

MODEL

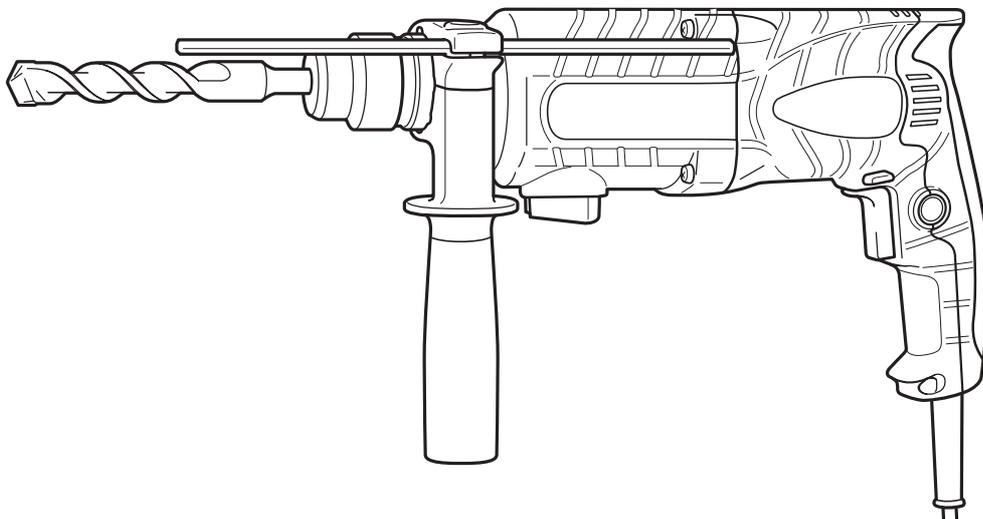
DH 22PB

Hitachi
Power Tools

ROTARY HAMMER
DH 22PB

TECHNICAL DATA
AND
SERVICE MANUAL

D



LIST No. E481

Aug. 2004

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

REMARK:

Throughout this TECHNICAL DATA AND SERVICE MANUAL, symbols are used in the place of company names and model names of our competitors. The symbols utilized here are as follows:

Symbols Utilized	Competitors	
	Company Name	Model Name
B	BOSCH	GBH2-22SRE
C	MAKITA	HR2021
D	HILTI	TE2

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1. PRODUCT NAME

Hitachi Rotary Hammer, Model DH 22PB

2. MARKETING OBJECTIVE

The Model DH 22PB is an evolutionary development of the Model DH 24PB, which features the concrete drilling capacity with the maximum drill bit diameter 22 mm and the use of SDS-plus shank tools.

The main features of the Model DH 22PB are as follows:

- (1) Class-top drilling speed
- (2) Improved resistance to grease leakage
- (3) One-push tool retainer eliminates the need for sliding the grip.
- (4) New and powerful design

3. APPLICATIONS

(1) Rotation and hammering function

- Drilling anchor holes
- Drilling holes in concrete, tile, brick and similar materials

(2) Rotation only function

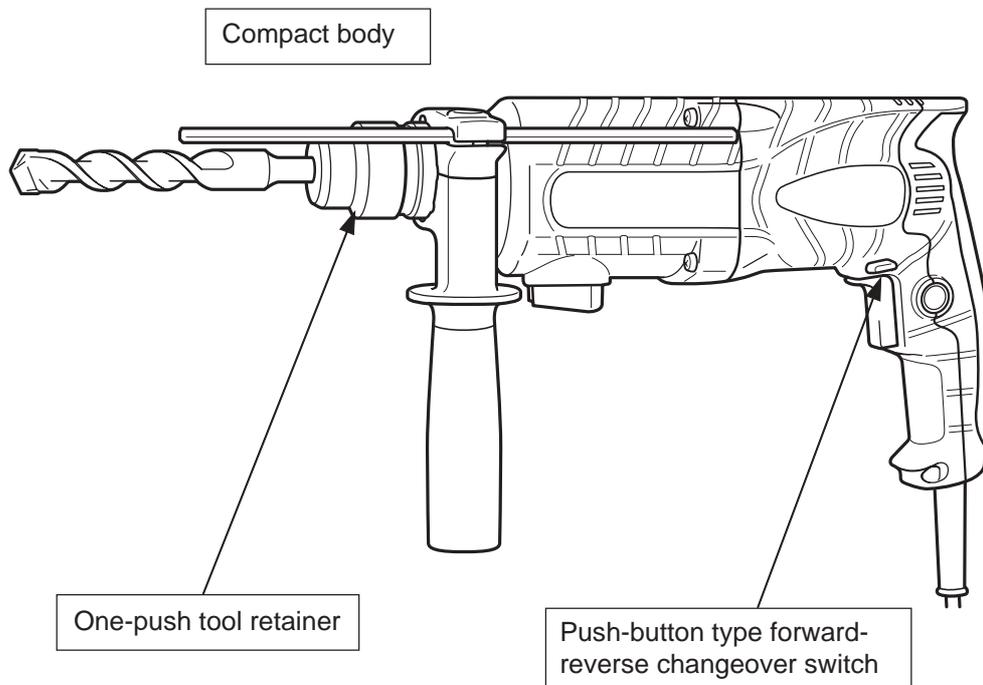
- Drilling holes in steel and wood (with chuck adapter)
- Tightening and loosening machine screws, wood screws (with chuck adapter)

[Typical applications]

- Air conditioning Installation of air conditioners, water coolers and heaters, and air ducts
- Piping and plumbing Installation of gas, water, and sanitary facilities
- Electrical work Installation of light fixtures and various electric appliances
- Interior decoration Installation of seating, display stands, and partitions
- Other civil engineering, construction and repair work

4. SELLING POINTS

- Class-top drilling speed
- Improved resistance to grease leakage
- New and powerful design



4-1. Selling Point Descriptions

4-1-1. Class-top drilling speed

The drilling speed of the Model DH 22PB is 1.8 times higher than B and 1.4 times higher than D and 1.1 times higher than C thanks to the efficient transmission of the hammering energy.

4-1-2. Improved resistance to grease leakage

The Model DH 22PB is equipped with a sealed type ball bearing at the tip of the bearing unit while the current Model DH 24PB is equipped with an open type ball bearing. In addition, the clearance around the bearing is minimized to improve the resistance to grease leakage.

4-1-3. One-push tool retainer

The tool retainer of the current Model DH 24PB needs sliding the grip to mount the bit. The one-push tool retainer of the Model DH 22PB eliminates the need for sliding the grip to mount the bit (sliding the grip is required at removal of the bit).

4-1-4. Push-button type forward-reverse changeover switch

The Model DH 22PB is equipped with the push-button type forward-reverse changeover switch that is more convenient and reliable than the lever-type switch of the current Model DH 24PB.

5. SPECIFICATIONS

5-1. Specifications

Model		DH 22PB																						
Capacity	Concrete	3.4 – 22 mm (1/8" – 7/8")																						
	Steel	13 mm (1/2")																						
	Wood	32 mm (1-1/4")																						
Power source		AC single phase 50 Hz or 60 Hz																						
Voltage, current and input		<table border="1"> <tr> <td>Voltage (V)</td> <td>110</td> <td>120</td> <td>220</td> <td>230</td> <td>240</td> </tr> <tr> <td>Current (A)</td> <td>5.9</td> <td>5.4</td> <td>3.0</td> <td>2.8</td> <td>2.7</td> </tr> <tr> <td>Input (W)</td> <td colspan="5">620</td> </tr> </table>					Voltage (V)	110	120	220	230	240	Current (A)	5.9	5.4	3.0	2.8	2.7	Input (W)	620				
Voltage (V)	110	120	220	230	240																			
Current (A)	5.9	5.4	3.0	2.8	2.7																			
Input (W)	620																							
Rotation speed	No-load	Forward: 0 to 1,050 min ⁻¹ , Reverse: 0 to 640 min ⁻¹																						
	Full-load	0 to 790 min ⁻¹																						
Full-load blow		0 to 4,400 min ⁻¹																						
Type of motor		AC single-phase commutator motor																						
Type of switch		Speed control switch with reversing switch																						
Type of handle		Gun-type handle of main body and side handle																						
Enclosure		Housing } Glassfiber reinforced polyamide resin (green) Handle cover } Gear cover Glassfiber reinforced polyamide resin (black)																						
Weight	Net*	2.3 kg (5.1 lbs.)																						
	Gross	4.4 kg (9.7 lbs.)																						
Packaging		Plastic case																						
Standard accessories		(1) Plastic case 1 (2) Side handle 1 (3) Depth gauge 1																						

* Weight excludes cord and side handle.

5-2. Optional Accessories

A. Drilling anchor holes (rotation + hammering)

- Drill bit (slender shaft)

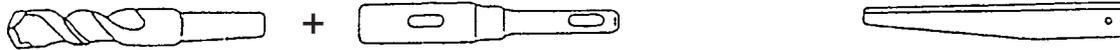


(1) Drill bit (slender shaft)

(2) Adapter for slender shaft
(SDS-plus shank)

Drill bit (slender shaft)				Adapter for slender shaft
Outer dia. (mm)	Effective length (mm)	Overall length (mm)	Code No.	Code No.
3.4 (1/8")	45 (1-25/32")	90 (3-17/32")	306369	306370
3.5 (9/64")	45 (1-25/32")	90 (3-17/32")	306368	

- Drill bit (taper shank)



(1) Drill bit (taper shank)

(2) Taper shank adapter
(SDS-plus shank)

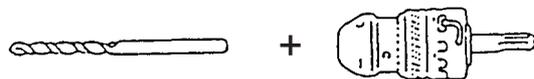
(3) Cotter

(1) Drill bit (taper shank)		(2) Taper shank adapter		(3) Cotter
Outer dia. (mm)	Code No.	Type	Code No.	Code No.
11 (7/16")	944460	Morse taper No. 1	303617	944477
12.3 (31/64")	944461			
12.7 (1/2")	993038			
14.3 (9/16")	944462			
14.5 (73/128")	944500			
17.5 (11/16")	944463	Morse taper No. 2	303618	
21.5 (27/32")	944464			

Part name	Code No.	
A-taper	303619	Taper shank adapter (A-taper or B-taper) is provided as an optional accessory, but drill bit is not provided.
B-taper	303620	

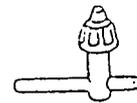
- 13 mm hammer drill chuck

For drilling operations when using a straight shank bit for impact drilling with a rotary hammer



(Straight-shank bit for
impact drills)

13 mm (1/2") hammer drill
chuck (SDS-plus shank)



