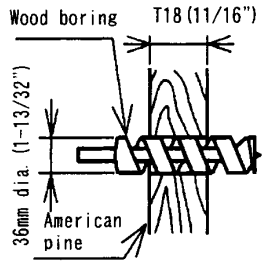
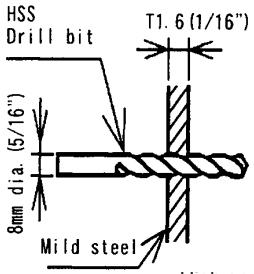
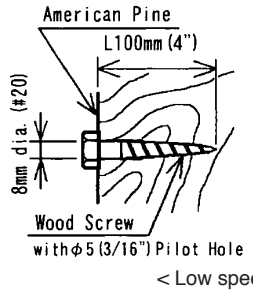
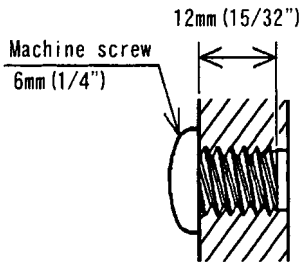
Model DV 18DL, DV 18DMR and C-1: 3.0 Ah

As actually measured values listed in the above table may vary depending on the 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.

7-2. Model DV 14DL

Drilling and fastening performance comparison per charge

Type of work	Maker	Model name	Working capacity (*) 0 100 200 300 400 / 0 *600 *1200 *1800 *2400	Driling speed (sec./pc.)
 < High speed >	HITACHI	DV 14DL	100	6.2
		DV 14DMR	100	6.2
	C – 2		120	6.0
 < Low speed >	HITACHI	DV 14DL	90	4.6
		DV 14DMR	90	4.6
	C – 2		140	3.5
 < High speed >	HITACHI	DV 14DL	150	5.3
		DV 14DMR	150	5.3
	C – 2		205	3.5
 < Low speed >	HITACHI	DV 14DL	70	5.4
		DV 14DMR	70	5.4
	C – 2		55	6.5
	HITACHI	DV 14DL	*1350	0.4
		DV 14DMR	*1350	0.4
	C – 2		*1140	0.5

*: Number of holes or fasteners per charge

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

Model DV 14DL, DV 14DMR and C-2: 3.0 Ah

As actually measured values listed in the above table may vary depending on the 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 Models DV 18DL and DV 14DL Cordless Impact Driver Drills 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 the 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 charge 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 the 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 storage batteries

Ensure that all customers understand that the storage batteries 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 storage battery.

For Europe

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

For the U.S.A. and Canada

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

(3) The following cautions are listed on the name plate to the Model UC 18YRL charger.

CAUTION
- For safe operation, see instruction manual.
- Charge HITACHI rechargeable batteries types EB7, EB9, EB12, EB14, EB18, EBL14, EBM18 series. Other types of batteries may burst causing personal injury and damage.
- Charge between 32˚ F and 104˚ F. Rest 15 minutes between the charging of batteries.
- Indoor use only.
- Replace defective cord immediately.

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

The cordless impact 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 impact driver drill for comparatively light work.

Because they are battery driven, the output of the motor in cordless driver drills is rather low in comparison with conventional electric power tools. Accordingly, they are not suitable for continuous drilling of many holes in succession, or for drilling into particularly hard materials which creates a heavy load. Sales persons 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) Use at the thrust of 100 to 150 N (10 to 15 kgf, 22 to 33 lbs.)

The drilling speed of this unit is not accelerated even if the tool is strongly pressed against the workpiece as is done with a usual AC impact drill. Such operation will damage the drill bit, resulting in not only poor working efficiency but also burnout of the motor.

(5) 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.)

(6) Variation in amount of work possible per charge

Although the nominal chargeable capacity of the storage batteries used with the Models DV 18DL and DV 14DL is 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.

(7) Precautions in the use of HSS drill bits

For example, although the Model DV 18DL is designed for drilling capacities of 50 mm (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.

(8) 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 Models DV 18DL and DV 14DL are 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.

(9) Avoid continuous use.

Although the Model DV 18DL 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 Models DV 18DVL and DV 14DL and take a pause about 15 minutes after a single charge operation as a guide.

9. REFERENCE MATERIALS

9-1. Speed Control Mechanism

Spindle rotation speed of the Models DV 18DL and DV 14DL can be controlled by simply varying the amount by which the trigger switch is depresed. The relationship between the amount the trigger switch is depressed (in millimeters) and the rotation speed is illustrated in Fig. 2.

NOTE: The gradient and values illustrated in Fig. 2 are intended for reference only, and will vary slightly due to differences in the discharge condition of the battery, the ambient temprature, and individual speed-control element accuracy.

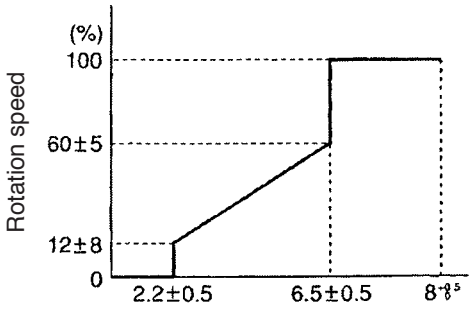


Fig. 2

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 danger of accidental turning of the motor.

10-1. Precautions in Disassembly and Reassembly

The **[Bold]** numbers in the descriptions below correspond to the item numbers in the Parts List and the exploded assembly diagram for the Model DV 18DL, and the **<Bold>** numbers to those in the Parts List and the exploded assembly diagram for the Model DV 14DL.

10-1-1. Disassembly

(1) Removal of the Hook Ass'y **[53] <53>** or the Hook Ass'y (W/Light) **[55] <59>**

Remove Special Screw (A) M5 **[59] [57]** with a flat-blade screwdriver or a coin. Remove the Hook Ass'y **[53] <53>** or the Hook Ass'y (W/Light) **[55] <59>** and the Hook Spring **[58] <56>**.

(2) Removal of the Carbon Brushes 5 x 6 x 11.5 **[34] <34>**

Remove the Brush Cap **[35] <35>** first then pry the Carbon Brush 5 x 6 x 11.5 **[34] <34>** off with a flat-blade screwdriver (at the position of collars). Remove the Brush Caps **[35] <35>** and the Carbon Brushes 5 x 6 x 11.5 **[34] <34>** at both sides.

(3) Removal of the Drill Chuck 13VLRL-N (W/O Chuck Wrench) **[2] <2>**

Perform the following steps (a) and (b) with the main unit mounted in the vise for removal of the Drill Chuck 13VLRL-N (W/O Chuck Wrench) **[2] <2>**. At this time, it is recommended to sandwich a cloth between the main unit and the vise to prevent Housing (A).(B) Set **[38] <38>** from being scratched.

(a) Fully open the jaws of the Drill Chuck 13VLRL-N (W/O Chuck Wrench) **[2] <2>** and remove the Special Screw (Left Hand) M6 x 23 **[1] <1>** by turning clockwise (be careful that it is a left-handed screw).

(b) Fix the hexagonal bar wrench M10 into the Drill Chuck 13VLRL-N (W/O Chuck Wrench) **[2] <2>** as shown in Fig. 3 then turn it counterclockwise to remove the Drill Chuck 13VLRL-N (W/O Chuck Wrench) **[2] <2>**.

