

MODEL

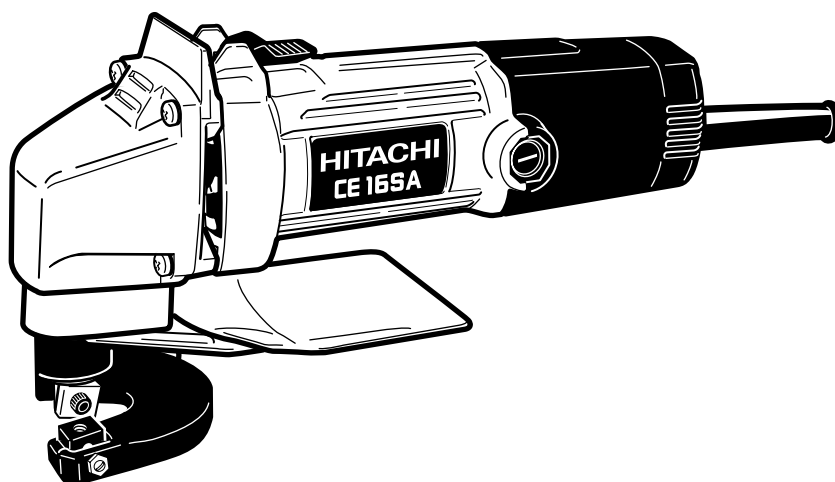
CE 16SA

Hitachi Power Tools

C

**HAND SHEAR
CE 16SA**

**TECHNICAL DATA
AND
SERVICE MANUAL**



LIST No. 0795

Dec. 2003

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	JS1600
B	BOSCH	GSC16



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1. PRODUCT NAME

Hitachi Hand Shear, Model CE 16SA

2. MARKETING OBJECTIVE

The Model CE 16 hand shear has been on the market for 16 years. To meet a demand for the remodeled one, we now offer renewed design with a slim body, for increased competitiveness and expanded sale.

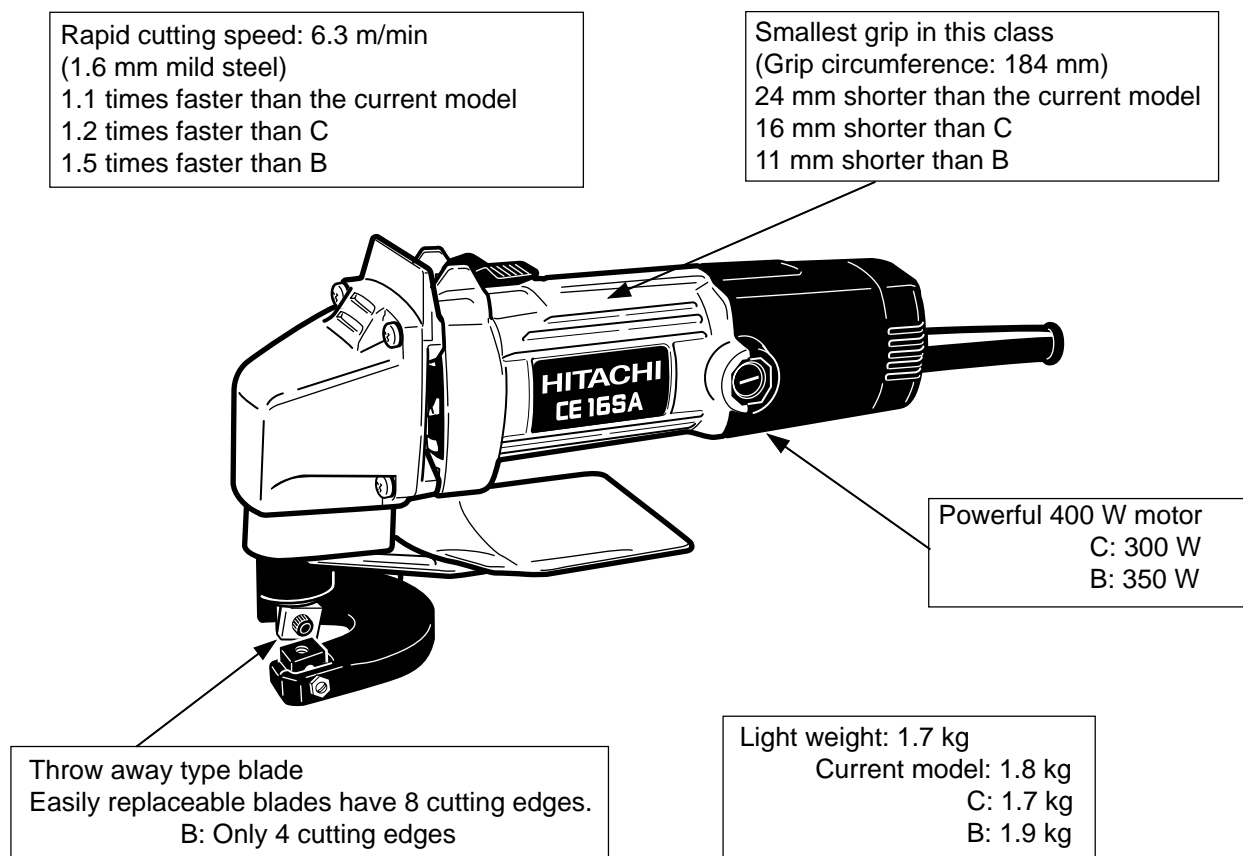
The Model CE 16SA has been developed to upgrade and replace the current Model CE 16. The key features of the Model CE 16SA are as follows:

- (1) Smallest grip in this class: Good operativity
(Grip circumference: 184 mm)
- (2) Rapid cutting speed: 6.3 m/min
- (3) Lightweight: 1.7 kg
- (4) Powerful 400 W motor

3. APPLICATIONS

- Shearing steel plate, stainless steel plate, aluminum plate, copper plate and other metal plates, also leather and fiberboard.

