

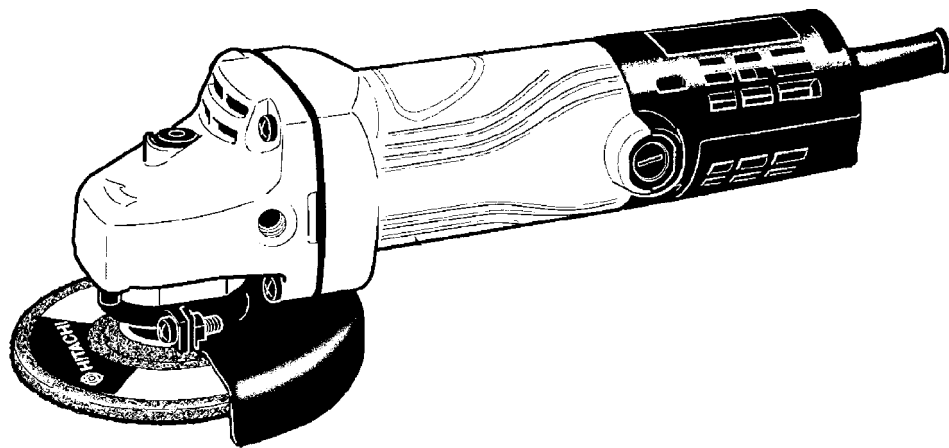
MODEL

PDA-100M

Hitachi
Power Tools

DISC GRINDER
PDA-100M

TECHNICAL DATA
AND
SERVICE MANUAL



P

LIST No. E270

Sept. 2005

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
B	BOSCH	GWS6-100
C	MAKITA	9526B

CONTENTS



Page

1. PRODUCT NAME	1
2. MARKETING OBJECTIVE	1
3. APPLICATIONS	1
4. SELLING POINTS	2
5. SPECIFICATIONS	5
6. COMPARISONS WITH SIMILAR PRODUCTS	6
6-1. Specification Comparisons	6
6-2. Comparisons in Torque vs. Rotation Speed and Stator Coil Temperature Rise	7
7. PRECAUTIONS IN SALES PROMOTION	8
7-1. Handling Instructions	8
7-2. Caution Plate	8
7-3. Precautions on Usage	8
8. PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY	9
8-1. Disassembly	9
8-2. Reassembly	10
8-3. Lubrication Points and Types of Lubricant	13
8-4. Tightening Torque	13
8-5. Wiring Diagram	13
8-6. Insulation Tests	14
8-7. No-load Current Value	14
9. STANDARD REPAIR TIME (UNIT) SCHEDULES	15
Assembly Diagram for PDA-100M	

1. PRODUCT NAME

Hitachi Disc Grinder, Models PDA-100M [100 mm (4")]

2. MARKETING OBJECTIVE

The current Model PDA-100D has obtained high evaluation for its highly durable aluminum housing in the Asian market. However, there is an increasing demand for a durable disc grinder having double-insulated construction with a high insulation class resin housing. To cope with this demand, we developed the new Model PDA-100M based on the current Model PDA-100D. The motor of the new Model PDA-100M is more durable than that of the current Model PDA-100D thanks to the double insulation construction. We aim to expand our market share with the new Model PDA-100M.

The main improvements are as follows:

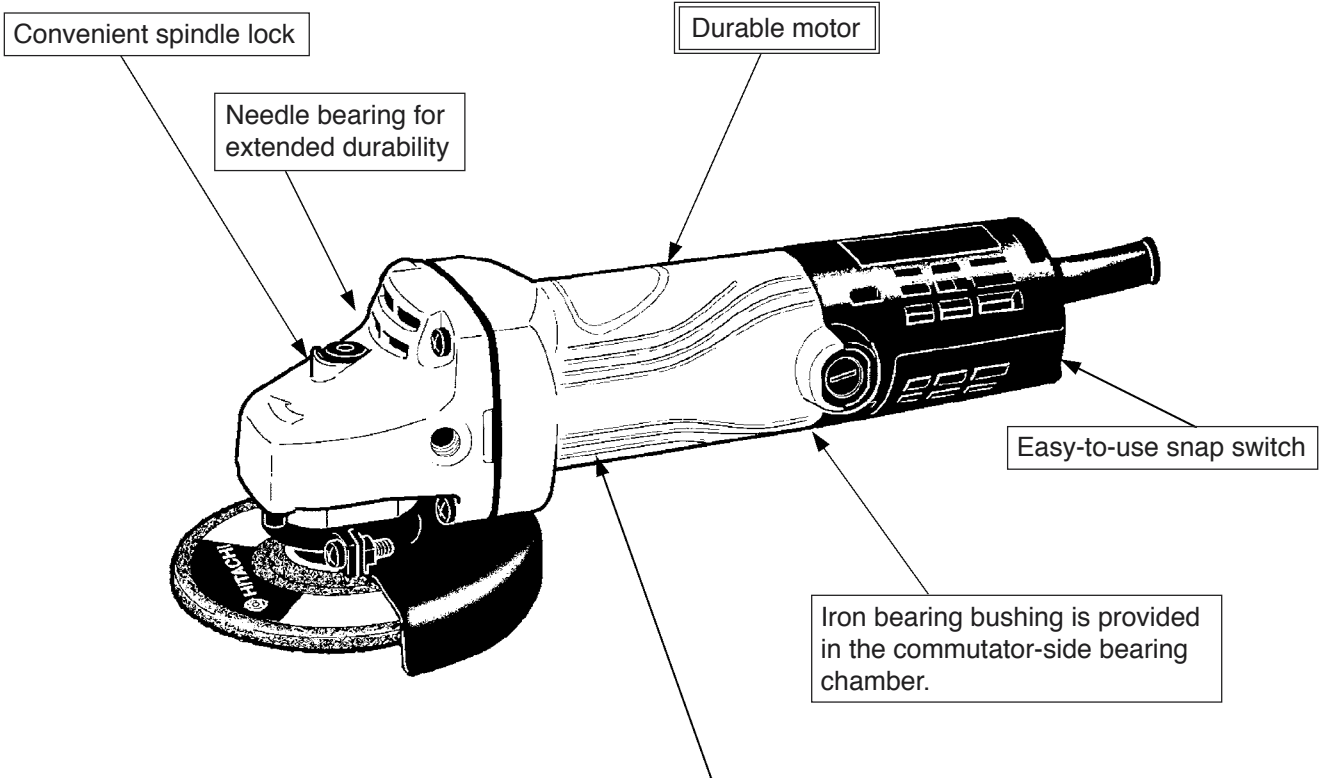
- ① The motor is so designed that commutation sparks are minimized during operation in order to increase the service life of the brush, commutator and the motor.
- ② The wear resistance of the coil is increased by attaching the protect tape to the coil end at the fan side of the armature.
- ③ The iron bearing bushing is adopted as the bearing of the resin housing in order to increase durability of the housing.
- ④ Use of thick copper wires increases the motor input and the overload durability owing to reduction of loss.

