



MODELS FDV 16V/FDV 20V/FDV 16VA/ FDV 20VA

1. PRECAUTIONS ON DISASSEMBLY AND REASSEMBLY:

The circled numbers in the descriptions below correspond to the item number in the Parts Lists and exploded assembly diagrams.

1-1. Disassembly:

1-1-1. Disassembly of the Motor Section:

(1) Removal of the Handle Cover:

Remove the three D4 x 20 Tapping Screws (42), and take off the Handle Cover (44).

(2) Removal of the Carbon Brushes:

After pulling up and disconnecting the leadwires which are inserted into the Brush Holders (47), the Carbon Brushes (46) can be removed together with the Brush Holders (47).

(3) Disassembly of the Gear Cover from the Housing:

Remove the two D5 x 85 Tapping Screws (9) and the two D5 x 45 Tapping Screws (23), and separate the Gear Cover (10) from the Housing (39). The Inner Cover (16), Armature (32) and related parts can then be removed from the Housing (39) in a single assembled body.

(4) Removal of the Armature from the Inner Cover (See Fig. 2):

As illustrated in Fig. 2, support the Inner Cover (16) with a tubular jig and push down on the pinion end of the Armature (32) with an arbor press.

(5) Disassembly of the Stator from the Housing:

Disconnect the leadwires of the Stator (36) from the Switch (45) (and, on the Models FDV 16VA and FDV 20VA only, from the Reversing Switch (56)). Then, lightly tap the joint portion between the Housing (39) and Fan Guide (34) with a wooden hammer to loosen and remove the Stator (36) together with its leadwires.

1-1-2. Disassembly of the Speed Change Device:

Lightly tap the joint portion between the Gear Cover (10) and the Inner Cover (16) with a wooden hammer to loosen and separate them. The D5 Pin (15) and Second Pinion (31) will come out of the Gear Cover simultaneously.

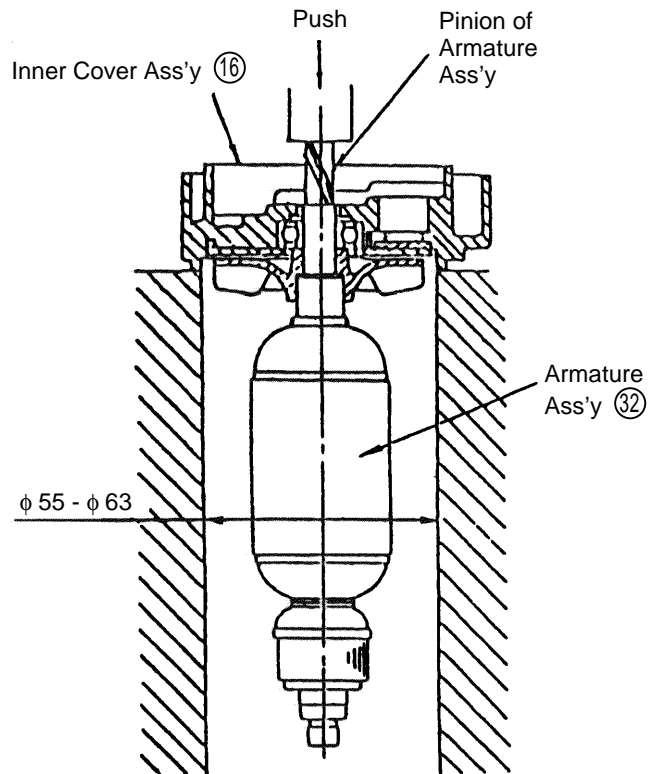


Fig. 2

1-1-3. Disassembly of the Impact Sections:

(1) Removal of the Drill Chuck (See Fig. 3):

For Models FDV 16VA and FDV 20VA only, first fully open the jaws of the Drill Chuck ②, and remove the left-hand threaded Special Screw ⑤⑤ by turning it clockwise with a minus screwdriver.

For all models, the Drill Chuck ② is fixed to the Spindle ⑤ by a UNF $\frac{1}{2}$ "-20 thread (right-hand threaded). As illustrated in Fig. 3, fit the pin portion of a J-78 Ring Ass'y (special repair tool, Code No. 970817) into the Chuck Wrench mounting hole on the Drill Chuck, and secure the assembly in a vise. Then, fit a 17 mm (43/64") width x 4 mm (5/32") or less thickness wrench onto the provided flat surfaces on the Spindle ⑤, and turn the Spindle counter-clockwise to loosen and remove the Drill Chuck ②.

