

MODELS

DV 20VB2

DV 18V

Hitachi

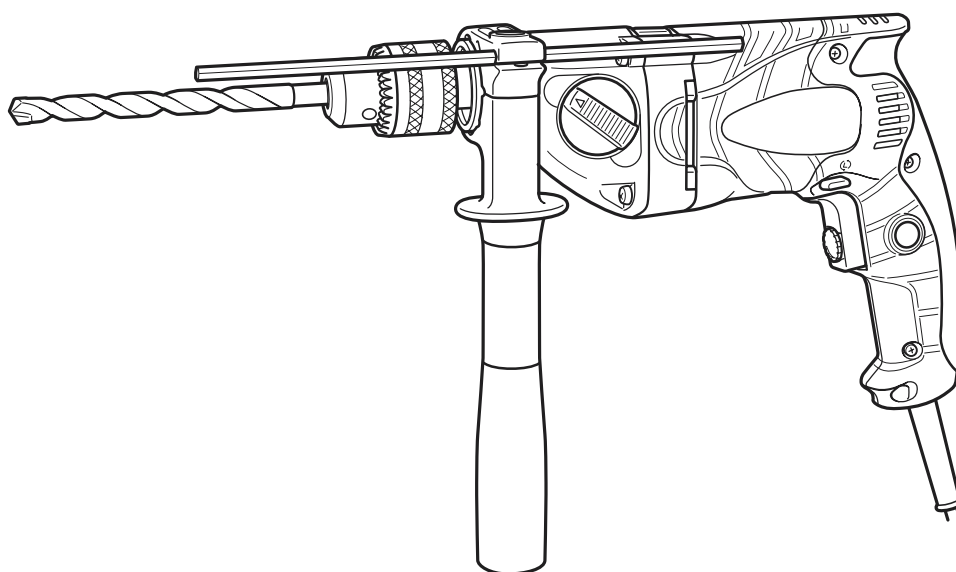
Power Tools

20 mm (3/4") IMPACT DRILL
DV 20VB2

18 mm (11/16") IMPACT DRILL
DV 18V

**TECHNICAL DATA
AND
SERVICE MANUAL**

D



LIST Nos. DV 20VB2: E475
DV 18V: E476

Oct. 2004

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:

Model DV 20VB2

Symbols Utilized	Competitors	
	Company Name	Model Name
B	BOSCH	GSB20-2RE
C	MAKITA	HP2051
H	METABO	SBE750

Model DV 18V

Symbols Utilized	Competitors	
	Company Name	Model Name
B	BOSCH	GSB18-2RE
H	METABO	SBE660



CONTENTS

	Page
1. PRODUCT NAME	1
2. MARKETING OBJECTIVE	1
3. APPLICATIONS	1
4. SELLING POINTS	1
4-1. Selling Point Descriptions	2
5. SPECIFICATIONS	3
5-1. Specifications	3
6. COMPARISONS WITH SIMILAR PRODUCTS	5
6-1. Specification Comparisons	5
6-2. Drilling Speed Comparisons	6
7. PRECAUTIONS IN SALES PROMOTION	7
7-1. Handling Instructions	7
7-2. Cautions on Name Plate	7
7-3. Precautions on Usage	8
8. PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY	11
8-1. Disassembly	11
8-2. Reassembly	16
8-3. Wiring Diagrams	19
8-4. Internal Wire Arrangement and Wiring Work	20
8-5. Insulation Tests	23
8-6. No-Load Current Value	23
9. STANDARD REPAIR TIME (UNIT) SCHEDULES	24
Model DV 20VB2	24
Model DV 18V	25
Assembly Diagram for DV 20VB2	
Assembly Diagram for DV 18V	

1. PRODUCT NAME

Hitachi 20 mm (3/4") Impact Drill, Model DV 20VB2

Hitachi 18 mm (11/16") Impact Drill, Model DV 18V

2. MARKETING OBJECTIVE

The Models DV 20VB2 and DV 18V are upgraded versions of the current Models DV 20VB, DV 20VC, DV 20T2, VTP-18 and VTV-18. The performance is greatly improved.

These two models are developed under the concept for compact, lightweight and powerful. The main features of the Models DV 20VB2 and DV 18V are as follows:

- (1) Compact and lightweight
- (2) Class-top drilling speed
- (3) Powerful motor
- (4) Shortest chuck offset
- (5) Durable aluminum gear cover and inner cover
- (6) Two-finger sized trigger switch with speed control dial

3. APPLICATIONS

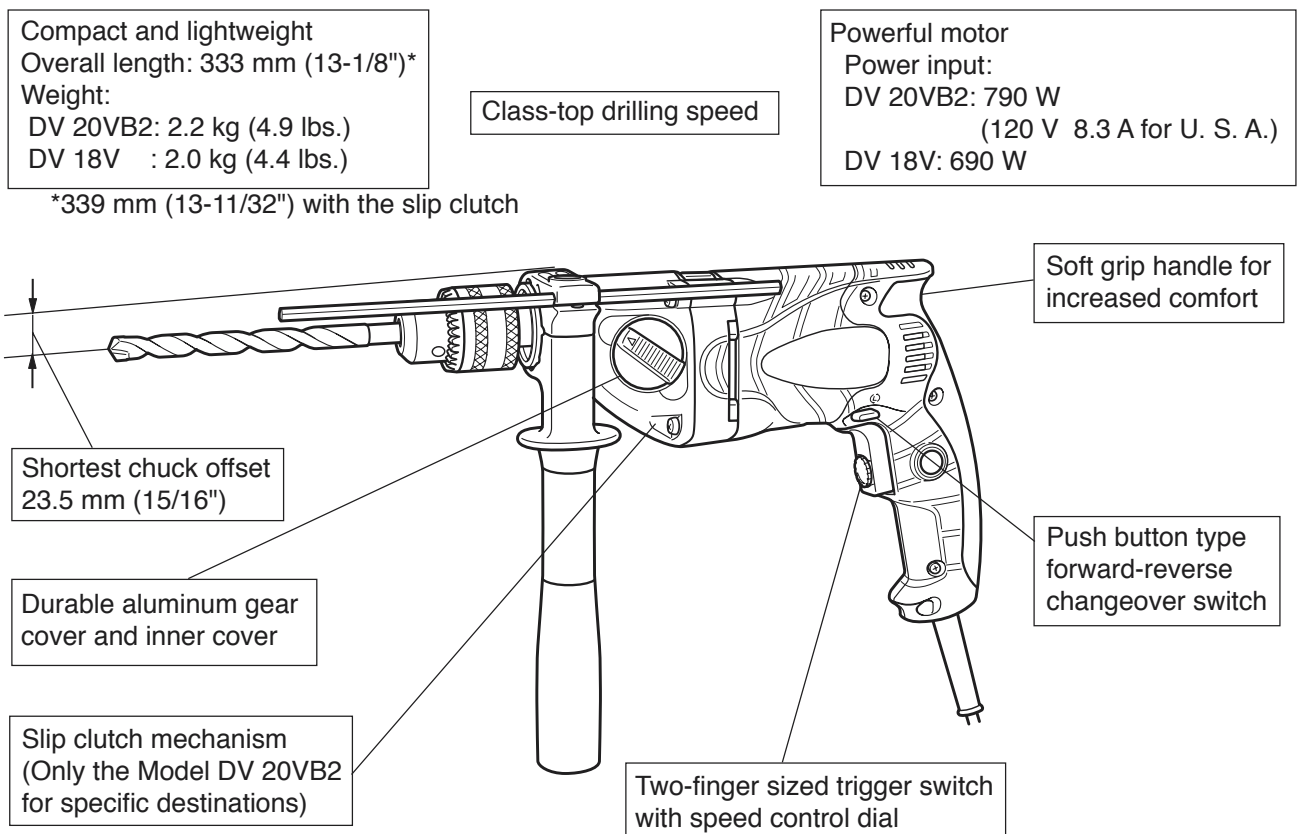
- (1) Rotation and impacting function

Drilling into concrete, brick, ceramic tile, marble, granite and other stone materials

- (2) Rotation only function

Drilling into metal, wood and plastics

4. SELLING POINTS



4-1. Selling Point Descriptions

(1) Compact and lightweight design for less user fatigue

To make the Models DV 20VB2 and DV 18V compact is the first priority at designing. Entire length of these models is 333 mm (13-1/8")*¹ and the chuck offset is 23.5 mm (15/16"). The Model DV 20VB2 weighs 2.2 kg (4.9 lbs.). The Model DV 18V weighs 2.0 kg (4.4 lbs.). Its ease of operation is the class-top level.

*1: 339 mm (13-11/32") with the slip clutch

(2) Class-top drilling speed

Thanks to the powerful motor (rated power consumption: DV 20VB2 790 W (120 V, 8.3 A), DV 18V 690 W), the Models DV 20VB2 and DV 18V can drill at the class-top speed while it is compact and lightweight. And powerful motor also provides high performance for heavy-duty applications.

(3) Easy-to-operate 2-finger sized trigger switch with speed control dial

The pulling amount of the trigger can be adjusted on the dial. It is convenient for operation keeping at a desired speed. The large variable speed control dial and the 2-finger sized trigger switch are easy to operate.

(4) Reliable and convenient push-button type forward/reverse changeover switch

The Models DV 20VB2 and DV 18V are equipped with the push-button type forward/reverse changeover switch that is more convenient and reliable than the lever-type switch. In addition, this switch is properly shaped and located not to make the pushbutton an obstacle at drilling.

(5) Durable aluminum die-casting inner cover and gear cover

The Models DV 20VB2 and DV 18V are equipped with the aluminum die-casting inner cover and gear cover for increased durability.

(6) Slip clutch mechanism (Only the Model DV 20VB2 for specific destinations)

The Model DV 20VB2 for specific destinations is equipped with the slip clutch mechanism to avoid direct and strong reaction force caused by application of a sudden and heavy load by slipping the transmission portion between the motor and the drill bit.

