

MODEL

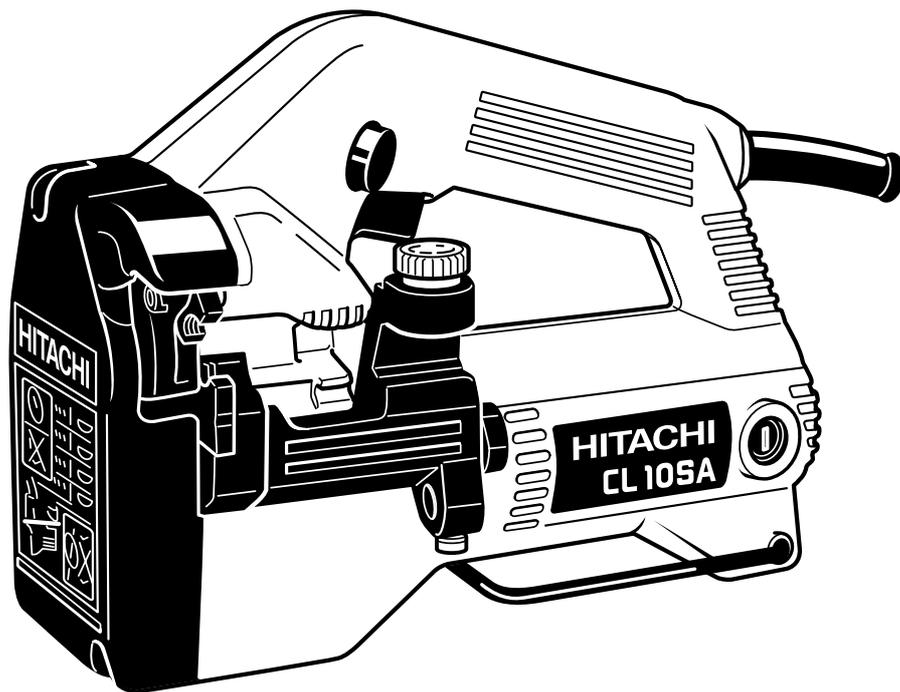
CL 10SA

HITACHI
POWER TOOLS

STUD CUTTER
CL 10SA

TECHNICAL DATA
AND
SERVICE MANUAL

C



LIST No. 0789

Jan. 2001

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	2
4-1. Selling Point Descriptions	2
5. SPECIFICATIONS	7
5-1. Specifications	7
5-2. Optional Accessories	7
6. COMPARISONS WITH SIMILAR PRODUCTS	8
6-1. Specification Comparisons	8
7. PRECAUTIONS IN SALES PROMOTION	9
7-1. Safety Instructions	9
8. REPAIR GUIDE	12
8-1. Precautions in Disassembly and Reassembly	12
8-2. Reassembly	17
8-3. Insulation Tests	25
8-4. No-load Current Value	25
9. STANDARD REPAIR TIME (UNIT) SCHEDULES	26
Assembly Diagram for CL 10SA	

1. PRODUCT NAME

Hitachi 10 mm Stud Cutter, Model CL 10SA

2. MARKETING OBJECTIVE

One of the primary uses of studs is for hanging of electric cable racks, air-conditioning ducts, and plumbing pipes and drains. Studs are usually sold in standard lengths of 1 to 3 meters, and must be cut to desired lengths in accordance with installation needs. They are currently being cut by cut-off machines, disc grinders, or manual hack saws, frequently require the use of files and grinders for deburring and finishing before they can be used. The current Model CL 10D stud cutter is, however, expensive because it is cordless and there is an increasing demand for a low-price stud cutter with cord. The new Model CL 10SA is a light-weight and low-price stud cutter adopting the same cam system as that of the Model CL 10D and sharing components with the Model CL 10D2 that is an upgraded version of the Model CL 10D. The Model CL 10SA can correspond to various applications with the wide selection of cutters (M10, M8, M6 and W3/8).

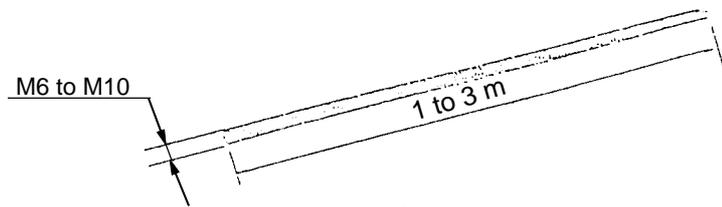


Fig. 1

3. APPLICATIONS

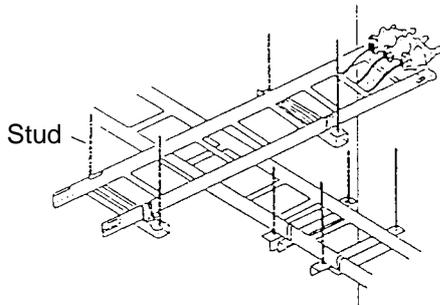
○ Cutting of mild-steel studs

[Typical threaded stud applications]

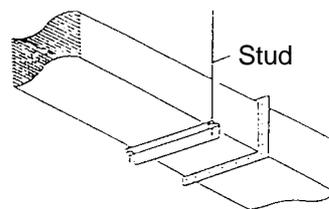
Electrical installation Suspension of luminaires, cable racks, conduit pipes, etc.

Air-conditioning Suspension of air-conditioning ducts, exhaust ducts, etc.

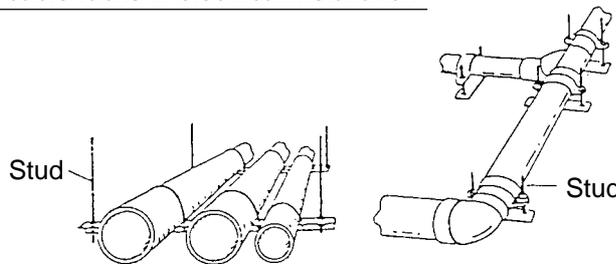
Plumbing installation Suspension of feed and drain pipes



(1) Suspension of cable racks in electrical installation



(2) Suspension of air-conditioning ducts



(3) Suspension of feed and drain pipes in plumbing work

Fig. 2

4. SELLING POINTS

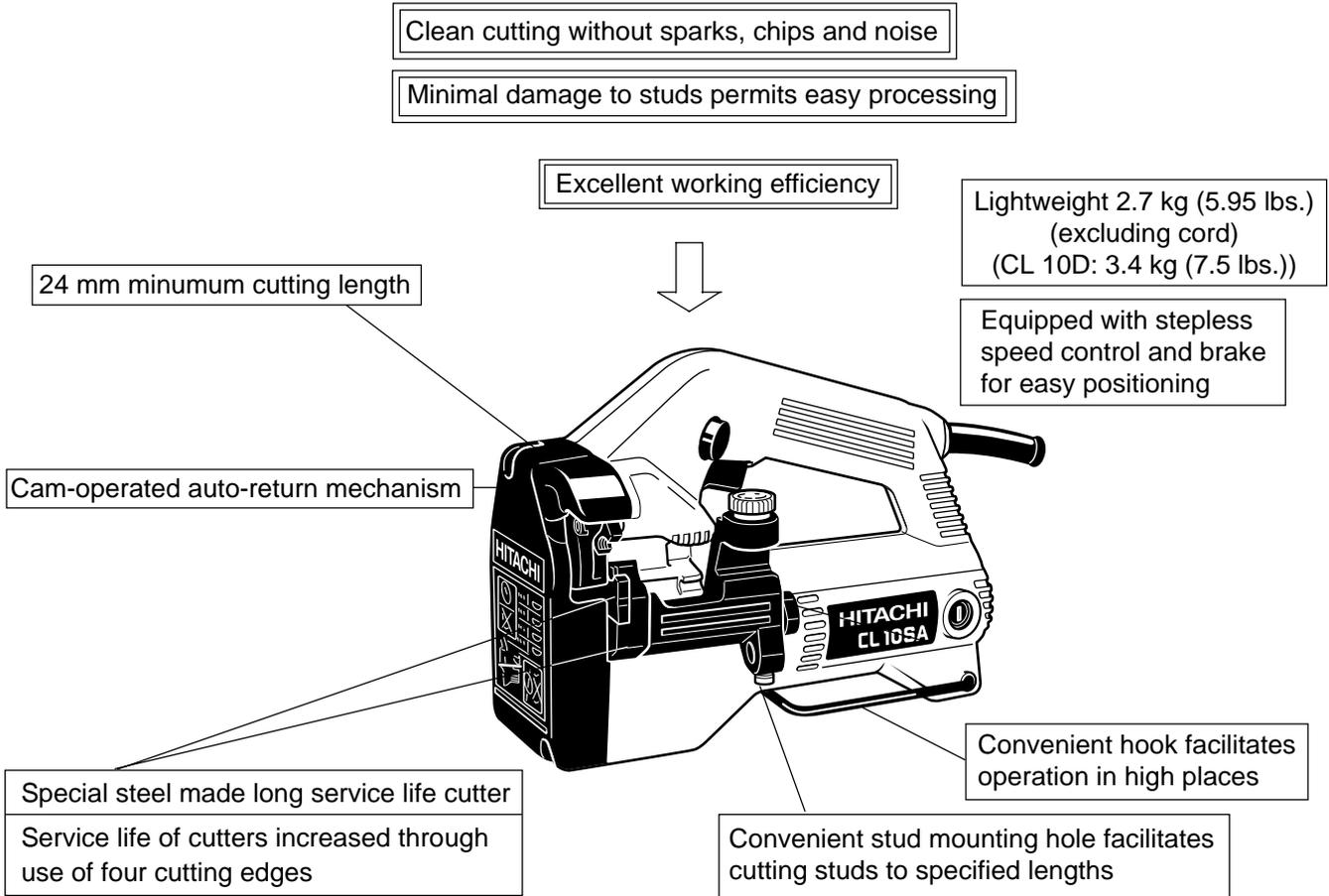


Fig. 3

4-1. Selling Point Descriptions

(1) Clean cutting without sparks, chips and noise

A safer and better working environment without fear of fire or scattering of chips and dust is ensured because the Model CL 10SA does not produce the chips, dust, and sparks unlike cut-off machines and disc grinders.

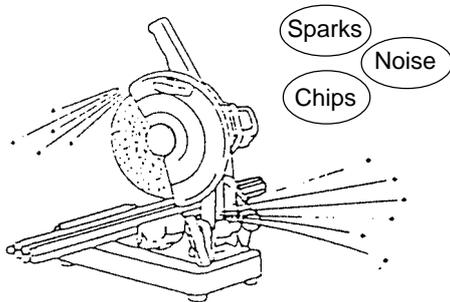


Fig. 4 Cutting by cut-off machine

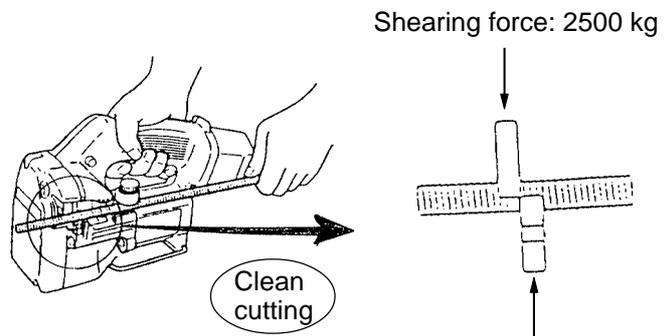
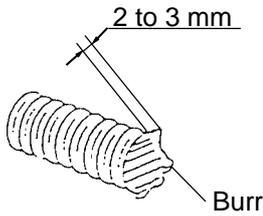


Fig. 5 Clean shearing with Model CL 10SA

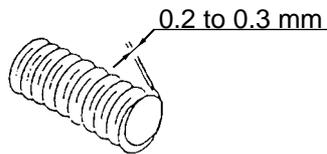
(2) Minimal damage to studs permits easy processing

Because of the special cutters employed, few burrs are caused during cutting, and nuts can be attached to the studs smoothly and easily. Deburring can be done easily and quickly by means of the provided trimmer.

[Stud cut with cut-off machine]



[Stud cut with Model CL 10SA]



Necessary torque: 5 kg-cm or below

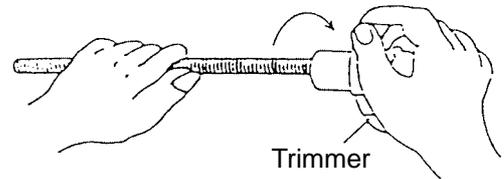


Fig. 6 Comparison of stud condition after cutting

Fig. 7 Deburring of stud with trimmer

(3) Lightweight

The length of a stud is basically determined by the various needs of the work site. If the ceiling is slanted, for example, it is hard to determine appropriate lengths. In such a case, it is common to hang studs which are longer than the required length, and mark and cut them off later. When mounting ducts, up to 20 studs can be cut at a time at floor level (with a cut-off machine, for example). When mounting luminaires, however, often only two studs are cut in one spot. This means that the cut-off machine must be moved from one spot to another over a wide area.

