

# MODELS DV 20T/DV 14V/DV 20V2/DV 20V3

## 1. PRECAUTIONS ON DISASSEMBLY AND REASSEMBLY:

The circled numbers in the descriptions below correspond to the item numbers in the parts lists and exploded assembly diagrams for models (those numbers in parentheses are for Model DV14V).

### 1-1. Disassembly:

#### 1-1-1. Motor Section Disassembly:

##### (1) Removal of Handle (B):

Loosen the D4 x 16 Tapping Screws (36) (29), and remove Handle (B) (40) (34).

##### (2) Removal of the Carbon Brushes:

With a small minus-hd. screwdriver, lift the Brush Holders (39) (32). Then while pushing the Carbon Brushes (38) (31) to the bottom of the Holders, gently pull out and disconnect the internal wire terminals. (See Fig. 4 and Fig. 5)

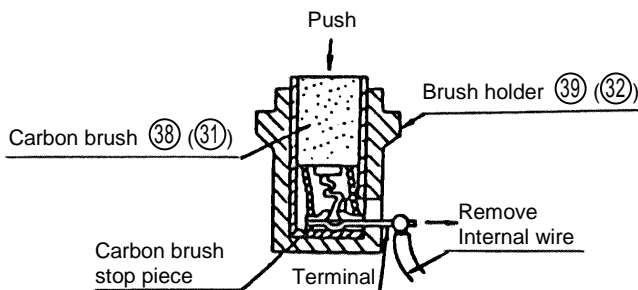


Fig. 4

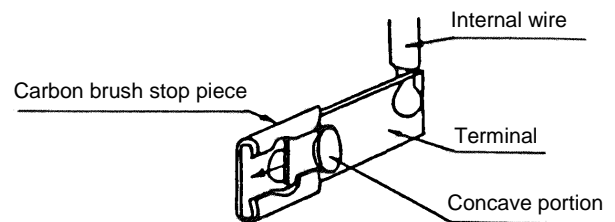


Fig. 5

(3) Separate the Gear Cover from the Housing:

Loosen the for D5 x 60 Tapping Screws (32) [in the case of Model DV14V, the D5 x 25 Tapping Screws (25) ], and separate the Gear Cover (10) (11) from the Housing (31) (24). Then, remove the Inner Cover Ass'y (17) (13) together with the Armature (27) (20) from the Housing/

(4) Separate the Armature from the Inner Cover Ass'y:

As illustrated in Fig. 6, support the Inner Cover Ass'y (17) (13) with a tubular jig, and push down on the tip of the pinion gear of the Armature (27) (20).

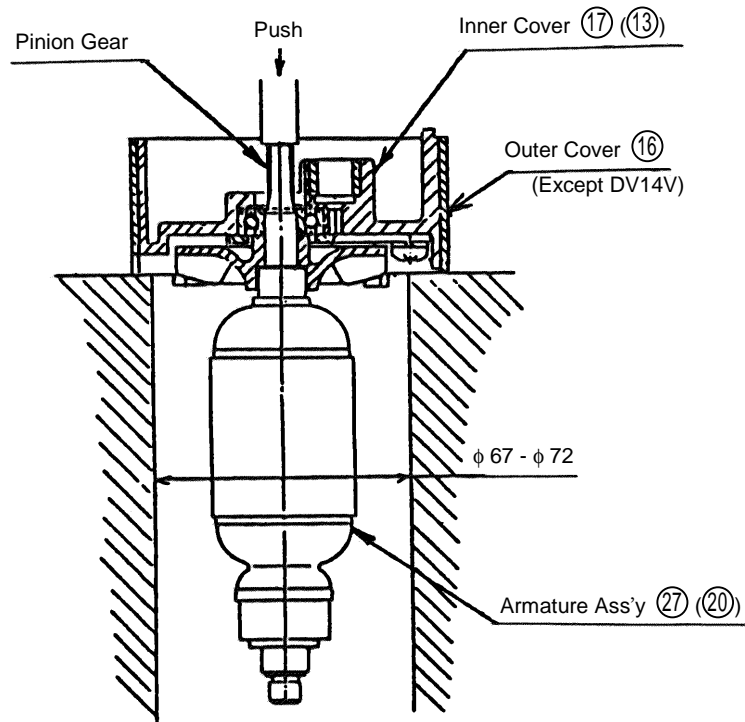


Fig. 6

(5) Disassembly of the Stator:

On the stators employed in the new impact drill series, the stators and leadwires are connected by a terminal connection system which, different from conventional models, permits easy separation of the individual parts. Accordingly, when it is necessary to replace the Stator or related parts, disassembly should be conducted in accordance with the following procedures.

First, loosen the two D4 x 16 Tapping Screws (36) (29), and remove Handle (A) (35) (28).

(a) When replacing internal wires only:

Without taking out the Stator, insert a small minus-hd. screwdriver through each of the leadwire ports of the Housing as illustrated in Fig. 7, and as illustrated in Fig. 8, gently pry open the terminal portions so that the Internal Wires can be slowly withdrawn. At this time, be very careful not to excessively pry apart the terminal portion. When assembling new Internal Wires, insert them through the four ports of the Housing and into the terminals of the Stator (Refer to Para. 1-2-7-(4)).

(b) When replacing the Stator only (Internal Wires remain usable):

On models which are equipped with a noise suppressor, first cut off the two Tubes (D) (47) (42) where the leadwires from the noise suppressor are joined to the internal wires from the Stator. Next, lightly tap the inner cover side of the Housing with a plastic hammer to loosen and remove the Stator. Then as illustrated in Fig. 8, use a small minus-hd. screwdriver to release the Internal Wire terminals, and gently pull them out. After a new Stator (30) (23) has been assembled into the Housing (31) (24), insert the four Internal Wires (43) - (46) (38) - (41). (Refer to Para. 1-2-7-(4)).

(c) When replacing both the Stator and Internal Wires:

On models equipped with a noise suppressor, first cut off the four Tubes (D) (47) (42) as described in Para. (b) above. Then, lightly tap the inner cover side of the Housing (31) (24) with a plastic hammer to loosen and remove the Stator together with the Internal Wires. In reassembly, first assemble the new Stator (30) (23) into the Housing (31) (24); then Insert the four new Internal Wires (43) - (46) (38) - (41). (Refer to Para. 1-2-7-(4)).