5. SPECIFICATIONS

5-1. Specifications

Model		DV 20VB2
Capacities	Concrete	Low speed: 20 mm (3/4") / High speed: 13 mm (1/2")
	Steel	Low speed: 13 mm (1/2") / High speed: 8 mm (5/16")
	Wood	Low speed: 40 mm (1-9/16") / High speed: 25 mm (1")
Drill chuck		Mount type: UNF 1/2" – 20 Capacity: 13 mm (1/2")
Type of motor		AC single phase commutator motor
Enclosure	Housing	Glassfiber reinforced polycarbonate + elastomer
	Handle	
	Inner cover	Aluminum alloy die casting
	Gear cover	
Type of switch		Variable speed control trigger switch with reversing switch
Power source		AC single phase 50/60 Hz
Rated voltage		(110 V, 120 V, 230 V, 240 V)
Rated current		110 V: 7.6 A 120 V: 8.3 A*1 230 V: 3.6 A 240 V: 3.5 A
Power input		790 W
Cord		2-core cabtire cord 2.5 m (8.3 ft.)
No-load speed		0 – 1000/3000/min
Full-load impact rate		8000/26000/min
Full-load output		440 W
Weight	Net*2	2.2 kg (4.9 lbs.)
	Gross	4.2 kg (9.3 lbs.)
Packaging		Plastic carrying case
Standard accessories		Side handle 1 Depth gauge 1 Chuck wrench (spec. only for chuck with chuck wrench) 1 Plastic carrying case 1
Optional accessories		Drill bit for concrete

*1 : For U.S.A. and Canada only

*2 : Without cord

Model		DV 18V
Capacities	Concrete	Low speed: 18 mm (11/16") / High speed: 13 mm (1/2")
	Steel	Low speed: 13 mm (1/2") / High speed: 8 mm (5/16")
	Wood	Low speed: 40 mm (1-9/16") / High speed: 25 mm (1")
Drill chuck		Mount type: UNF 1/2" — 20
		Capacity: 13 mm (1/2")
Type of motor		AC single phase commutator motor
Enclosure	Housing	Glassfiber reinforced polycarbonate + elastomer
	Handle	
	Inner cover	Aluminum alloy die casting
	Gear cover	
Type of switch		Variable speed control trigger switch with reversing switch
Power source		AC single phase 50/60 Hz
Rated voltage		(110 V, 220 V, 230 V, 240 V)
Rated current		110 V: 6.6 A 220 V: 3.3 A 230 V: 3.2 A 240 V: 3.0 A
Power input		690 W
Cord		2-core cabtire cord 2.5 m (8.3 ft.)
No-load speed		0 — 1000/3000/min
Full-load impact rate		8000/26000/min
Full-load output		340 W
Weight	Net*1	2.0 kg (4.4 lbs.)
	Gross	4.2 kg (9.3 lbs.) including the case. 3 kg (6.6 lbs.) excluding the case.
Packaging		Corrugated cardboard box or plastic carrying case
Standard accessories		Side handle 1 Depth gauge 1 Chuck wrench (spec. only for chuck with chuck wrench) 1 Plastic carrying case (provided only for the models specified to include the case) ... 1
Optional accessories		Drill bit for concrete

*1 : Without cord

6. COMPARISONS WITH SIMILAR PRODUCTS

6-1. Specification Comparisons

700 W class

Maker			HITACHI		H	C	B (Reference)
Model			DV 20VB2	DV 20VB			
Capacities	Concrete	mm (in.)	20 (3/4")	20 (3/4")	20 (3/4")	20 (3/4")	20 (3/4")
	Steel	mm (in.)	13 (1/2")	13 (1/2")	13 (1/2")	13 (1/2")	13 (1/2")
	Wood	mm (in.)	40 (1-9/16")	40 (1-9/16")	40 (1-9/16")	40 (1-9/16")	40 (1-9/16")
Rated power input		W	790 (120 V: 8.3 A)	750	750	720 (120 V: 8.2 A)	800
No-load speed	Low	/min.	0 – 1,000	0 – 1,100	0 – 1,000	0 – 1,200	0 – 1,100
	High	/min.	0 – 3,000	0 – 2,600	0 – 3,000	0 – 2,900	0 – 3,000
No-load impact rate	Low	/min.	0 – 13,000	0 – 17,600	0 – 19,000	0 – 24,000	0 – 17,600
	High	/min.	0 – 39,000	0 – 41,600	0 – 57,000	0 – 58,000	0 – 48,000
Max. torque	Low	N·m	54.1 (29.5) *1	44.5			
	High	N·m	19.6 (10.7) *1	18.1			
No-load noise level		dB	79	81	79	81	87
Housing structure		—	Cylindrical	Cylindrical	Cylindrical	Cylindrical	Cylindrical
Gear cover material		—	Aluminum	Plastic	Aluminum	Aluminum	Aluminum
Slip clutch		—	○/×*2	×	○	○	○
Soft grip handle		—	○	×	×	○	○
Speed control dial		—	○	×	○	○	○
Type of reversing switch		—	Push button	Lever	Brush shift	Lever	Brush shift
Overall length		mm (in.)	339 (13-11/32") *2 /333 (13-1/8")	340 (13-3/8")	368 (14-31/64")	360 (14-3/16")	356 (14-1/64")
Chuck offset		mm (in.)	23.5 (15/16")	29.0 (1-5/32")	27.5 (1-3/32")	24.5 (31/32")	30.0 (1-3/16")
Weight		kg (lbs.)	2.2 (4.9 lbs.)	2.3 (5.1 lbs.)	2.3 (5.1 lbs.)	2.3 (5.1 lbs.)	2.6 (5.7 lbs.)

*1 : With the slip clutch

*2 : Depends on the destinations.

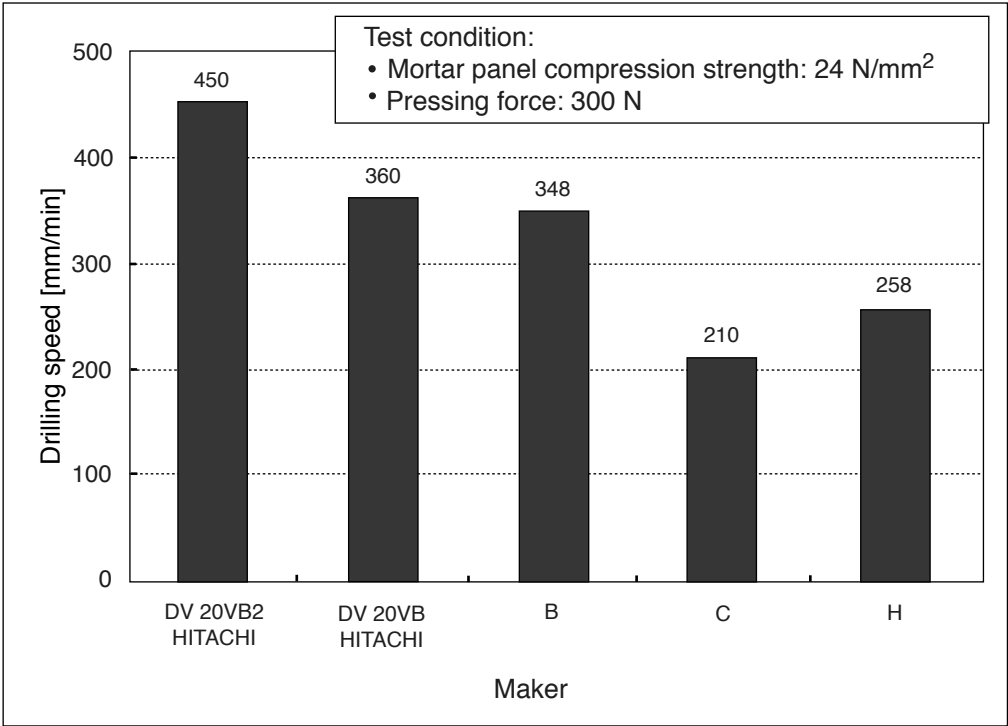
600 W class

Maker			HITACHI			H	B (Reference)
Model			DV 18V	VTP-18	VTV-18		
Capacities	Concrete	mm (in.)	18 (11/16")	18 (11/16")	18 (11/16")	16 (5/8")	18 (11/16")
	Steel	mm (in.)	13 (1/2")	13 (1/2")	13 (1/2")	13 (1/2")	13 (1/2")
	Wood	mm (in.)	40 (1-9/16")	—	—	30 (1-3/16")	40 (1-9/16")
Rated power input		W	690	640	640	660	750
No-load speed	Low	/min.	0 – 1,000	0 – 1,050	0 – 1,050	0 – 1,000	0 – 1,000
	High	/min.	0 – 3,000	0 – 1,800	0 – 1,800	0 – 3,000	0 – 3,000
No-load impact rate	Low	/min.	0 – 13,000	0 – 21,000	0 – 21,000	0 – 19,000	0 – 16,000
	High	/min.	0 – 39,000	0 – 36,000	0 – 36,000	0 – 57,000	0 – 48,000
Max. torque	Low	N·m	53.0	27.8	27.8	35.7	30.2
	High	N·m	19.2	17.2	17.2	11.8	10.3
No-load noise level		dB	79	82	82	79	85
Housing structure		—	Cylindrical	Cylindrical	Cylindrical	Cylindrical	Clamshell
Gear cover material		—	Aluminum	Aluminum	Aluminum	Aluminum	—
Slip clutch		—	×	×	×	○	×
Soft grip handle		—	○	×	×	×	○
Speed control dial		—	○	×	○	○	○
Type of reversing switch		—	Push button	—	—	Brush shift	Brush shift
Overall length		mm (in.)	333 (13-1/8")	340 (13-3/8")	340 (13-3/8")	359 (14-9/64")	346 (13-5/8")
Chuck offset		mm (in.)	23.5 (15/16")	25.0 (1")	25.0 (1")	27.5 (1-3/32")	30 (1-3/16")
Weight		kg (lbs.)	2.0 (4.4 lbs.)	2.3 (5.1 lbs.)	2.3 (5.1 lbs.)	2.1 (4.6 lbs.)	2.2 (5.1 lbs.)

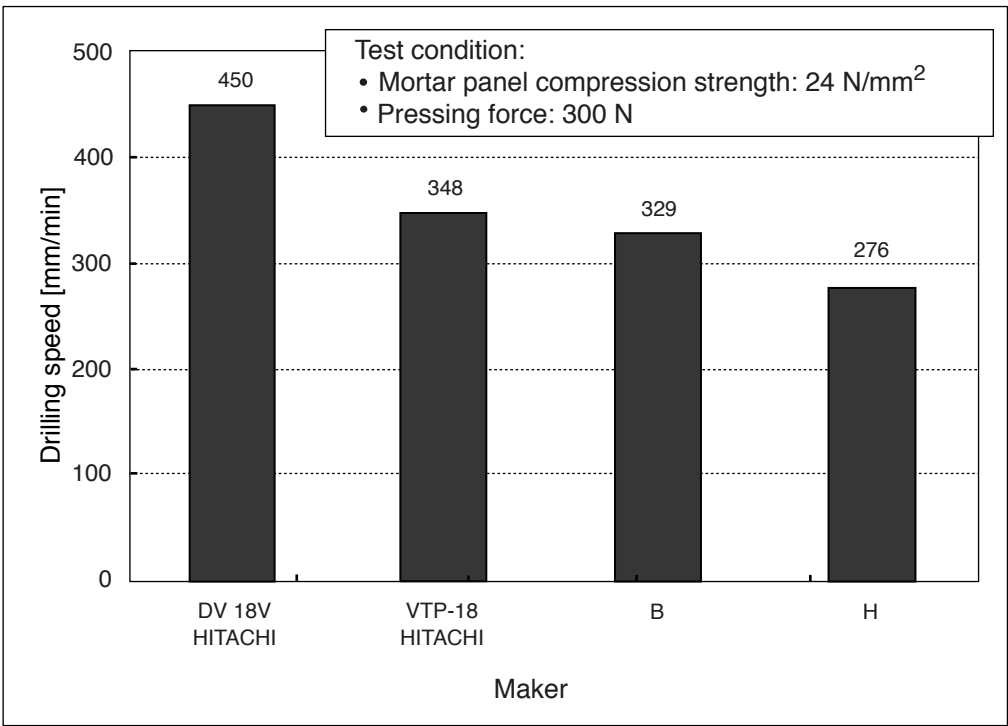
6-2. Drilling Speed Comparisons

Drilling speed depends on the operating conditions. The test results are based on actual factory tests, and should be used as a reference only.

700 W class



600 W class



7. PRECAUTIONS IN SALES PROMOTION

In the interest of promoting the safest and most efficient use of the Models DV 20VB2 and DV 18V Impact Drills by all of our customers, it is very important that at the time of sales 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 attached to each tool.

7-1. Handling Instructions

Although every effort is made in each step of design, manufacture and inspection to provide protection against safety hazards, the dangers inherent in the use of any electric power tool cannot be completely eliminated. Accordingly, general precautions and suggestions for the use of electric power tools, and specific precautions and suggestions for the use of the Impact Drill are listed in the Handling Instructions to enhance the safe, efficient use of the tool by the customer. Salespersons must be thoroughly familiar with the contents of the Handling Instructions to be able to offer appropriate guidance to the customer during sales promotion.