The Model CL 10SA is compact, lightweight, so it is easily transportable and particularly convenient for cutting off hanged studs.

(1) 20 to 30 % of studs are cut after being hanged.

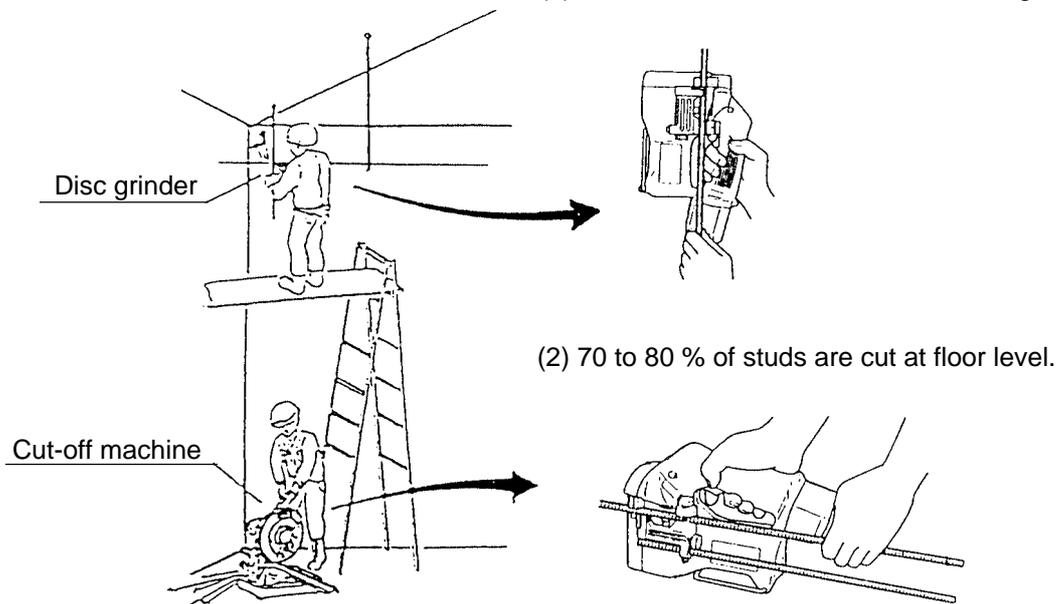


Fig. 8 Illustration of stud cutting work

(4) Long service life through use of stud cutting edges

Because of the uniquely shaped cutters specially developed by HITACHI, each cutter has four (front, back, upper, and lower) which can be used in turn for cutting studs. Each cutter is made of high wear-resistant, special steel, and is capable of cutting up to 500 studs with each of its cutting edges. Accordingly, up to 2,000 studs can be cut with appropriate use of the four cutting edges.

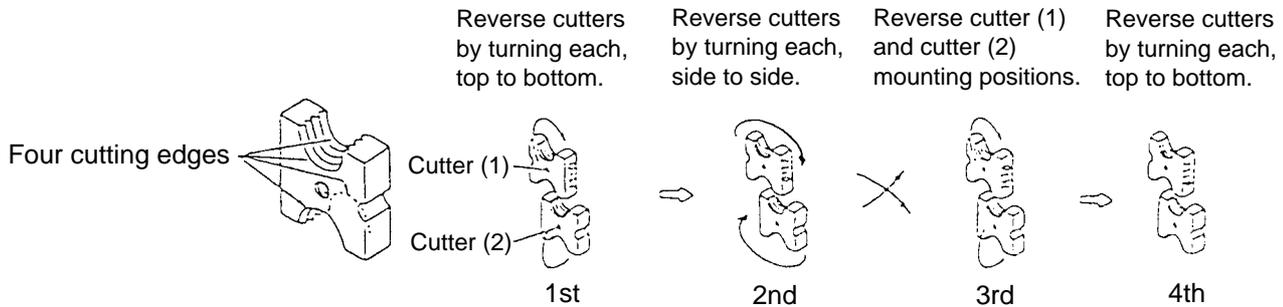
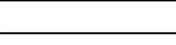


Fig. 9

(5) Excellent working efficiency

In conventional cutting with a cut-off machine or disc grinder, considerable time is required for deburring after the studs have been cut. In actual tests, the Model CL 10SA is approximately three times more efficient than cut-off machines or disc grinders.

Table 1. Cutting time comparison

Type of cutting tool	Cutting time (sec.)		
	10	20	30
Stud cutter CL 10SA	 2.4 (M10)		
Cordless stud cutter CL 10D	 2.6 (M10)		
• High-speed cut-off machine • Grinder	 8		
Hand saw			 30 to 60

(6) Minimum cutting length

As illustrated in Fig. 10, it is sometimes necessary to cut studs 30 mm or less from the ceiling surface when installing fluorescent lamps in electrical installation work. The Model CL 10SA permits cutting protruding studs to a minimum length of 24 mm from the ceiling surface.

In addition, when installing ducts in air-conditioning equipment installation work, it may be necessary to enclose the ducts with insulation (lagging) after installation to prevent the formation of dew. In such a case, studs must be cut as short as possible so that they do not protrude from L-shaped angles, in order to prevent damage of the lagging. As illustrated, the Model CL 10SA permits cutting of studs within an L-shaped angle measuring 25 mm x 25 mm x 3 mm (t).

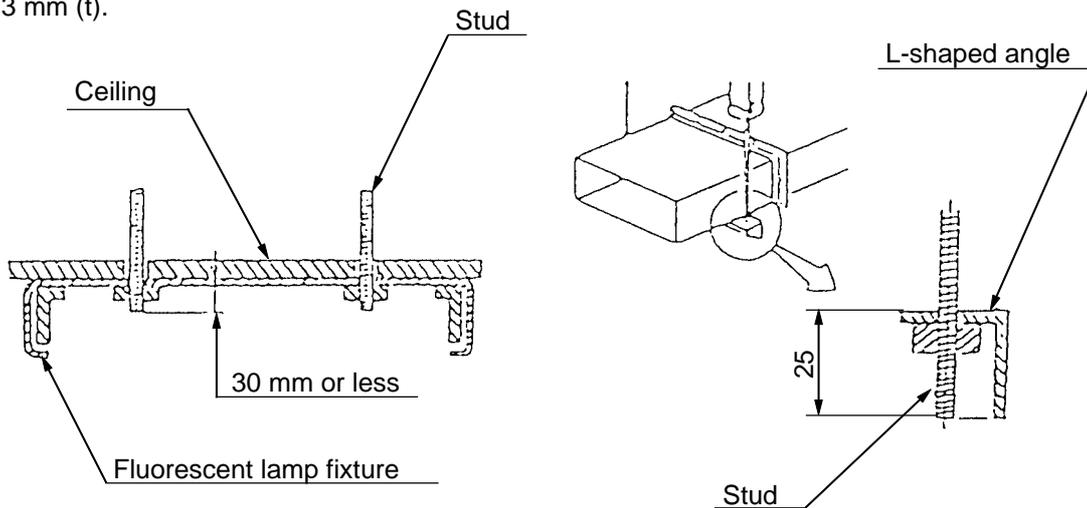


Fig. 10 Minimum cutting length

(7) Equipped with stepless speed control and brake for easy positioning

Before cutting a stud, when setting the open cutter to the desired cutting position, setting can be easily accomplished by turning on the switch at "Low speed". Also, as the Model CL 10SA is equipped with a brake that stops the cutter movement in an instant, the cutting operation can be stopped instantly at any desired condition without worry of unwanted inertial movement after the switch is turned off. Combined use of these two features provides excellent operability. When cutting a fastened stud (for example, hanged stud in a high place), the cutter can be closed at "Low speed" and, after ensuring the cutter properly engages the threads of the stud, the cutting operation can be performed at "full speed". This prevents possible abnormal bite, and ensures clean, accurate cutting.

(8) Convenient hook facilitates operation in high places

When performing equipment installation work in high places, cutting of hanging studs is often only one of several jobs that must be performed. Accordingly, it is sometimes necessary to put the stud cutter aside and use both hands for some other job. In such cases, the hook is very useful for hanging the stud cutter from a nearby conduit, steel grounding material, cable rack, or similar support when not in use.

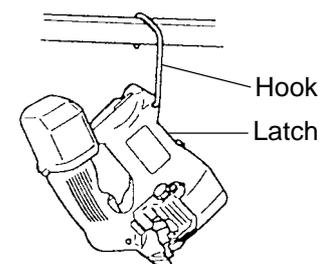


Fig. 11 Convenient hook facilitates operation in high places

(9) Convenient stud mounting hole facilitates cutting studs to specified lengths

The stud mounting hole is very convenient when cutting many studs to the same length at floor level.

The adjustable stud mounting hole permits mounting of M6 to M10 studs, and can be used as an accurate cutting length guide for the full range of applicable studs. It can be used not only to align cutting lengths to the rear of the main body, as shown in Fig. 12-(1), but also to align cutting lengths to the front of the main body, as shown in Fig. 12-(2). The stud mounting hole is particularly convenient when it is necessary to cut several studs at the same length from, for example, the surface of a ceiling.

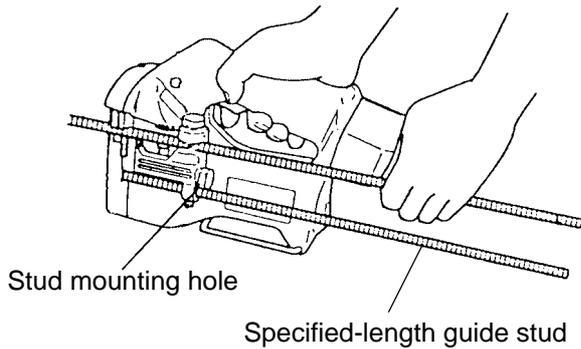


Fig. 12-(1) Length alignment to rear of main body

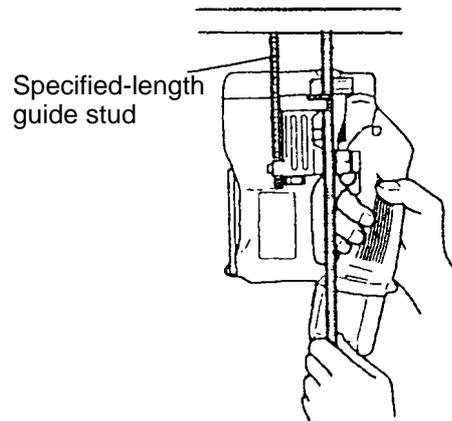


Fig. 12-(2) Length alignment to front of main body

Fig. 12 Stud mounting hole facilitates cutting to specified lengths

(10) Cam-operated auto-return mechanism

After cutting, the cutter is forcibly returned (opened) by means of a plate cam commonly called a "return plate".

This mechanism prevents such malfunctions as the cutter becoming jammed and not returning.

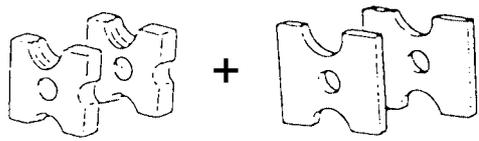
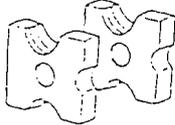
5. SPECIFICATIONS

5-1. Specifications

Model	CL 10SA	
Capacity	Mild steel studs (size of studs for cutting): M10, M8, M6 or W3/8"	
Type of motor	AC single-phase series commutator motor	
Enclosure	Main body : Glass fiber reinforced polyamide resin Cover: Glass fiber reinforced polyamide resin	
Insulation structure	Double insulation	
Type of switch	Trigger switch with forward/reverse changeover pushing button with brake and variable	
Power source	Single-phase AC 50 Hz	
Voltage and current	0.9 A (230 V)	
Power input	190 W	
No-load stroke	0 – 32 min ⁻¹	
Weight	2.7 kg (5.95 lbs.); excluding cord	
Packaging and packaged weight	Corrugated cardboard box: 3.7 kg (81.6 lbs.)	
Cord	Type	Two-core cabtire cable
	Overall length	4 m (13.1 ft.)
Standard accessories	Hexagon bar wrench 1 pc. M8 cutter ass'y 1 pc. M8 trimmer 1 pc.	