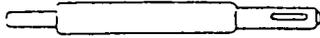
Chuck wrench

Part name	Code No.
13 mm (1/2") hammer drill chuck (Including chuck wrench)	303332
Chuck wrench	303334
Rubber cap	303335

B. Anchor setting

- Anchor setting bar to permit anchor setting operation with the rotary hammer

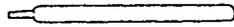
Anchor setting bar



Anchor setting adapter (SDS-plus shank)

Part name	Overall length	Code No.	Part name	Overall length	Code No.
W-1/4 Anchor setting adapter-A	260	302976	W-1/4 Anchor setting adapter-B	260	302979
W-5/16 Anchor setting adapter-A	260	302975	W-5/16 Anchor setting adapter-B	260	302978
W-3/8 Anchor setting adapter-A	160	303621	W-3/8 Anchor setting adapter-B	160	303622
W-3/8 Anchor setting adapter-A	260	302974	W-3/8 Anchor setting adapter-B	260	302977
Internal cone type			External cone type		

- Anchor setting bar for manual anchor setting



+

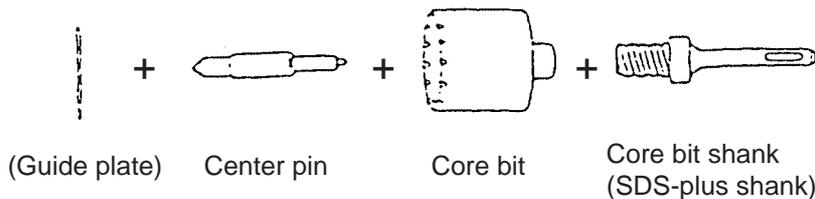


Anchor setting adapter

Part name	Code No.	Part name	Code No.
W-1/4 Anchor setting adapter-A	971794	W-1/4 Anchor setting adapter-B	971799
W-5/16 Anchor setting adapter-A	971795	W-5/16 Anchor setting adapter-B	971800
W-3/8 Anchor setting adapter-A	971796	W-3/8 Anchor setting adapter-B	971801
W-1/2 Anchor setting adapter-A	971797	W-1/2 Anchor setting adapter-B	971802
W-5/8 Anchor setting adapter-A	971798	W-5/8 Anchor setting adapter-B	971803
Internal cone type		External cone type	

C. Large hole boring (rotation + hammering)

- Center pin, core bit, core bit shank and guide plate



(1) Center pin (Do not use bit with outer diameter of 25 mm (31/32") and 29 mm (1-5/32"))

Center pin (A)	Core bit (outer diameter) 32, 35, 38 mm (1-1/4", 1-3/8", 1-1/2")	Code No. 982684
Center pin (B)	Core bit (outer diameter) 45, 50 mm (1-25/32", 2")	Code No. 982685

(2) Guide plate

Core bit (outer diameter) (mm)	Code No.	Core bit (outer diameter)	Code No.
32 (1-1/4")	982686	50 (2")	982690
35 (1-3/8")	982687		
38 (1-1/2")	982688		
45 (1-25/32")	982689		

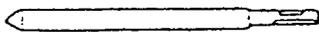
(3) Core bit with guide plate (The guide plate is not equipped with core bit with outer diameter of 25 mm (31/32") and 29 mm (1-5/32").)

Outer diameter (mm)	Code No.	Outer diameter (mm)	Code No.
25 (31/32")	982672	45 (1-25/32")	982677
29 (1-5/32")	982673	50 (2")	982678
32 (1-1/4")	982674		
35 (1-3/8")	982675		
38 (1-1/2")	982676		

(4) Core bit shank (SDS-plus shank)

Core bit shank (A)	Core bit (outer diameter) 25 - 38 mm (31/32" – 1-1/2")	Overall length 105 mm (4-1/8")	Code No. 303625
		Overall length 300 mm (11-52/64")	Code No. 303626
Core bit shank (B)	Core bit (outer diameter) 45 - 50 mm (1-25/32" – 2")	Overall length 300 mm (11-52/64")	Code No. 303627

D. Crushing operation (rotation + hammering)



Bull point (round type only)
(SDS-plus shank)

Code No. 303046

E. Bolt placing operation with chemical anchor (rotation + hammering)

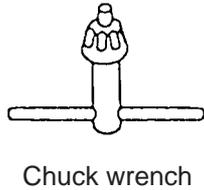
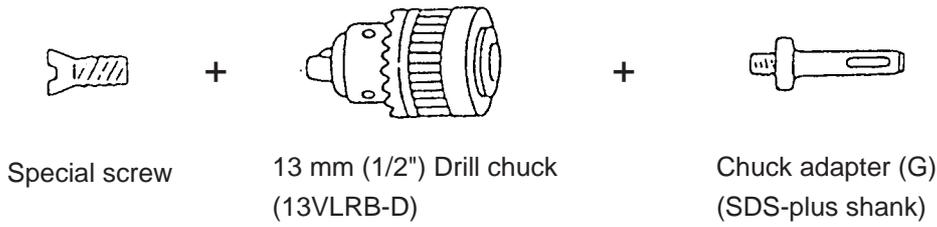


(Standard socket on the market) 12.7 mm (1/2") Chemical anchor adapter (SDS-plus shank)
19 mm (3/4") Chemical anchor adapter (SDS-plus shank)

Part name	Code No.
12.7 mm (1/2") Chemical anchor adapter	303044
19 mm (3/4") Chemical anchor adapter	303045

F. Drilling hole and driving screw (rotation only)

- Drill chuck, chuck adapter (G), special screw and chuck wrench



(Note)

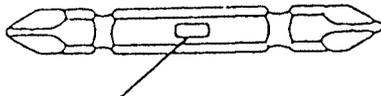
If the tool is to be used for loosening screws, open the three jaws of the drill chuck and securely fix the drill chuck to chuck adapter (G) with the special screw (a left-hand threaded M6 screw) when mounting the drill chuck onto chuck adapter (G).

	Part name	Code No.
a.	Chuck adapter (G) for SDS-plus shank system	303623
b.	13 mm (1/2") Drill chuck 13VLR (with chuck wrench)	321814
c.	Special screw (M6 left-hand threaded)	981122

(1) Cross-recessed head (Phillips) bit

[Overall length: 70 mm]

(For use with cross-recessed head (Phillips) screw)

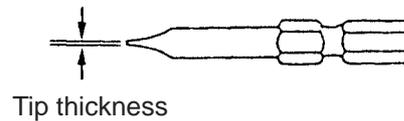


Bit No.	Code No.	Applicable screw dia. (mm)
No. 2	955654	4 – 5
No. 3	955655	6 – 8

(2) Slotted-head (minus) bit

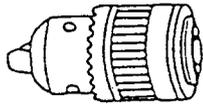
[Overall length: 50 mm]

(For use with slotted-head (minus) screw)



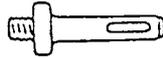
Bit tip thickness	Code No.	Applicable screw dia. (mm)
0.8	955658	4
1	955673	5 – 6

G. Drilling hole (rotation only) ... For drilling holes in steel and wood

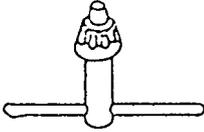


Drill chuck (13VLD-D)

+



Chuck adapter (D)
(SDS-plus shank)



Chuck wrench

(NOTE)

The 13VLA drill chuck and chuck adapter (D) cannot be used for reverse rotation. If reverse rotation is to be used for loosening screws, use the plus bit (Bit. No. 2), described below, by attaching it directly to chuck adapter (D).

Part name	Code No.
Chuck adapter (D) (for SDS-plus shank type)	303624
13 mm (1/2") Drill chuck 13VLD-D (with chuck wrench)	321813

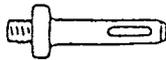
H. Driving screws (rotation only)

- Plus driver bit [overall length: 25 mm] (for cross-recessed head screw)



Bit No.

+



Chuck adapter (D)
(SDS-plus shank)

Bit No.	Screw size	Code No.
No. 2	3 – 5 mm	971511Z
No. 3	6 – 8 mm	971512Z

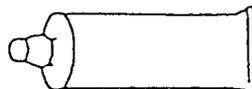
I. Grease for electric impact drill

- Containing 500 g (1.1 lbs.): Code No. 980927



- Containing 30 g (0.07 lbs.): Code No. 981840

70 g (0.15 lbs.): Code No. 308471



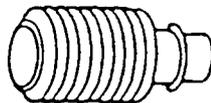
J. Dust cup, dust collector (B)

Dust cup



Code No. 971787

Dust collector (B) ass'y



Code No. 306885

6. COMPARISONS WITH SIMILAR PRODUCTS

6-1. Specification Comparisons

Item		Maker • Model	HITACHI DH 22PB	B	C	D
Capacity	Concrete	mm	22 (7/8")	22 (7/8")	20 (15/16")	20 (15/16")
	Steel	mm	13 (1/2")	13 (1/2")	13 (1/2")	13 (1/2")
	Wood	mm	32 (1-1/4")	30 (1-3/16")	32 (1-1/4")	20 (51/64")
Input		W	620	500	710	600
No-load rotation speed		min ⁻¹	0 – 1,050	0 – 1,100	0 – 1,050	0 – 1,100
Full-load impact rate		min ⁻¹	0 – 4,400	0 – 3,900	0 – 4,050	0 – 4,600
Weight		kg	2.3 (5.1 lbs.)	2.3 (5.1 lbs.)	2.3 (5.1 lbs.)	2.4 (5.3 lbs.)
Dimension	Length	mm	351 (13-13/16")	332 (13-5/64")	352 (13-55/64")	344 (13-35/64")
	Height	mm	198 (7-51/64")	208 (8-3/16")	197 (7-3/4")	200 (7-7/8")
	Width	mm	69 (2-23/32")	87 (3-27/64")	76 (3")	79 (3-7/64")
Function	Forward-reverse changeover switch		○ (Push-button type)	○ (Lever-type)	×	○ (Lever-type)
	Tool retainer		One-push type	One-push type	One-push type	Round type
	Changeover modes		2 modes	2 modes	2 modes	2 modes
Full-load vibration level		dB (VL)	119	120	118	120
Full-load noise level		dB (A)	92	90	87	91

Note 1) Mark "○": Equipped Mark "×": Not equipped

2) Weight excludes cord and side handle.

6-2. Drilling Speed Comparison

Drilling speed varies considerably depending on the work conditions. Use the factory test results shown in Fig. 1 for comparison purpose only.