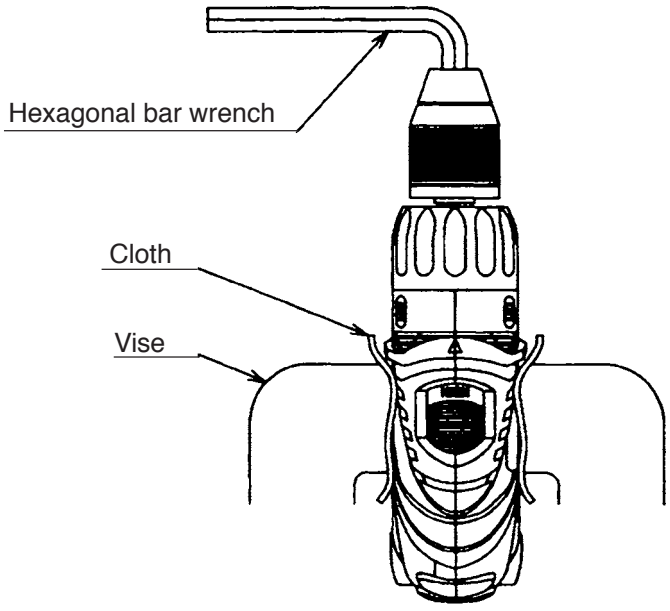


Fig. 3

(4) Adjust the Front Cap **[4] <4>** to " ◀ ".

(5) Disassembly of the main unit

Remove the ten Tapping Screws (W/Flange) D3 x 16 (Black) **[36] <36>** from the main unit. Holding the battery chamber of Housing (B) **[38] <38>**, gently remove Housing (B) **[38] <38>**. Then the inside parts can be removed in an assembled or single state. All the parts can be easily removed by raising the Front Cap **[4] <4>**. Parts are separated into the drive unit (an assembly of the armature and the gear unit), power supply unit, Pushing Button **[45] <46>** and Strap (Black) **[57] <55>**.

(6) Disassembly of the drive unit

(a) Remove the Front Cap **[4] <4>** and the Click Spring **[12] <12>** from the Front Case **[11] <11>**.

NOTE: Do not remove the Nut [6] <6> from the Front Case [11] <11> in this step.

(b) Remove the Shift Arm **[21] <21>** from the Gear Box Ass'y **[3] <3>** and remove the Shift Knob **[41] <41>** from the Shift Arm **[21] <21>**. Do not deform the Shift Arm **[21] <21>** by applying excessive force.

(c) Turn the Motor Spacer **[30] <30>** until a click is heard counterclockwise viewing from the rear of the Armature and Pinion Set **[31] <31>**. Remove the Motor Spacer **[30] <30>** from the Rear Case **[20] <20>**. Thus the armature unit is separated from the gear unit.

(7) Disassembly of the armature unit

(a) Removal of the Magnet **[32] <32>**

Note that the magnetic force of the Magnet **[32] <32>** is strong. Hold the Motor Spacer **[30] <30>** securely and pull toward the back of the Armature and Pinion Set **[31] <31>** to remove.

NOTE: Be careful that the ball bearing and the washer behind the Armature and Pinion Set [31] <31> may be attracted to the Magnet [32] <32> and come off the Armature and Pinion Set [31] <31> when removing the Magnet [32] <32>.

(b) Removal of the Motor Spacer **[30] <30>**

Remove the Motor Spacer **[30] <30>** from the Armature and Pinion Set **[31] <31>**. If it is too hard to remove, support the Motor Spacer **[30] <30>** and press down the tip of the armature shaft of the Armature and Pinion Set **[31] <31>** with a hand press.

(8) Disassembly of the gear unit

(a) Disassembly of the deceleration mechanism

Turn Washer (B) **[29] <29>** mounted in the Rear Case **[20] <20>** counterclockwise to remove. Take out the First Ring Gear **[28] <28>**, Planet Gear (A) Set (4 pcs.) **[27] <27>**, Pinion (B) **[26] <26>**, Planet Gear (B) Set (4 pcs.) **[25] <25>**, Pinion (C) **[24] <24>** and Slide Ring Gear **[23] <23>** in order. Then remove the Screw Set M3 x 12 (4 pcs.) **[22] <22>** that connects the Front Case **[11] <11>** with the Rear Case **[20] <20>**. Take out Washer (D) **[19] <19>**, Planet Gear (C) Set (5 pcs.) **[18] <18>**, Carrier **[17] <17>**, Ring Gear **[16] <16>**, Pin Set (6 pcs.) **[13] <13>**, Lock Ring **[15] <15>** and Washer (A) **[14] <14>** from the Front Case **[11] <11>** in order.

NOTE: Do not lose small parts. Pay special attention to the Pin Set (6 pcs.) [13] <13>, because they are apt to roll.

(b) Removal of the Switch Plate **[5] <5>**

Turn the switch flange so as to fit the projection of the switch flange to the recess of the Switch Plate **[5] <5>**, then remove the Switch Plate **[5] <5>** from the Front Case **[11] <11>**. (See Fig. 4.)

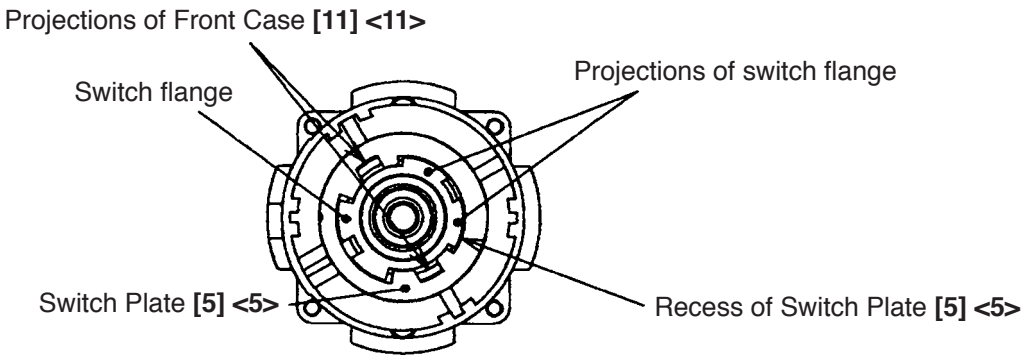


Fig. 4

(c) Disassembly of the clutch mechanism

Turn the Nut **[6] <6>** counterclockwise to remove from the Front Case **[11] <11>**. Take out the Spring **[7] <7>**, Thrust Washer **[8] <8>**, Stopper **[9] <9>** and Stopper Spring **[10] <10>** in order.

(9) Disassembly of the power supply unit

Disconnect each internal wire of Brush Block **[33] <33>** and Terminals **[50] [52] <50> <52>** with a solder iron.

NOTE: Do not remove the fin secured to the DC-speed control switch with a screw.

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

Perform wiring according to the wiring diagram (Fig. 5). Pay attention to the connecting direction of the internal wires and the terminals.