5-2. Optional Accessories

- Cutter ass'y

Stud size	Code No.	Combining cutters and spacers		
M10 x 1.5	308565	M10 Cutter 2	M10 Spacer 2	
M8 x 1.25	308564	M8 Cutter 2	M8 Spacer 2	
M6 x 1	308563	M6 Cutter 2	M6 Spacer 2	
*W3/8" x 1.5875	998479	W3/8" Cutter 2		

* The W3/8" is used without spacers.

- Trimmer

Stud size	Code No.	
M10 x 1.5	308570	
M8 x 1.25	308569	
M6 x 1	308568	
* W3/8" x 1.5875	308567	

6. COMPARISONS WITH SIMILAR PRODUCTS

6-1. Specification Comparisons

Item		Maker • Model		Hitachi		
				CL 10SA	CL 10D2	CL 10D
Catalog specifications	Capacity: Soft steel studs (Size of studs for cutting)		○ M10 x 1.5 ○ M8 x 1.25 ○ M6 x 1 ○ W3/8" x 1.5875	○ M10 x 1.5 ○ M8 x 1.25 ○ M6 x 1 ○ W3/8" x 1.5875	○ M10 x 1.5 ○ M8 x 1.25 ○ M6 x 1 ○ W3/8" x 1.5875	
	Voltage	V	AC 230 or more	DC 12	DC 9.6	
	Power input	W	190	—	—	
	No-load stroke	min ⁻¹	0 to 32	30	0 to 28	
	No-load sound pressure level	dB (A)	73	61	66	
	Dimensions	Length		235 mm (9-1/4")	281 mm (11-1/16")	258 mm (10-5/32")
		Height		182 mm (7-11/64")	179 mm (7-3/64")	179 mm (7-3/64")
		Width		107 mm (4-7/32")	107 mm (4-7/32")	107 mm (4-7/32")
Weight			2.7 kg (5.95 lbs.) (excluding cord)	3.2 kg (7.05 lbs.) (including battery)	3.4 kg (7.5 lbs.) (including battery)	
Cutting time (M10)	sec.		2.4	2.4	2.6	
Type of motor			AC single-phase series commutator motor	DC magnet	DC magnet	
Type of switch			Trigger switch with forward/reverse changeover pushing button with brake and variable	Trigger switch with forward/reverse changeover pushing button with brake	Trigger switch with forward/reverse changeover pushing button with brake and variable	
Battery	Type		—	EB 1230H or EB 12B	EB 9B	
	Nominal capacity	Ah	—	EB 1230H: 3.0 EB 12B: 2.0	2.0	
	Nominal voltage	V	—	12	9.6	
Charger	Model		—	UC 14YF2	UC 12Y	
Standard accessories			<ul style="list-style-type: none"> • Hexagon bar wrench • M8 cutter ass'y • M8 trimmer 	<ul style="list-style-type: none"> • Plastic tool case • Charger (UC 14YF2) • Hexagon bar wrench • M8 cutter ass'y • M8 trimmer 	<ul style="list-style-type: none"> • Plastic tool case • Charger (UC 12Y) • Hexagon bar wrench • M8 cutter ass'y • M8 trimmer 	

7. PRECAUTIONS IN SALES PROMOTION

7-1. Safety Instructions

In the interest of promoting the safest and most efficient use of these tools 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 Caution Plate and Name Plate attached to each tool.

A. Handling Instructions

Salespersons must be thoroughly familiar with the contents of the Handling Instructions in order to give pertinent advice to the customer.

(1) Perform cutting only after confirming that the threads of the stud cutter properly engage the threads of the stud. If the threads are not properly engaged, damage to the threads of the stud during cutting may make the stud unusable, and/or the cutter blade may be damaged.

(2) Ensure that the portion cut off of the stud is at least 10 mm in length.

As the blade portion of the cutter is very thin, if only one or two threads of the cutter are engaged with the threads of the stud, as illustrated in Fig. 13, the excessive concentration of load on the blade portion will cause it to break after only a few cutting operations. The length of stud cut off should be at least 10 mm. Instruct customers to confirm that all of the threads of the cutter engage the threads of the stud during cutting.

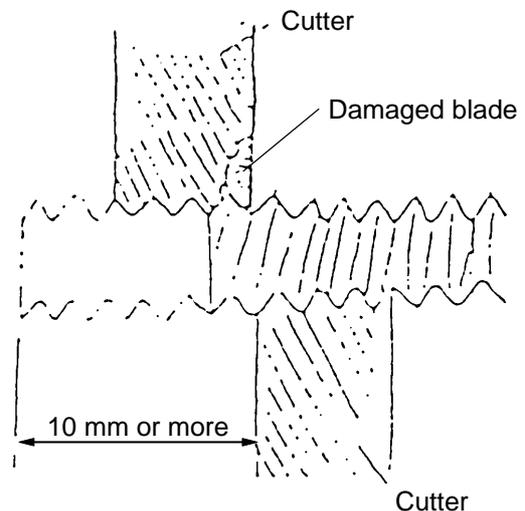


Fig. 13

(3) Care should be exercised when performing cutting in narrow places.

For example, in building construction work, studs that are used to hang ducts are often fitted with L-shaped angles. Instruct the customers to ensure that there is a clearance of at least 8 mm between the stud and the angle when 25 mm or 30 mm L-shaped angles are used, as illustrated in Fig. 14, before starting the cutting operation. If the clearance is less than 8 mm, Bracket (A) will come in contact with the side surface of the angle, preventing proper engagement of the threads of the cutters and the threads of the stud, and causing damage to the threads of the stud and/or the cutter blade.

Also, since the minimum cutting length of a stud is 14 mm from the surface of the nut, the stud can be cut off at a point 5 mm within the tip of the angle in the case of a 30 mm L-shaped angle, and approximately even with the tip of the angle in the case of a 25 mm L-shaped angle, as illustrated in Fig. 14. If cutting is attempted shorter than indicated, Bracket (A) will come in contact with the nut, causing possible damage to the cutter. Accordingly, particular caution is necessary.

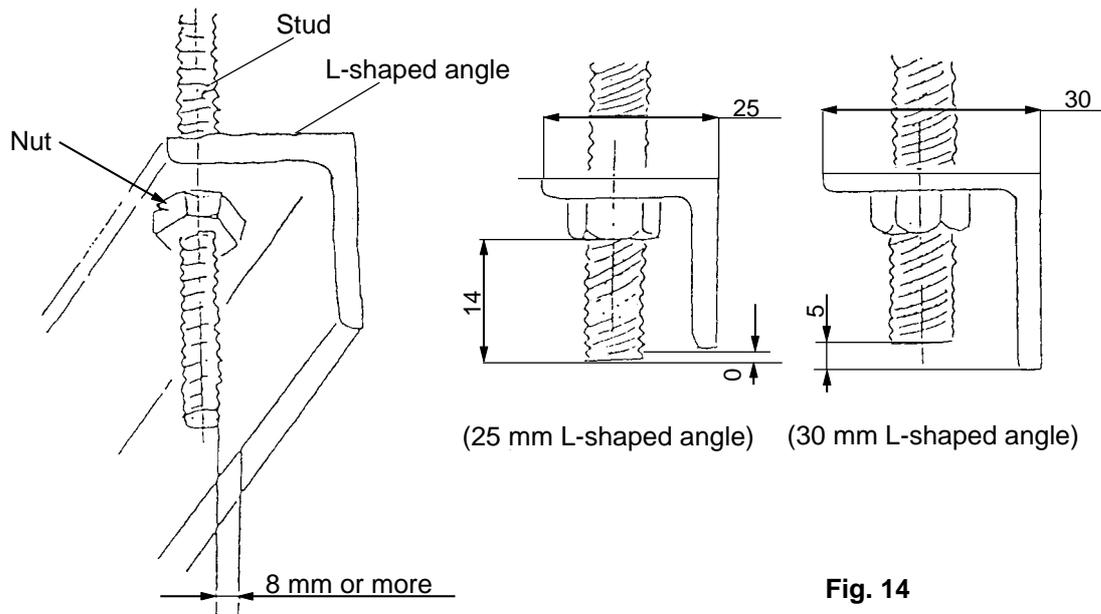


Fig. 14

(4) Precautions in cutter replacement

The cutters must be mounted in the proper directions. Instruct the customers to ensure that the notched grooves on the side surfaces of the cutters are in a "Yes" and "No" relationship when viewed from the front end of the main body, as illustrated in Fig. 15. In other words, when the notched groove is present (Yes) on one cutter, it must not be present (No) on the other. If the two cutters are in "Yes" and "Yes" alignment, or "No" and "No" alignment, the pitch of the threads of the stud will not match the pitch of the threads of the cutters, as illustrated in Fig.16. In such a case, the cutter blade will be damaged and/or the main body of the stud cutter will become defective after a short period of operation.

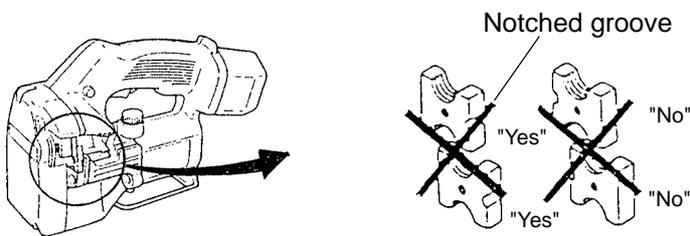


Fig. 15 Cutter replacement method

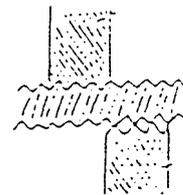


Fig. 16

(5) Never attempt to perform cutting operation at the  position.

If it is necessary to disengage the stud from the cutter during cutting, depress the trigger switch keeping the forward/reverse changeover pushing button set to the  position. Then the motor rotates in reverse direction and the stud can be disengaged. As the motor is locked at the  position, cutting of a stud cannot be performed. Excessive pressure or twisting force applied to the main body can seriously damage the tool. Be sure to instruct the customers never attempt to perform cutting operation setting the forward/reverse changeover pushing button at the  position. If the forward/reverse changeover pushing button is released from the  position before turning off the switch, bracket (A) may not stop immediately because of the switch properties and it is not faulty. Please instruct the customers about it.

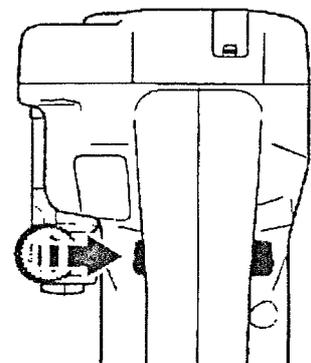


Fig. 17

- (6) The Model CL 10SA is designed for cutting mild steel studs. If the tool is used for cutting brass or stainless steel studs, the threads of the studs will be deformed so that nuts cannot be applied. In addition, as use of the tool to cut hardened bolts, different-sized studs, reinforcing rods, etc. will cause damage to the main body, the customers should be cautioned never attempt to use the tool for such purposes.
- (7) Carefully ensure that replacement cutters are appropriate for the stud sizes. As use of wrong-sized cutters will cause damage to the studs and/or cutter blades, the customers should be cautioned to ensure that correct cutters are used.
- (8) If the cutters are not mounted in the proper direction, or if the fastening hexagon socket head bolts are not properly tightened, it will cause damage to the cutters and the main body of the tool. Instruct the customer to ensure that the cutters are properly mounted.
- (9) When operating the tool in high places, the falling cut-off stud portions are extremely dangerous. The customers should be cautioned to be particularly careful at such times. In addition, the tool should be stored in a safe, secure place when not in use.
- (10) When operating the switch, carefully ensure that fingers are kept away from the cutters. To enhance safe operation, the Model CL 10SA is provided with a cover for the moving portion of the cutters, a housing shaped so that fingers are kept away from the cutters, a switch without a stopper, and other safety features. However, the opening to the cutters must be exposed to permit operation. Should the switch be turned on inadvertently when the fingers are carelessly near the cutters during replacement or cleaning of the cutters, while carrying the tool, or at any other time, serious injury could result. The customers should be cautioned to keep fingers away from the cutters.

8. REPAIR GUIDE

WARNING: Without fail, disconnect the power cord plug from the power source before starting repair or maintenance work. If the power cord plug is connected to the power source and the switch is activated inadvertently, the motor will start rotating unexpectedly, which could cause serious injury.

8-1. 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 CL 10SA.

