

PRODUCT NAME

Disc Grinder

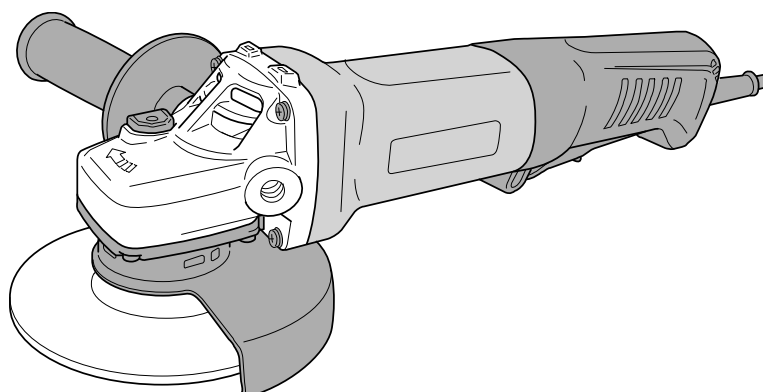
Models 115 mm (4-1/2") G 12SE3, G 12SE3(S)
125 mm (5") G 13SE3, G 13SE3(S)

G

CONTENTS

Page

REPAIR GUIDE	1
1. Precautions on disassembly and reassembly	1
• Disassembly	1
• Reassembly	3
• Lubrication point and type of lubricant	7
• Tightening torque	7
• Checking after reassembly	7
• Insulation test	7
• No-load current value	8
• Wiring diagram	8
STANDARD REPAIR TIME (UNIT) SCHEDULES	9



REPAIR GUIDE

WARNING: Before attempting disassembly, be sure to turn off the power switch and disconnect the power cord plug from the outlet.

1. Precautions on disassembly and reassembly

[Bold] numbers in the description below correspond to the item numbers in the parts list and exploded assembly diagram for the Models G 12SE3 and G 12SE3(S), and **<Bold>** numbers to those for the Models G 13SE3 and G 13SE3(S).

Disassembly

1. Removal of the armature and stator

- (1) Loosen the two Tapping Screws (W/Flange) D4 x 35 **[34]<34>** and Tapping Screw (W/Flange) D4 x 20 **[35]<35>**, then pull out Tail Cover (B) **[44]<44>** and Tail Cover (A) **[47]<47>**. Remove the Carbon Brushes (1 Pair) **[40]<40>****[48]<48>** from the Brush Holders **[42]<42>**.
- (2) Loosen the four Seal Lock Screws (W/Sp. Washer) M4 x 14 **[7]<7>** and remove the Packing Gland **[6]<6>** and Lever Holder **[8]<8>**.
- (3) Loosen the four Tapping Screws (W/Flange) D4 x 25 **[1]<1>** that fix the Gear Cover **[2]<2>** to remove the Armature **[24]<24>** from the Housing **[36]<36>** together with the Diffuser **[23]<23>**. At this time, check that the Rubber Bushing **[33]<33>** is fitted in the housing ball bearing chamber.
- (4) Carefully wrap the Armature **[24]<24>** with a soft, clean rag to protect it from being damaged, and clamp it securely in a vise. Then remove the Special Nut M7 **[18]<18>** and extract the Gear and Pinion Set **[25]<25>**.
- (5) Disconnect the four internal wires of the Stator **[30]<30>** from the Pushing Button Switch **[43]<43>** and Brush Holders **[42]<42>**.
- (6) Remove the Fan Guide **[29]<29>** and Stator **[30]<30>** from the Housing **[36]<36>**.

NOTE: • If the Stator **[30]<30>** is hard to be removed from the Housing **[36]<36>**, heat the Housing **[36]<36>** up to about 60°C to facilitate removal. Then pull out the Rubber Bushing **[33]<33>**.

- Each internal wire of the Stator **[30]<30>** is covered with a glass tube. Do not bend the internal wires repeatedly and do not peel off the glass tubes when removing the Stator **[30]<30>** from the Housing **[36]<36>**. Otherwise, the internal wires may be disconnected.
- Do not apply excessive force to the terminals of the Stator **[30]<30>** when removing them from the Pushing Button Switch **[43]<43>** and Brush Holders **[42]<42>**. Otherwise, the terminals of the Stator **[30]<30>** may be broken.

2. Removal of the rubber bushing

Insert the special repair tool J-201 spring hook (Code No. 970977) between the Rubber Bushing **[33]<33>** assembled in the Housing **[36]<36>** and the housing ball bearing chamber, and then pull out the Rubber Bushing **[33]<33>**.

