

MODEL

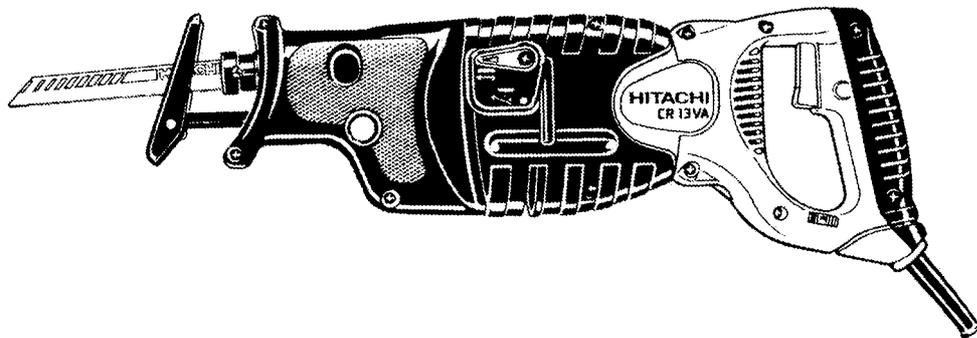
CR 13VA

HITACHI
POWER TOOLS

RECIPROCATING SAW
CR 13VA

TECHNICAL DATA
AND
SERVICE MANUAL

C



LIST No. E930

May 2000

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

Notice for use

Specifications and parts are subject to change for improvement.
Refer to Hitachi Power Tool Technical News for further information.

CONTENTS

	Page
1. PRODUCT NAME	1
2. MARKETING OBJECTIVE	1
3. APPLICATIONS	1
4. SELLING POINTS	1
4-1. Selling Point Descriptions	2
4-2. Descriptions of patent pending	5
5. SPECIFICATIONS	6
5-1. Specifications	6
5-2. Optional Accessories	7
6. COMPARISONS WITH SIMILAR PRODUCTS	9
6-1. For USA Market	9
6-2. For European Market	9
7. COMPARISONS IN CUTTING TIME	10
7-1. Cutting Steel Pipes	10
7-2. Cutting Wood	11
7-3. Cutting Wood with Saw Blade Installed Upside Down	12
7-4. Cutting Operation for Long Blade Life	13
8. PRECAUTIONS IN SALES PROMOTION	14
8-1. Handling Instructions	14
8-2. Caution on Name Plate	14
9. REPAIR GUIDE	15
9-1. PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY	15
9-2. Lubrication	24
9-3. Tightening Torques	24
9-4. Wiring Diagram	24
10. CONFIRMATION AFTER REASSEMBLY	26
10-1. Lead Wire Precautions	26
10-2. Insulation Tests	26
10-3. No-Load Current Value	26
11. STANDARD REPAIR TIME (UNIT) SCHEDULES	27
Assembly Diagram for CR 13VA	28
Assembly Diagram for CR 13VA [For the U.S.A. and Canada only]	32

1. PRODUCT NAME

Hitachi 130 mm (5") Reciprocating Saw, Model CR 13VA

2. MARKETING OBJECTIVE

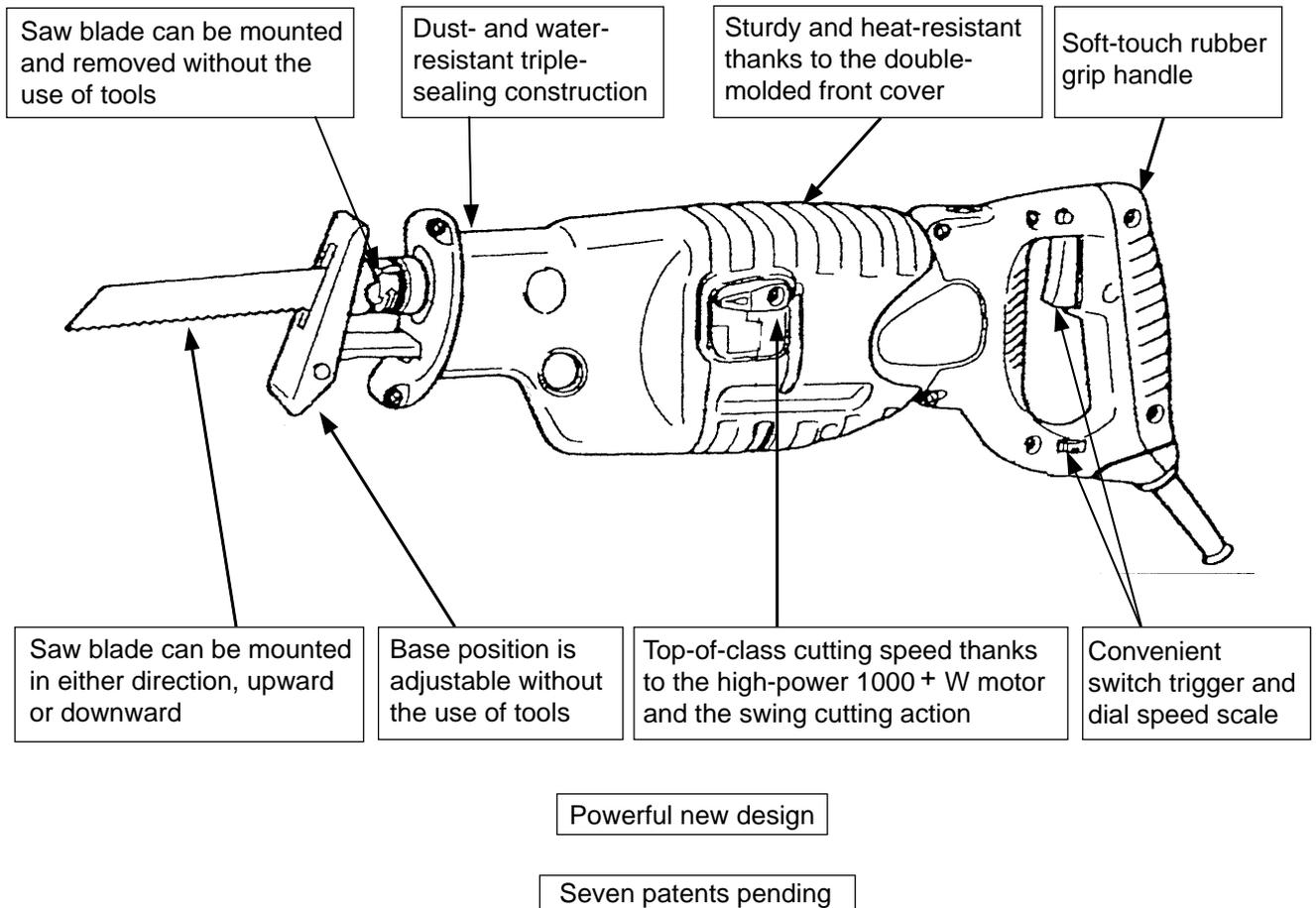
There is increasing demand for a high-speed and powerful saber saw in overseas markets. The new Model CR 13VA, which features a powerful motor and a swing cutting action, has been developed to meet that market demand. The swing cutting action is a new technology, in which the saw blade is swung like a pendulum, regardless of whether the saw blade is mounted upward or downward. The Model CR 13VA is at the top of its class in flash-cutting speed for two-by-four construction (on the floor).

The Model CR 13VA employs various convenient functions, including a detachable mechanism that enables one-hand mounting and removal of saw blades without the use of a wrench or other tools.

3. APPLICATIONS

- Cutting metal, wood and plastics etc.

4. SELLING POINTS



4-1. Selling Point Descriptions

(1) Fast cutting speed

The Model CR 13VA can cut various construction materials fast and efficiently thanks to the high-power motor whose maximum output is over 1000 W (Model CR 10V: 680 V).

(2) Saw blade can be mounted and removed without the use of tools (patent pending)

Generally, conventional saber saws required a blade holder and a bolt to secure the saw blade. Such inconvenience was a cause of inefficient operation because the operator kept using a dull blade without replacing it with a new one, even though a saber saw blade is apt to wear out due to its applications. The Model CR 13VA eliminates such inconvenience by adopting the Hitachi-original detachable mechanism that enables one-hand mounting and removal of saw blades without the use of a wrench or other tools.

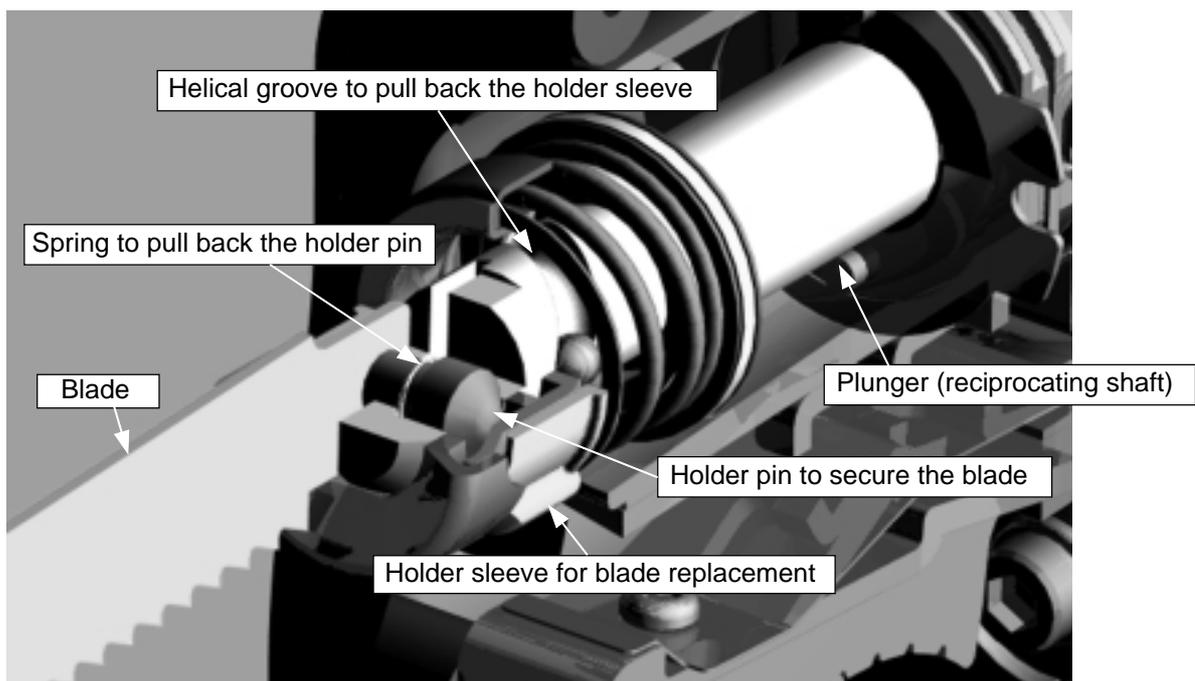
< Features of the Hitachi-original detachable mechanism >

- ① The saw blade can be mounted and removed just by turning the holder sleeve.
- ② The sleeve holder can be automatically secured in a released state by turning it all the way. In the released state, the built-in spring force pulls the holder pin back to the correct position automatically. Thus, saw blades can be smoothly replaced with one hand.

Competitors' products require two-hand operation.

Refer to the Handling Instructions and the leaflets for detailed information about saw blade replacement.

< Construction of detachable mechanism >



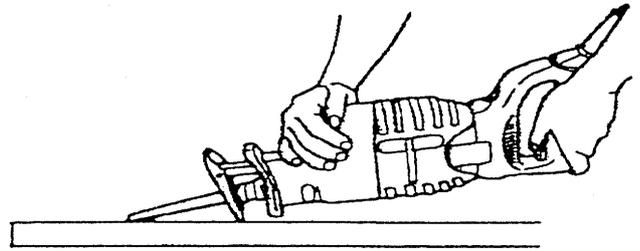
(3) Saw blade can be mounted in either direction, upward or downward

The Model CR 13VA is convenient for cutting materials on the floor or near window frames, and also for plunge cutting on plywood panels because the saw blade can be installed upside down.