8-1-1. Preparation to disassembly (Fig. 18)

Before disassembly, depress the trigger switch until Bracket (A) **[54]** opens and release the trigger switch. Then disconnect the power cord plug from the power source. Remove the two Special Bolts M5 x 9 **[62]** from the two Cutter Ass'y M8 **[64]** with the Hex. Bar Wrench 4 mm **[17]**. Connect the power cord plug to the power source. Depress the trigger switch until Bracket (A) **[54]** is positioned to the maximum cutting position. Then release the trigger switch and disconnect the power cord plug from the power source. Remove the two Brush Caps **[29]** and the two Carbon Brushes **[30]**.

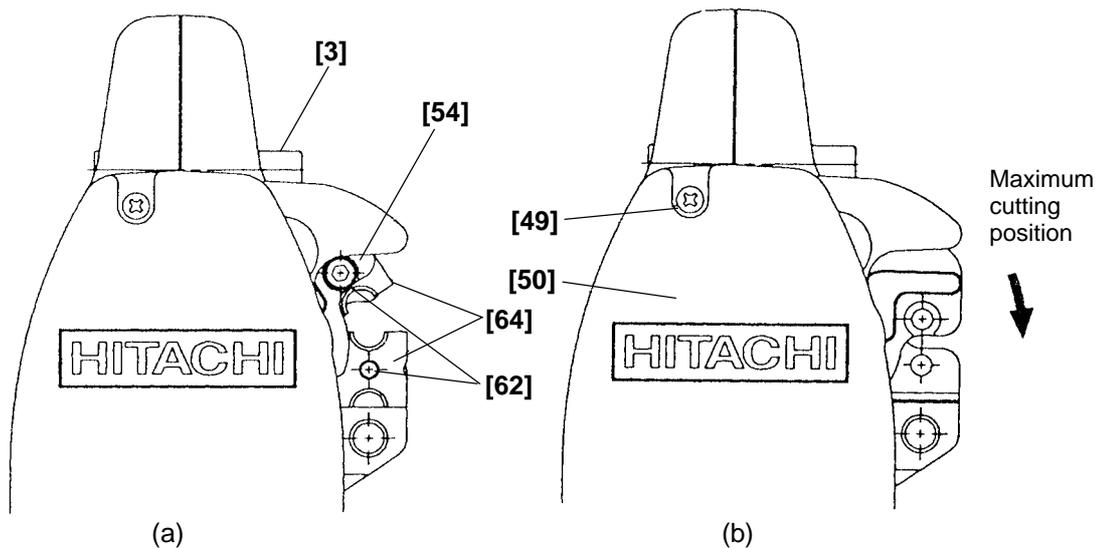


Fig. 18

On completion of the above preparation, be sure to disconnect the power cord plug from the power source. Remove the Bolt W3/8 x 75 **[60]**, loosen the Spring Washer M10 **[59]**, and take off the Stud Guide Ass'y **[58]**. (Fig. 19)

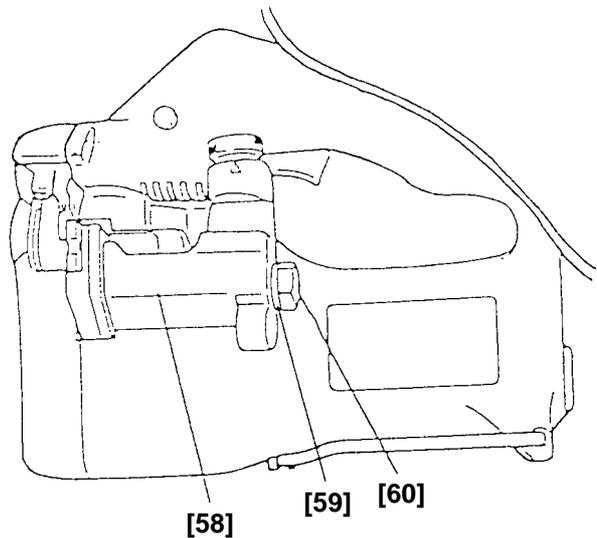


Fig. 19

8-1-2. Disassembly

(1) Bracket ass'y section

(a) Removal of the Cover [50] (Fig. 18)

Remove the two Machine Screws (W/Washers) M4 x 20 (Black) [49] from the Cover [50] and remove the Cover [50].

(b) Removal of the Return Plate [53] (Fig. 20)

Remove the two Seal Lock Screws (W/SP. Washer) M4 x 12 [52] and remove the Return Plate [53].

(c) Removal of the Gear Cover [33] (Fig. 20)

Remove the four Tapping Screws (W/Flange) D5 x 25 (Black) [31] and the two Tapping Screws D5 x 35 [55]. Hold Bracket (B) [56] and Bracket (A) [54] and remove them being careful not to move Bracket (A) [54]. Then the Second Gear [36] and the Third Pinion [35] can be removed (Fig. 21).

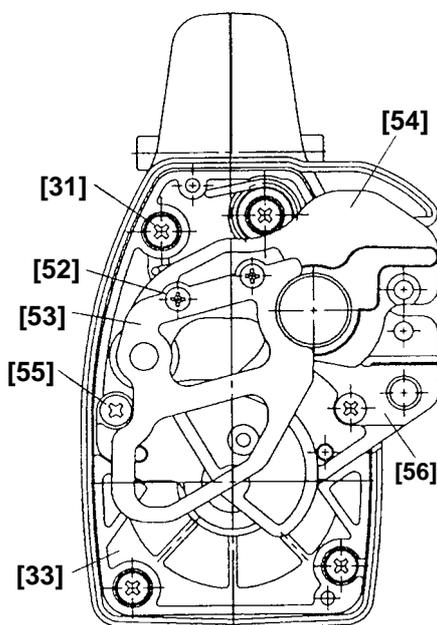


Fig. 20

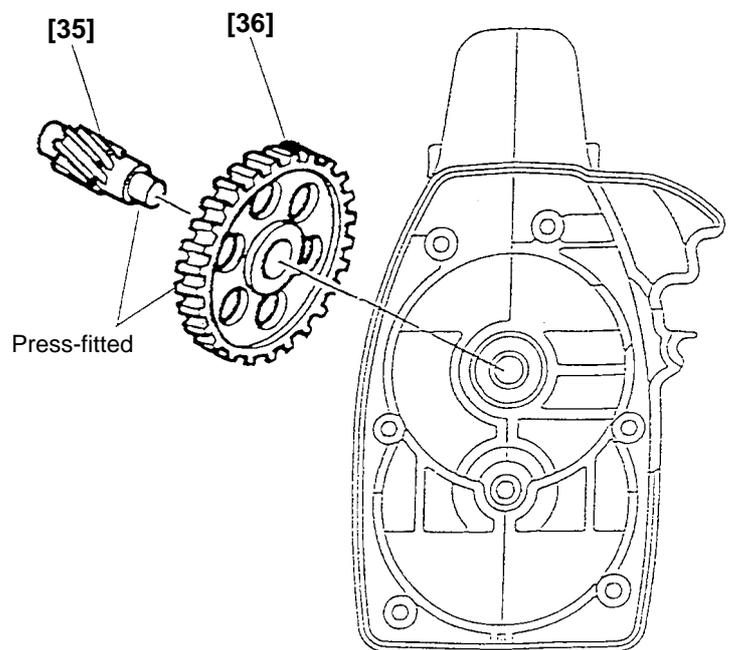


Fig. 21

(d) Removal of the Final Gear [47] (Fig. 22)

Remove the Retaining Ring for D18 Shaft [48] that retains the Final Gear [47] and the Cam Shaft [67] with the stop ring pliers. Remove the Final Gear [47] and the two Feather Keys 5 x 5 x 10 [68]. Then the Cam Shaft [67] can be removed.

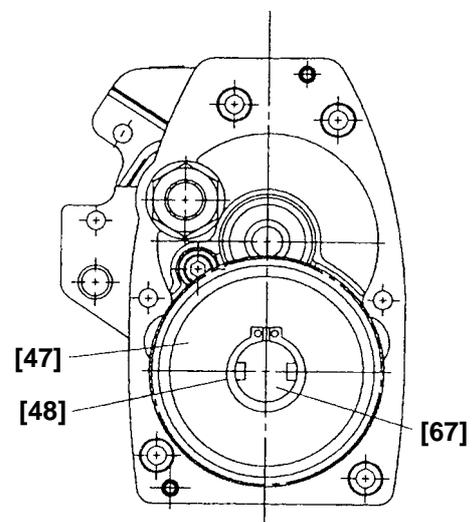


Fig. 22

(e) Removal of the bracket ass'y (Figs. 23 and 24)

Remove the three Hex. Socket Hd. Bolts M5 x 12 [46] from Bracket (B) [56] with the Hex. Bar Wrench 4 mm [17]. Holding Bracket (A) [54] and Bracket (B) [56], remove the bracket ass'y being careful not to make the Return Spring [32] jump up.

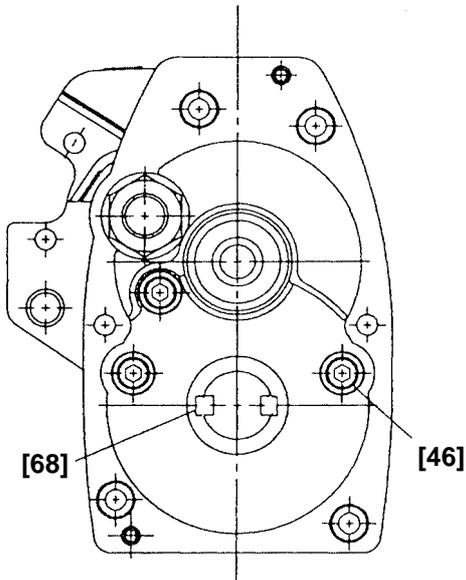


Fig. 23

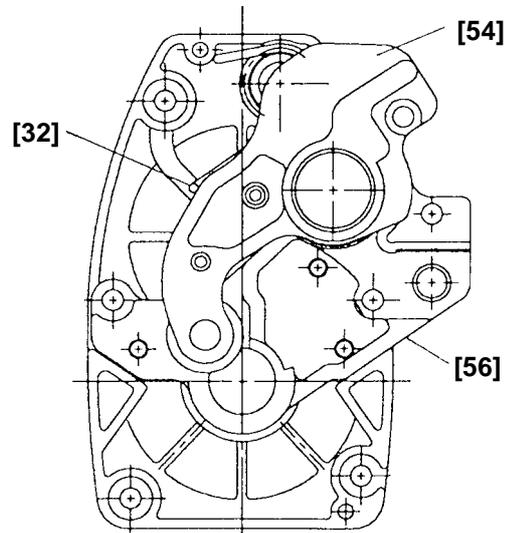
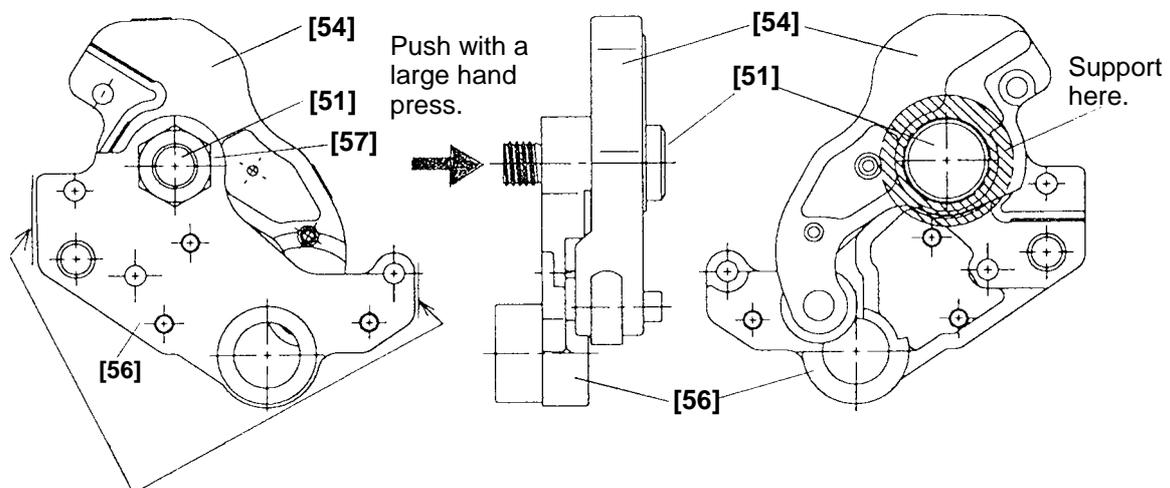


Fig. 24

(f) Disassembly of the bracket ass'y

(i) Removal of Bolt (A) [51] (Fig. 25)

Bolt (A) [51] that secures Bracket (A) [54] to Bracket (B) [56] is press-fitted into Bracket (B) [56] and tightened with the Lock Nut M12 [57]. Hold Bracket (B) [56] with a vise and loosen the Lock Nut M12 [57] with a wrench (loosening torque: about 350 kg•cm). Supporting around the head of Bolt (A) [51] of Bracket (A) [54], push the screw side of Bolt (A) [51] with a hand press to separate Bracket (A) [54] from Bracket (B) [56].