7-2. Cautions on Name Plate

The following basic safety precautions are listed on the Name Plate attached to the main body of each tool.

For Australia, New Zealand and China

CAUTION

- Read thoroughly HANDLING INSTRUCTIONS before use.

For the U.S.A. and Canada

WARNING

- To reduce the risk of injury, user must read and understand the instruction manual.

AVERTISSEMENT


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

These precautions are not listed on the Name Plates of the products destined for the countries other than Oceania, China, the U.S.A. and Canada.

7-3. Precautions on Usage

(1) IMPACT to ROTATION changeover

Shift the change lever between the right and left positions to switch easily between IMPACT (rotation and impact) and ROTATION (rotation only), respectively.

To bore holes in hard materials such as concrete, stone and tiles, shift the change lever to the right-hand position (as indicated by the  mark).

The drill bit operates by the combined actions of impact and rotation.

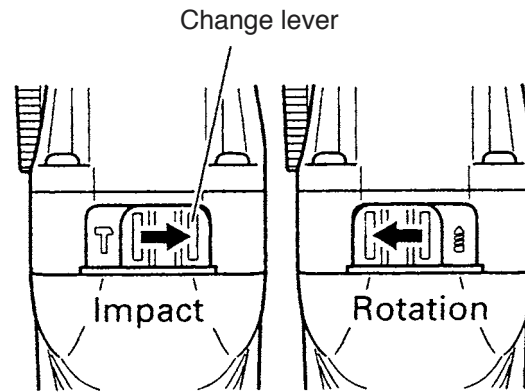



Fig. 1

To bore holes in metal, wood and plastic, shift the change lever to the left-hand position (as indicated by the  mark). The drill bit operates by rotational action only, as in the case of a conventional electric drill.

CAUTION:

- Do not use the hammer drill in the IMPACT function if the material can be bored by rotation only. Such action will not only reduce drill efficiency, but may also damage the drill tip.
- Operating the hammer drill with the change lever in mid-position may result in damage. When switching, make sure that you shift the change lever to the correct position.

NOTE:

The change lever may not shift smoothly when changing from hammer drill mode to drill mode. In this case, switch ON and operate the machine for few seconds. The spindle shaft will then be pushed forward, and the change lever can be moved smoothly.

(2) High-speed/low-speed changeover

Prior to changing speed, ensure that the switch is in the OFF position, and the drill has come to a complete stop.

To change speed, rotate the gear shift dial as indicated by the arrow in Fig. 2. The numeral "1" engraved on the drill body denotes low speed, the numeral "2" denotes high speed.

If it is hard to turn the gear shift dial, turn the chuck slightly in either direction and then turn the gear shift dial again.

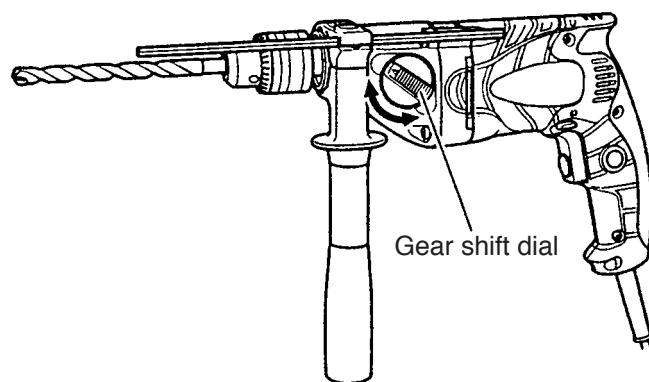


Fig. 2

(3) Check the rotational direction

The bit rotates clockwise (viewed from the rear side) by pushing the R-side of the push button.

The L-side of the push button is pushed to turn the bit counterclockwise.

(The (L) and (R) marks are provided on the body.)

⚠ CAUTION: Always use the hammer drill with clockwise rotation, when using it as a hammer drill.

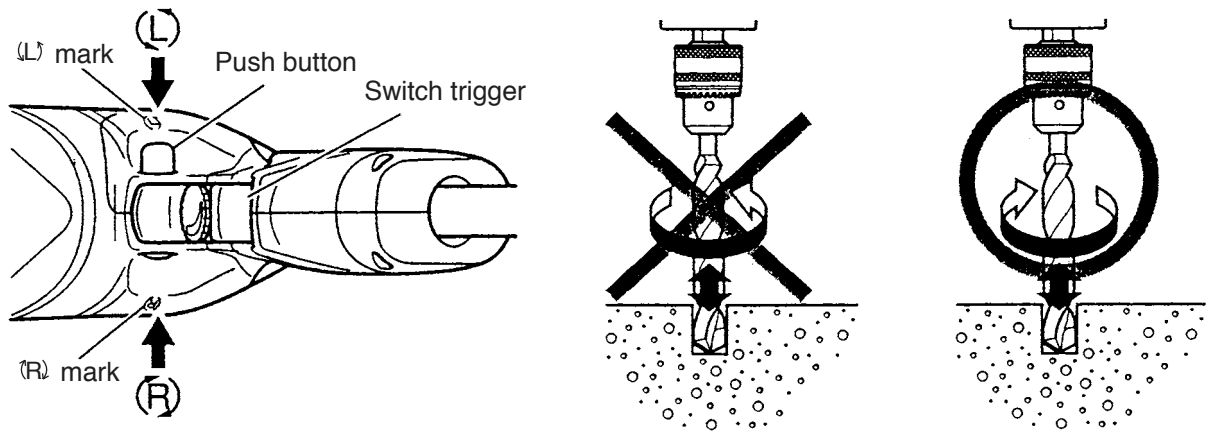


Fig. 3

(4) Switch operation

- When the trigger switch is depressed, the tool rotates. When the trigger is released, the tool stops.

- The rotational speed of the drill can be controlled by varying the amount that the trigger switch is pulled. Speed is low when the trigger switch is pulled slightly and increases as the trigger switch is pulled more.

- The desired rotation speed can be preselected with the speed control dial. Turn the speed control dial clockwise for higher speed and counterclockwise for lower speed.

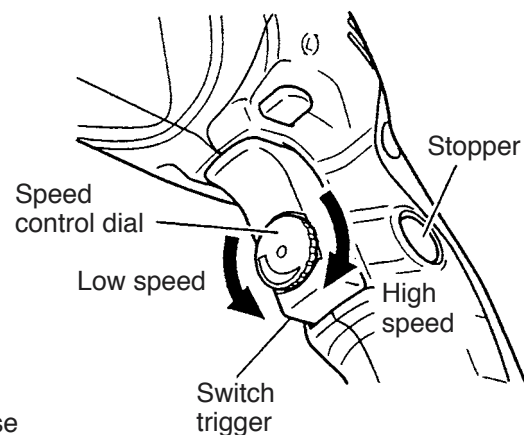


Fig. 4

- Pulling the trigger and pushing the stopper, it keeps the switched-on condition which is convenient for continuous running. When switching off, the stopper can be disconnected by pulling the trigger again.

NOTE: If the L-side of push button is pressed for reverse bit rotation, the stopper cannot be used.

(5) Drilling

- When drilling, start the drill slowly, and gradually increasing speed as you drill.
- Always apply pressure in a straight line with the bit. Use enough pressure to keep drilling, but do not push hard enough to stall the motor or deflect the bit.
- To minimize stalling or breaking through the material, reduce pressure on drill and ease the bit through the last part of the hole.
- If the drill stalls, release the trigger immediately, remove the bit from the work and start again. Do not click the trigger on and off in an attempt to start a stalled drill. This can damage the drill.

⚠ WARNING: The larger the drill bit diameter, the larger the reactive force on your arm. Be careful not to lose control of the drill because of this reactive force. To maintain firm control, establish a good foothold, use side handle, hold the drill tightly with both hands, and ensure that the drill is vertical to the material being drilled.

(6) Slip clutch mechanism (Only the Model DV 20VB2 for specific destinations)

The Model DV 20VB2 (only for specific destinations) is equipped with the slip clutch mechanism to avoid direct and strong reaction force caused by application of a sudden and heavy load by slipping the transmission portion between the motor and the drill bit.

⚠ CAUTION:

- Turn off the switch immediately if the rotation of the drill bit is stopped by the slip clutch. Be careful not to actuate the slip clutch frequently.
- The spindle shaft torque and the reaction force applied to the side handle when the slip clutch actuates are shown in the table below. In the case of the low gear, the reaction force applied to the side handle may be 345.1 N {35.2 kgf} at the maximum. Instruct the customers to use the side handle without fail and securely hold the Model DV 20VB2 with both hands standing on a good foothold, not to be affected by the reaction force.

		Spindle shaft torque		Reaction force applied to the side handle	
		N·m	kgf·m	N	kgf
High gear	Minimum	5.4	0.6	42.6	4.3
	Maximum	15.9	1.6	124.9	12.7
Low gear	Minimum	15.0	1.5	117.6	12.0
	Maximum	44.0	4.5	345.1	35.2

8. PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY

The numbers in the descriptions below correspond to the item numbers in the Parts List and exploded assembly diagram.

The **[Bold]** numbers are for the Model DV 20VB2, the **<Bold>** numbers for the Model DV 18V.

8-1. Disassembly

8-1-1. Motor section disassembly

(1) Removal of the handle cover

Loosen the Tapping Screws (W/Flange) D4 x 20 (Black) **[40]** **<39>**, and remove the Handle Cover **[41]** **<40>**.

(2) Removal of the carbon brushes

With a small flat-blade screwdriver, slightly lift the Brush Holders **[47]** **<46>**. Then, while pushing the Carbon Brushes (1 Pair) **[46]** **<45>** to the bottom of the brush holders, gently pull out and disconnect the internal wire terminals. (See Figs. 5 and 6.)

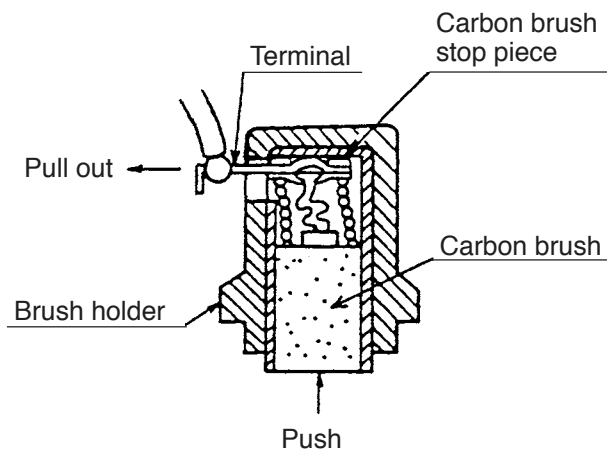


Fig. 5

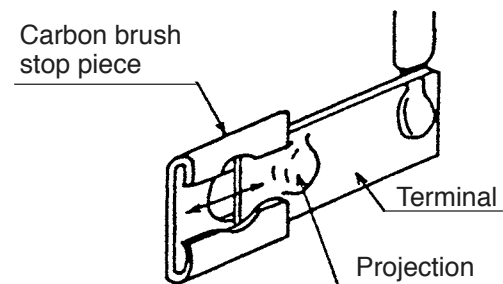


Fig. 6

(3) Removal of the gear cover from the housing

Loosen the Tapping Screws (W/Flange) D5 x 45 (D5 x 50: with clutch) **[12]** **<12>** and separate Gear Cover (A) Ass'y **[25]** **<25>** from the Housing **[38]** **<37>**. Then, remove the Inner Cover **[18]** **<18>** together with the Armature **[33]** **<32>** from the Housing **[38]** **<37>**.

