

MODEL

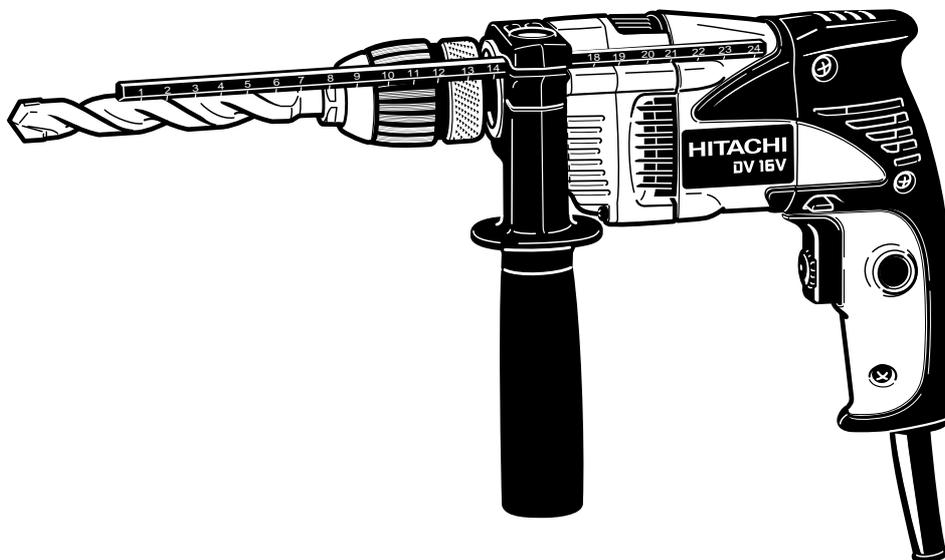
DV 16V

Hitachi Power Tools

**16 mm (5/8") IMPACT DRILL
DV 16V**

**TECHNICAL DATA
AND
SERVICE MANUAL**

D



LIST No. E104

Jan. 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:

Symbols Utilized	Competitors	
	Company Name	Model Name
C	MAKITA	HP1501K/HP1500
B-1 B-2	BOSCH	GSB16RE GSB13RE
H-1 H-2	METABO	SbE600R+L SBE560



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1. PRODUCT NAME

Hitachi Impact Drill, Model DV 16V

2. MARKETING OBJECTIVE

The new Model DV 16V is developed under the concept for compact, lightweight and sturdy. This model's outstanding features are as follows:

- (1) Compact and lightweight
- (2) Sturdy construction thanks to the cylindrical housing and aluminum gear-cover
- (3) Class-top drilling speed
- (4) Easy-to-operate 2-finger sized trigger switch with variable speed control dial and push-button type forward/reverse changeover switch
- (5) Nonskid soft grip handle

3. APPLICATIONS

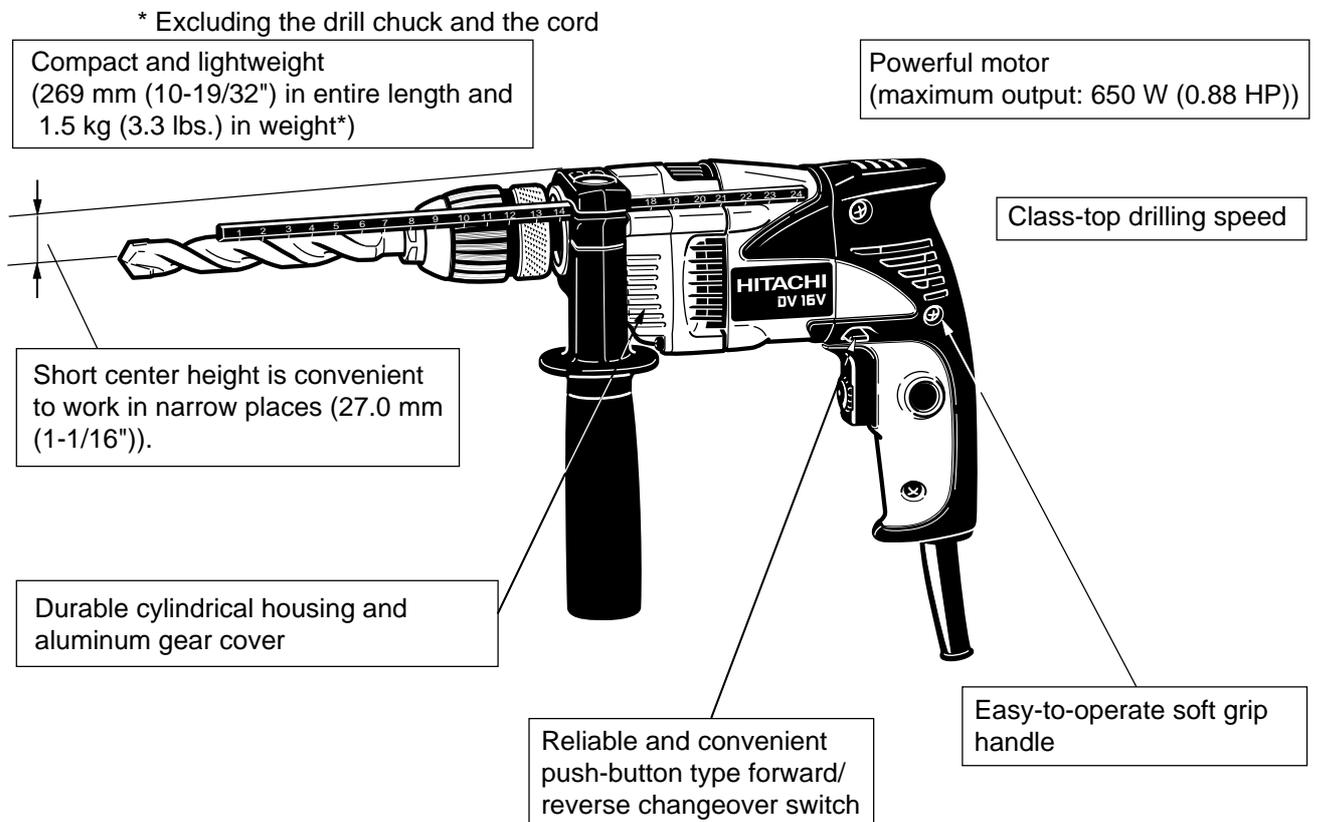
- (1) Rotation and impact function

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

To make the Model DV 16V compact is the first priority at designing. Entire length of the Model DV 16V is 269 mm (10-19/32") and the center height is 27 mm (1-1/16"). The Model DV 16V weighs 1.5 kg (3.3 lbs.) (excluding the drill chuck and the cord). Its ease of operation is the class-top level.

(2) Class-top drilling speed

Thanks to the powerful motor (rated power consumption: 590 W (0.80 HP) {120 V: 6 A}), the Model DV 16V can drill at the class-top speed while it is compact and lightweight.

(3) Easy-to-operate 2-finger sized trigger with variable 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 Model DV 16V is 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 cylindrical housing and aluminum die-casting inner cover and gear cover

The Model DV 16V is equipped with the cylindrical housing and the aluminum die-casting inner cover and gear cover. The cylindrical housing is superior to the competitors' 2-piece housings in durability. For example, the Model DV 16V was durable enough to bear more than 12,000 operations while the ball bearing of H-2 was damaged at about 3,000 operations as a result of our testing.