Please expand the sales of the new Model PDA-100M as well as the conventional Model PDA-100D.

3. APPLICATIONS

- Removal of casting fin and finishing of various types of steel, bronze, aluminum, and other metallic materials and castings
- Grinding of welded sections, or sections cut by acetylene torch
- Grinding of slate, brick, marble and similar materials

4. SELLING POINTS



High power input: 715 W
(PDA-100D: 620 W)
B : 670 W
C : 710 W

Well balanced and ergonomic design for easy operation

Hitachi original dust proof construction for long service life against abrasion from dust

- Application of adhesive to the commutator hook.
- Extended armature wedge.
- Protect tape
- Vent is resistant to sucking gravel.

● Durable motor

The motor of the Model PDA-100M is so designed that commutation sparks are minimized during operation in order to increase the service life of the brush and the commutator. Table 1 shows the wear ratios of the brush and the commutator as a result of continuous operation under the same loading conditions as general grinding operation with respect to the current Model PDA-100D. The service life of the Model PDA-100M is about 1.5 times longer than the current Model PDA-100D and the running cost can be reduced.

Table 1

Maker	HITACHI		B	C
	PDA-100M	PDA-100D		
Carbon life ratio	1.4	1.0	0.9	1.0
Commutator life ratio	1.5	1.0	1.1	1.0

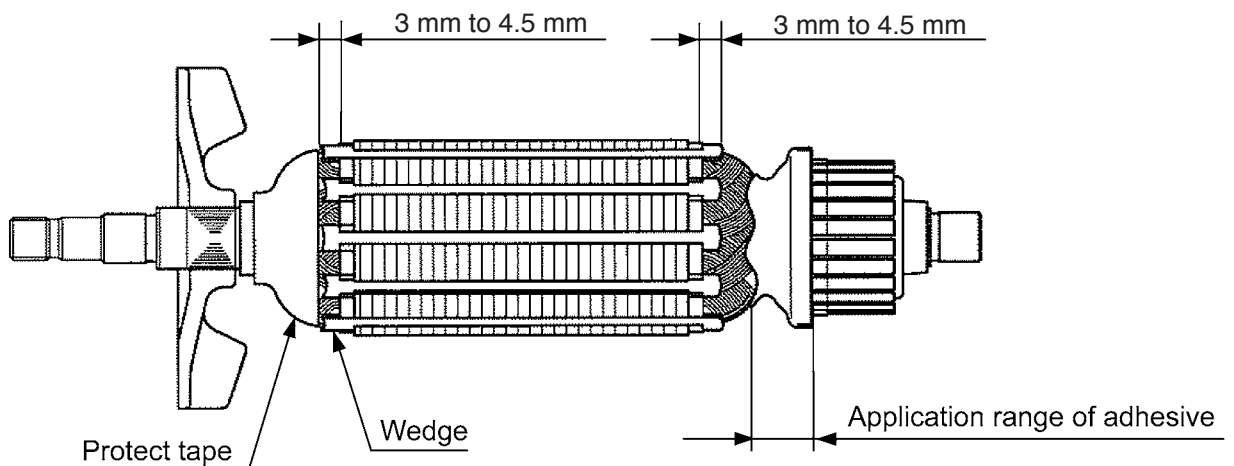
● Hitachi original dust proof construction for long service life against abrasion from dust

The Model PDA-100M is equipped with a motor whose durability is greater than the conventional models by making the following improvements. The service life of the armature coil is 4 times longer than the conventional models as a result of the gravel suction test (gravel is forcedly sucked in through the vents of the tail cover).

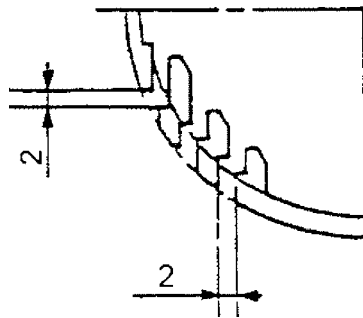
- The wedges at both ends of the armature coil are extended by 3 to 4.5 mm to protect the portions where the peripheral speed is the fastest and apt to be disconnected by dust or gravel.
- The protect tape covers the coil end at the fan side in order to protect the coil from being worn due to collision with dust or gravel entered through the air vent and repelled by the fan.
- The adhesive coating on the commutator hook prevents a break in the coil due to collision of dust or gravel with the hook and a short circuit due to deformation of the hook.

Table 2

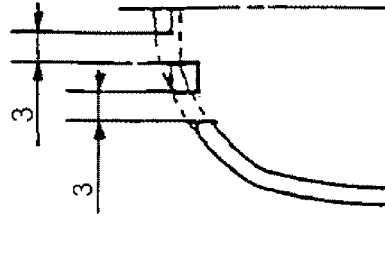
Maker	HITACHI		B	C
	PDA-100M	PDA-100D		
Durability ratio	4.0	1.0	0.8	1.0



New vent construction is adopted to prevent dust or gravel from getting inside.



Model PDA-100M
(Dust or gravel is hard to be sucked in.)



Model PDA-100D

- High power input

The motor of the Model PDA-100M is the same size as that of the durable Model PDA-100D. In addition, use of thick copper wires increases the motor input owing to reduction of loss.

