



# MODEL G 13SP

## 1. PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY

Describes procedures and precautions for disassembly and reassembly. The bold numerals in [ ] denote the numbers in the G13SP Parts List.

### 1-1. Disassembly of the Armature Ass'y

- (1) Loosen the two M5 Machine Screw [31] or [57] and remove the Wheel Guard Ass'y [34].
- (2) Loosen the D4 x 12 Tapping Screw [59] and remove the Brush Cover [60] from each side.
- (3) Remove the two Carbon Brushes [45] from the Brush Holders [46].
- (4) Remove the four D5 x 25 Tapping Screws [2].

The Armature [13] can then be taken out simultaneously with the Gear Cover Ass'y [4], Packing Gland [27], and related parts.

- (5) Remove the four M5 x 16L Seal Lock Screws [28].
- (6) After removing the three M4 x 10 Seal Lock Screws [1], the Armature [13] can be extracted together with the Bearing Cover [12], and related parts.
- (7) Carefully wrap the Armature [13] with a soft, clean rag to protect it from being damaged, and clamp it securely in a vise. Then, remove the M7 Special Nut [5], and extract the Pinion [6].
- (8) For the models indicated under Fig. 3, the Ball Bearing [9] can be removed from the Armature [13] by utilizing a J-204 bearing puller (special repair tool, Code No. 970982) as illustrated. After the ball bearing has been removed, the Bearing Cover [12] can be easily taken off.

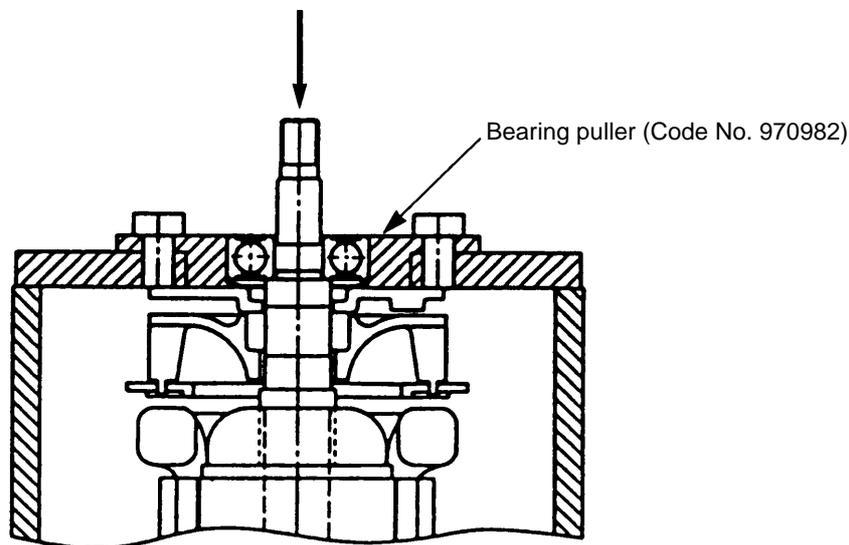


Fig. 3

### 1-2. Disassembly of the Dust Seal (A)

- (1) Insert the hook of the bearing puller (J-204) in the gap between the Ball Bearing [19] and Dust Seal (A) [18], and secure it with the wing bolt. Be careful not to insert the hook too deep.
- (2) Put the bearing puller on a suitable table and push down on the armature shaft with a hand press to remove the Ball Bearing [19].
- (3) Pull out the Dust Seal (A) [18] from the armature shaft.

### 1-3. Disassembly of the Stator Ass'y

- (1) Loosen the Tapping Screws D4 x 35L [61] and D4 x 20L [63] to remove the Handle (B) [62]. Then loosen the Tapping Screw D4 x 20L [53] to remove the Handle (A) [44].
- (2) Remove the Carbon Brushes [45] from the Brush Holders [46].
- (3) Remove the Tapping Screw D5 x 25 [2], then remove the Armature [13] together with the Gear Cover Ass'y [4] and Packing Gland [27] from the Housing [40].
- (4) Loosen the Hex. Hd. Tapping Screw D4 x 70L [15] to remove the Stator [16] from the Housing [40]. If the Stator [16] cannot be easily removed from the Housing [40], disassembly can be facilitated by heating the Housing [40] to a temperature of approximately 60 °C (140°F) with an appropriate heating device.

### 1-4. Disassembly of the Gear

- (1) Loosen the four M5 x 16L Seal Lock Screws [28], and remove the Packing Gland [27] together with Spindle (A) or (B) [30] and Gear [21] from the Gear Cover Ass'y [4] in a single body.
- (2) When it is necessary to remove the Gear [21] from Spindle (A) or (B) [30], it is highly recommended that the special repair tools described below be utilized.