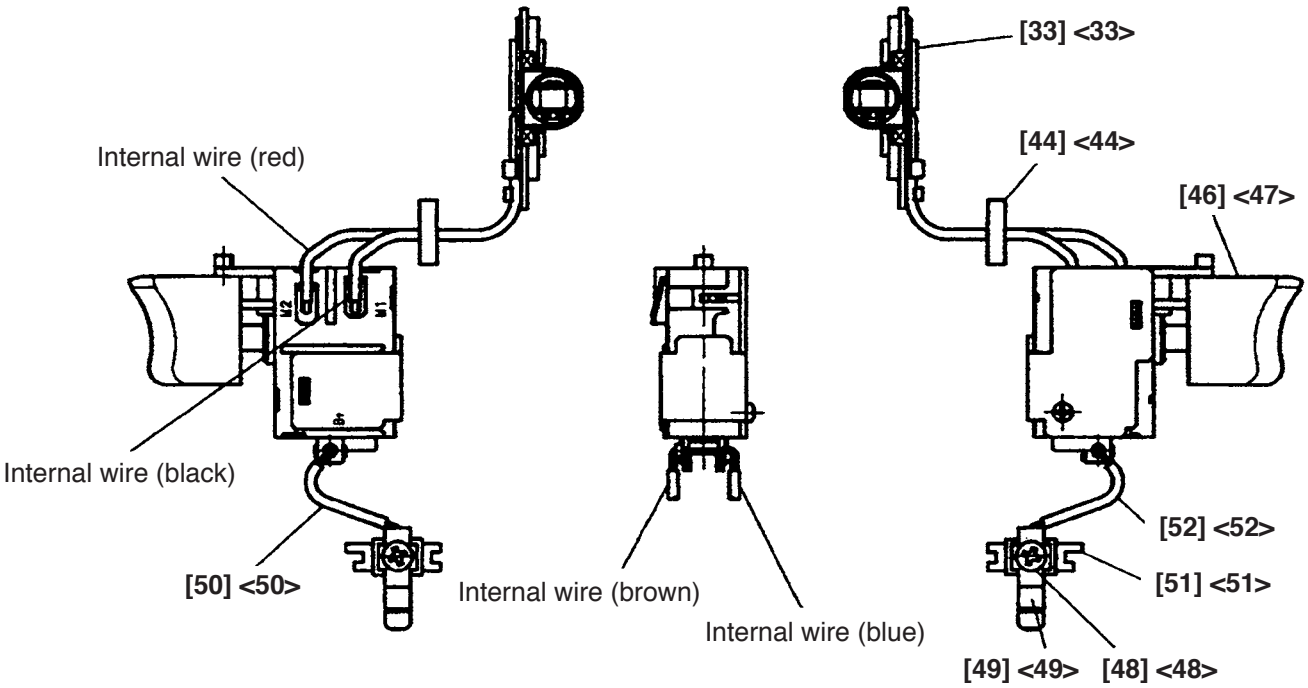


Fig. 5

(2) Reassembly of the clutch mechanism

(a) Mount the Stopper Spring **[10] <10>** (2 pcs.), Stopper **[9] <9>** (2 pcs.), Thrust Washer **[8] <8>** and Spring **[7] <7>** to the Front Case **[11] <11>** in order (see Fig. 6).

NOTE: Be careful not to drop the Stopper [9] <9> and the Stopper Spring [10] <10> until the Nut [6] <6> is inserted.

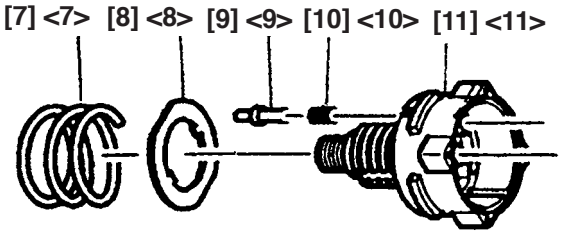


Fig. 6

(b) Screw the Nut **[6] <6>** in the Front Case **[11] <11>** (see Fig. 7).

Align the mark (i) on the Nut **[6] <6>** with the mark on the Front Case **[11] <11>** then screw it in. Rotate the Nut **[6] <6>** about a turn clockwise to align the mark (i) on the Nut **[6] <6>** with the mark on the Front Case **[11] <11>**. At this time, check that the "Y" surface of the Nut **[6] <6>** is almost flush with the "Z" surface of the Front Case **[11] <11>**. After above step, tighten the Nut **[6] <6>** so that the Nut **[6] <6>** pushes the Stopper **[9] <9>** into the Front Case **[11] <11>**.

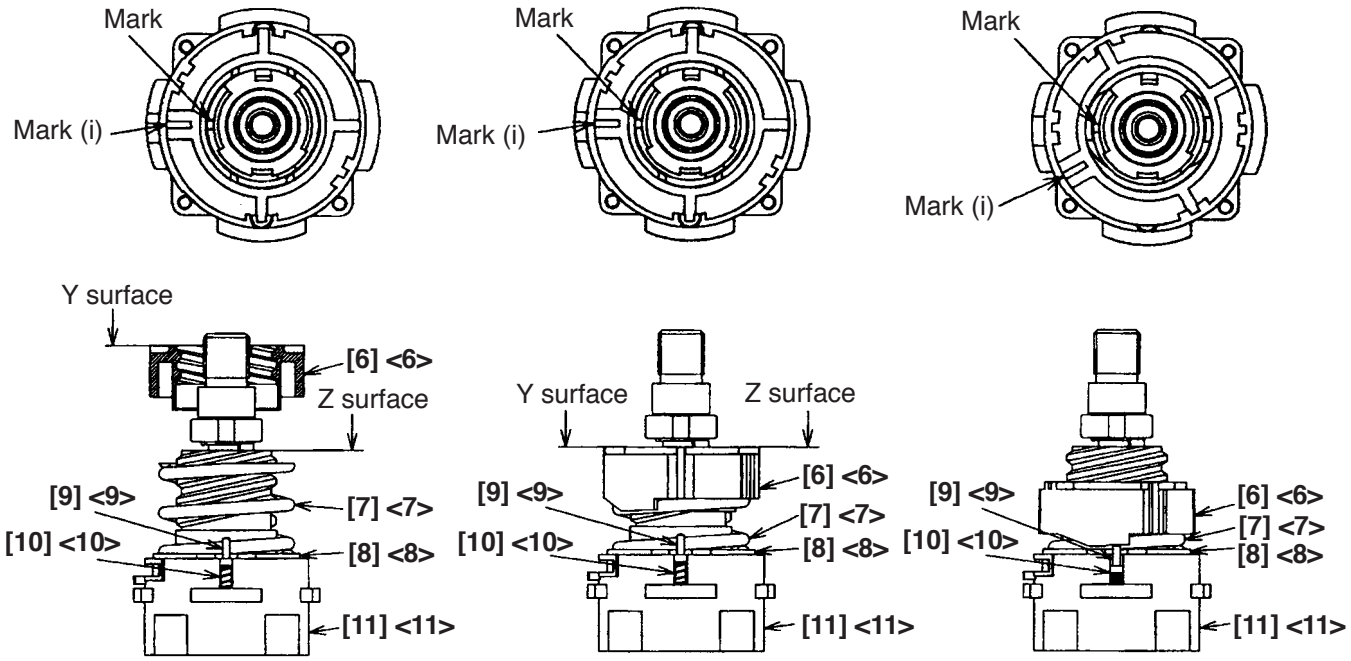


Fig. 7

(3) Reassembly of the gear unit

(a) Apply grease (Hitachi Motor Grease No. 29) to the engaging portions of each gear and contacting surfaces with the pin set (6 pcs.) of the ring gear properly.

(b) Mount the parts from the Pin Set (6 pcs.) **[13] <13>** to Washer (B) **[29] <29>** to the part assembled in the above (2) in order (see Fig. 8).

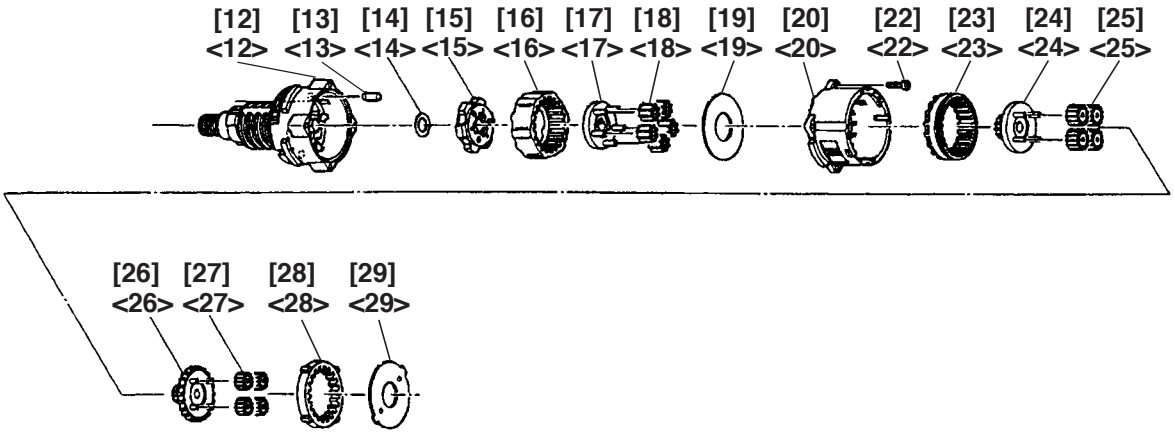


Fig. 8

① Apply grease approx. 1.2 g (Hitachi Motor Grease No. 29) to the shaded portion in the Front Case **[11] <11>** (See Fig. 9).