(4) Removal of the armature from the inner cover

As illustrated in Fig. 9, support the Inner Cover [18] <18> with a tubular jig, and push down on the top of the pinion of the Armature [33] <32>.

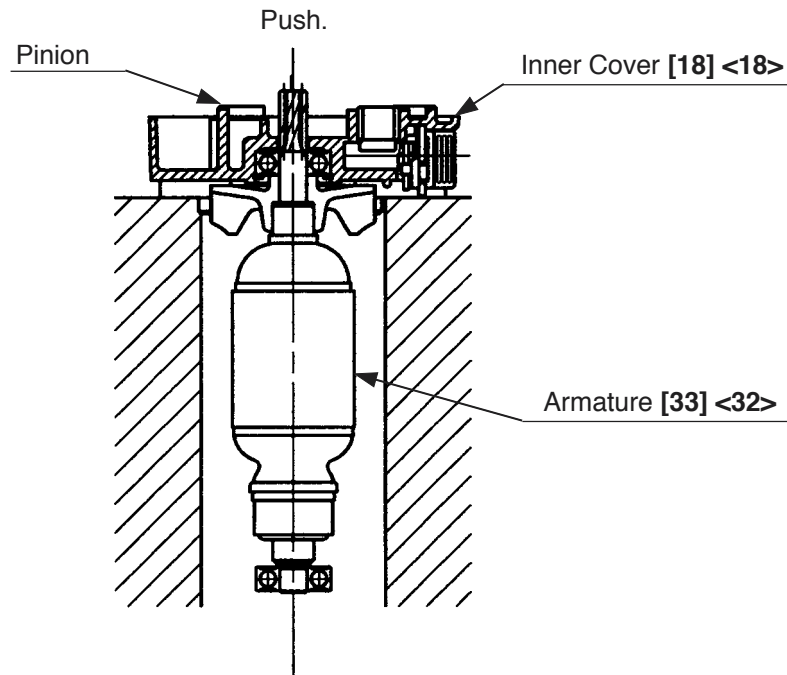


Fig. 7

(5) Removal of the stator from the housing

First, disconnect the internal wires from the Switch (1P Pillar Type) [43] <42>. To disconnect the internal wires from the switch, insert a small flat-blade screwdriver into the windows near the terminals and pull out the internal wires. Remove the Hex. Hd. Tapping Screws D4 x 50 [35], D4 x 45 <34> and tap the end surface of the Housing [38] <37> slightly with a wooden hammer. Then the stator can be removed from the housing.

8-1-2. Inner cover ass'y disassembly

Removal of the change lever

Remove the Change Cover [16] <16> and the Change Lever [15] <15>.

8-1-3. Removal of the drill chuck

The Drill Chuck [3] <3> is secured to the Spindle [4] <4> with 1/2"-20 UNF (right hand) and Flat Hd. Screw (A) (Left Hand) M6 x 25 [1] <1>. At first, open the chuck jaw as far as possible and loosen Flat Hd. Screw (A) (Left Hand) M6 x 25 [1] <1> by turning it clockwise.

- a. Hold the drill so that only the Drill Chuck [3] <3> rests firmly and squarely on the edge of a solid bench.

Install the hex. bar wrench into the drill chuck. Turn the drill chuck until the wrench is at about a 30° angle to the bench top and strike the wrench sharply with a hammer so the drill chuck turns in the counterclockwise direction. (Fig. 8)

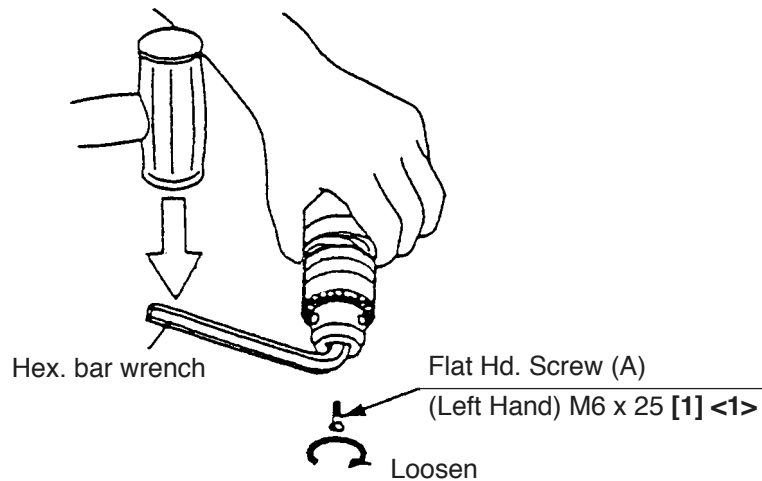


Fig. 8

If the drill chuck cannot be removed by striking the wrench, do not strike the wrench forcibly and try another way as follows.

- b. Hold the Spindle [4] <4> with the open-end wrench secured to the vise as shown in Fig. 9.

Mount the pipe to the hex. bar wrench. Turn the hex. bar wrench counterclockwise to loosen the drill chuck. (Fig. 9)

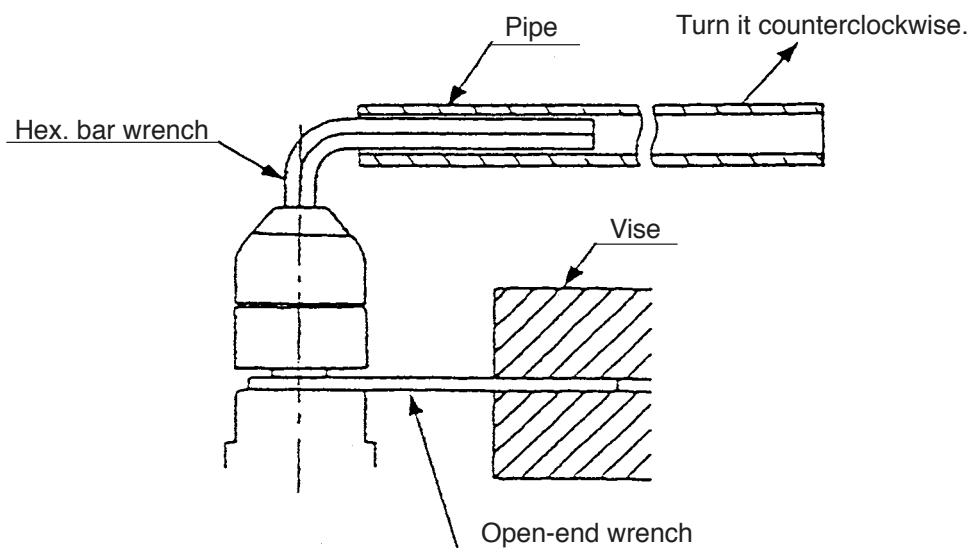


Fig. 9

c. (For keyed chuck only)

Secure the drill chuck with a disassembly tool: Ring (J-78) to the drill chuck, which in proper sequence should be secured with a vise. Then fit a disassembly tool: Wrench Ass'y (J-140) to the spindle, and turn it counterclockwise. (Fig. 10)

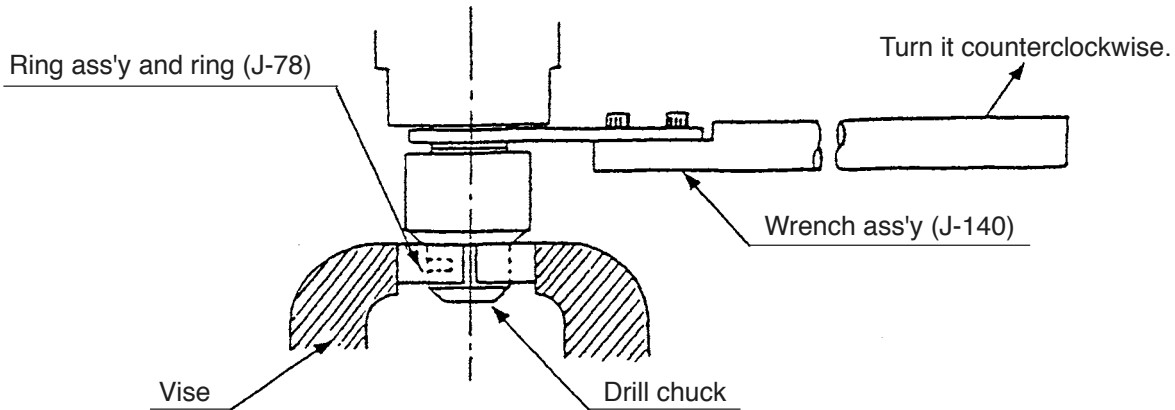


Fig. 10

8-1-4. Gear cover section disassembly

(1) Removal of the spindle

Remove the Retaining Ring For D35 Hole [5] <5> and the Dust Seal [6] <6>.

Support the tip of the Gear Cover (A) Ass'y [25] <25> with a cylindrical jig of inside diameter 35 mm or more, and push the rear portion of the Spindle [4] <4> lightly. Then the spindle can be removed together with the Ball Bearing 6202DDCMPS2L [7] <7> and Spring (A) [9] <9>. (Fig. 11)

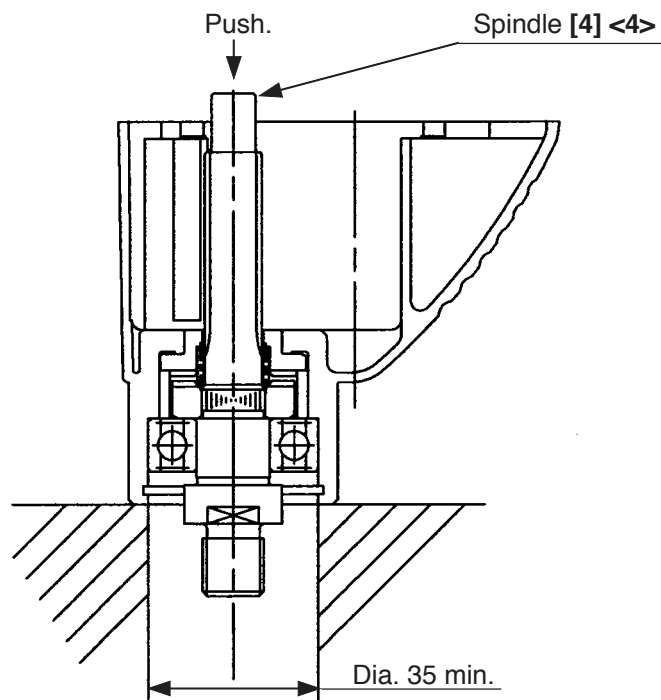


Fig. 11

(2) Removal of the shift lever

Position the Shift Lever Ass'y [19] <19> as shown in Fig. 12. Push both ends of the Retaining Ring (E-type) for D15 Shaft [26] <26> with a pair of long-nose pliers until a clearance about 1 to 2 mm is made. Keeping the clearance, turn the Shift Lever Ass'y [19] <19> by 180 degrees together with the Retaining Ring (E-type) for D15 Shaft [26] <26>. Insert a flat-blade screwdriver into the clearance and pry the Retaining Ring (E-type) for D15 Shaft [26] <26> off upward.

⚠ CAUTION:

If the Retaining Ring (E-type) for D15 Shaft [26] <26> is pushed excessively, the Shift Lever Ass'y [19] <19> cannot be turned due to a wide clearance.

