

MODEL

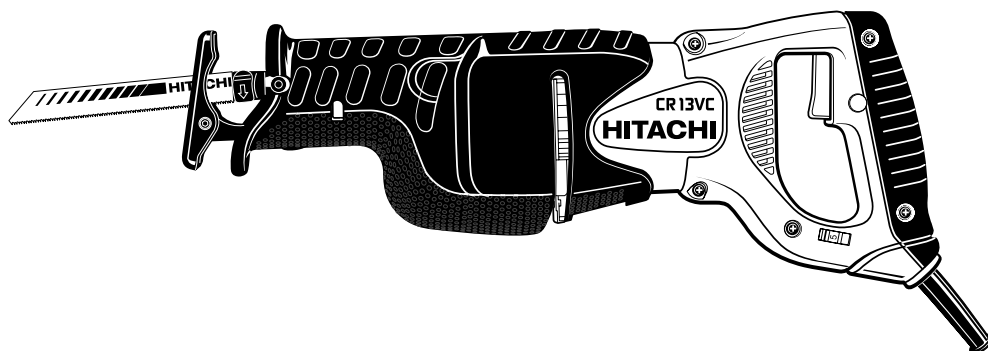
CR 13VC

HITACHI
POWER TOOLS

RECIPROCATING SAW
CR 13VC

TECHNICAL DATA
AND
SERVICE MANUAL

C



LIST No. 0792

Aug. 2002

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

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
P	DEWALT	DW307MK
Q	FLEX	SK2902VV
C	MAKITA	JR3030T



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1. PRODUCT NAME

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

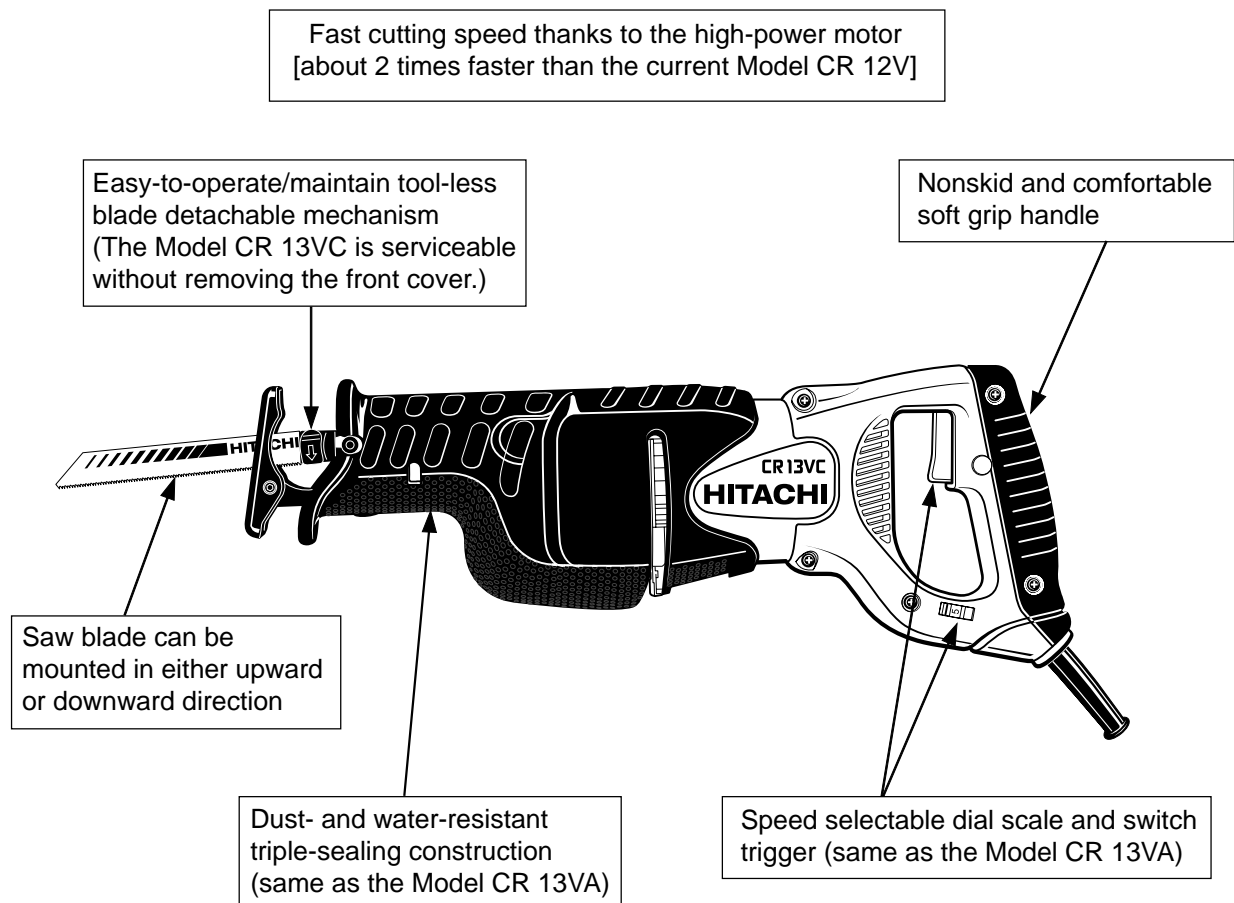
2. MARKETING OBJECTIVE

The new Model CR 13VC is an upgraded version of the current Model CR 12V to satisfy the market demand for a lightweight and high-speed saber saw. Thanks to the powerful motor, the Model CR 13VC offers the class-top cutting performance. The weight is equivalent to that of the current Model CR 12V. The Model CR 13VC is easy to operate and maintain thanks to the various convenient functions such as Hitachi-original tool-less blade detachable mechanism.

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 12V: 720 W).

(2) New tool-less blade detachable mechanism

Recently, most saber saws on the market are equipped with a mechanism that requires no tool such as hexagonal wrench for mounting and removal of saw blades. The Model CR 13VC is also equipped with such a mechanism in order to replace saw blades speedily.

[Features of the tool-less blade detachable mechanism]

① Easy to mount and remove saw blades

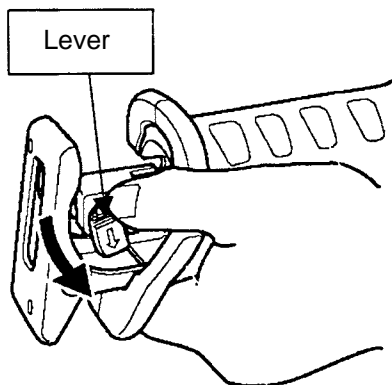
Saw blades can be easily mounted and removed just by pressing the lever.

② Easy to maintain

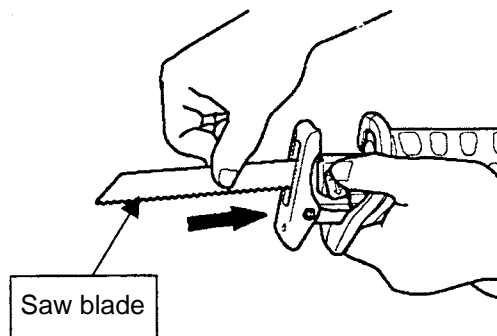
The tool-less blade detachable mechanism can be disassembled and reassembled without removing the front cover.

<How to mount a saw blade>

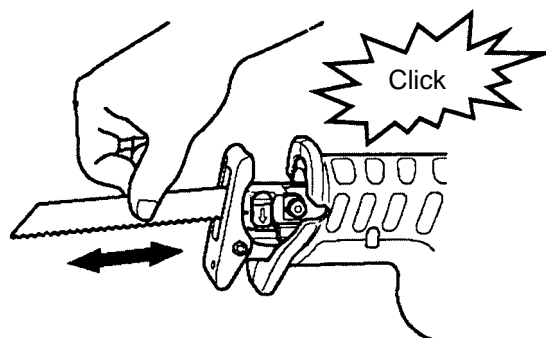
(a) Push the lever in the direction of the arrow mark marked on the lever.



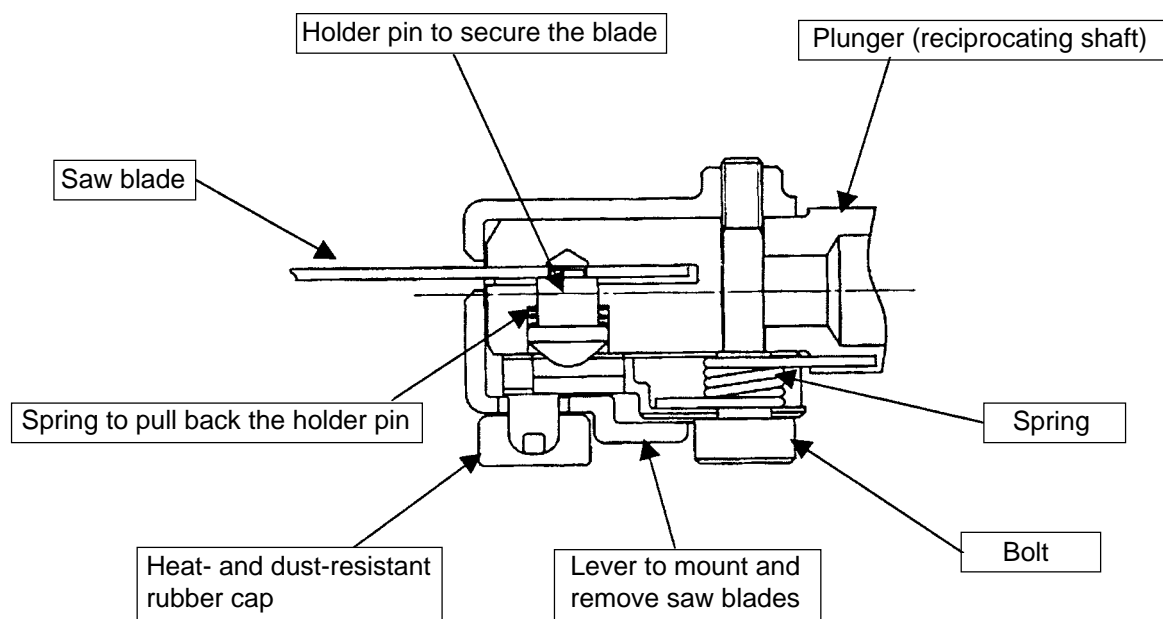
(b) Insert the saw blade all the way into the small slit of the plunger tip with the lever pushing.