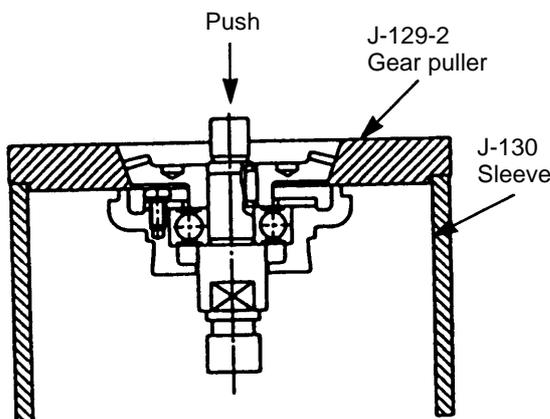


Fig. 4

As illustrated in Fig. 4, support the angled surface of the Gear [21] with a J-129-2 gear puller (special repair tool, Code No. 970906), rest the J-129-2 gear puller on a J-130 sleeve (special repair tool, Code No. 970907), and push down on the tip of the Spindle (A) or (B) [30] with a hand press to remove the Gear [21].

In the event J-129-2 gear puller cannot be inserted, expand the gap between the Gear [21] and the Packing Gland [27] as shown below, and extract the gear with a J-166 bearing puller (special repair tool, Code No. 970947).

- (a) Support the Packing Gland [27] as shown in Fig. 5, and push Spindle (A) or (B) [30] downward approximately 2 mm.
- (b) Turn the Packing Gland [27] over, support it as shown in Fig. 6, and push Spindle (A) or (B) [30] downward approximately 2 mm. In this way, you can expand the gap between the Gear [21] and Packing Gland [27] as shown in Fig. 7.