3. Removal of the dust seal

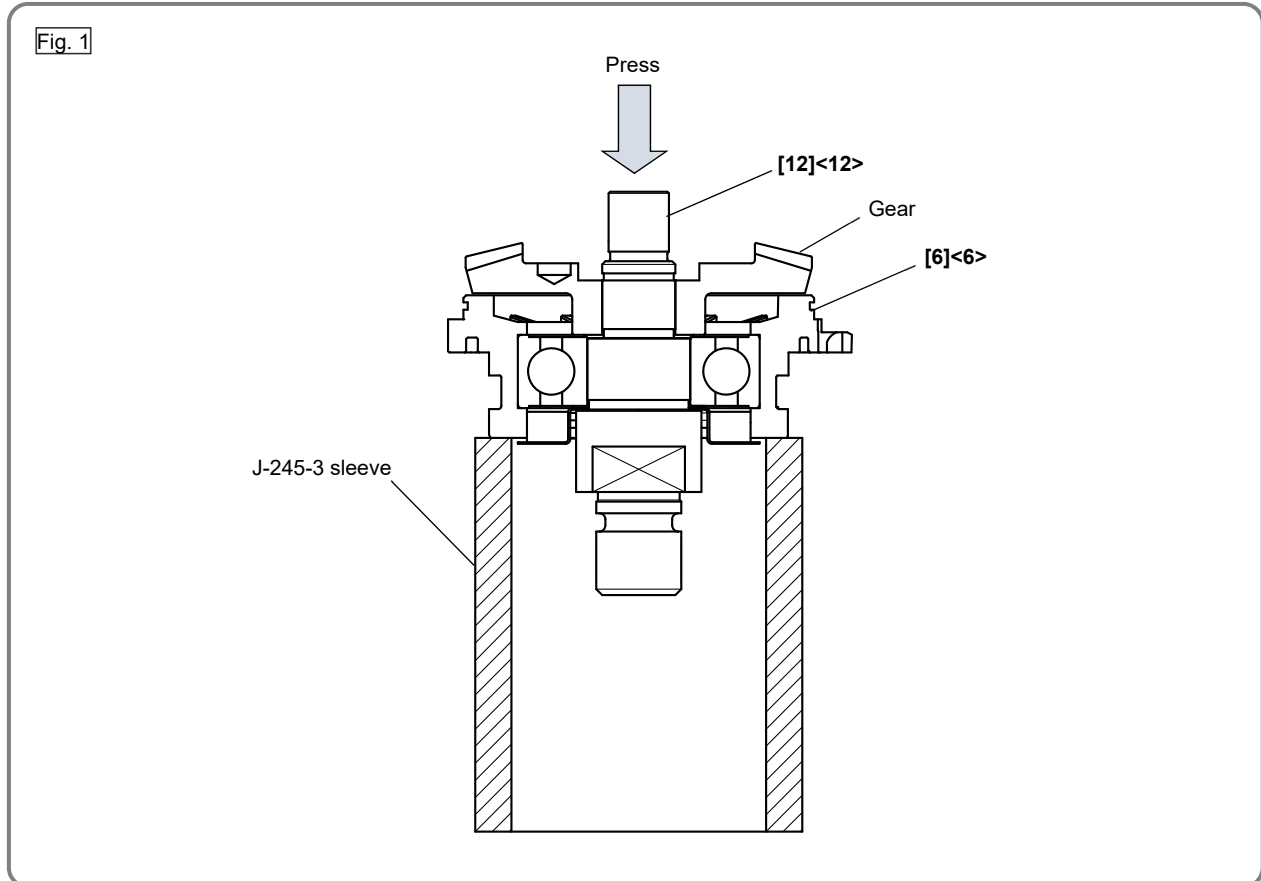
- (1) Insert the hooks of the J-204 bearing puller between the Ball Bearing 698SS **[32]<32>** and the Dust Seal **[31]<31>** and fix the hooks with the wing bolts.

NOTE: Be careful not to insert the hooks excessively.

- (2) Put the bearing puller on an appropriate stand. Press down on the armature shaft with a hand press and pull out the Ball Bearing 698SS **[32]<32>**.
- (3) Pull out the Dust Seal **[31]<31>** from the armature shaft.

4. Removal of the gear and spindle

- (1) Loosen the four Seal Lock Screws (W/Sp. Washer) M4 x 14 [7]<7> and remove the Packing Gland [6]<6> from the Gear Cover [2]<2>.
- (2) Remove the Retaining Ring for D12 Shaft [4]<4> that secures the gear to the Spindle [12]<12>.
- (3) When it is necessary to remove the gear from the Spindle [12]<12>, it is highly recommended that the special repair tool J-245-3 sleeve (Code No. 307720) described below is utilized. Place the assembly on a sleeve that matches the dimension of the Packing Gland [6]<6> and press down on the top of the Spindle [12]<12> with a hand press to remove the gear as shown in Fig. 1.



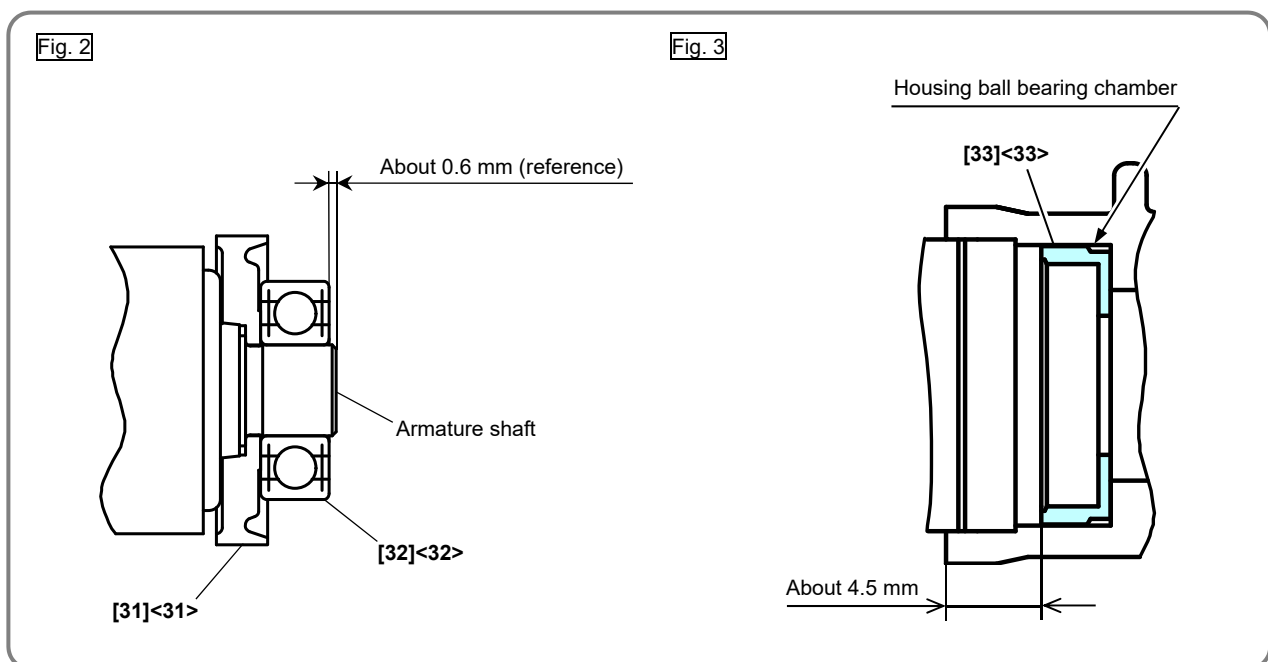
5. Removal of the off lock lever and on lock lever

- (1) After removing the Switch Lever [55]<55> from the Housing [36]<36>, remove the Off Lock Lever [54]<54> from the bottom of the Switch Lever [55]<55>. The Pin [52]<52> and Spring [53]<53> are removed together with the Off Lock Lever [54]<54>.
- (2) Push the Pin [49]<49> to remove the On Lock Lever [51]<51>.