(c) Release the lever and pull the back of the saw blade two or three times by hand to check that the blade is securely mounted. When pulling the blade, you will know it is properly mounted if it clicks and the lever moves slightly.



< Construction of the tool-less blade detachable mechanism >

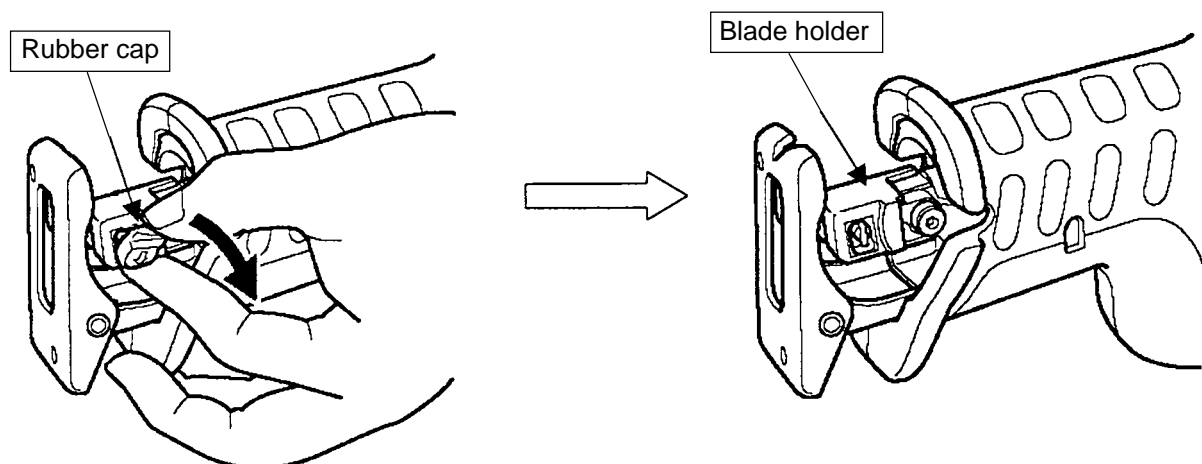


< Maintenance of the tool-less blade detachable mechanism >

After use, clean the blade mount with a brush to ensure that the tool-less blade detachable mechanism can function smoothly. In addition to the regular maintenance, perform the following effective maintenance occasionally.

○ Cleaning the inside of the tool-less blade detachable mechanism

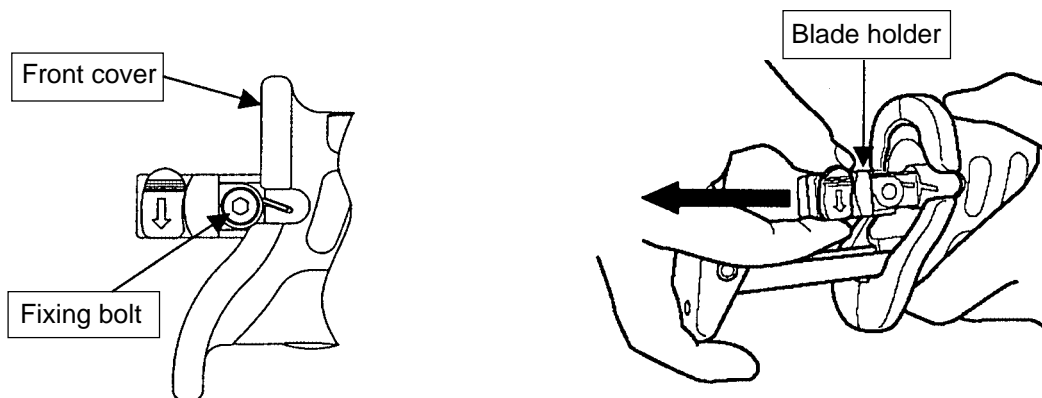
Pull the rubber cap provided on the lever in the direction of an arrow mark shown below. Then the rubber cap can be removed from the lever easily. Remove dust from the inside of the blade holder with air or the like.



< Disassembly and cleaning of the tool-less blade detachable mechanism >

The tool-less blade detachable mechanism can be easily disassembled or reassembled because the fixing bolt can be loosened or tightened without removing the front cover. To disassemble the tool-less blade detachable mechanism, remove the fixing bolt and pull out the blade holder.

(Caution) This is a special bolt comprised of an M4 thread and an M5 hexagonal socket. Be careful not to break the bolt by overtightening.



○ In case the saw blade is apt to come off

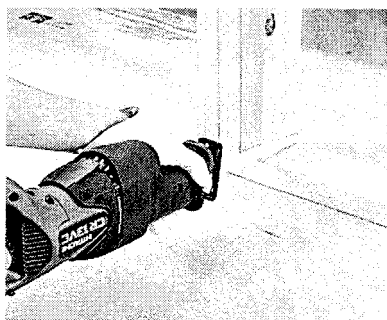
The saw blade is apt to come off if the blade hole is worn out. Replace the saw blade with new one. If the new saw blade comes off even after replacement, the holder pin may be worn out. Replace the holder pin with new one.



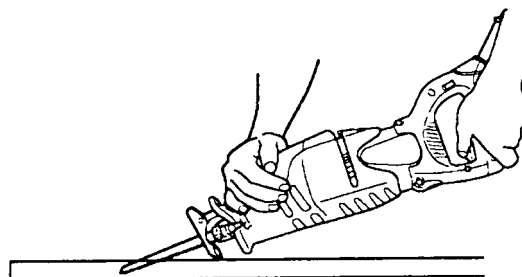
(3) Saw blade can be mounted in either direction, upward or downward

The Model CR 13VC is convenient for cutting materials on the floor or near the wall, and also for plunge cutting on plywood panels because the saw blade can be mounted in reverse.

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



<Plunge cutting on plywood panels>



Refer to the Handling Instructions for detailed information about plunge cutting on plywood panels.

(4) Dust-and water-resistant triple-sealing construction

The Model CR 13VC 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

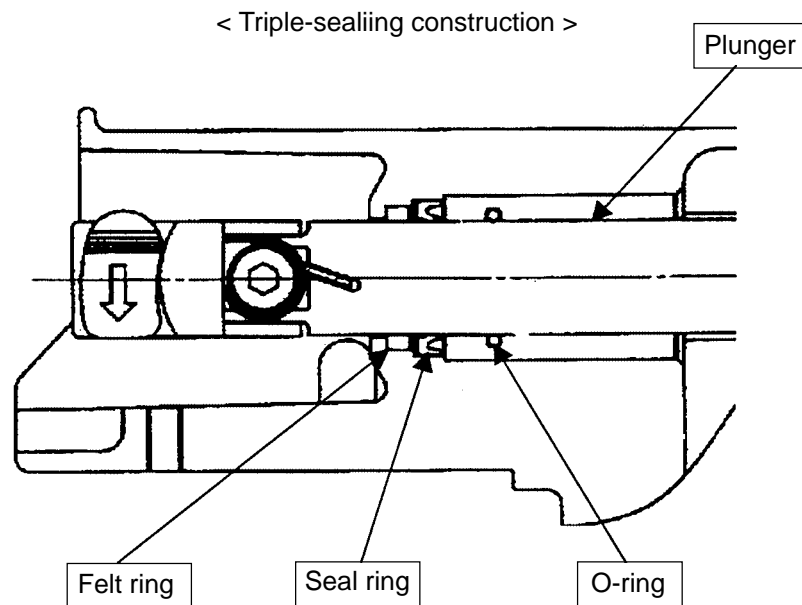
It prevents dust from entering by way of the plunger (reciprocating shaft).

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 o-ring (made of heat-resistant rubber)

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



(5) Comfortable double-molded (leostomer and polyamide resin) handle

The handle is nonskid and comfortably fits in the palm of a hand thanks to the double-molded construction (glassfiber reinforced polyamide resin at the handle main body and leostmer at the grip). You can see the excellence especially when you operate the Model CR 13VC wearing working gloves.

5. SPECIFICATIONS

5-1. Specifications

Capacities	Max. cutting size Steel pipe outer diameter 130 mm (5") Wood thickness (for Europe) 300 mm (for USA) 5" Mild steel plate 19 mm (3/4")
Power source	AC single phase 50 or 60 Hz
Type of motor	AC single phase series commutator motor
Enclosure	<ul style="list-style-type: none"> • Housing Glassfiber reinforced polyamide resin • Handle Glassfiber reinforced polyamide resin + Leostmer • Front cover Leostmer • Gear cover and inner cover Aluminum alloy die casting
Type of switch	Variable trigger switch
Full load current	110 V 9.7 A 120 V 8.9 A 220 V 4.8 A 230 V 4.6 A 240 V 4.4 A
Power input	1,010 W
Max. output (reference)	1,180 W
Number of strokes	No load 0 to 2,800/min. Full load 2,100/min. [dial setting 5]
Stroke	29 mm (1-1/7")
Weight	Net 3.3 kg (7.3 lbs.) [without cord] Gross 6.1 kg (13.4 lbs.)
Packaging	Plastic case (in corrugated cardboard sleeve)
Cord length	2.5 m (8.2 ft)
Standard accessories	<ul style="list-style-type: none"> • Blade No. 103 * 1 • Plastic case 1 • Hexagonal bar wrench 1

*: This blade is sold separately as an optional accessory in some areas.