5. SPECIFICATIONS

5-1. Specifications

Model		DV 16V
Capacities	Concrete	16 mm (5/8")
	Steel	13 mm (1/2")
	Wood	25 mm (1")
Drill chuck		Mount type: UNF 1/2" - 20 Capacity: 13 mm (1/2")
Power source		AC single phase 50/60 Hz
Rated voltage		110 V, 120 V, 220 V, 230 V, 240 V
Rated current		110 V: 5.6 A 120V: 6.0 A*1 220 V: 2.8 A 230 V: 2.7 A 240 V: 2.6 A
Power input		590 W (0.80 HP)
Power output	Full-load	310 W (0.42 HP)
	Max.	650 W (0.88 HP)
Speed	No-load	0 – 2,900/min.
	Full-load	2,160/min.
No-load impact rate		0 – 46,400/min.
Type of motor		AC single phase series commutator motor
Enclosure	Housing	Glassfiber reinforced polycarbonate resin + elastomer
	Handle	
	Gear cover	Aluminum alloy die casting
	Inner cover	
Insulation structure		Double insulation
Type of switch		Variable speed control trigger switch with reversing switch
Overall length		269 mm (10-19/32")
Weight	Net*2	1.5 kg (3.3 lbs.)
	Gross	3.5 kg (7.6 lbs.)
Packaging		Corrugated cardboard box with plastic carrying case
Cord		2-core cabtire cord 2.5 m (8.2 ft.)
Standard accessories		Side handle 1 Depth gauge 1 Chuck wrench*3 1 Plastic carrying case 1

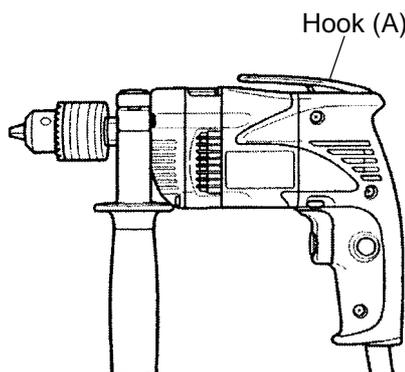
*1 For USA and Canada only

*2 Without drill chuck and cord

*3 Spec. for the keyed chuck only

5-2. Optional Accessories

- Drill bit for concrete
- Hook (A) (Code No. 321612)



6. COMPARISONS WITH SIMILAR PRODUCTS

6-1. Specification Comparisons

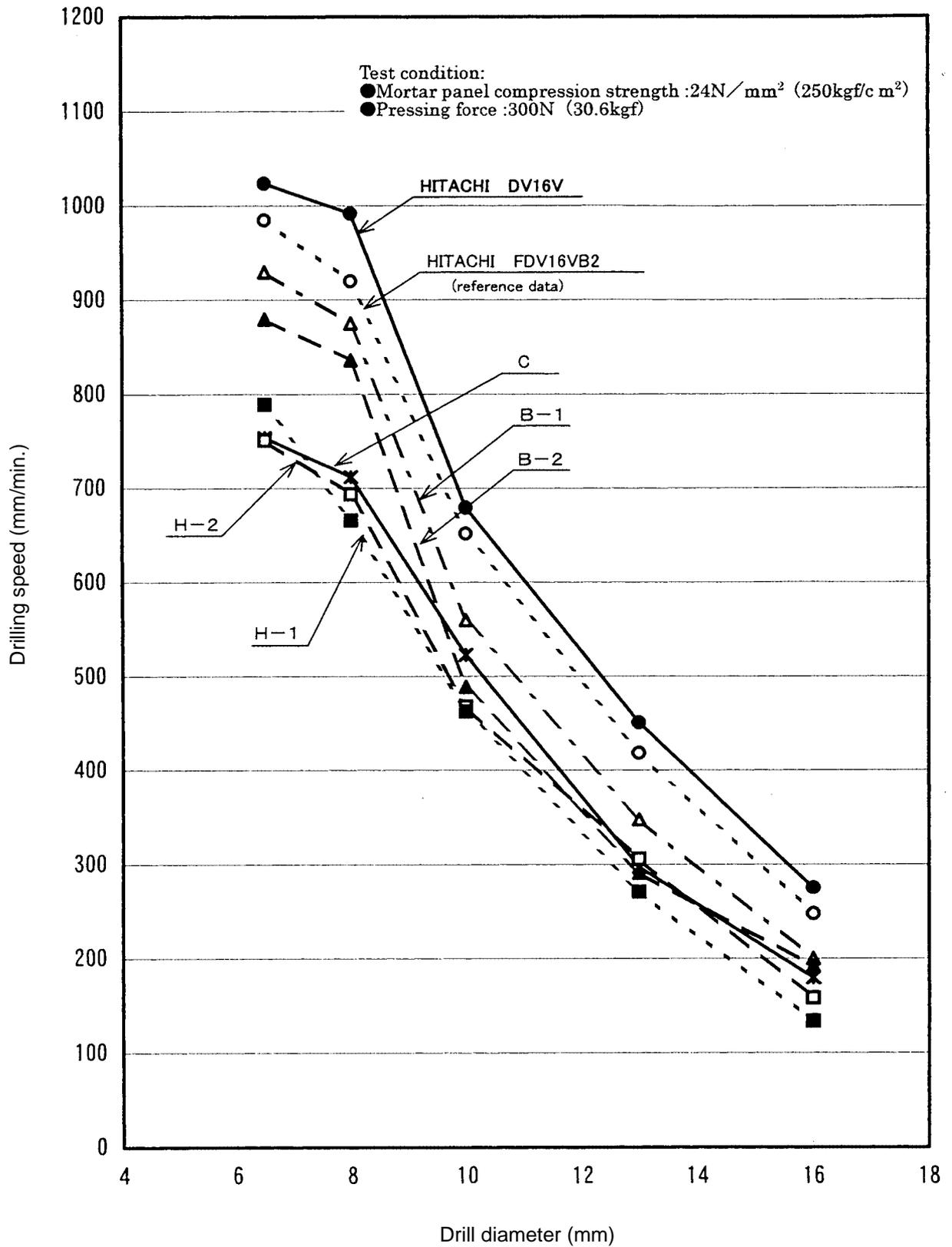
			HITACHI	C	B-1	B-2	H-1	H-2
			DV 16V					
Capacities	Concrete	mm (in.)	16 (5/8")	15 (9/16")	16 (5/8")	13 (1/2")	12 (1/2")	12 (1/2")
	Steel	mm (in.)	13 (1/2")	13 (1/2")	13 (1/2")	10 (3/8")	10 (3/8")	10 (3/8")
	Wood	mm (in.)	25 (1")	25 (1")	30 (1-3/16")	20 (3/4")	25 (1")	20 (3/4")
Rated power input	W (HP)	590 (0.80) {120 V: 6 A}	550 (0.74)	650 (0.88)	550 (0.74)	600 (0.81)	560 (0.75)	
Rated power output	W (HP)	310 (0.42)	*1 280 (0.38)	*1 330 (0.45)	*1 280 (0.38)	*1 95 (0.13)	*1 270 (0.36)	
Max. power output	W (HP)	650 (0.88)	*1 520 (0.70)	*1 550 (0.74)	*1 440 (0.59)	*1 160 (0.22)	*1 380 (0.51)	
No-load speed	/min.	0 – 2,900	0 – 2,800	0 – 2,600	0 – 2,600	0 – 2,800	0 – 2,800	
No-load impact rate	/min.	0 – 46,400	0 – 44,800	0 – 41,600	0 – 41,600	0 – 50,000	0 – 50,000	
Max. torque	N·m (in·lbs.)	12.6 (111.6)	*1 10.7 (94.8)	*1 13.2 (116.9)	*1 11.1 (98.3)	*1 3.2 (28.4)	*1 9.4 (83.3)	
No-load noise level	dB	78.0	*1 81.1	*1 86.1	*1 83.2	*1 78.6	*1 76.9	
Housing structure		Cylindrical	Clamshell	Clamshell	Clamshell	Clamshell	Clamshell	
Soft grip handle		○	×	○	×	×	×	
Speed control dial		○	×	○	○	○	○	
Type of reversing switch		Pushing button	Lever	Pushing button	Pushing button	Lever	Lever	
Overall length	mm (in.)	269 (10-19/32")	299 (11-49/64")	286 (11-17/64")	270 (10-5/8")	285 (11-7/32")	278 (10-15/16")	
Chuck offset	mm (in.)	27.0 (1-1/16")	28.5 (1-1/8")	35.0 (1-3/8")	32.5 (1-9/32")	28.0 (1-7/64")	27.5 (1-5/64")	
Weight (catalog)	kg (lbs.)	1.5 (3.3)	1.7 (3.7)	1.65 (3.6)	1.6 (3.5)	1.7 (3.7)	1.7 (3.7)	
Actual weight (*2)	kg (lbs.)	1.7 (3.7)	*1 1.8 (4.0)	*1 1.9 (4.2)	*1 1.6 (3.5)	*1 2.0 (4.4)	*1 1.9 (4.2)	