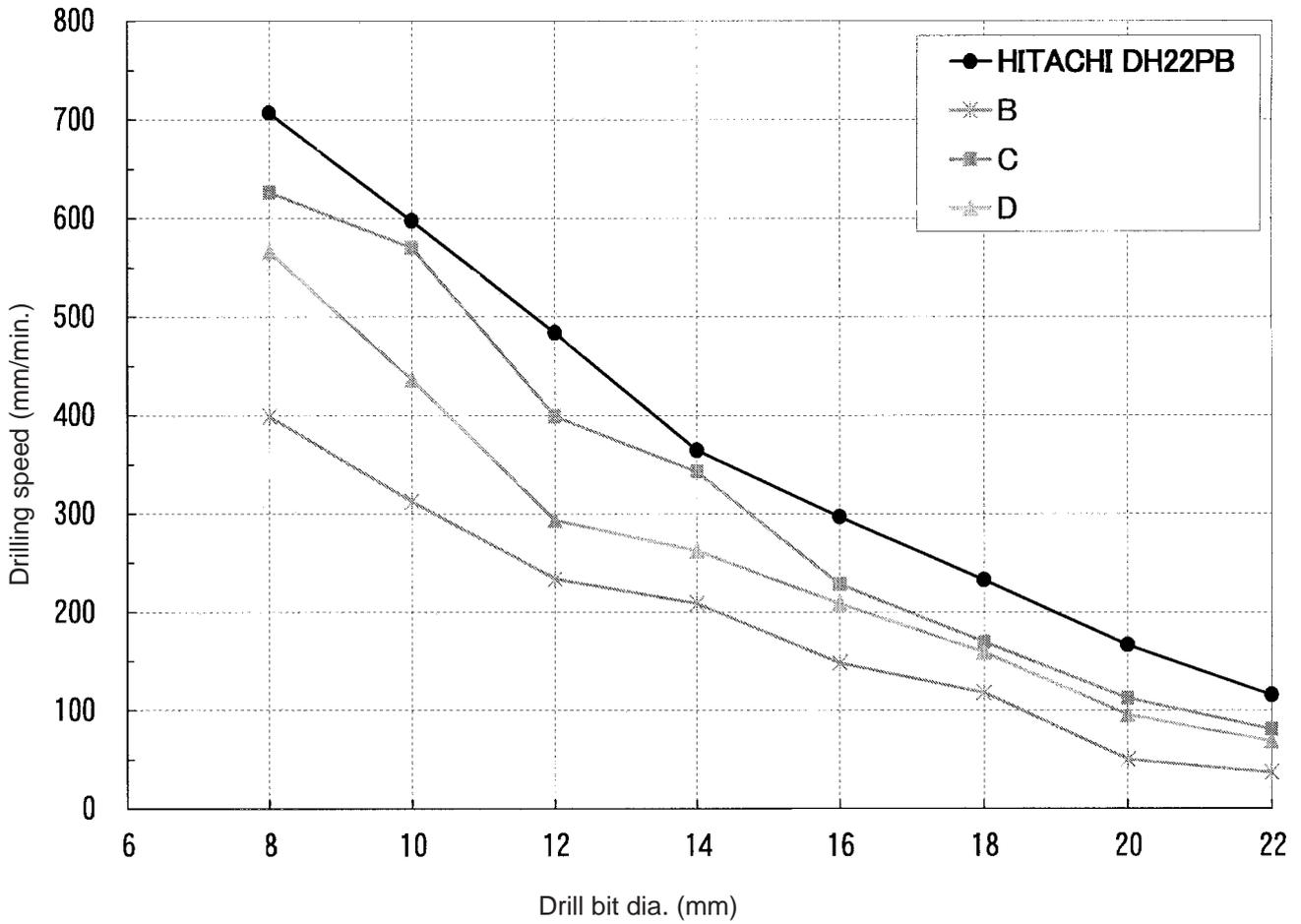


Fig. 1

[Test conditions]

- Direction : Downward drilling
- Pushing force : 98 N (10 kgf)
- Test material : Concrete panel with a compression strength of 2,352 N/cm² (240 kgf/cm²)

7. PRECAUTIONS IN SALES PROMOTION

In the interest of promoting the safest and most efficient use of the Model DH 22PB Rotary Hammer 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 Caution Plate 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 safety hazards, the dangers inherent in the use of any electric power 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 Rotary Hammer 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 Model DH 22PB unit is provided with a Caution Plate (illustrated below) which lists basic safety precautions in use. Carefully ensure that the customer fully understands and follows these precautions before using tool.

For Australia and New Zealand

CAUTION
● Read thoroughly **HANDLING INSTRUCTIONS**
before use.

For the U. S. A. and Canada

-WARNING- ● To reduce the
risk of injury, user must read and
understand instruction manual.
AVERTISSEMENT ● Afin de réduire le risque
de blessures, l'utilisateur doit
lire et bien comprendre le mode d'emploi.

For Taiwan

注意
● 使用前請詳讀使用說明書

8. REFERENCE MATERIAL

8-1. Lubrication

It is not necessary to replenish the grease lubricant unless the tool is disassembled or there is grease leakage due to a defective seal. Special grease is used in the striking section. Should the striking section (within the gear cover) be disassembled, carefully remove the old grease from all parts and, on reassembly, insert 50 g (1.8 oz) of new grease into the gear cover and 10 g (0.4 oz) into the groove of the inner cover. Be careful not to exceed the designed amount of grease. Excessive grease will reduce striking efficiency.

Apply Molub Alloy No. 777-1 grease to the outer circumference of the clutch groove and the pin portion of the change lever.

8-2. Tool Structure

While the structure is essentially the same as the Model DH 24PB, the descriptions below are included to enhance your understanding of the tool and its mechanisms.

- Transmission of rotation

Unlike conventional rotary hammers, the armature shaft in the Model DH 22PB is in parallel with the tool shaft - the same structure that is employed in most impact drills. This structure was adopted in order to make the Model DH 22PB more compact for easier handling and operability. Thus, the appearance of the Model DH 22PB is similar to that of an impact drill. The rotation of the armature is transmitted to the second shaft via the first gear, and causes it to rotate. The second pinion provided on the second shaft engages the second gear mounted on the outer circumference of the cylinder. The cylinder is coupled to the second gear by means of a slip mechanism, and they rotate together. The end of the cylinder also functions as the drill bit retainer. The cylinder is key-connected to the inserted drill bit by means of two key rails, and transmits rotation to the drill bit. A steel ball is used to prevent the bit from falling.

- Piston reciprocating mechanism

In conventional rotary hammers, a piston is caused to reciprocate by a connecting rod and crank shaft, and the crank shaft and the cylinder axis are at right angle to each other. Accordingly, the armature shaft and the cylinder axis are at a right angle to each other. In the Model DH 22PB, through adoption of a spiral drive system (a mechanism using a reciprocating bearing), a more compact design has been achieved by arranging the armature shaft in parallel with the cylinder axis. Referring to Fig. 2, the rotation of armature is transmitted to the second shaft via the first gear. The second shaft rotation is further transmitted through a spline to the clutch, which engages with a reciprocating bearing and causes it to rotate. However, as illustrated, circular grooves on the inner race of the reciprocating bearing are positioned on an angle of inclination with relation to the second shaft. The rotation of the inner race and the shaft causes that angle of inclination to change regularly forward and back with relation to the second shaft, and produces a rocking motion to the outer race of the reciprocating bearing. Finally, a rod extending from the outer race of the reciprocating bearing is connected to the piston by a piston pin, and causes the reciprocating motion of the piston.

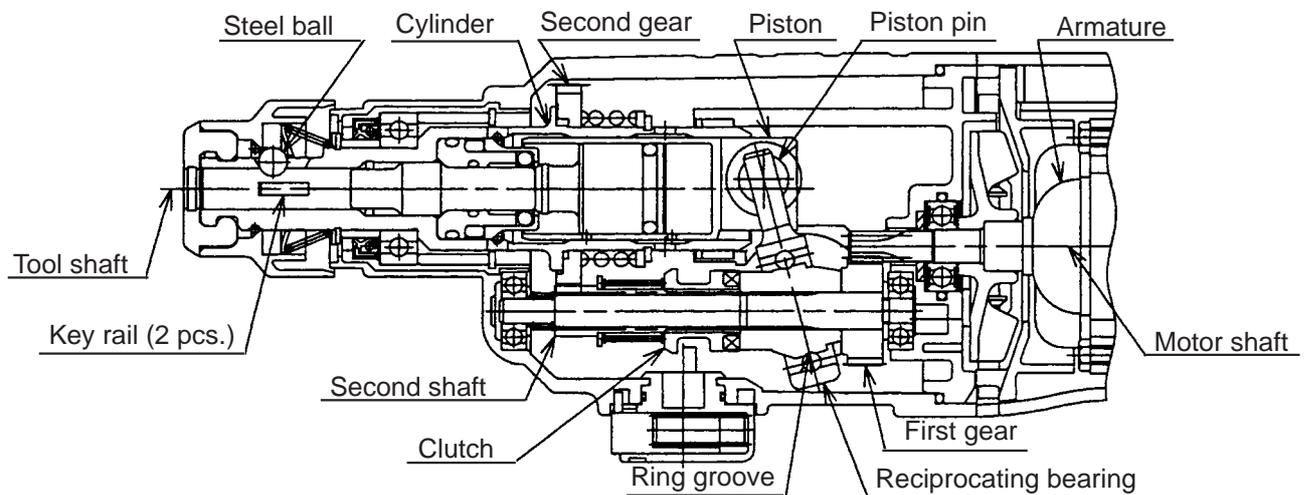


Fig. 2

- Hammering function

The piston reciprocated within the cylinder to move the striker in the same manner as in conventional rotary hammers. As the piston reciprocates, the changing air pressure inside the air chamber between the piston and the striker causes the striker to move and continuously strike against the end of the second hammer. At the same time, the changing air pressure within the air chamber which moves the striker also provides an "air cushion" which absorbs the impact of the hammering action. As air leakage from the air chamber would weaken the air-cushion effect and reduce impact absorption, the O-ring (mounted on the striker) is extremely important to seal the air. Although special rubber material is utilized in construction of the O-ring to make its effective service life as long as possible, wear cannot be fully avoided. Accordingly, it is recommended that the O-ring be replaced approximately once a year, depending on the frequency of usage of the tool.