NOTE: Be sure to apply grease to the shaded portion in the Front Case [11] <11>. Otherwise, the spindle lock may not work properly.

② Mount the Lock Ring **[15] <15>** to the Front Case **[11] <11>** so that the projections on the Lock Ring **[15] <15>** engage with the recesses in the Front Case **[11] <11>**. Make sure that the flat plane of Lock Ring **[15] <15>** faces the Front Case **[11] <11>** (see Fig. 9).

③ Mount the Carrier **[17] <17>** so that recess (A) on the Lock Ring **[15] <15>** is aligned with projection (B) on the Carrier **[17] <17>** (be careful of the direction). Then make sure that the flat plane of the spindle faces the flat plane of the Carrier **[17] <17>**. If mounted 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 **[17] <17>** (see Figs. 10 and 11).

NOTE: When mounting the Carrier [17] <17> to the Lock Ring [15] <15>, never apply the grease between the plates of the Lock Ring [15] <15> and Carrier [17] <17>. Otherwise, the spindle lock may not work properly.

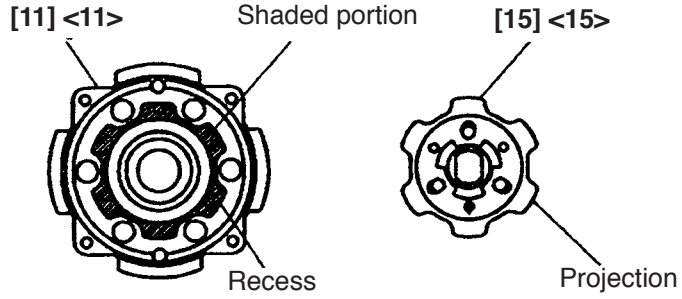


Fig. 9

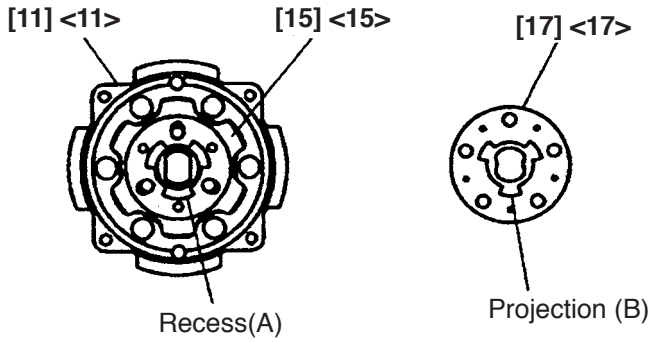


Fig. 10

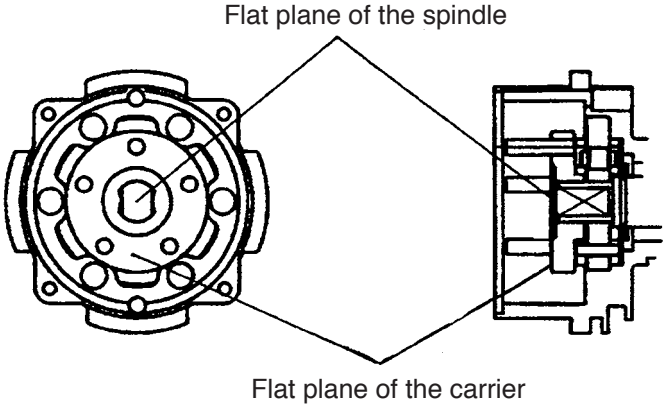


Fig. 11

④ Pay attention to the mounting direction of the Ring Gear **[16] <16>**, Slide Ring Gear **[23] <23>**, Pinion (C) **[24] <24>** and Pinion (B) **[26] <26>** (see Fig. 8).

⑤ Mount the Front Case **[11] <11>** to the Rear Case **[20] <20>** so that the concave portion of the Front Case **[11] <11>** aligns with the protrusion of the Rear Case **[20] <20>** (see Fig. 15).

⑥ Fit the protrusion of Washer (B) **[29] <29>** in the concave portion of the Rear Case **[20] <20>** and turn it clockwise viewing from the armature until it contacts the Rear Case **[20] <20>** (see Fig. 12).

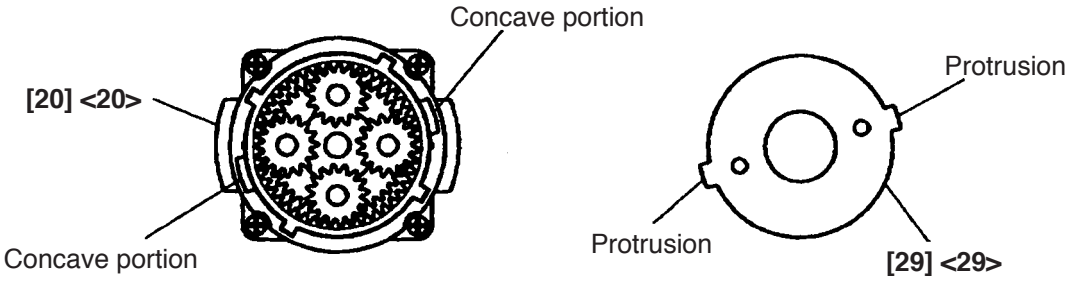


Fig. 12

(4) Reassembly of the armature unit

(a) Mounting the Motor Spacer **[30] <30>**

Mount the Motor Spacer **[30] <30>** to the Armature and Pinion Set **[31] <31>**. If it is too hard to mount, support the Motor Spacer **[30] <30>** and press down the rear end of the armature shaft of the Armature and Pinion Set **[31] <31>** with a hand press.

(b) Mounting the Magnet **[32] <32>**

Mount the Magnet **[32] <32>** to the Armature and Pinion Set **[31] <31>** so that the notch of the Magnet **[32] <32>** faces the rear of the Armature and Pinion Set **[31] <31>**. Hold each part securely as the Armature and Pinion Set **[31] <31>** may be attracted to the Magnet **[32] <32>** by the strong magnetic force (see Fig. 13).

NOTE: Be careful that the ball bearing and the washer at the rear of the Armature and Pinion Set [31] <31> may come off due to the magnetic force of the Magnet [32] <32>.

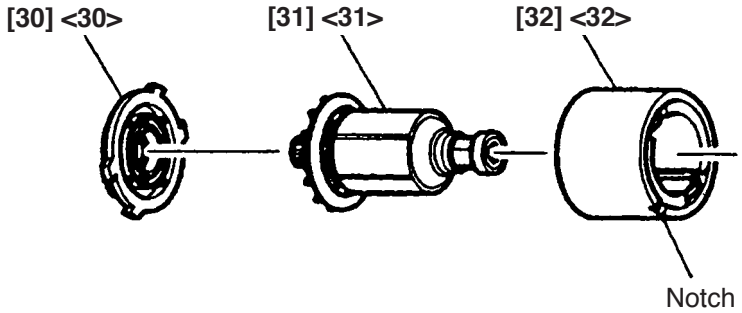


Fig. 13

(5) Reassembly of the drive unit

(a) Fit the protrusion of the Motor Spacer **[30] <30>** in the concave portion of the Rear Case **[20] <20>** engaging the pinion of the Armature and Pinion Set **[31] <31>** with Planet Gear (A) Set (4 pcs.) **[27] <27>**. Turn it fully clockwise viewing from the rear of the Armature and Pinion Set **[31] <31>** (see Fig. 14).

