

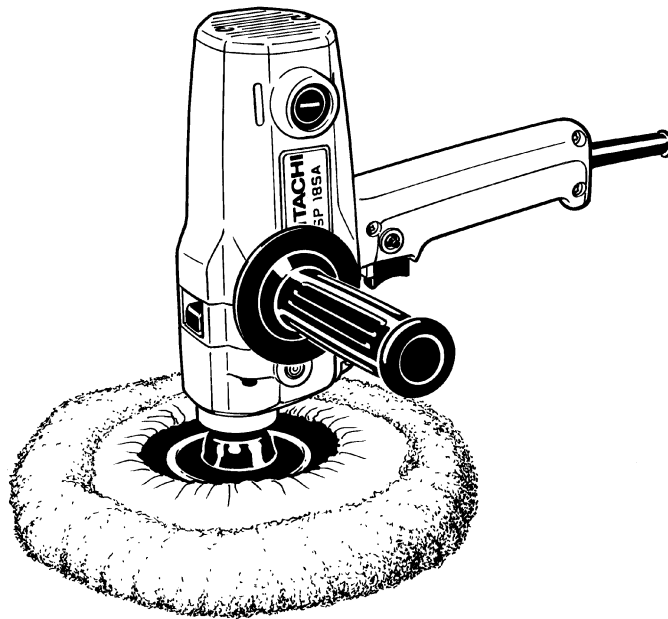
MODELS

**SP 18SA**

**HITACHI**  
**POWER TOOLS**

**POLISHER**  
**SP 18SA**

**TECHNICAL DATA**  
**AND**  
**SERVICE MANUAL**



**S**

LIST No. 0351

Sep. 1999

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:

Symbol Utilized	Competitor	
	Company Name	Model Name
C	MAKITA	9218 PB

# CONTENTS

	<b>Page</b>
<b>1. PRODUCTS NAME</b> .....	1
<b>2. MARKETING OBJECTIVE</b> .....	1
<b>3. APPLICATIONS</b> .....	1
<b>4. SELLING POINTS</b> .....	1
4-1. Selling Point Descriptions .....	2
<b>5. SPECIFICATIONS</b> .....	4
<b>6. COMPARISONS WITH SIMILAR PRODUCTS</b> .....	5
6-1. Specification Comparisons .....	5
6-2. Practical Test Data .....	6
<b>7. PRECAUTIONS IN SALES PROMOTION</b> .....	6
7-1. Handling Instructions .....	6
7-2. Cautions on Name Plate .....	7
7-3. Precautions on Usage .....	7
<b>8. PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY</b> .....	8
8-1. Disassembly of the Armature Ass'y and the Lock Lever Ass'y .....	8
8-2. Disassembly of the Stator Ass'y .....	9
8-3. Disassembly of the Final Gear and the Ball Bearing .....	9
8-4. Reassembly .....	10
8-5. Tightening Torque .....	10
8-6. Wiring Diagrams .....	10
8-7. Insulation Tests .....	11
8-8. No-Load Current Values .....	11
<b>9. STANDARD REPAIR TIME (UNIT) SCHEDULES</b> .....	12
 <b>[ Appendix ]</b>	
Assembly Diagram for SP 18SA .....	13

## 1. PRODUCTS NAME

Hitachi Polisher, Model SP 18SA [180 mm (7")]

## 2. MARKETING OBJECTIVE

The Model SP 18SA is a high-power and double-insulated electric polisher with a stand-up design specially developed to meet customer demands in European, North American and Asian markets.

This polisher will make it possible to exploit new markets because it is the first product in our polisher line to satisfy this range of demands.