5. SPECIFICATIONS

Item		Model	PDA-100M														
Depressed center wheel	Dimensions	O.D. 100 mm (4") x Thickness 6 mm (1/4") x I.D. 16 mm (5/8") Offset amount: 4 mm (5/32")															
	Max. peripheral speed	4,300 m/min (14,000 ft/min, 72 m/s)															
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>6.8</td> <td rowspan="4">715</td> </tr> <tr> <td>220</td> <td>3.4</td> </tr> <tr> <td>230</td> <td>3.3</td> </tr> <tr> <td>240</td> <td>3.2</td> </tr> </tbody> </table>				Voltage (V)	Current (A)	Power input (W)	110	6.8	715	220	3.4	230	3.3	240	3.2
Voltage (V)	Current (A)	Power input (W)															
110	6.8	715															
220	3.4																
230	3.3																
240	3.2																
Rotation speed (no-load)		12,000/min															
Type of motor		AC single-phase commutator motor															
Type of switch		Snap switch															
Enclosure	Housing	Glassfiber reinforced polyamide resin (gray)															
	Tail cover	Glassfiber reinforced polyamide resin (black)															
	Gear cover	Aluminum alloy die casting (metallic silver)															
	Packing grand	Aluminum alloy die casting															
Weight	Net: *1	1.5 kg (3.3 lbs.)															
	Gross:	2.5 kg (5.5 lbs.)															
Packaging		Corrugated cardboard box															
Standard accessories*2		Depressed center wheel [Outer dia.100 mm (4")] 1 Wrench 1															

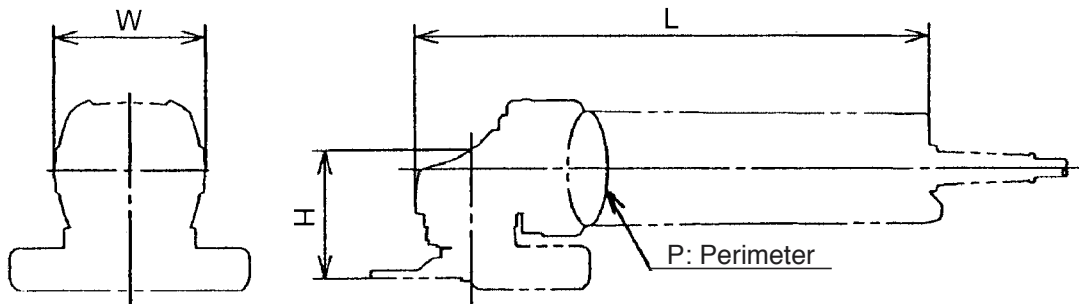
*1 : Net weight excludes cord, depressed center wheel, wheel nut, wheel washer and wheel guard.

*2 : Standard accessories are subject to change without prior notice.

6. COMPARISONS WITH SIMILAR PRODUCTS

6-1. Specification Comparisons

Maker		HITACHI		B	C
Model		PDA-100M	PDA-100D		
Wheel diameter	mm	100	100	100	100
No-load speed	/min	12,000	12,000	11,000	11,000
Power input	W	715	620	670	710
Power output	W	430	300	360	370
Max. power output	W	870	800	760	860
Dimensions	L	mm	260	254	265
	W	mm	76	67	76
	H	mm	63	60	73
	P	mm	200	200	191
Weight *	Catalog	kg	1.5	1.7	1.4
	Actual	kg	1.6	2.0	1.4
Type of switch	—	Snap	Snap	Snap	Snap



* Weight excludes cord, depressed center wheel, wheel nut, wheel washer and wheel guard.

6-2. Comparisons in Torque vs. Rotation Speed and Stator Coil Temperature Rise

Figure 1 shows comparisons of the rotation speed and the stator coil temperature rise between a competitive model with respect to torque. Torque represents the magnitude of load, i.e., the amount of pressing force, cutting depth and forward force in actual cutting jobs. This shows that a powerful motor is less likely to burn out because it has both a minimum drop of rotation speed even at a greater torque and a lower stator coil temperature rise at the same torque.