- Idle hammering prevention mechanism

The idle hammering prevention mechanism in the Model DH 22PB is different from that of conventional rotary hammers. When the drill bit is lifted from the concrete surface on completion of drilling, the second hammer moves to the position indicated by the continuous lines in Fig. 3, and the protruding (lip) portion at the tip of the striker is gripped by O-ring (C) mounted between the hammer holder and the damper holder. In this state, should the piston continue to move so that the small piston respiratory hole is blocked by the inner wall of the cylinder, the air in the air chamber will pass through the large piston respiratory hole and be released through the air-escape slot and large cylinder respiratory hole provided on the inner wall of the cylinder. Accordingly, there is no change in the air pressure within the air chamber, and movement of the striker (idle hammering operation) is prevented. The gripping force of O-ring (C) on the striker is so small in comparison with the conventional mouth system that practically no pressing force at all is required to restart the hammering operation.

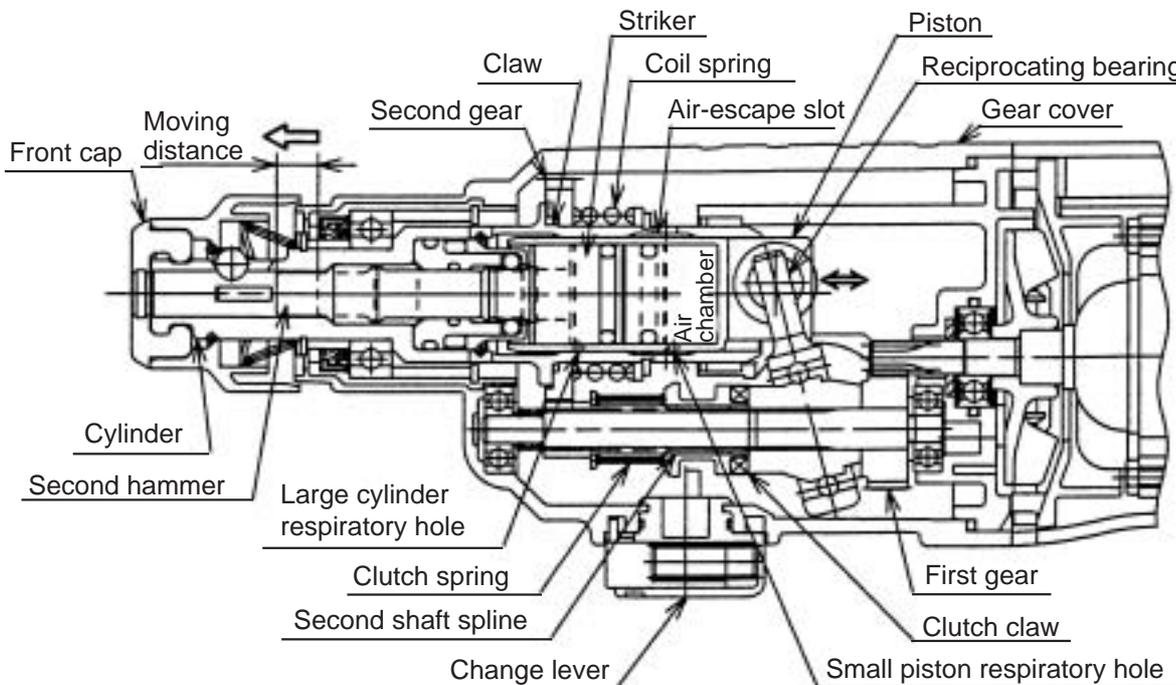


Fig. 3

- Slip mechanism

The slip mechanism in the Model DH 22PB consists of a coil spring which applies a pre-set amount of pressure to ensure the interlocking of three claws provided on the flange of the cylinder (the final rotating shaft) and three matching claws provided on the face of the second gear, by which rotation is transmitted to the cylinder. The second gear is fitted to the cylinder with a certain amount of play.

If an excessively large torque is applied to the tool shaft (cylinder), the force of the torque will exceed the pressure of the coil spring and cause the claws on the second gear to disengage from and ride over the claws on the cylinder so that the second gear idles and does not transmit rotation. Even should the drill bit come in contact with a reinforcing bar within the concrete, causing sudden excessive torque, the slip mechanism functions to prevent damage to the gears, and possible loss of control of the tool by the operator.

- Sealed and dustproof construction

The gear cover is totally enclosed by oil seals, O-rings and other devices to prevent leakage of lubricating grease, and to keep dust and dirt out of the internal mechanisms. The drill bit chuck portion is protected by a rubber front cap to keep out dust and chips which could cause improper fitting of the drill bit and/or other faulty operation of the chuck portion. The speed control switch is also a fully dust-proofed type to prevent dust and chips from entering the handle section and causing possible operational trouble or a break down of the insulation.

- Speed control

The Model DH 22PB is equipped with a variable speed control switch which permits free change of the rotation speed and hammering force. When drilling in fragile materials, pull the switch trigger gently for low rotation speed (hammering force) to achieve optimum results. Note that the switch trigger cannot be pulled to the full but up to the half in the reverse drilling, and the speed is about half of the forward drilling. In addition, the switch stopper cannot be used in the reverse drilling.

8-3. "Rotation Only" and "Rotation + Hammering" Changeover Mechanism

The change lever on the Model DH 22PB permits quick and easy changeover between the "Rotation Only" and "Rotation + Hammering" functions. When operating the change lever, be sure to continue pressing the pushing button. Armature rotation is transmitted to the second shaft and first gear, and then to the clutch via the spline on the second shaft spline. Claws on the surface of the clutch engage matching claws on the reciprocating bearing to convert the rotation into reciprocating motion. The clutch can travel back and forth on the second shaft. Claws on the surface of the clutch is pressed against on the reciprocating bearing by the force of the clutch spring during usual operation ("Rotation + Hammering"). The reciprocating bearing is fitted on the second shaft with some play. When the change lever is set to the "Rotation Only" ( mark) position, the eccentric pin of the change lever forces the clutch to move against the pressure of the clutch spring in the direction of the front cap, so that it disengages from the claws on the reciprocating bearing, and the reciprocating bearing stops rotating on the second shaft. When the change lever is returned to the "Rotation + Striking" ( mark) position, the force of the clutch spring presses the clutch back against the reciprocating bearing so that the claws engage to transmit rotation to the reciprocating bearing once more.

8-4. "Rotation Only" (no hammering)

The Model DH 22PB is equipped with a change lever for changeover between "Rotation + Hammering" and "Rotation Only" functions, merely mounting the chuck adapter will not stop the hammering action; it is absolutely necessary to turn the change lever to the "Rotation Only" setting for drilling or driving screws. Should the change lever be set to the "Rotation + Hammering" position when the tool is used for drilling, the hammering action may cause the drill chuck to be broken or damaged. Sales personnel should carefully ensure that the buyer is thoroughly advised on this point.

8-5. Drill Bits

The chuck section is designed exclusively for the popular and widely available SDS-plus shank bits, as shown in Fig. 4. Rotating torque is transmitted to the drill bit by two key rails provided in the tool holding section. A steel ball is used to prevent the bit from falling out.

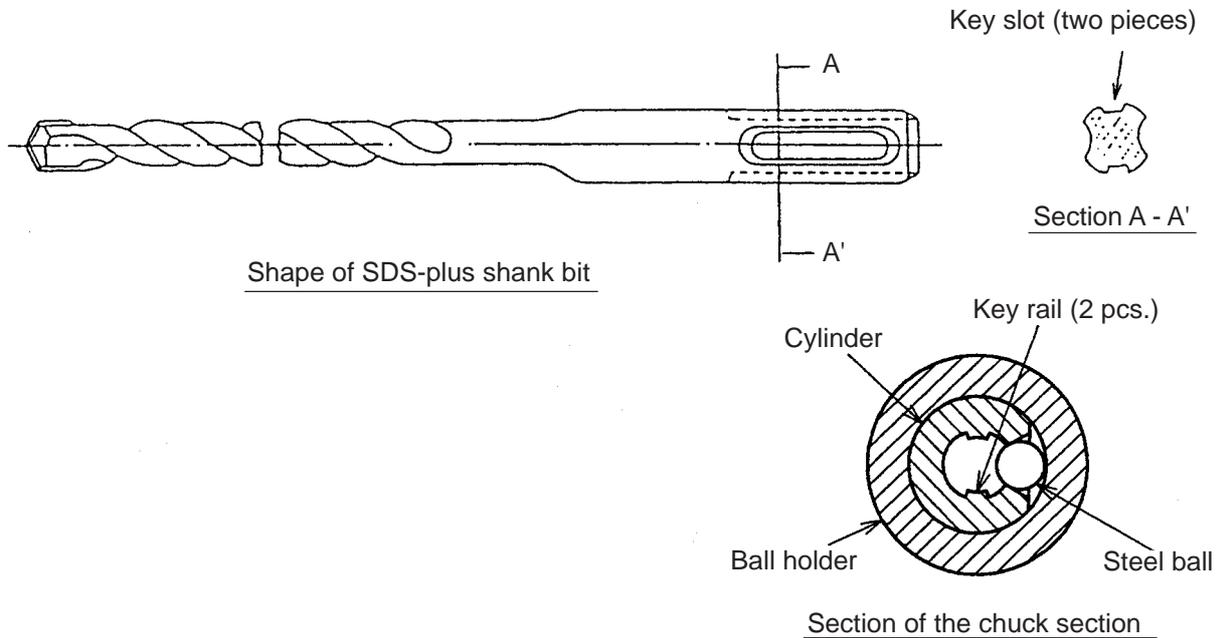


Fig. 4

The service life of a drill bit with a diameter of 8 mm is approximately 300 holes when drilling into concrete with a depth of 30 mm. If reground before the end of its service life, the drill bit will continue to provide efficient drilling. Figure 5 shows the regrinding angle.