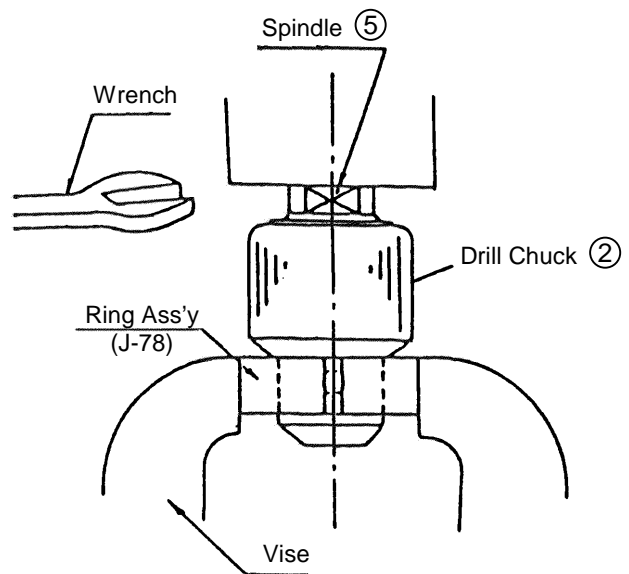


Fig. 3

(2) Removal of the Spindle:

With stop ring pliers, remove the D32 C-Type Retaining Ring ③, which supports the Dust Seal ④, from the Gear Cover ⑩. Then lightly tap the end of the Spindle ⑤ from the inner Cover fitting side to loosen and remove the Dust Seal ④, Spring ⑭, Spindle ⑤ and related parts. Please note that the 6002DDCM Ball Bearing ⑦ and Ratchet (B) ⑧ are press-fitted onto the Spindle ⑤.

(3) Removal of Ratchet (B) (See Fig. 4):

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

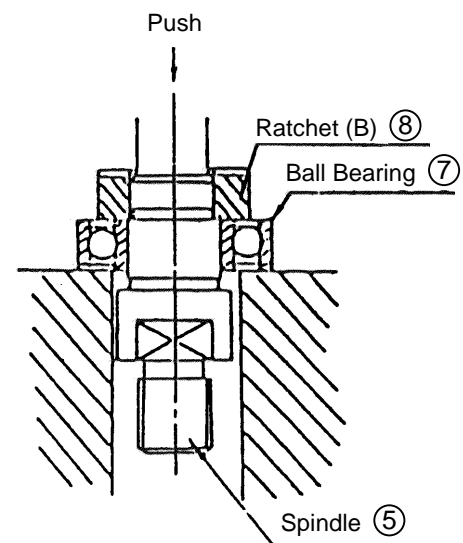


Fig. 4

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. Lubricants:

(1) Gear Cover Interior (lubricating gears and pinions):

Apply 30 g (1.06 oz) Grease (Genuine Hitachi Motor Grease No. 29, Code No. 930035 is recommended) within the Gear Cover ⑩ to lubricate gears and pinions.

(2) Percussion Section:

Apply 5 g (0.18 oz) of Mollub Alloy #777-1 Grease (Code No. 971042 is recommended) on the notch of Ratchet (B) ⑧ and Gear ⑫, and the nose portion inside of the Gear Cover ⑩.

(3) Pinion portion of the Armature:

Fully apply Grease (Genuine Hitachi Motor Grease No. 29 is recommended) to the bottom of the pinion teeth.

1-2-2. Screw Locking Agents:

- | | |
|---|--------------------|
| (1) Special Screw ⑤⑤ (Models FDV16VA and FDV20VA) | Three Bond TB 1407 |
| (2) Changing Knobs ①⑦ | Three Bond TB 1747 |
| (3) Shifting Lever ②⑥ | Three Bond TB1747 |

1-2-3. Tightening Torques:

- | | |
|---|--|
| (1) Special Screw ⑤⑤ (Models FDV16VA and FDV20VA) | 40 - 50 kg-cm
(34.7 - 43.3 lbs-in.) |
| (2) D4 Tapping Screws: ④②, ⑤① | 15 - 25 kg-cm
(13 - 21.7 lbs-in.) |
| D5 Tapping Screws: ⑨, ②③ | 25 - 35 kg-cm
(21.7 - 30.4 lbs-in.) |
| (3) M4 Hexagon Socket Hd. Bolg: ②⑤ | 3 - 5 kg-cm
(2.6 - 4.3 lbs-in.) |
| (4) M5 Hexagon Socket Hd. Bolts (Seal Lock Bolts): ②② | 40 - 50 kg-cm
(34.7 - 43.4 lbs-in.) |

1-2-4. Reassembly of the Speed Change Device: (See Fig. 5)

- (1) Insert the Shifting Rod ②⑨ into the Gear Cover ⑩, and assemble Spring (H) ②⑦ and the D3.969 Steel Ball ②⑧ on the Shifting Lever ②⑥. Then, tighten the Shifting Lever ②⑥ with the M4 x 12 Hexagon Socket Hd. Set Screw ②⑤ with a hexagonal bar wrench.

Note: The assembling directions of the Shifting Lever and Shifting Rod are illustrated in Fig. 5.

- (2) Mount the Shifting Arm ③① onto the Gear ①② and engage the Gear ①② onto the Spindle ⑤. The round hole of the Shifting Arm ③① must be faced to the inside of the Gear Cover. Assembly of the Gear is illustrated in Fig. 5.
- (3) Insert the recessed portion of the Shifting Arm ③① onto the roll pin of the Shifting Rod ②⑨.
- (4) Insert the D5 Pin ①⑤ into the round hole of the Shifting Arm ③①, and fix it in the Gear Cover ⑩.

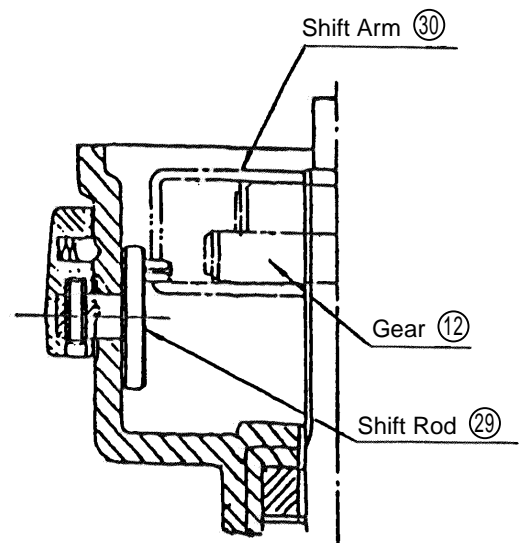


Fig. 5

1-2-5. Reassembly of the Inner Cover Section (See Fig. 6):

With an arbor press, fit the 608VVC2PS2 Ball Bearing ②① into the Inner Cover ①⑥. Next, mount the Changing Knobs ①⑦ onto the Changing Plate ①⑧, and insert it together with Spring (A) ①⑨ into the Inner Cover ①⑥, being very careful that the parts are aligned as illustrated in Fig. 6. Finally, fix the Bearing Holder ②① with the three M5 x 12 Hexagon Socket Hd. Bolts ②②.

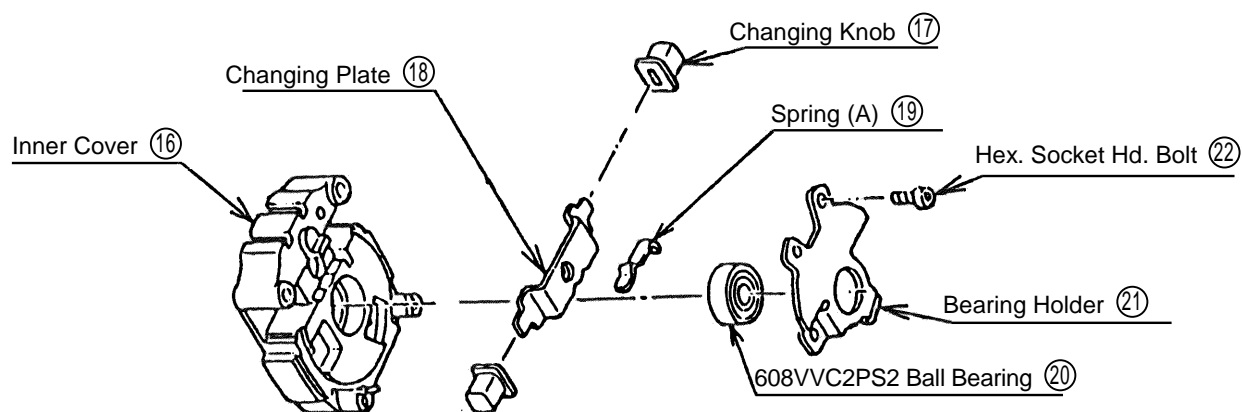


Fig. 6

1-2-6. Wiring Diagrams and Leadwire Arrangements (See Figs. 7 through 14):