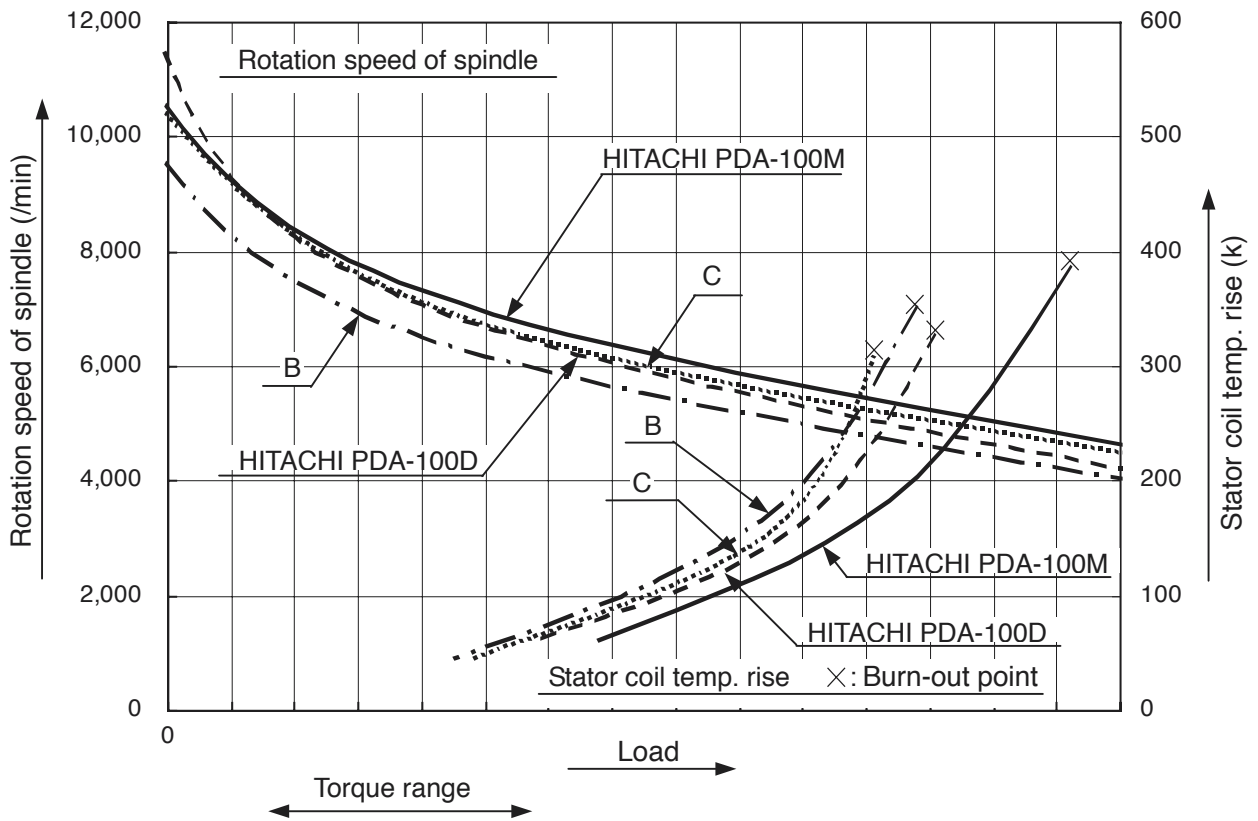


Fig. 1 Comparisons in torque vs. rotation speed and stator coil temperature rise

Figure 1 indicates the following:

- ① The motor speed of the Model PDA-100M is higher than that of B, C and Model PDA-100D at the same torque. This means that the working efficiency of the Model PDA-100M is superior to B, C and Model PDA-100D.
- ② The stator coil temperature rise of the Model PDA-100M is lower than that of B, C and Model PDA-100D thanks to the improved cooling mechanism and it is equivalent to that of the Model PDA-100D. This means that the Model PDA-100M has a burn-resistant and tenacious motor.

7. PRECAUTIONS IN SALES PROMOTION

In the interest of promoting the safest and most efficient use of the Model PDA-100M disc grinder by all of our customers, it is very important that at the time of sale, the salesperson carefully ensures that the buyer seriously recognizes the importance of the contents of the Handling Instructions, and fully understands the meaning of the precautions listed on the nameplate attached to each tool.

7-1. Handling Instructions

Although every effort is made in each step of design, manufacture and inspection to provide protection against any hazards, the dangers inherent in the use of any electric 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 disc grinders are listed in the Handling Instructions to enhance the safe, efficient use of the tool by the customer. Salespersons must be thoroughly familiar with the contents of the Handling Instructions to be able to offer appropriate guidance to the customer during sales promotion.

7-2. Caution Plate

The following caution is listed on the nameplate 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

7-3. Precautions on Usage

Instruct the customer to pay particular attention to the two points described below.

(1) Use of the side handle (Optional accessory)

When the side handle is used, the customer must be instructed to ensure without fail that the wheel guard is mounted in the manner so that it protects the operator's hand from coming into contact with the depressed center wheel.

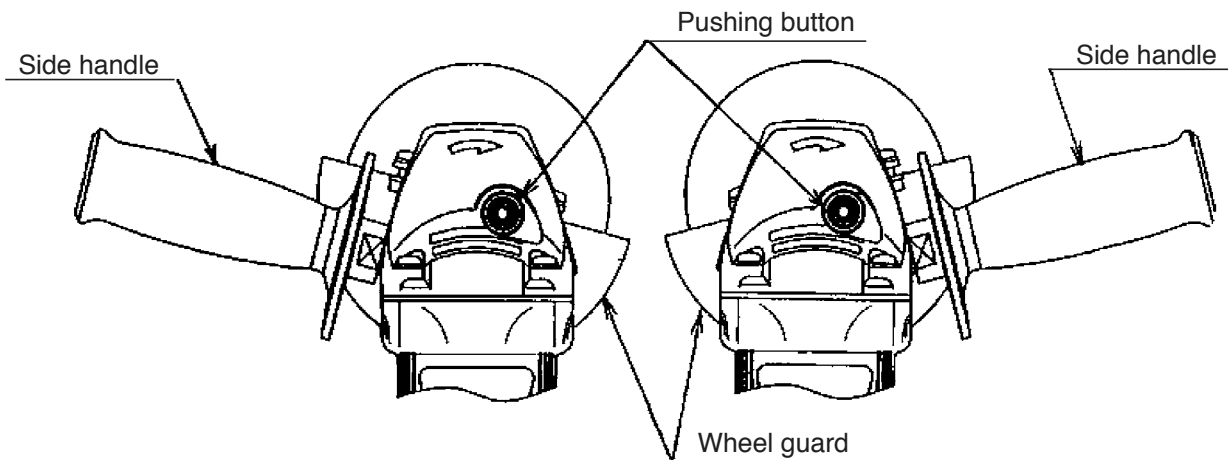


Fig. 2

(2) Never press the pushing button while the depressed center wheel is rotating.

If the pushing button (Fig. 2) is pressed while the depressed center wheel is rotating, the spindle will stop immediately. In such a case, there is a danger that the wheel nut may be loosened, so that the depressed center wheel flies out unexpectedly and may cause possibly 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 the exploded assembly diagram for Model PDA-100M.

8-1. Disassembly

(1) Disassembly of the armature

- 1) Remove the Brush Caps **[38]** and take out the Carbon Brushes **[39]**.
- 2) Loosen the four Tapping Screws D5 x 25 (Black) **[1]** which fix the Gear Cover Ass'y **[3]** to remove the Armature **[7]** from the Housing **[33]** together with the Bearing Holder **[6]**.
- 3) Loosen the Special Nut M7 **[4]** which fixes the pinion to remove the pinion.
- 4) Insert the hooks of the J-204 bearing puller between the Ball Bearing 628VVC2PS2-L **[5]** and the Bearing Holder **[6]** from both sides and fix the hooks with the wing bolts.
- 5) Place the J-204 bearing puller on a supporting jig and push down on the tip of the armature shaft with a hand press to remove the Ball Bearing 628VVC2PS2-L **[5]**. Then remove the Bearing Holder **[6]**.

(2) Disassembly of the dust seal

- 1) Insert the hooks of the J-204 bearing puller between the commutator and the Dust Seal **[11]** from both sides, and fix the hooks with the wing bolts.
- 2) Place the J-204 bearing puller on a supporting jig and push down on the armature shaft with a hand press to remove the Dust Seal **[11]** together with the Ball Bearing 608VVC2PS2L **[12]**. Replace the Dust Seal **[11]** with new one because it is damaged by the removal of the Ball Bearing 608VVC2PS2L **[12]**.