Reassembly

Reverse the disassembly procedure to reassemble. Note the following points.

- (1) Rub grease into the teeth of the Gear and Pinion Set [25]<25> with your fingers so that the grease reaches each tooth bottom. Note that under-lubricated Gear and Pinion Set [25]<25> may wear at a faster rate.
- (2) When replacing the Armature [24]<24> and the Ball Bearing 698SS [32]<32> on the commutator side, press the Dust Seal [31]<31> in while carefully noting its direction until the end face of the Dust Seal [31]<31> contacts the butting surface of the Armature [24]<24>, and check that the Dust Seal [31]<31> cannot turn freely. (See Fig. 2.) The Dust Seal [31]<31> is an important element for improved dust protection of the Ball Bearing 698SS [32]<32>. Be sure to replace the Dust Seal [31]<31> with new one at every disassembly work. Fit the Rubber Bushing [33]<33> into the housing ball bearing chamber before installing the Armature [24]<24>. (See Fig. 3.)



- (3) When installing the Stator [30]<30> into the Housing [36]<36>, insert it while being careful about correctly placing the internal wires of the Stator [30]<30> as shown in Fig. 4. Connect the four internal wires of the Stator [30]<30> correctly as shown in Fig. 5.

NOTE: • Be careful not to put the internal wire of the Carbon Brush (1 Pair) [40]<40>[48]<48> on the top of the Brush Holders [42]<42> when connecting the internal wires of the Stator [30]<30> or when connecting the Carbon Brush (1 Pair) [40]<40>[48]<48>.

- Each internal wire of the Stator [30]<30> is covered with a glass tube. Do not bend the internal wires repeatedly and do not peel off the glass tubes when mounting the Stator [30]<30> to the Housing [36]<36>. Otherwise, the internal wires may be disconnected.
- Do not apply excessive force to the terminals of the Stator [30]<30> when inserting them into the Pushing Button Switch [43]<43> and Brush Holders [42]<42>. Otherwise, the terminals of the Stator [30]<30> may be broken.

Fig. 4

Connect to the Pushing Button Switch [43]<43>. Connect to the Brush Holder [42]<42>.

Connect to the Brush Holder [42]<42>.

Connect to the Pushing Button Switch [43]<43>.

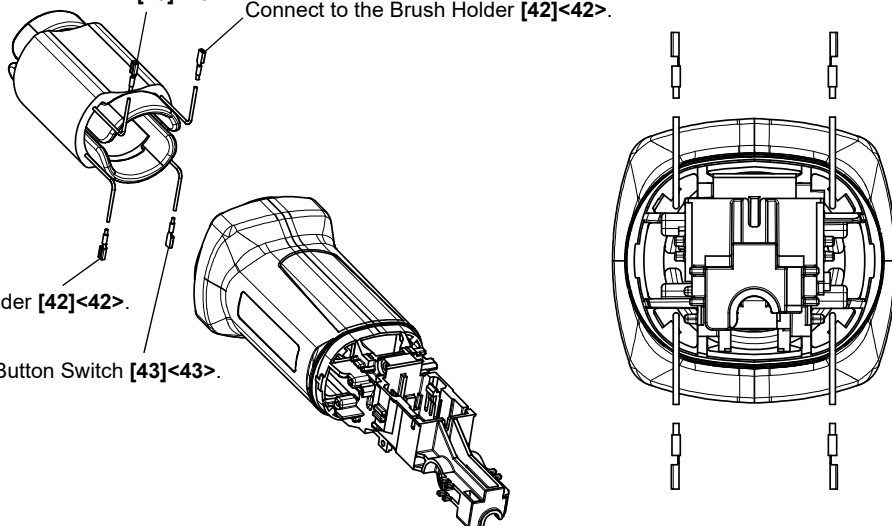
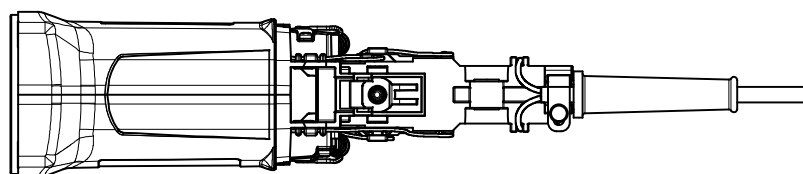
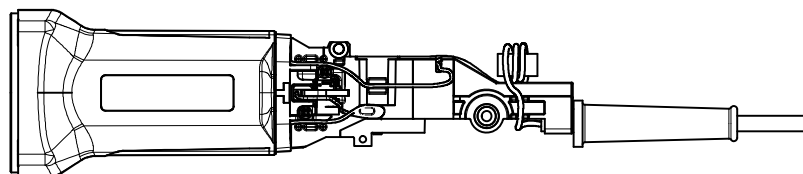
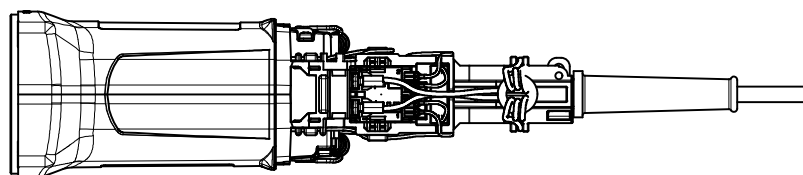
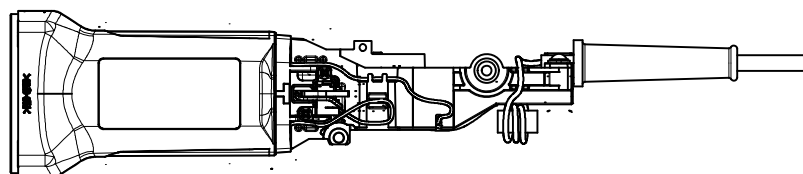
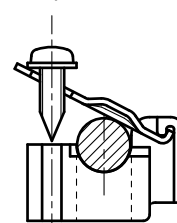
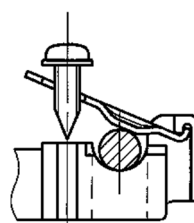