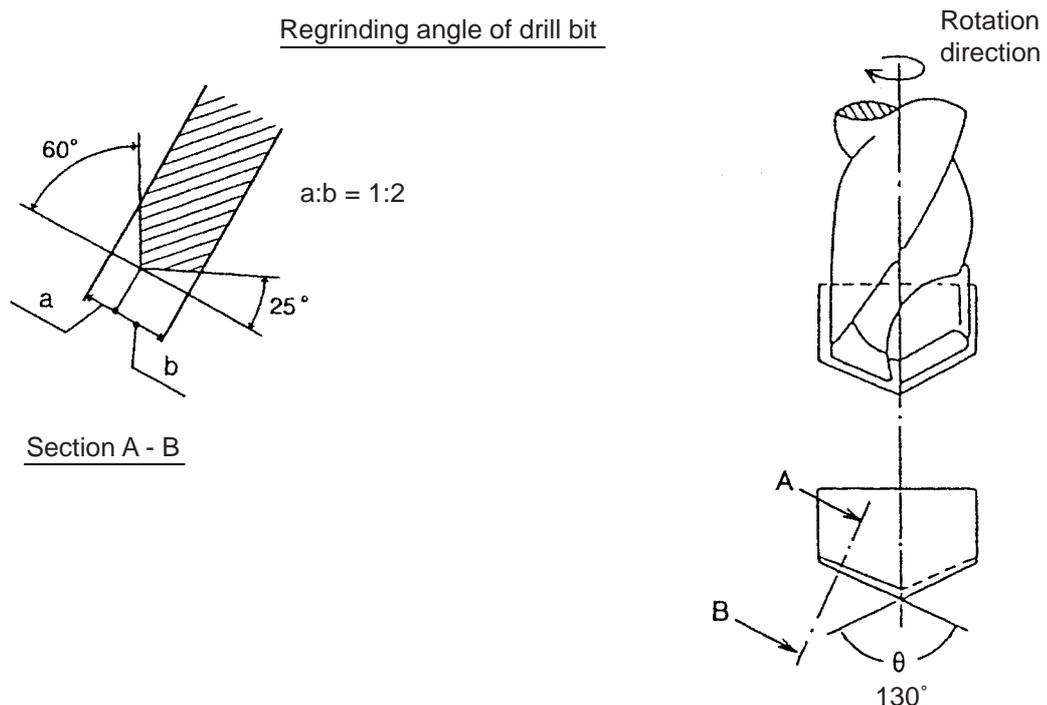


Fig. 5

8-6. Chuck Section

The tool retainer is structured as shown in Fig. 6.

The tip of the tool retainer is covered with the front cap (made of rubber) to prevent dust and chips from getting inside. The steel ball falls into the round groove of the bit to prevent the tool from coming off and the two key rails transmit the rotation torque.

To mount the bit, push the bit in the tool retainer as far as it will go. Pushing lightly, turn the bit until it is caught. At this position, push the bit in as far as it will go (sliding the grip is not required for mounting the bit). To remove the bit, slide the grip backward to the full and remove the bit.

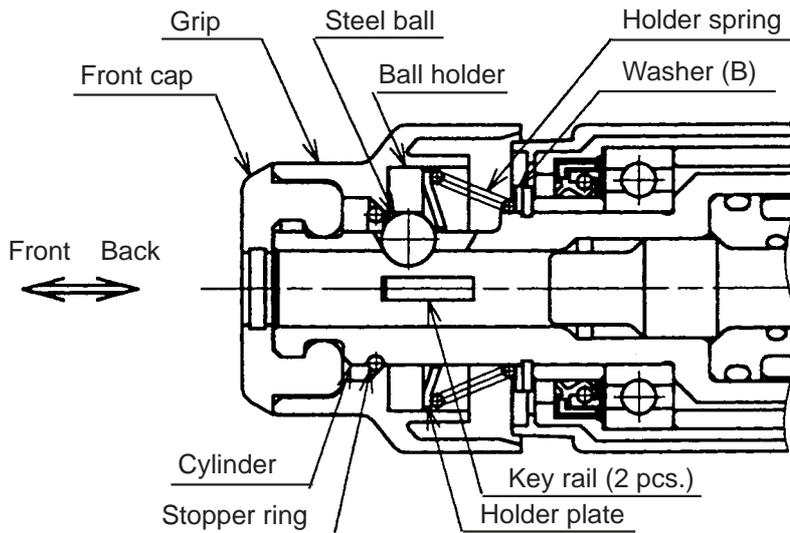


Fig. 6

8-7. Dust Collector (B)

When drilling holes overhead, dust collector (B) can be mounted on the Model DH 22PB to prevent dust and chips from falling downward. Dust collector (B) is intended solely for use when drilling holes in concrete, and cannot be used for drilling holes in steel or wood. It is designed for use with drill bits with overall length of 166 mm, 160 mm and 110 mm, and cannot be used with any longer bits. When using a drill bit with an overall length of 166 mm with dust collector (B), drilling up to a depth of approximately 72 mm is possible. When using dust collector (B), ensure it is securely fastened to the grip on the main body with socket adapter (B). Although the socket and socket adapter (B) rotate together with the tool shank, there is a steel ball between the outer race and the socket which serves as a ball bearing. Should the dust cover be forced against the concrete surface, it will not rotate even though the tool shank continues to rotate. Should the tool be operated when the dust cover is not being held against a concrete surface, inertia may cause dust collector (B) to become disconnected from the grip.

Accordingly, caution the customer to press dust collector (B) and drill bit firmly against the concrete surface before turning on the switch to start drilling.

When dust collector (B) is used, almost no dust and chips are scattered about. However, since the chips and dust remaining in the collector may scatter after completion of the drilling operation, the customer should be advised to always wear protective glasses.

When dust collector (B) is disassembled for repair or maintenance, be very careful to prevent oil or grease from adhering to the steel balls. Grease or oil on the steel balls may cause concrete dust to enter the unit and cause defective rotation.

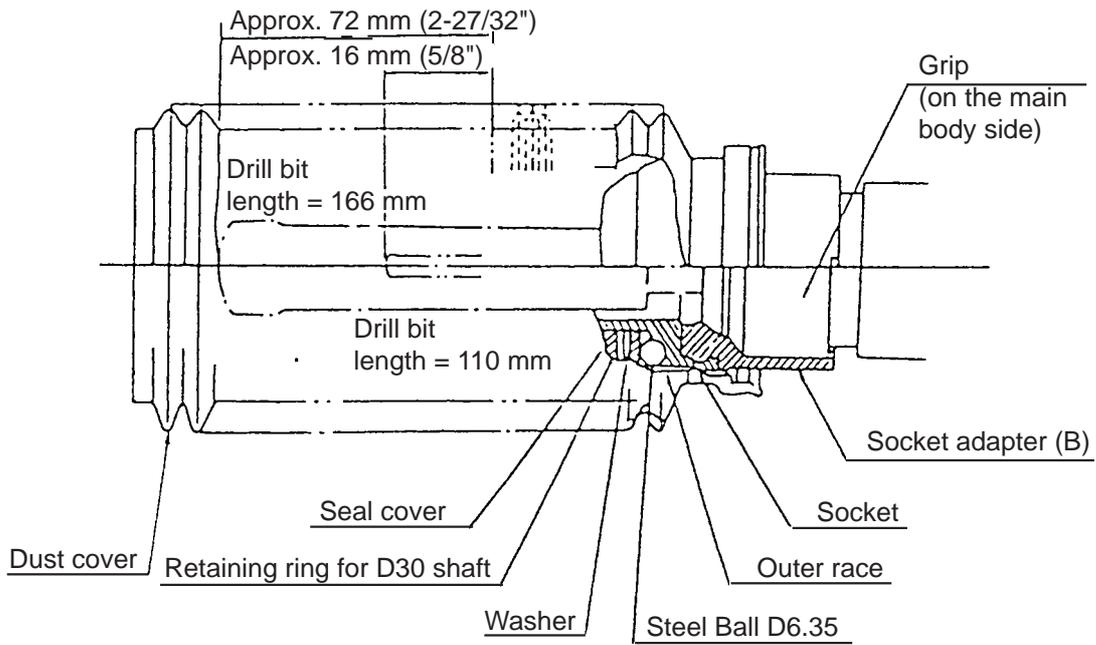


Fig. 7 Dust collector (B) structure

9. PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY

The numbers in **[Bold]** correspond to the item numbers in the Parts List and exploded assembly diagrams.

9-1. Disassembly

(1) Disassembly of the striking mechanism section

Push in the Second Hammer **[27]** with a drill bit or a screwdriver. Remove the Striker **[35]** chucked by O-ring (C) **[32]**. Push the Pushing Button **[12]** fully when the Change Lever **[14]** is positioned "Rotation Only" (⚙️ mark) as shown in Fig. 8. Then turn the Change Lever **[14]** by 135° clockwise. Ply out the Change Lever **[14]** at this position. Remove the Tapping Screw (W/Flange) D5 x 35 **[9]** from the Gear Cover **[10]** and remove the Gear Cover **[10]**.

The Inner Cover **[39]** and the Housing **[62]** are loosely fitted together. Attempting to pull them out first could cause the Armature **[57]** to be pulled out at the same time, causing damage to the Carbon Brushes **[66]**.

Remove the Spacer **[42]** and Spring (B) **[43]** from the end of the Second Shaft **[44]**, and turn the Second Shaft **[44]** so that the Piston **[37]** moves to its maximum upper position (inner cover side). The arm of the Reciprocating Bearing **[48]** can then be disconnected from the Piston Pin **[40]**, and the Second Shaft **[44]** and the components mounted on it can be removed from the Inner Cover **[39]** as a unit.

With a bearing puller, remove the First Gear **[49]** from the Second Shaft **[44]**. Then take off the Reciprocating Bearing **[48]**. At this time, carefully note that the First Gear **[49]** must be aligned with and press-fitted onto the 9 mm diameter end of the Second Shaft **[44]**.

The Clutch **[47]**, Clutch Spring **[46]** and Washer (B) **[45]** can then be removed from the Second Shaft **[44]**.

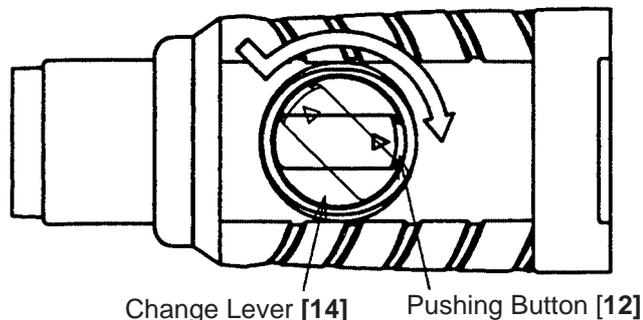


Fig. 8

(2) Disassembly of the tool retainer

Slide the Grip [3] fully in the arrow direction as shown in Fig. 9 and remove the Front Cap [1]. Pulling the Grip [3] as shown in Fig. 10, remove the Stopper Ring [2] with a retaining ring puller. Then the Grip [3], Ball Holder [4], Steel Ball D7.0 [21], Holder Plate [5], Holder Spring [6] and Washer (B) [7] can be removed from the Cylinder [22].