Hold at these positions with a vise and loosen the Lock Nut M12 [57].

Fig. 25

(ii) Removal of Roller (A) [65] (Fig. 26)

The Roller Pin [66] that secures Roller (A) [65] is press-fitted into Bracket (A) [54]. Remove the Roller Pin [66] by pushing in either direction with a hand press. Then Roller (A) [65] can be removed.

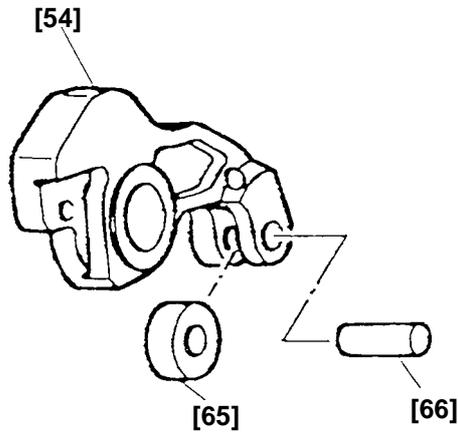


Fig. 26

(2) Housing ass'y section

(a) Removal of the Hook [19] (Fig. 27)

Remove the Retaining Ring (E-type) for D4 Shaft [16] that retains the Hook [19] with a small flat-blade screwdriver. Then the Hook [19] can be removed.

(b) Removal of Housing (B) [2]

Remove the nine Tapping Screws (W/Flange) D4 x 20 (Black) [14] that secure Housing (A) [2] to Housing (B) [2]. Holding the compartment of the Gear Cover [33] in Housing (A) [2] and Housing (B) [2], remove Housing (B) [2] carefully.

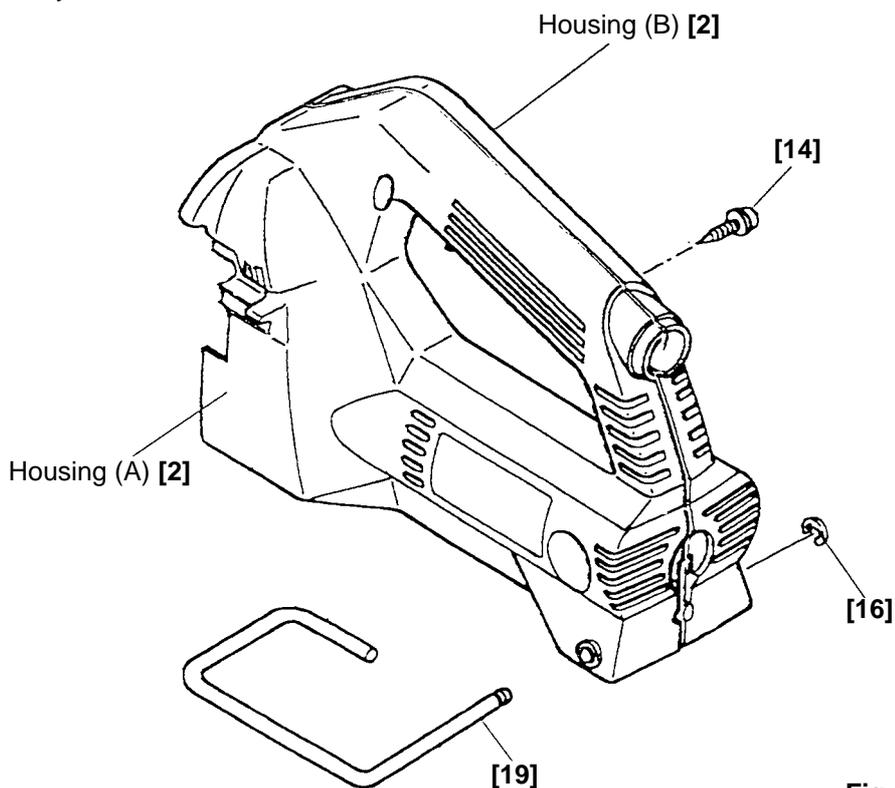


Fig. 27

(3) Power supply unit section

(a) Remove the two Tapping Screws (W/Flange) D4 x 16 [12] from the inside of the main body.

Remove the Cord Clip [11] and the Cord Armor [9].

(b) Then the decelerating mechanism and the power supply unit can be removed together.

(c) Removal of the Switch [6]

To disconnect the two internal wires (red and blue) coming from the Brush Block Ass'y [25], two internal wires (black) coming from the Noise Suppressor [8] and three internal wires (black, yellow and white) coming from the Stator [22] from the Switch [6], insert the pin of the special repair tool J-86 into the holes where each internal wire is inserted and warp the flat spring with the pin to the extent that the internal wires can be removed.

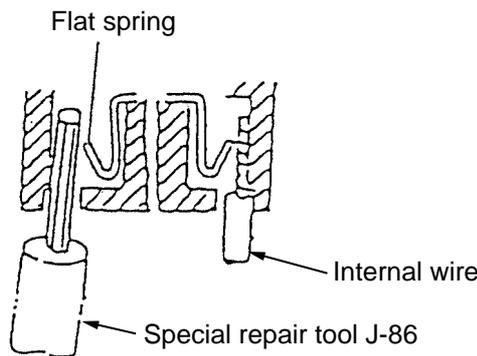


Fig. 28

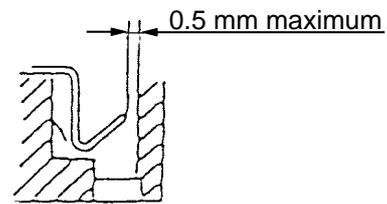


Fig. 29

[CAUTION] Excessive warping can cause permanent deformation of the flat spring and poor contact with the internal wire. If the clearance shown in Fig. 29 is over 0.5 mm, replace the flat spring with new one.

(d) Removal of the Cord [10]

Loosen the screw on the Switch [6] with a small flat-blade screwdriver and disconnect the two internal wires (blue and brown) coming from the Cord [10].

(4) Second pinion section (Fig. 30)

Remove the Ball Bearing 6001VVCMP2L [45] press-fitted into the Second Pinion [41] with a bearing puller. Then the Washer [44] can be removed. Remove the Ball Bearing 609VVC2PS2L [37] in the same manner and remove the Retaining Ring for D15 Shaft [38] with the stop ring pliers. Then the Washer [39] can be removed. Remove the Needle [43] and the Idle Gear [42].

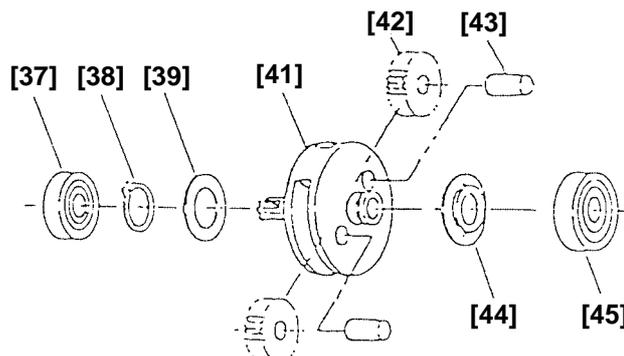


Fig. 30

8-2. Reassembly

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

(1) Reassembly of the power supply unit section

Be sure to perform wiring connections as indicated in the wiring diagram below (Fig. 31).

When connecting the internal wires to the terminals of the Switch [6], check that the flat springs of each terminal are not deformed (Fig. 29). After connection, lightly pull the internal wires to check that they are securely connected.

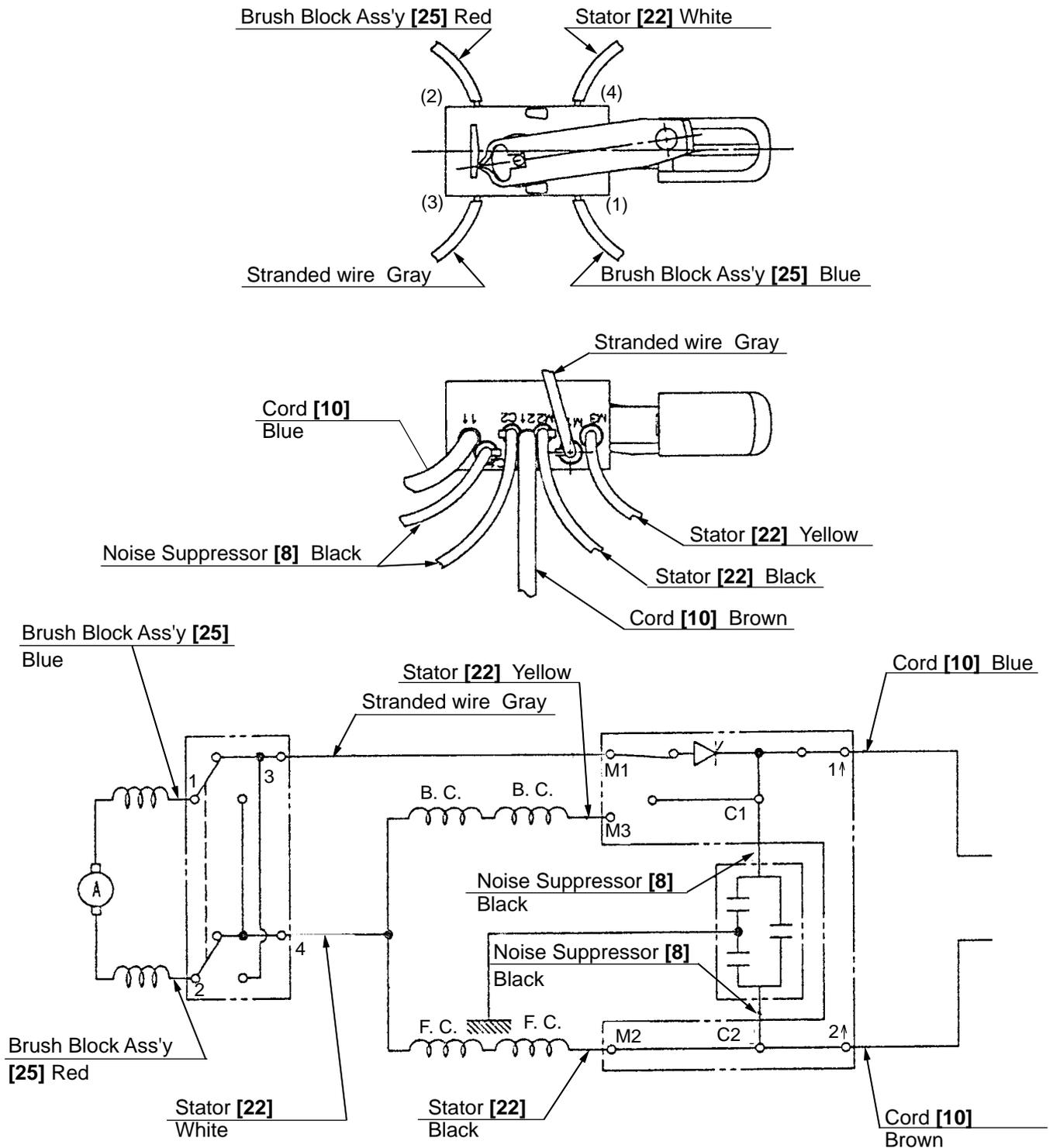


Fig. 31 Wiring diagram

(2) Reassembly of the housing section

(a) Second Pinion [41] (Fig. 32)

Before inserting the Needle [43] in the Second Pinion [41], apply grease (Nippeco SEP-3A) to the inner circumference of the two Idle Gears [42]. Mount the Washer [44] facing its smaller diameter side to the Ball Bearing 6001VVCMP2L [45]. Mount the Washer [39] and then the Retaining Ring for D15 Shaft [38] using the stop ring pliers. Press-fit the Ball Bearing 6001VVCMP2L [45] and the Ball Bearing 609VVC2PS2L [37].