Fig. 5



Direction of the cord clip

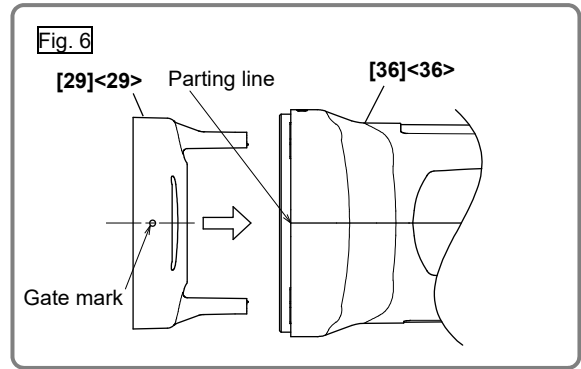


For 120 V, 230 V, and 240 V

For 110 V

(4) Be sure to soak the inner diameter of the Felt Packing [9]<9> with machine oil. Otherwise, its dust sealing function will fail to work properly, resulting in premature damage to the ball bearing of the Packing Gland [6]<6>. Wipe the Felt Packing [9]<9> lightly with a rag before assembling.

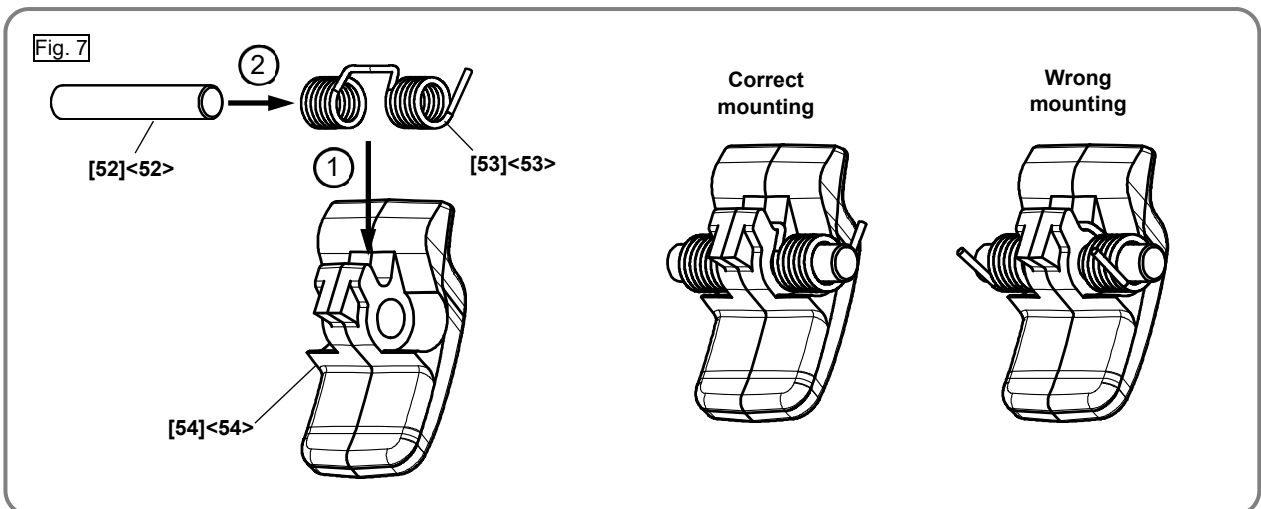
(5) Mount the Fan Guide [29]<29> in proper direction by matching the gate mark of the Fan Guide [29]<29> with the parting line of the Housing [36]<36> as show in Fig. 6.



(6) Mount the Off Lock Lever [54]<54> and On Lock Lever [51]<51> according to the following procedure.
NOTE: Some models are not equipped with the On Lock Lever [51]<51> depending on the specifications.

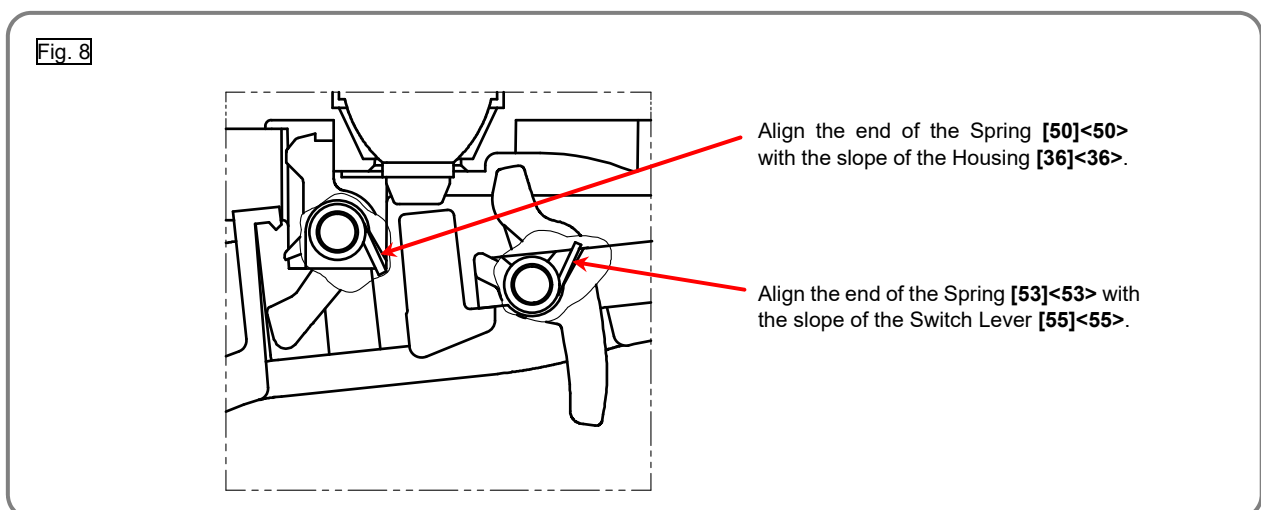
(a) Put the Spring [53]<53> on the Off Lock Lever [54]<54> and insert the Pin [52]<52> as shown in Fig. 7. Use a flat-blade screwdriver to push the Pin [52]<52> in the groove on the back of the Switch Lever [55]<55>.