*1 : Note that the data marked with asterisk is the factory test result.

*2 : Without cord

6-2. Drilling Speed Comparisons

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



7. PRECAUTIONS IN SALES PROMOTION

In the interest of promoting the safest and most efficient use of the Model DV 16V Impact Drill 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 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 Australia, China, the U.S.A. and Canada.

7-3. Precautions on Usage

(1) Confirm the direction of bit rotation

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

The L-side of the push button is pushed to turn the bit counterclockwise. The (R) and (L) marks are provided on the body. (Fig. 1)

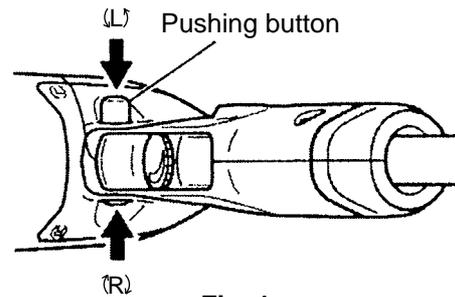


Fig. 1

CAUTION

Be sure to rotate the bit clockwise when drilling into concrete with a drill bit in the IMPACT mode. Especially in the case of an impact drill equipped with a keyless chuck, the drill chuck may loosen easily or the chuck may come off the spindle if the bit is rotated counterclockwise in the IMPACT mode. (Fig. 2)

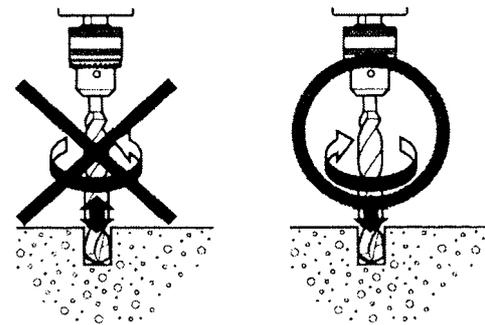


Fig. 2

(2) IMPACT to ROTATION changeover (Fig. 3)

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 (R) mark).

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

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

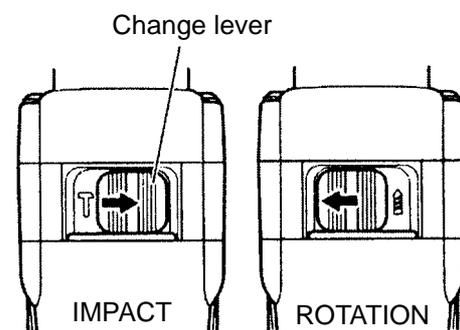


Fig. 3

CAUTION

- Do not use the impact 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 impact 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.

7-4. Attaching Hook (A)

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

- (1) Loosen the Tapping Screw (W/Flange) D4 x 20 (Black) **[31]** and remove the Handle Cover **[32]**.
- (2) Insert the mounting foot of hook (A) into the air vent of the Housing **[25]** as shown in Fig. 4.
- (3) Mount the Handle Cover **[32]**.

Refer to "8-2-3. Tightening torque" for tightening torque of each screw. Be careful not to catch the internal wires when mounting the handle cover.

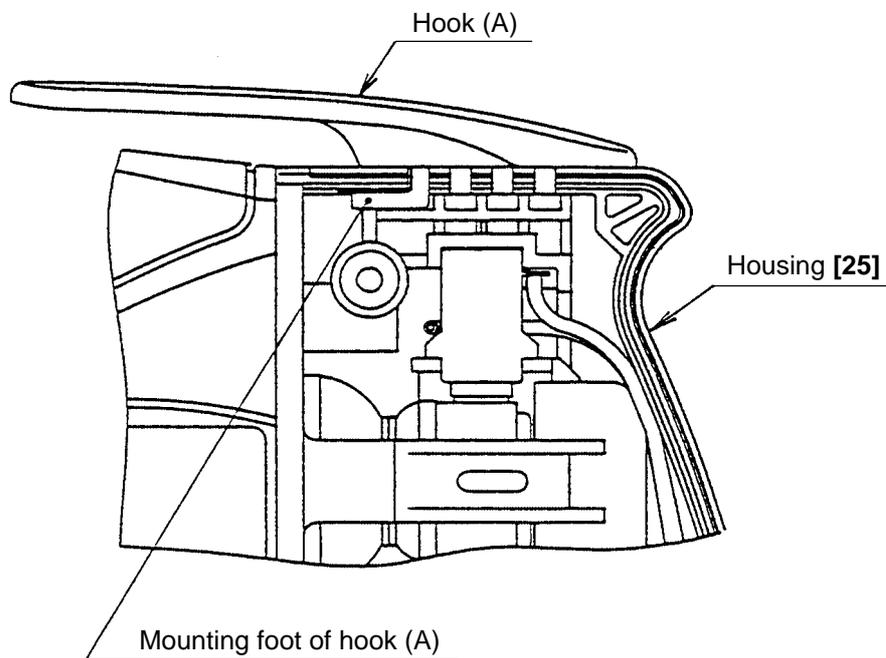


Fig. 4

8. PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY

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

8-1. Disassembly

8-1-1. Motor section disassembly

(1) Removal of the handle cover

Loosen the Tapping Screw (W/Flange) D4 x 20 (Black) **[31]** and remove the Handle Cover **[32]**.