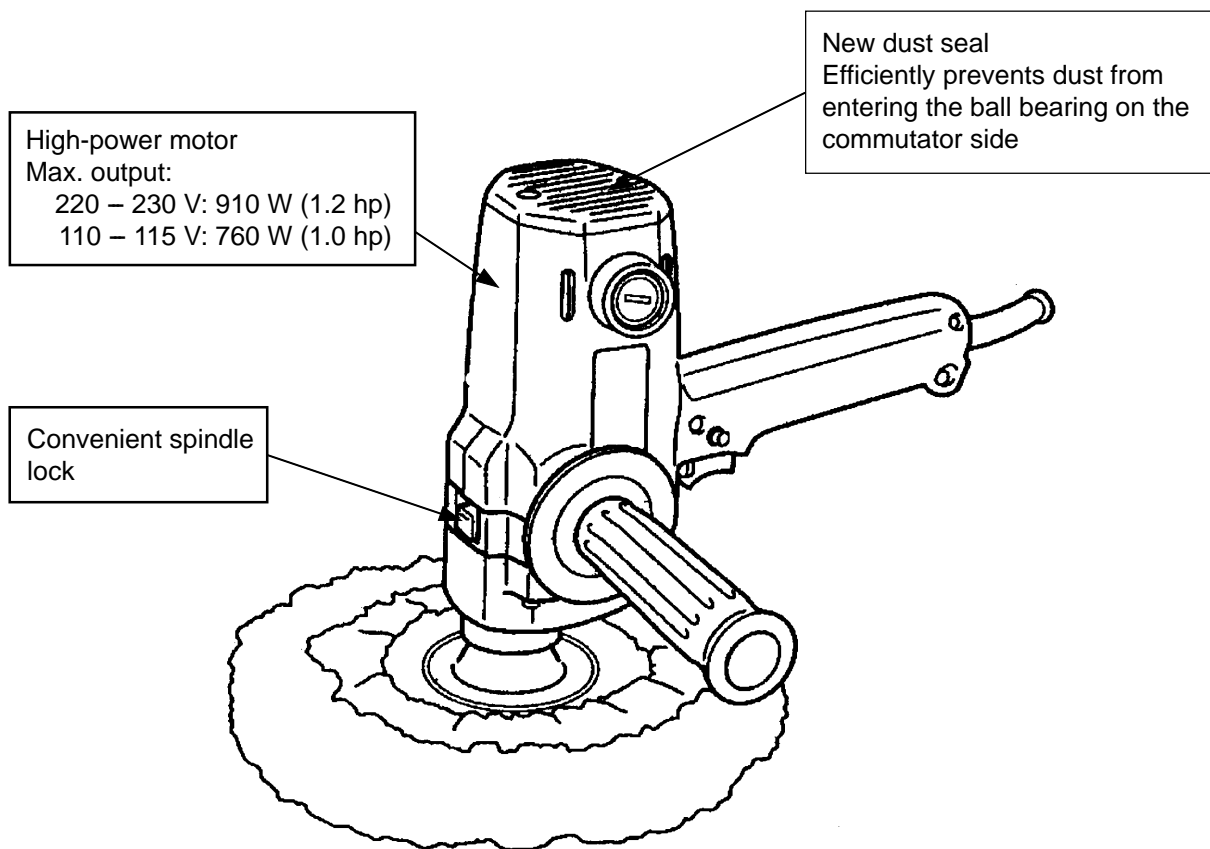
The Model SP 18SA has the following features.

- 1) High-power motor
- 2) Convenient spindle lock
- 3) Dust-proof bearing-chamber

## 3. APPLICATIONS

- Polishing or shining painted metal surfaces, such as those of automobiles, trains, elevators, refrigerators, sewing machines, washing machines, metal appliances, etc.
- Polishing varnished surfaces of wooden furniture, etc.
- Shining synthetic resin or ebonite products.

## 4. SELLING POINTS



#### 4-1. Selling Point Descriptions

##### 1) High-power motor

The Model SP 18SA is equipped with a high-power motor and is more powerful than similar products. We could say that the ratio of the motor's maximum output to the product weight defines its performance. Compared with a typical competitor's model C in terms of this indicator, the Model SP 18SA proves to have higher performance as shown in Table 1.

**Table 1 Comparison of max. output and product weight (220 – 230 V)**

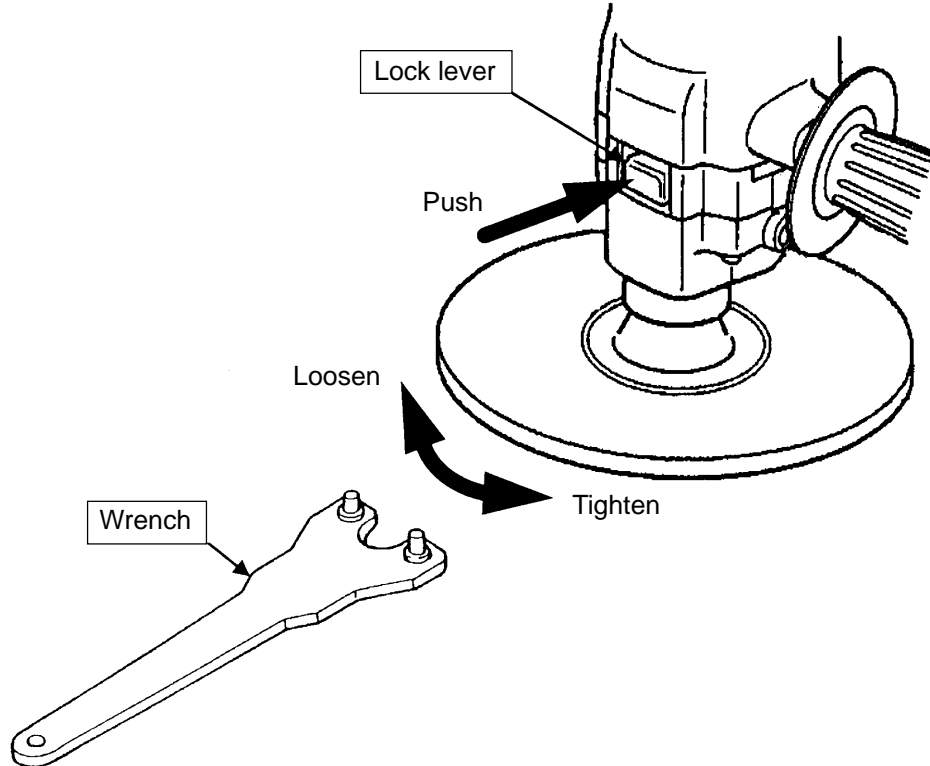
Item	Maker Model	HITACHI	C
		SP 18SA	
Max. output *1	(W)	910 (1.22 hp)	640 (0.86 hp)
Actual product weight *2	(kg)	3.08 (6.79 lbs)	2.95 (6.50 lbs)
Max. output/product weight (W/kg)		295 (0.18 hp/lb)	217 (0.13 hp/lb)

\*1 Max. output may vary depending on the market

\*2 Actual product weight is a measured weight and excludes cord.  
(Maximum output may vary depending on market area.)