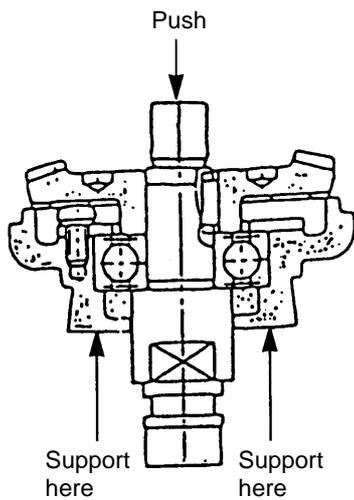


Fig. 5

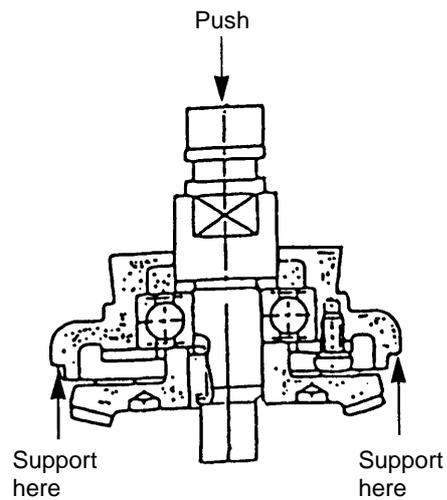


Fig. 6

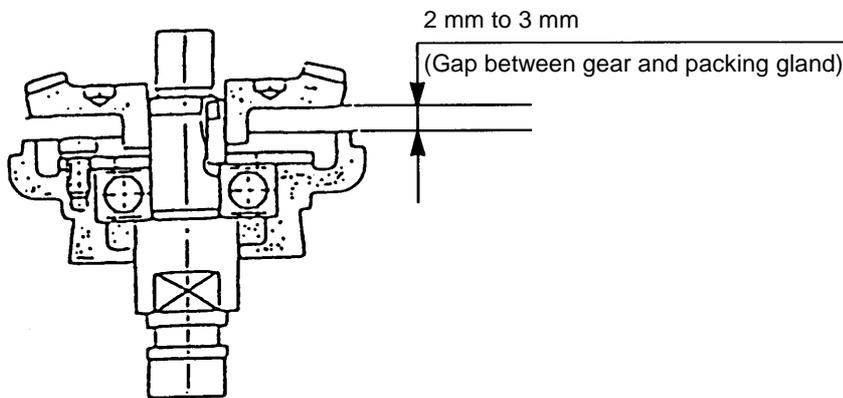


Fig. 7

### 1-5. Reassembly

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

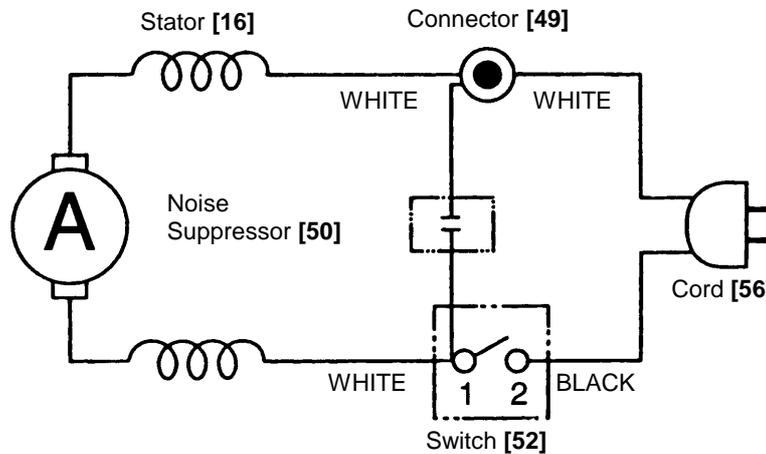
- (1) After disassembly, thoroughly remove old grease from the inside of the Gear Cover Ass'y [4], and insert 18 g of new grease (Nippeco JF-375, Code No. 930036, is recommended) prior to reassembly. When inserting grease, apply it to the pinion gear tooth surfaces, and to the needle bearing inside the gear cover.
- (2) When replacing the ball bearing on the commutator side of the armature, be very careful to ensure that Dust Seal (A) [18] is assembled in the proper direction. Dust Seal (A) [18] plays an important role in dustproofing of the ball bearing, and must be replaced with a new one if disassembled. Do not forget to insert the Thrust Washer [17] on the armature side of the Dust Seal (A) [18].
- (3) When reinstalling the Handle (A) [44] to the Housing [40], be careful not to make the Plate [43] fall off.
- (4) Apply three bond TB 1406 screw locking agent to the following screws.
  - Three M4 x 10 Seal Lock Screws [1] which fix Bearing Cover [12] in place.
  - Three M4 x 8 Seal Lock Screws [22] which fix Bearing Cover (B) [23] in place.
  - Four M5 x 16 Seal Lock Screws [28] which fix Packing Gland [27] in place.

**1-6. Tightening Torque of Each Screw**

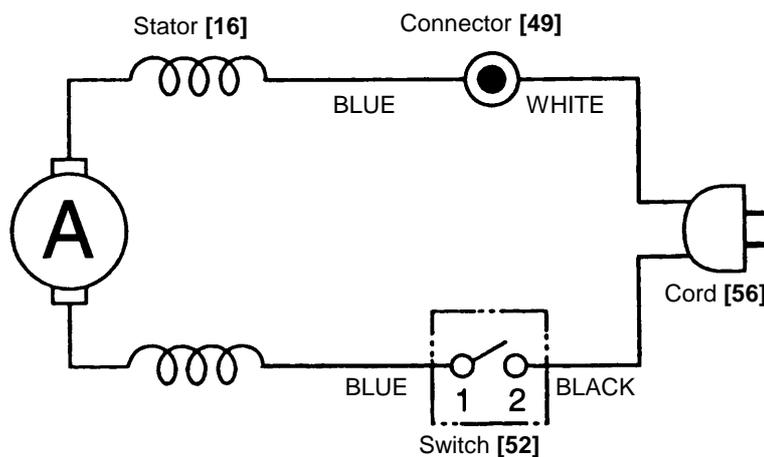
- D3 Tapping Screw [47] .....0.74 ± 0.15 N·m (7.5 ± 1.5 kgf·cm, 0.5 ± 0.4 ft-lbs.)
- D4 Tapping Screw (W/Flange) [53] [59] [61] [63] and D4 Hex. Hd. Tapping [15]  
 .....1.96 ± 0.49 N·m (20 ± 5 kgf·cm, 1.4 ± 0.4 ft-lbs.)
- D5 Tapping Screw [2] .....2.94 ± 0.49 N·m (30 ± 5 kgf·cm, 2.2 ± 0.4 ft-lbs.)
- M4 Seal Lock Screw (W/Sp. Washer) [1] [22] .....1.76 ± 0.39 N·m (18 ± 4 kgf·cm, 1.3 ± 0.3 ft-lbs.)
- M5 Seal Lock Screw (W/Sp. Washer) [28].....3.43 ± 0.96 N·m (35 ± 7 kgf·cm, 2.5 ± 0.5 ft-lbs.)
- M7 Screw Nut [5] .....5.88 ± 0.98 N·m (60 ± 10 kgf·cm, 3.6 ± 0.7 ft-lbs.)

**1-7. Wiring Diagrams**

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### 1-8. Insulation Tests

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

Insulation resistance: 7M  $\Omega$  or more with DC 500 V megohm tester

Dielectric strength: AC 4000 V for 1 minute, with no abnormalities ..... 220 V

AC 2500 V for 1 minute, with no abnormalities ..... 110 V

### 1-9. Gear Backlash Value

Gear backlash should be maintained at a value of 2 mm or less measured at the outer edge of a fresh depressed-center wheel.

### 1-10. No-Load Current Value

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

Voltage	110 V	220 V
Current (Max.)	3 A	1.5 A

## 2. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
G 13SP			Work Flow					
			Wheel Guard Ass'y				Housing Stator	
	General Assembly			Pinion Armature Ass'y Gear Cover Seal Ring (A) Washer (C) Ball Bearing (629T12) Rubber Ring Felt Bearing Cover Dust Seal (A) Ball Bearing (608VVMC2)				
				Pushing Button Lock Pin Gear Seal Packing	Bearing Cover (B) Ball Bearing (6201DD) Felt Packing Packing Gland Spindle (B) Key (3x3x8)			
			Handle (A) Handle (B) Carbon Brush (2pcs.) Spring (2pcs.) Trigger Switch Cord Cord Armor	Controller Rubber Ring Magnet Brush Holder (2pcs.)				