(2) Removal of the carbon brushes

With a small flat-blade screwdriver, slightly lift the Brush Holders **[36]**. Then, while pushing the Carbon Brushes **[35]** to the bottom of the Brush Holders **[36]**, gently pull out and disconnect the internal wire terminals. (Figs. 5 and 6)

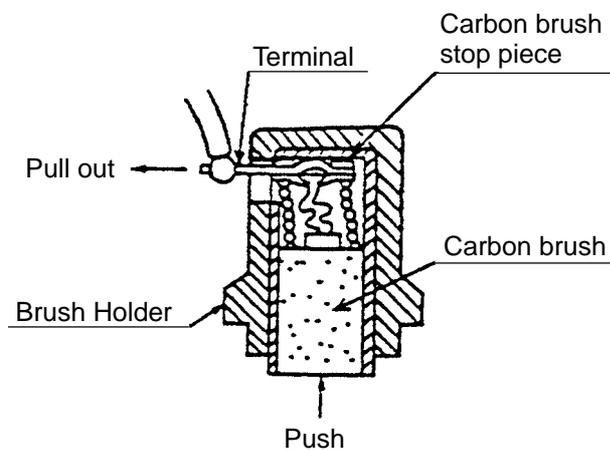


Fig. 5

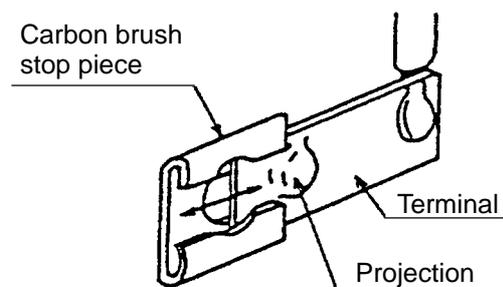


Fig. 6

(3) Removal of the gear cover from the housing

Loosen the Tapping Screw (W/Flange) D4 x 40 **[10]** and Tapping Screw (W/Flange) D4 x 55 **[12]**, and separate the Gear Cover **[13]** from the Housing **[25]**. Then, remove the Inner Cover **[17]** together with the Armature **[20]** from the Housing **[25]**.

(4) Removal of the armature ass'y from the inner cover

As illustrated in Fig. 7, support the Inner Cover [17] with a tubular jig, and push down on the top of the pinion of the Armature [20].

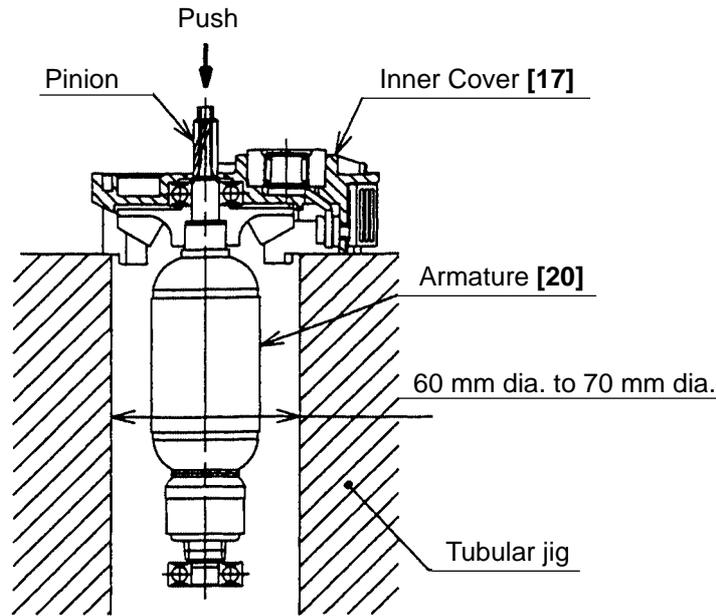


Fig. 7

(5) Removal of the stator from the housing

First, disconnect the internal wires from the Switch (1P Pillar Type) [33]. 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 Tapping Screws D4 x 50 [22] and tap the end surface of the Housing [25] slightly with a wooden hammer. Then the stator can be removed from the housing.

8-1-2. Removal of the drill chuck

The Drill Chuck 13VLRH-N (W/O Chuck Wrench) [3] is secured to the Spindle [7] with 1/2"-20 UNF (right hand) and Flat Hd. Screw (A) (Left Hand) M6 x 25 [1]. At first, open the chuck jaw as far as possible and loosen Flat Hd. Screw (A) (Left Hand) M6 x 25 [1] by turning it clockwise.

- a. Hold the drill so that only the Drill Chuck 13VLRH-N (W/O Chuck Wrench) [3] rests firmly and squarely on the edge of a solid bench. Instal 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)

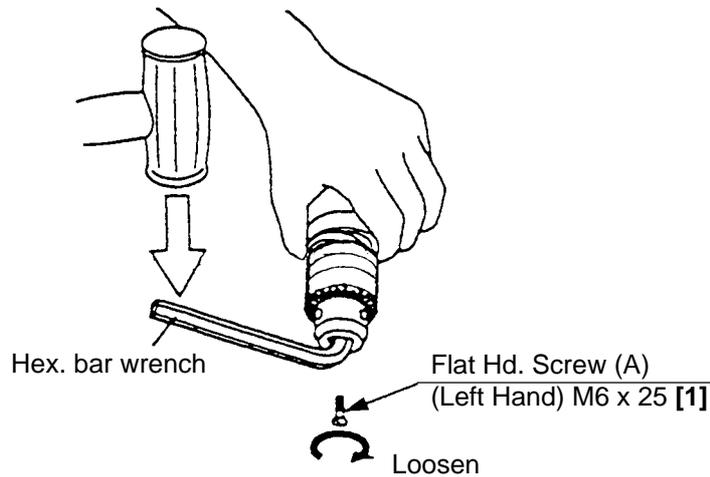


Fig. 8

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 [7] 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)

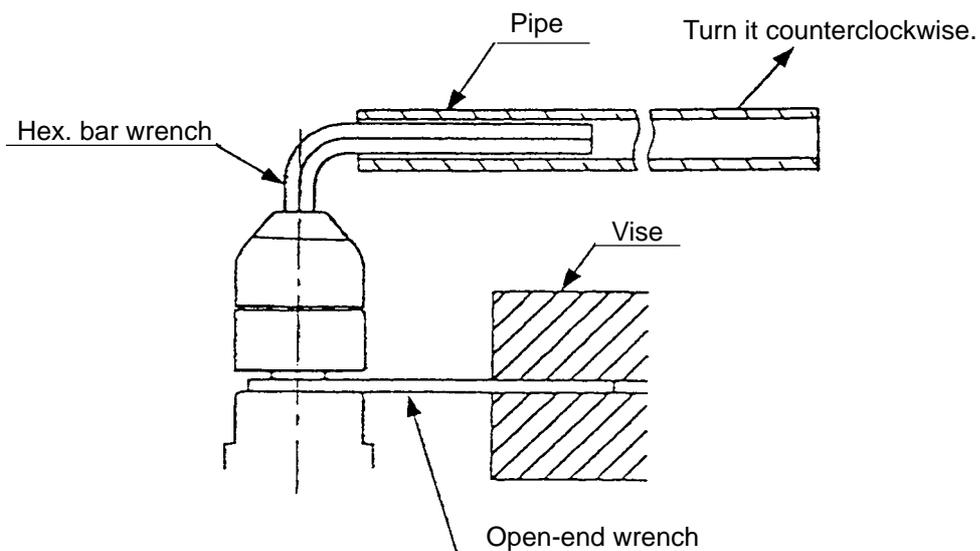


Fig. 9

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)