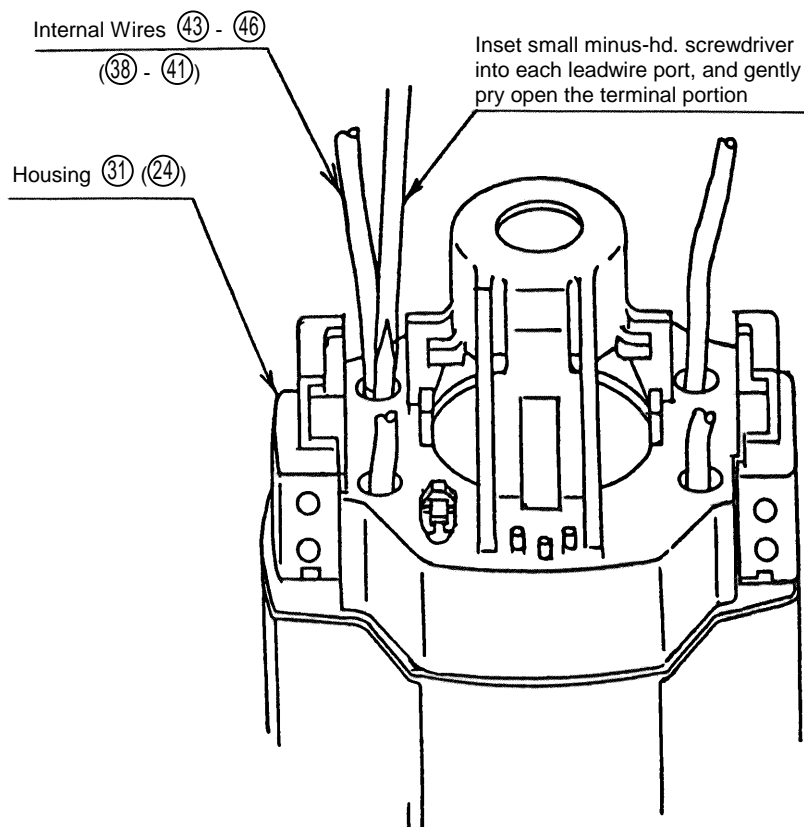
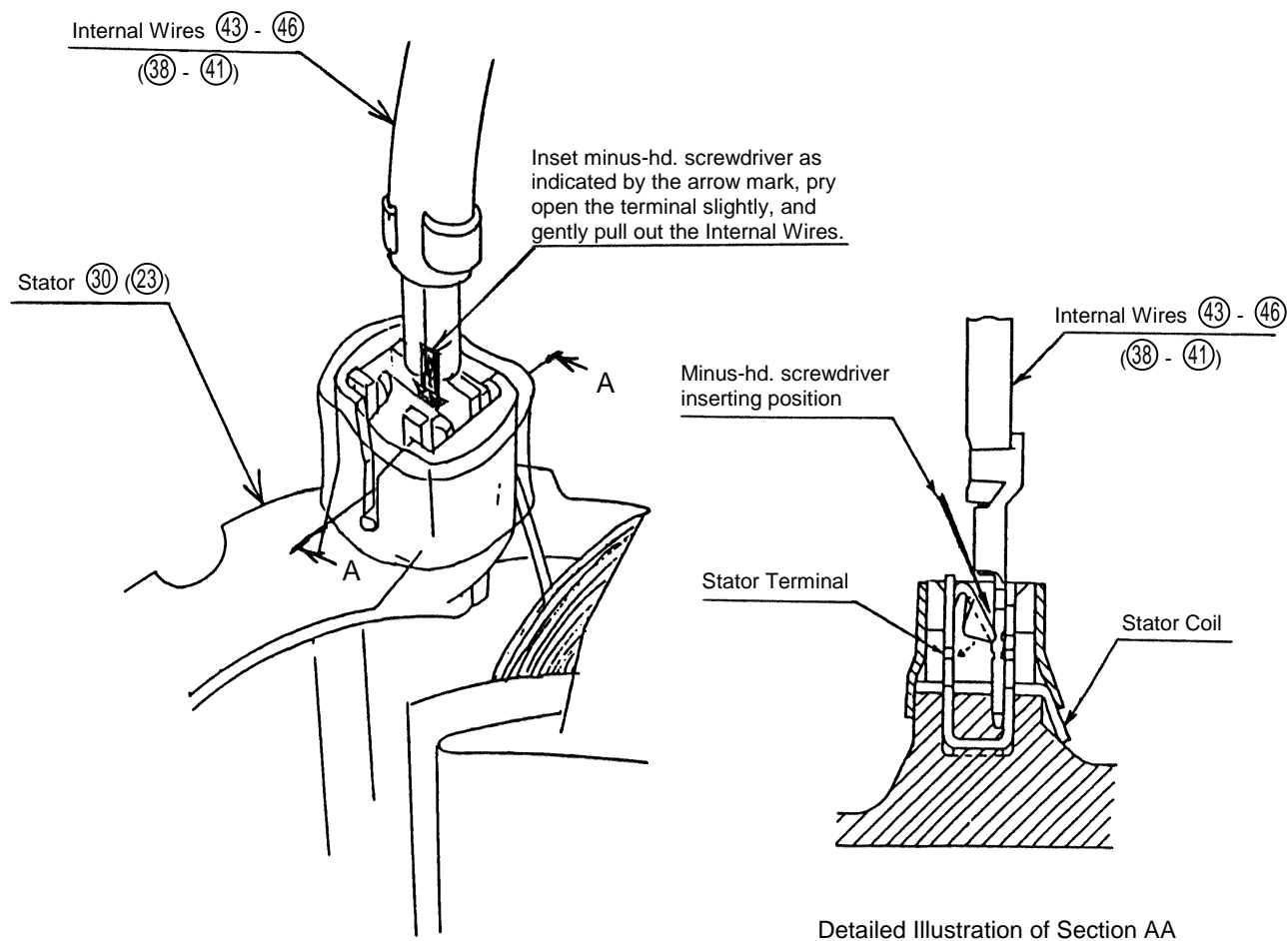


Fig. 7



**Fig. 8**

1-1-2. Disassembly of the Speed Changeover Mechanism (Not applicable to Model DV14V):  
Remove the Steel Ball (5), Spring (11), Washer (15) and High Speed Gear (14) from the rear portion of the Spindle (4). Next, turn Shifting Lever (23) so that the arrow mark (►) is directed to the neutral position (halfway between the "1" and "2" positions). Then take out the Shifting Spring (25) with a small minus-hd. screwdriver or similar tool, and pull out the Shifting Lever (23). Finally, take out the Clutch Disc (13), Low Speed Gear (12) and Spring (11).