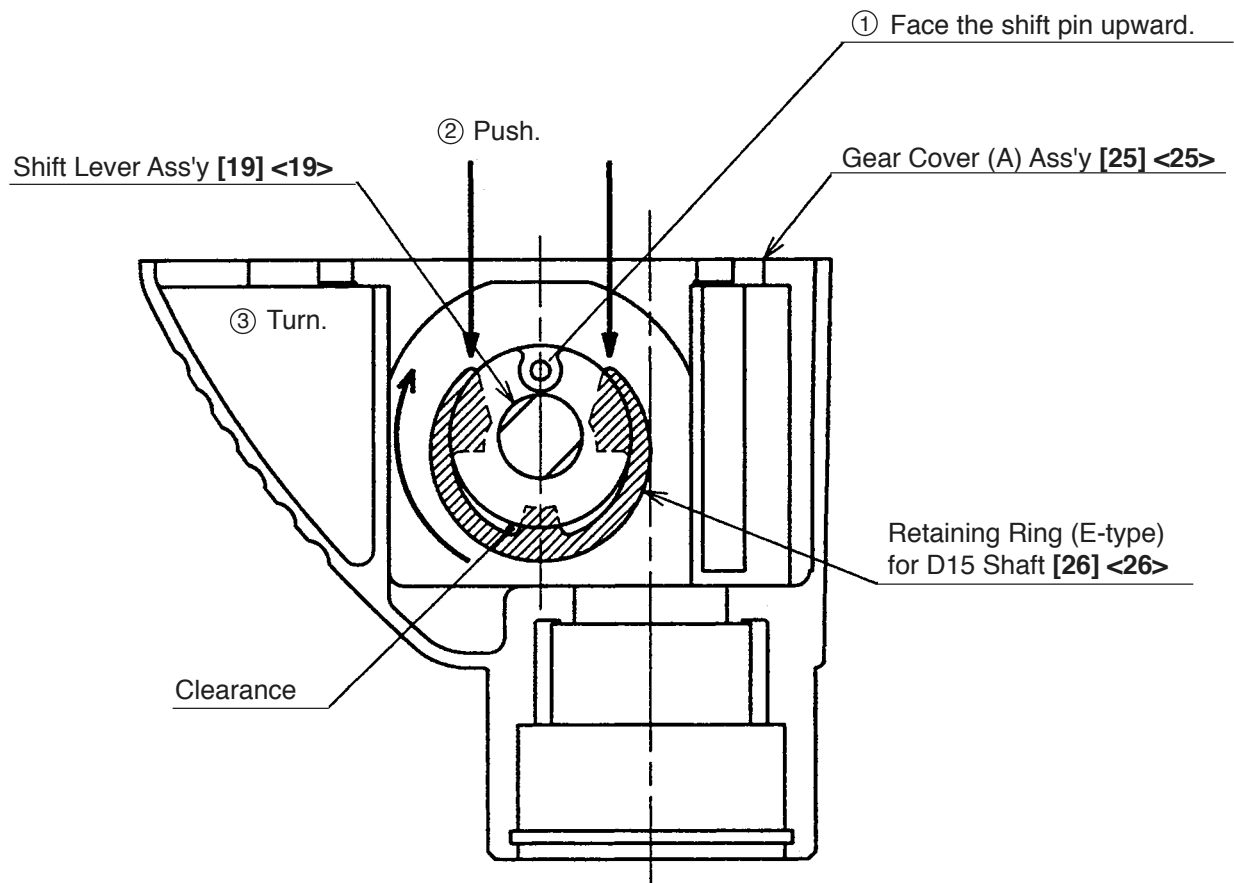


Fig. 12

8-2. Reassembly

Reassembly can be accomplished by following the disassembly procedures in reverse. However, special attention should be given to the following items.

8-2-1. Internal wire arrangement

- (1) Arrange the internal wires according to "8-4. Internal Wire Arrangement and Wiring Work".
- (2) Be careful not to catch the internal wires when mounting the handle cover.

8-2-2. Lubrication

- (1) Apply ATTLUB MS No. 2 Grease to the following parts.

- Teeth of the Second Pinion and Gear Set [14] <14>, the Gear Set [29] <29>.
- On the Spindle [4] <4>.
Ground portion for fitting the Ball Bearing 6202DDCMPS2L [7] <7>, splined portion and hole of rear side.
- On the Shift Lever Ass'y [19] <19>.
Outer circumference portion of the Shift Pin [21] <21>, the O-ring (S-22) [22] <22>.
- On the Change Shaft [17] <17>.
Outer circumference portion.
- Lip portion of the Dust Seal [6] <6>.
- On the Inner Cover [18] <18>.
Metal portion.
- Inside of Gear Cover (A) Ass'y [25] <25>: 5 g

- (2) Apply MORABUAROI 777-1 to the following parts.

- On Gear Cover (A) Ass'y [25] <25>.
Teeth of Ratchet (B) [11] <11>.
- Teeth of Ratchet (A) [8] <8>.

8-2-3. Tightening torque

- (1) Flat Hd. Scerw (A) (Left Hand) M6 x 25 [1] <1> 4.0 to 5.0 N·m (39.0 to 47.8 in-lbs.)
- (2) Tapping Screw (W/Flange) D4 x 20 (Black) [40] <39> 1.5 to 2.5 N·m (13.3 to 22.1 in-lbs.)
- (3) Tapping Screw (W/Flange) D5 x 45 [12] <12> 2.4 to 3.4 N·m (21.3 to 30.1 in-lbs.)
- (4) Drill Chuck [3] <3> 29.4 to 39.2 N·m (260 to 347 in-lbs.)

8-2-4. Reassembly of the gear cover section

Figure 13 shows the assembly drawing. Reassemble the gear cover section according to the following figure.

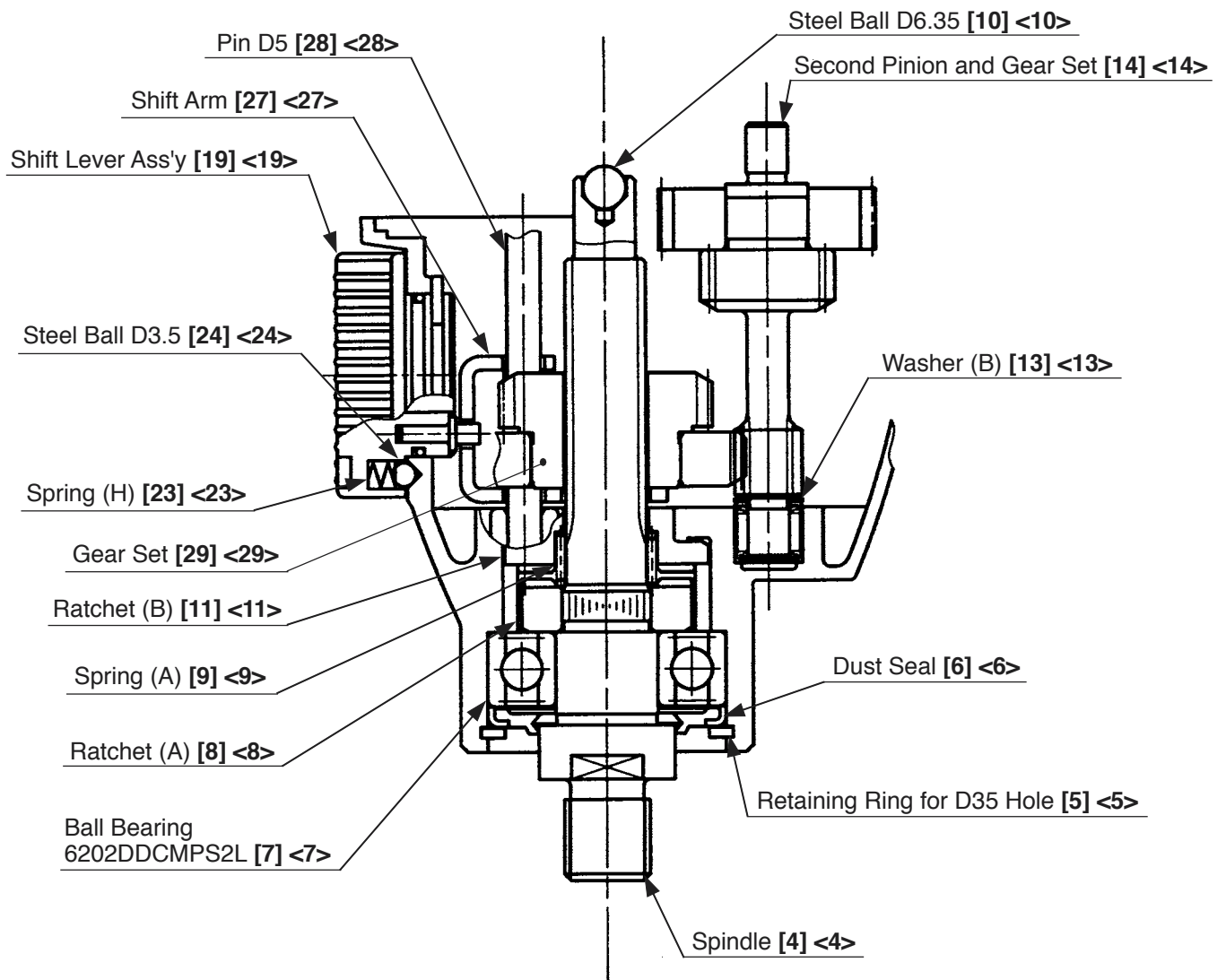


Fig. 13

⚠ CAUTION:

- Be sure to replace Ratchet (A) [8] <8> with a new one. Never reuse Ratchet (A) [8] <8> previously removed from the Spindle [4] <4>. If reused, the tightening torque between Ratchet (A) [8] <8> and the Spindle [4] <4> will be far too low and the Spindle [4] <4> may run idle in the IMPACT mode.
- Mounting directions of the Shift Arm [27] <27> and the Gear Set [29] <29> are specified. Mount these parts in the specified direction as shown in the above figure.

(With slip clutch)