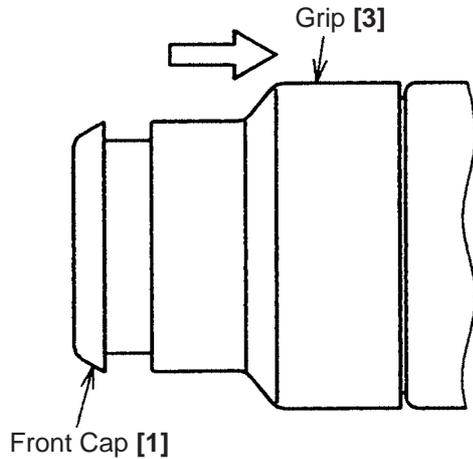


Fig. 9

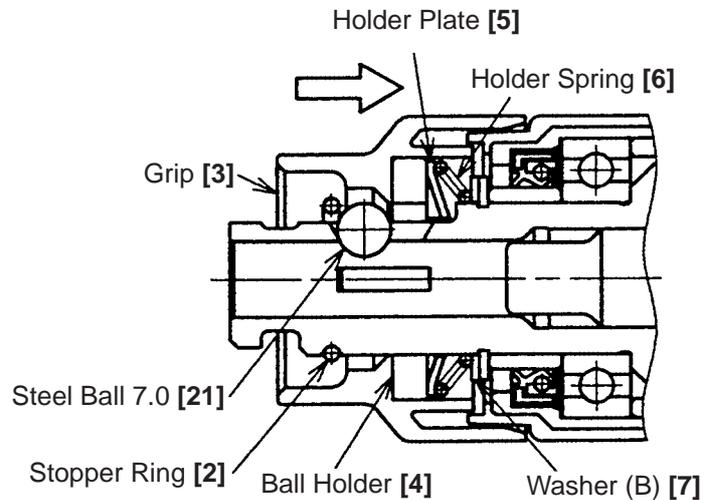


Fig. 10

(3) Disassembly of the cylinder and the second gear (slip mechanism section)

Remove the Gear Cover [10] from the Inner Cover [39] and remove the entire tool retainer. Remove the Retaining Ring for D20 Shaft [8] with a retaining ring puller. Stand the Gear Cover [10] in this state and pull out the Cylinder [22] from the Gear Cover [10] with a hand press. Then the Sleeve [17] can be removed from the Cylinder [22]. Remove the Retaining Ring for D30 Shaft [26] from the Cylinder [22] with a retaining ring puller. Then the Second Gear [23], Spring (A) [24] and Washer (A) [25] can be removed from the Cylinder [22].

(4) Disassembly of the cylinder and the second hammer

Remove the Stopper Ring [34] from the inside diameter portion of the Cylinder [22]. Then the Second Hammer [27], O-ring (1AP-20) [28], Hammer Holder [29], O-ring (B) [30], Damper (A) [31], O-ring (C) [32] and Damper Holder [33] can be removed from the Cylinder [22]. Remove the Stopper Ring [34] from the groove of the inside diameter portion of the Cylinder [22] by tapping the Stopper Ring [34] through the 5-mm diameter hole of the Cylinder [22] with a hammer and a punch as shown in Fig. 11. At reassembly, replace the Stopper Ring [34] with new one as the removed Stopper Ring [34] is deformed. To prevent idle hammering, also replace O-ring (C) [32] with new one at reassembly.

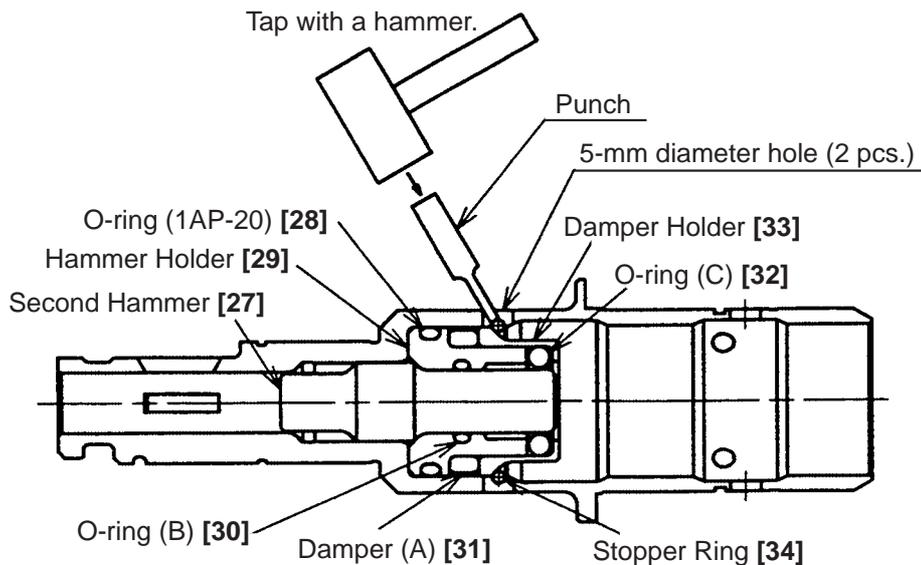


Fig. 11

9-2. Reassembly

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

(1) Application of lubricant

Apply special grease (for hammer and hammer drill) to the O-ring (1AP-20) [28] and O-ring (B) [30] for the Hammer Holder [29], Damper (A) [31], O-ring (C) [32], O-ring (I.D.16) [36] for the Striker [35], outer circumference of the Striker [35], inner and outer circumference of the Piston Pin [40], outer circumference of the Piston [37], Reciprocating Bearing [48], Reciprocating Bearing [48] rotary shaft of the Second Shaft [44], clutch claw of the Cylinder [22], inner circumference of the metal of the Inner Cover [39], Second Hammer [27], and the lip portion of the Oil Seal [16]. Fill 50 g of the special grease in the gear cover and 10 g in the inner cover groove. Apply Molub Alloy No. 777-1 grease to the outer circumference of the Clutch [47] groove and the pin portion of the Change Lever [14]. Apply Hitachi Motor Grease No. 29 to the O-ring (S-18) [15] for the Steel Ball D7.0 [21] and the Change Lever [14].

* Application of Hitachi Motor Grease No. 29 makes it easy to mount the Spacer [42].

(2) Mounting the Change Lever [14]

Push the Pushing Button [12] deeply in the hole of the Change Lever [14]. Position the Change Lever [14] on the Gear Cover [10] as shown in Fig. 12 and push it in firmly. Adjust the Change Lever [14] to the position "Rotation + Hammering" (T mark) or "Rotation Only" (H mark).

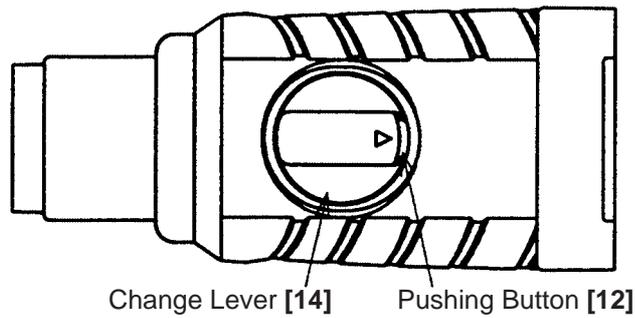


Fig. 12

(3) Press-fitting the first gear

Press-fit the First Gear [49] aligning with the shaft end surface of the Second Shaft [44]. After press-fitting the First Gear [49], check that the inside ring of the Reciprocating Bearing [48] turns smoothly.

(4) Reassembly of the oil seal

Prior to reassembly, apply grease to the inner circumference of the Oil Seal [16]. However, do not apply grease to its outer circumference. Also, when press-fitting the Oil Seal [16], ensure that it is straight and level.

(5) Mounting the piston

Mount the Piston [37] facing its two 2-mm diameter holes to the Second Shaft [44] as shown in Fig. 13.

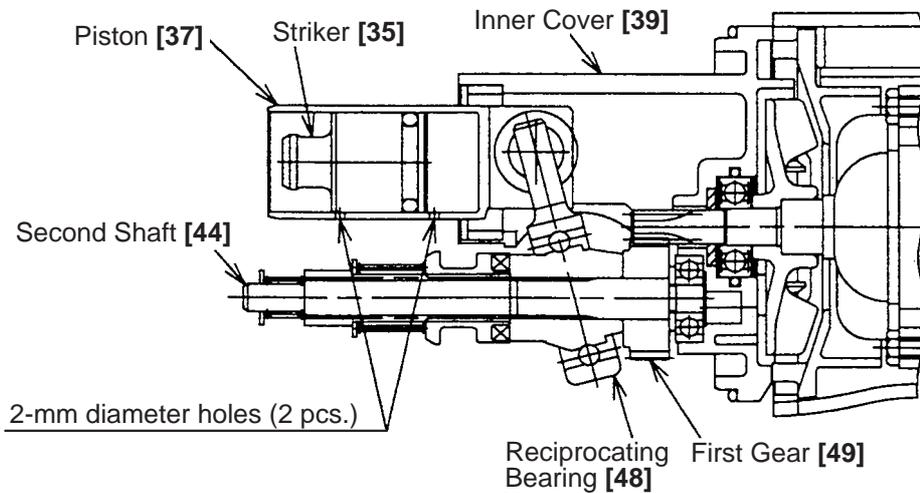


Fig. 13

9-3. Tightening Torque

Tapping Screw D3 x 10 [68]	0.7 ± 0.2 N·m (7.5 ± 1.5 kgf·cm, 6.5 ± 1.3 in-lbs.)
Tapping Screws D4 [59] [79] [80]	2.0 ± 0.5 N·m (20 ± 5 kgf·cm, 17.4 ± 4.3 in-lbs.)
Tapping Screw (W/Flange) D5 x 35 [9]	2.9 ± 0.5 N·m (30 ± 5 kgf·cm, 26.0 ± 4.3 in-lbs.)