(3) Disassembly of stator (A)

- 1) Remove the Armature **[7]** and loosen the Tapping Screw (W/Flange) D4 x 25 (Black) **[47]** to remove Tail Cover (B) **[46]**.
- 2) Loosen the two Machine Screws (W/Washer) M3.5 x 6 **[48]** that secure the internal wire of the Cord **[54]** and Stator (A) **[10]** to the Switch (1P Screw Type) **[49]** and loosen the two screws of the Pillar Terminal **[43]**. Remove the two internal wires from the Cord **[54]** and the Pillar Terminal **[43]**.
- 3) Remove the Tapping Screw (W/Flange) D4 x 40 **[37]** and the Tapping Screw (W/Flange) D4 x 20 (Black) **[36]**. Remove Tail Cover (A) **[35]** then remove the Earth Terminal **[41]** from the Housing **[33]**.
- 4) Disconnect the two internal wires of Stator (A) **[10]** coming from the Brush Holder **[40]** of Stator (A) **[10]**.
- 5) Remove the Fan Guide **[8]** from the Housing **[33]**.
- 6) Loosen the Tapping Screw (W/Flange) D4 x 70 **[9]** securing Stator (A) **[10]**. Remove Stator (A) **[10]** from the Housing **[33]**.

(4) Disassembly of the gear

- 1) Loosen the four Seal Lock Screws (W/Sp. Washer) M4 x 12 [21] that secure the Packing Gland [20] to the Gear Cover Ass'y [3] and remove the Packing Gland [20] from the Gear Cover Ass'y [3].
- 2) Remove the Retaining Ring for D11 Shaft [13] that secures the gear to the Spindle [23].
- 3) Remove the Wave Washer [14] and the gear from the Spindle [23].

8-2. Reassembly

Push the parts together in the reverse order of disassembly, with the precautions given below.

- (1) Ensure that the terminals of the stator are not bent or otherwise damaged.
- (2) Generously lubricate the teeth of the gear and the pinion with grease. Rub grease onto the teeth with your fingers so that the grease reaches each tooth bottom. Note that the gear and the pinion may wear faster than normal if under-lubricated.
- (3) Be sure to soak the inner diameter of the Felt Packing [19] with machine oil. Otherwise, its dust-sealing function will fail to work properly, resulting in earlier damage of the Ball Bearing 6201VVCMP2L [18].
- (4) When replacing the Armature [7] and the Ball Bearing 608VVC2PS2L [12] on the commutator side, press inward on the Dust Seal [11] while taking care of its direction until the end face of the Dust Seal [11] contacts against the end surface of the Armature [7] and make sure that Dust Seal [11] cannot be turned freely by hand. (See Fig. 3).

The Dust Seal [11] is an important element for improved dust protection of the Ball Bearing 608VVC2PS2L [12]. Be sure to replace with a new one each time.

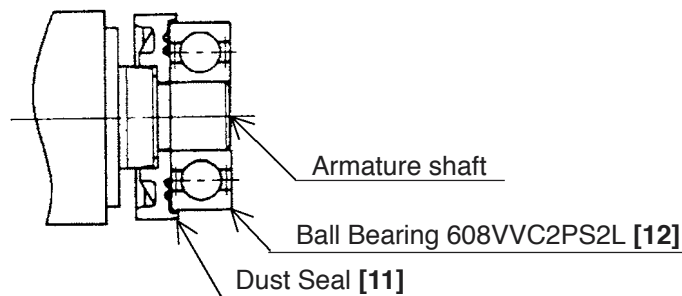


Fig. 3

- (5) When connecting the Earth Terminal [41] to the internal wire (the middle wire among three) of the Noise Suppressor [45], strip the insulation sheath on the internal wire by about 6 mm and press-connect it together with the Earth Terminal [41] with a clamping tool available on the market.

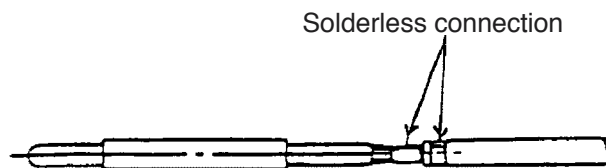


Fig. 4

(6) Mount the Cord [54] according to the following

procedure when replacing the standard cord (cord armor is integrally molded).

- 1) Remove the standard cord (cord armor is integrally molded) according to the procedure of 8-1 (3).
- 2) Strip the coating on the internal wire of the Cord [54] about 10 mm from the tip and crimp the Terminal [50] to the brown or black internal wire as shown in Fig. 5.
- 3) Insert the Cord [54] into the Cord Armor D8.8 [51].
- 4) Cut off the rib for holding the cord of Tail Cover (B) [46] with nippers as shown in Fig. 6.
- 5) Mount the Cord [54] and the Cord Armor D8.8 [51] to Tail Cover (A) [35] and secure them with the Cord Clip [52] and two Tapping Screws (W/Flange) D4 x 16 [53] as shown in Fig. 7.
- 6) Mount each internal wire reversing the removal procedure. Then mount Tail Cover (B) [46] to Tail Cover (A) [35] and secure them with the Tapping Screw (W/Flange) D4 x 25 (Black) [47].