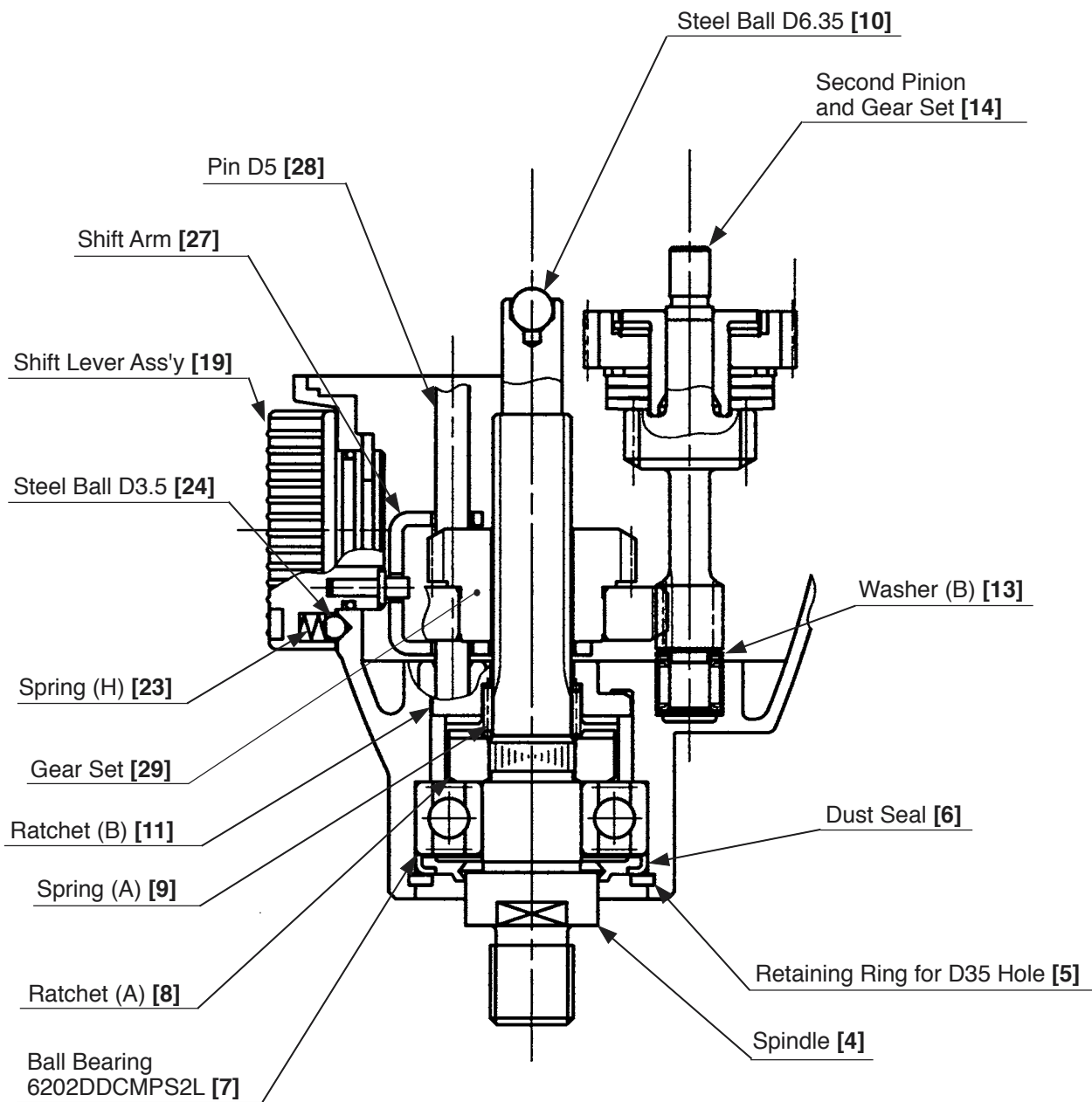


Fig. 14

⚠ CAUTION:

- Be sure to replace Ratchet (A) [8] with a new one. Never reuse Ratchet (A) [8] previously removed from the Spindle [4]. If reused, the tightening torque between Ratchet (A) [8] and the Spindle [4] will be far too low and the Spindle [4] may run idle in the IMPACT mode.
- Mounting directions of the Shift Arm [27], Gear Set [29] and Spring (A) [9] are specified. Mount these parts in the specified direction as shown in the above figure.