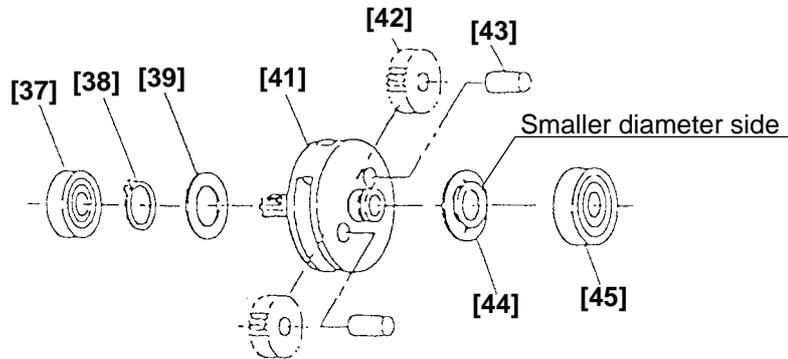


Fig. 32

(b) Planet gear (Fig. 33)

First, apply grease (Nippeco SEP-3A) to the inner circumference of the Ring Gear [40]. Mount the pinion of the Armature [21] mounted with the Stator [22] and the Brush Block Ass'y [25] to the Second Pinion [41] assembled according to the above step (a) and then mount the Ring Gear [40]. Check that the Ring Gear [40] and the Second Pinion [41] are rattling. If there is no rattle (gears are not engaged properly), the motor will be locked. Mount this assembly to Housing (A) [2] mating the protrusion of the Ring Gear [40] to the groove of Housing (A) [2].

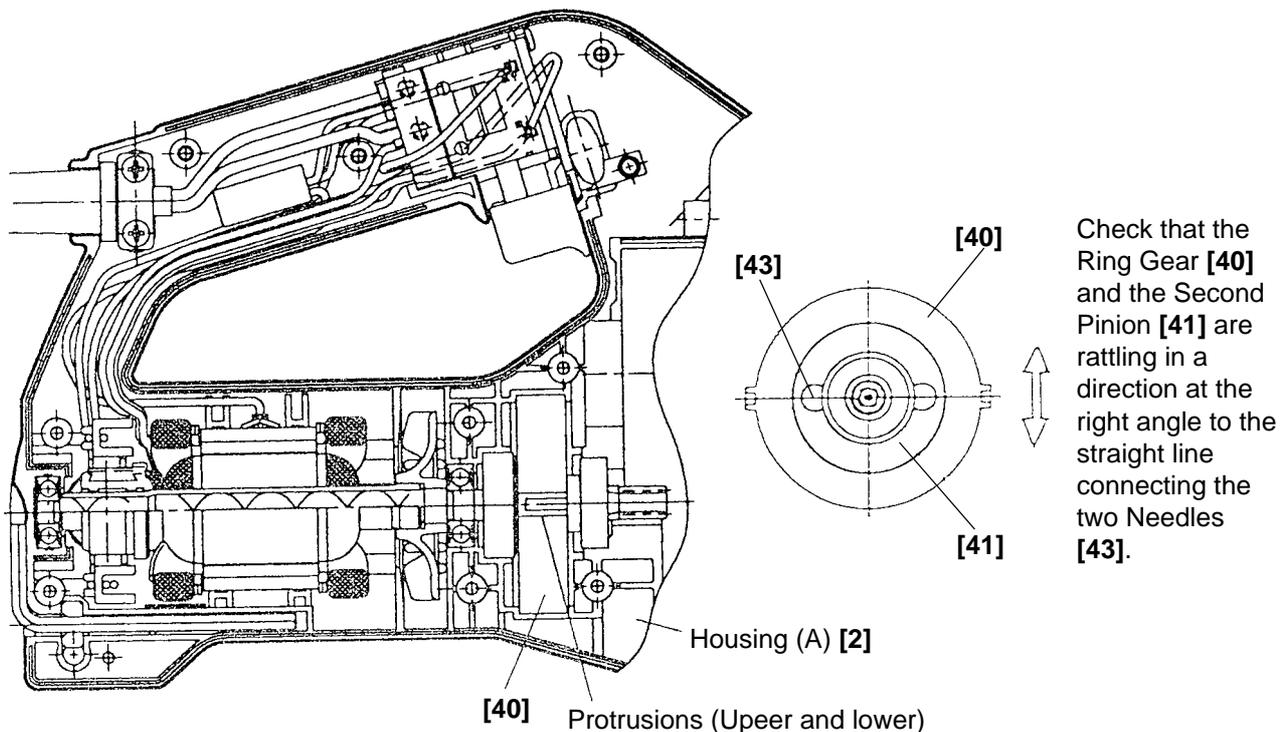


Fig. 33

(c) Power supply unit (Fig. 34)

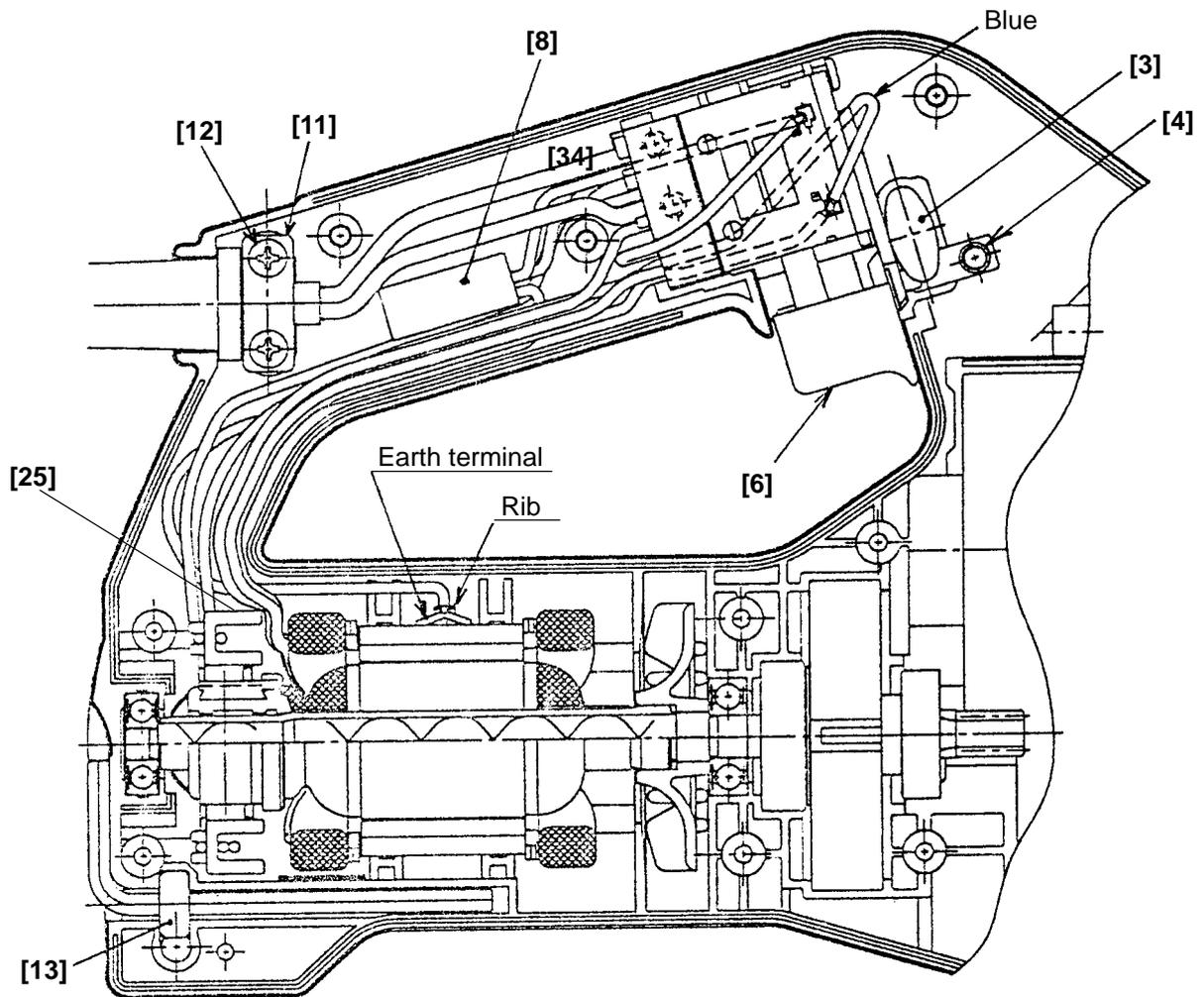


Fig. 34

- (a) Mount the Cord [10] to Housing (A) [2] and mount the Cord Clip [11] facing its protrusion to the cord. Secure them with the two Tapping Screws (W/Flange) D4 x 16 [12].
- (b) Push the earth terminal of the Noise Suppressor [8] as far as it will go along the ribs of the Stator [22] and Housing (A).
- (c) Put the internal wire (blue) of the Brush Block Ass'y [25] under the Switch [6].
- (d) Arrange the Switch [6] and the Noise Suppressor [8] as shown in Fig. 34.

- (d) Mount the Pushing Button (A) [3] mating its groove to the protrusion on the lever of the Switch [6] (Fig. 35).
- (e) Mount the Spring (A) [4] to the Pushing Button (A) [3] (Fig. 34).
- (f) Mount the Wrench Holder [13] to Housing (A) [2] (Fig. 34).
- (g) Place the internal wires to the proper positions in Housing (A) [2]. Secure Housing (B) [2] with the nine Tapping Screws (W/Flange) D4 x 20 (Black) [14] being careful not to catch the internal wires.
- (h) Mount the Hook [19] in the proper direction. Mount the Retaining Ring (E-type) for D4 Shaft [16] (Fig. 36).

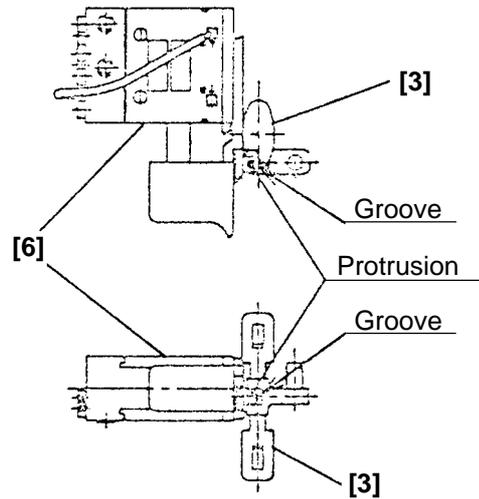


Fig. 35

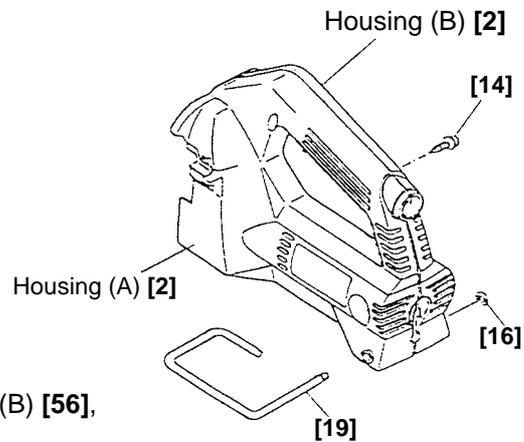


Fig. 36

(3) Reassembly of the bracket ass'y section

(a) Lubrication (Fig. 37)

Sufficiently apply grease to Bracket (A) [54], Bracket (B) [56], Roller (A) [65], Cam Shaft [67], coupling portion and rotating portion of Bolt (A) [51] because high loads are applied to these parts.

Also apply grease to the inner circumferences of the punched holes of the Return Plate [53] and the sliding portions of the Return Spring [32] and Bracket (A) [54]. Apply TUFREX 251 grease to the shafts, holes and surfaces indicated with diagonal lines and two-dot chain lines in Fig. 37. Carefully apply grease to the inner circumference of the hole of Roller (A) [65] until the grooves in the hole are completely greased.