< Cutting on the floor in two-by-four construction >



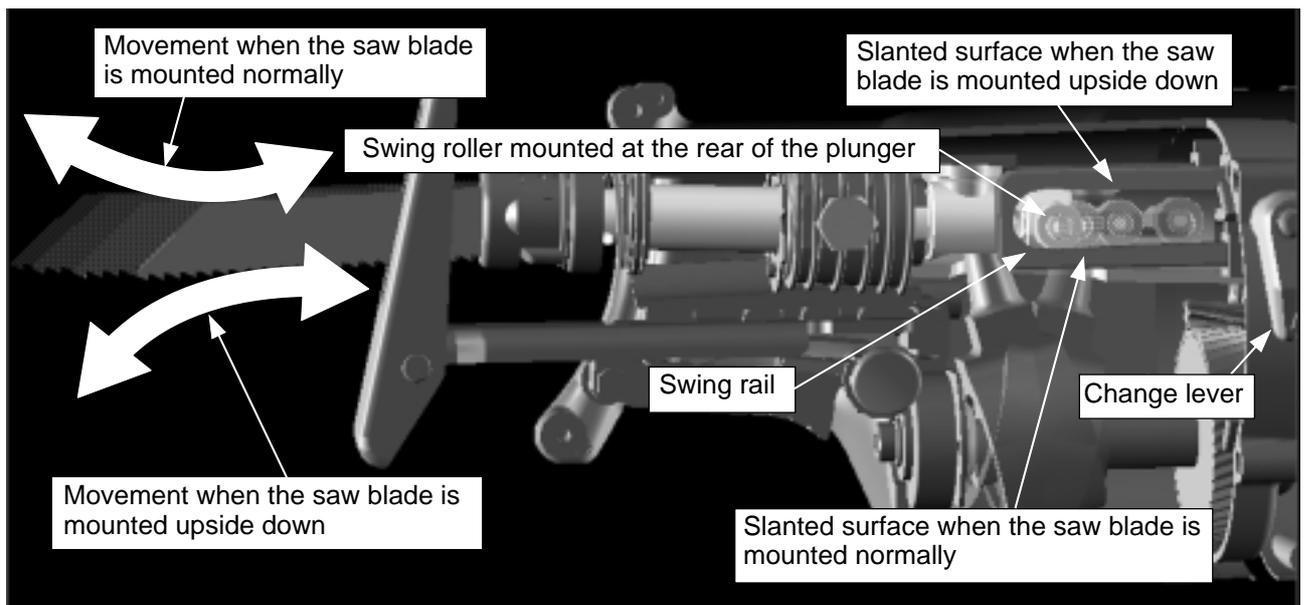
< Plunge cutting on plywood panels >



(4) New swing cutting action (patent pending)

Two cutting systems, smooth "straight cutting" and efficient "swing cutting", can be selected with the change lever. The saw blade is made to forcibly bite into the material when the swing roller at the rear of the plunger (reciprocating shaft) moves up and down along the slanted surface of the swing rail in the gear cover. Soft materials such as wood, etc. can be efficiently cut because the reaction during swing cutting is lower than that of orbital cutting. The saw blade can be mounted in either facing upward or downward.

< New swing cutting mechanism >



(5) Dust- and water-resistant triple-sealing construction <patent pending>

The Model CR 13VA has a triple-sealing construction to protect from the large amount of dust generated when cutting construction materials, autoclaved lightweight concrete, etc. and also from waste water when cutting pipes.

① Dust-resistant felt ring (with backup ring)

It prevents dust from entering by way of the plunger (reciprocating shaft).

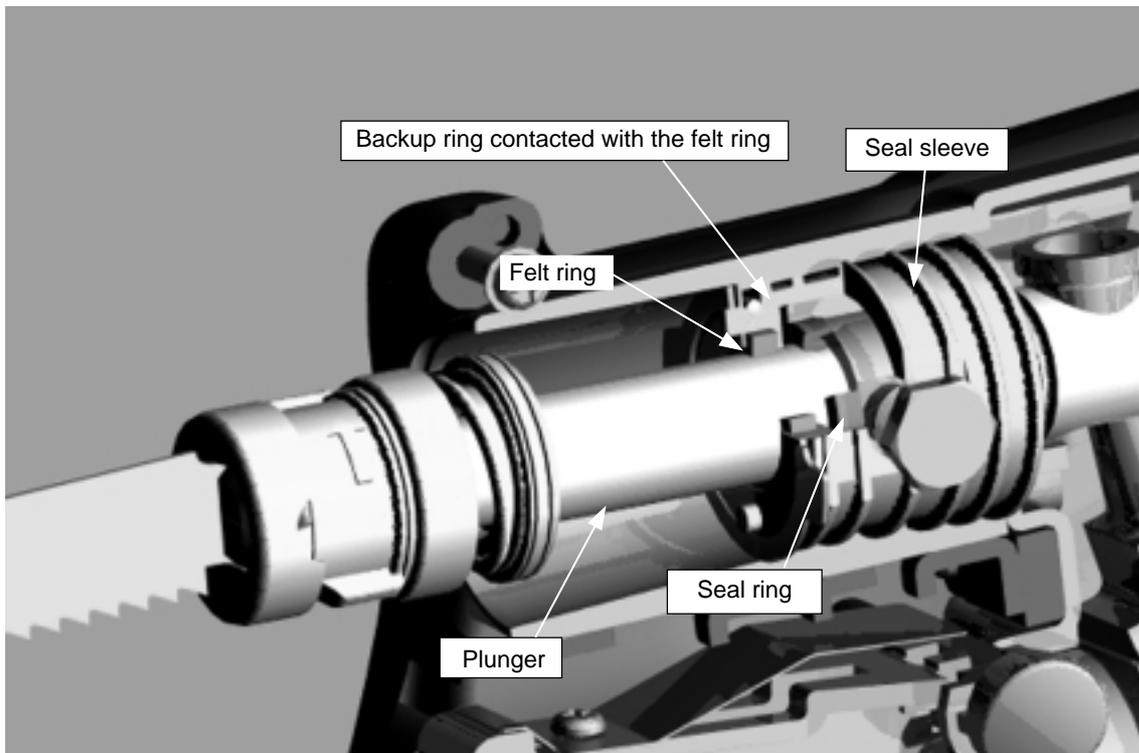
② Dust- and water-resistant seal ring (made of heat-resistant rubber)

It prevents dust and waste water from entering by way of the plunger (reciprocating shaft).

③ Dust- and water-resistant seal sleeve (made of heat-resistant rubber)

It prevents dust and waste water from entering through the clearance of the gear case.

< Triple-sealing construction >



(6) Sturdy and heat-resistant thanks to the double-molded front cover (rubber and plastic) <patent pending>

Front covers made of rubber have been generally used for saber saws. However, such front covers are not so durable and there is increasing demand for a sturdier saber saw. To cope with this demand, the Model CR 13VA is equipped with a durable double-molded front cover that is composed of a glass-fiber reinforced polycarbonate body and a nonskid rubber grip. In addition, heat resistance is improved by making a clearance between the front cover and the gear case to flow cooling air for the motor.

4-2. Descriptions of patent pending

No.	Patent	Descriptions	Japan	Overseas
1	Blade holder of saber saw	A detachable mechanism that enables one-hand mounting and removal of saw blades without the use of a wrench or other tools (competitors' products require two-hand operation)	○	○
2	Cutting mechanism of saber saw	A swing cutting mechanism in which the saw blade can be mounted in whichever direction, upward or downward (In competitors' products and our current products, orbital cutting is not available when the saw blade is mounted in reverse.)	○	○
3	Front cover of saber saw	A durable and heat-resistant front cover of double-molded construction (rubber and plastic) (In competitors' products and our current products, a front cover made of rubber is used and is not as durable.)	○	○
4	Plunger holder of saber saw	A dust- and water-resistant triple-sealing construction. Sealing quality is not reduced even if the plunger swings. (In competitors' products and our current products, a double-sealing construction is generally used.)	○	○
5	Base of saber saw	A base with an added shock-absorbing spring	○	—
6	Portable electric saw	The entire design of the Model CR 13VA (design right) (The design is the first of its type including the new front cover design.)	○	—
7	Saw blade for electric saw	A curved saber saw blade that can cut stainless materials It is under development with a saw blade manufacturer in Japan.	○	—

5-2. Optional Accessories

The cutting speed of the Model CR 13VA is substantially higher than that of the current model, however, the conventional HCS blades may be broken in heavy applications such as house demolition, etc. To cope with this problem, the BI-METAL blades shown in Table 2 are provided. The BI-METAL blades are tough and rarely break since they are made by electron-beam welding together of two different types of steels. A very hard steel called "DM05" (JIS: SKH51 or equivalent molybdenum containing high speed tool steel) or "Matrix II" (JIS: SKH59 or equivalent cobalt containing high speed tool steel) is used at the cutting edges, and a flexible steel for spring material is used for the blade main body. So these BI-METAL blades are remarkably stronger than the HCS blades.

(1) HCS blades

The blade numbers of HCS blades in Table 1 are engraved in the vicinity of the mounting position of each blade. Select appropriate blades by referring to Tables 1 and 3 below.

Table 1: HCS blades

Blade No.	Uses	Thickness (mm)
No. 1	For cutting steel pipes less than 105 mm in outer diameter	2.5 – 6
No. 2	For cutting steel pipes less than 30 mm in outer diameter	2.5 – 6
No. 3	For cutting steel pipes less than 30 mm in outer diameter	Below 3.5
No. 4	For cutting and roughing lumber	50 – 70
No. 5	For cutting and roughing lumber	Below 30
No. 8	For cutting vinyl chloride pipes less than 105 mm in outer diameter	2.5 – 15
	For cutting and roughing lumber	Below 105
No. 9	For cutting steel pipes less than 130 mm in outer diameter	2.5 – 6
No. 95	For cutting steel and stainless pipes less than 105 mm in outer diameter	Below 2.5
No. 96	For cutting steel and stainless pipes less than 30 mm in outer diameter	Below 2.5

(2) BI-METAL blades

The blade numbers of BI-METAL blades in Table 2 are engraved in the vicinity of the mounting position of each blade. Select appropriate blades by referring to Table 2 and 3 below.

Table 2: BI-METAL blades

Blade No.	Uses	Thickness (mm)
No. 101	For cutting steel and stainless pipes less than 60 mm in outer diameter	2.5 – 6
No. 102	For cutting steel and stainless pipes less than 130 mm in outer diameter	2.5 – 6
No. 103	For cutting steel and stainless pipes less than 60 mm in outer diameter	2.5 – 6
No. 104	For cutting steel and stainless pipes less than 130 mm in outer diameter	2.5 – 6
No. 105	For cutting steel and stainless pipes less than 60 mm in outer diameter	2.5 – 6
No. 106	For cutting steel and stainless pipes less than 130 mm in outer diameter	2.5 – 6
No. 107	For cutting steel and stainless pipes less than 60 mm in outer diameter	Below 3.5
No. 108	For cutting steel and stainless pipes less than 130 mm in outer diameter	Below 3.5
No. 121	For cutting and roughing lumber	300
No. 131	All purpose	—
No. 132	All purpose	—

(3) Selection of blades for other materials

Table 3

Material to be cut	Material quality	Thickness (mm)	Blade No.
Iron plate	Mild steel plate	2.5 – 19	No. 1, 2, 101, 102, 103, 104, 105, 106, 131, 132
		Below 3.5	No. 3, 6, 107, 108
Nonferrous metal	Aluminum Copper Brass	5 – 20	No. 1, 2, 101, 102, 103, 104, 105, 106, 131, 132
		Below 5	No. 3, 6, 107, 108
Synthetic resin	Phenol resin Melamine resin etc.	10 – 50	No. 1, 2, 4, 101, 102, 103, 104, 131, 132
		5 – 30	No. 3, 5, 8, 105, 106, 107, 108
	Vinyl chloride Acrylic resin etc.	10 – 60	No. 1, 2, 4, 101, 102, 103, 104, 131, 132
		5 – 30	No. 3, 5, 8, 105, 106, 107, 108

6. COMPARISONS WITH SIMILAR PRODUCTS

6-1. For USA Market

Maker		HITACHI		P	E	S	
Model		CR 13VA	CR 10V				
1. Voltage	V	120	115	120			
2. Rated current	A	11.0	6.5	10.0	10.0	10.0	
3. Stroke	inch	1-1/4	1	1-1/8	1-1/4	1-1/4	
4. No-load speed	/min.	0 – 2,800	700 – 2,200	0 – 2,600	0 – 3,200	0 – 2,900	
5. Max. output	W	1,070	680	920	(900)	---	
6. Dimensions	L	inch	18.1	16.4	18.0	17.6	17.5
	H		6.5	5.5	7.3	6.9	6.7
	W		4.1	3.7	4.2	3.6	3.7
7. Net weight	lbs.	8.8	7.9	9.0	8.8	8.4	
8. Vibration	dB	126.0	118.3	126.0	115.5	121.5	
9. No-load noise	dB	91.0	81.5	90.8	89.3	87.2	
10. Features	Variable speed	*T&D	D	T	T&D	T&D	
	Blade tool-less	○	×	○	○	○	
	Base tool-less	○	×	×	○	○	
	Front cover	Plastic & Rubber	Rubber	Rubber	Rubber	Rubber	
	Cutting action	○ (Swing)	○ (Orbital)	○ (Orbital)	×	×	
	Counter balance	×	×	×	○	○	

6-2. For European Market

Maker		HITACHI		R	Y	B	
Model		CR 13VA	CR 10V				
1. Voltage	V	230		230			
2. Power input	W	1,050	720	1,050	1,000	1,100	
3. Stroke	mm	32	26	28	32	32	
4. No-load speed	/min.	0 – 2,800	700 – 2,200	0 – 2,600	0 – 2,800	0 – 2,700	
5. Max. output	W	1,180	680	920	—	—	
6. Dimensions	L	mm	462	417	458	446	499
	H		165	140	185	175	175
	W		106	94	107	92	98
7. Net weight	kg	4.0	3.6	4.0	3.9	4.4	
8. Vibration	dB	126.0	118.3	126.0	115.5	124.0	
9. No-load noise	dB	91.0	81.5	90.8	89.3	93.5	
10. Features	Variable speed	*T&D	D	T	T&D	T&D	
	Blade tool-less	○	×	○	○	○	
	Base tool-less	○	×	×	○	○	
	Front cover	Plastic & Rubber	Rubber	Rubber	Rubber	Rubber	
	Cutting action	○ (Swing)	○ (Orbital)	○ (Orbital)	×	○ (Orbital)	
	Counter balance	×	×	×	○	○	