4. SELLING POINTS



4-1. Selling Point Descriptions

(1) Rapid cutting speed (6.3 m/min):

As shown in the table below (based on comparative cutting of 1.6 mm [1/16"] mild steel plate), the cutting speed of the Model CE 16SA is the fastest in this class of hand shears. This is because of the high stroke speed of the piston during actual cutting operation; the more powerful motor minimizes stroke speed loss when the load is increased. The much higher cutting speed of the Model CE 16SA in comparison with B and C.

For further details concerning the relationship between the cutting speed and the number and the length of the piston strokes, refer to the explanation of cutting speed below.

(NOTE) Actual cutting speeds may vary depending on the hardness of the workpiece material, the skill of the operator, and other variables.

Table 1 Comparison of cutting speed for 1.6 mm mild steel

Maker	Model	2 4 6 m/min	Stroke (min ⁻¹)*	Length of stroke (mm)
HITACHI	CE 16SA	6.3	3,700	2
	CE 16	5.8	3,400	2
B		4.1	—	—
C		5.0	2,900	2

* Stroke (min⁻¹) indicates the number of strokes during actual cutting operation.

Explanation of cutting speed

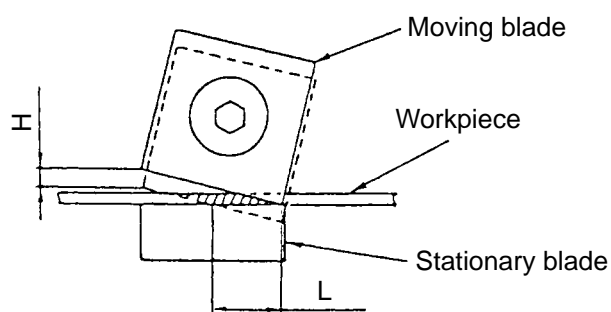


Fig. 1

S: Cutting speed (m/min)

N: Number of actual strokes (/min)

H: Length of stroke (m)

L: Cutting length per stroke (m)

C: Constant

$$S = N \times L$$

$$= C \times N \times H$$

From the formulae above, it can be clearly seen that increases in the values of "N" and "H" will result in faster cutting speeds. However, it should be noted that the amount to which these values can be increased is limited by the bounds of existing design technology. In addition, please note that there is very little difference in the value of the constant "C" among the various manufacturers.

(2) Smallest grip in this class:

Table 2 Comparison of grip circumference

Maker	Model	Grip circumference
HITACHI	CE 16SA	184 mm (7-1/4")
	CE 16	208 mm (8-3/16")
B		195 mm (7-11/16")
C		200 mm (7-7/8")

The housing is easy to grip and use because the grip circumference is 24 mm shorter than the conventional model, 11 mm shorter than B, and 16 mm shorter than C.

(3) Throw-away type blade (Easily replaceable blades have 8 cutting edges):

The Model CE 16SA, on the other hand, utilizes a throw-away blade system that eliminates the bothersome and time-consuming regrinding of blades. When the edge of the blade becomes worn or damaged, simply rotate the blade unit 90° to expose a sharp, new cutting edge. In addition, the reversible blade units utilized on the Model CE 16SA have a total of 8 usable cutting edges - 4 on the front, and 4 on the back. As a single cutting edge is capable of cutting approximately 400 meters of 1.6 mm [1/16"] mild steel plate, one blade unit permits cutting of up to 3,200 meters (10,480 feet). While B utilizes a throw-away type blade, it has only 4 usable cutting edges.

The blade types and specifications of various makers and models are shown in the table below.

Table 3 Comparison of type of blade

Maker	Model	Type of blade	Number of edges
HITACHI	CE 16SA	Throw away	8
	CE 16	Throw away	8
B		Throw away	4
C		Throw away	8

(4) Powerful 400 W motor and light weight:

Table 4 Comparison of power input and weight

Item	Maker Model	HITACHI		B	C
		CE 16SA	CE 16		
Power input (W)		400	400	350	300
Weight (kg)		1.7 (3.7 lbs.)	1.8 (4.0 lbs.)	1.9 (4.2 lbs.)	1.7 (3.7 lbs.)