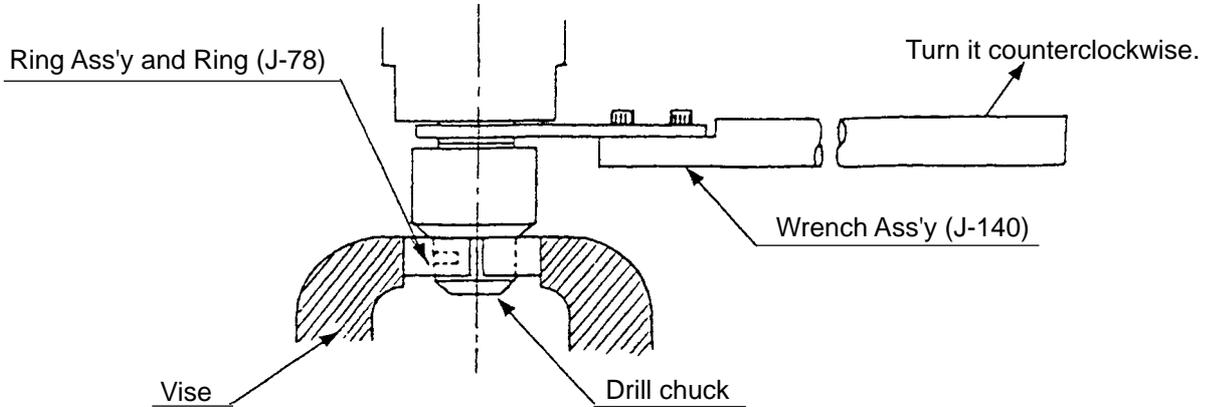


Fig. 10

8-1-3. Removal of the spindle

Remove the Retaining Ring for D32 Hole [4] and the Dust Seal [5]. Place the end surface of the Gear Cover [13] on the tubular jig and press down on the Spindle [7] with a hand press. Then the spindle can be removed together with the Ball Bearing 6002VVCMP52L [9], Distance Ring [6], Spring [8] and the Retaining Ring for D15 Shaft [11]. The Gear [15] can be removed from the spindle. (Fig. 11)

< Caution > Be sure to replace both the spindle and the gear with new ones.

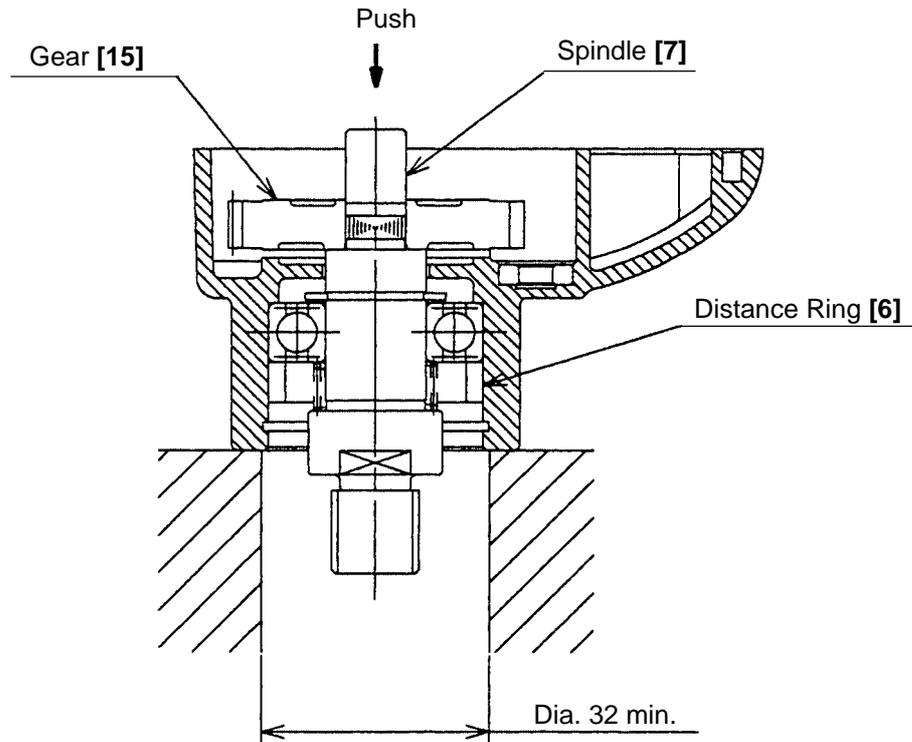


Fig. 11

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

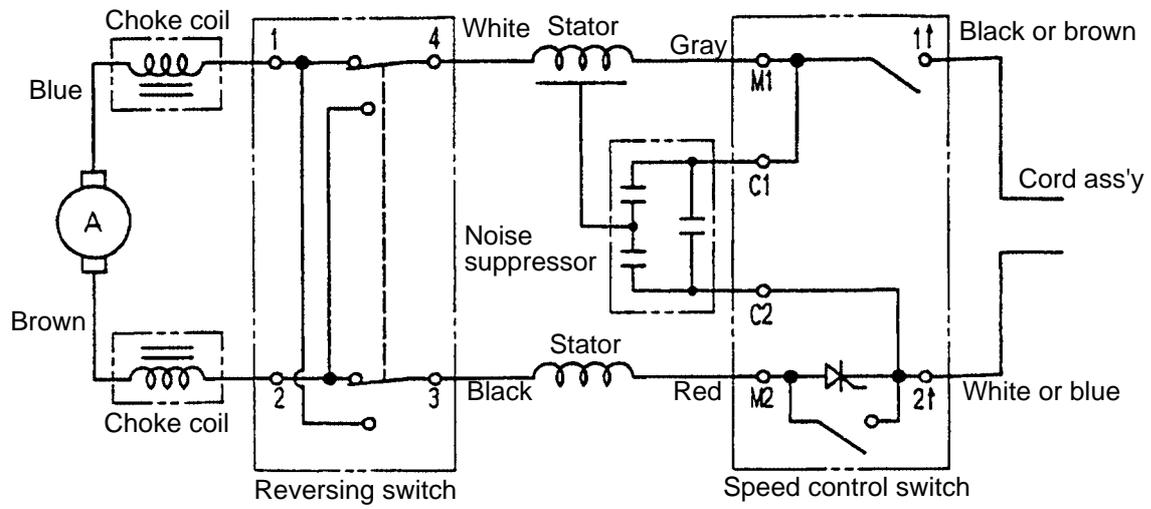
- (1) Apply ATTOLUB MS No. 2 Grease (Code No. 309922) to the following parts.
 - Teeth of the Armature **[20]** and the Gear **[15]** (with a brush)
 - On the Spindle **[7]**
Ground portion for fitting the Ball Bearing 6002VVCMP2L **[9]**, splined portion and hole of rear side.
 - Surface of Steel Ball D6.35 **[16]**
 - Lip portion of the Dust Seal **[5]**
 - On the Inner Cover **[17]**
Inside of Needle Bearing, teeth of ratchet
 - Inside the Gear Cover **[13]**: 5 g