8-3. Wiring Diagrams

(1) For products with noise suppressor

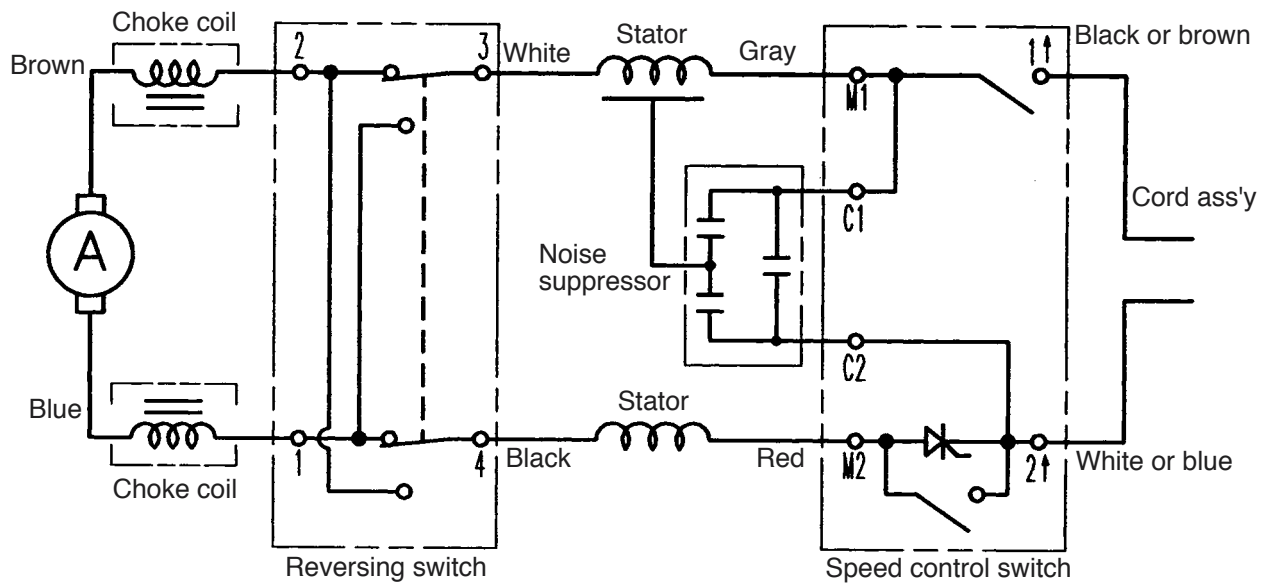


Fig. 15

(2) For products without noise suppressor

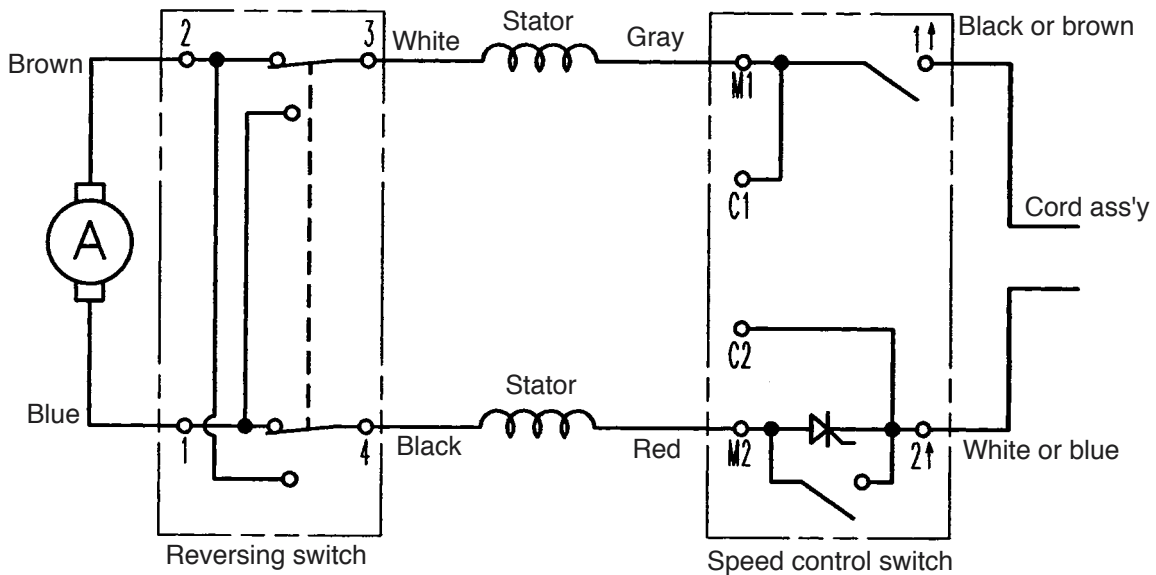


Fig. 16

8-4. Internal Wire Arrangement and Wiring Work

A. Internal wire arrangement

(1) For products with noise suppressor

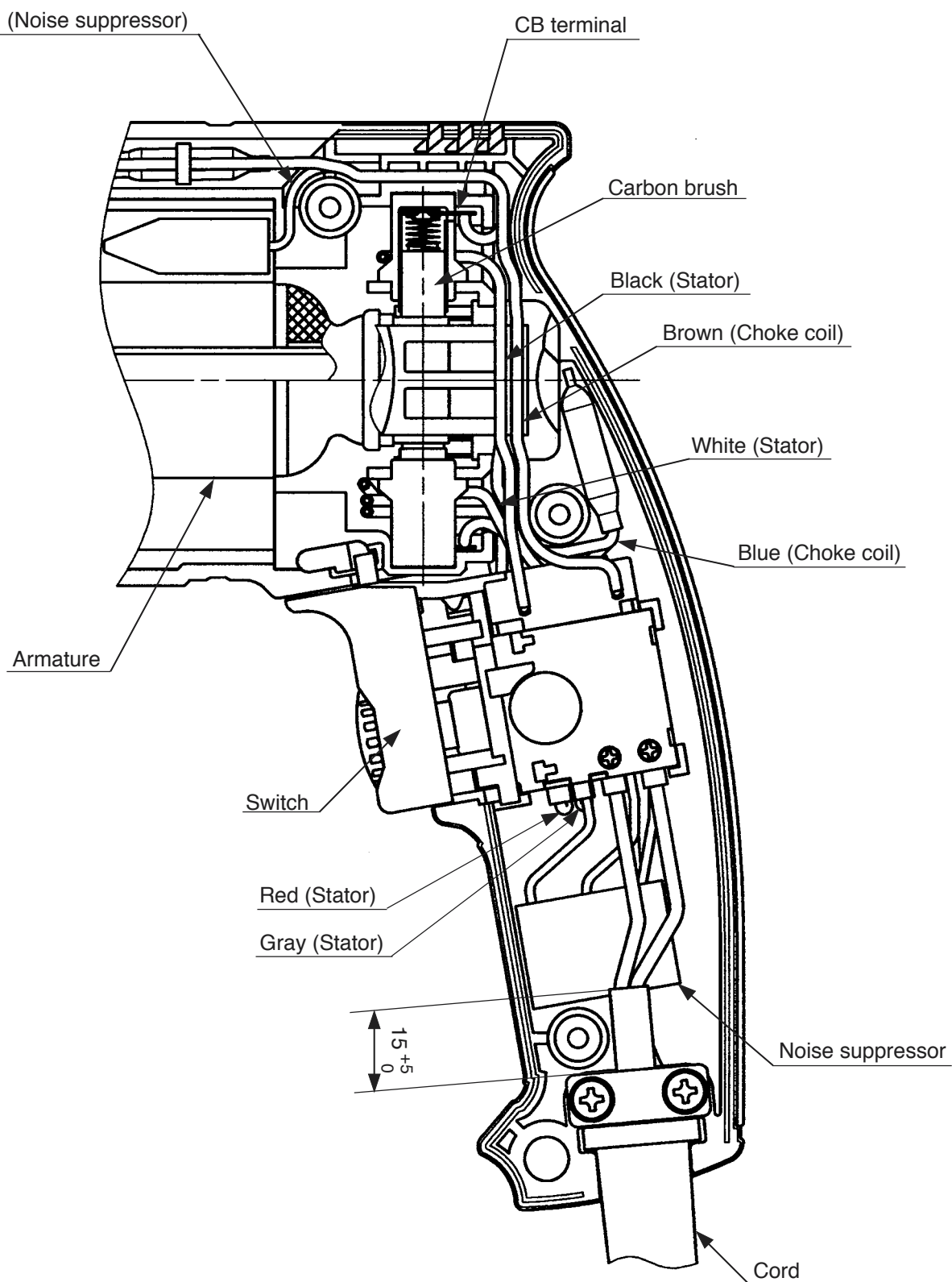


Fig. 17

(2) For products without noise suppressor

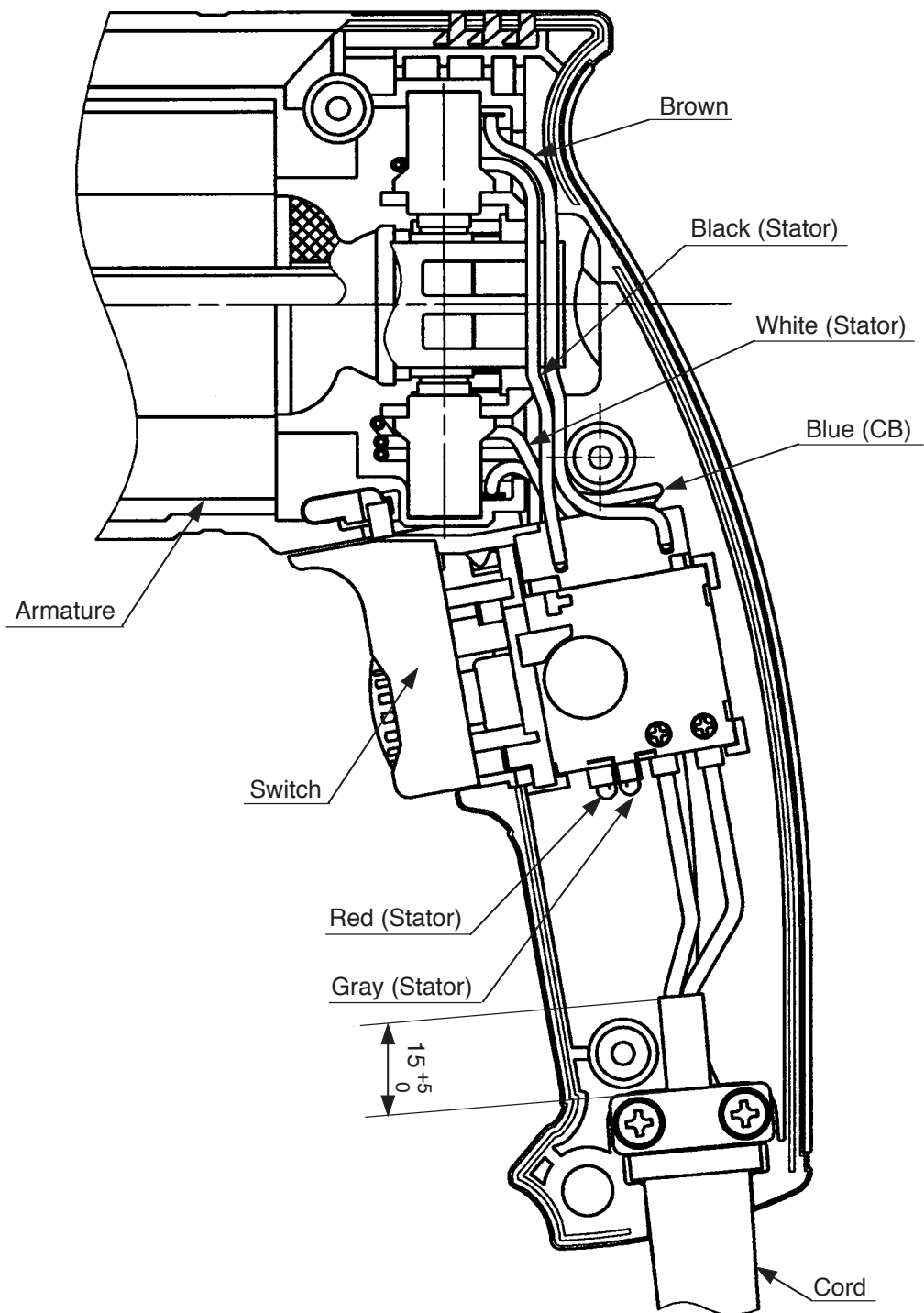


Fig. 18

B. Switch connection

(1) Wiring of reversing switch

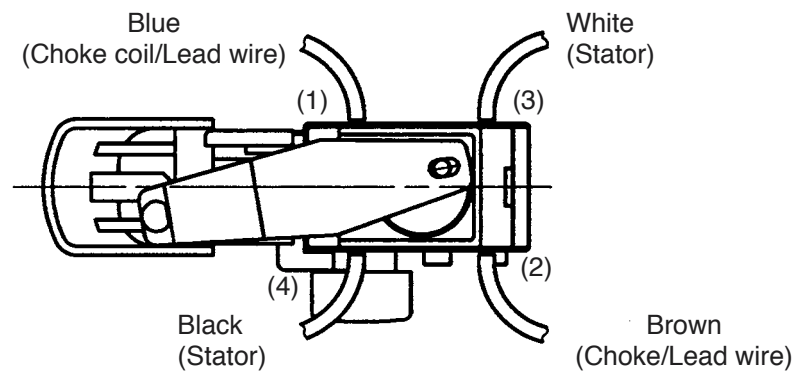


Fig. 19

(2) Wiring of speed control switch

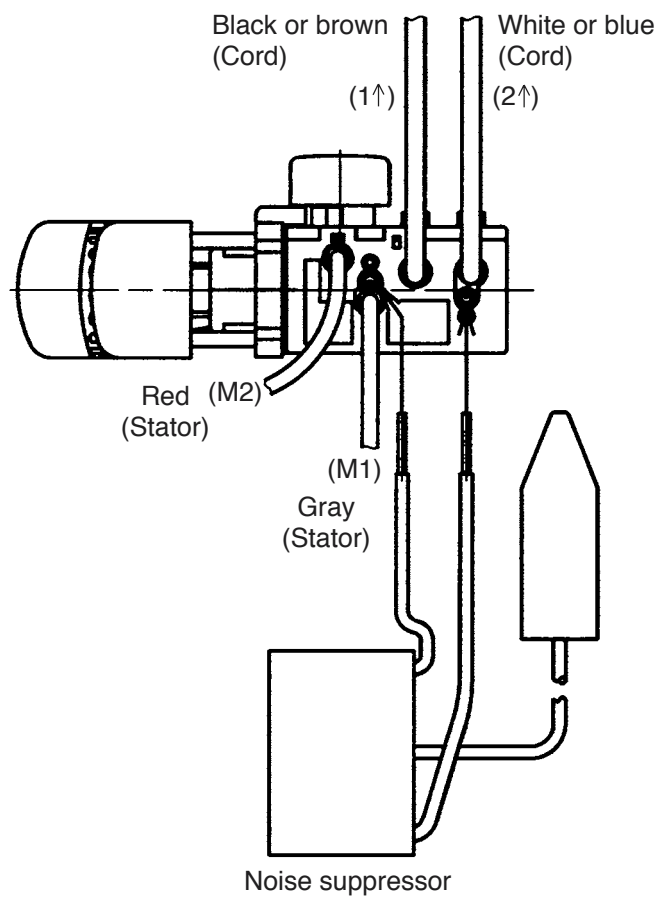


Fig. 20

8-5. Insulation Tests

On completion of reassembly after repair, measure the insulation resistance and conduct the dielectric strength test.

Insulation resistance: 7 M Ω or more with DC 500 V megohm tester

Dielectric strength: AC 4,000 V/1 minute, with no abnormalities 220 V – 240 V (and 110 V for U.K. products)

AC 2,500 V/1 minute, with no abnormalities 110 V – 127 V (except U.K. products)

8-6. No-Load Current Value

After no-load operation for 30 minutes, the no-load current value should be as follows.

Model DV 20VB2

Voltage (V)	110	120	230	240
Current (A) Max.	3.5	3.2	1.6	1.5

Model DV 18V

Voltage (V)	110	220	230	240
Current (A) Max.	3.5	1.7	1.6	1.5

9. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
DV 20VB2	General Assembly	Work Flow						
		Handle Cover Cord Armor	→	Switch Cord				
					Housing Stator			
				Armature Ball Bearing (608DD) Ball Bearing (608VV)	Inner Cover Second Pinion and Gear Set Change Lever Change Cover Change Shaft			
		Drill Chuck	→		Spindle Ball Bearing (6202DD) Ratchet (A) Spring (A)	Gear Cover (A) Ass'y Ratchet (B) Shift Lever Ass'y Spring (H) Shift Arm Gear Set		

MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
DV 18V		Work Flow						
		Handle Cover Cord Armor		Switch Cord				
					Housing Stator			
		General Assembly		Armature Ball Bearing (608DD) Ball Bearing (608VV)	Inner Cover Second Pinion and Gear Set Change Lever Change Cover Change Shaft			
		Drill Chuck			Spindle (B) Ball Bearing (6202DD) Ratchet (A) Spring (A)	Gear Cover (A) Ass'y Ratchet (B) Shift Lever Ass'y Spring (H) Shift Arm Gear Set		

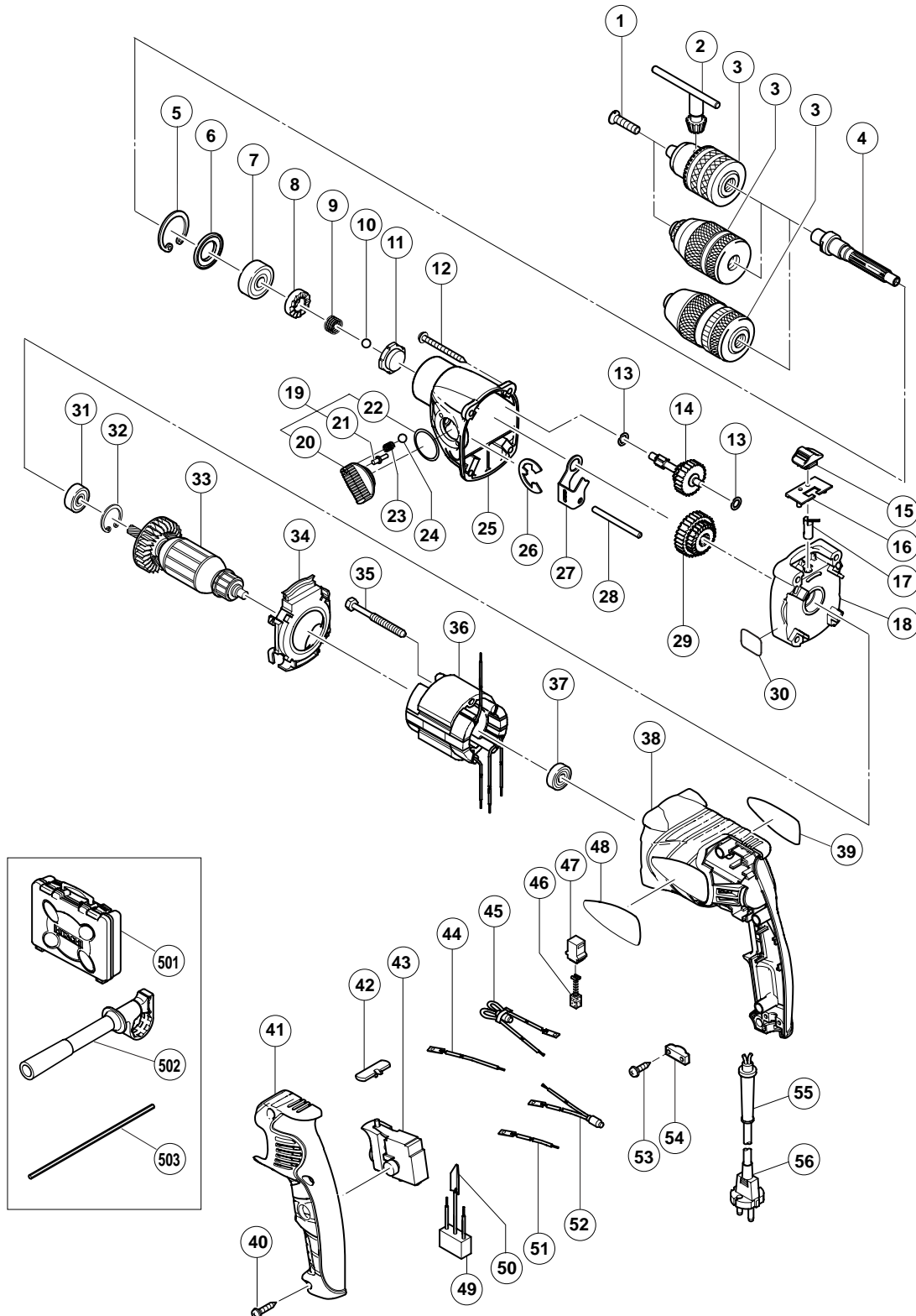
ELECTRIC TOOL PARTS LIST

■ IMPACT DRILL

2004 • 4 • 20

Model DV 20VB2

(E1)