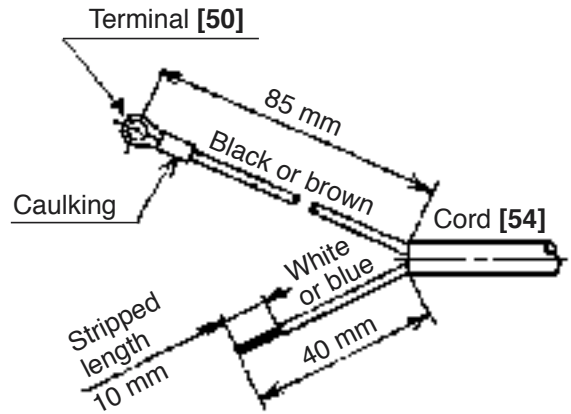


Fig. 5

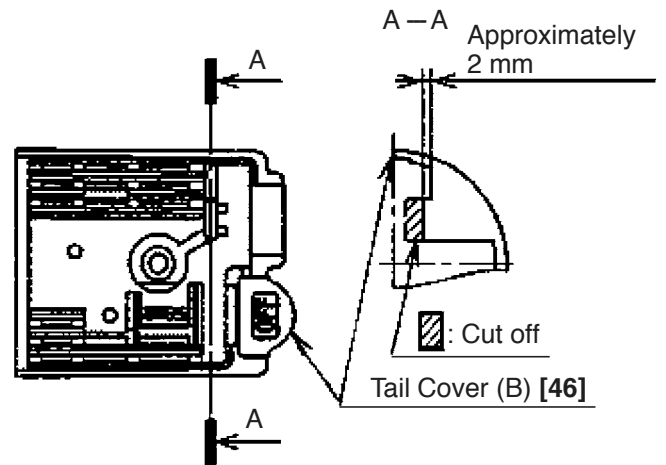
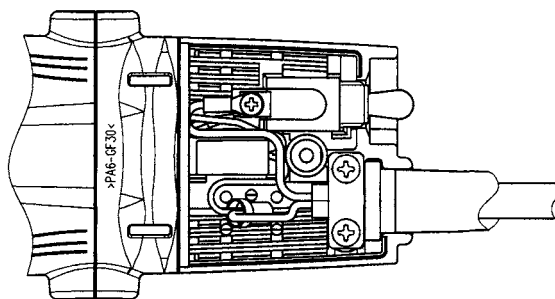
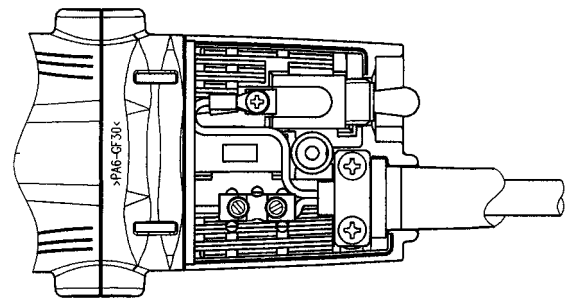


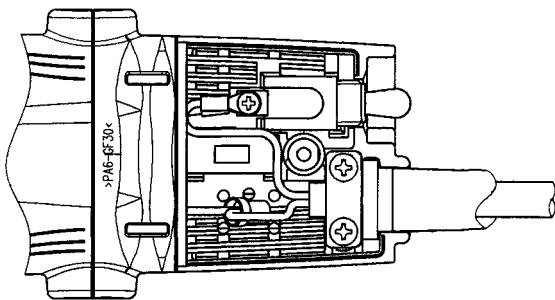
Fig. 6



(a) For Taiwan



(b) For Singapore and Malaysia



(c) For other countries

Fig. 7

- (7) Connect the internal wires of Stator (A) [10] correctly as shown in Fig. 8 and Fig. 9.
- (8) Connect each internal wire correctly as shown in Fig. 9 being careful not to put them between the parts.

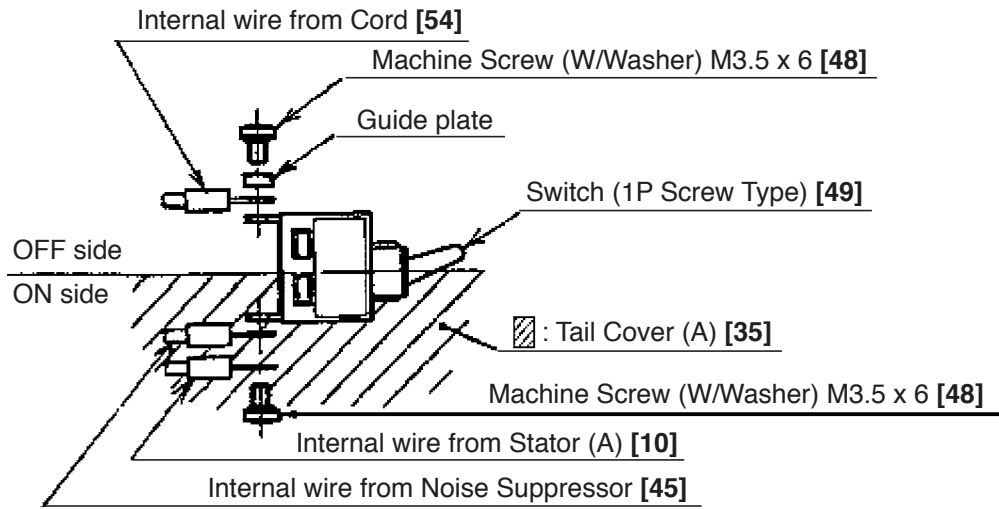


Fig. 8

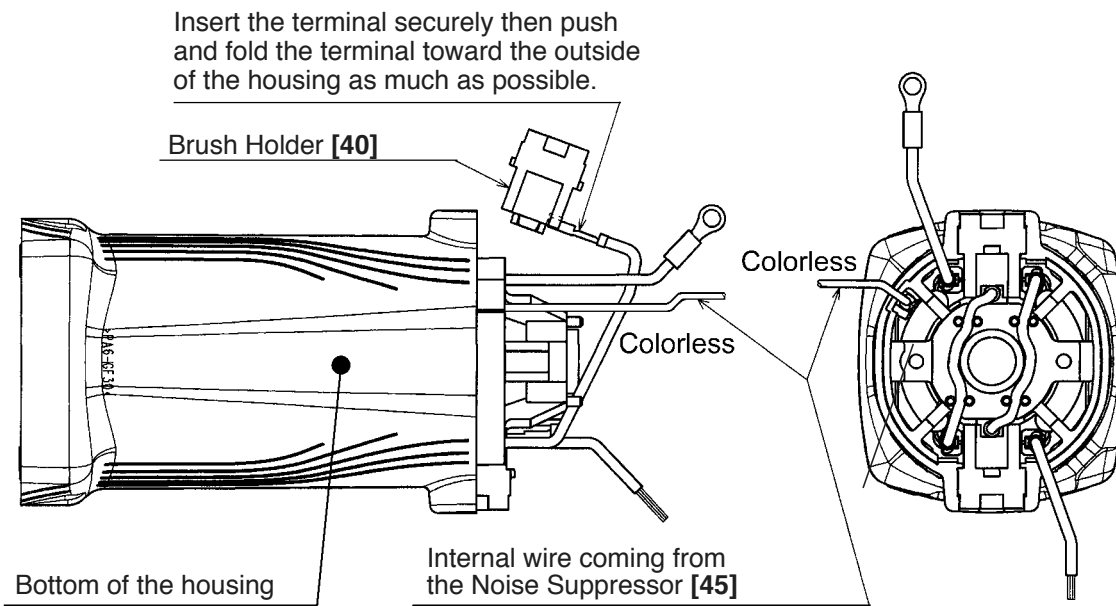


Fig. 9

- (9) When replacing the Gear Cover Ass'y [3], lubricate the needle bearing part with mixed oil.
- Mixed oil: A mixture of Hitachi Power Tool Grease No. 2 (Unilube No. 00 Code No. 939302 is recommended) and turbine oil
- Mixture ratio 1:1 (weight ratio)
 - Quantity 0.5 cc