8-2-3. Tightening torque

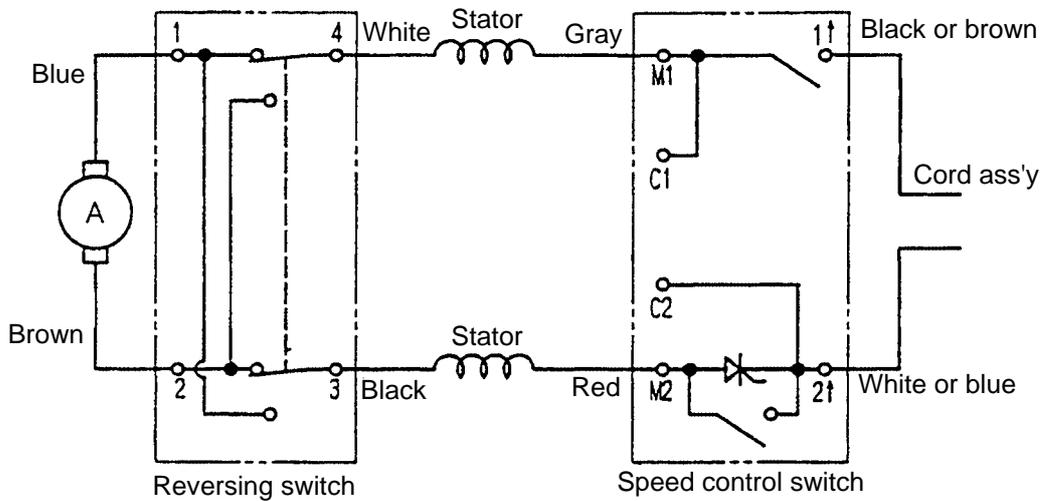
- (1) Tapping Screw D4 1.5 to 2.5 N•m (13.3 to 22.1 in-lbs.)
- (2) Drill Chuck 30 to 50 N•m (266 to 443 in-lbs.)
- (3) Machine Screw M3 (Switch (1P Pillar Type) **[33]**) 0.4 to 0.8 N•m (3.5 to 7.1 in-lbs.)

8-3. Wiring Diagram

(1) For products with noise suppressor



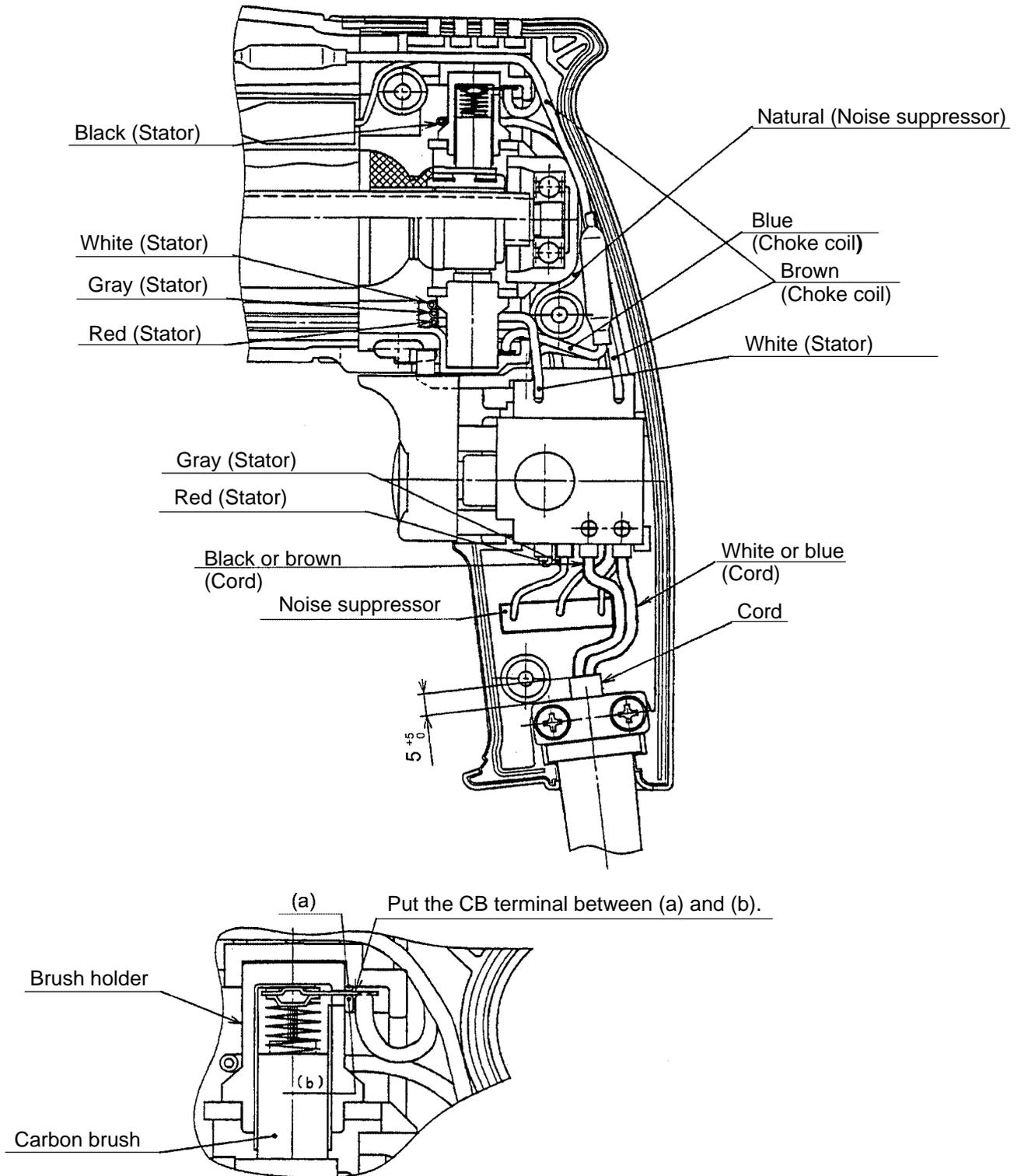
(2) For products without noise suppressor