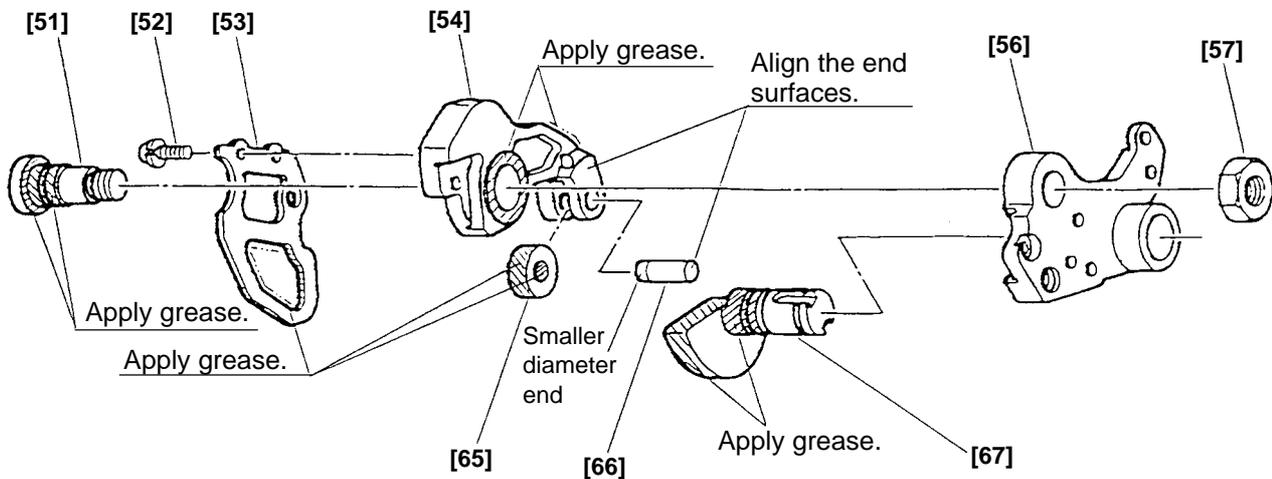


Fig. 37

(b) Mounting Roller (A) [65]

Check the position of the smaller diameter end of the Roller Pin [66] and insert the Roller Pin [66] in the hole of Bracket (A) [54] in the proper direction as shown in Fig. 37. Align Roller (A) [65] with the hole of Bracket (A) [54] and press-fit the Roller Pin [66] until it becomes flush with the end surface of Bracket (A) [54] (Fig. 37).

(c) Press-fitting Bolt (A) [51]

Put Bolt (A) [51] through the hole of Bracket (A) [54] and press-fit it in Bracket (B) [56] completely (Fig. 37). At this time, a clearance is made between Bracket (A) [54] and Bracket (B) [56] due to the dimensional tolerance.

(d) Observe the specified tightening torque of the Lock Nut M12 [57] because it is very important for the strength.

(e) Reassembly of the bracket ass'y

(i) Mount the Return Spring [32] to the Gear Cover [33] (Fig. 38).

(ii) Mount the bracket ass'y assembled in the above steps (b) and (c) to the Gear Cover [33] hooking the Return Spring [32] on Bracket (A) [54] (Fig. 38).

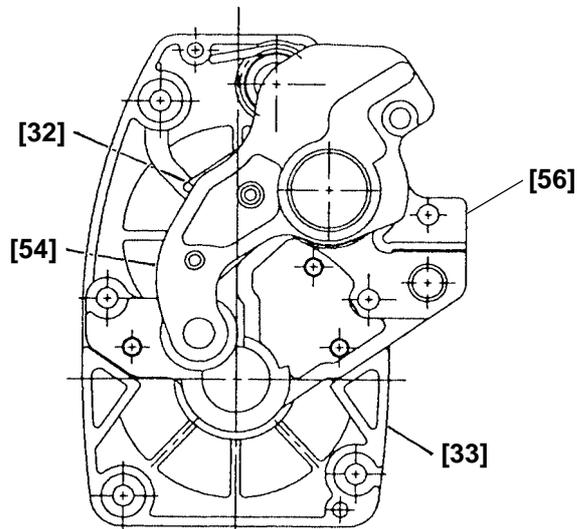


Fig. 38

(iii) Tighten the three Hex. Socket Hd. Bolts M5 x 12 [46] with the Hex. Bar Wrench 4 mm [17] at the specified tightening torque because they are very important for the strength (Fig. 39).

(iv) Mount the Ball Bearing 629VVC2PS2L [34] to the Gear Cover [33] (Fig. 39).

(v) Mount the two Feather Keys 5 x 5 x 10 [68] to the Cam Shaft [67]. Insert the Final Gear [47] in the proper direction. Mount the Retaining Ring for D18 Shaft [48] to it using the stop ring pliers (Fig. 40). Apply grease (Nippeco SEP-3A) to the outer circumference of the Final Gear [47].

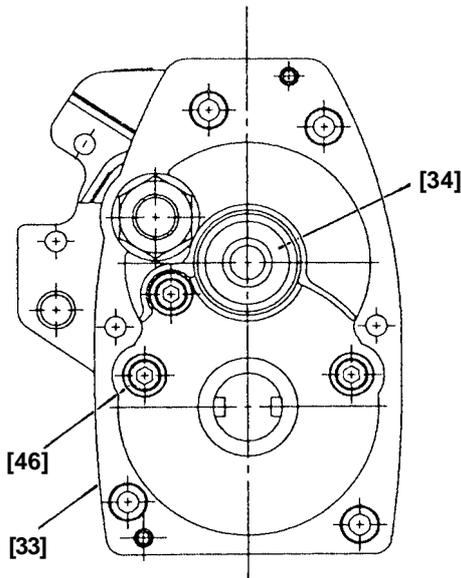


Fig. 39

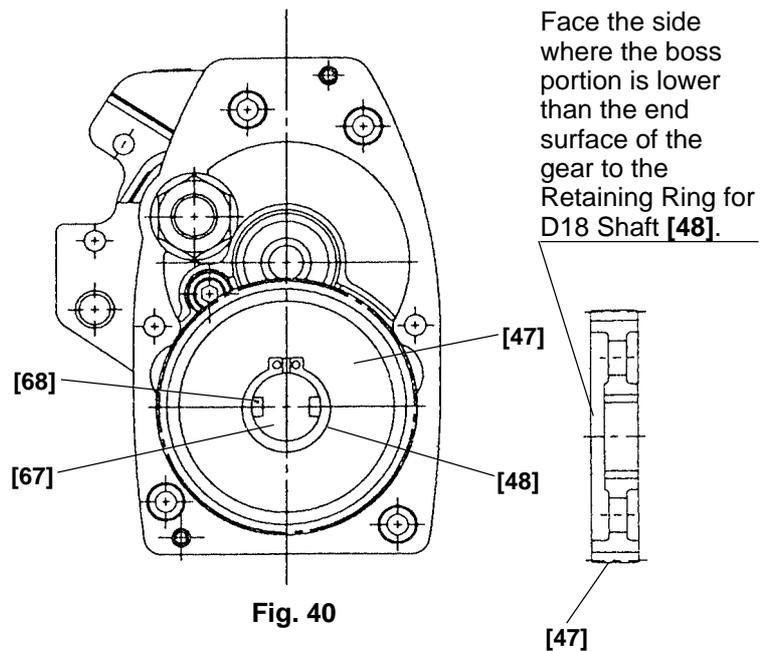


Fig. 40

(f) Mounting the assembly to the main body

(i) Insert the Ball Bearing 608VVC2PS2L [20] in the ball bearing chamber of Housing (A) [2] (Fig. 41).

(ii) Press-fit the Third Pinion [35] in the Second Gear [36] and insert it in the Ball Bearing 608VVC2PS2L [20] of Housing (A) [2] (Fig. 41). At this time, apply grease (Nippeco SEP-3A) to the outer circumference of the Second Gear [36].

(iii) Mount the Gear Cover [33] to the housing keeping Bracket (A) [54] at the maximum cutting position in the same manner as the removal procedure (be careful of the spring force) (Fig. 42).

(iv) Tighten the four Tapping Screws (W/Flange) D5 x 25 (Black) [31] and the two Tapping Screws D5 x 35 [55] (Fig. 42).

CAUTION: Check that there is no scratch, dust or chips on the surfaces of the cam and the roller.

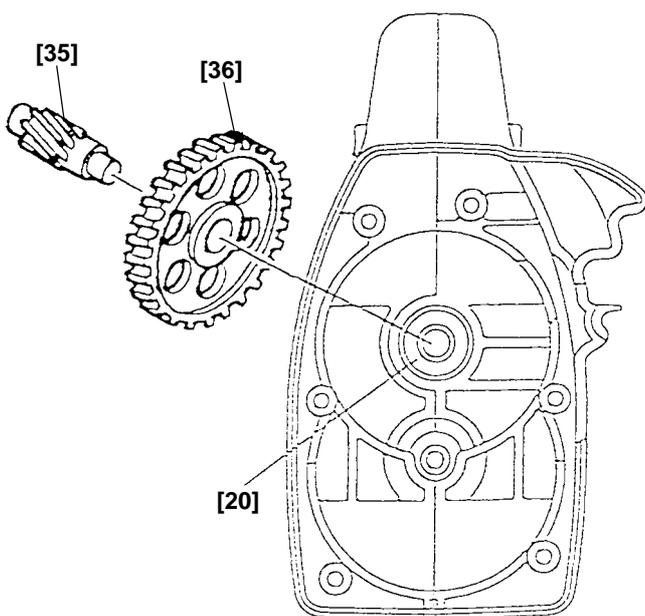


Fig. 41

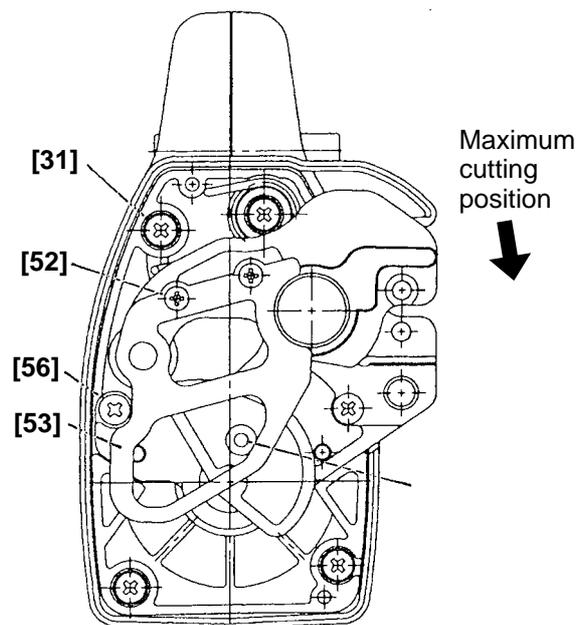


Fig. 42

(g) Reassembly of the Return Plate [53]

Align the Return Plate [53] with the Roller Pin [66] and Bolt (A) [51]. Insert the pin of the Cam Shaft [67] in the hole of the Return Plate [53] and secure them with the two Seal Lock Screws (W/SP. Washer) M4 x 12 [52] (Fig. 42).

(h) Confirmation after reassembly

Before mounting the Cover [50], mount the two Carbon Brushes [30], tighten the two Brush Caps [29], connect the power cord plug to the power source and check the following operations.

- (i) Check that the Cam Shaft [67] rotates clockwise as shown in Fig. 43 by depressing the trigger switch.
- (ii) Pressing the Pushing Button (A) [3] to the  position, depress the trigger switch. Check that the Cam Shaft [67] rotates counterclockwise (in the reverse direction of Fig. 43).
- (iii) Check that the Pushing Button (A) [3] returns to the original position when releasing the Pushing Button (A) [3].

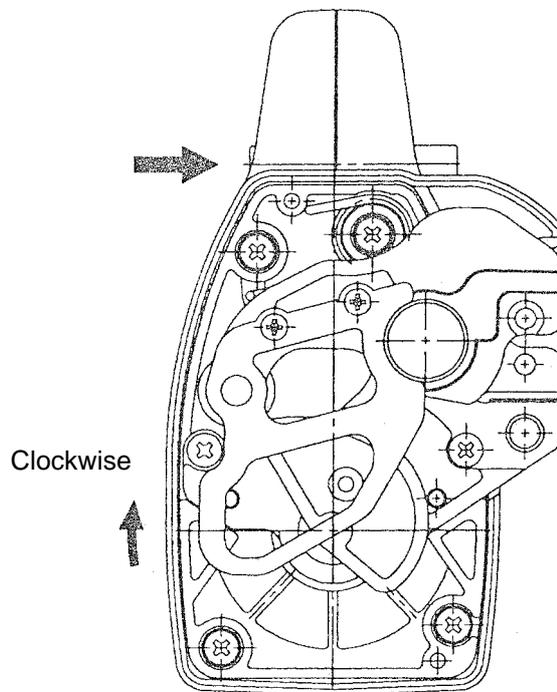


Fig. 43 Rotating direction of the Cam Shaft [67]

(g) Mounting the Cover [50] or the Cutter Ass'y M8 [64]

Disconnect the power cord plug from the power source, and fasten the Cover [50] with the two Machine Screws (W/Washers) M4 x 20 (Black) [49].