##### 2) Convenient spindle lock

The Model SP 18SA is the first polisher in the polisher industry equipped with a convenient spindle-lock mechanism. Thanks to this mechanism, tools can be easily replaced as shown in Fig. 1.



**Fig. 1**

### 3) New dust seal

Newly-designed dust seals are adopted in the bearing chamber on the commutator side.

This ensures better dust-resistance of the ball bearing in comparison with C.

The key features of the new dust seal are as follows.

- (1) Width is increased to 6.5 mm (C: 2 mm)
- (2) 2-step side construction is provided and each step has labyrinth grooves.

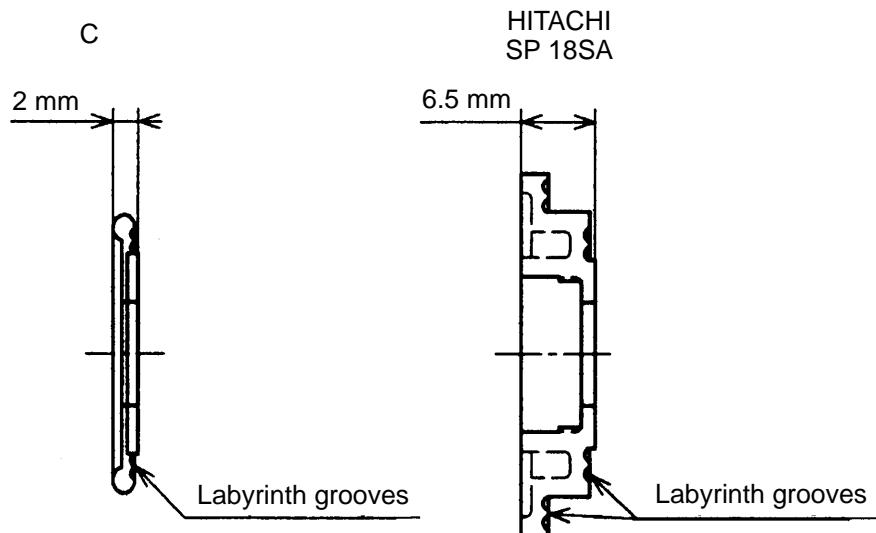


Fig. 2

## 5. SPECIFICATIONS

Item		Model	SP 18SA													
Capacity		180 mm (7")														
Power source		AC single phase 50 or 60 Hz														
Voltage, current and power input		<table border="1"> <thead> <tr> <th>Voltage (V)</th> <th>Current (A)</th> <th>Power input (W)</th> </tr> </thead> <tbody> <tr> <td>110</td> <td>6.3</td> <td rowspan="4">650</td> </tr> <tr> <td>115</td> <td>6.0</td> </tr> <tr> <td>220</td> <td>3.1</td> </tr> <tr> <td>230</td> <td>3.0</td> </tr> </tbody> </table>			Voltage (V)	Current (A)	Power input (W)	110	6.3	650	115	6.0	220	3.1	230	3.0
		Voltage (V)	Current (A)	Power input (W)												
		110	6.3	650												
		115	6.0													
		220	3.1													
230	3.0															
Rotation speed (no-load)		2,000 /min														
Type of motor		AC single-phase commutator motor														
Type of switch		Trigger switch														
Enclosure		Material: Housing } Handle cover } ..... Glassfiber reinforced polyamide resin (green) Tale cover }														
		Gear cover } Inner cover } ..... Aluminum alloy die casting														
		Painting: Gear cover } Inner cover } ..... Metallic silver														
Weight	Catalog	Net *1	2.9 kg (6.4 lbs)													
	Actual	Net *1	3.1 kg (6.8 lbs)													
		Gross	3.8 kg (8.4 lbs)													
Packaging		Corrugated cardboard box														
Standard accessories *2		Rubber pad 180 mm (7") ..... 1 Wool bonnet 180 mm (7") ..... 1 Side handle ..... 1 Wrench ..... 1														

\*1 Weight excludes cord.

\*2 The standard accessories differ in some areas.