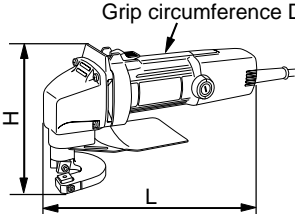
5. SPECIFICATIONS

Item	Specifications																		
Capacity																			
Mild steel (400 N/mm²)	1.6 mm (1/16")																		
Stainless steel (600 N/mm²)	1.2 mm (3/64")																		
Aluminum (200 N/mm²)	2.3 mm (3/32")																		
Power source	AC single phase 50 or 60 Hz																		
Voltage, current and power input	<table><tr><th>Voltage (V)</th><th>Current (A)</th><th>Power input (W)</th></tr><tr><td>110</td><td>3.8</td><td rowspan="6">400</td></tr><tr><td>115</td><td>3.7</td></tr><tr><td>120</td><td>3.5</td></tr><tr><td>220</td><td>1.9</td></tr><tr><td>230</td><td>1.8</td></tr><tr><td>240</td><td>1.8</td></tr></table>			Voltage (V)	Current (A)	Power input (W)	110	3.8	400	115	3.7	120	3.5	220	1.9	230	1.8	240	1.8
	Voltage (V)	Current (A)	Power input (W)																
	110	3.8	400																
	115	3.7																	
	120	3.5																	
	220	1.9																	
	230	1.8																	
	240	1.8																	
Type of motor	AC single phase commutator motor																		
Enclosure	<ul style="list-style-type: none">• Housing Glassfiber reinforced polyamide resin (Green)• Tail cover Glassfiber reinforced polyamide resin (Black)• Gear cover, inner cover Aluminum alloy die casting																		
Type of switch	Slide switch																		
Power output	230 (W)																		
No-load stroke	4700/min																		
Full-load stroke	2900/min																		
Weight	<ul style="list-style-type: none">• Net : 1.7 kg (3.7 lbs.)• Gross : 2.4 kg (5.3 lbs.)																		
Packaging	Corrugated cardboard box																		
Standard accessories	<ul style="list-style-type: none">• Thickness gauge 1• Hex. bar wrench 1																		

6. COMPARISONS WITH SIMILAR PRODUCTS

The specifications of the Model CE 16SA are compared with various other models in the table below. The primary advantages of the Model CE 16SA in comparison with the other models are:

- (1) Smallest grip and lightweight design
- (2) Rapid cutting speed
- (3) Powerful motor
- (4) Throw-away blade that requires minimal maintenance

Maker • Model				HITACHI		B	C	
Item		Unit	CE 16SA	CE 16				
Nameplate and catalog specifications	Capacity	Mild steel	mm	1.6 (1/16")	1.6 (1/16")	1.6 (1/16")	1.6 (1/16")	
		Stainless steel	mm	1.2 (3/64")	1.2 (3/64")	0.7 (1/32")	1.2 (3/64")	
		Aluminum plate	mm	2.3 (3/32")	2.3 (3/32")	2.0 (5/64")	2.0 (5/64")	
	Min. cutting radius		mm	25 (63/64")	25 (63/64")	20 (51/64")	30 (1-3/16")	
	Power input		W	400	400	350	300	
	No-load stroke		min ⁻¹	4,700	4,200	2,200	4,000	
	Weight		kg	1.7 (3.7 lbs.)	1.8 (4 lbs.)	1.9 (4.2 lbs.)	1.7 (3.7 lbs.)	
Characteristics	Power output		W	230	220	—	160	
	Full-load stroke		min ⁻¹	2900	2800	—	2700	
	Length of stroke		mm	2	2	—	2	
	Type of blade			Throw away (8 edges)	Throw away (8 edges)	Throw away (4 edges)	Throw away (8 edges)	
	Scrap guide			Provided	Provided	Provided	Provided	
	No-load noise level 1 m		dB	79	79	79	80	
	No-load vibration		dB	108	108	107	112	
<div>External dimensions</div> <div></div>			mm	D	184	208	195	200
				L	250	258	289	230
				H	146	146	140	146
			inch	D	7-1/4"	8-3/16"	7-11/16"	7-7/8"
				L	9-27/32"	10-5/32"	11-3/8"	9-1/16"
				H	5-3/4"	5-3/4"	5-33/64"	5-3/4"
Standard accessories	Thickness gauge			1	1	1	—	
	Hex. bar wrench			1	1	1	1	

7. PRECAUTIONS IN SALES PROMOTION

In the interest of promoting the safest and most efficient use of the Model CE 16SA Hand Shear 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 nameplate 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 tool cannot be completely eliminated. Accordingly, general precautions and suggestions for the use of the hand shear 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. Precautions on Nameplate

Each Model CE 16SA is provided with a nameplate which lists basic safety precautions (illustrated below) in its use. Carefully ensure that the customer fully understands and follows these precautions before using the tool.

(1) 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) For other countries

CAUTION

●Read thoroughly **HANDLING INSTRUCTIONS** before use.

7-3. Efficient Cutting Procedures

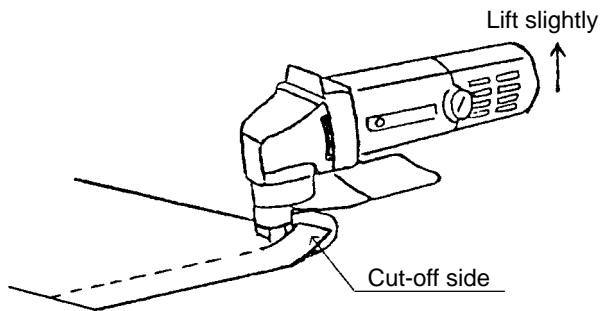


Fig. 2

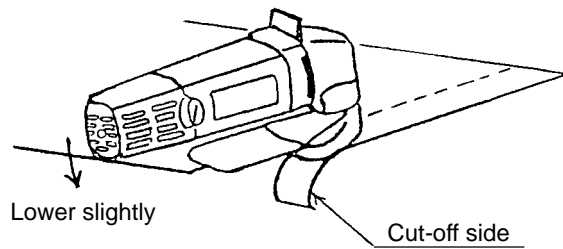


Fig. 3

Instruct the customer in the following techniques so that most efficient cutting operations can be achieved. When cutting thin workpieces (1 mm [.039"] or less) with a hand shear, the main body of the tool should be kept parallel with the surface of the workpiece. However, when cutting thicker workpieces (more than 1 mm [.039"]), the procedures described below will ensure smooth and efficient cutting operations.