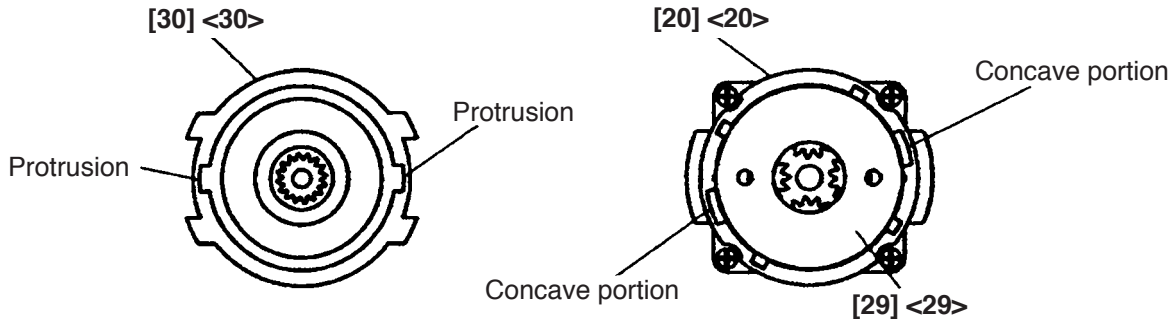


Fig. 14

(b) Mounting the Shift Arm **[21] <21>** and the Shift Knob **[41] <41>** (see Fig. 15).

① Mount the Shift Arm **[21] <21>** to the protruded side of the Rear Case **[20] <20>**. At this time, insert the protrusion of the Shift Arm **[21] <21>** into the hole of the Rear Case **[20] <20>** and check that the protrusion is inserted into the groove of the Slide Ring Gear **[23] <23>** that is mounted in the Rear Case **[20] <20>** (see Fig. 8).

② Insert the Shift Arm **[21] <21>** into the groove of the Shift Knob **[41] <41>** facing "LOW" indication on the Shift Knob **[41] <41>** backward.

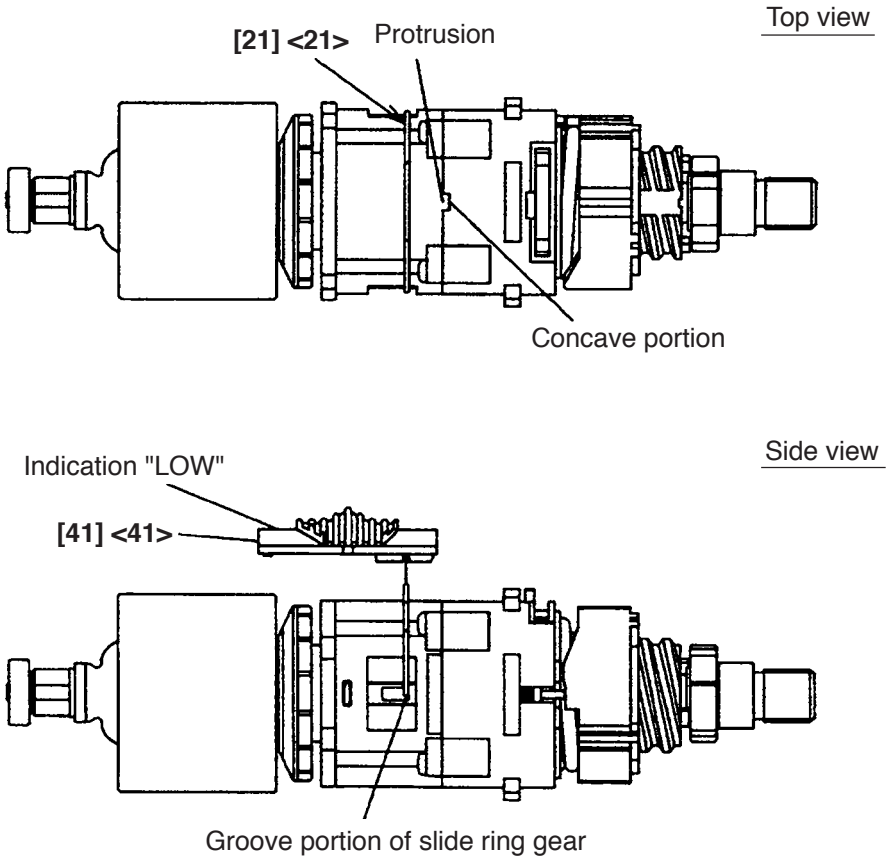


Fig. 15

(c) Mounting the Click Spring **[12] <12>** and the Front Cap **[4] <4>**.

① Mount the Switch Plate **[5] <5>** aligning with the projections of the Front Case **[11] <11>** as shown in Fig. 4.

② Mount the Click Spring **[12] <12>** to the Front Case **[11] <11>**.

③ When the Nut **[6] <6>** is screwed in the Front Case **[11] <11>** about 1-11/12 turns (690˚), the mark (i) of the Nut **[6] <6>** and the marking of the Switch Plate **[5] <5>** are positioned as shown in Fig. 16. Set the narrow slit of the switch flange as shown in Fig. 16. Mount the Front Cap **[4] <4>** aligning the narrow projection of the Front Cap **[4] <4>** with the mark (i) of the Nut **[6] <6>**. (The narrow projection of the Front Cap **[4] <4>** is positioned at "1" when viewed from the outside.)

Check that the protrusion of the Click Spring **[12] <12>** is inserted into the groove inside the Front Cap **[4] <4>**.

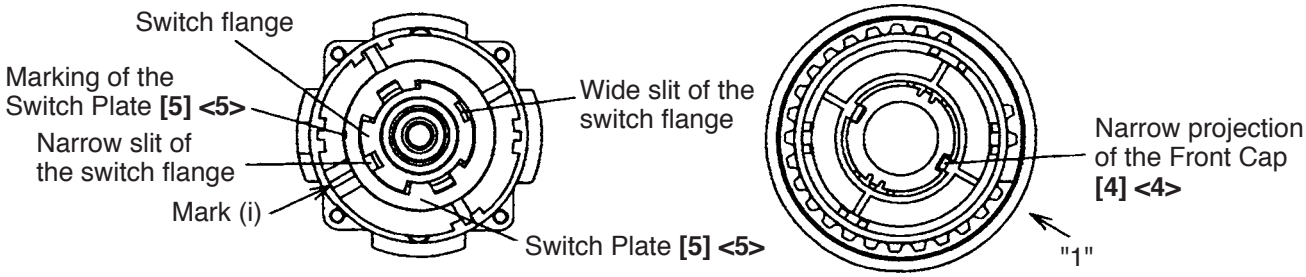


Fig. 16

(6) Reassembly of the main unit

(a) Mount the power supply unit and the drive unit that were reassembled in the above procedure to Housing (A) **[38] <38>**. At this time, align the protrusions of the Brush Block **[33] <33>**, Front Case **[11] <11>** and Motor Spacer **[30] <30>** with the concave portions of Housing (A) **[38] <38>**, the notch of the Magnet **[32] <32>** with the protrusion of Housing (A) **[38] <38>**, and the groove of the Front Cap **[4] <4>** with the protrusion of Housing (A) **[38] <38>** (see Fig. 17).