5-2. Optional Accessories

The cutting speed of the Model CR 13VC is substantially higher than that of the current Model CR 12V, 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

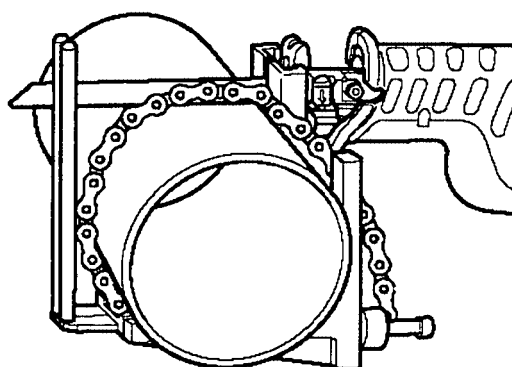
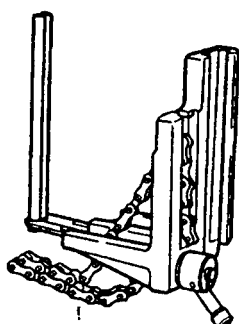
Material to be cut	Material quality	Thickness (mm)	Blade No.
Iron plate	Mild steel plate	2.5 – 19	No. 1, 2, 101, 102, 103, 104, 105, 106, 131, 132
		Below 3.5	No. 3, 6, 107, 108
Nonferrous metal	Aluminum Copper Brass	5 – 20	No. 1, 2, 101, 102, 103, 104, 105, 106, 131, 132
		Below 5	No. 3, 6, 107, 108
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

(2) Cut-off guide (L)

Cut-off guide (L) permits easy cutting of mild steel pipes.

	Code No.	Cutting application	Blade used
Cut-off guide (L)	321113	Outer diameter 75 mm - 165 mm	No. 9, No. 131

Cut-off guide (L) is applicable to the above specified saw blades only. Do not use it for the other short saw blades. Check that the saw blade is not disengaged from the guide bar before operation. During cutting, be careful not to disengage the saw blade from the guide bar. If the saw blade is disengaged from the guide bar, the saw blade can be damaged.



6. COMPARISONS WITH SIMILAR PRODUCTS

Maker		HITACHI		P	Q	C	
Model		CR 13VC	CR 12V				
1. Voltage		V	230		230		
2. Power input		W	1,010	720	850	1,050	900
3. Stroke		mm	29	30	32	28	28
4. No-load speed		/min.	0 – 2,800	800 – 2,500	0 – 2,800	0 – 2,600	0 – 2,600
5. Max. output		W	1,180	680	—	—	—
6. Dimensions	L	mm	435	422	430	460	460
	H		165	140	178	170	158
	W		95	86	97	103	100
7. Net weight		kg	3.3	3.2	3.1	3.9	3.5
8. Vibration		dB	124.0	116.2	124.2	123.1	119.8
9. No-load noise		dB	87.5	86.0	86.6	90.2	82.7
10. Features	Variable speed		*T&D	D	T	T	T
	Blade tool-less		○	×	○	○	○
	Base tool-less		×	×	×	○	○
	Handle		Plastic & Rubber	Plastic	Plastic	Plastic	Plastic
	Sealing construction		Triple-seal	Double-seal	Double-seal	Double-seal	Double-seal

* Vibration of the handle in to-and-fro direction

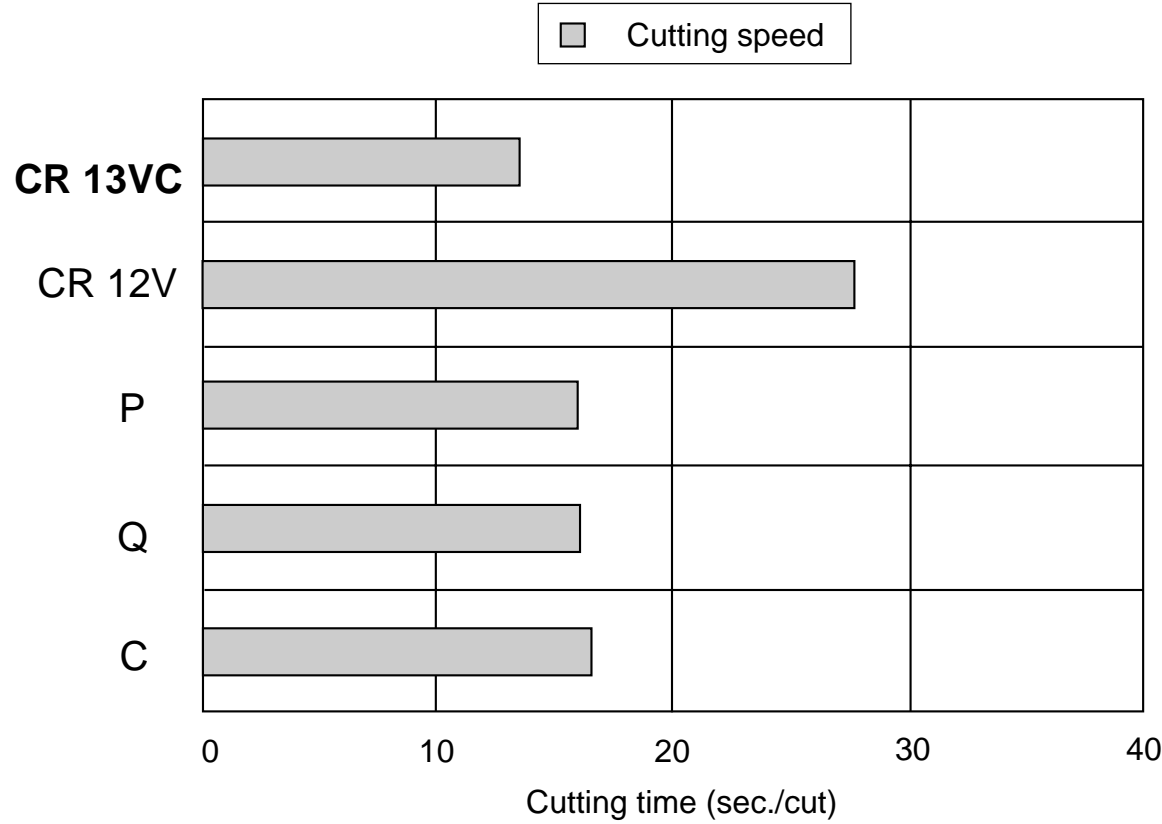
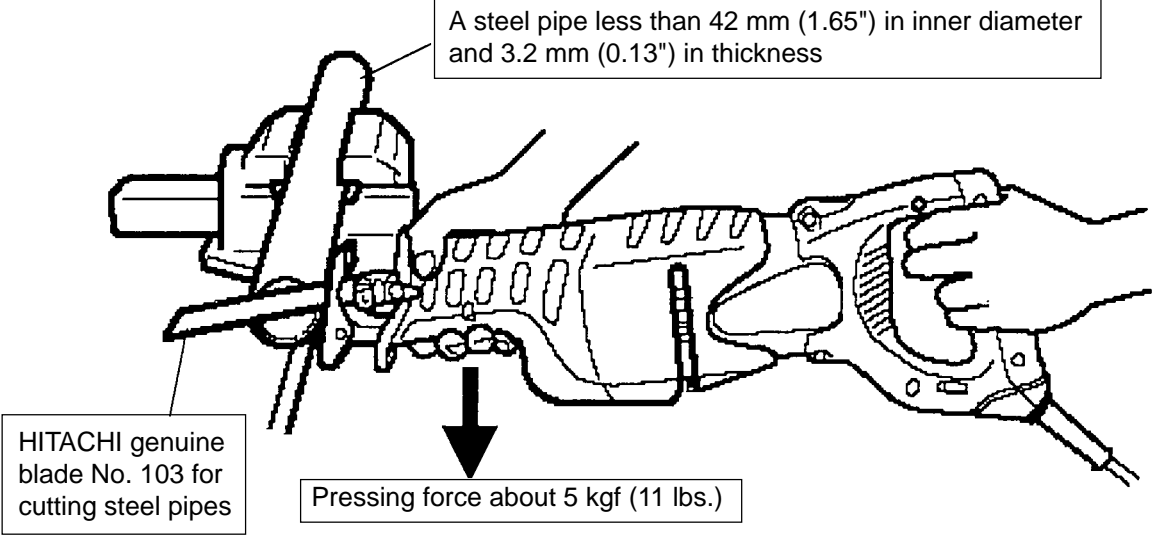
* T: Variable speed control with trigger