NOTE: Be sure to align the end of the Spring [53]<53> with the slope of the Switch Lever [55]<55>. Otherwise, the Off Lock Lever [54]<54> does not move smoothly.



(b) Put the Spring [50]<50> and On Lock Lever [51]<51> on the Housing [36]<36>. Then insert the Pin [49]<49>.

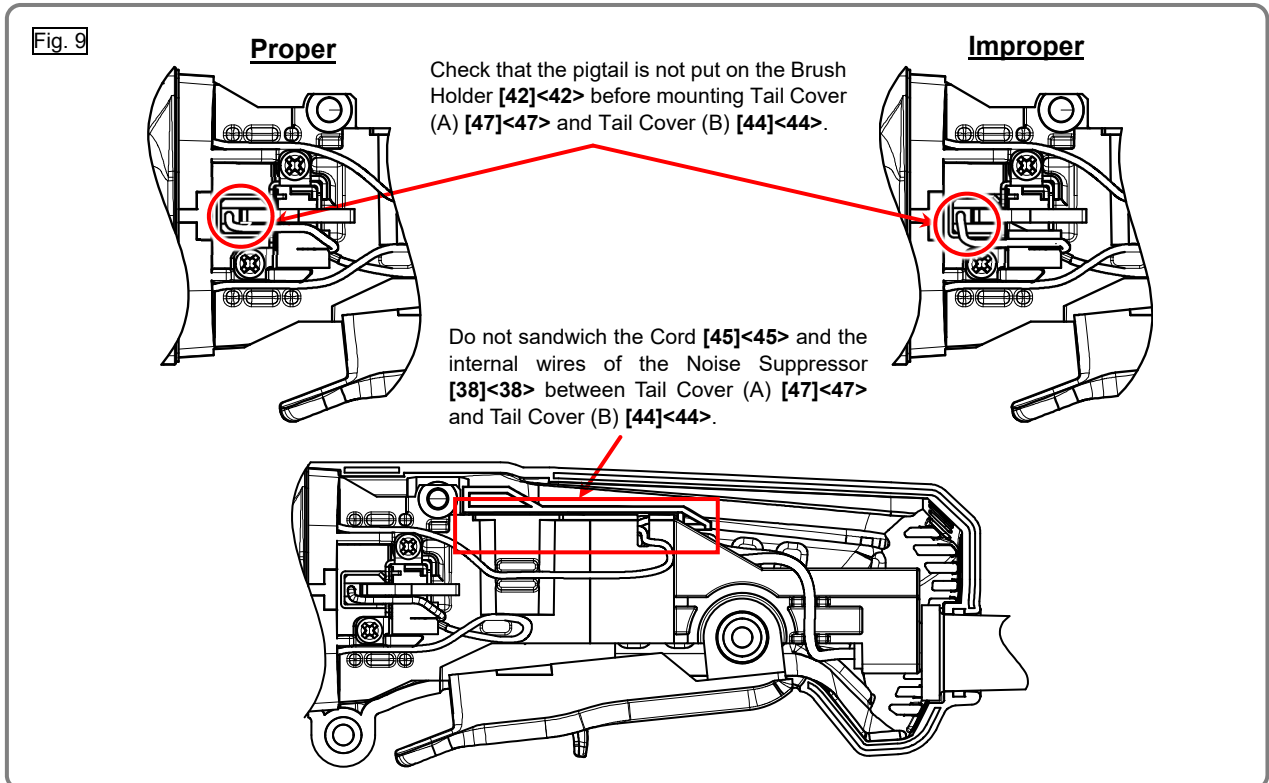
(c) Check that the Spring [50]<50> is mounted in the proper position as shown in Fig. 8. Then mount the Switch Lever [55]<55> to the Housing [36]<36>.



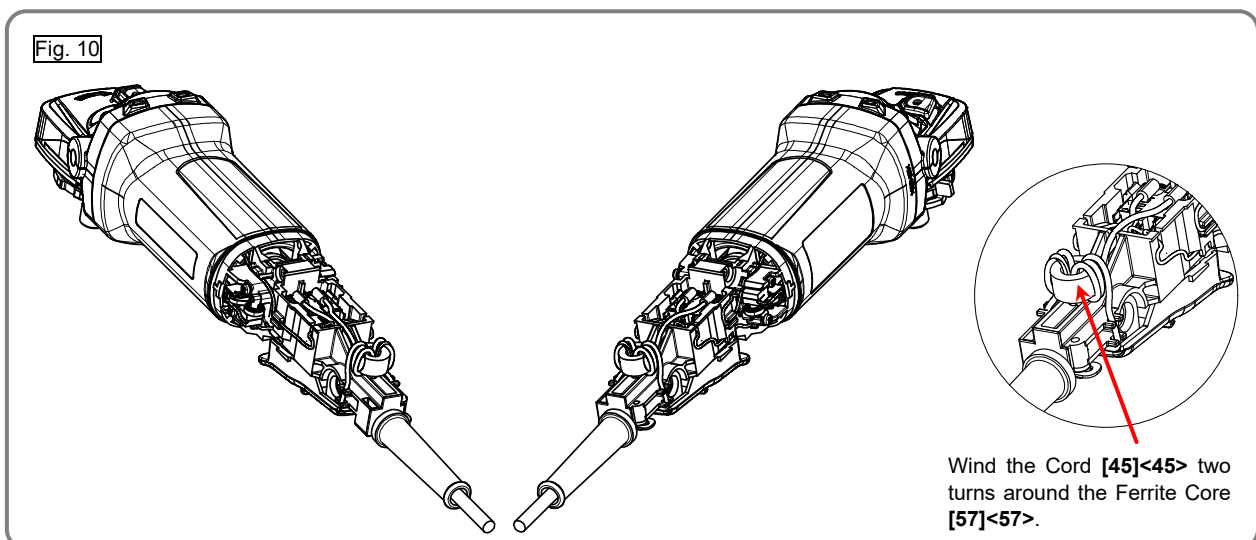
(7) When mounting Tail Cover (A) [47]<47> and Tail Cover (B) [44]<44>, check the position of the Cord [45]<45>, pigtail of the Carbon Brush (1 Pair) [40]<40>[48]<48>, and internal wires of the Noise Suppressor [38]<38> as shown in Fig. 9.