9-4. Wiring Diagrams

(1) Products with noise suppressor

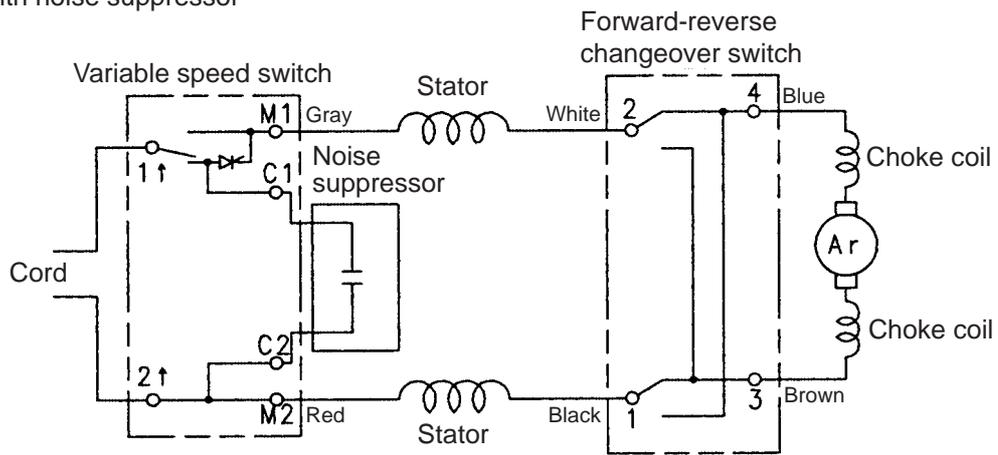


Fig. 14

(2) Products without noise suppressor

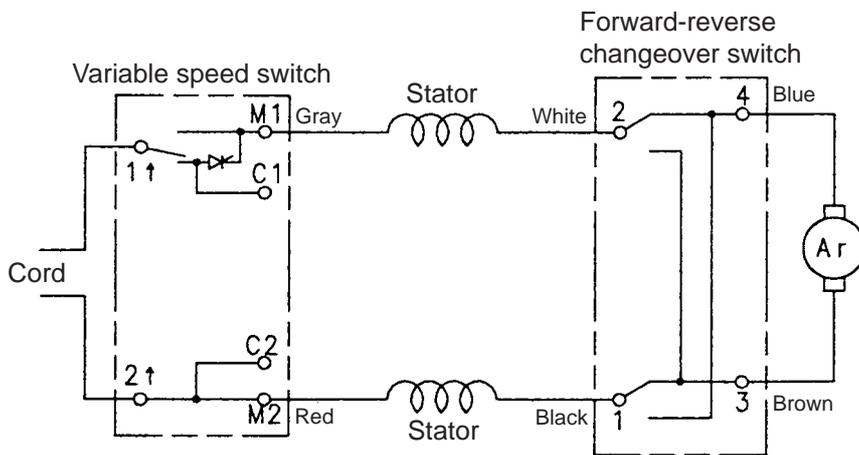


Fig. 15

9-5. Internal Wire Arrangement and Wiring Work

A. Internal wire arrangement

(1) Product with noise suppressor

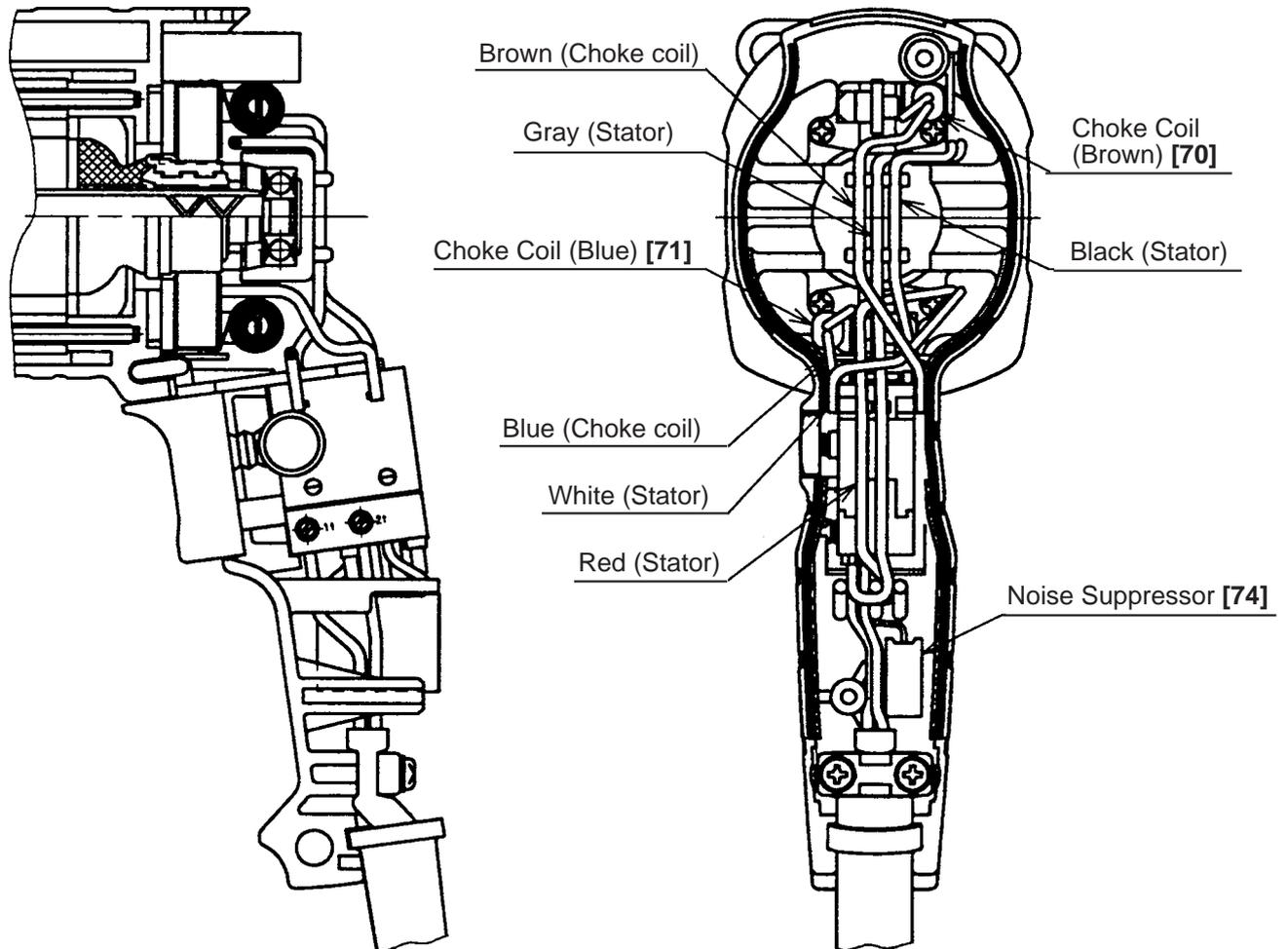


Fig. 16

(2) Product without noise suppressor

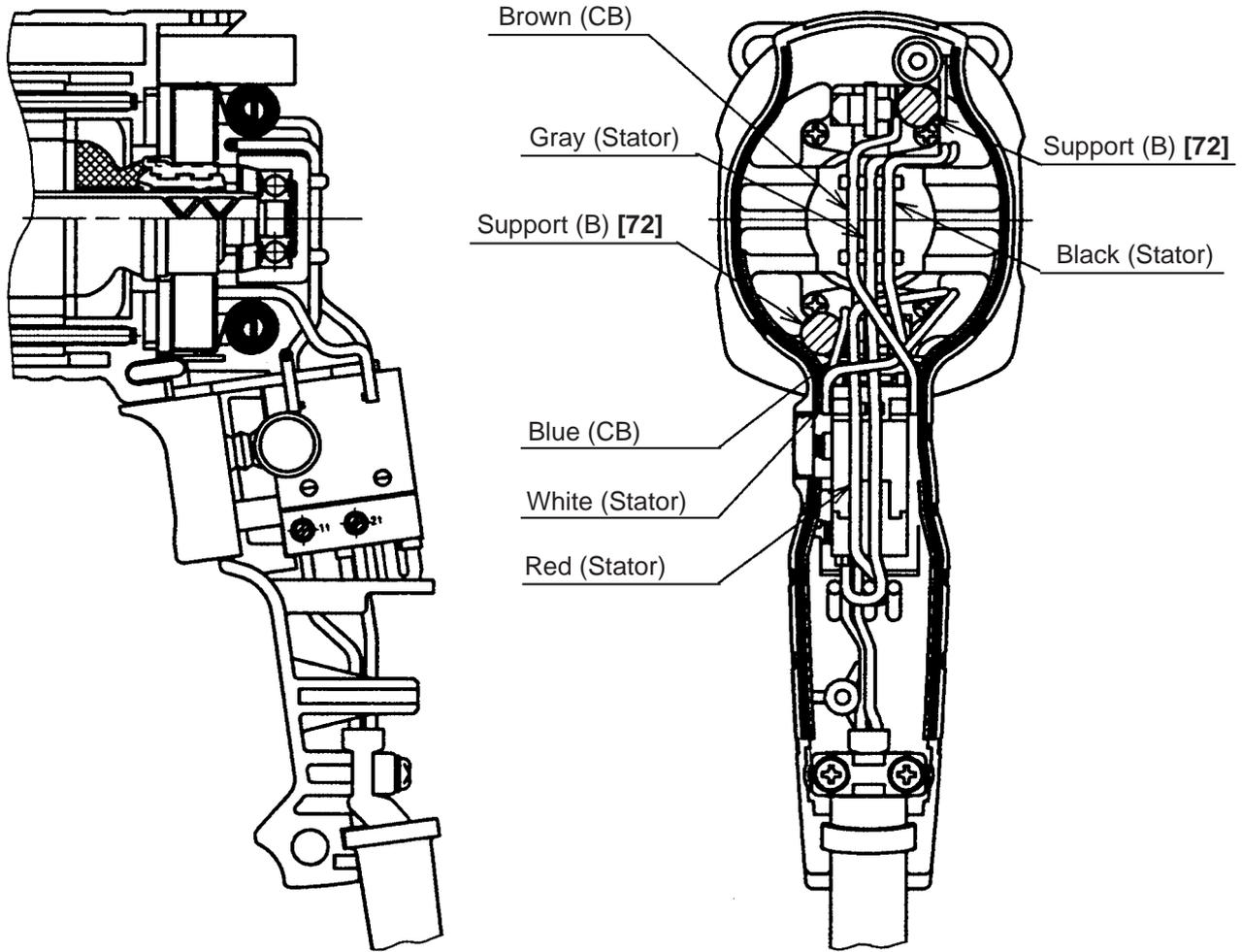


Fig. 17

B. Additional wiring work

General internal wiring can be accomplished by referring to paragraphs 9-4 and 9-5-A. The following are special instructions for switch connection.

(1) Wiring of reversing switch

Insert the lead wire (black) coming from the stator into the terminal (1) of the reversing switch, and the lead wire (white) into the terminal (2) as shown in Fig. 21. Insert the lead wire (brown) coming from the carbon brush or choke coil into the terminal (3) and the lead wire (blue) into the terminal (4). After the insertion, pull each lead wire slightly to check the lead wires do not come off. To disconnect the lead wires, insert a small flat-blade screwdriver into the windows near the terminals and pull out the lead wires.