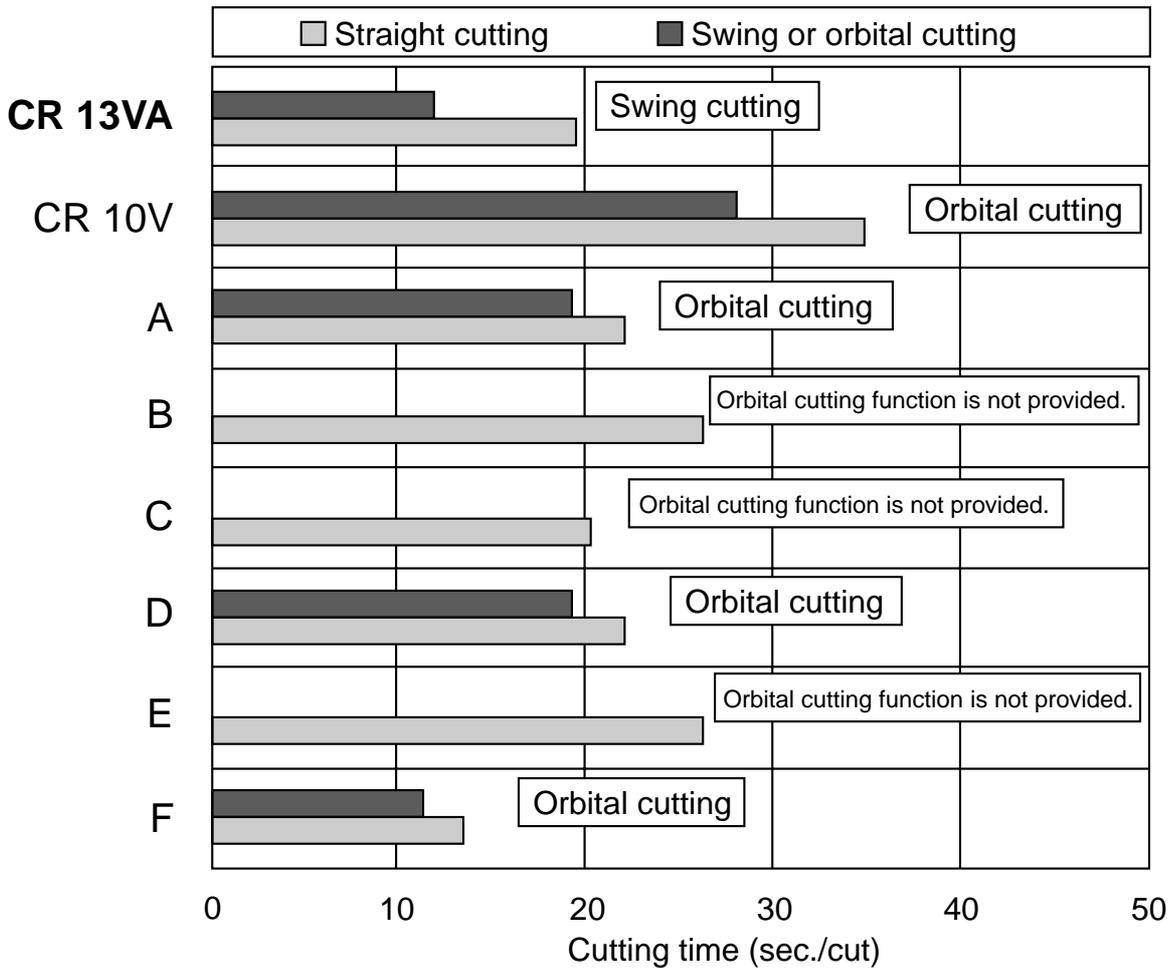
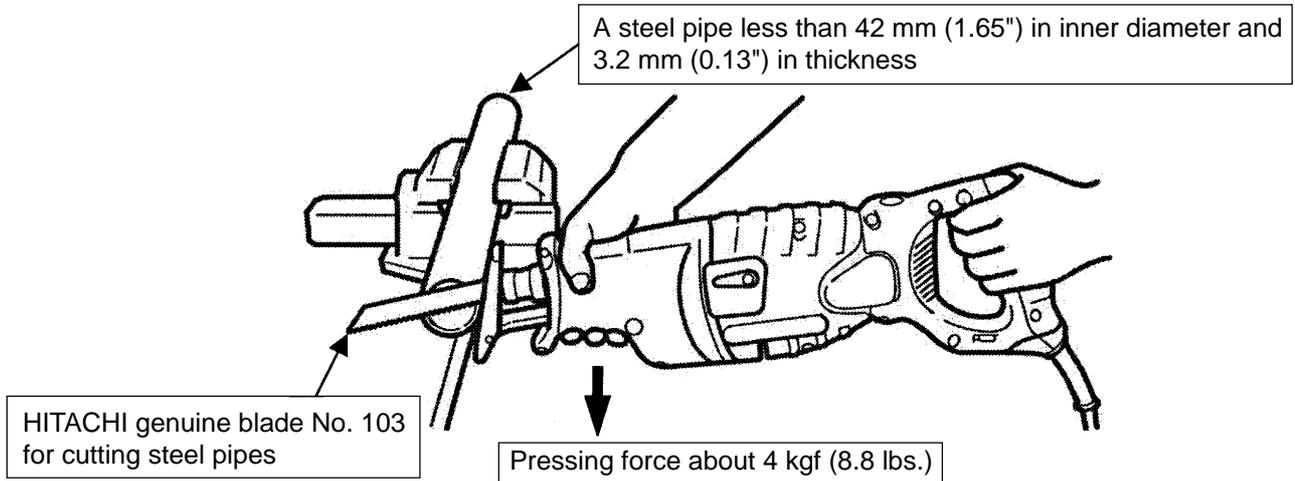
*T: Variable speed control with trigger

D: Variable speed control with dial

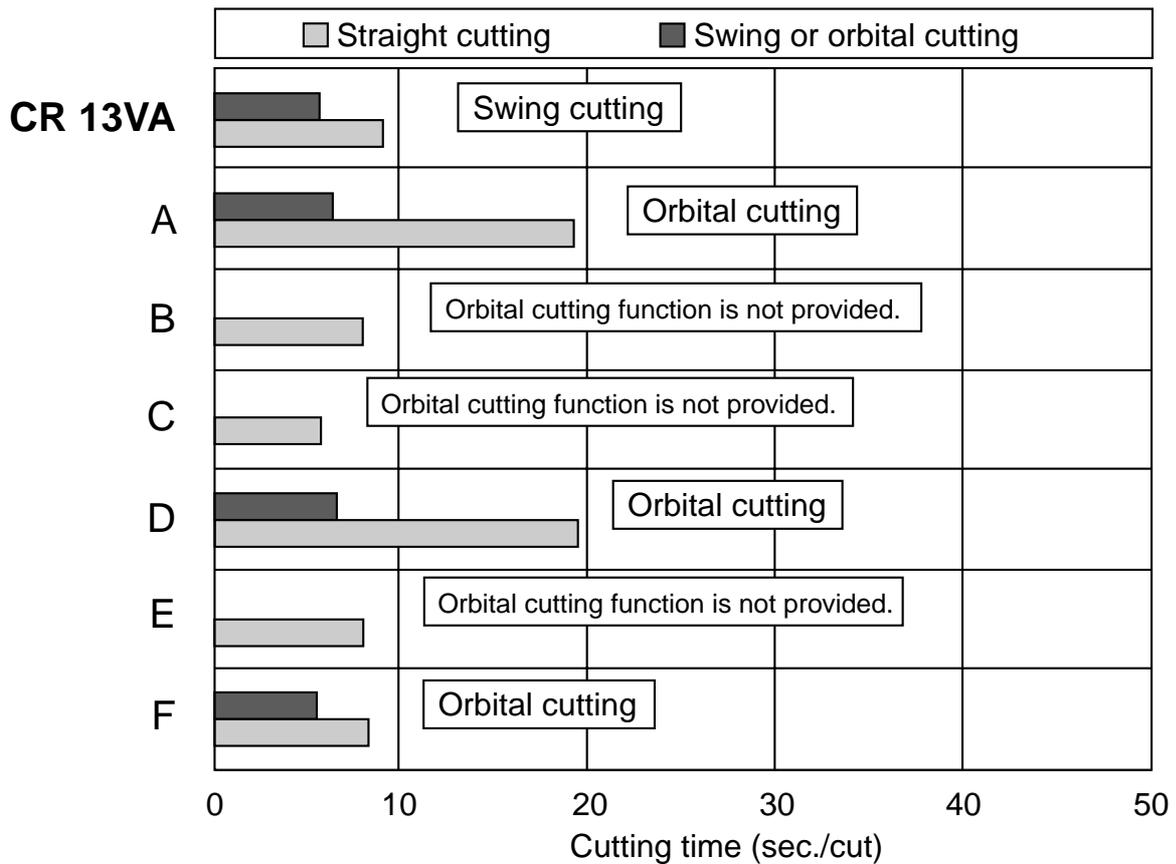
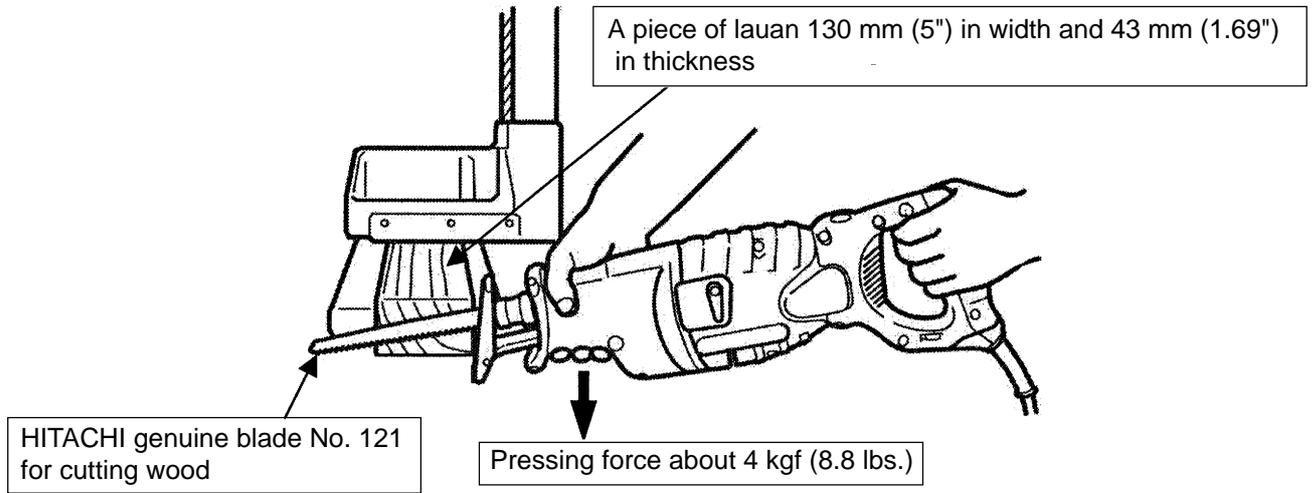
7. COMPARISONS IN CUTTING TIME

The following test data should be used for reference purposes only since the cutting time may vary depending on the operating conditions such as the cutting function, pressing force, type of blade, etc. The graph shows the time (in sec.) required to cut a piece of each material.