## 6. COMPARISONS WITH SIMILAR PRODUCTS

### 6-1. Specification Comparisons

Maker			HITACHI	C
Model			SP 18SA	
Capacity	mm		180 (7")	180 (7")
Power input	W		650	570
Power output	W		390 (0.5 hp)	370 (0.5 hp)
Max. power output (220 – 230 V / 115 – 110 V)	W		910 (1.2 hp) / 760 (1.0 hp)	640 (0.9 hp) / 530 (0.7 hp)
No-load speed	/min		2,000	2,000
No-load noise level	dB/A		84	82
Spindle lock			Equipped	NA *1
Weight *2	Catalog		kg	2.9 (6.4 lbs)
	Actual			3.1 (6.8 lbs)
Dimensions	Catalog	H	mm	240 (9-7/16")
	Actual	H	mm	243 (9-9/16")
		L		237 (9-11/32")
		W		105 (4-1/8")
				98 (3-27/32")

\*1 NA: Not applicable

\*2 Weight without cord

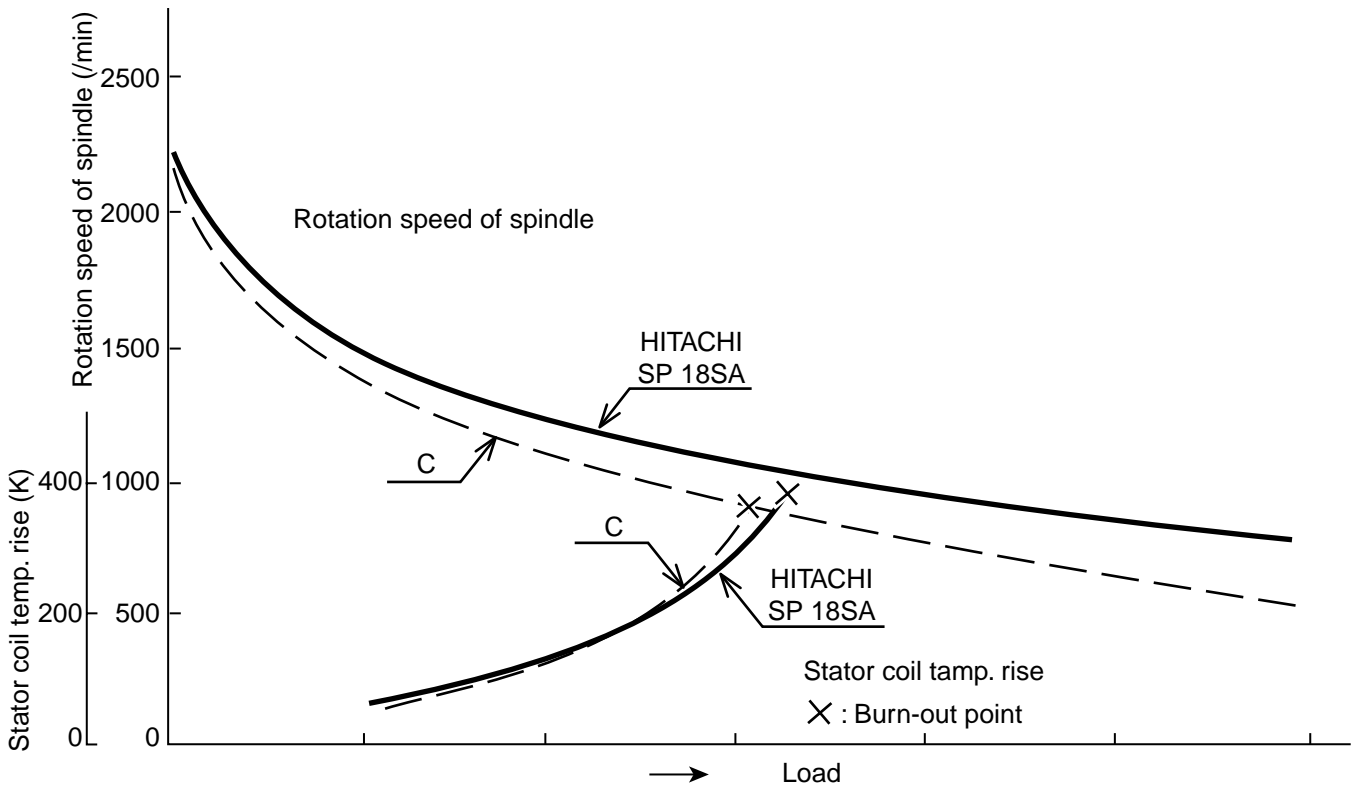
## 6-2. Practical Test Data

### 1) Comparisons in torque vs. rotation speed and stator coil temp. rise

The graph below shows the relationship between the rotation speed and the stator coil temperature rise while varying loads.

The rotation speed of the Model SP 18SA is higher than that of similar product C.

This means that the efficiency of the Model SP 18SA is superior to similar product C.



## 7. PRECAUTIONS IN SALES PROMOTION

In the interest of promoting the safest and most efficient use of the Model SP 18SA Polisher 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.

### 7-1. Handling Instructions

Although every effort is made in each step of design, manufacture, and inspection to provide protection against safety hazards, the dangers inherent in the use of any electric power tool cannot be completely eliminated. Accordingly, general precautions and suggestions for the use of the polisher is listed in the Handling Instructions to enhance the safe, efficient use of the tool by the customer. Salespersons must be thoroughly familiar with the contents of the Handling Instructions to be able to offer appropriate guidance to the customer during sales promotion.