NOTE: • Be careful not to sandwich the Cord [45]<45> and the internal wires of the Noise Suppressor [38]<38> between Tail Cover (A) [47]<47> and Tail Cover (B) [44]<44>. Fit the Cord [45]<45> in the groove of the Housing [36]<36>.

- Be careful not to put the pigtail of the Carbon Brush (1 Pair) [40]<40>[48]<48> on the top of the Brush Holders [42]<42> when mounting Tail Cover (A) [47]<47> and Tail Cover (B) [44]<44>. Before mounting Tail Cover (A) [47]<47> and Tail Cover (B) [44]<44>, check the pigtail position.
- Mount the Ferrite Core [57]<57> as shown in Fig. 10.



(8) Tighten three of the four Seal Lock Screws (W/Sp. Washer) M4 x 14 [7]<7> except the one for securing the Lever Holder [8]<8>. Mount the Lever [27]<27> and Retaining Ring D4 [28]<28> to the Lever Holder [8]<8>. Hook the Spring [26]<26> on the Lever [27]<27>. Then tighten the remaining Seal Lock Screw (W/Sp. Washer) M4 x 14 [7]<7>.



Lubrication point and type of lubricant

NOTE: Use a brush when rubbing grease.

- (1) When replacing the Gear Cover [2]<2>, lubricate the inner circumference of the needle bearing with 0.3 g of Cosmo Molybdenum No. 1 grease.
- (2) Rub 18 g of Cosmo Molybdenum No. 1 grease into the pinion chamber of the Gear Cover [2]<2>.
- (3) Rub 2 g of Cosmo Molybdenum No. 1 grease into the teeth of the gear.
- (4) Rub 0.7 g of Cosmo Molybdenum No. 1 grease into the teeth of the pinion.

Tightening torque

Item No.	Part name	Tightening torque		
		N•m	lbf•ft	kgf•cm
[7]<7>	Seal Lock Screw (W/Sp. Washer) M4 x 14	1.8 ± 0.4	1.3 ± 0.3	18 ± 4
[18]<18>	Special Nut M7	7.4 ± 0.5	5.5 ± 0.4	75 ± 5
[34]<34>	Tapping Screw (W/Flange) D4 x 35 (Black)	2.0 ± 0.5	1.5 ± 0.4	20 ± 5
[35]<35>	Tapping Screw (W/Flange) D4 x 20 (Black)	2.0 ± 0.5	1.5 ± 0.4	20 ± 5
[39]<39>	Tapping Screw D3 x 8	0.74 $_{-0.25}^0$	0.54 $_{-0.18}^0$	7.5 $_{-2.5}^0$
[59]<59>	Tapping Screw (W/Flange) D4 x 12	2.0 ± 0.5	1.5 ± 0.4	20 ± 5

Checking after reassembly

Be sure to check the following after mounting the Off Lock Lever [54]<54> and On Lock Lever [51]<51>.

- Check that the Off Lock Lever [54]<54> moves smoothly between the lock position and the unlock position. Release the Switch Lever [55]<55> and check that the motor stops immediately and the Off Lock Lever [54]<54> moves to the lock position smoothly.
- Check that the motor does not start by pulling the Switch Lever [55]<55> when the Off Lock Lever [54]<54> is in the lock position.
- While pulling the Switch Lever [55]<55>, move the On Lock Lever [51]<51> to the on lock position. Check that the Switch Lever [55]<55> does not return to the original position by releasing the Switch Lever [55]<55>.

Insulation test

Measure the insulation resistance and dielectric strength after reassembly.