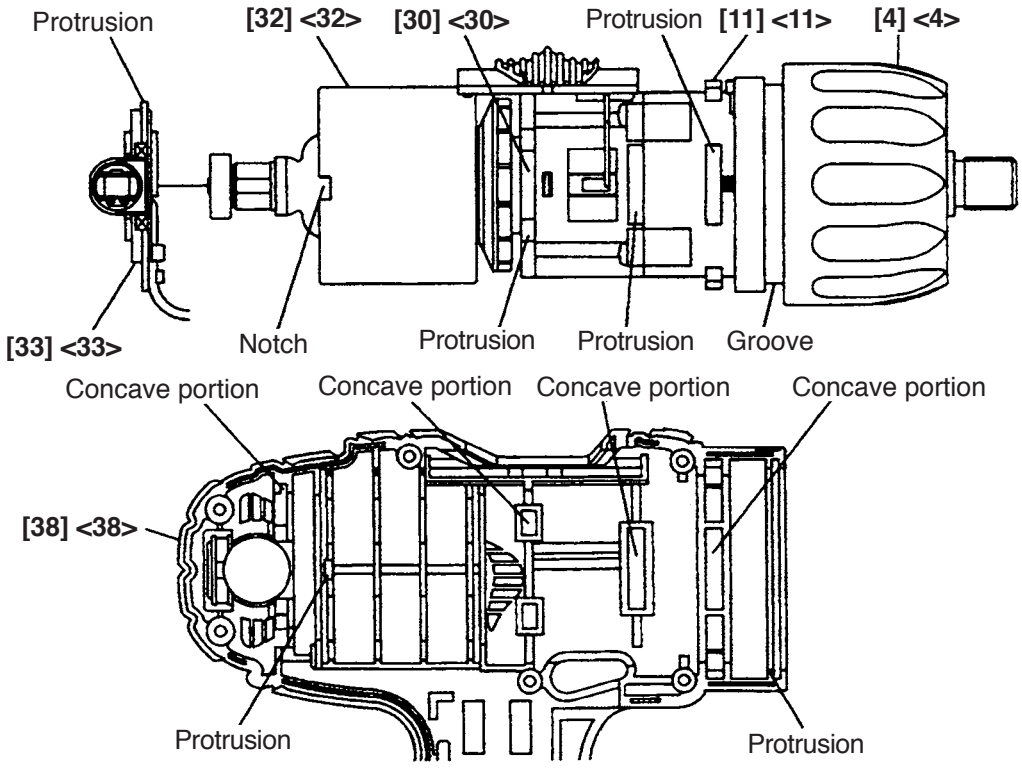


Fig. 17

(b) Mount the DC-Speed Control Switch **[46] <47>** that was not mounted in the above step (a) to Housing (A) **[38] <38>**. Mount the Pushing Button **[45] <46>** to Housing (A) **[38] <38>**. Check that the protrusion of the forward/reverse changeover lever of the DC-Speed Control Switch **[46] <47>** is inserted into the groove of the Pushing Button **[45] <46>**.

(c) Mount the Strap (Black) **[57] <55>** to Housing (A) **[38] <38>**.

(d) Align Housing (A) **[38] <38>** with Housing (B) **[38] <38>** and secure with ten Tapping Screws (W/Flange) D3 x 16 (Black) **[36] <36>**.

(e) Check for proper operation of the Front Cap **[4] <4>** and the Shift Knob **[41] <41>**. When the reassembly procedure is completed up to step (e), ensure that every indication on the Front Cap **[4] <4>** from number "1" to the hammer mark " " can be aligned with the triangle mark on Housing (A). (B) Set **[38] <38>** respectively and that the Front Cap **[4] <4>** turns moderately. If any indication on the Front Cap **[4] <4>** cannot be aligned with the triangle mark on Housing (A). (B) Set **[38] <38>**, correctly remount the Front Cap **[4] <4>** according to step (2) or (5) (c) as it is improperly mounted. Check for proper operation of the Shift Knob **[41] <41>**. Check that the speed changes between high and low properly by shifting the Shift Knob **[41] <41>**. If the speed cannot change properly or moderately, correctly remount the Shift Knob **[41] <41>** according to step (3) (b) or (5) (b) as it is improperly mounted.

(7) Mounting the Drill Chuck 13VLRL-N (W/O Chuck Wrench) **[2] <2>**

Mount the Drill Chuck 13VLRL-N (W/O Chuck Wrench) **[2] <2>** to the spindle and tighten the Special Screw (Left Hand) M6 x 23 **[1] <1>**.

(8) Mounting the Carbon Brushes 5 x 6 x 11.5 **[34] <34>**

Mount the two Carbon Brushes 5 x 6 x 11.5 **[34] <34>** to the Brush Block **[33] <33>** and secure the two Brush Caps **[35] <35>** to the Brush Block **[33] <33>**. Check that the claws of the Carbon Brushes 5 x 6 x 11.5 **[34] <34>** are properly inserted into the brush tubes.

(9) Reassembly of the Hook Ass'y **[53] <53>** or the Hook Ass'y (W/Light) **[55] <59>**

Check that the V-Lock Nut M5 **[54] <54>** is mounted to the Hook Ass'y **[53] <53>** or the Hook Ass'y (W/Light) **[55] <59>**. Mount the Hook Spring **[58] <56>** and secure it with Special Screw (A) M5 **[59] <57>**. Make sure to mount the Hook Spring **[58] <56>** with its larger diameter side pointing inward the housing.

(10) Other precautions in reassembling

After completion of reassembly, check that the rotating direction of the Drill Chuck 13VLRL-N (W/O Chuck Wrench) **[2] <2>** matches the position of the Pushing Button **[45] <46>**. When the Pushing Button **[45] <46>** is pressed from the (R) side, the rotating direction of the Drill Chuck 13VLRL-N (W/O Chuck Wrench) **[2] <2>** should be clockwise as viewed from behind. Switch on and off the Models DV 18DL or DV 14DL using the battery. Then turn the Drill Chuck 13VLRL-N (W/O Chuck Wrench) **[2] <2>** by hand in forward and reverse direction to check that the spindle lock properly works in either direction within a half rotation. Check that the runout of the Drill Chuck 13VLRL-N (W/O Chuck Wrench) **[2] <2>** is 0.8 mm or less at the position 110 mm away from the tip of the chuck using a 12-mm dia. test bar.

(11) Screw tightening torque

Special Screw (Left Hand) M6 x 23 **[1] <1>**	3.92 – 4.9 N·m (40 – 50 kgf·cm)
Drill Chuck 13VLRL-N (W/O Chuck Wrench) **[2] <2>**	17.6 – 21.6 N·m (180 – 220 kgf·cm)
Screw Set M3 x 12 **[22] <22>**	0.62 – 0.94 N·m (6 – 10 kgf·cm)
Brush Cap **[35] <35>**	0.68 – 0.88 N·m (7 – 9 kgf·cm)
Tapping Screw (W/Flange) D3 x 16 (Black) **[36] <36>**	1.0 – 1.6 N·m (10 – 16 kgf·cm)
Special Screw (A) M5 **[59] <57>**	1.47 – 2.45 N·m (15 – 25 kgf·cm)

10-2. Precaution 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 18YRL.

11. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable / Fixed	10	20	30	40	50	60
DV 18DL DV 14DL	General Assembly	Work Flow Drill Chuck (Keyless) Hook Ass'y	Armature and Pinion Set Magnet Brush Block DC-Speed Control Switch Shift Knob Gear Box Ass'y	Housing (A).(B) Set Front Cap Nut Spring Front Case Lock Ring 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			

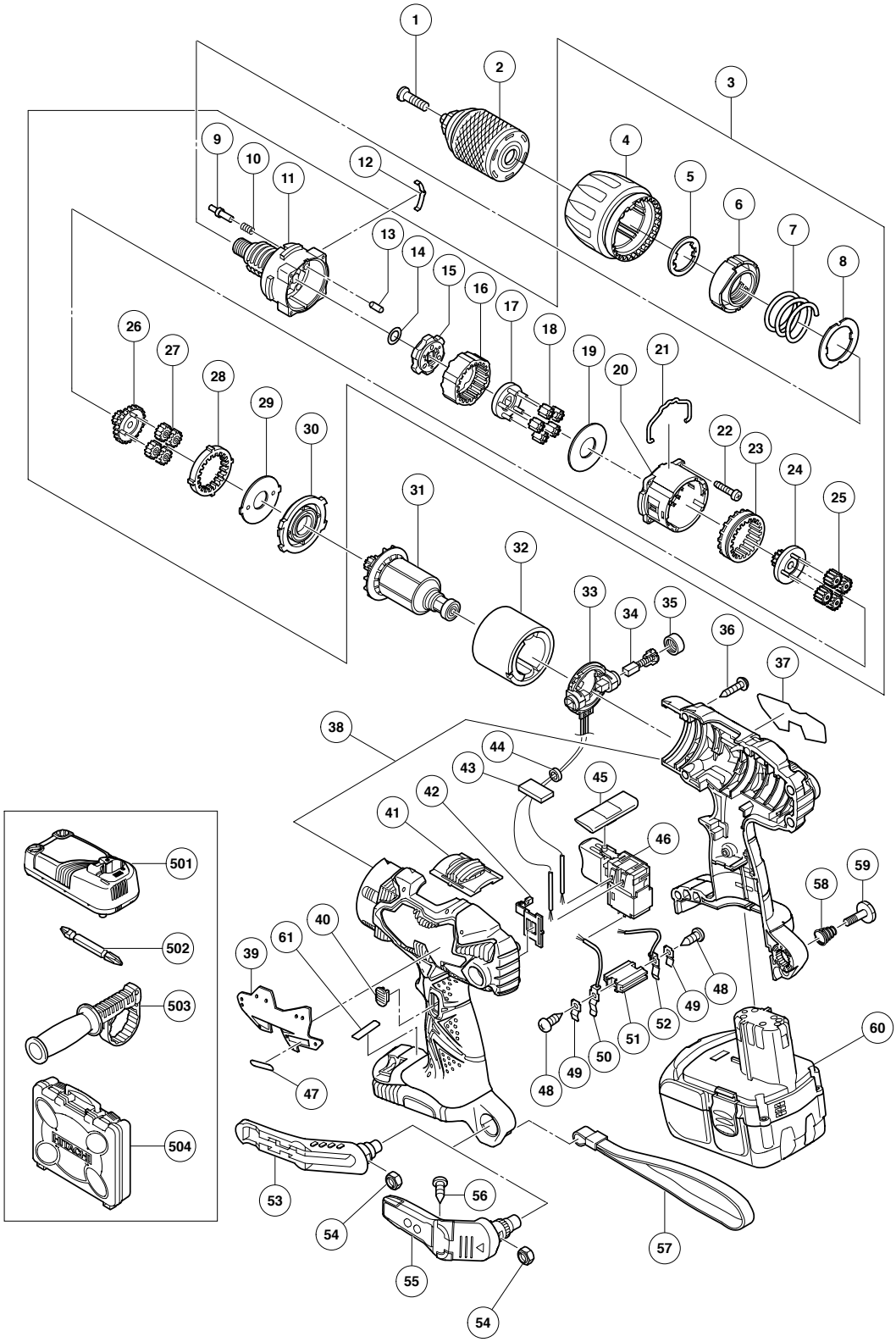
Hitachi Power Tools

LIST NO. G853

ELECTRIC TOOL PARTS LIST

■ CORDLESS IMPACT DRIVER DRILL 2006 · 7 · 6

Model DV 18DL (E1)



	ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
	1	311-959	SPECIAL SCREW (LEFT HAND) M6X23	1		
	2	323-898	DRILL CHUCK 13VLRL-N (W/O CHUCK WRENCH)	1		
	3	324-061	GEAR BOX ASS'Y	1	INCLUD. 4-11, 13-30	
	4	324-074	FRONT CAP	1		
	5	324-136	SWITCH PLATE	1		
	6	324-064	NUT	1		
	7	324-135	SPRING	1		
	8	324-063	THRUST WASHER	1		
	9	322-972	STOPPER	2		
	10	322-971	STOPPER SPRING	2		
	11	324-062	FRONT CASE	1		
	12	320-773	CLICK SPRING	1		
	13	322-975	PIN SET (6 PCS.)	6		
	14	322-980	WASHER (A)	1		
	15	322-976	LOCK RING	1		
	16	324-066	RING GEAR	1		
	17	322-978	CARRIER	1		
	18	324-067	PLANET GEAR (C) SET (5 PCS.)	5		
	19	324-065	WASHER (D)	1		
	20	322-981	REAR CASE	1		
	21	322-990	SHIFT ARM	1		
	22	320-087	SCREW SET M3X12 (4 PCS.)	4		
	23	324-069	SLIDE RING GEAR	1		
	24	324-068	PINION (C)	1		
	25	324-070	PLANET GEAR (B) SET (4 PCS.)	4		
	26	324-071	PINION (B)	1		
	27	324-073	PLANET GEAR (A) SET (4 PCS.)	4		
	28	324-072	FIRST RING GEAR	1		
	29	322-988	WASHER (B)	1		
	30	322-989	MOTOR SPACER	1		
	31	360-701	ARMATURE AND PINION SET	1		
	32	322-996	MAGNET	1		
	33	322-993	BRUSH BLOCK	1		
	34	999-054	CARBON BRUSH 5X6X11.5 (1 PAIR)	2		
	35	319-918	BRUSH CAP	2		
	36	313-687	TAPPING SCREW (W/FLANGE) D3X16 (BLACK)	10		
	37		NAME PLATE	1		
	38	326-278	HOUSING (A).(B) SET	1		
	39	326-279	PLATE (A)	1		
	40	326-276	LEVER (A)	1		
	41	324-137	SHIFT KNOB	1		
	42	326-277	LEVER (B)	1		
*	43	326-493	SUPPORT (D)	1	EXCEPT FOR USA, CAN	
*	44	323-229	FERRITE CORE	1	EXCEPT FOR USA, CAN, AUS	
	45	322-997	PUSHING BUTTON	1		
	46	322-994	DC-SPEED CONTROL SWITCH	1		
	47		HITACHI LABEL	1		
	48	958-715	TAPPING SCREW D4X10	2		
	49	996-118	HOLDER SPRING	2		
	50	323-003	TERMINAL	1		
	51	320-997	TERMINAL PIECE	1		

	ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
	52	322-995	TERMINAL	1		
*	53	320-287	HOOK ASS'Y	1	INCLUD. 54 FOR NOR, SWE, DEN, FRG, AUS	
	54	320-288	V-LOCK NUT M5	1		
*	55	321-918	HOOK ASS'Y (W/LIGHT)	1	INCLUD. 54, 56 FOR GBR, FRG, USA, CAN	
*	56	321-672	TAPPING SCREW D2X6	2	FOR GBR, FRG, USA, CAN	
*	57	306-952	STRAP (BLACK)	1	EXCEPT FOR USA, CAN	
	58	319-926	HOOK SPRING	1		
	59	320-881	SPECIAL SCREW (A) M5	1		
*	60	326-240	BATTERY EBM 1830 (EUROPE, AUS, NZL)	2		
*	60	326-241	BATTERY EBM 1830 (USA, CAN)	2		
*	61		CAUTION PLATE	1	FOR USA, CAN	