D: Variable speed control with dial

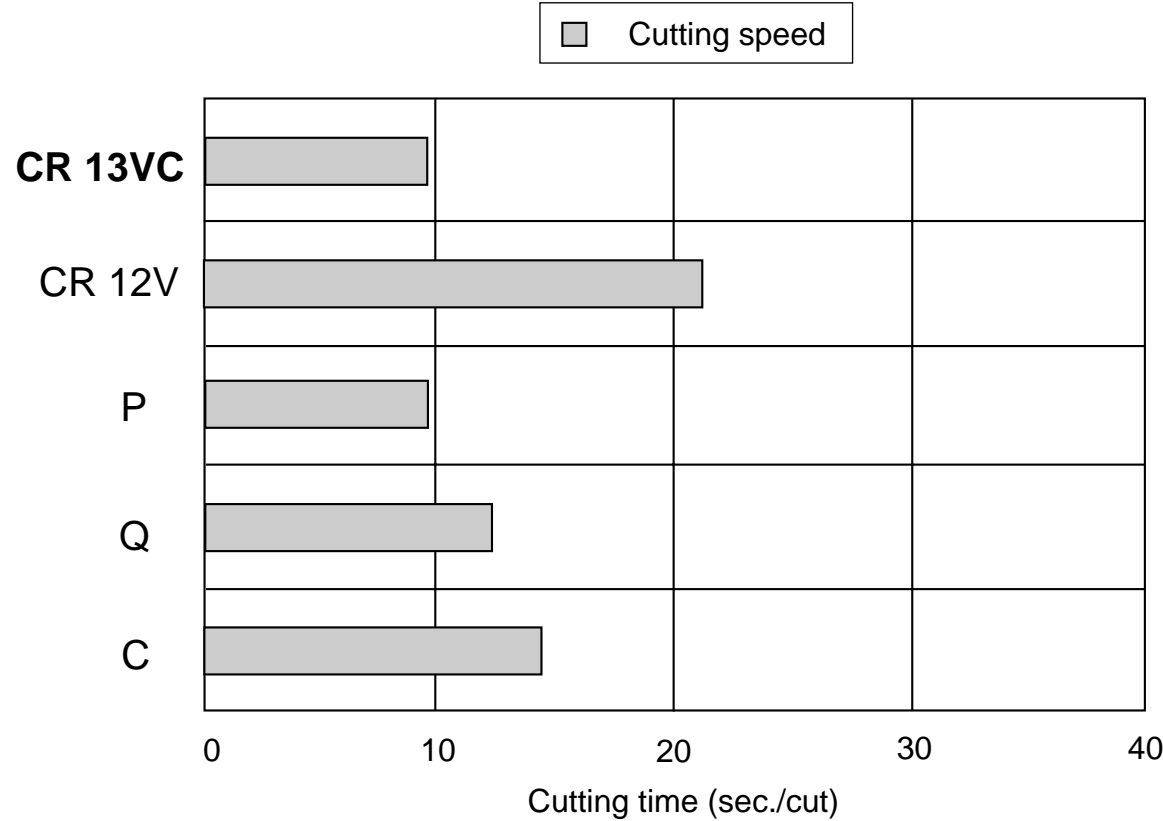
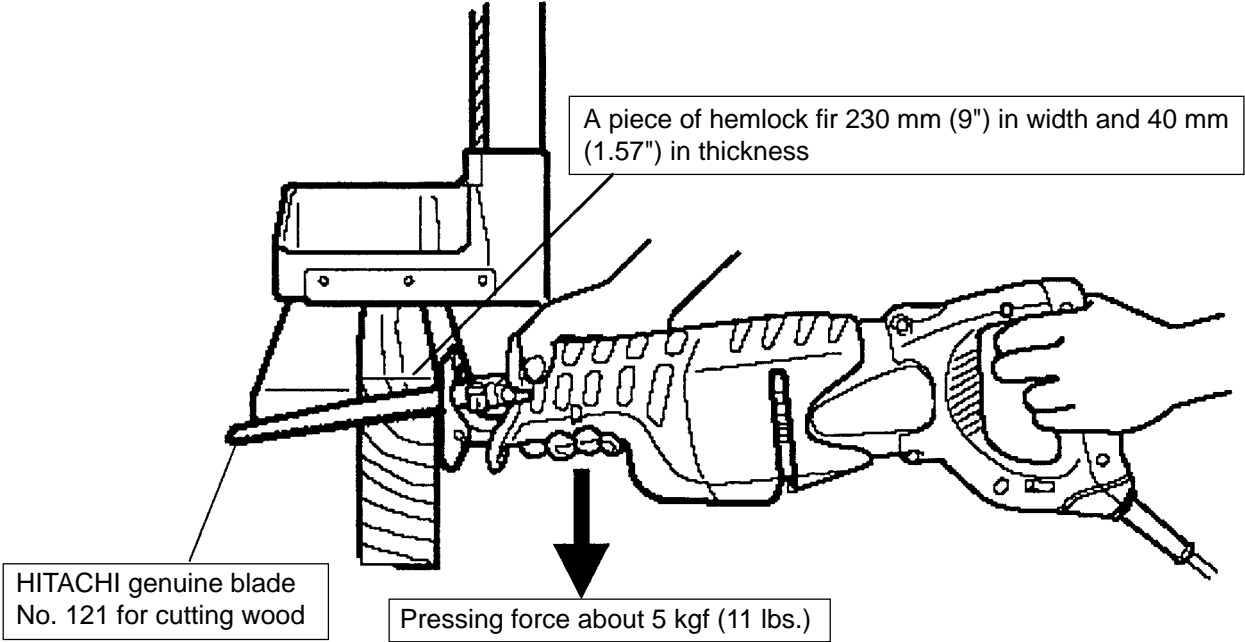
7. COMPARISONS IN CUTTING TIME

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

7-1. Cutting Steel Pipes



7-2. Cutting Wood



7-3. 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.

< 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 to 5 kgf (8.8 to 11 lbs.).

8. PRECAUTIONS IN SALES PROMOTION

In the interest of promoting the safest and most efficient use of the Model CR 13VC 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 Taiwan

使用前請詳讀使用說明書

9. REPAIR GUIDE

9-1. Precautions in Disassembly and Reassembly

The **[Bold]** numbers in the description below correspond to the item numbers in the Parts List and exploded assembly diagram for the Model CR 13VC. Before disassembly or replacement of saw blades, disconnect the power cord plug from the outlet.

1. Disassembly

(1) Removal of Front Cover (C) **[2]** (Fig. 1)

Remove the Hex. Socket Hd. Bolt (W/Flange) M5 x 12 **[22]** and remove Base (B) **[1]**. Remove the Cover Clip **[13]** with a flat-blade screwdriver and remove Front Cover (C) **[2]** from the main body.

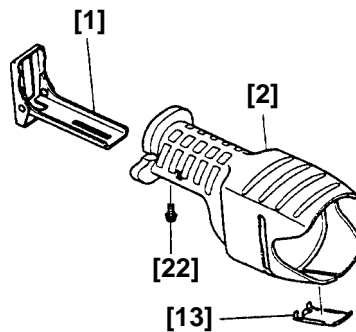


Fig. 1

(2) Removal of Gear Cover (B) **[5]** (Figs. 2 and 3)

Hold the fan of the armature and loosen the Nylock Bolt (W/Flange) M6 x 35 **[20]** about two turns previously. Remove four Machine Screws (W/Washers) M5 x 60 (Black) **[45]** and pull out Gear Cover (B) **[5]** from the main body. Remove the Nylock Bolt (W/Flange) M6 x 35 **[20]** and Washer (G) **[21]**. Then Second Shaft (B) **[30]** and Sub Shaft (B) **[25]** can be removed from Gear Cover (B) **[5]** in an assembly state.

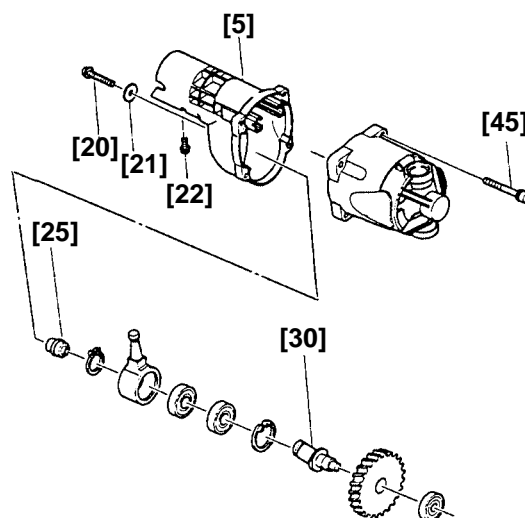


Fig. 2

Remove the Pin D6 [12] and the Swing Roller [11] then remove Plunger (B) [4] assembly from Gear Cover (B) [5]. At this time, be careful not to scratch the Felt Washer [6], V-ring [8] and O-ring [9]. Push out Metal (B) [10] press-fitted in Gear Cover (B) [5] with a press. Remove the V-ring [8], Washer (H) [7] and Felt Washer [6]. Remove the O-ring [9] from Metal (B) [10] with a small flat-blade screwdriver. Remove three Nylock Bolts (W/Flange) M4 x 12 [60] and the Ball Bearing 6002DDCMPS2L [23].

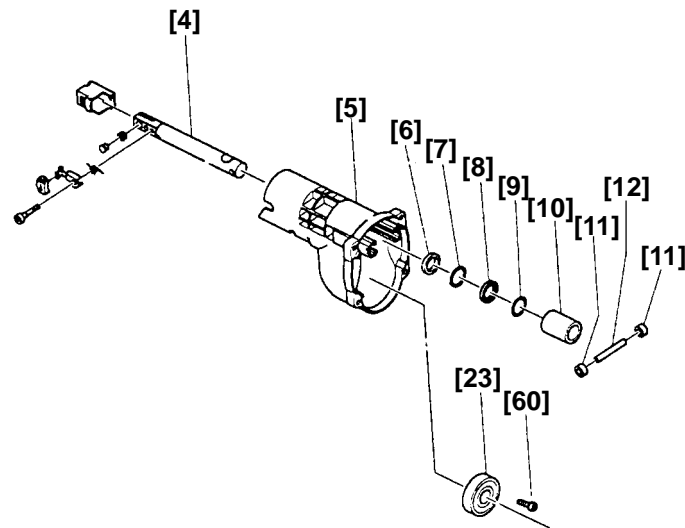


Fig. 3

(3) Removal of the saw blade mount (Fig. 4)

Slide the Cap [15] (made of rubber) out of Lever (A) [16] with fingers horizontally. Remove the Special Bolt M4 [14]. Then Blade Holder (A) [3], Lever (A) [16], Spring (D) [17], Holder Pin (B) [18] and Spring (B) [19] can be removed from Plunger (B) [4]. At this time, be careful not to lose Spring (B) [19].