## 7-2. Cautions on Name Plate

The following basic precautions are listed on the Name Plate attached to the main body of each tool.

### (1) For Taiwan

注意

- 使用前請詳讀使用說明書
- 禁止在雨中使用

### (1) For the U.S.A. and Canada

- WARNING -

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

AVERTISSEMENT

Afin de réduire le risque de blessures, l'utilisateur doit lire et bien comprendre le mode d'emploi.

### (1) For China

CAUTION

Read thoroughly HANDLING INSTRUCTIONS before use.

## 7-3. Precautions on Usage

Never press the lock lever while the spindle is rotating:

If the lock lever is pressed while the spindle is rotating, the spindle will stop immediately. In such a case, there is a danger that the wheel washer may be loosened so that the rubber pad and wool bonnet fly off unexpectedly to cause possible serious injury.

## 8. PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY

The **[Bold]** numbers in the descriptions below correspond to the item numbers in the Parts List and exploded assembly diagram for SP 18SA.

### 8-1. Disassembly of the Armature Ass'y and the Lock Lever Ass'y

(1) Loosen the two Brush Caps **[27]**, and take out the Carbon Brushes **[26]**.

(2) Remove the four Tapping Screws D5 x 55 **[7]**, and remove the Gear Cover **[8]**, and related parts.

The Armature Ass'y **[17]** can then be taken out together with the Inner Cover **[12]**, the Lock Lever **[14]**, and related parts.

(3) As illustrated in Fig. 3, the Inner Cover **[12]**, and related parts can be removed from the Armature Ass'y **[17]**, and related parts by utilizing a J-130 sleeve (special repair tool, Code No. 970907) and a J-131 plate (special repair tool, Code No. 305711).

(4) The Ball Bearing **[13]** can be removed from the Armature Ass'y **[17]** by utilizing the J-30 bearing puller ass'y (special repair tool, Code No. 970804).

After the Ball Bearing has been removed, the Lock Lever **[14]** can be easily taken off.

(5) As illustrated in Fig. 4, the Ball Bearing **[19]** can also be removed from the Armature Ass'y **[17]** by utilizing the J-130 sleeve (special repair tool, Code No. 970907) and a J-204 bearing puller (special repair tool, Code No. 970982).

After the Ball Bearing has been removed, the Dust Seal **[18]** can be easily taken out.

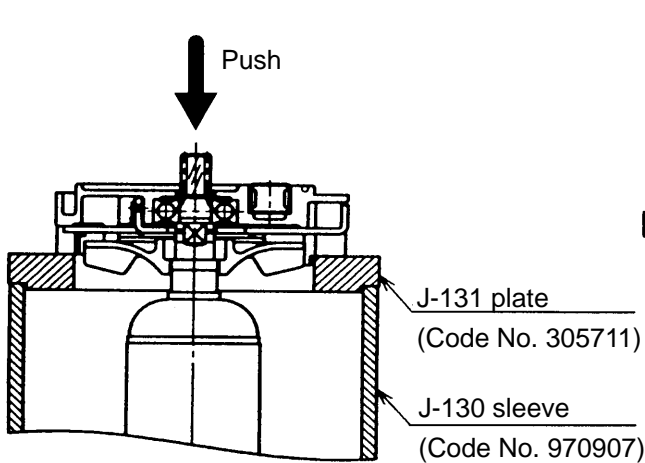


Fig.3

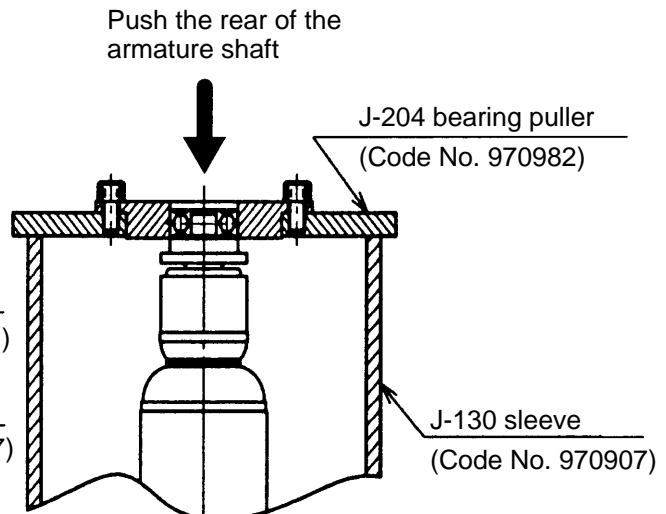


Fig.4

## 8-2. Disassembly of the Stator Ass'y

- (1) After taking off the Armature Ass'y [17], loosen the five Tapping Screws D4 X 20 [30] and remove the Tail Cover [29], the Handle Cover [33] and the Fan Guide [20].
- (2) Disconnect the lead wires of the Stator Ass'y [21] from Switch (C) [37].  
Then, disconnect the lead wires of Noise Suppressor [34].
- (3) Disconnect the Brush Terminals [22] from the Brush Holders [25].
- (4) Loosen the two Hex. Hd. Tapping Screws [31], and remove the lead wire of the Noise Suppressor [34].  
And pull out the lead wires of the Stator Ass'y [21] from the Housing Ass'y [23]. Then, the Stator Ass'y can be taken out of the Housing Ass'y [23]. If the Stator Ass'y [21] cannot be easily taken out of the Housing Ass'y [23], disassembly can be facilitated by heating the Housing Ass'y to a temperature of approximately 60 °C (140 °F) in an appropriate heating oven.