8-3. Lubrication Points and Types of Lubricant

- Pinion chamber of Gear Cover Ass'y [3] Nippeco grease (SEP-3A) 5 g
(Code No. 930035 is recommended.)
Generously rub grease onto the gear and pinion.
- Needle bearing Mixed oil 0.5 cc
Mixed oil: Mixture of Hitachi Power Tool Grease No. 2
(Unilube No. 00, Code No. 939302) and turbine oil
Mixture ratio 1:1 (weight ratio)

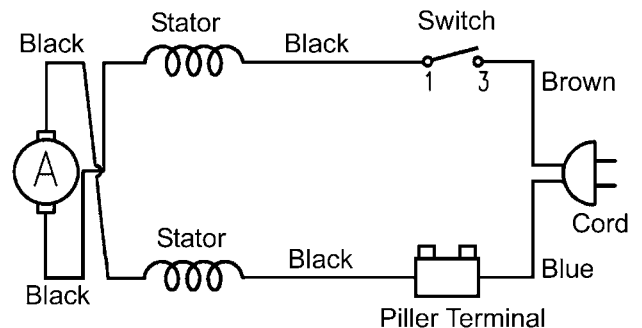
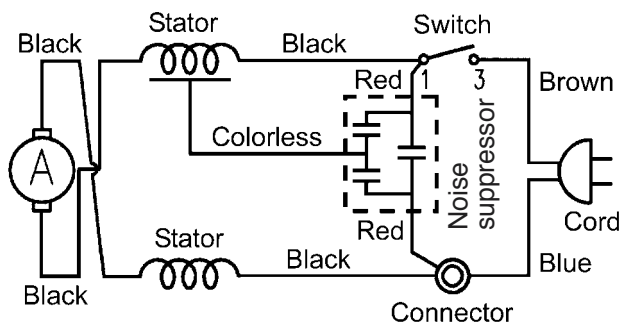
8-4. Tightening Torque

- Tapping Screws D4 [9] [36] [37] [47] [53] 2.0 ± 0.5 N·m (20 ± 5 kgf·cm, 1.5 ± 0.4 fb-lbs.)
- Seal Lock Screws (W/Sp. Washer) M4 [16] [21] 1.8 ± 0.4 N·m (18 ± 4 kgf·cm, 1.3 ± 0.3 fb-lbs.)
- Tapping Screw D5 x 25 (Black) [1] 2.9 ± 0.5 N·m (30 ± 5 kgf·cm, 2.2 ± 0.4 fb-lbs.)
- Machine Screw (W/Sp. Washer) M5x16 (Black) [25] 1.6 ± 0.4 N·m (16 ± 4 kgf·cm, 1.2 ± 0.3 fb-lbs.)
- Special Nut M7 [4] 6.4 ± 1.0 N·m (65 ± 10 kgf·cm, 4.7 ± 0.7 fb-lbs.)
- Brush Cap [38] 0.6 ± 0.2 N·m (6 ± 2 kgf·cm, 0.4 ± 0.1 fb-lbs.)

8-5. Wiring Diagram

(1) For Taiwan

(2) For Singapore



(3) For other countries

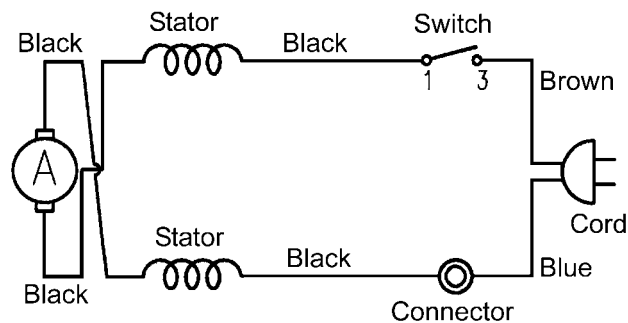


Fig. 10

8-6. Insulation Tests

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

Insulation resistance: 7 M Ω or more with 500 V DC megohm tester

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

AC 3,500 V/1 minute with no abnormalities 110 V -- 127 V products

8-7. No-load Current Value

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

Voltage (V)	110	220	230	240
Current (A) max.	2.6	1.2	1.2	1.2

9. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
PDA-100M		Work Flow						
		Switch Tail Cover (A) Tail Cover (B) Cord Cord Armor			Housing Ass'y Stator			
	General Assembly			Armature Ball Bearing (628VV) Bearing Holder Dust Seal Ball Bearing (608VV)				
				Gear Cover Ass'y Pushing Button Lock Pin		Packing Gland Ball Bearing (6201VV) Spindle Gear and Pinion Set		
		Wheel Guard Ass'y						