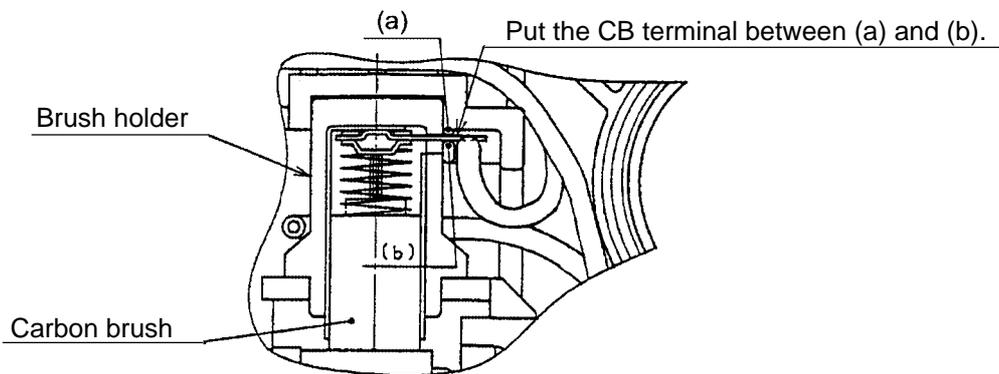
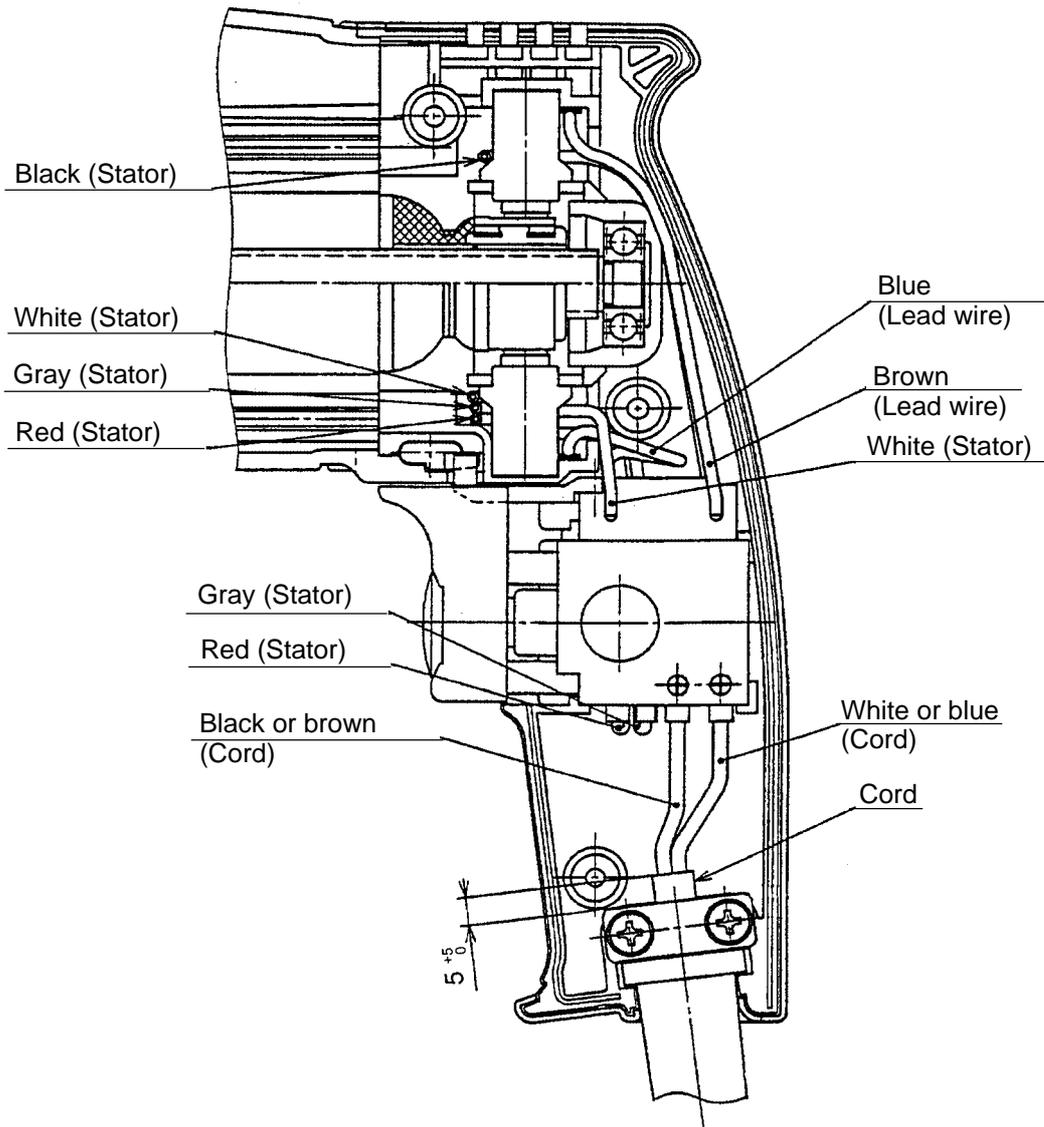
8-4. Internal Wire Arrangement and Wiring Work

A. Internal wire arrangement

(1) For products with noise suppressor

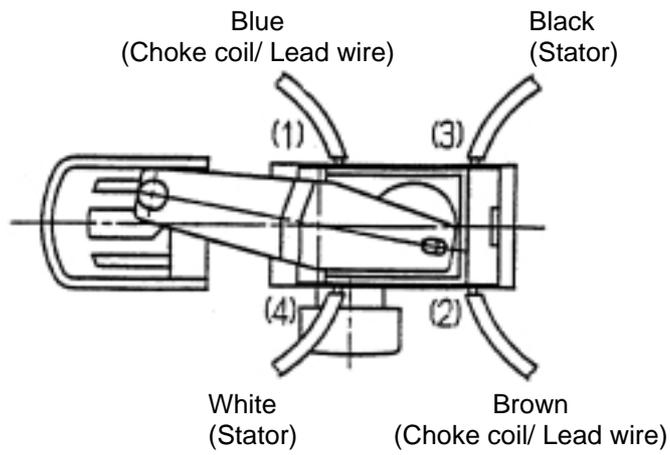


(2) For products without noise suppressor

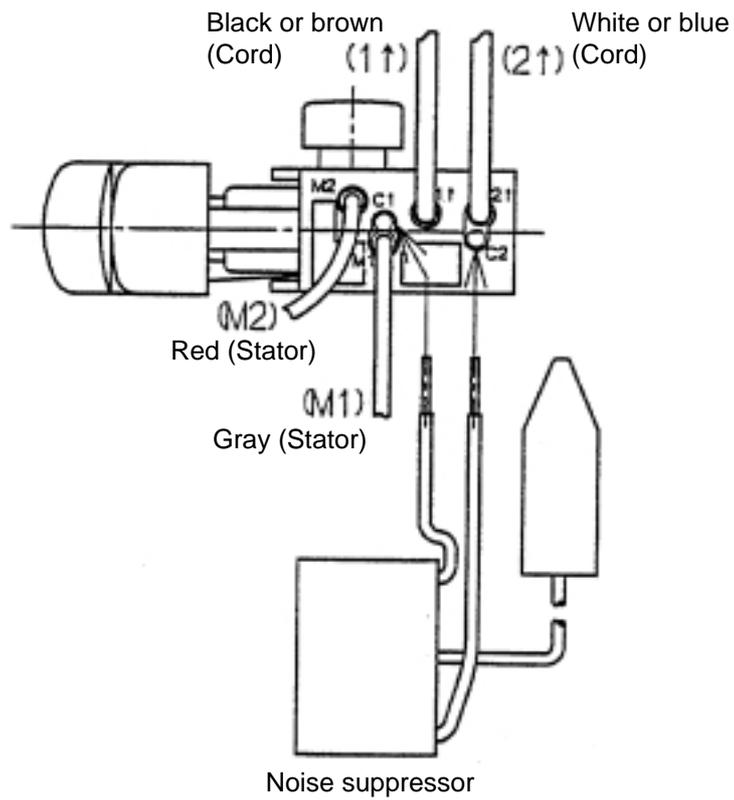


B. Switch connection

(1) Wiring of reversing switch



(2) Wiring of speed control switch



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.