## 8-3. Disassembly of the Final Gear and the Ball Bearing

- (1) Loosen the four Tapping Screws D5 x 55 [7], and remove the Gear Cover [8], together with the Spindle [4], the Final Gear [16], and the related parts as a single unit. Then, the Second Pinion [10] and Washer [11] can be removed easily.
- (2) Remove the Bearing Caps [3] with the J-21 wrench.
- (3) As illustrated in Fig. 5, support the tip of the Gear Cover [8] with a cylindrical jig of inside diameter 35 mm or more, and push the rear portion of the Spindle [4]. At this time, the Final Gear [16] will come off of the Spindle.
- (4) Remove the D12 Retaining Ring [6] from the Spindle [4], and the Ball Bearing [5] can be removed from the Spindle [4] with the J-30 bearing puller ass'y (special repair tool, Code No. 970804).

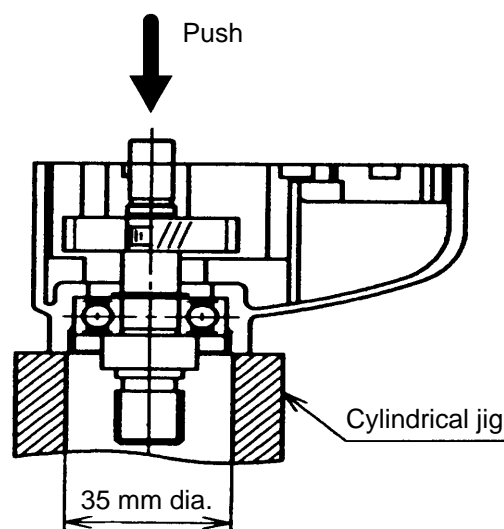


Fig. 5

### 8-4. Reassembly

Perform reassembly in the reverse order of disassembly while observing the given precautions and taking care of the following points.

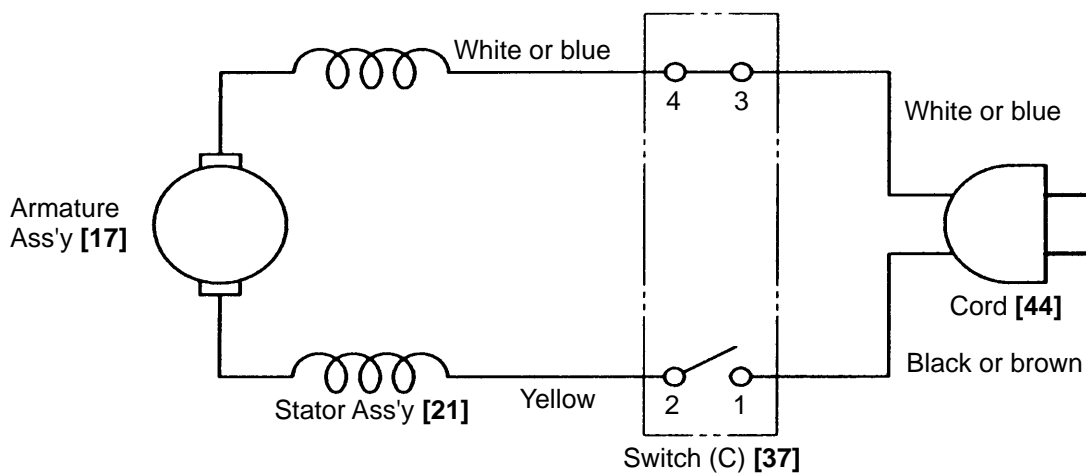
- (1) After disassembly, thoroughly remove old grease from the inside of the Gear Cover [8], and insert 30 g of new grease (Nippeco JF-375, Code No. 930036, is recommended) prior to reassembly. When inserting grease, apply it to the pinion gear teeth surfaces, and to the needle bearing inside the Inner Cover [12].
- (2) When replacing the Ball Bearing [19] on the commutator side of the Armature Ass'y [17], be very careful to ensure that the Dust Seal [18] is assembled in the proper direction. The Dust Seal [18] plays an important role in protecting the ball bearing against dust, and must be replaced with a new one if disassembled.