- (1) As illustrated in Fig. 2, the tail portion of the main body of the tool should be lifted slightly when the cut-off side of the workpiece is on the left side of the tool.
- (2) As illustrated in Fig. 3, the tail portion of the main body of the tool should be lowered slightly when the cut-off side of the workpiece is on the right side of the tool.

7-4. Blade Service Life

Blade replacement and service life are described in the Handling Instruction as illustrated in Fig. 4 below. The service life described is approximate and is based on straight line cutting of 1.6 mm [1/16"] mild steel plate material with an even, clean surface. Less favorable cutting conditions may cause the service life of the blade to be slightly shortened.

BLADE REPLACEMENT

The hand shear uses disposable blades. Each blade has 8 cutting edges, as shown in Fig. After a cutting edge cuts 400 meters of panel, cutting performance will fall. In such a case, turn the blade toward another direction to use another cutting edge. After all 8 cutting edges are used and worn, replace the blade.

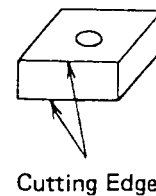


Fig. 4

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

(1) Disassembly of the Armature **[11]**:

- ① Loosen the Brush Caps **[41]**, and take out the Carbon Brushes **[42]**.
- ② Loosen the four Tapping Screws D5 x 30 **[1]**, remove the Gear Cover **[2]**, and take out the Armature **[11]** together with the Inner Cover **[8]** in a single body from the Housing Ass'y **[32]**.
- ③ As illustrated in Fig. 5, support the Inner Cover **[8]** with an appropriate tubular jig (inner diameter: 63 mm to 72 mm), and press down on the pinion portion of the armature shaft with a hand press to loosen and remove the Armature **[11]**.

(2) Disassembly of the Stator **[14]**:

- ① After the Armature **[11]** has been disassembled, loosen the Tapping Screw (W/Flange) D4 x 45 **[51]**, and remove the Tail Cover **[50]**.
- ② Remove the four internal wires from the Stator **[14]** connected with the Brush Holder **[43]**, the Pillar Terminal **[39]** and the Switch (1P Solder Type) **[44]**.
- ③ Remove the Fan Guide **[12]** from the Housing Ass'y **[32]**.
- ④ After removing the two Hex. Hd. Tapping Screws D4 x 70 **[13]**, gently tap the end surface of the Housing Ass'y **[32]** (gear cover side) with a wooden hammer to loosen and remove the Stator **[14]** from the Housing Ass'y **[32]**.

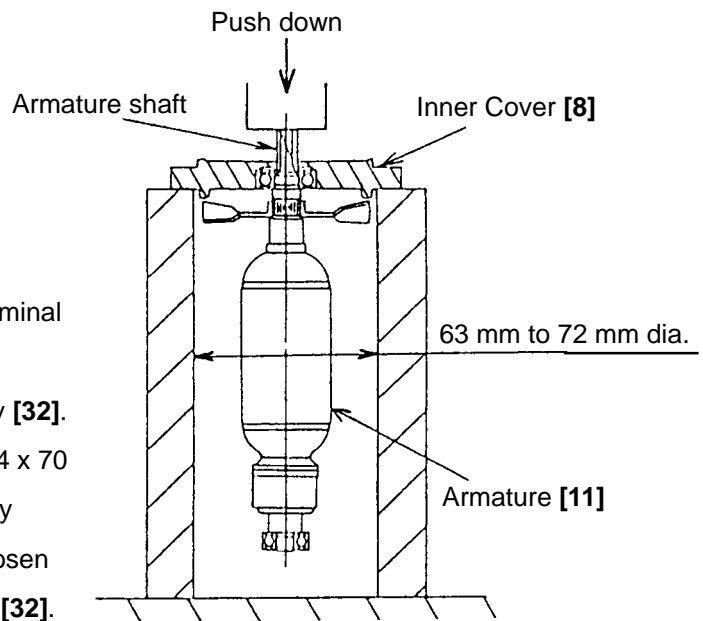


Fig. 5

(3) Disassembly of the gear cover section:

- ① Loosen the Machine Screw M5 x 12 **[20]**, and remove the Protector **[18]**.
- ② Loosen the four Tapping Screws D5 x 30 **[1]** and remove the Gear Cover **[2]**.
- ③ Remove the Spindle and Gear Set **[7]**.
- ④ Loosen the Hex. Socket Hd. Bolt M4 x 10 **[24]**, and remove the Moving Blade **[23]**.
- ⑤ Loosen the Hex. Socket Set Screw M8 x 20 **[3]**, and remove the Blade Holder **[25]**.
- ⑥ Remove the Connecting Rod Ass'y **[5]** and Piston **[22]** from the Gear Cover **[2]**.
- ⑦ Fit an appropriate slender rod against either end of the Pin D6 **[21]**, press the slender rod through with a hand press to remove the Pin D6 **[21]**, and separate the Connecting Rod Ass'y **[5]** and the Piston **[22]**.