The Cutter Ass'y M8 [64] must be mounted in the proper directions. As shown in Fig. 44, they must be mounted so that if the groove in the side of one cutter is present (Yes), the groove in the side of the outer cutter is not present (No). After mounting direction has been confirmed, fasten the cutters with the two Special Bolts M5 x 9 [62].

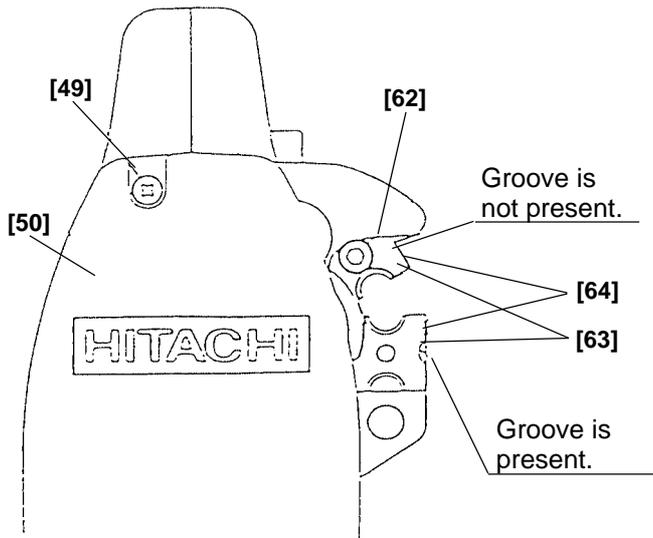


Fig. 44

Size	Attachment
M10	
M8	
M6	
W3/8"	

(h) Fasten the Stud Guide Ass'y [58] with the Bolt W3/8 x 75 [60] and Spring Washer M10 [59] as shown in Fig. 19.

(i) Tightening torques are as follows:

Tapping Screw (W/Flange) D4 x 20 (Black) [14]	$1.96 \pm 0.49 \text{ N}\cdot\text{m}$ ($20 \pm 5 \text{ kgf}\cdot\text{cm}$, $17.4 \pm 4.3 \text{ in}\cdot\text{lbs.}$)
Machine Screw (W/Washers) M4 x 20 (Black) [49]	$1.76 \pm 0.49 \text{ N}\cdot\text{m}$ ($18 \pm 5 \text{ kgf}\cdot\text{cm}$, $15.7 \pm 4.3 \text{ in}\cdot\text{lbs.}$)
Seal Lock Screw (W/SP. Washer) M4 x 12 [52]	$1.76 \pm 0.49 \text{ N}\cdot\text{m}$ ($18 \pm 5 \text{ kgf}\cdot\text{cm}$, $15.7 \pm 4.3 \text{ in}\cdot\text{lbs.}$)
Tapping Screw (W/Flange) D5 x 25 (Black) [31]	$3.43 \pm 0.49 \text{ N}\cdot\text{m}$ ($35 \pm 5 \text{ kgf}\cdot\text{cm}$, $30.5 \pm 4.3 \text{ in}\cdot\text{lbs.}$)
Tapping Screw D5 x 35 [55]	$3.43 \pm 0.49 \text{ N}\cdot\text{m}$ ($35 \pm 5 \text{ kgf}\cdot\text{cm}$, $30.5 \pm 4.3 \text{ in}\cdot\text{lbs.}$)
Hex. Socket Hd. Bolt M5 x 12 [46]	$5.88 \pm 1.47 \text{ N}\cdot\text{m}$ ($60 \pm 15 \text{ kgf}\cdot\text{cm}$, $52.2 \pm 13 \text{ in}\cdot\text{lbs.}$)
Special Bolt M5 x 9 [62]	$5.88 \pm 1.47 \text{ N}\cdot\text{m}$ ($60 \pm 15 \text{ kgf}\cdot\text{cm}$, $52.2 \pm 13 \text{ in}\cdot\text{lbs.}$)
Lock Nut M12 [57]	$34.3 \pm 7.35 \text{ N}\cdot\text{m}$ ($350 \pm 75 \text{ kgf}\cdot\text{cm}$, $304.5 \pm 65 \text{ in}\cdot\text{lbs.}$)
Bolt W3/8 x 75 [60]	$15.68 \pm 3.92 \text{ N}\cdot\text{m}$ ($160 \pm 40 \text{ kgf}\cdot\text{cm}$, $139.2 \pm 35 \text{ in}\cdot\text{lbs.}$)

8-3. Insulation Tests

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

Insulation resistance: 7 M Ω or more with DC 500 V Megohm Tester

Dielectric strength test: AC 4,000 V/1 minute, with no abnormalities 220 V -- 240 V products

8-4. No-load Current Value

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

Voltage (V)	230
Current (A) max.	0.6

9. STANDARD REPAIR TIME (UNIT) SCHEDULES

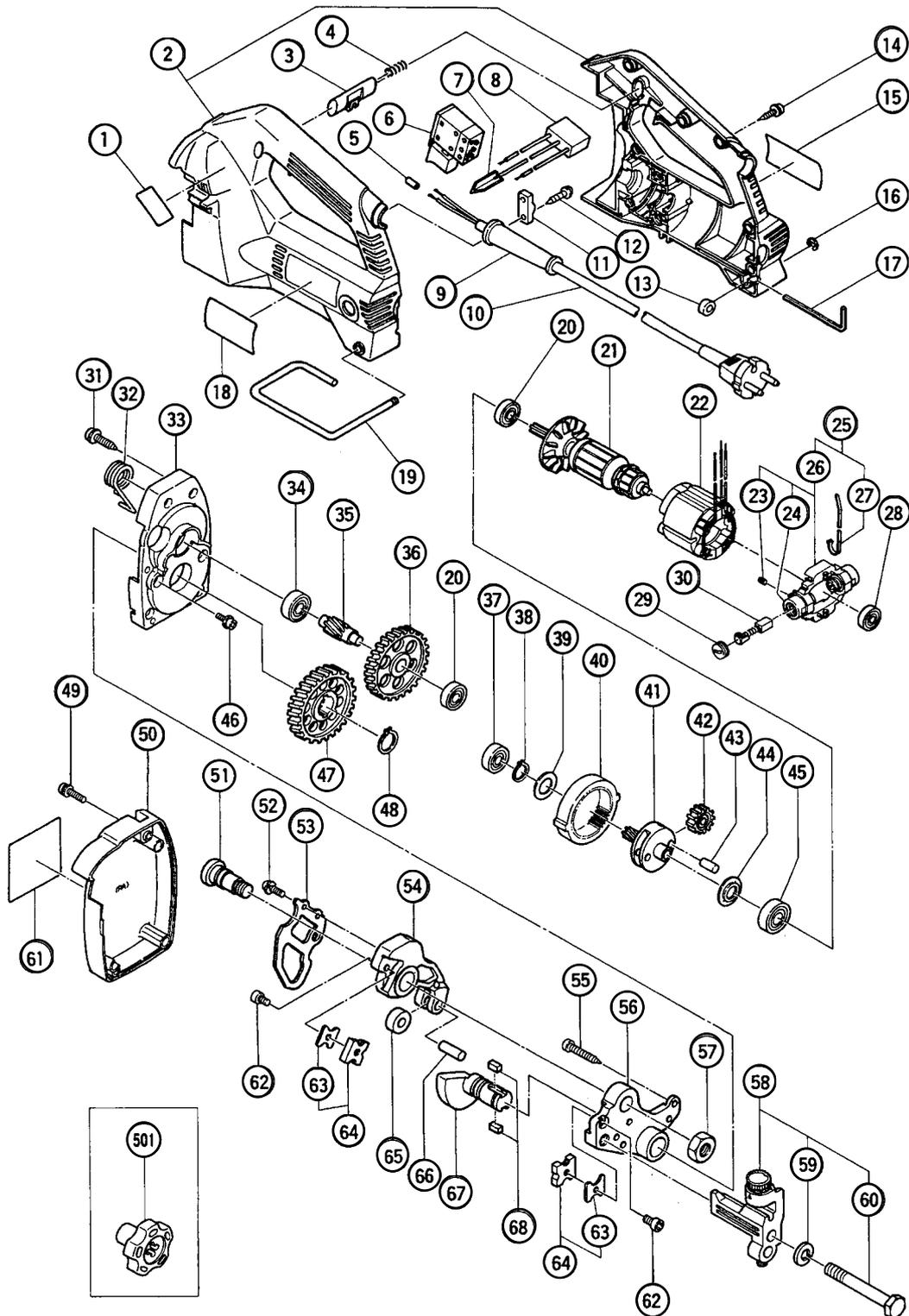
MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
CL 10SA		Work Flow						
					Second Pinion Ball Bearing (6001VV) Washer x 2 Ball Bearing (609VV) Retaining Ring for D15 Shaft Ring Gear Needle x 2 Idle Gear x 2			
			Hook Retaining Ring (E-type) for D4 Shaft			Pushing Button (A) Spring (A) Switch Housing (A).(B) Set Cord Armature Ball Bearing (608VV) Ball Bearing (626VV) Stator		
		General Assembly						
		Cover	Final Gear Feather Key 5 x 5 x 10 (2 pcs.) Retaining Ring for D18 Shaft	Gear Cover Return Spring	Bolt (A) Lock Nut M12 Bracket (B) Cam Shaft Stud Guide Ass'y			
			Second Gear Third Pinion Ball Bearing (629VV) Ball Bearing (608VV)		Return Plate Bracket (A) Roller (A) Roller Pin			

ELECTRIC TOOL PARTS LIST

■ **STUD CUTTER**
Model CL 10SA

2001 • 1 • 25

(E1)



PARTS

CL 10SA

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS
1		CAUTION PLATE (E)	1	
2	319-411	HOUSING (A).(B) SET	1	
3	319-402	PUSHING BUTTON (A)	1	
4	319-403	SPRING (A)	1	
5	981-373	TUBE (D)	2	FOR CORD
6	319-412	SWITCH	1	
7	992-635	EARTH TERMINAL	1	
8	994-273	NOISE SUPPRESSOR	1	
* 9	953-327	CORD ARMOR D8.8	1	
* 9	938-051	CORD ARMOR D10.1	1	
* 10	500-235Z	CORD	1	(CORD ARMOR D8.8)
* 10	500-391Z	CORD	1	(CORD ARMOR D10.1) FOR SUI
* 10	500-440Z	CORD	1	(CORD ARMOR D8.8) FOR GBR
11	937-631	CORD CLIP	1	
12	984-750	TAPPING SCREW (W/FLANGE) D4X16	2	
13	307-607	WRENCH HOLDER	1	
14	301-653	TAPPING SCREW (W/FLANGE) D4X20 (BLACK)	9	
15		NAME PLATE	1	
16	968-643	RETAINING RING (E-TYPE) FOR D4 SHAFT	1	
17	944-458	HEX. BAR WRENCH 4MM	1	
18		HITACHI LABEL	1	
19	319-401	HOOK	1	
20	608-VVM	BALL BEARING 608VVC2PS2L	2	
21	360-545E	ARMATURE 230V	1	
22	340-490E	STATOR 230V	1	
23	981-478	HEX. SOCKET SET SCREW M4X4	2	
24	957-571	BRUSH HOLDER	2	
25	319-408	BRUSH BLOCK ASS'Y	1	INCLUD.26,27
26	315-992	BRUSH BLOCK ASS'Y	1	INCLUD.23,24
27	313-505	WIRE BAND	2	
28	626-VVM	BALL BEARING 626VVC2PS2L	1	
29	931-266	BRUSH CAP	2	
30	999-021	CARBON BRUSH (1 PAIR)	2	
31	305-558	TAPPING SCREW (W/FLANGE) D5X25 (BLACK)	4	
32	307-624	RETURN SPRING	1	
33	307-622	GEAR COVER	1	
34	629-VVM	BALL BEARING 629VVC2PS2L	1	
35	319-407	THIRD PINION	1	
36	319-406	SECOND GEAR	1	
37	609-VVM	BALL BEARING 609VVC2PS2L	1	
38	939-544	RETAINING RING FOR D15 SHAFT (10 PCS.)	1	
39	302-714	WASHER	1	
40	310-254	RING GEAR	1	
41	319-405	SECOND PINION	1	
42	319-404	IDLE GEAR	2	
43	307-609	NEEDLE	2	
44	307-608	WASHER	1	
45	600-1VV	BALL BEARING 6001VVCMP2S2L	1	
46	998-471	HEX. SOCKET HD. BOLT M5X12	3	
47	319-393	FINAL GEAR	1	
48	939-546	RETAINING RING FOR D18 SHAFT (10 PCS.)	1	

* ALTERNATIVE PARTS

1 - 01