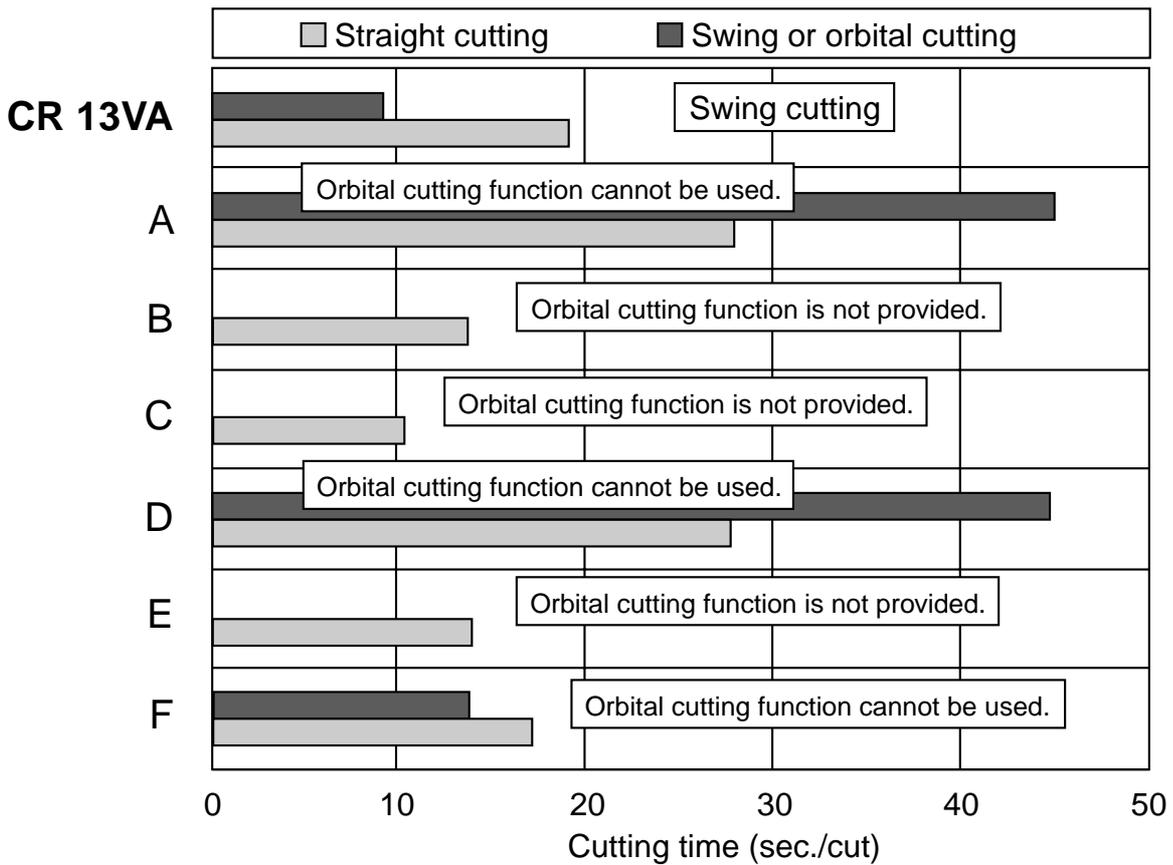
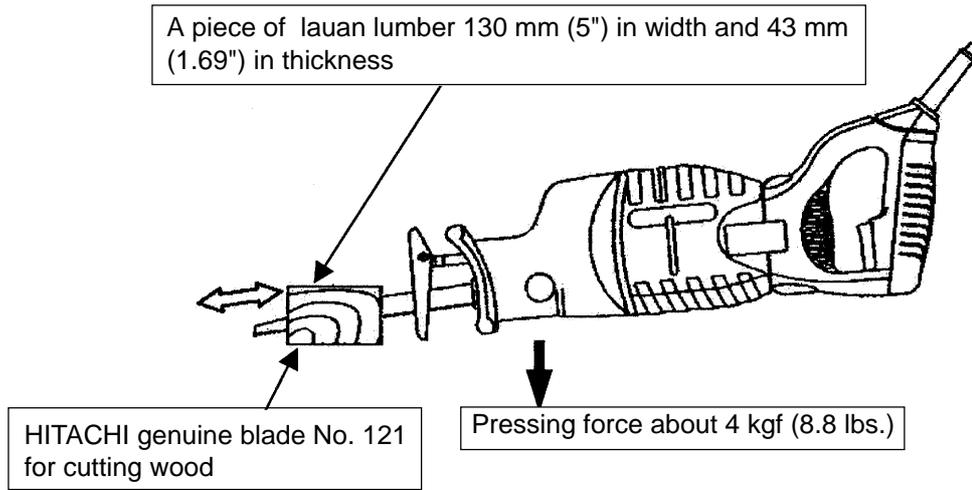
7-1. Cutting Steel Pipes



7-2. Cutting Wood



7-3. Cutting Wood with Saw Blade Installed Upside Down

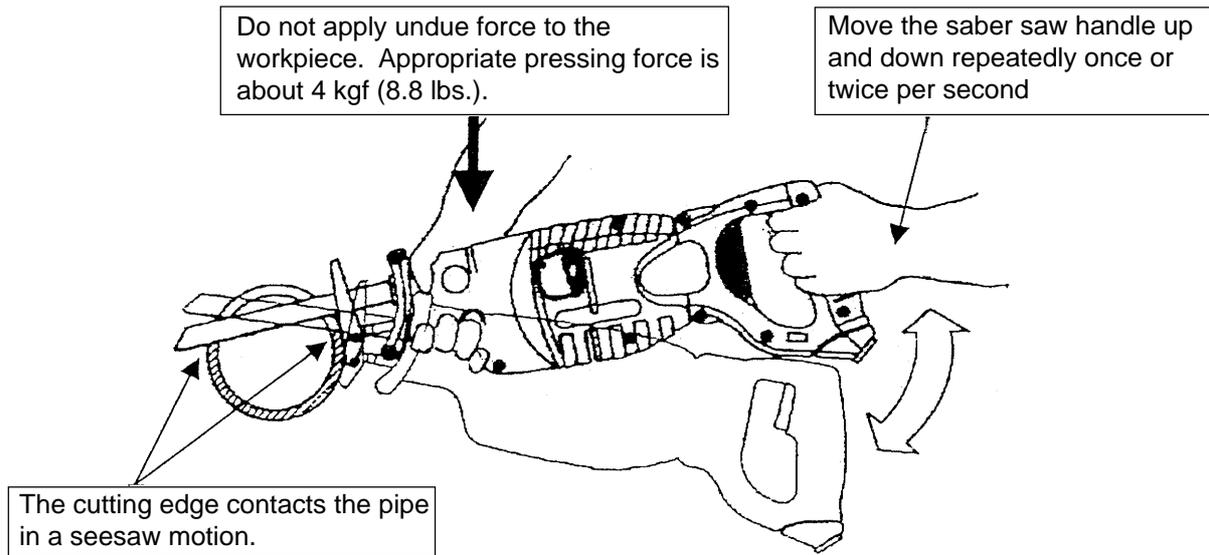


7-4. Cutting Operation for Long Blade Life

The service life of a saw blade may vary depending on the operating conditions such as the type of cutting action, pressing force, etc. Observing the following instructions can lengthen the service life of a saw blade, for reference.

① Move the saber saw handle up and down repeatedly during the cutting operation

- The service life of a saw blade can be lengthened by moving the saber saw handle up and down repeatedly once or twice per second during the cutting operation as shown below.



< Explanation >

Heat generated in the cutting operation can significantly affect the service life of the saw blade. Continued cutting operation with the saw blade heated to red hot can decrease the hardness of the saw blade because the cutting edge is annealed. The saw blade is then worn out in a short time and nothing can be cut. The merits of moving the saber saw up and down are described below.

- ① The seesaw motion of the saw blade can minimize heating.
- ② The effective cutting length of the blade is longer than that of an ordinary cutting operation. Thus, the service life of the saw blade can be lengthened and the cutting speed becomes faster. Cutting wood in the same manner can also make the cutting speed faster.

② Do not apply undue force to the workpiece

Application of undue force to the workpiece during the cutting operation can heat up the saw blade and the number of strokes can decrease, causing reduction of speed. Appropriate pressing force is about 4 kgf (8.8 lbs.).

8. PRECAUTIONS IN SALES PROMOTION

In the interest of promoting the safest and most efficient use of the Model CR 13VA Reciprocating Saw 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 Name Plate attached to each tool.

8-1. 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 Reciprocating Saw is listed in the Handling Instructions to enhance the safe and 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 customers during sales promotion.

8-2. Caution on Name Plate

Each tool is provided with a Name Plate which contains the following basic safety precautions in the use of the tool.

(1) For Australia, New Zealand and China

CAUTION

Read thoroughly HANDLING INSTRUCTIONS before use.

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

– WARNING –

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

9. REPAIR GUIDE

9-1. PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY

Please follow the precautions below for disassembly and reassembly procedures. The circled numbers in the following figures and the **[Bold]** numbers in the descriptions below correspond to the item numbers in the Parts List. Prior to attempting disassembly or replacement of the saw blade, ensure that the power cord plug is disconnected from the power source.

1. Disassembly

(1) Disassembly of Front Covers (A) and (B) **[46]** **[26]** section (Fig. 1)

Remove the Base **[22]**, then the five Tapping Screws (W/Flange) D4 x 25 **[43]** and the Seal Lock Screw (W/Washers) M4 x 10 **[44]**. Remove the Change Knob **[45]** and Front Cover (A) **[46]** from the main body. Remove the Pushing Button **[27]**, Base Lever **[25]** and Spring (C) **[28]**. Remove Front Cover (B) **[26]** and the Base Adapter **[50]** from the main body.

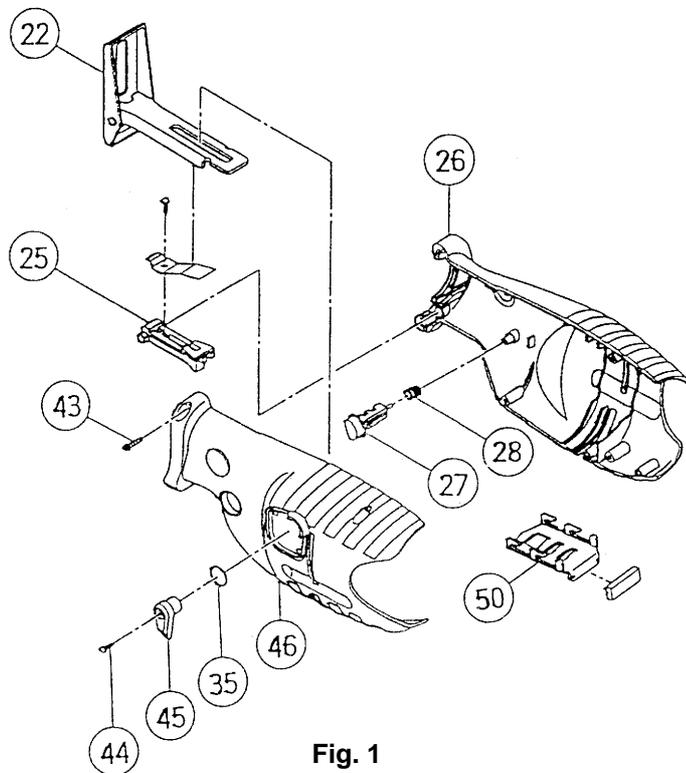


Fig. 1

(2) Disassembly of the Gear Cover **[31]** (Figs. 2 to 4)

Pull out the Change Shaft **[34]** from the Inner Cover (A) **[33]**. At this time, be careful not to lose the O-Rings **[35]** on both ends of the change shaft.

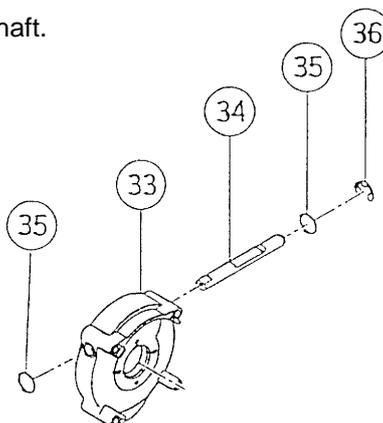


Fig. 2

Loosen the Nylock Bolt (W/Flange) M6 x 35 [47] which secures the fan of the armature ass'y (approximately two turns). Remove the four Machine Screws (W/Washers) M5 x 60 [42] and then pull out the Gear Cover [31] from the main body. Remove the Nylock Bolt (W/Flange) M6 x 35 [47], then Second Shaft (A) [64] section and the Sub Shaft [57] can be removed from the Gear Cover [31]. At this time, Second Shaft (A) [64] section can be easily removed after first pulling out the tip of the Plunger (A) Set [32] approximately 20 mm from the Gear Cover [31].

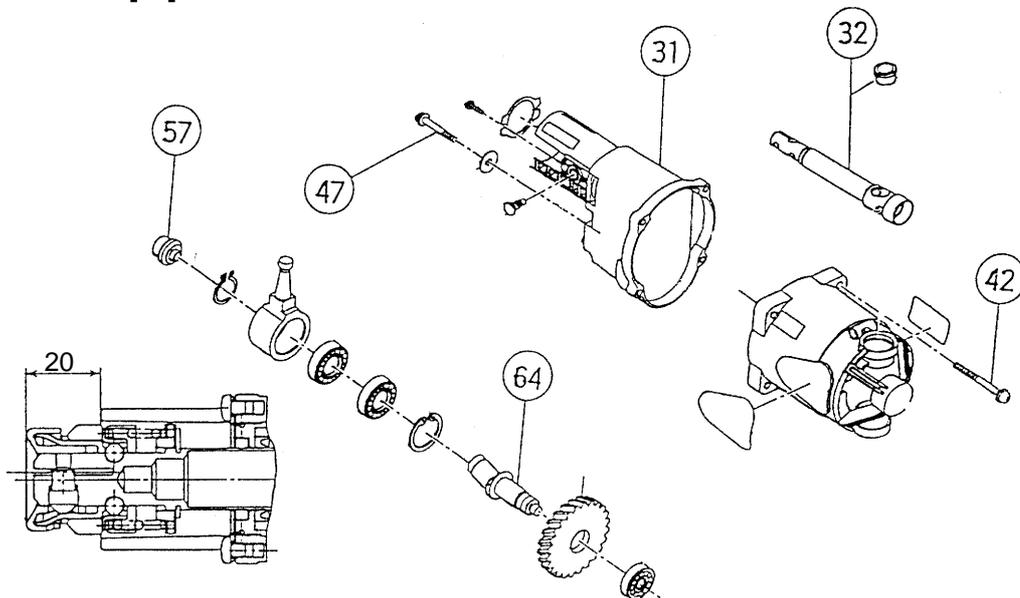


Fig. 3

Remove the two FT-Machine Screws M4 x 6 [29] and remove the Felt Cover [30]. Secure the Gear Cover [31] and remove the two Bolts M10 [49] to remove the two Swing Rails [52] from the inside of the Gear Cover [31]. Pull out the Guide Sleeve Ass'y [9] from the gear cover, then Plunger (A) Set [32] and the Guide Sleeve Ass'y [9] can be removed in an assembled state. At this time, remove the Swing Roller [53] with the Pin D6 [54] mounted. Remove the two Machine Screws M4 x 10 [59] from the inside of the gear cover and then remove Bearing Cover (B) [58] and the Ball Bearing 6003DDCMPS2S [56].