### 1-1-3. Disassembly of the Impact Section:

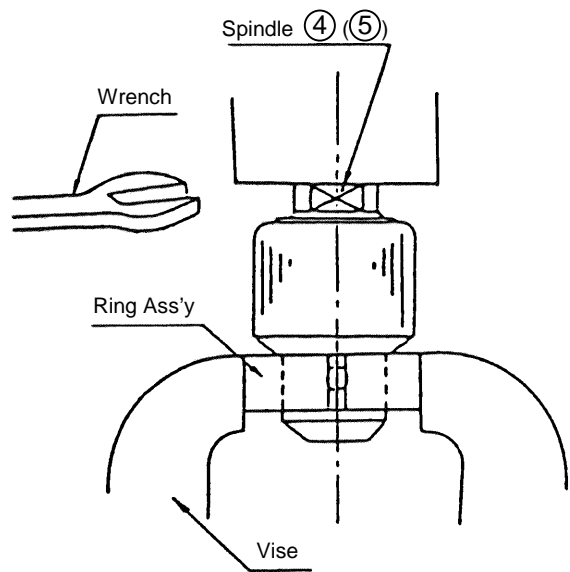
#### (1) Removal of the Drill Chuck:

##### (a) For Models DV20V2 and DV14V Only:

First, fully open the jaws of the Drill Chuck ② (③) and remove the left-hand threaded Special Screw ⑤⑦ (①) by turning it clockwise with a minus screwdriver. Further disassembly is the same for all models.

##### (b) For All Models:

The Drill Chuck ② (③) is fixed to the Spindle ④ (⑤) by a UNF ½ -20 thread (right-hand threaded). As illustrated in Fig. 9, attach a J-78 Ring Ass'y (Special Repair Tool, Code No. 970817) to the Drill Chuck (inserting the pin of the Ring Ass'y into one of the Chuck Wrench mounting holes on the body of the Drill Chuck) and secure the Ring Ass'y in a vise. Then, fit a 17 mm (43/64 ) width x 4 mm (5.32 ) or less thickness wrench onto the flat surfaces provided on the Spindle ④ (⑤), and turn the Spindle counterclockwise to remove the Drill Chuck ② (③).



**Fig. 9**

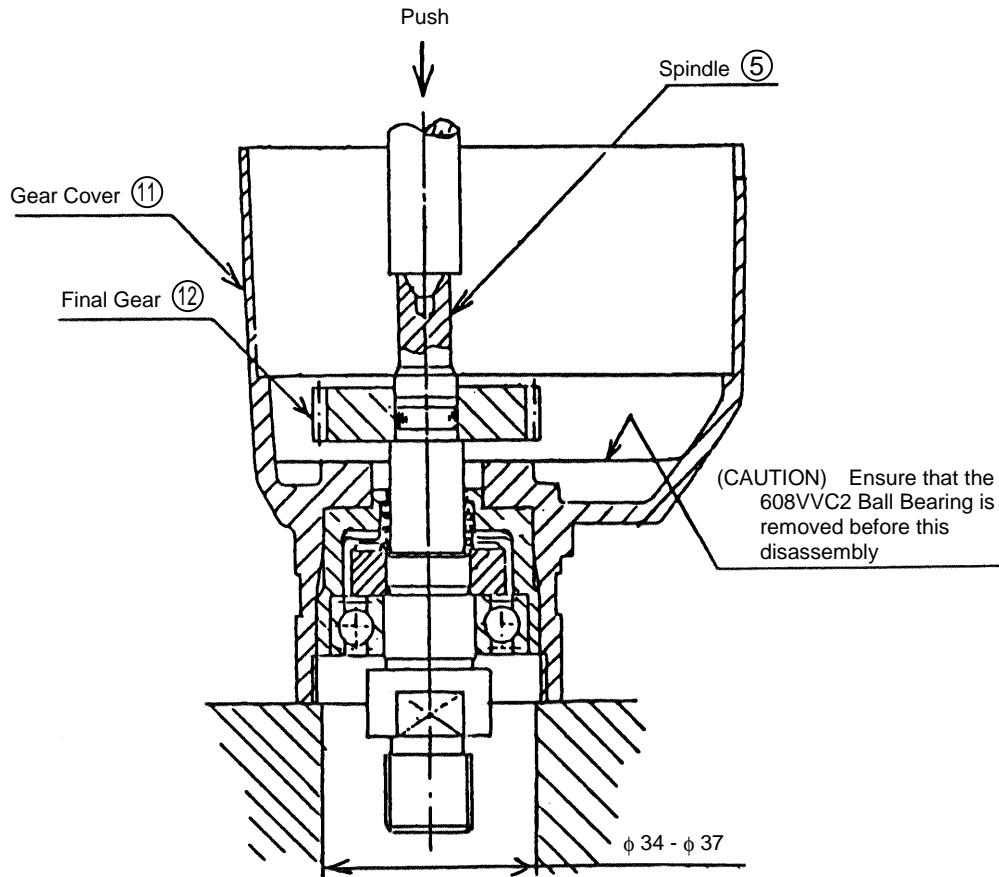
#### (2) Removal of the Spindle:

##### (a) For Models DV20V2, DV20V3 and DV20T:

Remove the Dust Seal ③ by turning it clockwise with a J-168 Special Wrench (Special Repair Tool, Code No. 970950). Then pull out the Spindle ④ together with 6002DDCM Ball Bearing ⑥ and Ratchet (B) ⑦.