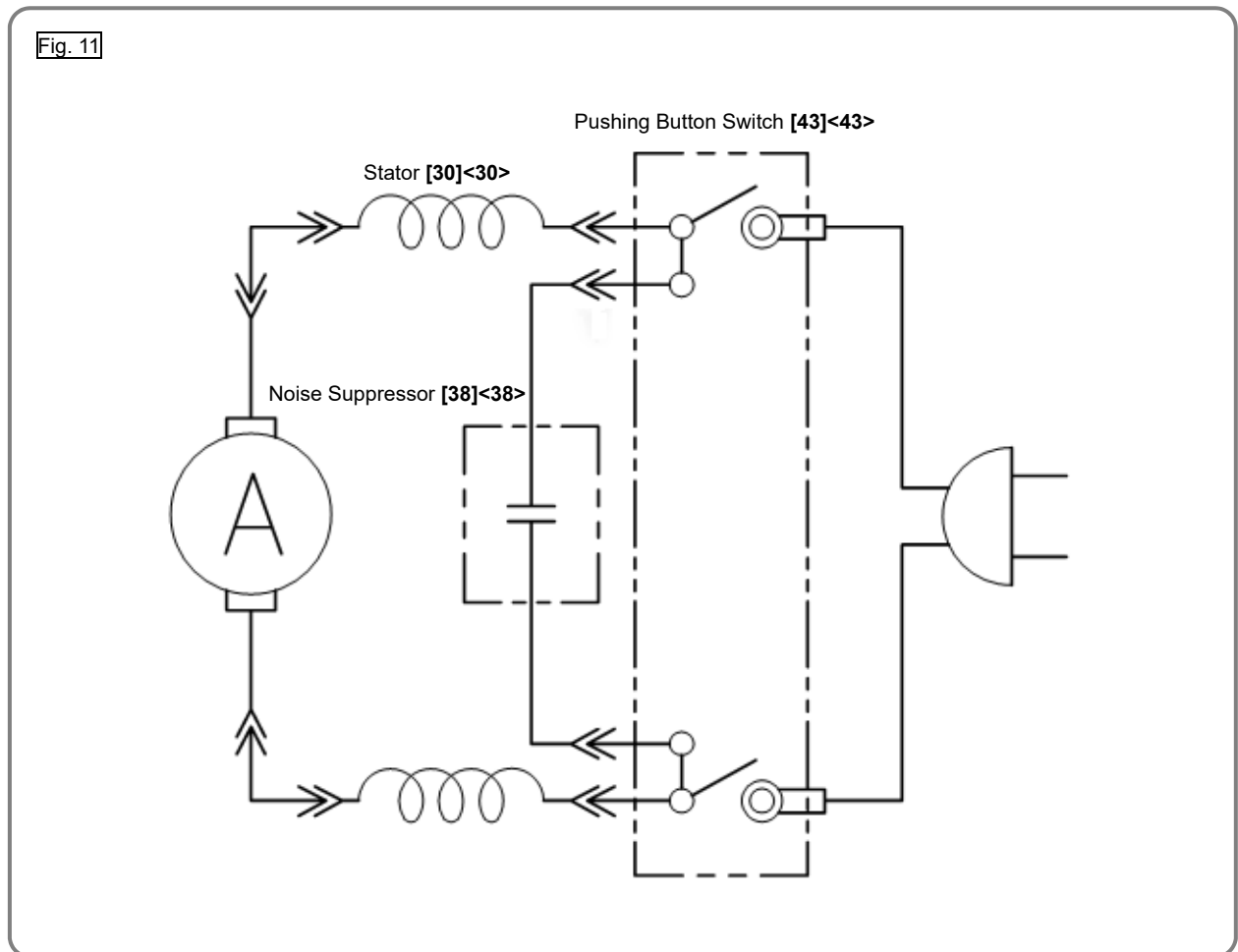
- Insulation resistance: 7 MΩ or higher (as measured with a 500 VDC megohm tester)
- Dielectric strength: 4,000 VAC/minute, with no abnormalities -----230 V to 240 V
2,500 VAC/minute, with no abnormalities -----110 V to 120 V

No-load current value

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

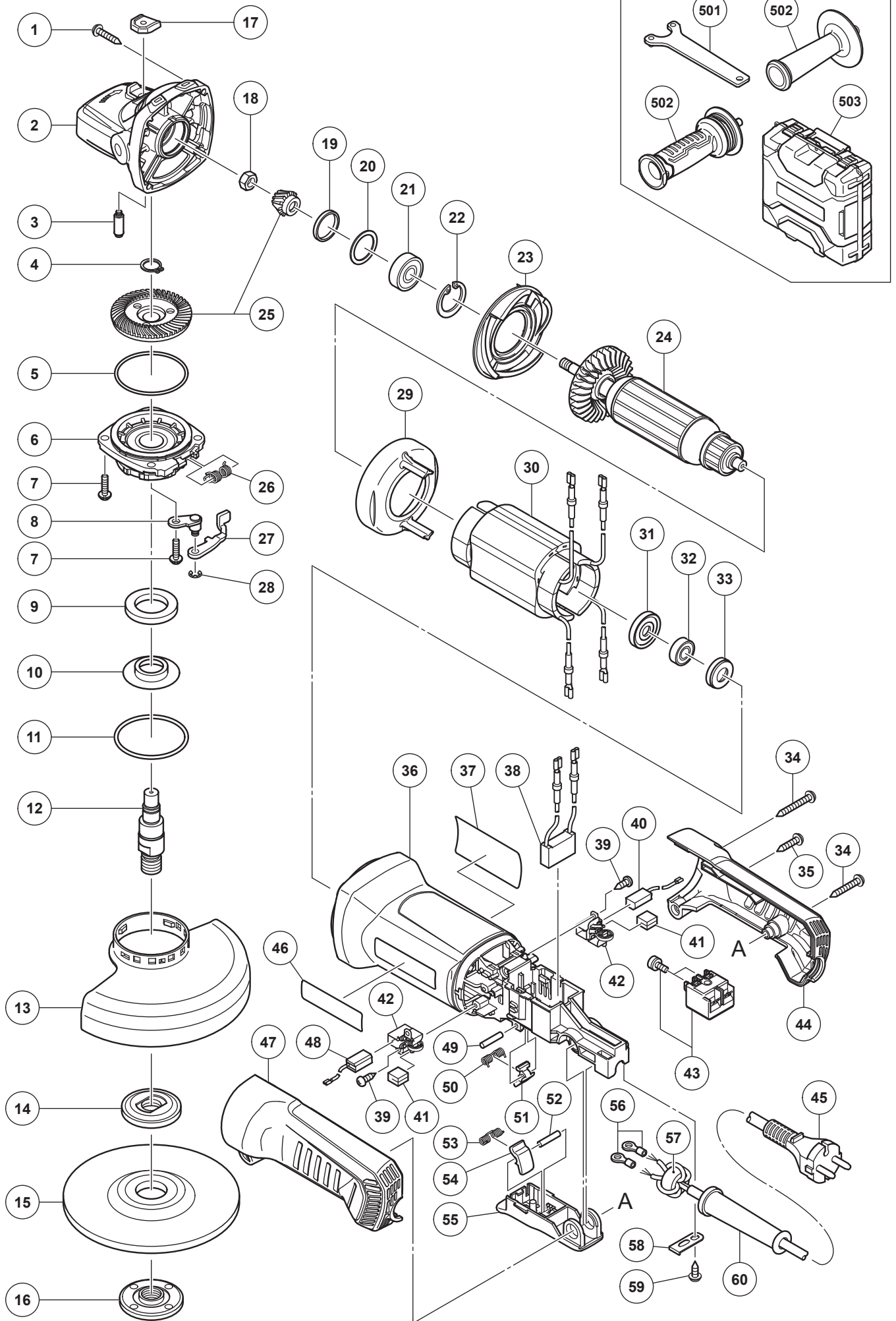
Voltage	110 V	120 V	230 V	240 V
Current max.	5.0 A	5.0 A	2.5 A	2.5 A