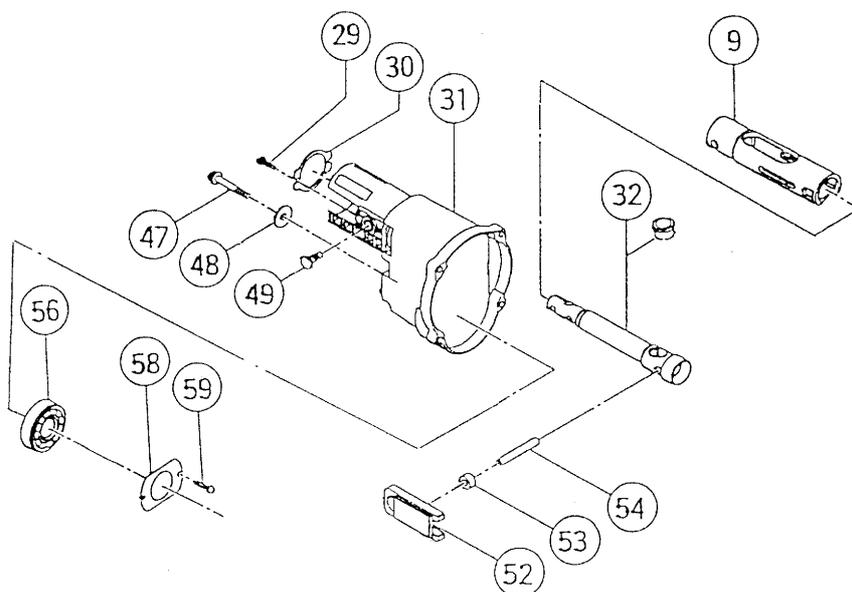


Fig. 4

(3) Disassembly of the blade mounting section (Fig. 5)

Remove the Retaining Ring (E-Type) for D14 Shaft [2] from Plunger (A) Set [32] with a flatblade screwdriver. At this time, be careful that Spring (A) [19] is pushing against the retaining ring. Next, slide the Guide Washer [17] backward and remove the two Steel Balls D4.76 [15]. Move Holder Sleeve (B) [14] backward and adjust the position of the notch on Holder Sleeve (B) [14] (see Fig. 16) then remove the Holder Pin [11] and Spring (B) [12] with a magnet. At this time, be careful not to damage Spring (B) [12] by applying undue force or forgetting to remove it. Remove Holder Sleeve (A) [13], Holder Sleeve (B) [14], Holder Sleeve (C) [16], Guide Washer [17], Dust Washer [18], Spring (A) [19], Washer (D) [20], Thrust Bearing [21], Washer (E) [1] and Washer (F) [3] from Plunger (A) Set [32].

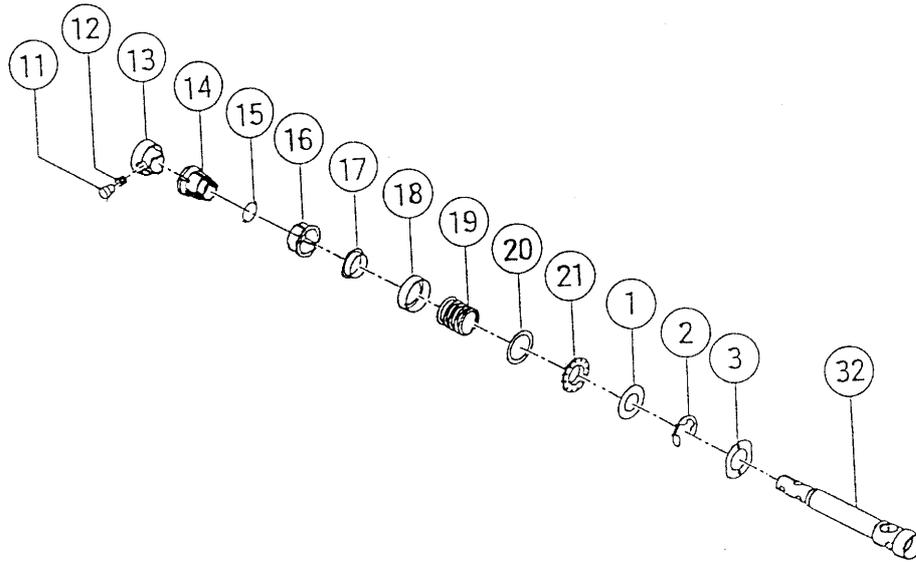


Fig. 5

(4) Disassembly of the Guide Sleeve Ass'y [9] section (Fig. 6)

Remove the O-Ring [4] from the rim of the Seal Sleeve [6] and pull out the Felt Washer [5], Seal Sleeve [6] and V-Ring [7] from the Guide Sleeve Ass'y [9]. Next, remove the Plunger Sleeve [10] by pressing it from underneath Plunger (A) Set [32] with a hand press (see Fig. 19). Remove the Pin D6 [54] and then Plunger (A) Set [32] from the rear of the Guide Sleeve Ass'y [9].

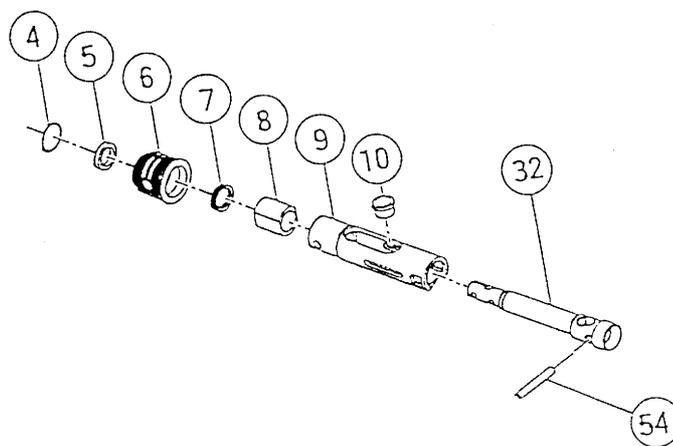


Fig. 6

(5) Disassembly of the Second Shaft (A) [64] section (Fig. 7)

Remove the Retaining Ring for D17 Shaft [60] from Second Shaft (A) [64]. While holding the side surface of the Recipro Plate [61], push the end surface of Second Shaft (A) [64] (parallel with the side surface of the Recipro Plate [61]) with a hand press and remove the Recipro Plate [61] in an assembled state. Next, while holding the side surface of the Gear [65], push the end surface of Second Shaft (A) [64] with a hand press and remove the Gear [65] and the Ball Bearing 608VVC2PS2L [66]. Remove the Retaining Ring for D35 Hole [63] from the Recipro Plate [61], then remove the two Ball Bearings 6003VVCMPS2L [62] from the Recipro Plate [61].

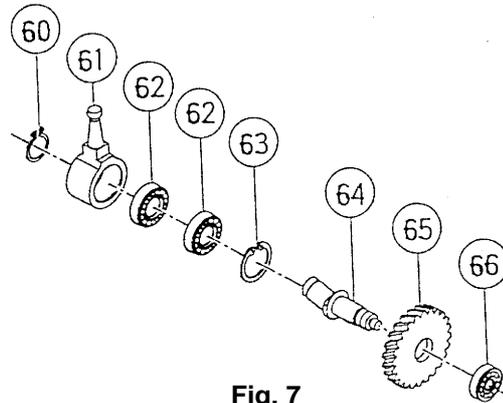


Fig. 7

(6) Disassembly of Inner Cover (A) [33] and the Housing [40] section (Fig. 8)

Remove the two Brush Caps [37] and the two Carbon Brushes [38]. Tap the air vents of the Housing [40] slightly with a plastic hammer, then Inner Cover (A) [33] can be removed from the housing together with the Armature Ass'y [70]. At this time, be careful not to tap the fan with the plastic hammer. Remove the Fan Guide [71] from the inside of the housing.

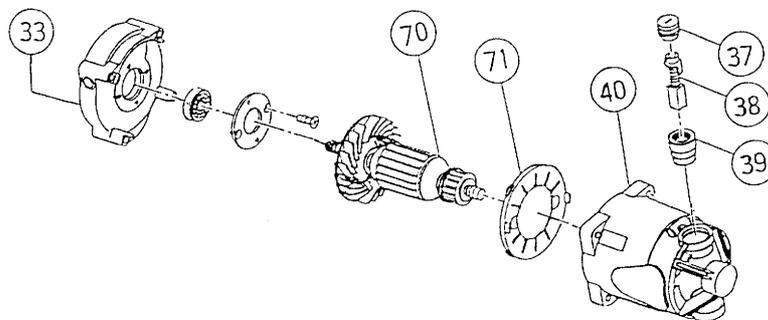


Fig. 8

(7) Disassembly of Inner Cover (A) [33] and the Armature Ass'y [70] section (Fig. 9)

While holding the side surface of Inner Cover (A) [33] where the Armature Ass'y [70] is assembled, push the end surface of the armature pinion with a hand press and remove it. Remove the two Flat Hd. Screws M4 x 8 [69] to remove the Bearing Cover [68] and the Ball Bearing 6001VVCMPS2L [67].

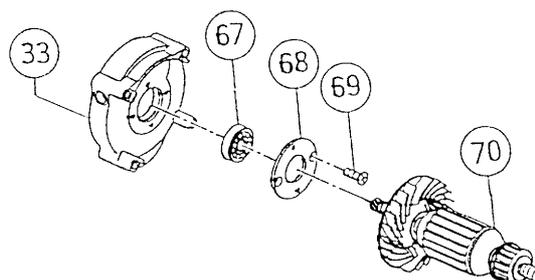


Fig. 9

(8) Disassembly of Handles (A) [74] and (B) [80] section (Fig. 10)

Remove the six Tapping Screws (W/Flange) D4 x 25 [43]. Remove the Grip Cover [81] by pulling it backward and remove Handle (A) [74]. Then, the Switch Trigger [76] can be removed.

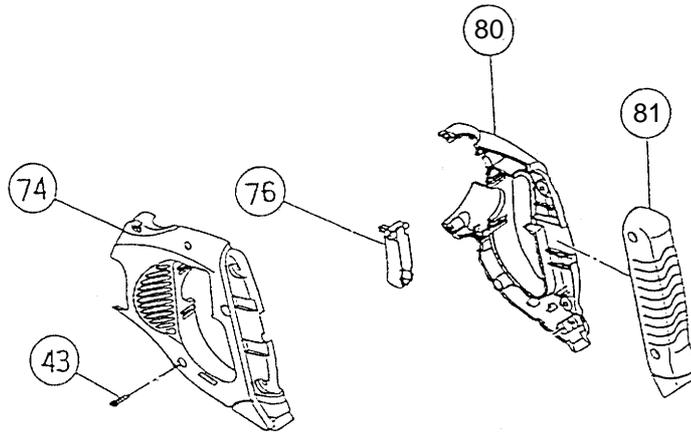


Fig. 10

(9) Disassembly of Handle (B) [80] and the Switch [75] section (Fig. 11)

Disconnect the two internal wires coming from the Stator [73] and the two internal wires coming from the Cord [85] by loosening the small screw on the switch. Then, the Switch [75] can be removed. If the Noise Suppressor [83] is connected to the switch, cut the internal wires and then remove the switch because the internal wires coming from the stator and the triac are crimped to the noise suppressor through Tube (D) [79].