8-2. Reassembly

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

- (1) Grease (Nippeko Grease (SEP-3A) is recommended) is used inside the Gear Cover [2]. Prior to reassembly, thoroughly remove the old grease and apply fresh grease liberally to the following parts: the pinion portion of the Armature [11], the Spindle and Gear Set [7], the Needle Bearing (M152112) [6] of the Connecting Rod Ass'y [5], the needle bearing portion of the Inner Cover [8], the Piston [22] and the inner circumference of the Blade Holder [25] where the piston slides.
- (2) When press-fitting the Needle Bearing (M152112) [6] into the Connecting Rod Ass'y [5] with a hand press, fit an appropriate jig against the engraved surface end of the needle bearing to push it properly into the Connecting Rod Ass'y [5].
- (3) When reassembling the Blade Holder [25] into the Gear Cover [2] (see Fig. 6), carefully ensure that the Hex. Socket Set Screw M8 x 20 [3] is properly aligned with the recessed hole on the blade holder. Then, tighten the Hex. Socket Set Screw M8 x 20 [3] to the rated torque.
- (4) Using the accessory Thickness Gauge [502], adjust the clearance between the Moving Blade [23] and the Stationary Blade [26] to a dimension of 0.2 mm (.008"). (For adjustment procedures, please refer to the Handling Instructions.)
- (5) Fit the Rubber Bushing [17] into the housing ball bearing chamber before installing the Armature [11] (see Fig. 7).

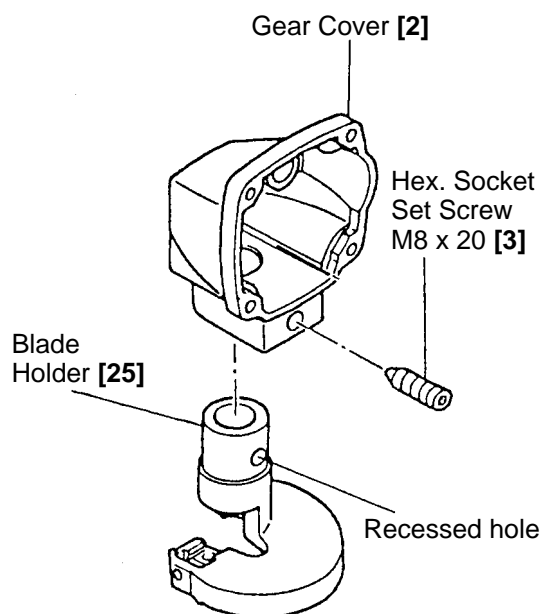


Fig. 6

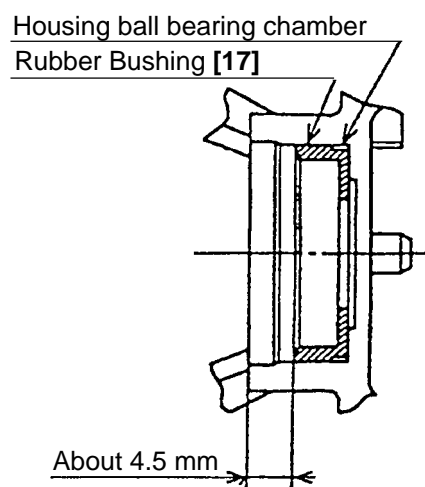


Fig. 7

- (6) When installing the Stator [14] into the Housing Ass'y [32], insert it while taking care of the placement of the internal wires of the Stator [14] as indicated in Fig. 8. Connect the four internal wires of the Stator [14] with the parts indicated in Fig. 8.