##### (b) For Mode DV14V Only:

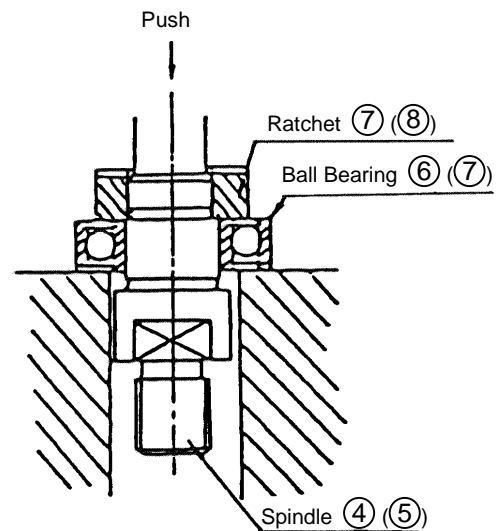
Lightly tap an open area (inner cover side) of the Gear Cover ⑪ with a wooden or plastic hammer to loosen and remove the Second Pinion ⑱ and 608VVC2 Ball Bearing ⑮. (At this time, ensure without fail that the 608VVC2 Ball Bearing is removed. If it is forgotten, subsequent disassembly of the Spindle ⑤ cannot be accomplished.) Then remove the Steel Ball ⑥ from the rear portion of the Spindle ⑤. Next, remove the Dust Seal ④ by turning it clockwise with a J-168 Special Wrench (Special Repair Tool, Code No. 970950). Then, as illustrated in Fig. 10, support the forward end of the Gear Cover ⑪ with an appropriate jig, and push down on the end of the Spindle ⑤ with a hand press to remove it from the Gear Cover.



**Fig. 10**

**(3) Removal of Ratchet (B):**

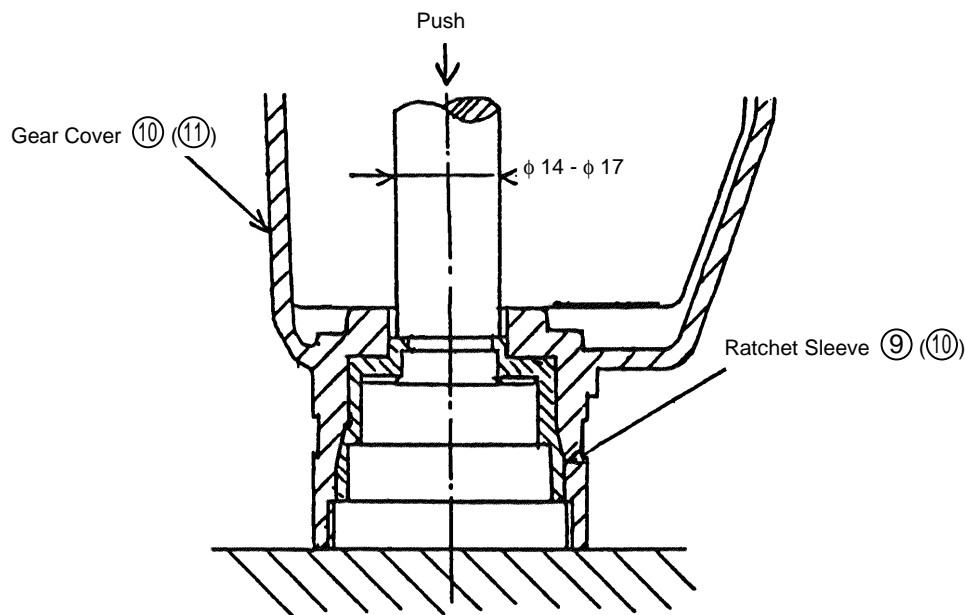
As illustrated in Fig. 11, support the 6002DDCM Ball Bearing (6) (7) with an appropriate tubular jig, and push down on the tip of the Spindle (4) (5) with a hand press to simultaneously remove Ratchet (B) (7) (8) and the 6002DDCM Ball Bearing (6) (7).



**Fig. 11**

**(4) Removal of the Ratchet Sleeve:**

The Ratchet Sleeve (9) (10) is pressure-fitted into the Gear Cover (10) (11). As illustrated in Fig. 12, push down on the Ratchet Sleeve (9) (10) with a hand press to loosen and remove it from the Gear Cover.



**Fig. 12**

**(5) Removal of the Changing Plate:**

Remove the three M5 x 12 Machine Screws (22) (18), and take off the Bearing Holder (21) (17). The Changing Plate (18) (14) can then be taken out.

**1-2. Reassembly:**

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

**1-2-1. Lubrication:**

**(1) Inside the Gear Cover (for Gear and Pinion Lubrication):**

Insert the appropriate amount (see below) of a lithium based motor grease (Hitachi Motor Grease No. 29, Code No. 930035, is recommended) inside the Gear Cover.

- For Models DV20V2, DV20V3 and DV20T: 40 g (1.4 oz.)
- For Model DV14V: 20 g (0.7 oz.)

**(2) Inside of the Inner Cover Ass'y:**

Liberally coat grease (Hitachi Motor Grease No. 29, Code No. 930035, is recommended) on the metal portions of the inside of the Inner Cover Ass'y.

**(3) Armature Pinion Gear:**

Liberally coat the teeth of the pinion gear with grease (Hitachi Motor Grease No. 29, Code No. 930035, is recommended).

**(4) Spindle:**

- Liberally apply grease (Hitachi Motor Grease No. 29, Code No. 930035, is recommended) on the spindle portion (not applicable for Model DV14V) and the Steel Ball (5) (6) mounting chamber on the end of the Spindle (4) (5).
- Liberally apply grease (Molub-Alloy Grease #777-1, Code No. 971042, is recommended) on the 6002DDCM Ball Bearing (6) (7) mounting portion of the Spindle (4) (5).

(5) Clutch Disc (Not Applicable for Model DV14V):

Liberally apply grease (Hitachi Motor Grease No. 29, Code No. 930035, recommended) on the external groove of the Clutch Disc ⑬.

(6) Shifting Lever (Not Applicable for Model DV14V):

Liberally coat grease (Hitachi Motor Grease No. 29, Code No. 930035, is recommended) on the sliding portion (exposed metal portion) of the Shifting Lever ⑳.

(7) Impact Section (Ratchet Sleeve and Ratchet (B)):

Apply approximately 1.5 g (0.18 oz.) of grease (Molub Alloy Grease #777-1, Code No. 971042, is recommended) on the ratchet portions the Ratchet Sleeve ⑨ (⑩) and Ratchet (B) ⑦ (⑧).

1-2-2. Screw Locking Agent:

Prior to reassembly, coat the three M5 x 12 Machine Screws ②② (⑱) with screw locking agent (Three-Bond TB 1747 is recommended).