Wiring diagram



STANDARD REPAIR TIME (UNIT) SCHEDULES

Model	Repair time	10	20	30	40	50	60 min.
<div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">G 12SE3</div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;">G 13SE3</div>		Work Flow					
		Housing Stator Rubber Bushing					
	General Assembly		Pushing Button Switch Cord Cord Armor Ferrite Core	Brush Holder Noise Suppressor Cord Clip			
				Gear Cover Seal Ring (A) Washer (C) Ball Bearing 629VV Retaining Ring for D26 Hole Lock Pin Pushing Button Diffuser	Armature Dust Seal Ball Bearing 698SS Special Nut M7 Pinion (Gear and Pinion Set)	Packing Gland Spindle Felt Packing Fringer Gear (Gear and Pinion Set) Retaining Ring for D12 Shaft O-ring Lever Holder Lever Spring Retaining Ring D4 Tail Cover (A) Tail Cover (B)	
		Switch Lever Off Lock Lever Spring Pin	On Lock Lever Spring Pin				



MODEL
G13SE3

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS
1	307028	TAPPING SCREW (W/FLANGE) D4 X 25 (BLACK)	4	
2	375889	GEAR COVER ASS'Y	1	
3	301943	LOCK PIN	1	
4	939542	RETAINING RING FOR D12 SHAFT (10 PCS.)	1	
5	375899	O-RING	1	
6	375887	PACKING GLAND	1	
7	376226	SEAL LOCK SCREW (W/SP. WASHER) M4 X 14	4	
8	375894	LEVER HOLDER	1	
9	376227	FELT PACKING	1	
10	376228	FRINGER	1	
11	375900	O-RING	1	
*12	375895	SPINDLE	1	
*12	375896	SPINDLE	1	FOR USA, CAN
13	375904	WHEEL GUARD	1	
*14	376067	WHEEL WASHER	1	
*14	319373	WHEEL WASHER	1	FOR USA, CAN
15	316822	D. C. WHEELS 125MM A36Q (25 PCS.)	1	
*16	339579	WHEEL NUT M14	1	
*16	937923P	WHEEL NUT 5/8"-11UNC (FOR METABO)	1	FOR USA, CAN
17	336535	PUSHING BUTTON	1	
18	301941	SPECIAL NUT M7	1	
19	308543	SEAL RING (A)	1	
20	980866	WASHER (C)	1	
21	629VVM	BALL BEARING 629VV	1	
22	939554	RETAINING RING FOR D26 HOLE (10 PCS.)	1	
23	336542	DIFFUSER	1	
*24	361131E	ARMATURE 230 V	1	
*24	361131F	ARMATURE 240 V	1	
*24	361131C	ARMATURE 110 V	1	
*24	361131U	ARMATURE ASS'Y 120 V	1	INCLUD. 21, 31, 32
25	375888	GEAR AND PINION SET	1	
26	376229	SPRING	1	
27	375892	LEVER	1	
28	6685336	RETAINING RING D4	1	
29	336530	FAN GUIDE	1	
*30	341071F	STATOR 230 V-240 V	1	
*30	341071C	STATOR 110 V	1	
*30	341071D	STATOR 120 V	1	
31	336536	DUST SEAL	1	
32	336871	BALL BEARING 698SS	1	
33	309929	RUBBER BUSHING	1	
34	303694	TAPPING SCREW (W/FLANGE) D4 X 35 (BLACK)	2	
35	301653	TAPPING SCREW (W/FLANGE) D4 X 20 (BLACK)	1	
36	375879	HOUSING	1	
37		NAME PLATE	1	
38	375897	NOISE SUPPRESSOR	1	
39	328210	TAPPING SCREW D3 X 8	4	
*40	999076	CARBON BRUSH (AUTO STOP TYPE) (1 PAIR)	1	
*40	999076	CARBON BRUSH (AUTO STOP TYPE) (1 PAIR)	2	FOR AUS
41	336872	CUSHION SPONGE	2	
42	336537	BRUSH HOLDER	2	
*43	376232	PUSHING BUTTON SWITCH	1	
*43	376231	PUSHING BUTTON SWITCH	1	FOR GBR (110 V), USA, CAN
*43	376230	PUSHING BUTTON SWITCH	1	FOR EUROPE(S)
44	375881	TAIL COVER (B)	1	
*45	500390Z	CORD	1	
*45	500408Z	CORD	1	FOR AUS, NZL
*45	500407Z	CORD	1	FOR USA, CAN
*45	500440Z	CORD	1	FOR GBR (230 V)
*45	500517Z	CORD	1	FOR GBR (110 V)
*45	500235Z	CORD	1	FOR RUS
46		BRAND LABEL	1	
47	375880	TAIL COVER (A)	1	
48	999088	CARBON BRUSH (1 PAIR)	1	
49	375902	PIN	1	FOR RUS, USA, CAN, EUROPE(S)
50	375901	SPRING	1	FOR RUS, USA, CAN, EUROPE(S)
51	375885	ON LOCK LEVER	1	FOR RUS, USA, CAN, EUROPE(S)
52	375902	PIN	1	
53	375901	SPRING	1	
54	375886	OFF LOCK LEVER	1	
*55	375884	SWITCH LEVER	1	
*55	375883	SWITCH LEVER	1	FOR W/ON LOCK LEVER

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS
56	980063	TERMINAL	2	
57	334379	FERRITE CORE	1	
58	937631	CORD CLIP	1	
59	305720	TAPPING SCREW (W/FLANGE) D4 X 12	1	
60	953327	CORD ARMOR D8.8	1	
STANDARD ACCESSORIES				
501	938332Z	WRENCH	1	
*502	994322	SIDE HANDLE	1	
*502	336865	SIDE HANDLE	1	FOR VIBRATION-ABSORBING
503	376233	CASE	1	