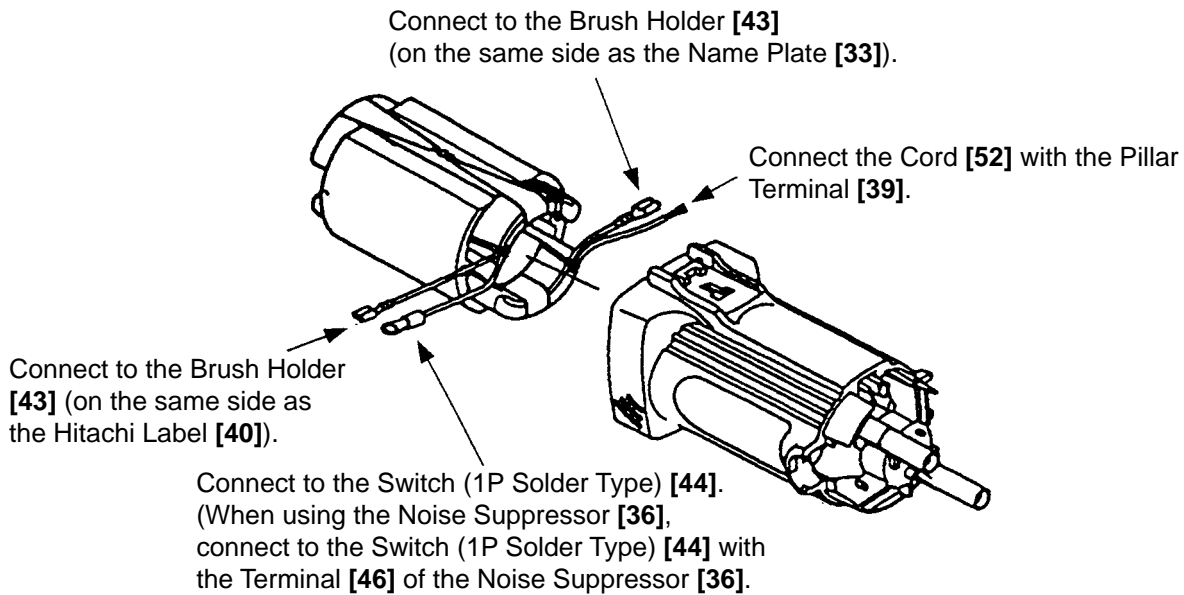


Fig. 8

- (7) When connecting the Earth Terminal [34] to the internal wire (the middle wire among three) of the Noise Suppressor [36], strip the insulation sheath on the internal wire by about 6 mm and press-connect it together with the Earth Terminal [34] with a clamping tool on the market.

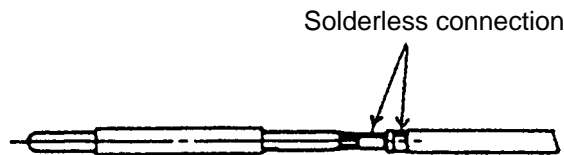


Fig. 9

8-3. Lubrication Points and Types of Lubricant

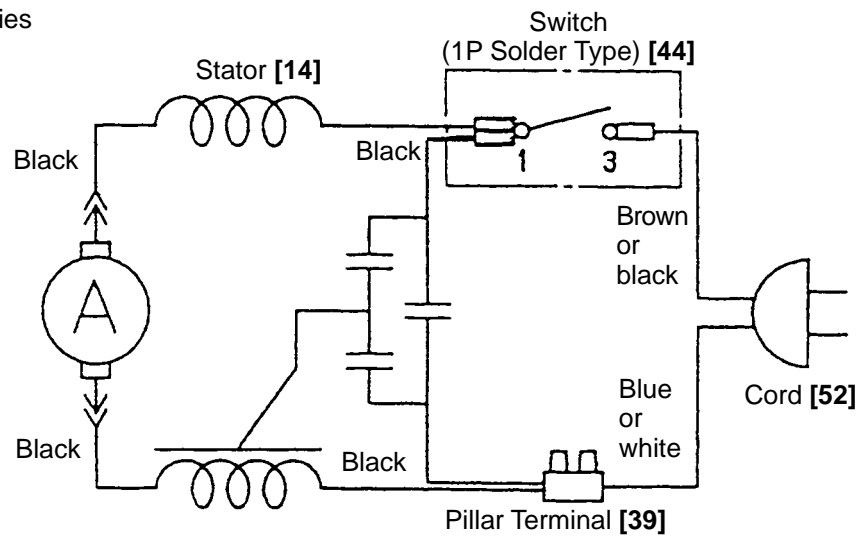
Anytime the Gear Cover [2] is disassembled, thoroughly clean out the old grease and insert 15 grams (.53 oz) of new grease (Nippeko grease (SEP-3A) is recommended) prior to reassembly.

8-4. Tightening Torques

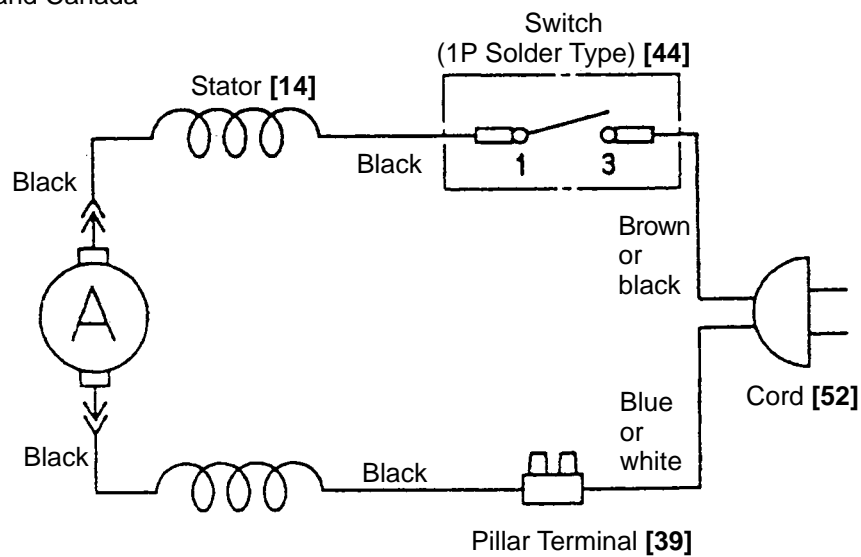
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|--|---|
| (1) Tapping Screws D5 x 30 [1] | 2.9 ± 0.5 N·m (30 ± 5 kgf·cm, 2.2 ± 0.4 ft-lbs.) |
| (2) Tapping Screws (W/Flange) D4 [48] [51] | 2.0 ± 0.5 N·m (20 ± 5 kgf·cm, 1.5 ± 0.4 ft-lbs.) |
| (3) Hex. Socket Set Screw M8 x 20 [3] | 8.8 ± 1.0 N·m (90 ± 10 kgf·cm, 6.3 ± 0.7 ft-lbs.) |
| (4) Brush Cap [41] | 1.0 ± 0.5 N·m (10 ± 5 kgf·cm, 0.7 ± 0.4 ft-lbs.) |