PARTS

DV 20VB2

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
* 1	995-344	FLAT HD. SCREW (A) (LEFT HAND) M6X25	1	EXCEPT FOR DRILL CHUCK 13VLN	
2	987-576	CHUCK WRENCH FOR 13VLB-D, 13VLR-D	1		
* 3	321-814	DRILL CHUCK 13VLRB-D	1	INCLUD. 1, 2	
* 3	319-546	DRILL CHUCK 13VLRE-N (W/O CHUCK WRENCH)	1		
* 3	316-280	DRILL CHUCK 13VLN (W/O CHUCK WRENCH)	1		
* 4	322-857	SPINDLE (B)	1		
* 4	322-866	SPINDLE (A)	1	FOR SLIP CLUTCH	
5	939-556	RETAINING RING FOR D35 HOLE (10 PCS.)	1		
6	322-851	DUST SEAL	1		
7	620-2DD	BALL BEARING 620DDCMPS2L	1		
8	322-850	RATCHET (A)	1		
9	984-101	SPRING (A)	1		
10	959-150	STEEL BALL D6.35 (10 PCS.)	1		
11	322-845	RATCHET (B)	1		
* 12	316-321	TAPPING SCREW (W/FLANGE) D5X45	4		
* 12	322-869	TAPPING SCREW (W/FLANGE) D5X50 (BLACK)	4	FOR SLIP CLUTCH	
13	322-852	WASHER (B)	2		
* 14	322-858	SECOND PINION AND GEAR SET	1		
* 14	322-867	SECOND PINION AND GEAR SET	1	FOR SLIP CLUTCH	
15	322-841	CHANGE LEVER	1		
16	322-842	CHANGE COVER	1		
17	322-840	CHANGE SHAFT	1		
* 18	322-859	INNER COVER (B)	1		
* 18	322-868	INNER COVER (A)	1	FOR SLIP CLUTCH	
19	322-847	SHIFT LEVER ASS'Y	1	INCLUD. 20-22	
20		SHIFT LEVER	1		
21	322-848	SHIFT PIN	1		
22	306-353	O-RING (S-22)	1		
23	981-328	SPRING (H)	1		
24	319-535	STEEL BALL D3.5 (10 PCS.)	1		
25	322-844	GEAR COVER (A) ASS'Y	1	INCLUD. 11	
26	323-048	RETAINING RING (E-TYPE) FOR D15 SHAFT	1		
27	322-849	SHIFT ARM	1		
* 28	322-860	PIN D5	1		
* 28	984-104	PIN D5	1	FOR SLIP CLUTCH	
29	322-846	GEAR SET	1		
* 30		LABEL (FOR SLIP CLUTCH)	1	FOR SLIP CLUTCH	
31	608-DDM	BALL BEARING 608DDC2PS2L	1		
32	939-553	RETAINING RING FOR D22 HOLE (10 PCS.)	1		
* 33	360-652C	ARMATURE 110V	1		
* 33	360-652U	ARMATURE ASS'Y 120V	1	INCLUD. 31, 37	
* 33	360-652E	ARMATURE 230V	1		
* 33	360-652F	ARMATURE 240V	1		
34	322-843	FAN GUIDE	1		
35	961-672	HEX. HD. TAPPING SCREW D4X50	2		
* 36	340-587C	STATOR 110V	1		
* 36	340-587D	STATOR 120V	1		
* 36	340-587E	STATOR 230V	1		
* 36	340-587F	STATOR 240V	1		
37	608-VVM	BALL BEARING 608VVC2PS2L	1		
38	322-861	HOUSING	1		

PARTS

DV 20VB2

[illegible]

STANDARD ACCESSORIES

DV 20VB2

[illegible]

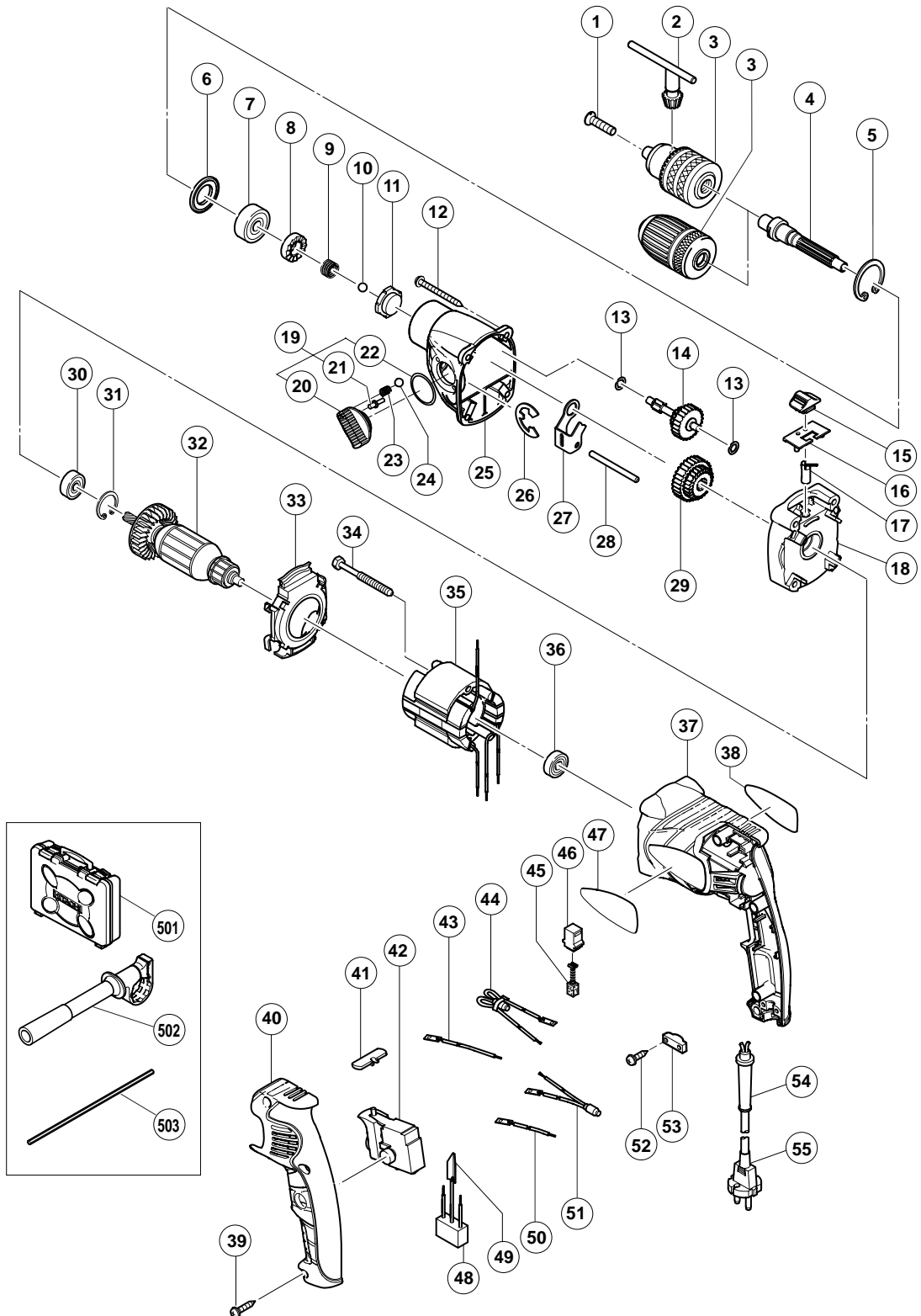
OPTIONAL ACCESSORIES

[illegible]

ELECTRIC TOOL PARTS LIST

IMPACT DRILL
Model DV 18V

2004 • 4 • 20
(E1)



PARTS

DV 18V

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
1	995-344	FLAT HD. SCREW (A) (LEFT HAND) M6X25	1		
* 2	987-576	CHUCK WRENCH FOR 13VLB-D,13VLR-D	1		
* 3		DRILL CHUCK	1	INCLUD. 1, 2 SUPPLIED WITH ITEM NO. 601	
* 3	322-357	DRILL CHUCK 13VLRH-N (W/O CHUCK WRENCH)	1		
4	322-857	SPINDLE (B)	1		
5	939-556	RETAINING RING FOR D35 HOLE (10 PCS.)	1		
6	322-851	DUST SEAL	1		
7	620-2DD	BALL BEARING 6202DDCMPS2L	1		
8	322-850	RATCHET (A)	1		
9	984-101	SPRING (A)	1		
10	959-150	STEEL BALL D6.35 (10 PCS.)	1		
11	322-845	RATCHET (B)	1		
12	316-321	TAPPING SCREW (W/FLANGE) D5X45	4		
13	322-852	WASHER (B)	2		
14	322-858	SECOND PINION AND GEAR SET	1		
15	322-841	CHANGE LEVER	1		
16	322-842	CHANGE COVER	1		
17	322-840	CHANGE SHAFT	1		
18	322-859	INNER COVER (B)	1		
19	322-847	SHIFT LEVER ASS'Y	1	INCLUD. 20-22	
20		SHIFT LEVER	1		
21	322-848	SHIFT PIN	1		
22	306-353	O-RING (S-22)	1		
23	981-328	SPRING (H)	1		
24	319-535	STEEL BALL D3.5 (10 PCS.)	1		
25	322-844	GEAR COVER (A) ASS'Y	1	INCLUD. 11	
26	323-048	RETAINING RING (E-TYPE) FOR D15 SHAFT	1		
27	322-849	SHIFT ARM	1		
28	322-860	PIN D5	1		
29	322-846	GEAR SET	1		
30	608-DDM	BALL BEARING 608DDC2PS2L	1		
31	939-553	RETAINING RING FOR D22 HOLE (10 PCS.)	1		
* 32	360-655C	ARMATURE 110V	1		
* 32	360-655E	ARMATURE 220V-230V	1		
* 32	360-655F	ARMATURE 240V	1		
33	322-843	FAN GUIDE	1		
34	981-824	HEX. HD. TAPPING SCREW D4X45	2		
* 35	340-589C	STATOR 110V	1		
* 35	340-589E	STATOR 220V-230V	1		
* 35	340-589F	STATOR 240V	1		
36	608-VVM	BALL BEARING 608VVC2PS2L	1		
37	322-861	HOUSING	1		
38		NAME PLATE	1		
39	301-653	TAPPING SCREW (W/FLANGE) D4X20 (BLACK)	3		
40	322-862	HANDLE COVER	1		
41	322-853	PUSHING BUTTON	1		
42	322-854	SWITCH (1P PILLAR TYPE)	1		
* 43	321-630	INTERNAL WIRE (BROWN) 100L	1	FOR SYR, THA, INA, KUW, IND, SIN, HKG	
* 44	322-517	CHOKE COIL (BROWN) 220V-240V	1	FOR ITA, ESP, GBR (230V), NZL, AUS, AUT, SAF, CHN	
* 44	322-518	CHOKE COIL (BROWN) 110V	1	FOR GBR (110V)	

PARTS

DV 18V

[illegible]

STANDARD ACCESSORIES

DV 18V

[illegible]

OPTIONAL ACCESSORIES

[illegible]