- (1) Wiring diagrams are illustrated in Figs. 7 through 10.
Leadwire arrangements are illustrated in Figs. 11 through 14. When mounting the Handle Cover (44), be particularly careful not to pinch any of the leadwires.
- (2) Carefully ensure that the connectors on the leadwires which are connected to terminals 3 and 6 of the Reversing Switch (56) are inserted fully and securely inside the terminals, and that there are no exposed wires. (Models FDV16VA and FDV20VA only).
- (3) Ensure that the terminal of the neutral wire from the Noise Suppressor (48) is properly inserted into the chamber provided between the grooved portion of the Housing (39) and the Stator (36), as illustrated in Figs. 11 and 12.
- (4) Wiring Diagrams:
A. For models with a Noise Suppressor:

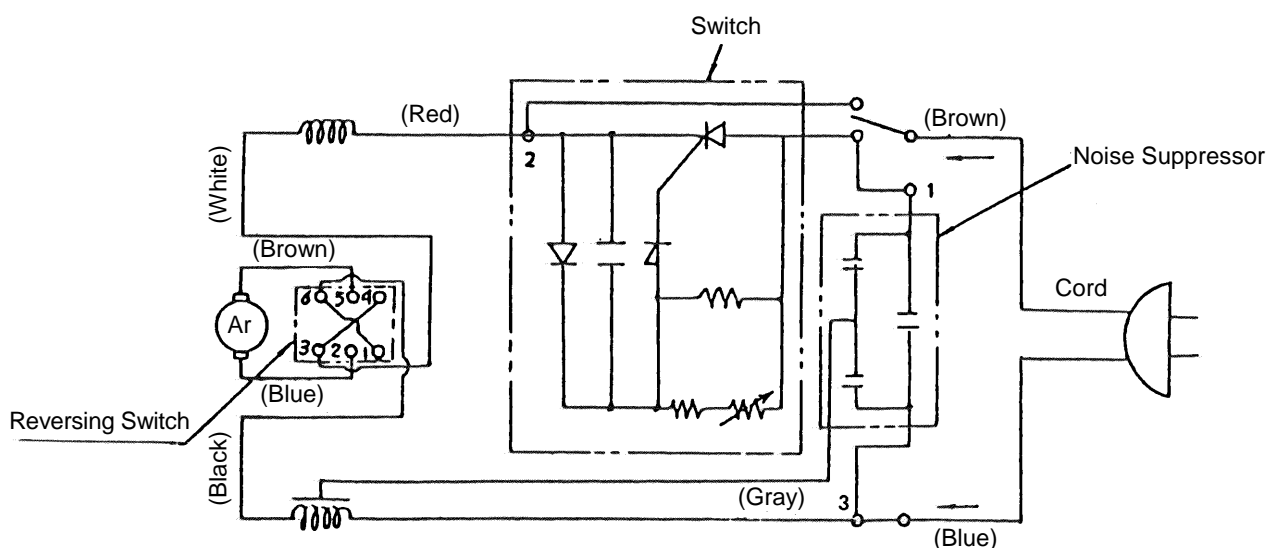


Fig. 7 Models FDV16VA and FDV20VA

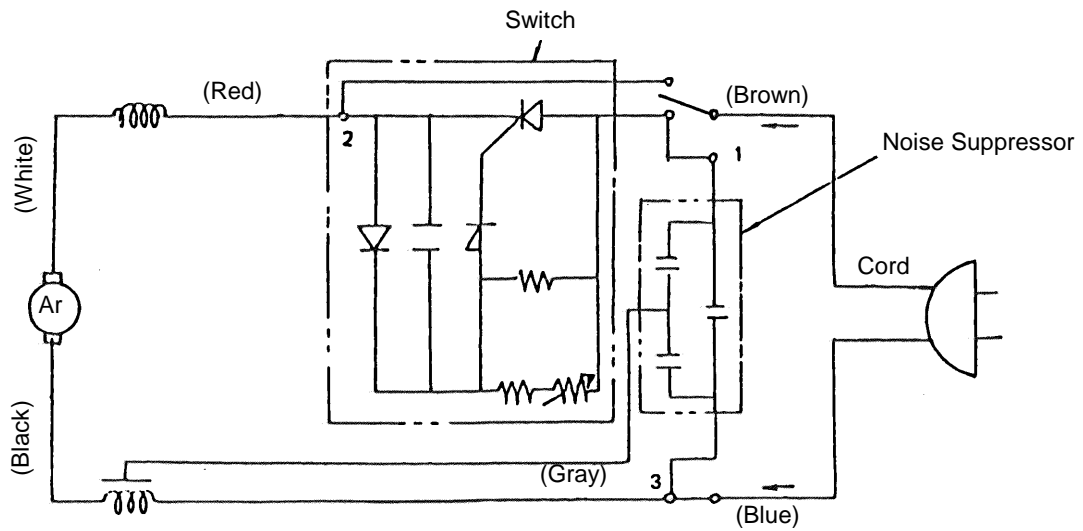


Fig. 8 Models FDV16V and FDV20V

B. For models without a Noise Suppressor:

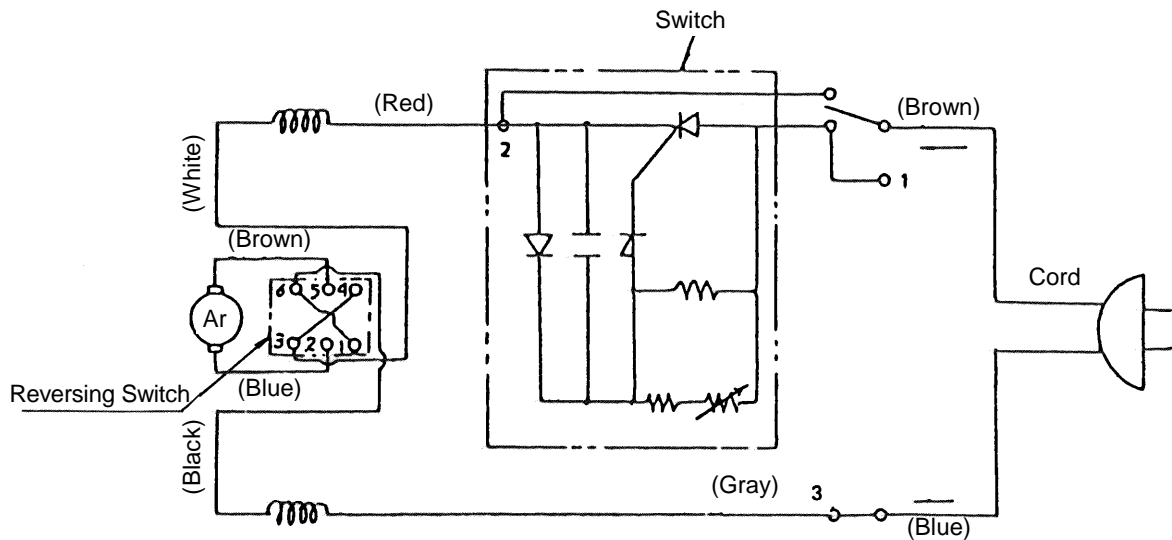


Fig. 9 Models FDV16VA and FDV20VA

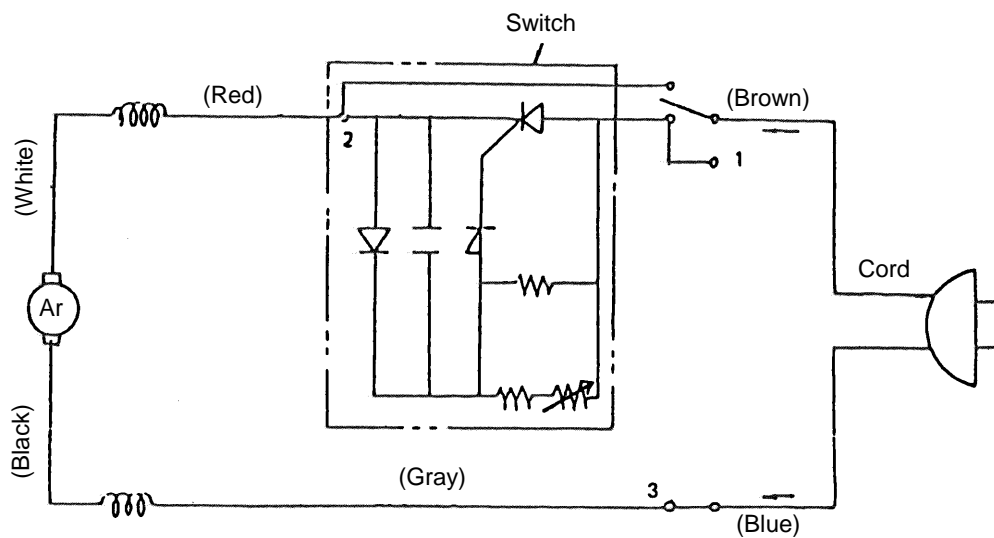


Fig. 10 models FDV16V and FDV20V

(5) Schematic Diagrams:

A. For Models with the Noise Suppressor:

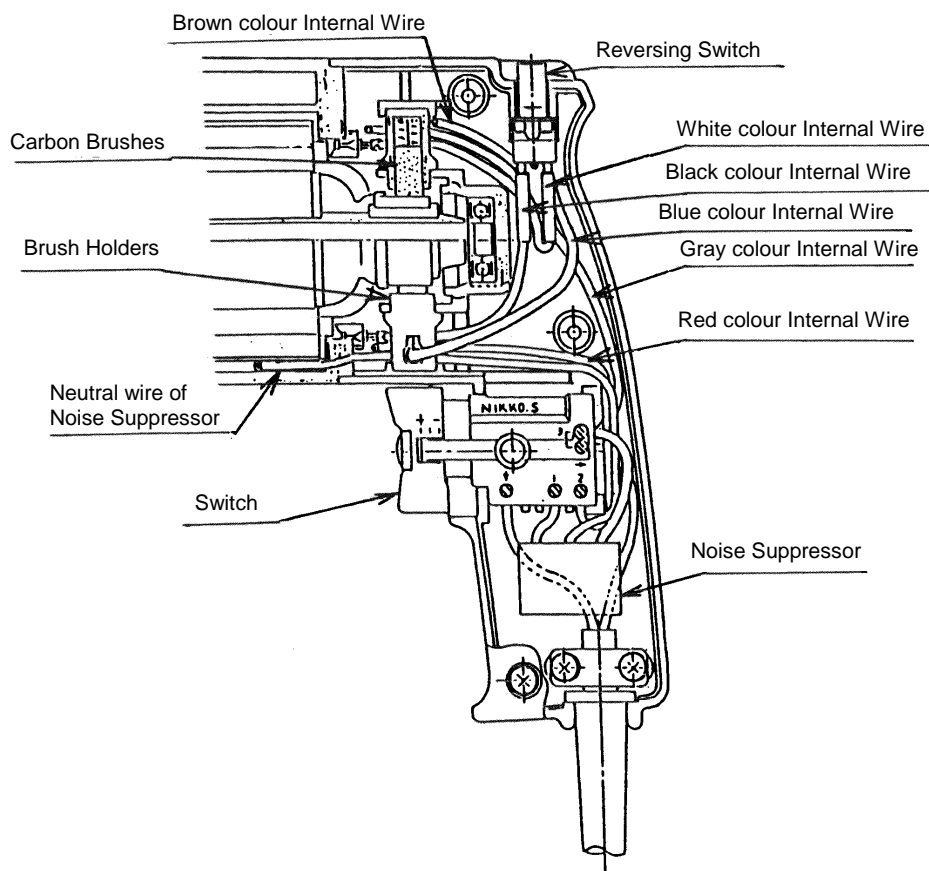


Fig. 11 Models FDV16VA and FDV20VA

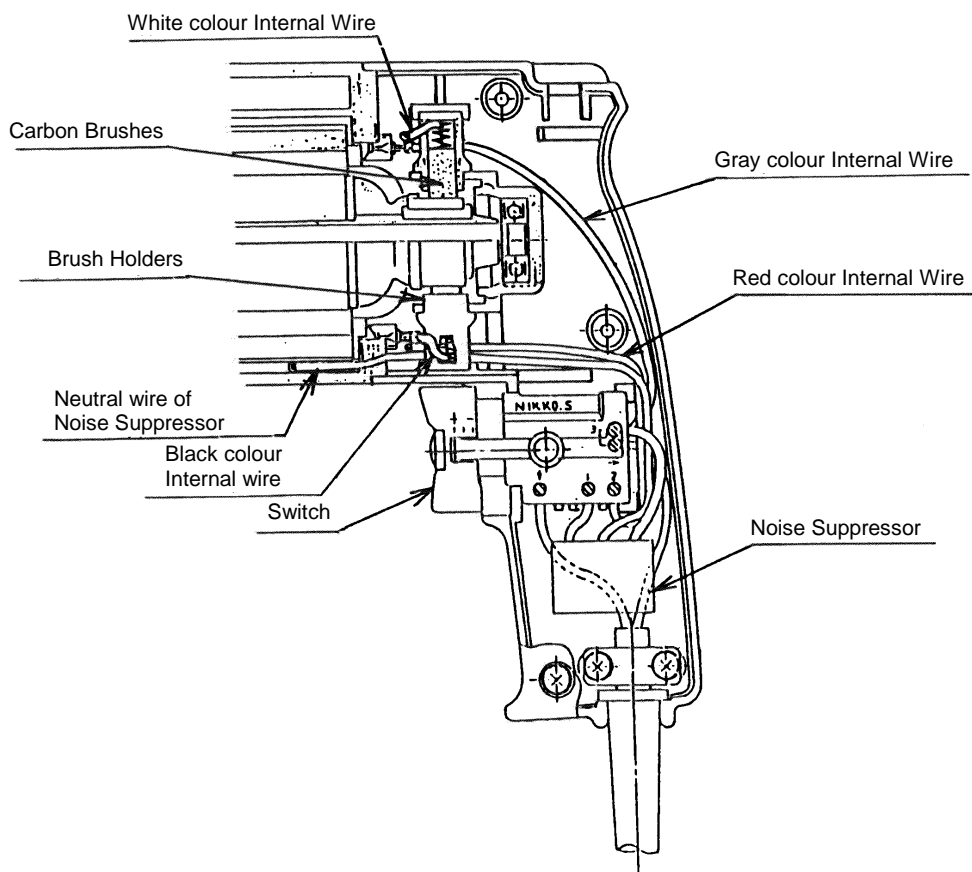


Fig. 12 Models FDV16V and FDV20V

B. For Models without the Noise Suppressor:

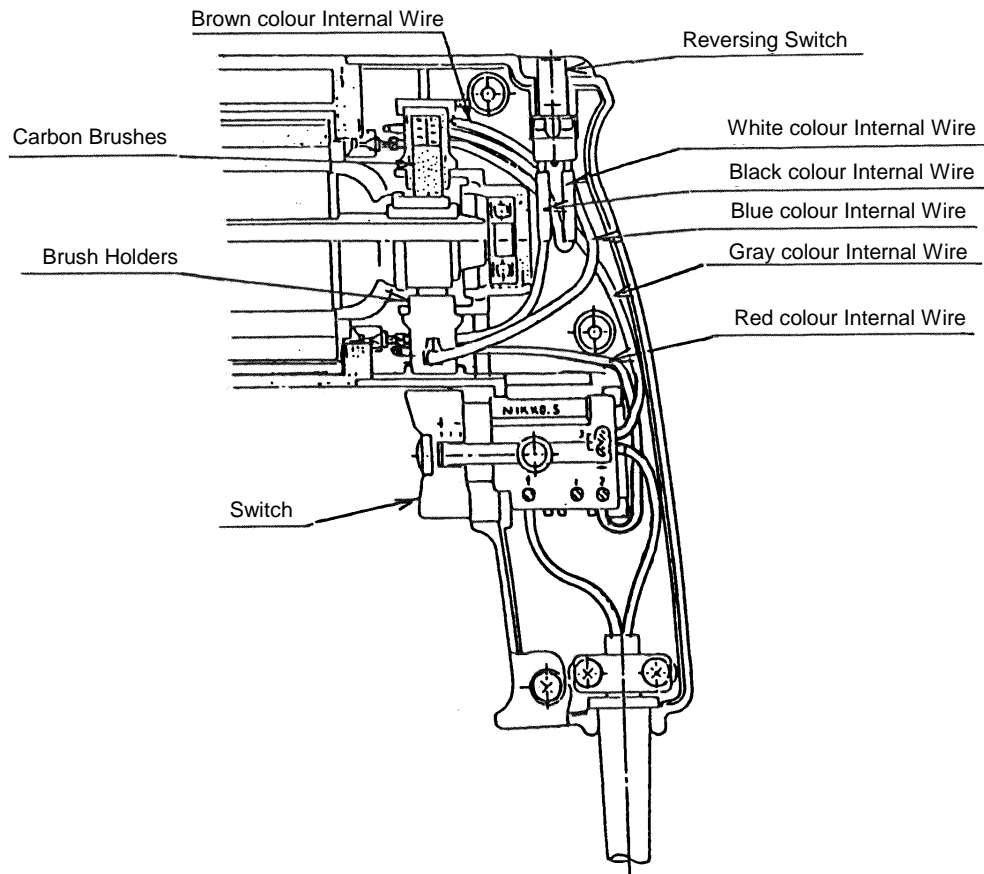


Fig. 13 Models FDV16VA and FDV20VA

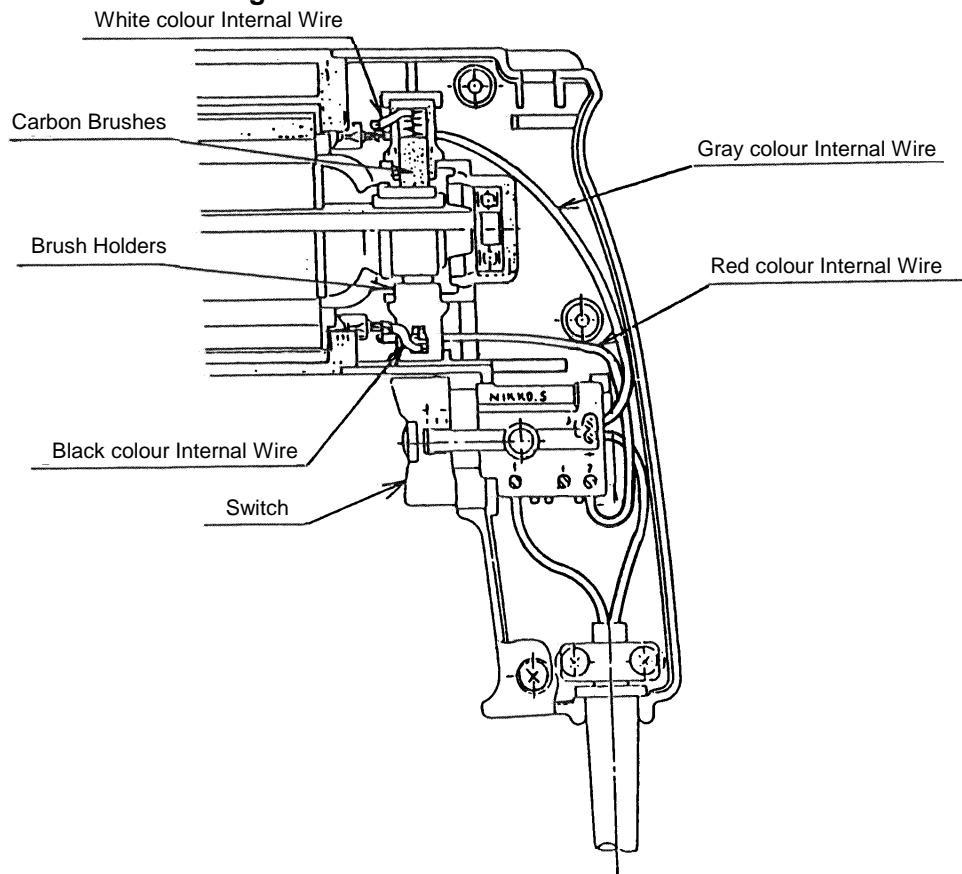


Fig. 14 Models FDV16V and FDV20V

1.3 Insulation Tests:

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

Insulation Resistance: $7M\Omega$ or more with DC500V Megohm Tester.

Dielectric Strength: AC4000V/1 minute, with no abnormalities 220V - 240V products

1.4 No-Load Current:

After 30 minutes of no-load operation, the no-load currents should be as follows:

220V	1.3A or Less
230V	1.2A or Less
240V	1.2A or Less