8-5. Wiring Diagram

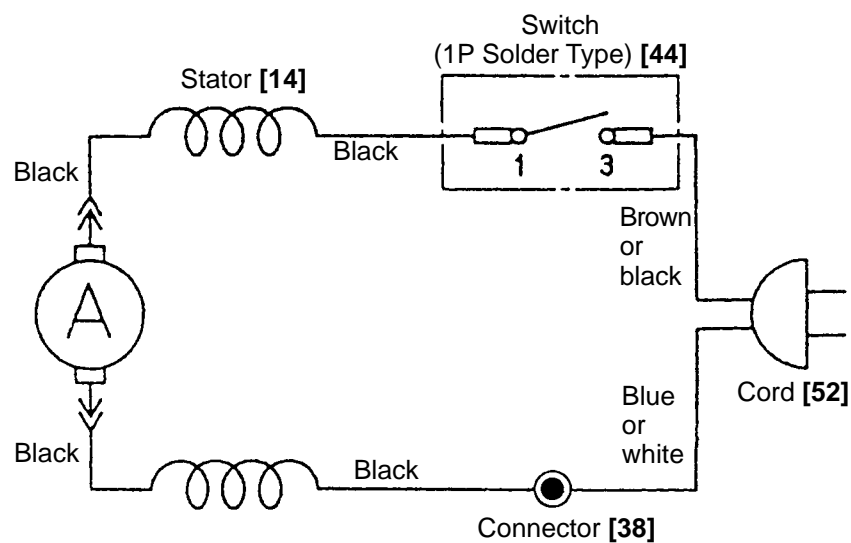
(1) For other countries



(2) For the U.S.A. and Canada



(3) For Hong Kong and Indonesia



8-6. Insulation Tests

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

Insulation resistance: 7 MΩ 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 — 120 V
(except U.K. products)

8-7. No-load Current Value

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

Voltage	110 V	115 V	120 V	220 V	230 V	240 V
Current (Max.)	1.4 A	1.4 A	1.3 A	0.7 A	0.7 A	0.7 A

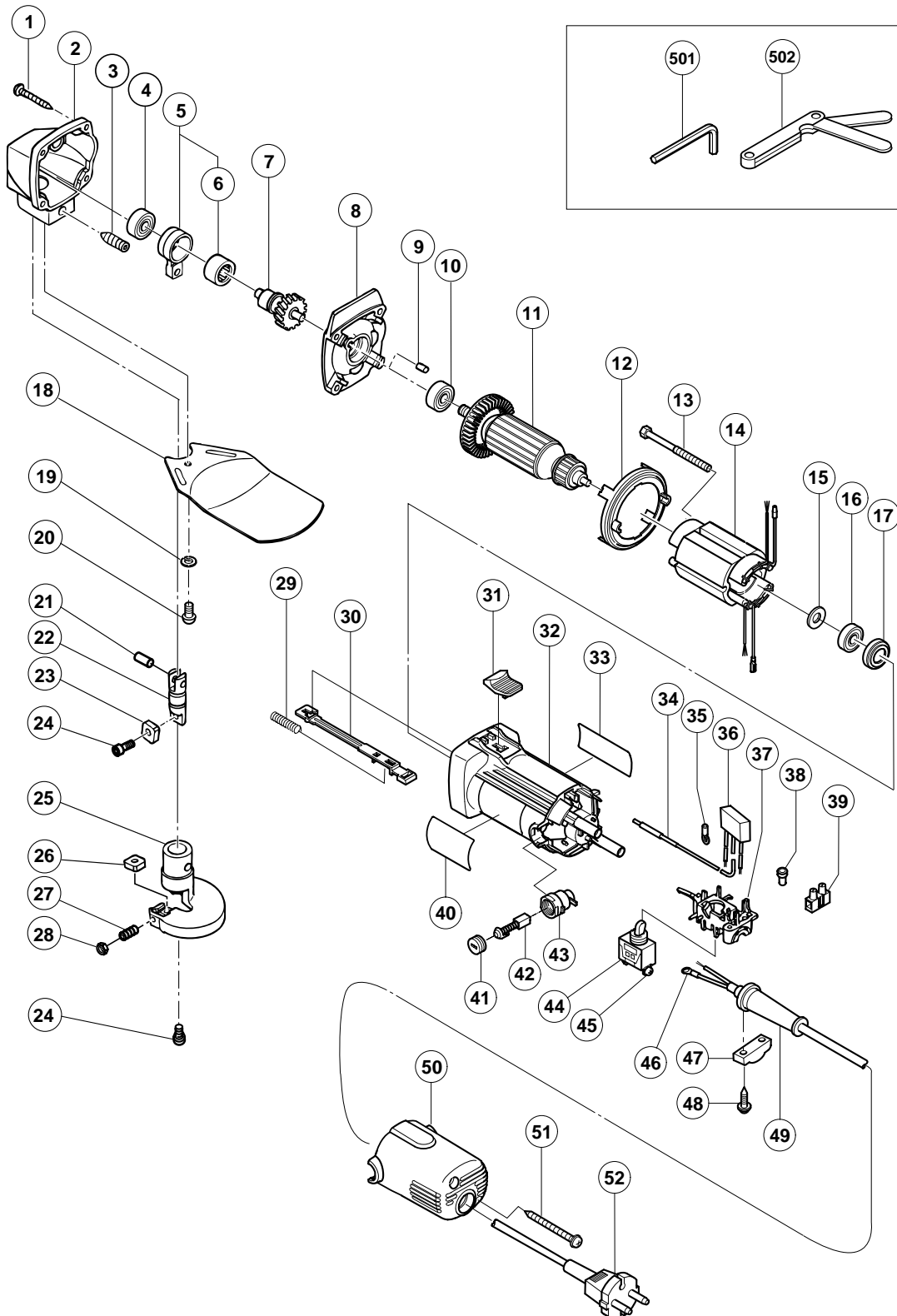
9. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
CE 16SA		Work Flow						
		Tail Cover Cord Armor		Switch Holder Snap Switch Cord				
				Slide Bar Spring Slide Knob	Housing Ass'y Stator			
		General Assembly		Armature Inner Cover Ball Bearing (608VV) Ball Bearing (626VV)				
				Connecting Rod Ass'y Ball Bearing (608VV) Needle Bearing Spindle and Gear Set	Gear Cover Piston			
				Blade Holder				