1-2-3. Tightening Torques:

(1) Special Screw ⑤⑦ (①) (Models DV20V2 and DV14V Only) .....	40 - 50 kg-cm (34.7 - 43.3 lbs-in.)
(2) D4 Tapping Screws: ③⑥, ⑤① (②⑨, ④⑤) .....	15 - 25 kg-cm (13 - 21.7 lbs-in.)
D5 Tapping Screws: ③② (②⑤) .....	25 - 35 kg-cm (21.7 - 30.4 lbs-in.)
(3) M5 Machine Screws: ②② (⑱) .....	25 - 35 kg-cm (21.7 - 30.4 lbs-in.)
(4) Dust Seal ③ (④) .....	100 - 150 kg-cm (86.8 - 130.2 lbs-in.)
(5) Drill Chuck ② (③) .....	300 - 400 kg-cm (260.4 - 347.2 lbs-in.)

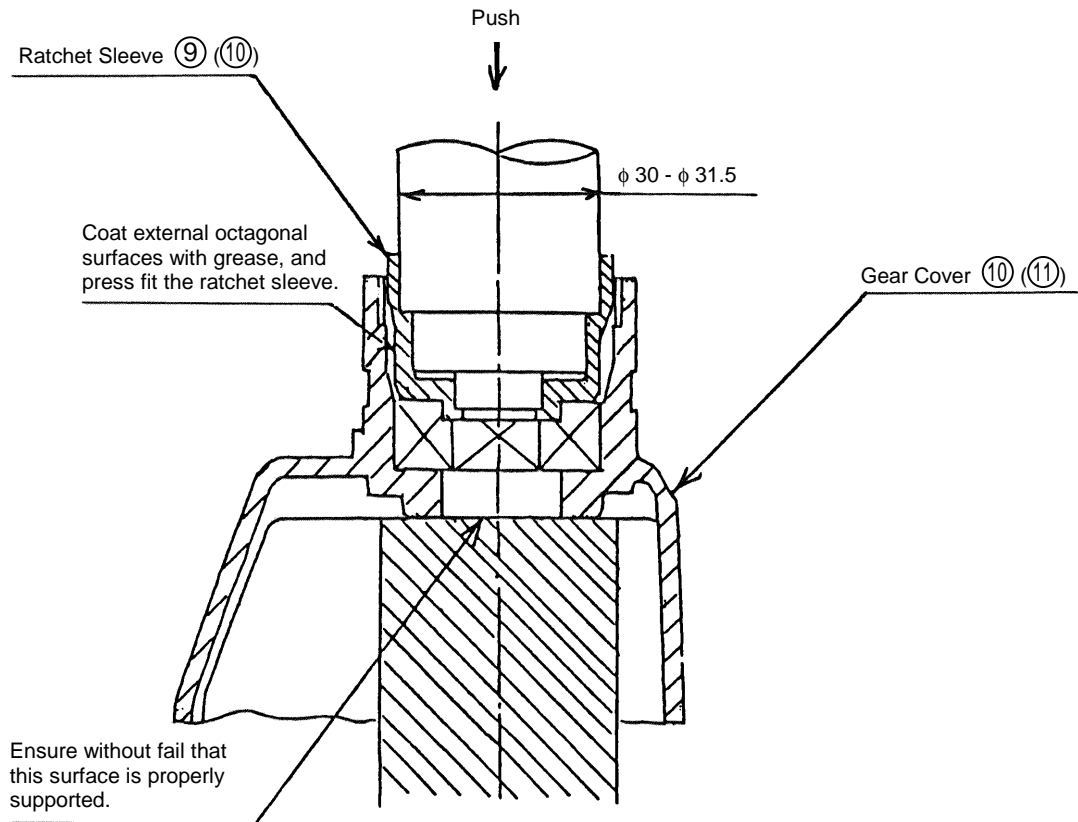
1-2-4. Fitting of the Stator:

During reassembly, the Stator ③① (②③) is assembled into the Housing ③① (②④) before connecting the Internal Wires. After ensuring that the grooves of the Stator are properly aligned with the upper and lower side ribs of the Housing, push the Stator into the Housing while lightly tapping the end surface of the Housing with a wooden or plastic hammer. As these components are particularly tight fitting, carefully ensure that the Stator is inserted fully into the Housing by looking into the opening of the Housing to confirm surface to surface contact.

1-2-5. Pressure Fitting of the Ratchet Sleeve:

First, liberally coat grease (Hitachi Motor Grease No. 29, Code No. 930035, is recommended) on the octagonal portion of external surface of the Ratchet Sleeve ⑨ (⑩). Next, insert the Ratchet Sleeve slightly into the mounting portion of the Gear Cover ⑩ (⑪), turn it by hand to confirm that the octagonal fitting surfaces are properly aligned, and push it part way into the Gear Cover. then, as illustrated in Fig. 13, support the inner portion with an appropriate jig and press-fit the Ratchet Sleeve fully into the Gear Cover.