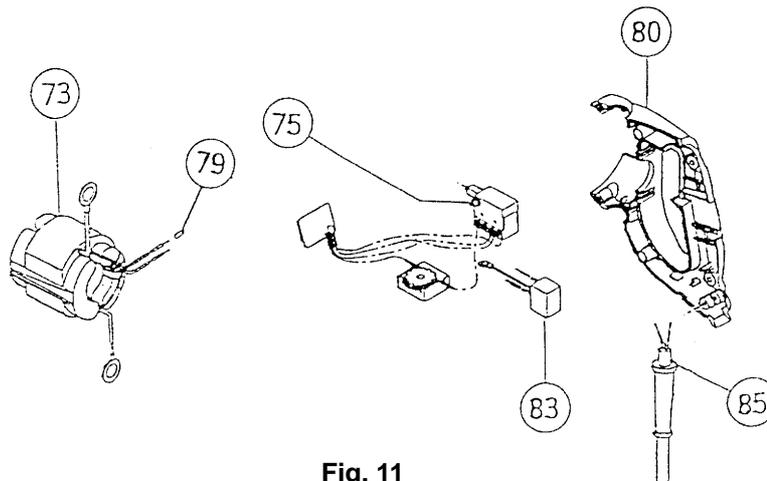


Fig. 11

(10) Disassembly of the Housing [40] and the Brush Holder [39] section (Fig. 12)

Remove the CB terminal coming from the Stator [73] from the Brush Holder [39] and remove the Brush Holder [39] from the inside of the Housing [40] with a flatblade screwdriver. (No screw or adhesive was used for mounting.)

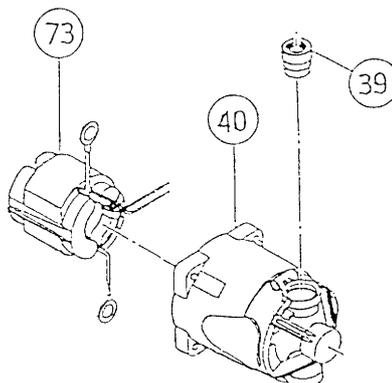


Fig. 12

2. Reassembly

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

(1) Press-fitting the Recipro Plate [61] ass'y into Second Shaft (A) [64] (Fig.13)

Tool required: Special repair tool J-315

Mount the two Ball Bearings 6003VVCMP2L [62] and the Retaining Ring for D35 Hole [63] to the Recipro Plate [61] to complete the assembly (recipro plate ass'y).

(a) If the Gear [65] and the Ball Bearing 608VVC2PS2L [66] are not mounted to Second Shaft (A) [64], mount Second Shaft (A) [64] and the recipro plate ass'y to the special repair tool J-315 and press-fit it in the direction of the arrow with a hand press as shown in Fig. 13-a.

(b) When the Gear [65] and the Ball Bearing 608VVC2PS2L [66] are mounted to Second Shaft (A) [64], mount Second Shaft (A) [64] and the recipro plate ass'y to the special repair tool J-315 and press-fit it in the direction of the arrow with a hand press as shown in Fig. 13-b.

Be careful of the direction when press-fitting the recipro plate ass'y.

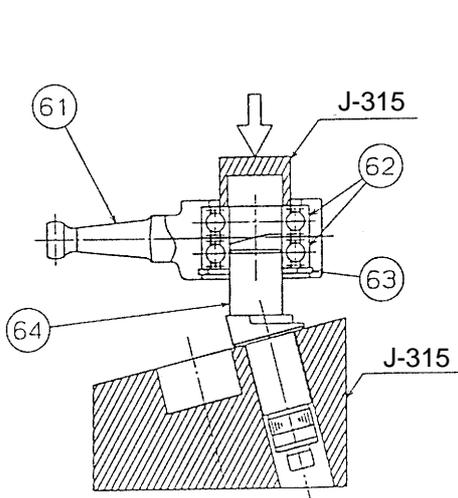


Fig. 13-a

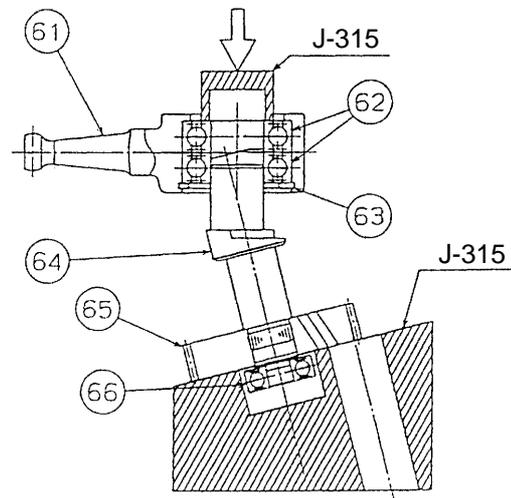


Fig. 13-b

(2) Press-fitting Metal (A) [8] into the guide sleeve (Fig. 14)

(Metal (A) [8] and the guide sleeve are supplied together as the Guide Sleeve Ass'y [9].)

Tool required: Special repair tool J-316 (adjusted to the proper dimensions)

Insert Metal (A) [8] into the press-fitting portion of the guide sleeve so that the outer flat section of the metal can be seen from the 8 mm dia. hole of the guide sleeve. (An inspection hole is provided on one side of the metal.) Mount the two special repair tools J-316 in the 8 mm dia. hole as shown in Fig. 14. Push the guide sleeve in the direction shown by the arrow as far as it will go with a hand press.

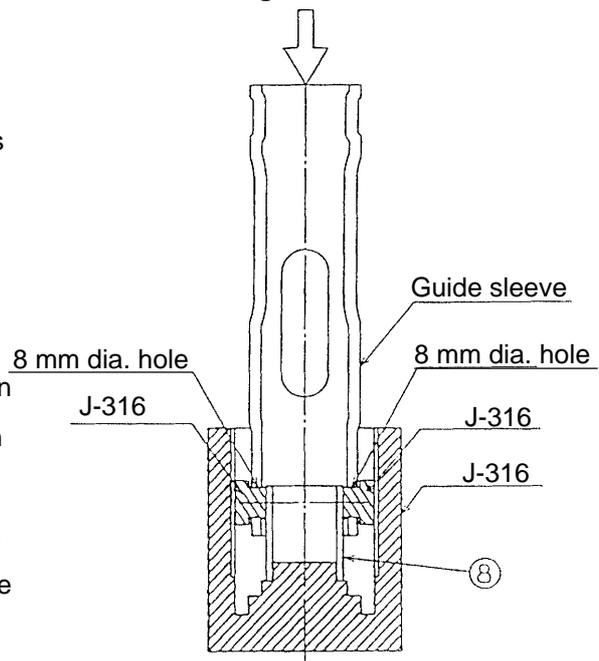


Fig. 14

(3) Reassembly of the blade mounting section (Figs. 15, 16 and 17)

Apply Doubrex 251 grease to the inner circumference of Holder Sleeve (B) [14] and the cam groove of Plunger (A) Set [32]. Mount Washer (E) [1], Thrust Bearing [21], Washer (D) [20], Spring (A) [19], Dust Washer [18], Guide Washer [17], Holder Sleeve (C) [16], Holder Sleeve (B) [14] and Holder Sleeve (A) [13] in the Plunger (A) Set [32] through the tip in order (Fig. 15).

Next, align the hole of the Plunger (A) Set [32] with the notches of Holder Sleeve (A) [13] and Holder Sleeve (B) [14] and then insert Spring (B) [12] and the Holder Pin [11] into the hole. Push in the Holder Pin [11] to eject Holder Sleeves (B) [14] and (C) [16] forward (as shown in (A) Fig. 16). Turn them about 90° counterclockwise viewing from the tip (as shown in (B) Fig. 16), then insert the two Steel Balls D4.76 [15] (in the direction of the arrow marks shown in Figs. 16 and 17). Slide all the parts up to Washer (E) [1] forward (as shown in (C) Fig. 17) and mount the Retaining Ring (E-type) for D14 Shaft [2] securely by adjusting Spring (A) [19]. Be careful of the projections and depressions on Holder Sleeve (B) [14] and Holder Sleeve (C) [16] when mounting. After reassembly, test mount and remove a saw blade to check for proper operation.

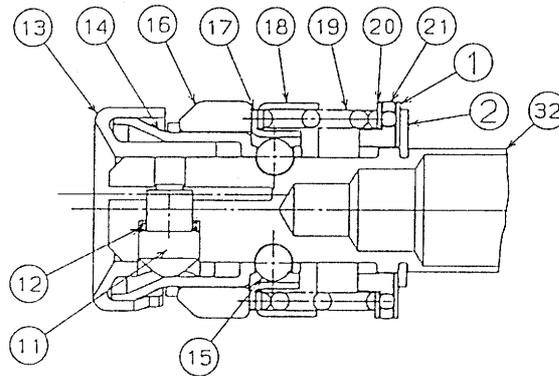


Fig. 15

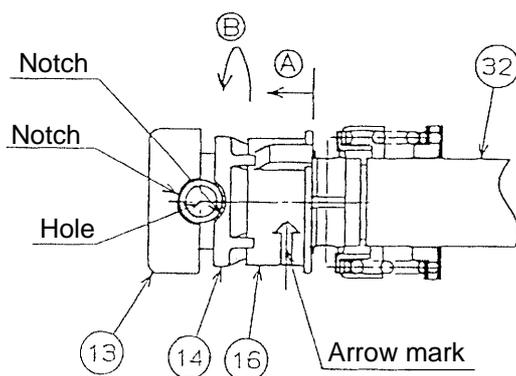


Fig. 16

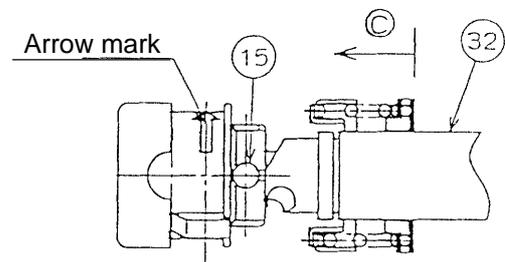
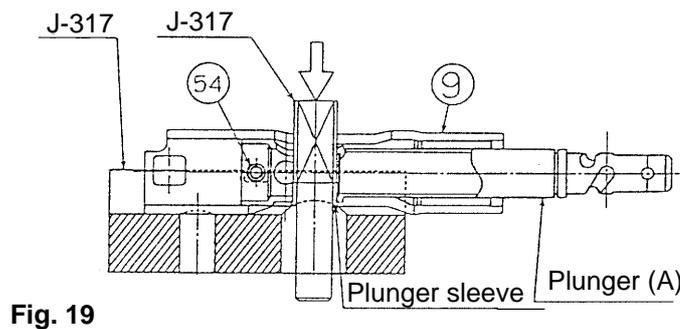
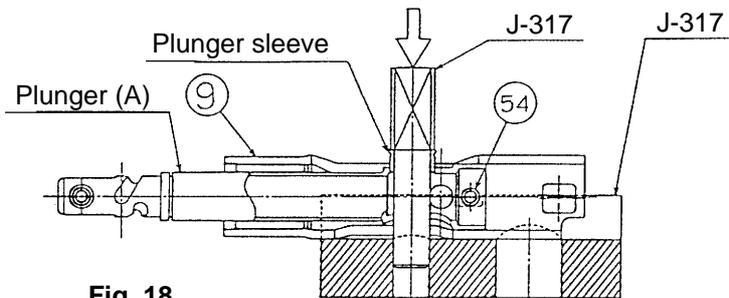


Fig. 17

(4) Press-fitting plunger (A) into the plunger sleeve (Figs. 18 and 19)

Tool required: Special repair tool J-317

Apply Nippeco SEP-3A grease to the sliding portion of plunger (A) and insert it into the Guide Sleeve Ass'y [9]. Insert the Pin D6 [54] into plunger (A). Mount it to the special repair tool J-317 and press-fit it in the direction of the arrow as shown in Fig. 18. At this time, be careful not to gall the plunger sleeve. After reassembly, check that plunger (A) slides smoothly. For reference, the special repair tool J-317 can also be used for pulling out the plunger sleeve as shown in Fig. 19.

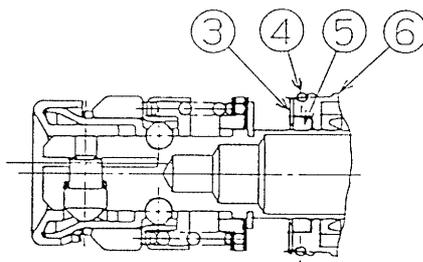


(5) Others

* Be careful not to dislodge the Felt Washer [5]. (Fig. 20)

The Felt Washer [5] is inserted in the Seal Sleeve [6]. The O-Ring [4] is provided around the seal sleeve to make closer contact between the felt washer and plunger (A) and also to increase the dust-resistance.

Moving plunger (A) after mounting the felt washer can dislodge the felt washer. Hold Washer (F) [3] with your hand to prevent the felt washer from becoming dislodged when moving plunger (A).



* Be careful not to damage Washer (F) [3]. (Fig. 21)

Washer (F) has an oval shape to fit the inside of the Gear Cover [31]. Therefore, perform disassembly and reassembly so that washer (F) is properly aligned with the shape of the gear cover.