ELECTRIC TOOL PARTS LIST

HAND SHEAR
Model CE 16SA

2003 • 9 • 25
(E1)



PARTS

CE 16SA

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
1	957-580	TAPPING SCREW D5X30	4		
2	998-003	GEAR COVER	1		
3	998-008	HEX. SOCKET SET SCREW M8X20	1		
4	608-VVM	BALL BEARING 608VVC2PS2L	1		
5	998-004	CONNECTING ROD ASS'Y	1	INCLUD. 6	
6	993-163	NEEDLE BEARING (M152112)	1		
7	998-006	SPINDLE AND GEAR SET	1		
8	998-002	INNER COVER	1		
9	931-701	BEARING LOCK	1		
10	608-VVM	BALL BEARING 608VVC2PS2L	1		
* 11	360-622C	ARMATURE 110V	1		
* 11	360-622U	ARMATURE ASS'Y 120V-127V	1	INCLUD. 10, 15, 16	
* 11	360-622E	ARMATURE 220V-230V	1		
* 11	360-622F	ARMATURE 240V	1		
12	306-840	FAN GUIDE	1		
13	982-021	HEX. HD. TAPPING SCREW D4X70	2		
* 14	340-567C	STATOR 110V	1		
* 14	340-567D	STATOR 120V-127V	1		
* 14	340-567E	STATOR 220V-230V	1		
* 14	340-567F	STATOR 240V	1		
15	942-204	WASHER	1		
16	626-VVM	BALL BEARING 626VVC2PS2L	1		
17	309-929	RUBBER BUSHING	1		
18	998-010	PROTECTOR	1		
19	949-454	SPRING WASHER M5 (10 PCS.)	1		
20	949-237	MACHINE SCREW M5X12 (10 PCS.)	1		
21	993-546	PIN D6	1		
22	998-005	PISTON	1		
23	998-000	MOVING BLADE	1		
24	949-812	HEX. SOCKET HD. BOLT M4X10 (10 PCS.)	2		
25	998-007	BLADE HOLDER	1		
26	998-001	STATIONARY BLADE	1		
27	998-009	SLOTTED HD. SET SCREW M4X14	1		
28	949-565	LOCK NUT M4 (10 PCS.)	1		
29	314-429	SPRING	1		
30	314-427	SLIDE BAR	1		
31	314-428	SLIDE KNOB	1		
32	314-438	HOUSING ASS'Y	1	INCLUD. 17	
33		NAME PLATE	1		
* 34	314-854	EARTH TERMINAL	1	FOR NOISE SUPPRESSOR	
35	311-741	TERMINAL	1		
* 36	994-273	NOISE SUPPRESSOR	1	FOR TPE, HKG, NGU, NZL, AUS, GBR, SAF, EUROPE, FIN, NOR, SWE, DEN, SUI, CHN, KOR	
37	314-432	SWITCH HOLDER	1		
* 38	959-140	CONNECTOR 50091 (10 PCS.)	1	EXCEPT FOR TPE, HKG, NGU, NZL, AUS, GBR, SFA, EUROPE, FIN, NOR, SWE, DEN, SUI, CHN, KOR	
* 39	938-307	PILLAR TERMINAL	1	FOR TPE, HKG, NGU, NZL, AUS, GBR, SFA, EUROPE, FIN, NOR, SWE, DEN, SUI, CHN, KOR	
40		HITACHI LABEL	1		
41	936-551	BRUSH CAP	2		
42	999-021	CARBON BRUSH (1 PAIR)	2		

PARTS

CE 16SA[illegible]

STANDARD ACCESSORIES

CE 16SA[illegible]

OPTIONAL ACCESSORIES

[illegible]