**Fig. 13**

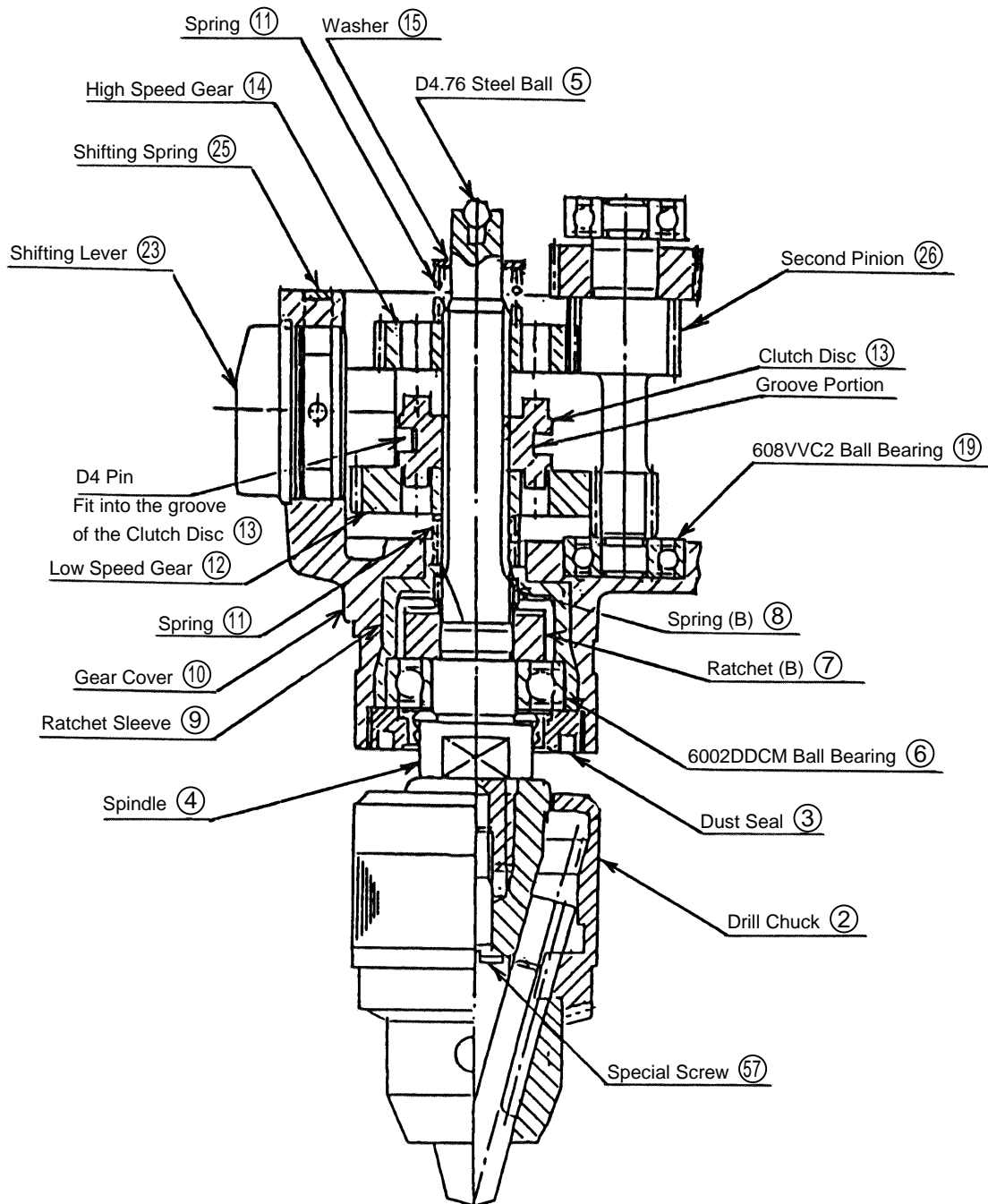
**1-2-6. Reassembly Procedures for the Gear Cover Section (Not Applicable to Model DV14V):**

(See Fig. 14)

Note: For appropriate lubrication of components, see Para. 1-2-1,

- (1) Press fit the Ratchet Sleeve ⑨ into the Gear Cover ⑩ (Refer to Para. 1-2-5.)
- (2) Assemble the 608VVC2 Ball Bearing ⑲ into the Gear Cover ⑩.
- (3) Mount the 6002DDCM Ball Bearing ⑥, Ratchet (B) ⑦, and Spring (B) ⑧ on the Spindle ④, and assemble them into the Gear Cover ⑩.
- (4) Reassemble the Dust Seal ③ into the Gear Cover ⑩ by turning it clockwise.
- (5) Reassemble the Drill Chuck ② onto the Spindle ④ by turning it clockwise with the J-168 Special Wrench.
- (6) Fully open the jaws of the Drill Chuck ②, reinsert the Special Screw ⑤⑦, and fully tighten it by turning it counter-clockwise. (Model DV20V2 only.)
- (7) Reassemble one of the Springs ⑪, the Low Speed Gear ⑫ and the Clutch Disc ⑬ onto the rear portion of the Spindle ④.
- (8) Mount the O-Ring ②④ onto the Shifting Lever ②③. Then, push and hold the Low Speed Gear ⑫ toward the Drill Chuck, insert the Shifting Lever from the side, ensure that the D4 Pin on the Shifting Lever is properly aligned with an fits into the groove on the outer circumference of the Clutch Disc ⑬. Finally, turn the Shifting Lever by hand and confirm that it is in proper contact with the groove on the Clutch Disc ⑬.
- (9) Turn the Shifting Lever ②③ so that the arrow mark (▶) is directed to the neutral position (halfway between the "1" and "2" positions), and insert the Shifting Spring ②⑤.

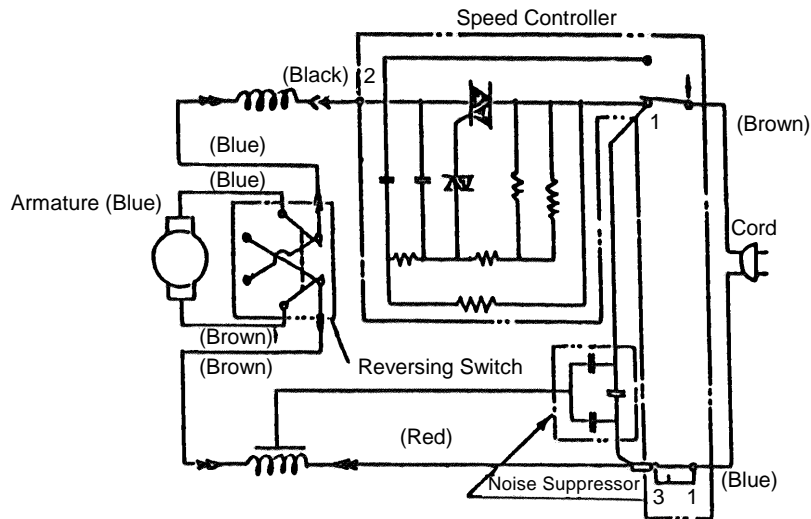
- (10) Reassemble the High Speed Gear ⑭, the remaining Spring ⑪ and the Washer ⑮ onto the Spindle ④.
- (11) Mount the D4.76 Steel Ball ⑤ into the chamber on the end of the Spindle ④.
- (12) Reassemble the Second Pinion ⑳ into the Gear Cover ⑩.
- (13) Finally, reassemble the fully assembled Gear Cover section to the Inner Cover Ass'y ⑰, being very careful not to lose the D4.76 Steel Ball ⑤.