Voltage (V)	110	120	220	230	240
Current (A) Max.	2.3	2.1	1.1	1.1	1.1

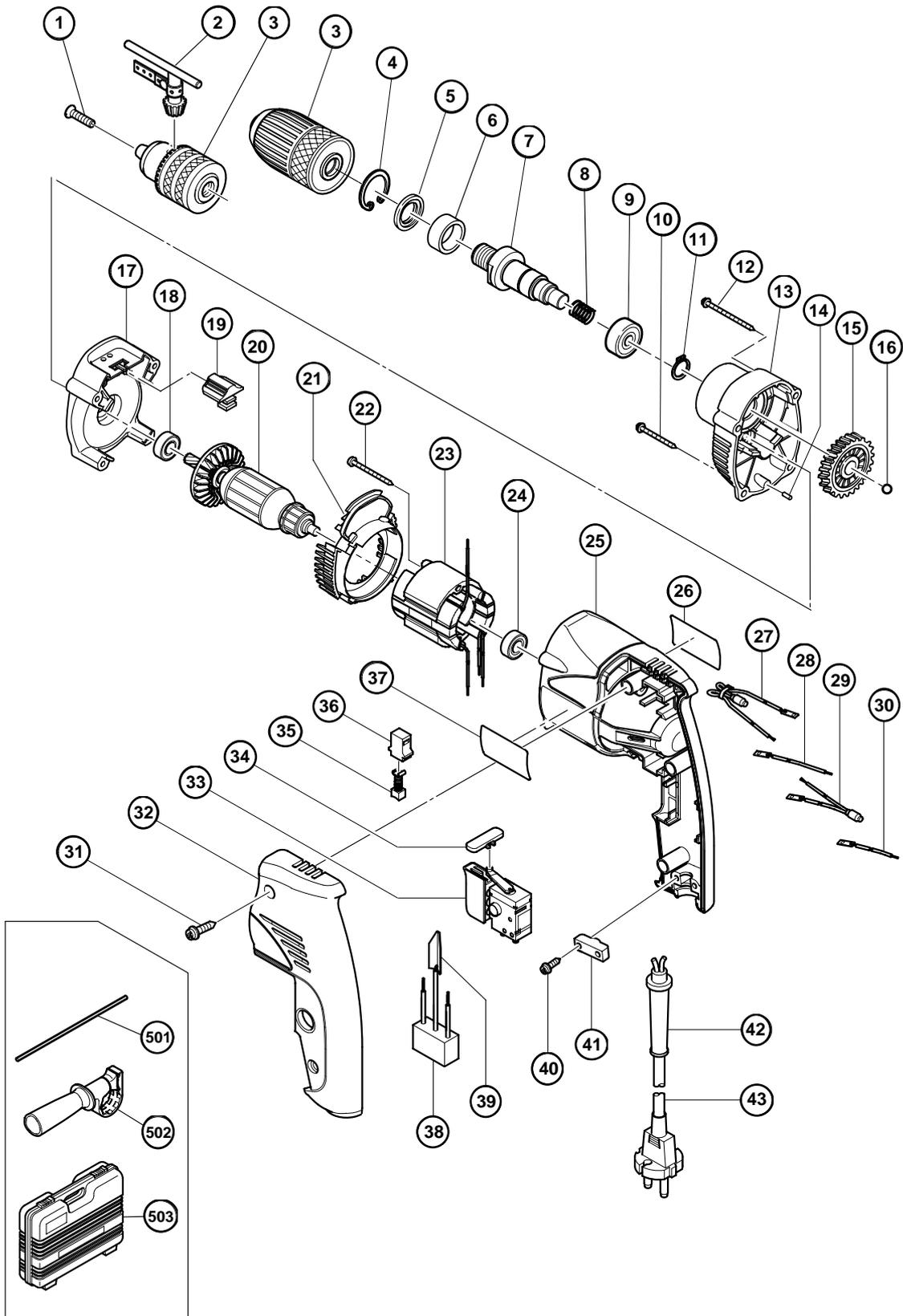
9. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
DV 16V		Work Flow						
			Switch Handle Cover Cord Cord Armor		Housing Stator			
		General Assembly		Armature Inner Cover Ball Bearing (608DD) Change Lever Ball Bearing (608VV)				
			Drill Chuck	Spindle Dust Seal Ball Bearing (6002VV) Gear Cover Gear				

ELECTRIC TOOL PARTS LIST

■ **IMPACT DRILL**
Model DV 16V

2003 • 12 • 10
(E1)



PARTS

DV 16V

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	322-357	DRILL CHUCK 13VLRH-N (W/O CHUCK WRENCH)	1	
* 3		DRILL CHUCK 13VLRB-D	1	INCLUD. 2 SUPPLIED WITH ITEM NO.601
4	948-001	RETAINING RING FOR D32 HOLE	1	
5	971-654	DUST SEAL	1	
6	322-515	DISTANCE RING	1	
7	322-513	SPINDLE	1	
8	322-514	SPRING	1	
9	600-2VV	BALL BEARING 6002VVCMP2L	1	
10	306-664	TAPPING SCREW (W/FLANGE) D4X40	2	
11	939-544	RETAINING RING FOR D15 SHAFT (10 PCS.)	1	
12	322-516	TAPPING SCREW (W/FLANGE) D4X55	2	
13	322-512	GEAR COVER	1	
14	322-511	NEEDLE (B)	1	
15	317-482	GEAR	1	
16	959-150	STEEL BALL D6.35 (10 PCS.)	1	
17	322-509	INNER COVER	1	
18	608-DDM	BALL BEARING 608DDC2PS2L	1	
19	322-510	CHANGE LEVER	1	
* 20	360-626C	ARMATURE 110V	1	
* 20	360-626U	ARMATURE ASS'Y 120V	1	INCLUD. 18, 24
* 20	360-626E	ARMATURE 220V-240V	1	
21	322-508	FAN GUIDE	1	
22	950-515	TAPPING SCREW D4X50	2	
* 23	340-573C	STATOR 110V	1	
* 23	340-573D	STATOR 120V	1	
* 23	340-573E	STATOR 220V-230V	1	
* 23	340-573F	STATOR 240V	1	
24	608-VVM	BALL BEARING 608VVC2PS2L	1	
25	321-622	HOUSING	1	
26		NAME PLATE	1	
* 27	322-517	CHOKE COIL (BROWN) 220V-240V	1	EXCEPT FOR USA, CAN
* 27	322-518	CHOKE COIL (BROWN) 110V	1	FOR GBR (110V)
* 28	321-630	INTERNAL WIRE (BROWN) 100L	1	FOR USA, CAN
* 29	321-634	CHOKE COIL (BLUE) 110V-240V	1	EXCEPT FOR USA, CAN
* 29	322-519	CHOKE COIL (BLUE) 110V	1	FOR GBR (110V)
* 30	321-631	INTERNAL WIRE (BLUE) 55L	1	FOR USA, CAN
31	301-653	TAPPING SCREW (W/FLANGE) D4X20 (BLACK)	3	
32	321-629	HANDLE COVER	1	
33	321-632	SWITCH (1P PILLAR TYPE)	1	
34	321-628	PUSHING BUTTON	1	
35	999-041	CARBON BRUSH (1 PAIR)	2	
36	955-203	BRUSH HOLDER	2	
37		HITACHI LABEL	1	
* 38	994-273	NOISE SUPPRESSOR	1	EXCEPT FOR USA, CAN
* 39	992-635	EARTH TERMINAL	1	FOR NOISE SUPPRESSOR
40	984-750	TAPPING SCREW (W/FLANGE) D4X16	2	
41	937-631	CORD CLIP	1	
42	953-327	CORD ARMOR D8.8	1	
* 43	500-247Z	CORD	1	(CORD ARMOR D8.8)