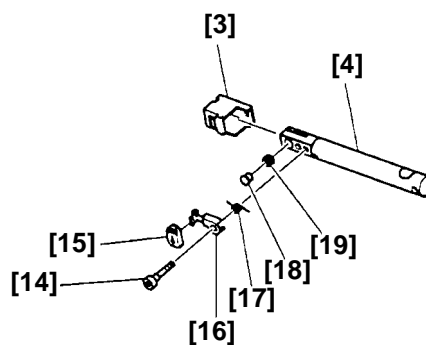


Fig. 4

(4) Removal of Second Shaft (B) [30] (Fig. 5)

Remove the Ball Bearing 608VVC2PS2L [32] from Second Shaft (B) [30]. Push the end surface of Second Shaft (B) [30] with a press supporting the side of Gear (B) [31] to remove Second Shaft (B) [30] from Gear (B) [31]. Remove the Retaining Ring for D17 Shaft [26] from Second Shaft (B) [30]. Push the end surface of Second Shaft (B) [30] (parallel surface to the side of the Recipro Plate [27]) with a press supporting the side of Recipro Plate [27] to remove the Recipro Plate [27] in an assembly state. Remove the Retaining Ring for D35 Hole [29] and remove two Ball Bearings 6003VVCMP2S2L [28] from the Recipro Plate [27].

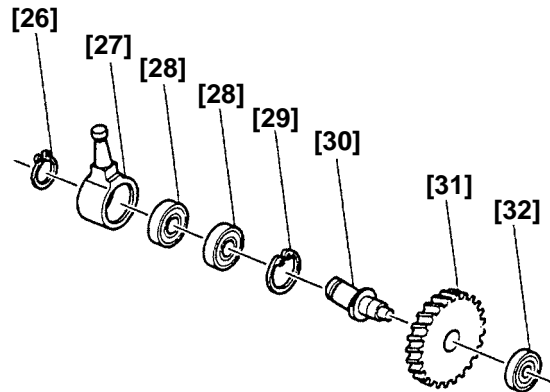


Fig. 5

Removal of Inner Cover (B) [33] and Housing (Green) [40] (Fig. 6)

Remove two Brush Caps [41] and two Carbon Brushes [42]. Tap the air vent of the Housing (Green) [40] lightly with a plastic hammer. Then Inner Cover (B) [33] can be removed together with the Armature [35] from the Housing (Green) [40]. At this time, do not hit the fan with the plastic hammer. Remove the Fan Guide [36] from the Housing (Green) [40].

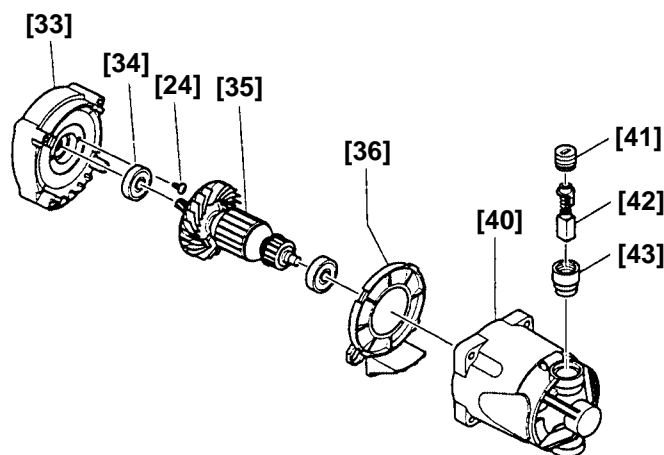


Fig. 6

(5) Removal of Inner Cover (B) [33] and Armature [35] (Fig. 7)

Push the pinion end surface of the Armature [35] with a press supporting the end surface of Inner Cover (B) [33] to remove the Armature [35]. Remove two Slotted Hd. Screws (Seal Lock) M4 x 10 [24] and the Ball Bearing 6001VVCMP2L [34].

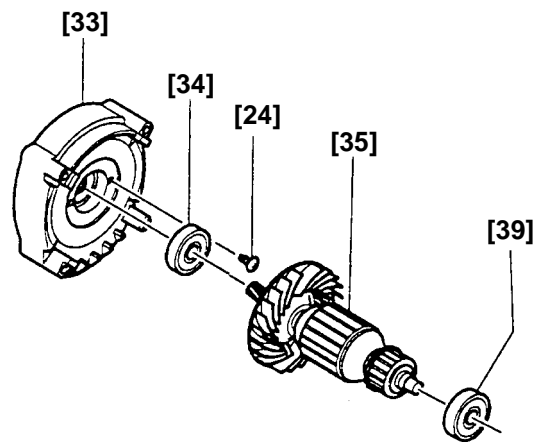


Fig. 7

(6) Removal of Handle (A) [53] and Handle (B) [48] (Fig. 8)

Remove five Tapping Screws (W/Flange) D4 x 25 (Black) [47] and Handle (B) [48]. Then the Switch Trigger [50] can be removed.

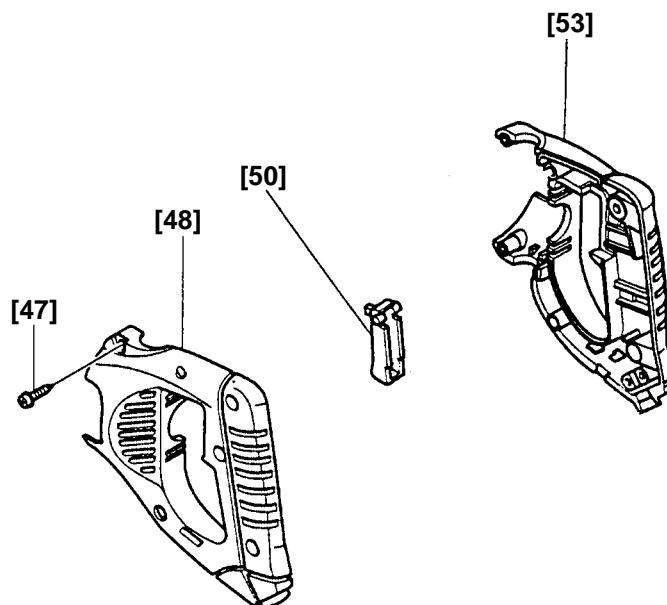


Fig. 8

(7) Removal of Handle (A) [53] and Switch [51] (Fig. 9)

Loosen the machine screws securing two internal wires coming from the Stator Ass'y [38] and two internal wires coming from the Cord [59]. Then the Switch [51] can be removed from Handle (A) [53]. Remove two Tapping Screws (W/Flange) D4 x 16 [56] and remove the Cord Clip [57], Cord [59] and Cord Armor [58] from Handle (A) [53].

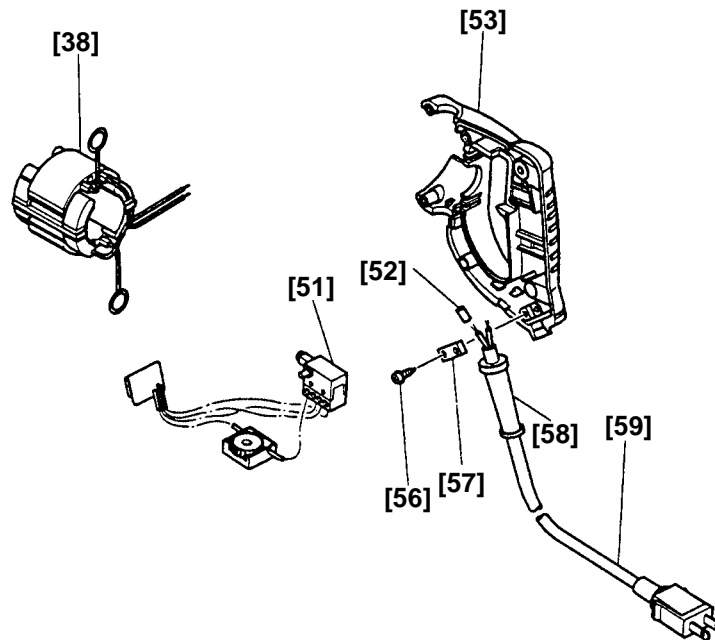


Fig. 9

(8) Removal of Housing (Green) [40] and Brush Holder [43] (Fig. 10)

Remove the brush terminal coming from the Stator Ass'y [38] from the Brush Holder [43]. Push out the Brush Holder [43] from the inside of the Housing (Green) [40] with a flat-blade screwdriver (no screw nor adhesive is used).

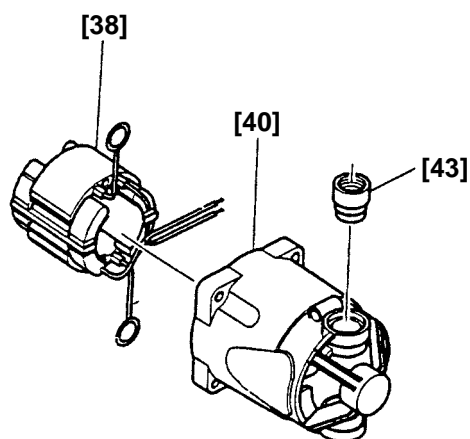


Fig. 10

2. Reassembly

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

(1) Mounting Second Shaft (B) [30] to the Recipro Plate [27] (Fig. 11)

Use the special jigs (J-330 and J-315) for press-fitting.