STANDARD ACCESSORIES

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
501		CHARGER (MODEL UC 18YRL)	1		
502	983-006	+ DRIVER BIT NO. 2 65L	1		
503	323-001	SIDE HANDLE	1		
504	323-230	CASE	1		

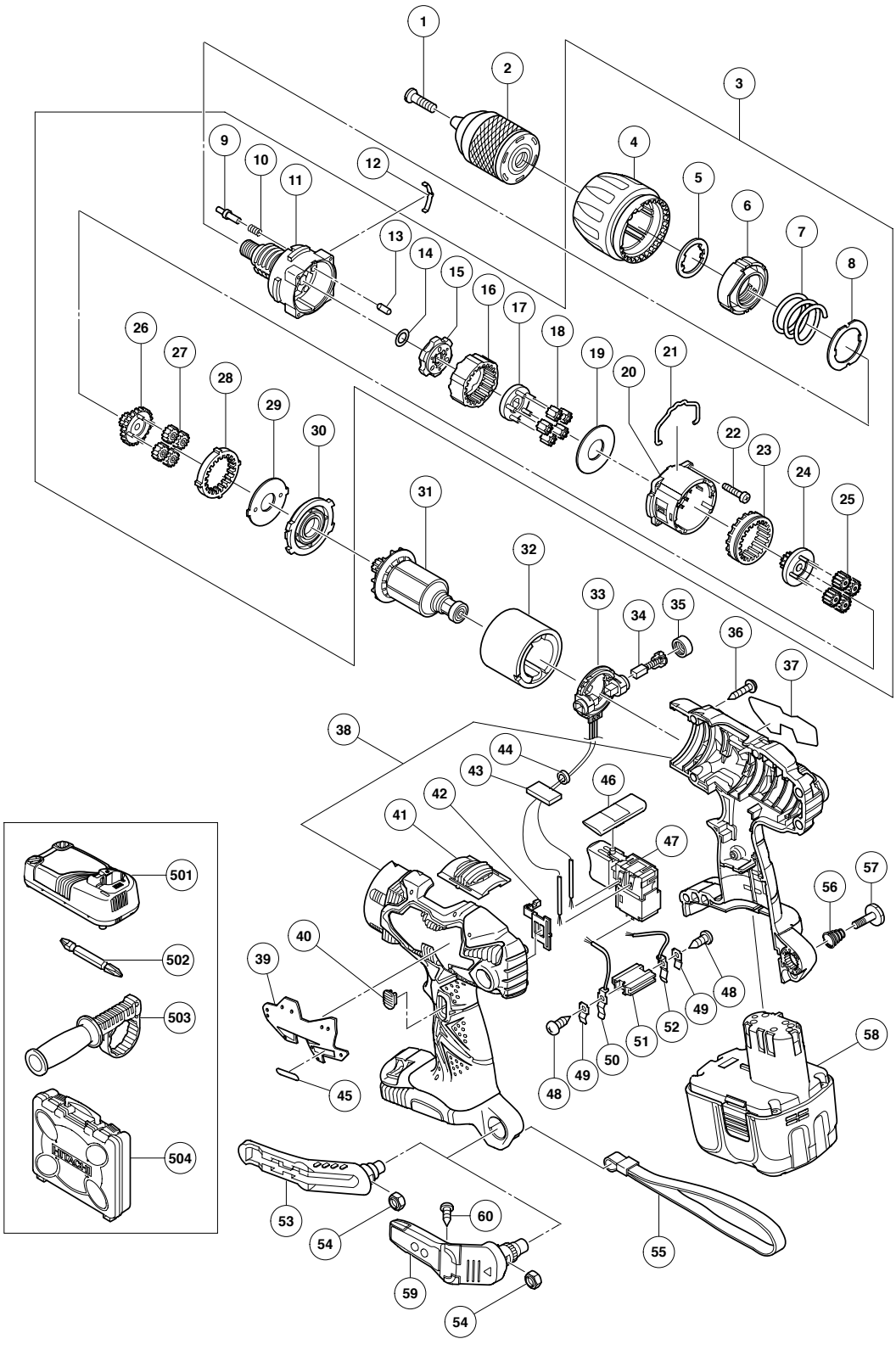
Hitachi Power Tools

LIST NO. G854

ELECTRIC TOOL PARTS LIST

■ CORDLESS IMPACT DRIVER DRILL 2006 · 7 · 6

Model DV 14DL (E1)



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	4	324-074	FRONT CAP	1		
	5	324-136	SWITCH PLATE	1		
	6	324-064	NUT	1		
	7	324-135	SPRING	1		
	8	324-063	THRUST WASHER	1		
	9	322-972	STOPPER	2		
	10	322-971	STOPPER SPRING	2		
	11	324-062	FRONT CASE	1		
	12	323-231	CLICK SPRING	1		
	13	322-975	PIN SET (6 PCS.)	6		
	14	322-980	WASHER (A)	1		
	15	322-976	LOCK RING	1		
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	17	322-978	CARRIER	1		
	18	324-067	PLANET GEAR (C) SET (5 PCS.)	5		
	19	324-065	WASHER (D)	1		
	20	322-981	REAR CASE	1		
	21	322-990	SHIFT ARM	1		
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	24	324-068	PINION (C)	1		
	25	324-070	PLANET GEAR (B) SET (4 PCS.)	4		
	26	324-071	PINION (B)	1		
	27	324-073	PLANET GEAR (A) SET (4 PCS.)	4		
	28	324-072	FIRST RING GEAR	1		
	29	322-988	WASHER (B)	1		
	30	322-989	MOTOR SPACER	1		
	31	360-721	ARMATURE AND PINION SET	1		
	32	322-996	MAGNET	1		
	33	322-993	BRUSH BLOCK	1		
	34	999-054	CARBON BRUSH 5X6X11.5 (1 PAIR)	2		
	35	319-918	BRUSH CAP	2		
	36	313-687	TAPPING SCREW (W/FLANGE) D3X16 (BLACK)	10		
	37		NAME PLATE	1		
	38	326-280	HOUSING (A).(B) SET	1		
	39	326-279	PLATE (A)	1		
	40	326-276	LEVER (A)	1		
	41	324-137	SHIFT KNOB	1		
	42	326-277	LEVER (B)	1		
	43	326-493	SUPPORT (D)	1		
*	44	323-229	FERRITE CORE	1	EXCEPT FOR AUS	
	45		HITACHI LABEL	1		
	46	322-997	PUSHING BUTTON	1		
	47	322-994	DC-SPEED CONTROL SWITCH	1		
	48	958-715	TAPPING SCREW D4X10	2		
	49	996-118	HOLDER SPRING	2		
	50	323-003	TERMINAL	1		
	51	320-997	TERMINAL PIECE	1		

	ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
	52	322-995	TERMINAL	1		
*	53	320-287	HOOK ASS'Y	1	INCLUD.54 FOR NOR, SWE, DEN, FRG, AUS	
	54	320-288	V-LOCK NUT M5	1		
	55	306-952	STRAP (BLACK)	1		
	56	319-926	HOOK SPRING	1		
	57	320-881	SPECIAL SCREW (A) M5	1		
	58	326-236	BATTERY EBL 1430 (EUROPE, AUS, NZL)	2		
*	59	321-918	HOOK ASS'Y (W/LIGHT)	1	INCLUD. 54, 60 FOR GBR, FRG	
*	60	321-672	TAPPING SCREW D2X6	2	FOR GBR, FRG	

STANDARD ACCESSORIES

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
501		CHARGER (MODEL UC 18YRL)	1		
502	983-006	+ DRIVER BIT NO. 2 65L	1		
503	323-001	SIDE HANDLE	1		
504	323-230	CASE	1		

Hitachi Koki Co., Ltd.
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