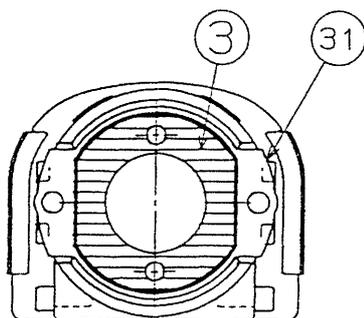


Fig. 21

*Be careful of the direction of the Cord Clip [78]. (Fig. 22)

Cord dia.: More than 6.4 mm,
8.5 mm or less

Cord dia.: More than 8.5 mm,
10.8 mm or less

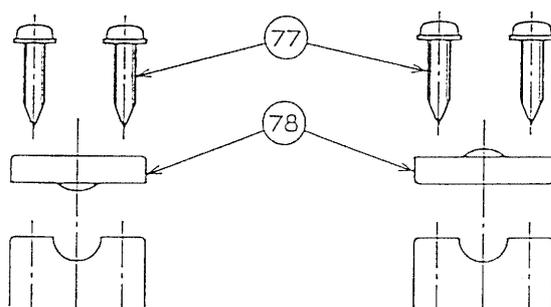


Fig. 22

*Precaution when mounting the Armature Ass'y [70] in the Housing [40]

Prior to mounting the Armature Ass'y [70] in the Housing [40], press-fit the Ball Bearing 6001VVCMP2L [67] to prevent the Armature Ass'y [70] from becoming dislodged from the ball bearing portion at the fan side when removing the Armature Ass'y [70] from the Housing [40]. (Fig. 9)

9-2. Lubrication

(1) Nippeco SEP-3A grease

- Lip portion of the V-Ring [7]
- Sphere portion of the Recipro Plate [61]
- Inner circumferene of the Guide Sleeve Ass'y [9] and Metal (A) [8]
- Apply 45 g of Nippeco SEP-3A to the Gear Cover [31].
- Inner circumference of the Swing Roller [53]
- Both sides of the Thrust Bearing [21]

(2) Doubrex 251 grease

- Steel Ball D4.76 [15]
- Cam groove portion of Plunger (A) Set [32]
- Inner circumference of Holder Sleeve (B) [14]

9-3. Tightening Torques

• FT-Machine Screw M4 x 6 [29]	1.2 ± 0.3 N·m (12 ± 3 kgf·cm, 10.4 ± 2.6 in-lbs.)
• Seal Lock Screw (W/Washers) M4 x 10 [44]	1.8 ± 0.4 N·m (18 ± 4 kgf·cm, 15.6 ± 3.5 in-lbs.)
• Machine Screw M4 x 10 [59]	1.8 ± 0.4 N·m (18 ± 4 kgf·cm, 15.6 ± 3.5 in-lbs.)
• Flat Hd. Screw M4 x 8 [69]	1.8 ± 0.4 N·m (18 ± 4 kgf·cm, 15.6 ± 3.5 in-lbs.)
• Tapping Screw D4 x 8 [23]	1.8 ± 0.4 N·m (18 ± 4 kgf·cm, 15.6 ± 3.5 in-lbs.)
• Tapping Screw (W/Flange) D4 x 25 [43]	2.0 ± 0.5 N·m (20 ± 5 kgf·cm, 17.4 ± 4.3 in-lbs.)
• Tapping Screw (W/Flange) D4 x 16 [77]	2.0 ± 0.5 N·m (20 ± 5 kgf·cm, 17.4 ± 4.3 in-lbs.)
• Machine Screw (W/Washers) D5 x 60 [42]	2.5 ± 0.5 N·m (25 ± 5 kgf·cm, 21.7 ± 4.3 in-lbs.)
• Hex. Hd. Tapping Screw D 5 x 55 [72]	3.4 ± 0.7 N·m (35 ± 7 kgf·cm, 30.4 ± 6.1 in-lbs.)
• Nylock Bolt (W/Flange) M6 x 35 [47]	9.8 ± 2.0 N·m (100 ± 20 kgf·cm, 86.8 ± 17.4 in-lbs.)
• Bolt M10 [49]	12.3 ± 2.5 N·m (125 ± 25 kgf·cm, 108.5 ± 21.7 in-lbs.)

9-4. Wiring Diagram

Carefully ensure that wiring is accomplished as illustrated below. As incorrect wiring will result in lack of rotation, reverse rotation or other malfunctions, close attention is absolutely necessary. Also, be careful of the presence or absence of Tube (D) [79] for working.

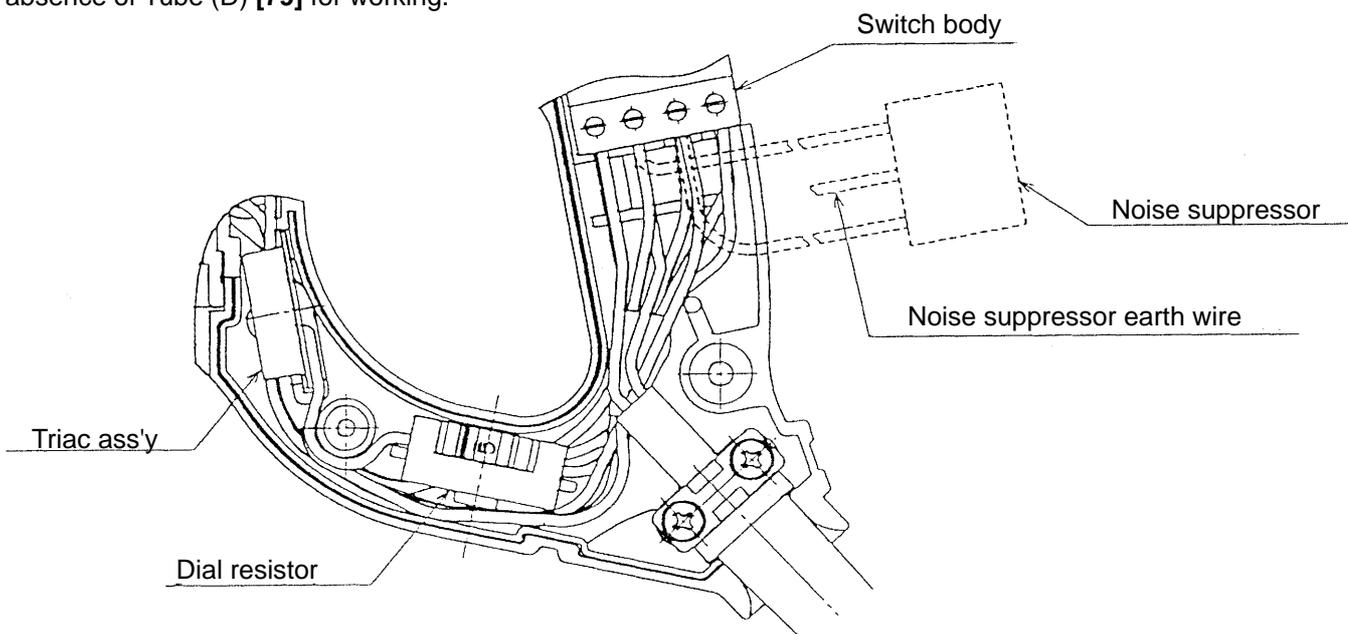


Fig. 23

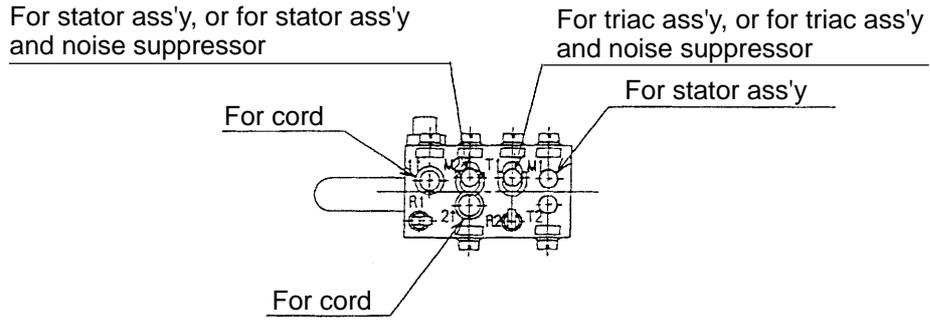


Fig. 24

With noise suppressor type

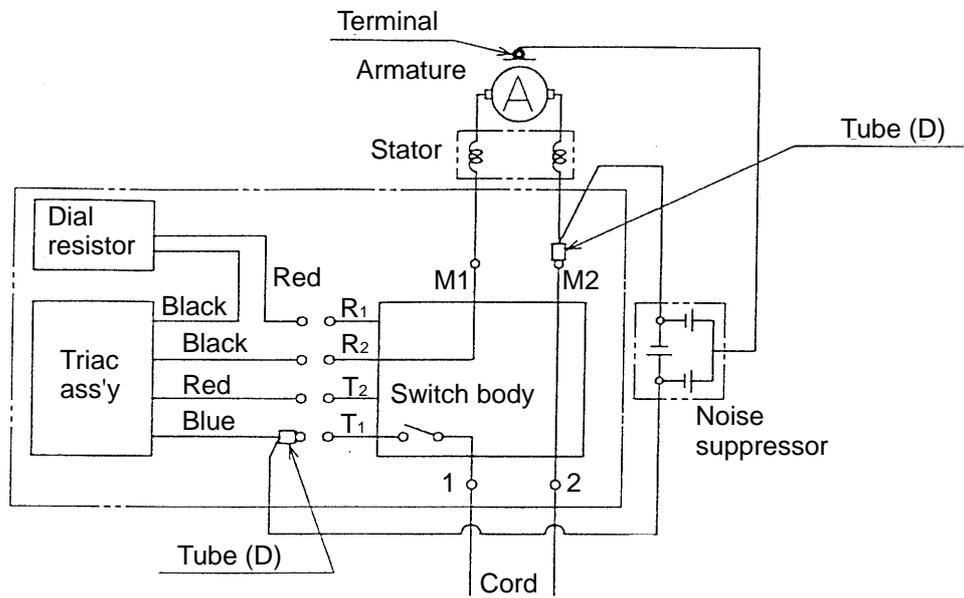


Fig. 25

120 V type

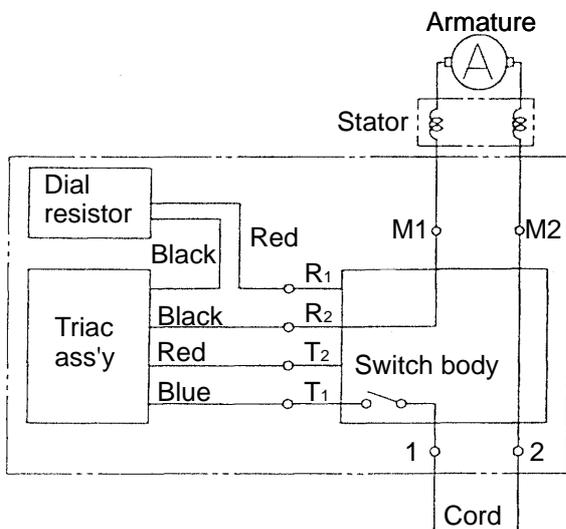


Fig. 26

Other type

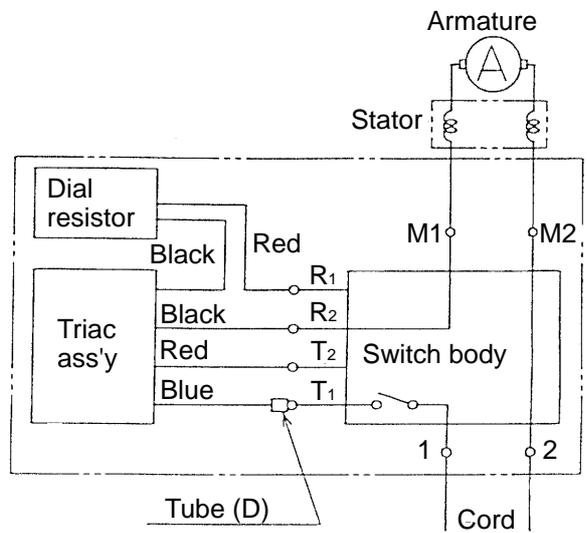


Fig. 27

10. CONFIRMATION AFTER REASSEMBLY

10-1. Lead Wire Precautions

When connecting lead wires, be very careful not to remove the insulation covering of each lead wire more than needed. Also, ensure that the lead wires are not pinched between the mating surfaces of the handle.

10-2. Insulation Tests

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

Insulation resistance: $7M\Omega$ or more with DC 500 V Megohm Tester

Dielectric strength: AC 4000 V/1 minute, with no abnormalities ... 220 V to 240 V

AC 2500 V/1 minute, with no abnormalities ... 110 V to 127 V

10-3. No-Load Current Value

After no-load operation for 30 minutes, the no-load current value should be as specified below at a frequency of 50/60 Hz.