First, mount two Ball Bearings 6003VVCMP2L [28] and the Retaining Ring for D35 Hole [29] to the Recipro Plate [27] to make an assembly of the Recipro Plate [27].

(a) When Gear (B) [31] and Ball Bearing 608VVC2PS2L [32] are not mounted:

Mount the assembly of the Recipro Plate [27] to the jigs as shown in Fig. 11-a and push it in the arrow direction with a press.

(b) When Gear (B) [31] and Ball Bearing 608VVC2PS2L [32] are mounted:

Mount the assembly of the Recipro Plate [27] to the jigs as shown in Fig. 11-b and push it in the arrow direction with a press. Be careful of the direction when press-fitting the assembly of the Recipro Plate [27].

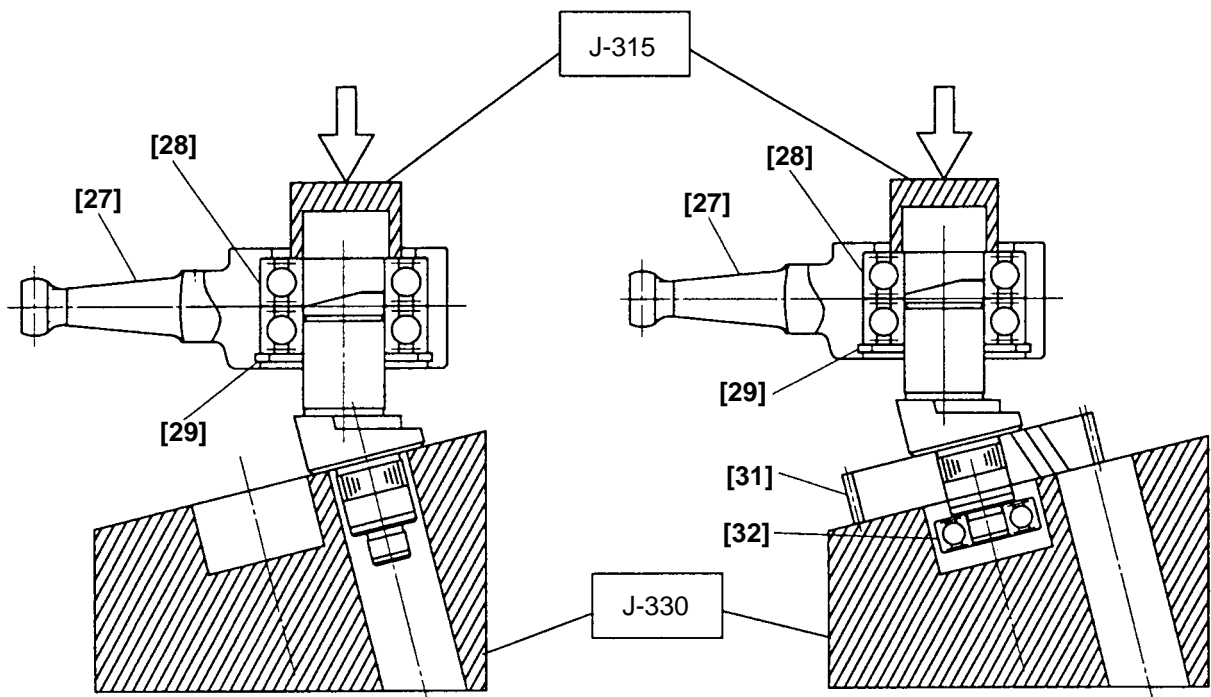


Fig. 11-a

Fig. 11-b

(2) Mounting the saw blade mount (Figs. 12, 13 and 14)

Insert Spring (B) [19] and Holder Pin (B) [18] into Plunger (B) [4]. Apply Nippeco SEP-3A to the slanted portion of Lever (A) [16]. Mount the shorter end of Spring (D) [17] into Lever (A) [16] then mount Lever (A) [16] into Blade Holder (A) [3]. Keeping this state, insert the tip of Plunger (B) [4] into Blade Holder (A) [3]. At this time, fit Spring (D) [17] in the groove of Plunger (B) [4] securely. Tighten the Special Bolt M4 [14] at the specified torque. Push the Cap [15] to Lever (A) [16] from the side so that the arrow mark on the Cap [15] points downward. At this time, check that there is no gap between the Cap [15] and Blade Holder (A) [3]. Be careful not to break the Special Bolt M4 [14] by overtightening with an M5 hexagonal wrench. Finally, mount and dismount the saw blade to check for operation.

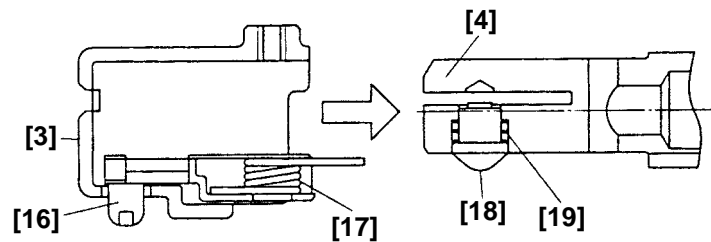


Fig. 12

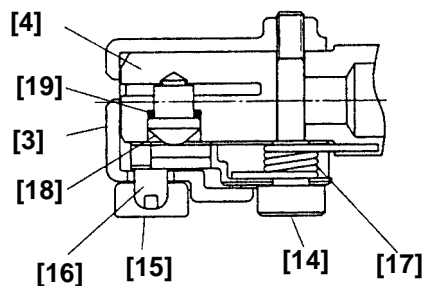


Fig. 13

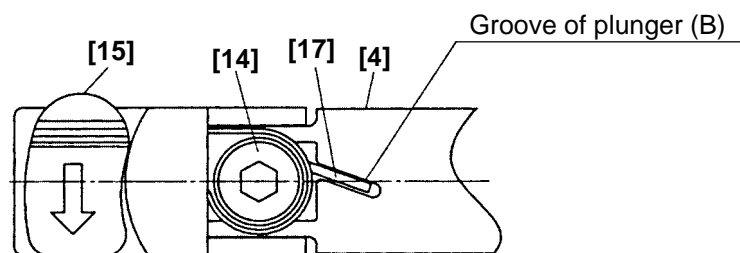


Fig. 14

(3) Mounting Metal (B) [10] to Gear Cover (B) [5] (Fig. 15)

Apply Nippeco SEP-3A to the inner circumferences of Metal (B) [10] and the O-ring [9]. Mount the O-ring [9] to the inside groove of Metal (B) [10]. Mount the Felt Washer [6], Washer (H) [7] and the V-ring [8] to Gear Cover (B) [5] in order. Press-fit Metal (B) [10] (an inspection hole is provided at one side) all the way with a press. At this time, carefully mount the Felt Washer [6], Washer (H) [7] and the V-ring [8] to the proper positions in Gear Cover (B) [5] respectively. If Metal (B) [10] is press-fitted without mounting these parts properly, they may be damaged or Plunger (B) [4] may be improperly mounted or the water-resistance may be degraded.

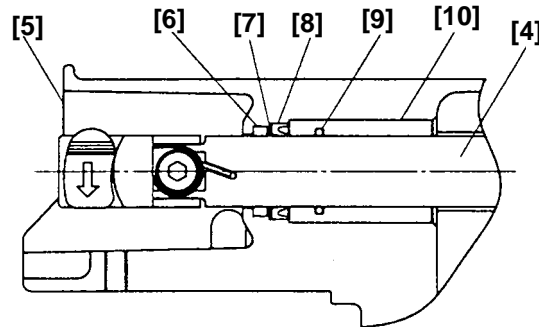


Fig. 15

(4) Mounting the Ball Bearing 6002DDCMPS2L [23] to Gear Cover (B) [5] (Fig. 15)

Mount the Ball Bearing 6002DDCMPS2L [23] to Gear Cover (B) [5] securely. Tighten three Slotted Hd. Screws (Seal Lock) M4 x 10 [24] at the specified torque two times respectively. Improper mounting of the Ball Bearing 6002DDCMPS2L [23] or improper tightening of the Slotted Hd. Screws (Seal Lock) M4 x 10 [24] may cause malfunction of the Model CR 13VC.

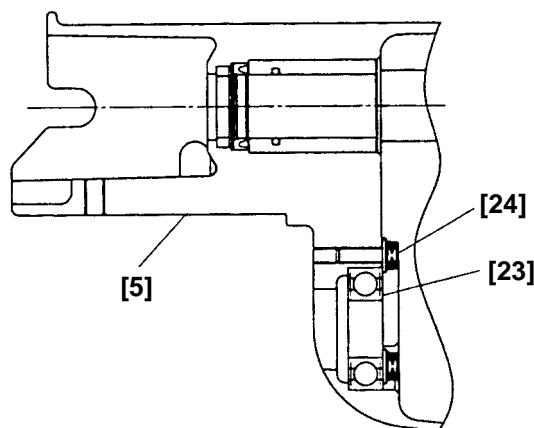


Fig. 16

(5) Mounting Plunger (B) [4] to Gear Cover (B) [5] (Fig. 17)

Apply Nippeco SEP-3A to the polished portion of Plunger (B) [4] (the saw blade mount has already been mounted). Insert it into Gear Cover (B) [5]. When inserting, turn the Felt Washer [6], V-ring [8] and O-ring [9] slowly to prevent scratching them. Especially be careful of the Felt Washer [6] because it is apt to be caught by Plunger (B) [4]. After insertion of Plunger (B) [4], apply Nippeco SEP-3A to the Pin D6 [12] and the inner circumferences of two Swing Rollers [11] then mount them to Plunger (B) [4].