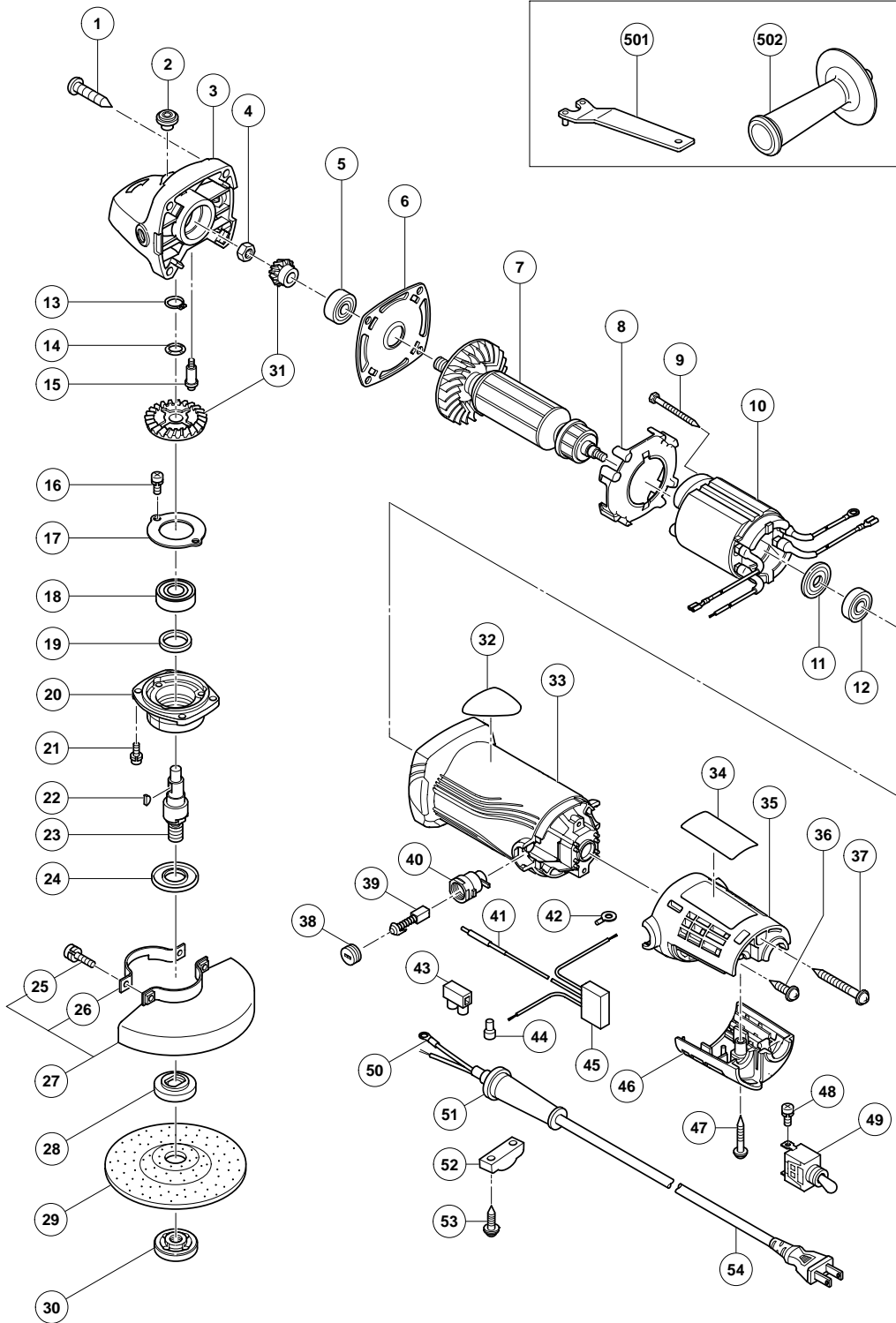
ELECTRIC TOOL PARTS LIST

■ DISC GRINDER

2005 • 9 • 5

Model PDA-100M

(E1)



PARTS

PDA-100M

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS
1	320-523	TAPPING SCREW D5X25 (BLACK)	4	
2	301-944	PUSHING BUTTON	1	
3	316-484	GEAR COVER ASS'Y	1	INCLUD. 2, 15
4	301-941	SPECIAL NUT M7	1	
5	628-VVC	BALL BEARING 628VVC2PS2-L	1	
6	316-480	BEARING HOLDER	1	
* 7	360-744C	ARMATURE 110V	1	
* 7	360-744G	ARMATURE 220V	1	
* 7	360-744E	ARMATURE 230V	1	
* 7	360-744F	ARMATURE 240V	1	
8	319-898	FAN GUIDE	1	
9	319-358	TAPPING SCREW (W/FLANGE) D4X70	2	
* 10	340-649C	STATOR (A) 110V	1	
* 10	340-649E	STATOR (A) 220V-240V	1	
11	315-877	DUST SEAL	1	
12	608-VVM	BALL BEARING 608VVC2PS2L	1	
13	316-487	RETAINING RING FOR D11 SHAFT	1	
14	316-486	WAVE WASHER	1	
15	301-943	LOCK PIN	1	
16	997-263	SEAL LOCK SCREW (W/SP. WASHER) M4X10	2	
17	316-490	BEARING COVER	1	
18	620-1VV	BALL BEARING 6201VVCMP2L	1	
19	301-946	FELT PACKING	1	
20	316-489	PACKING GLAND	1	
21	307-127	SEAL LOCK SCREW (W/SP. WASHER) M4X12	4	
22	302-047	WOODRUFF KEY	1	
23	316-485	SPINDLE	1	
24	301-945	FRINGER	1	
25	308-386	MACHINE SCREW (W/SP. WASHER) M5X16 (BLACK)	2	
26	301-949	SET PLATE	1	
27	301-948	WHEEL GUARD ASS'Y	1	INCLUD. 25, 26
28	320-497	WHEEL WASHER	1	
29	316-820	D. C. WHEELS 100MMX4T A36Q (25 PCS.)	1	
30	321-795	WHEEL NUT (C)	1	
31	321-450	GEAR AND PINION SET	1	
32		HITACHI LABEL	1	
33	325-140	HOUSING	1	
34		NAME PLATE	1	
35	325-143	TAIL COVER (A)	1	
36	302-086	TAPPING SCREW (W/FLANGE) D4X20 (BLACK)	1	
37	306-664	TAPPING SCREW (W/FLANGE) D4X40	1	
38	936-551	BRUSH CAP	2	
39	999-021	CARBON BRUSH (1 PAIR)	2	
40	313-777	BRUSH HOLDER	2	
* 41	314-854	EARTH TERMINAL	1	FOR TPE
* 42	980-063	TERMINAL	1	FOR NOISE SUPPRESSOR
* 43	938-307	PILLAR TERMINAL	1	FOR SIN, IND
* 44	959-140	CONNECTOR 50091 (10 PCS.)	1	EXCEPT FOR SIN, IND
* 45	994-273	NOISE SUPPRESSOR	1	FOR TPE
* 46	325-141	TAIL COVER (B)	1	
* 46	325-142	TAIL COVER	1	FOR SYR