110 V ... 5.2 A max.

115 V ... 5.0 A max.

120 V ... 4.7 A max.

127 V ... 4.5 A max.

220 V ... 2.6 A max.

230 V ... 2.5 A max.

240 V ... 2.4 A max.

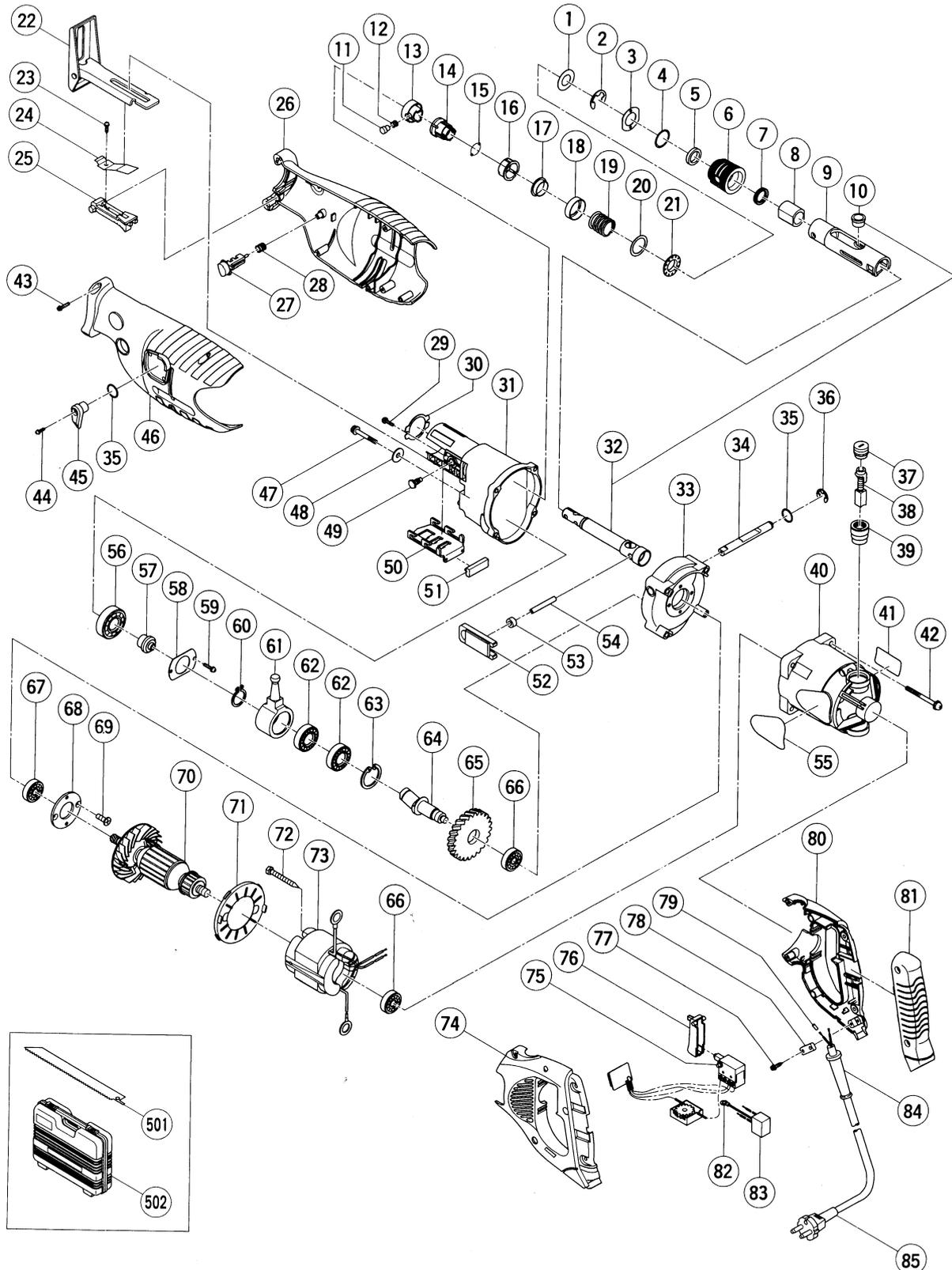
11. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		10	20	30	40	50	60
	Fixed							
CR 13VA		Work Flow						
		Handle (A),(B) Switch Cord Cord Armor Switch Trigger		Inner Cover (A) Armature Ass'y Ball Bearing (6001VV) Ball Bearing (608VV) Change Shaft O-Ring				
	General Assembly	Front Cover (A) Front Cover (B)		Ball Bearing (6003DD) Sub Shaft Recipro Plate Ball Bearing (6003VV) x 2 Second Shaft (A) Gear Ball Bearing (608VV)				
				Plunger (A) Guide Sleeve Ass'y Metal (A) Seal Sleeve O-Ring (S-24) Thrust Bearing Spring (A) Gear Cover				
				Base				

ELECTRIC TOOL PARTS LIST

■ SABER SAW
Model CR 13VA

1999.12.20
(E1)



PARTS

CR 13VA

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
1	318-484	WASHER (E)	1		
2	318-453	RETAINING RING (E-TYPE) FOR D14 SHAFT	1		
3	318-457	WASHER (F)	1		
4	878-609	O-RING (S-24)	1		
5	318-458	FELT WASHER	1		
6	318-460	SEAL SLEEVE	1		
7	318-459	V-RING	1		
8	318-463	METAL (A)	1		
9	318-462	GUIDE SLEEVE ASS'Y	1	INCLUD.8	
10		PLUNGER SLEEVE	1		
11	318-481	HOLDER PIN	1		
12	318-483	SPRING (B)	1		
13	318-478	HOLDER SLEEVE (A)	1		
14	318-479	HOLDER SLEEVE (B)	1		
15	959-149	STEEL BALL D4.76 (10 PCS.)	2		
16	318-480	HOLDER SLEEVE (C)	1		
17	318-477	GUIDE WASHER	1		
18	318-487	DUST WASHER	1		
19	318-482	SPRING (A)	1		
20	318-486	WASHER (D)	1		
21	318-485	THRUST BEARING	1		
22	318-455	BASE	1		
23	310-222	TAPPING SCREW D4X8	1		
24	318-495	HOLDER SPRING	1		
25	318-497	BASE LEVER	1		
26	318-471	FRONT COVER (B)	1		
27	318-496	PUSHING BUTTON	1		
28	318-494	SPRING (C)	1		
29	677-495	FT-MACHINE SCREW M4X6	2		
30	318-456	FELT COVER	1		
31	318-468	GEAR COVER	1		
32	318-824	PLUNGER (A) SET	1	INCLUD.10	
33	318-469	INNER COVER (A)	1		
34	318-489	CHANGE SHAFT	1		
35	872-654	O-RING (1AP-10)	2		
36	974-577	RETAINING RING (E-TYPE) FOR D7 SHAFT	1		
37	945-161	BRUSH CAP	2		
38	999-043	CARBON BRUSH (1 PAIR)	2		
39	958-900	BRUSH HOLDER	2		
40	318-506	HOUSING (GREEN)	1		
41		NAME PLATE	1		
42	307-224	MACHINE SCREW (W/WASHERS) M5X60 (BLACK)	4		
43	307-028	TAPPING SCREW (W/FLANGE) D4X25 (BLACK)	11		
44	303-851	SEAL LOCK SCREW (W/WASHERS) M4X10 (BLACK)	1		
45	318-490	CHANGE KNOB	1		
46	318-470	FRONT COVER (A)	1		
47	318-451	NYLOCK BOLT (W/FLANGE) M6X35	1		
48	318-452	WASHER (G)	1		
49	318-493	BOLT M10	2		
50	318-454	BASE ADAPTER	1		
51	318-461	CUSHION RUBBER	1		

* : ALTERNATIVE PARTS

12 - 99

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS
52	318-488	SWING RAIL	2	
53	318-492	SWING ROLLER	2	
54	318-491	PIN D6	1	
55		HITACHI LABEL	1	
56	600-3DD	BALL BEARING 6003DDCMPS2S	1	
57	318-475	SUB SHAFT	1	
58	318-476	BEARING COVER (B)	1	
59	949-216	MACHINE SCREW M4X10 (10 PCS.)	2	
60	967-261	RETAINING RING FOR D17 SHAFT	1	
61	318-466	RECIPRO PLATE	1	
62	600-3VV	BALL BEARING 6003VVCMP2L	2	
63	939-556	RETAINING RING FOR D35 HOLE (10 PCS.)	1	
64	318-474	SECOND SHAFT (A)	1	
65	318-473	GEAR	1	
66	608-VVM	BALL BEARING 608VVC2PS2L	2	
67	600-1VV	BALL BEARING 6001VVCMP2L	1	
68	302-435	BEARING COVER	1	
69	949-321	FLAT HD. SCREW M4X8 (10 PCS.)	2	
* 70	360-514C	ARMATURE 110V-115V	1	
* 70	360-514U	ARMATURE ASS'Y 120V-127V	1	INCLUD.66,67
* 70	360-514E	ARMATURE 220V-230V	1	
* 70	360-514F	ARMATURE 240V	1	
71	318-467	FAN GUIDE	1	
* 72	961-501	HEX. HD. TAPPING SCREW D5X60	2	
* 72	953-174	HEX. HD. TAPPING SCREW D5X55	2	FOR USA
* 73	340-459H	STATOR 110V-115V	1	
* 73	340-459G	STATOR 120V-127V	1	FOR USA
* 73	340-459J	STATOR 220V-230V	1	
* 73	340-459E	STATOR 220V-230V	1	FOR IND,SYR,HKG
* 73	340-459K	STATOR 240V	1	
74	318-508	HANDLE (A) (GREEN)	1	
* 75	318-817	SWITCH	1	FOR GBR(110V)
* 75	318-504	SWITCH	1	FOR USA
* 75	318-505	SWITCH	1	
76	318-499	SWITCH TRIGGER	1	
77	984-750	TAPPING SCREW (W/FLANGE) D4X16	2	
78	937-631	CORD CLIP	1	
79	981-373	TUBE (D)	4	
80	318-509	HANDLE (B) (GREEN)	1	
81	318-472	GRIP COVER	1	
* 82	938-108	TERMINAL	1	FOR NOISE SUPPRESSOR
* 83	994-273	NOISE SUPPRESSOR	1	EXCEPT SYR,USA,IND,HKG
* 84	953-327	CORD ARMOR D8.8	1	
* 84	938-051	CORD ARMOR D10.1	1	
* 85	500-201Z	CORD	1	(CORD ARMOR D10.1) FOR TPE
* 85	500-234Z	CORD	1	(CORD ARMOR D8.8)
* 85	500-245Z	CORD	1	(CORD ARMOR D10.1) FOR SYR
* 85	500-435Z	CORD	1	(CORD ARMOR D8.8) FOR HKG,GBR(230V)
* 85	500-439Z	CORD	1	(CORD ARMOR D8.8) FOR AUS,NZL
* 85	500-461Z	CORD	1	(CORD ARMOR D8.8) FOR GBR(110V)
* 85	500-447Z	CORD	1	(CORD ARMOR D8.8) FOR SUI

PARTS

CR 13VA

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS
1	318-484	WASHER (E)	1	
2	318-453	RETAINING RING (E-TYPE) FOR D14 SHAFT	1	
3	318-457	WASHER (F)	1	
4	878-609	O-RING (S-24)	1	
5	318-458	FELT WASHER	1	
6	318-460	SEAL SLEEVE	1	
7	318-459	V-RING	1	
8	318-463	METAL (A)	1	
9	318-462	GUIDE SLEEVE ASS'Y	1	INCLUD.8
10		PLUNGER SLEEVE	1	
11	318-481	HOLDER PIN	1	
12	318-483	SPRING (B)	1	
13	318-478	HOLDER SLEEVE (A)	1	
14	318-479	HOLDER SLEEVE (B)	1	
15	959-149	STEEL BALL D4.76 (10 PCS.)	2	
16	318-480	HOLDER SLEEVE (C)	1	
17	318-477	GUIDE WASHER	1	
18	318-487	DUST WASHER	1	
19	318-482	SPRING (A)	1	
20	318-486	WASHER (D)	1	
21	318-485	THRUST BEARING	1	
22	318-455	BASE	1	
23	310-222	TAPPING SCREW D4X8	1	
24	318-495	HOLDER SPRING	1	
25	318-497	BASE LEVER	1	
26	318-471	FRONT COVER (B)	1	
27	318-496	PUSHING BUTTON	1	
28	318-494	SPRING (C)	1	
29	677-495	FT-MACHINE SCREW M4X6	2	
30	318-456	FELT COVER	1	
31	318-468	GEAR COVER	1	
32	318-824	PLUNGER (A) SET	1	INCLUD.10
33	318-469	INNER COVER (A)	1	
34	318-489	CHANGE SHAFT	1	
35	872-654	O-RING (1AP-10)	2	
36	974-577	RETAINING RING (E-TYPE) FOR D7 SHAFT	1	
37	945-161	BRUSH CAP	2	
38	999-043	CARBON BRUSH (1 PAIR)	2	
39	958-900	BRUSH HOLDER	2	
40	318-506	HOUSING (GREEN)	1	
41		NAME PLATE	1	
42	307-224	MACHINE SCREW (W/WASHERS) M5X60 (BLACK)	4	
43	307-028	TAPPING SCREW (W/FLANGE) D4X25 (BLACK)	11	
44	303-851	SEAL LOCK SCREW (W/WASHERS) M4X10 (BLACK)	1	
45	318-490	CHANGE KNOB	1	
46	318-470	FRONT COVER (A)	1	
47	318-451	NYLOCK BOLT (W/FLANGE) M6X35	1	
48	318-452	WASHER (G)	1	
49	318-493	BOLT M10	2	
50	318-454	BASE ADAPTER	1	
51	318-461	CUSHION RUBBER	1	

* : ALTERNATIVE PARTS

2 - 00