### 8-5. Tightening Torque

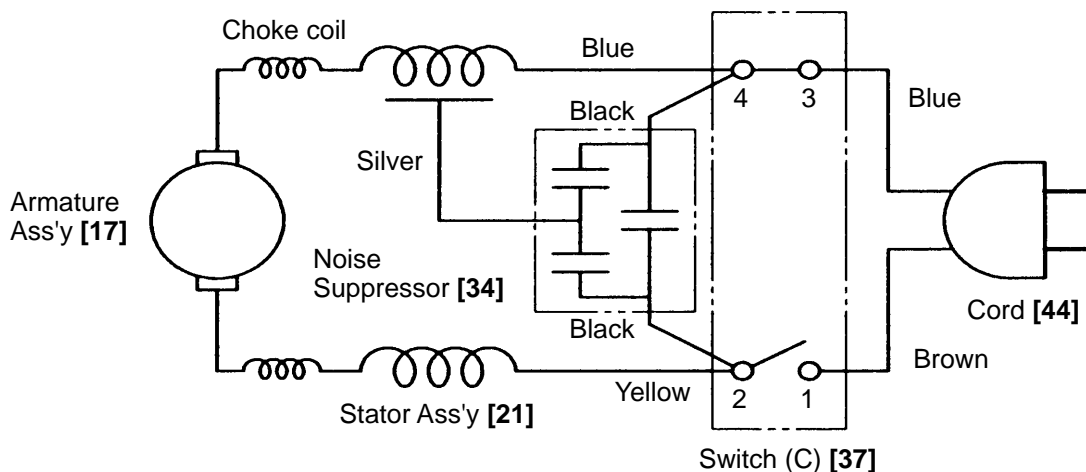
D4 Tapping Screw (W/Flange) [30] [41]	.....	2.0 ± 0.5 N·m (20 ± 5 kgf·cm, 1.5 ± 0.4 ft-lbs)
D5 Tapping Screw [7]	} .....	2.9 ± 0.5 N·m (30 ± 5 kgf·cm, 2.2 ± 0.4 ft-lbs)
D5 Hex. Hd. Tapping Screw [31]		

### 8-6. Wiring Diagrams

For the U.S.A., Canada and Asian countries (except China)



For European countries and China



### 8-7. Insulation Tests

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

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

Dielectric strength: AC 4,000 V for 1 minute, with no abnormalities ..... 220 V – 230 V

AC 2,500 V for 1 minute, with no abnormalities ..... 110 V – 127 V

### 8-8. No-Load Current Values

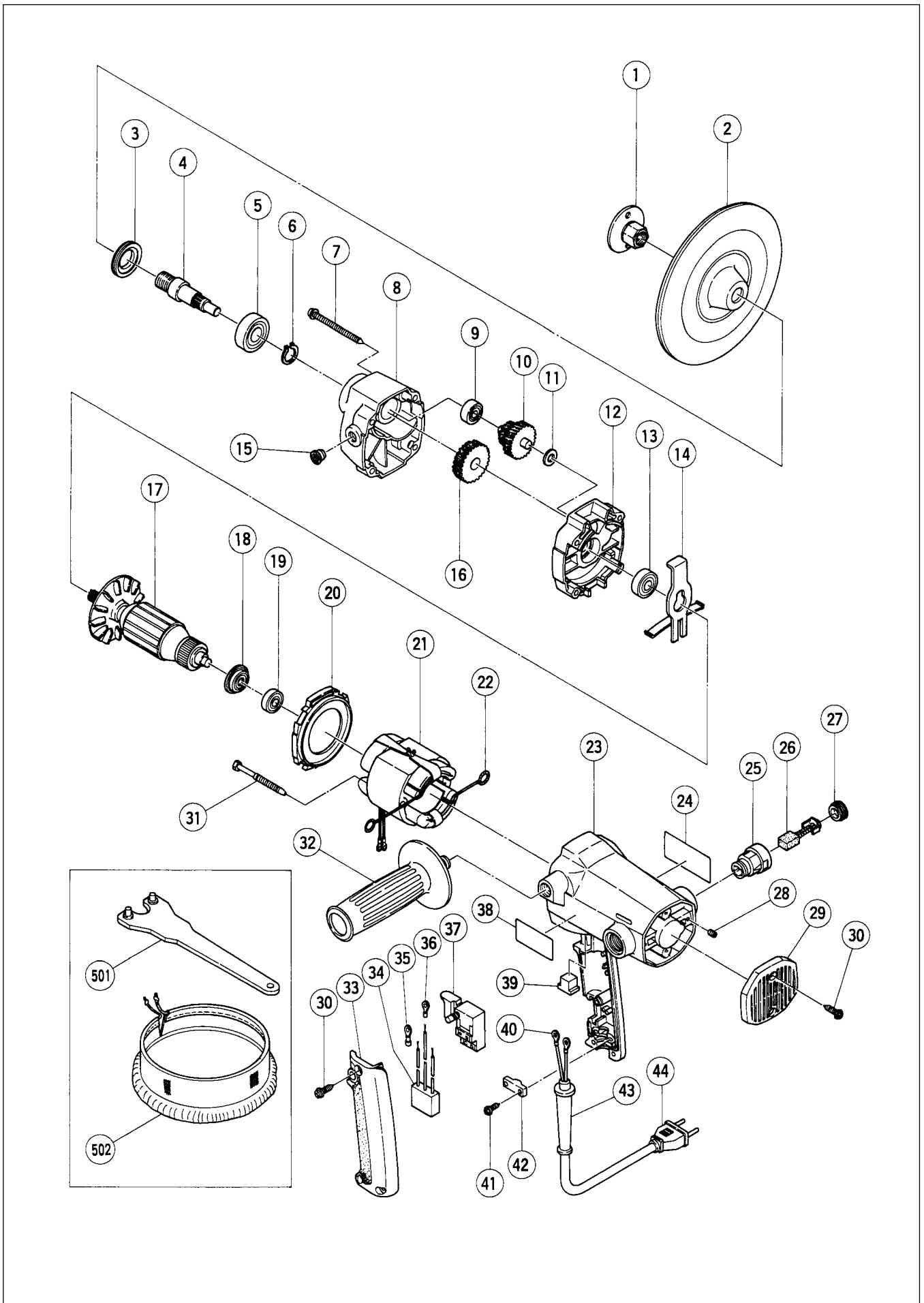
After no-load operation for 30 minutes, the no-load current value should be as follows.