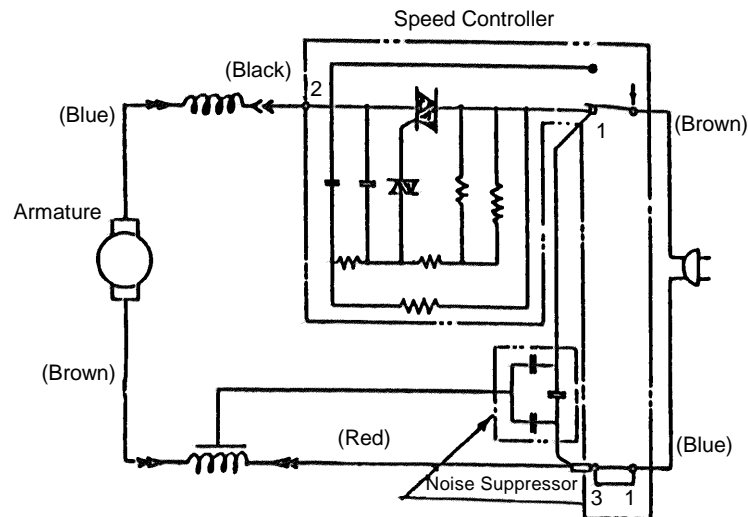
**Fig. 14**

### 1-2-7. Wiring Diagrams and Lead Wire Arrangements:

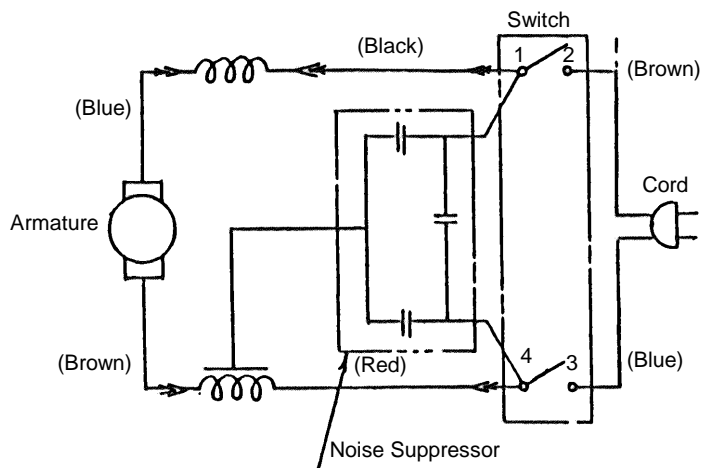
- (1) When connecting the Internal Wires to the Carbon Brushes, insert the terminals as illustrated in Fig. 5 above.
- (2) Refer to Figs. 18 - 20 for leadwire arrangements. Be very careful not to pinch any of the leadwires when reassembling Handle (B).
- (3) Wiring Diagrams:
  - A. For products with Noise Suppressor:



**Fig. 15 Model DV20V2 and DV14V**



**Fig. 16 Model DV20V3**



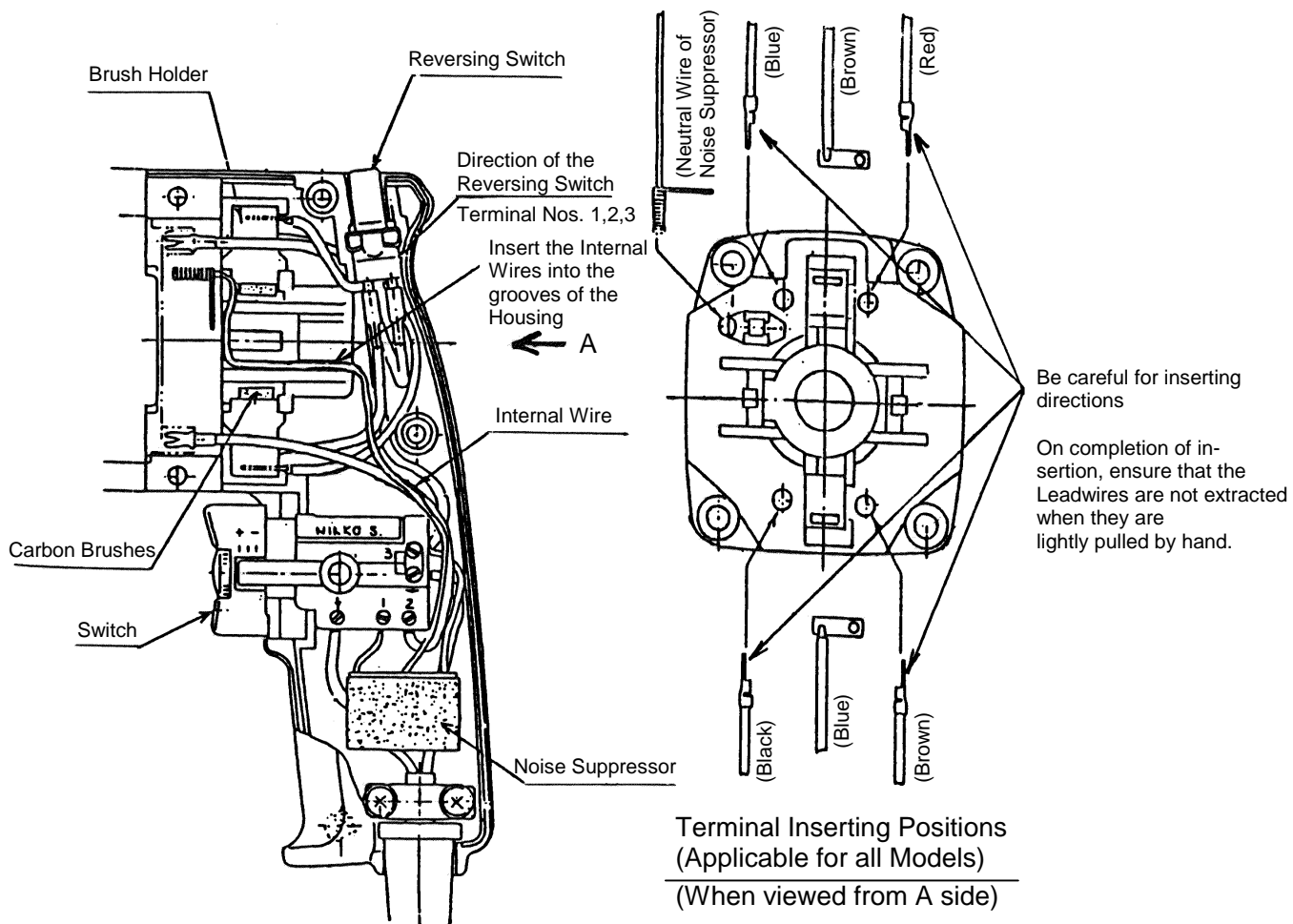
**Fig. 17 Model DV20T**

B. For products without Noise Suppressor:

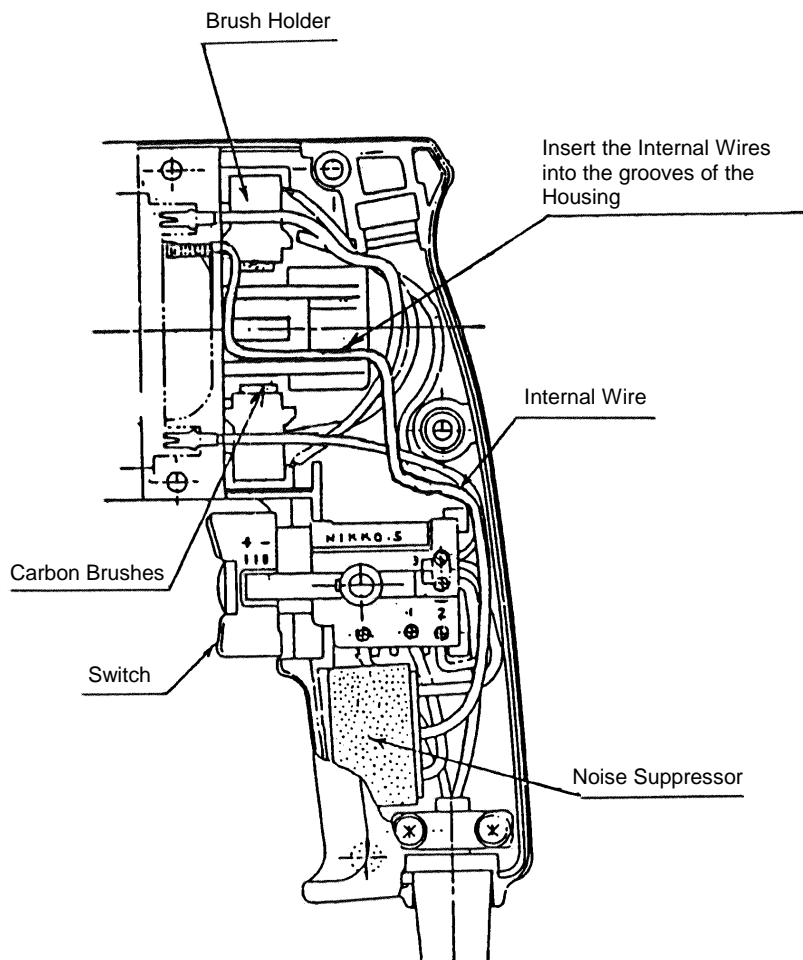
The Wiring Diagrams for products without Noise Suppressor are the same as the Wiring Diagrams in Fig. 15, 16 and 17 with the Noise Suppressor removed.

(4) Leadwire Arrangements:

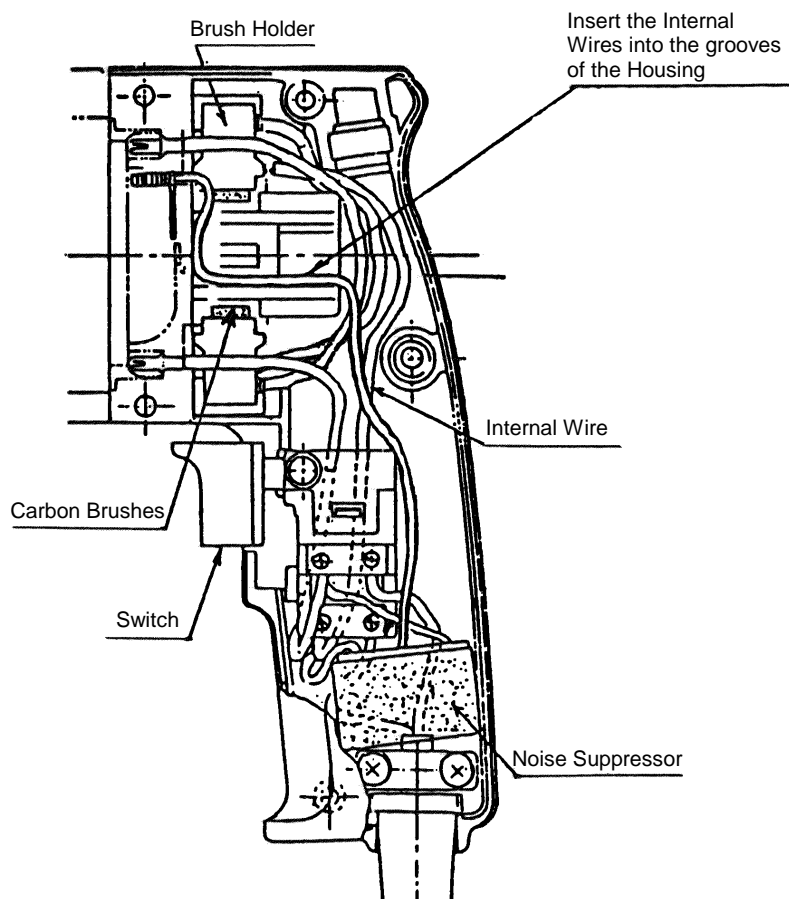
A. For products with Noise Suppressor:



**Fig. 18 Models DV20V2 and DV14V**



**Fig. 19 Model DV20V3**



**Fig. 20 Model DV20T**

B. For products without Noise Suppressor:

The Leadwire Arrangements for products without Noise Suppressor are the same as the Leadwire Arrangements in Figs.18, 19 and 20 with the Noise Suppressor removed.

### 1-3. Insulation Tests:

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

Insulation Resistance : 7MΩ or more with DC500V Megohm Tester.

Dielectric Strength:	AC4000V/1 minute, with no abnormalities .....	220V - 240V (and 110V for U.K. products)
	AC2500V/1 minute, with no abnormalities .....	110V - 127V (except U.K. products)