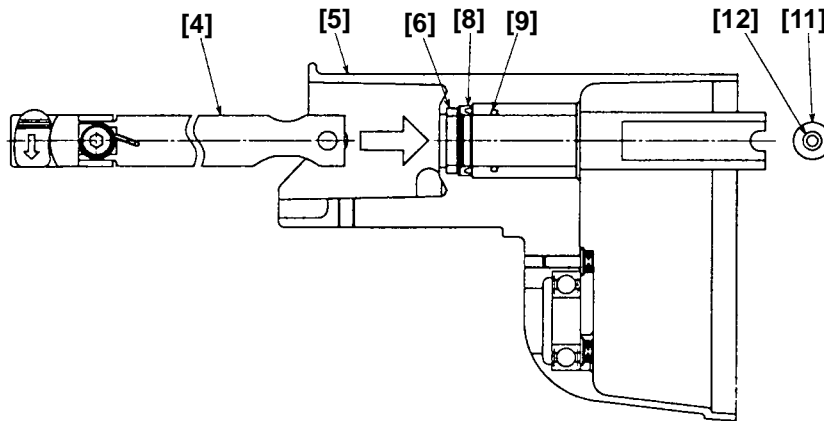


Fig. 17

(6) Others

* Caution when reinstalling the Armature [35] to the Housing (Green) [40]

The Armature [35] may come off the Ball Bearing 6001VVCMP52L [34] when removing the Armature [35] from the Housing (Green) [40]. To prevent it, press-fit the Armature [35] to the Ball Bearing 6001VVCMP52L [34] before reinstalling the Armature [35] to the Housing (Green) [40] (Fig. 7).

* Be careful of the mounting direction of the Cord Clip [57]. (Fig. 18)

Cord dia.: More than 6.4 mm dia., 8.5 mm dia. or less. Cord dia.: More than 8.5 mm dia., 10.8 mm dia. or less.

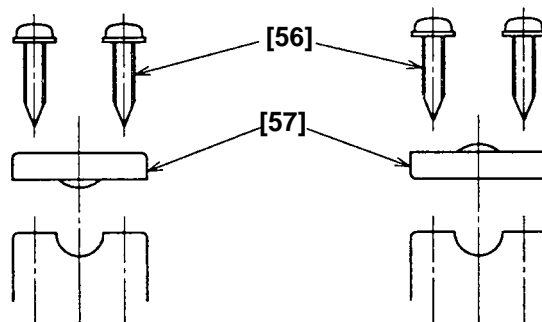


Fig. 18

9-2. Lubrication

Nippeco SEP-3A

- Slanted portion of Lever (A) [16]
- Inner circumference of the Swing Roller [11]
- Teeth of Gear (B) [31]
- Pinion of the Armature [35]
- Apply 45 g of Nippeco SEP-3A to the Swing Roller [11], Plunger (B) [4] and Gear (B) [31] in Gear Cover (B) [5].
- O-ring [9]
- Spherical portion of the Recipro Plate [27]
- Polished portion of Plunger (B) [4]
- Inner circumference of Metal (B) [10]

9-3. Tightening Torques

- Slotted Hd. Screw (Seal Lock) M4 x 10 [24] $1.8 \pm 0.4 \text{ N}\cdot\text{m}$ ($18 \pm 4 \text{ kgf}\cdot\text{cm}$)
- Tapping Screws (W/Flange) D4 [47] [56] $2.0 \pm 0.5 \text{ N}\cdot\text{m}$ ($20 \pm 5 \text{ kgf}\cdot\text{cm}$)
- Nylock Bolt (W/Flange) M4 [60] $3.6 \pm 0.7 \text{ N}\cdot\text{m}$ ($37 \pm 7 \text{ kgf}\cdot\text{cm}$)
- Special Bolt M4 [14] $4.4 \pm 0.5 \text{ N}\cdot\text{m}$ ($45 \pm 5 \text{ kgf}\cdot\text{cm}$)
- Machine Screws (W/Washers) M5 x 60 (Black) [45] $2.5 \pm 0.5 \text{ N}\cdot\text{m}$ ($25 \pm 5 \text{ kgf}\cdot\text{cm}$)
- Hex. Hd. Tapping Screw D5 x 60 [37] $3.4 \pm 0.7 \text{ N}\cdot\text{m}$ ($35 \pm 7 \text{ kgf}\cdot\text{cm}$)
- Hex. Socket Hd. Bolt (W/Flange) M5 x 12 [22] $5.9 \pm 1.5 \text{ N}\cdot\text{m}$ ($60 \pm 15 \text{ kgf}\cdot\text{cm}$)
- Nylock Bolt (W/Flange) M6 x 35 [20] $11.8 \pm 2.0 \text{ N}\cdot\text{m}$ ($120 \pm 20 \text{ kgf}\cdot\text{cm}$)

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. (Figs. 19, 20, 21 and 22)