Voltage (V)	110	115	220	230
Current (A) max.	2.5	2.6	1.5	1.5

### 9. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
SP 18SA		Work Flow						
		Switch Cord			Housing Stator			
	General Assembly			Armature Ball Bearing (600DD) Ball Bearing (608VV) Dust Seal Inner Cover				
				Gear Cover First Gear Ball Bearing (6201DD) Spindle Bearing Cap Ball Bearing (608VV) Second Pinion Final Gear				

Assembly Diagram for SP 18SA



## PARTS

SP 18SA

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS		
*	1	953-381	WASHER NUT	1		
*	1	953-246Z	WASHER NUT M14	1	FOR ITA,ESP	
*	1	953-254P	WASHER NUT 5/8"-11UNC	1	FOR USA	
*	2	953-255	RUBBER PAD (D16 HOLE)	1	FOR INA,SIN,HKG,USA,CHN	
*	2	953-247Z	RUBBER PAD (D14 HOLE)	1	FOR ITA,ESP	
	3	944-005	BEARING CAP	1		
*	4	317-910	SPINDLE	1		
*	4	317-908	SPINDLE	1	FOR ITA,ESP	
*	4	317-909	SPINDLE	1	FOR USA	
	5	620-1DD	BALL BEARING 6201DDCMPS2L	1		
	6	939-542	RETAINING RING FOR D12 SHAFT (10 PCS.)	1		
	7	309-778	TAPPING SCREW (W/FLANGE) D5X55 (BLACK)	4		
	8	318-016	GEAR COVER	1		
	9	608-VVM	BALL BEARING 608VVC2PS2L	1		
	10	317-905	SECOND PINION	1		
	11	317-906	WASHER	1		
	12	317-904	INNER COVER	1		
	13	600-0DD	BALL BEARING 6000DDCMPS2L	1		
	14	317-890	LOCK LEVER	1		
	15		CAP	1		
	16	317-907	FINAL GEAR	1		
*	17	360-502U	ARMATURE ASS'Y 110V-115V	1	INCLUD.13,18,19	
*	17	360-502E	ARMATURE 220V-230V	1		
	18	317-889	DUST SEAL	1		
	19	608-VVM	BALL BEARING 608VVC2PS2L	1		
	20	317-888	FAN GUIDE	1		
*	21	340-449C	STATOR ASS'Y 110V-115V	1	INCLUD.22	
*	21	340-449H	STATOR ASS'Y 220V-230V	1	INCLUD.22	
*	21	340-449E	STATOR ASS'Y 220V-230V	1	INCLUD.22 FOR INA,SIN,HKG	
	22	930-703	BRUSH TERMINAL	2		
	23	317-896	HOUSING ASS'Y	1	INCLUD.25,28	
	24		NAME PLATE	1		
	25	958-900	BRUSH HOLDER	2		
	26	999-043	CARBON BRUSH (1 PAIR)	2		
	27	945-161	BRUSH CAP	2		
	28	938-477	HEX. SOCKET SET SCREW M5X8	2		
	29	317-894	TAIL COVER	1		
	30	302-086	TAPPING SCREW (W/FLANGE) D4X20 (BLACK)	5		
	31	953-174	HEX. HD. TAPPING SCREW D5X55	2		
	32	937-981	SIDE HANDLE FOR M14	1		
	33	317-892	HANDLE COVER	1		
*	34	994-273	NOISE SUPPRESSOR	1	FOR ITA,ESP,CHN	
*	35	311-741	TERMINAL	2	FOR NOISE SUPPRESSOR	
*	36	959-144	TERMINAL 50051 (10 PCS.)	1	FOR NOISE SUPPRESSOR	
	37	302-477	SWITCH (C) (1P SCREW TYPE) W/LOCK	1		
	38		HITACHI LABEL	1		
	39	317-893	DUST PACKING	1		
	40	980-063	TERMINAL	2	FOR CORD	
	41	984-750	TAPPING SCREW (W/FLANGE) D4X16	2		
	42	960-266	CORD CLIP	1		
*	43	953-327	CORD ARMOR D8.8	1		

\* : ALTERNATIVE PARTS

5 - 99