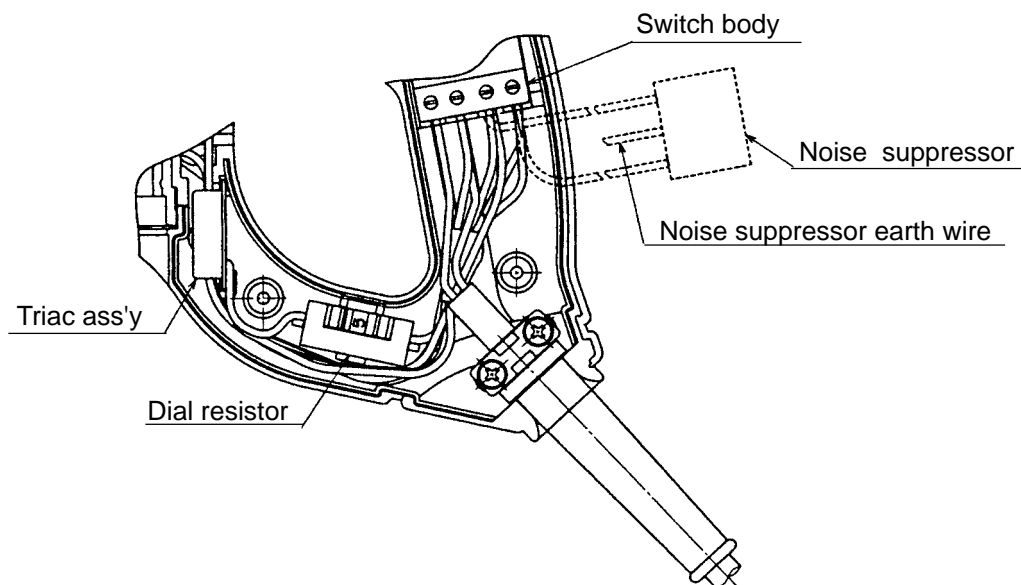


Fig. 19

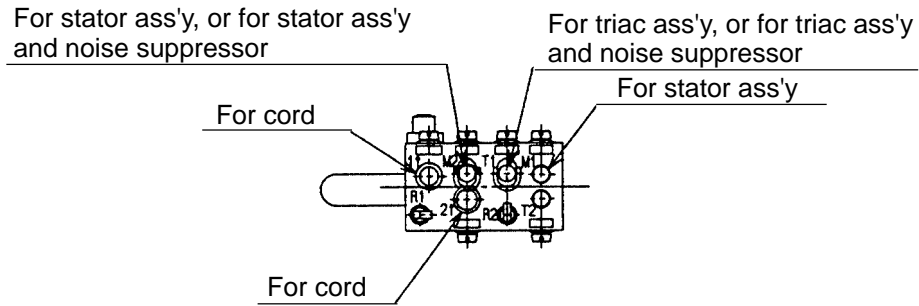


Fig. 20

With noise suppressor type

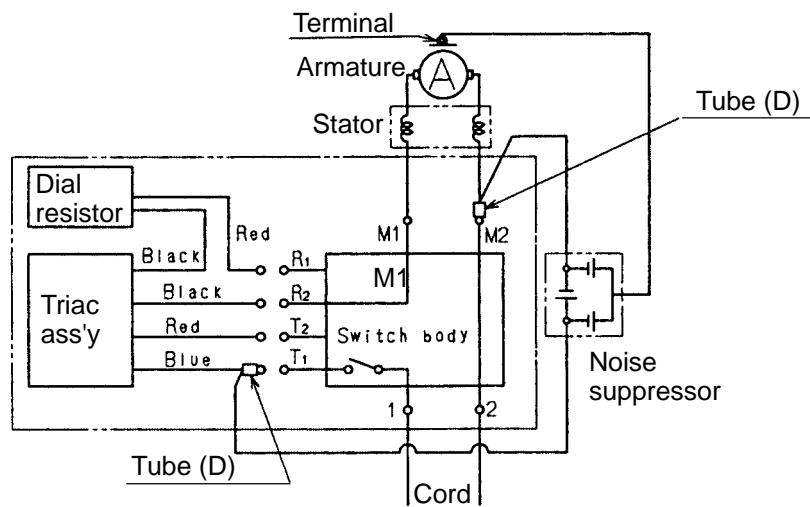


Fig. 21

120 V type

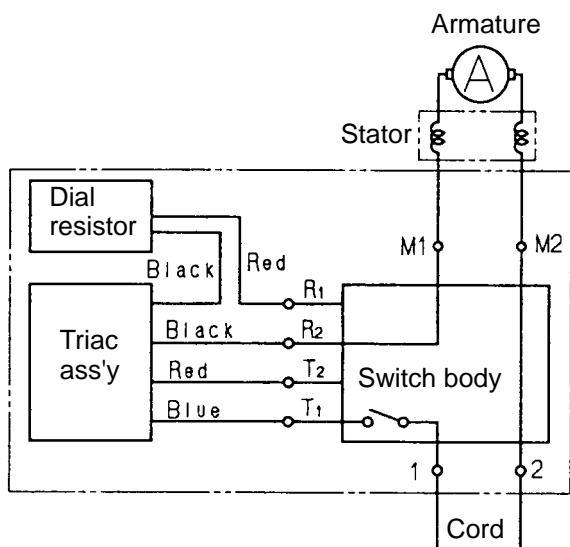


Fig. 22

Other type

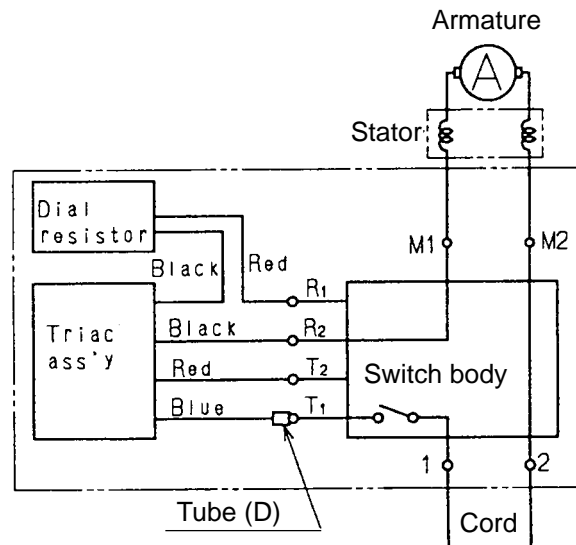


Fig. 23

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 resistatance and conduct dielectric strength test.

Insulation resistance: 7 MΩ 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 ... 4.4 A max.	115 V ... 4.2 A max.	120 V ... 4.1 A max.
127 V ... 4.3 A max.	220 V ... 2.1 A max.	230 V ... 2.2 A max.
240 V ... 2.1 A max.		

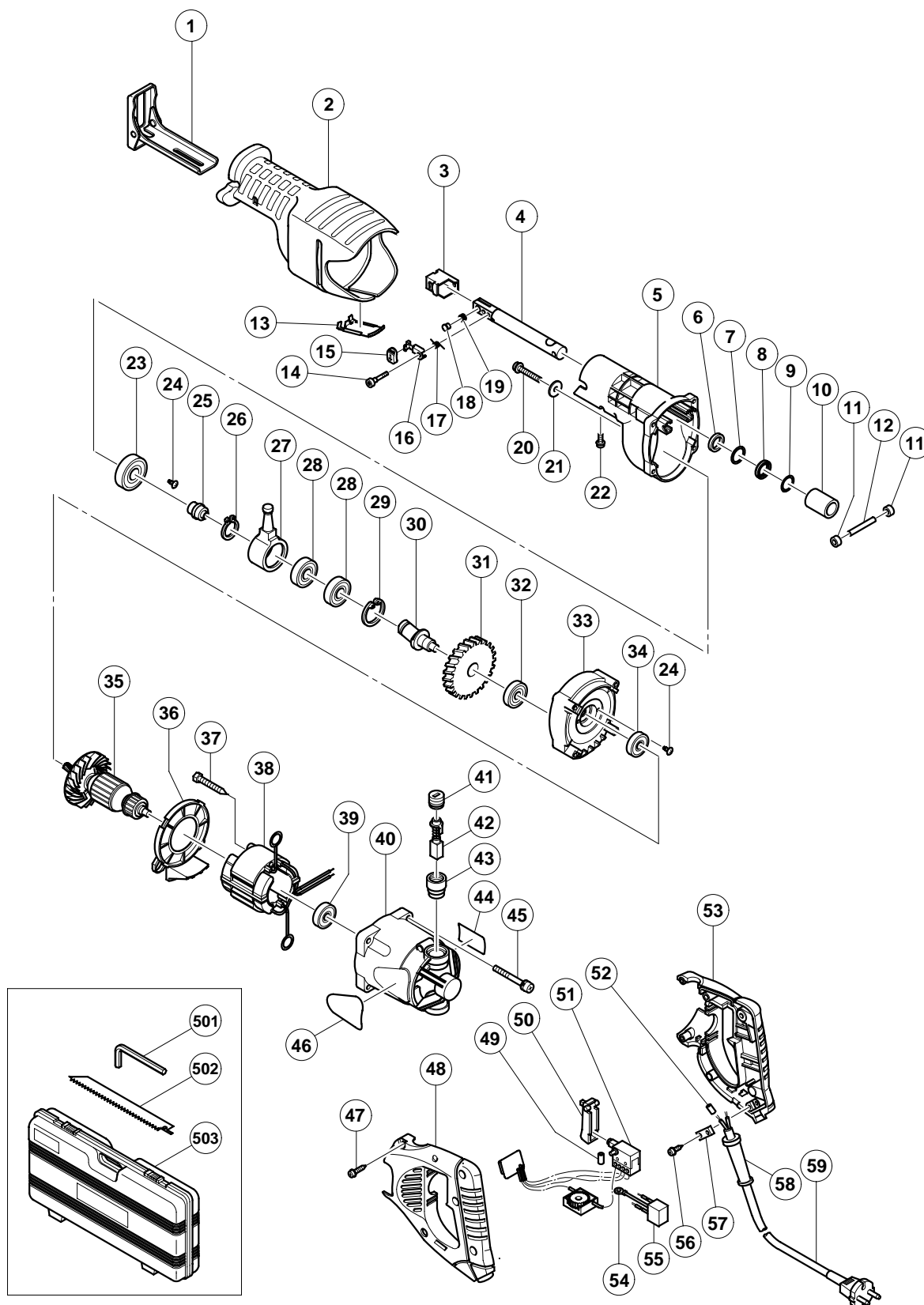
11. STANDARD REPAIR TIME (UNIT) SCHEDULES

[illegible]

ELECTRIC TOOL PARTS LIST

■ RECIPROCATING SAW Model CR 13VC

2002 • 8 • 30
(E1)



PARTS

CR 13VC

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
1	321-116	BASE (B)	1		
2	321-125	FRONT COVER (C)	1		
3	321-132	BLADE HOLDER (A)	1		
4	321-120	PLUNGER (B)	1		
5	321-123	GEAR COVER (B)	1		
6	318-458	FELT WASHER	1		
7	321-117	WASHER (H)	1		
8	318-459	V-RING	1		
9	321-118	O-RING	1		
10	321-214	METAL (B)	1		
11	321-136	SWING ROLLER	2		
12	318-491	PIN D6	1		
13	321-126	COVER CLIP	1		
14	321-133	SPECIAL BOLT M4	1		
15	321-130	CAP	1		
16	321-131	LEVER (A)	1		
17	321-135	SPRING (D)	1		
18	321-134	HOLDER PIN (B)	1		
19	318-483	SPRING (B)	1		
20	318-451	NYLOCK BOLT (W/FLANGE) M6X35	1		
21	318-452	WASHER (G)	1		
22	996-399	HEX. SOCKET HD. BOLT (W/FLANGE) M5X12	1		
23	600-2DD	BALL BEARING 6002DDCMPS2L	1		
24	314-430	SLOTTED HD. SCREW (SEAL LOCK) M4X10	5		
25	321-129	SUB SHAFT (B)	1		
26	967-261	RETAINING RING FOR D17 SHAFT	1		
27	321-121	RECIPRO PLATE	1		
28	600-3VV	BALL BEARING 6003VVCMP2L	2		
29	939-556	RETAINING RING FOR D35 HOLE (10 PCS.)	1		
30	321-128	SECOND SHAFT (B)	1		
31	321-127	GEAR (B)	1		
32	608-VVM	BALL BEARING 608VVC2PS2L	1		
33	321-124	INNER COVER (B)	1		
34	600-1VV	BALL BEARING 6001VVCMP2L	1		
* 35	360-581C	ARMATURE 110V	1		
* 35	360-581U	ARMATURE ASS'Y 120V	1	INCLUD.34,39	
* 35	360-581E	ARMATURE 220V-230V	1		
* 35	360-581F	ARMATURE 240V	1		
36	321-122	FAN GUIDE	1		
37	961-501	HEX. HD. TAPPING SCREW D5X60	2		
* 38	340-479H	STATOR ASS'Y 110V-115V	1	INCLUD.37	
* 38	340-479G	STATOR ASS'Y 120V-127V	1	INCLUD.37	
* 38	340-479E	STATOR ASS'Y 220V-230V	1	INCLUD.37	
* 38	340-479K	STATOR ASS'Y 240V	1	INCLUD.37	
* 38	340-479J	STATOR ASS'Y 220V-230V	1	INCLUD.37 FOR NZL,FIJ,GBR,EUROPE,NOR,SWE,	
				DEN,FIN	
39	608-VVM	BALL BEARING 608VVC2PS2L	1		
40	318-506	HOUSING (GREEN)	1		
41	945-161	BRUSH CAP	2		
42	999-043	CARBON BRUSH (1 PAIR)	2		
43	958-900	BRUSH HOLDER	2		

CR 13VC

- 3 -

CR 13VC

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OPTIONAL ACCESSORIES

[illegible]