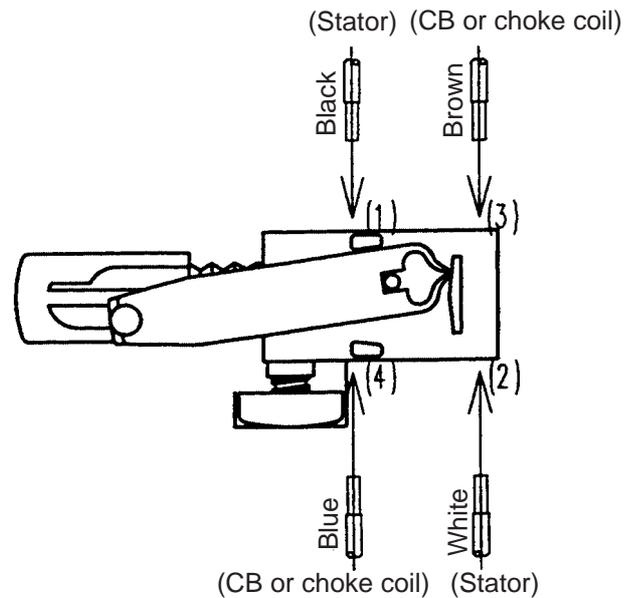


Fig. 18 Wiring of reversing switch

(2) Wiring of speed control switch

Insert each cord into the terminal 1† and terminal 2† of the speed control switch as shown in Fig. 22 and tighten the screw (tightening torque: 0.6 ± 0.2 N·m (6 ± 2 kgf·cm, 5.2 ± 1.7 in-lbs.)). Insert the lead wire (gray) coming from the stator into the terminal M1 and the lead wire (red) into the terminal M2. Insert each lead wire (white) coming from the noise suppressor into the terminal C1 and C2. After the insertion, pull each lead wire slightly to check the lead wires do not come off. To disconnect the lead wires, insert a small flat-blade screwdriver into the windows near the terminals and pull out the lead wires.

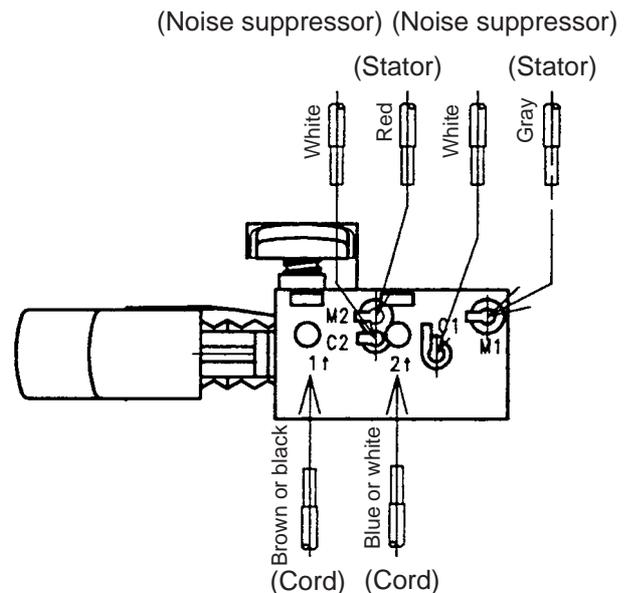


Fig. 19 Wiring of reversing switch

9-6. Insulation Tests

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

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

Dielectric strength: AC 4,000 V/1 minute, with no abnormalities 220 V – 240 V (and 110 V for U.K. products)

AC 2,500 V/1 minute, with no abnormalities 110 V – 120 V (except U.K. products)

9-7. No-load Current Values

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

Voltage (V)	110	120	220	230	240
Current (A) max.	3.6	3.3	1.8	1.7	1.6

10. STANDARD REPAIR TIME (UNIT) SCHEDULES

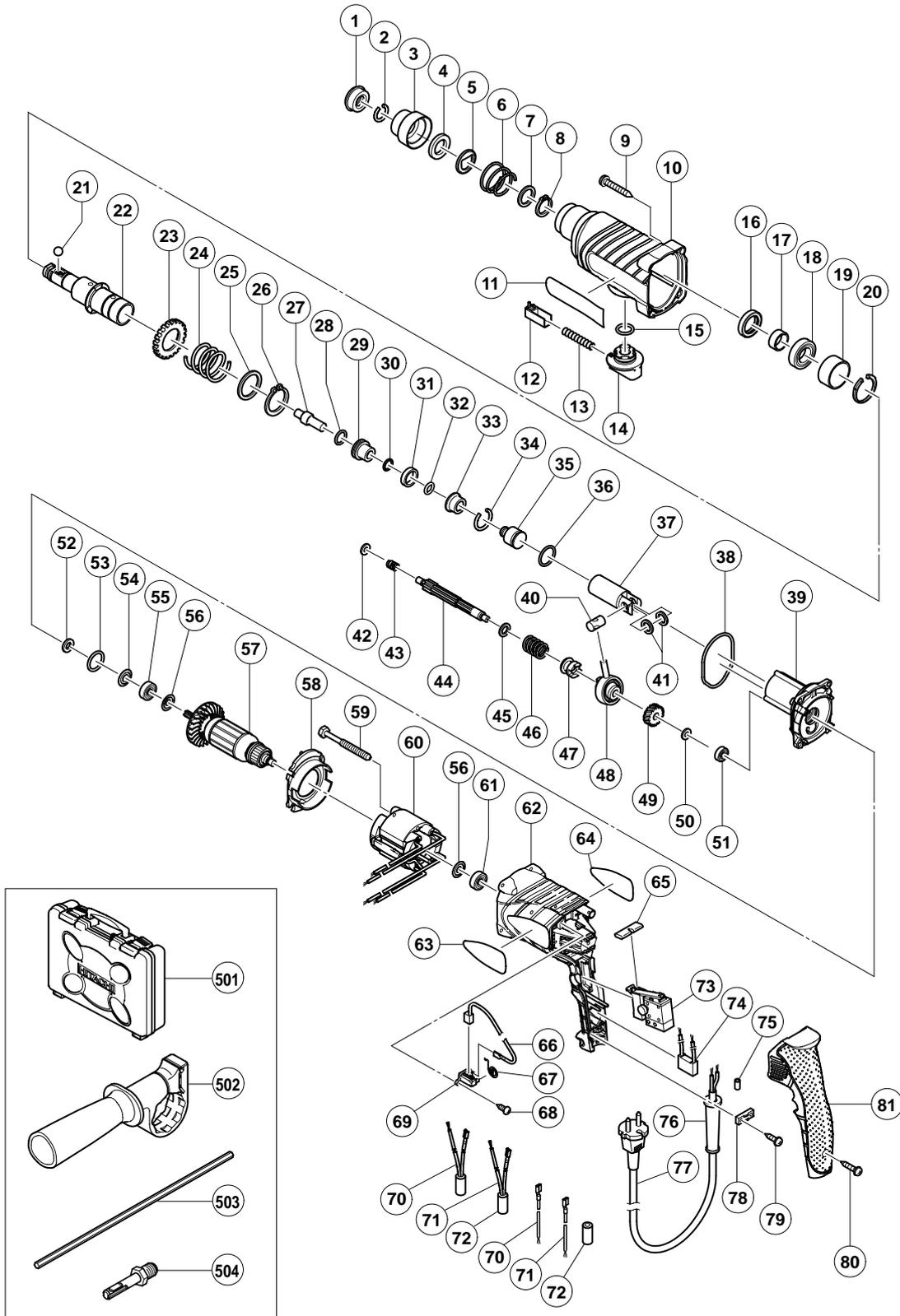
MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
DH 22PB		Work Flow						
		Handle Cover Cord Armor		Switch Cord			Housing Stator	
					Armature O-ring (P-22) Ball Bearing (608DD) Ball Bearing (608VV)			
		General Assembly					Second Hammer O-ring (1AP-20) Hammer Holder O-ring (B) Damper (A) O-ring (C) Damper Holder	Cylinder Second Gear Spring (A)
		Front Cap Grip Ball Holder Holder Spring Steel Ball D7.0						
		Change Lever O-ring (S-18) Pushing Button					Gear Cover Oil Seal Ball Bearing (6904DD) Sleeve (A)	
				Striker O-ring Piston O-ring Piston Pin Washer (C) x 2	Inner Cover Spring (B) Second Shaft Clutch Spring Clutch Reciprocating Bearing First Gear Ball Bearing (626VV)			

ELECTRIC TOOL PARTS LIST

■ ROTARY HAMMER Model DH 22PB

2004 • 8 • 30

(E1)



PARTS

DH 22PB

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS
1	306-345	FRONT CAP	1	
2	306-340	STOPPER RING	1	
3	322-809	GRIP	1	
4	322-810	BALL HOLDER	1	
5	322-811	HOLDER PLATE	1	
6	322-812	HOLDER SPRING	1	
7	984-118	WASHER (B)	1	
8	939-547	RETAINING RING FOR D20 SHAFT (10 PCS.)	1	
9	301-654	TAPPING SCREW (W/FLANGE) D5X35	4	
10	322-786	GEAR COVER	1	
11		HITACHI LABEL (A)	1	
12	322-789	PUSHING BUTTON	1	
13	317-223	PUSHING SPRING	1	
14	322-787	CHANGE LEVER	1	
15	878-885	O-RING (S-18)	1	
16	307-688	OIL SEAL	1	
17	322-815	SLEEVE	1	
18	690-4DD	BALL BEARING 6904DDPS2L	1	
19	322-819	SLEEVE (A)	1	
20	322-813	RETAINING RING 37MM	1	
21	959-156	STEEL BALL D7.0 (10 PCS.)	1	
22	322-814	CYLINDER	1	
23	301-677	SECOND GEAR	1	
24	301-678	SPRING (A)	1	
25	301-679	WASHER (A)	1	
26	948-310	RETAINING RING FOR D30 SHAFT	1	
27	322-803	SECOND HAMMER	1	
28	944-486	O-RING (1AP-20)	1	
29	322-804	HAMMER HOLDER	1	
30	322-802	O-RING (B)	1	
31	322-805	DAMPER (A)	1	
32	322-808	O-RING (C)	1	
33	322-806	DAMPER HOLDER	1	
34	322-807	STOPPER RING	1	
35	322-801	STRIKER	1	
36	322-834	O-RING (I.D. 16)	1	
37	322-800	PISTON	1	
38	322-793	O-RING (I.D. 66.5)	1	
39	322-792	INNER COVER	1	
40	322-798	PISTON PIN	1	
41	322-799	WASHER (C)	2	
42	322-795	SPACER	1	
43	322-796	SPRING (B)	1	
44	322-794	SECOND SHAFT	1	
45	301-659	WASHER (B)	1	
46	301-660	CLUTCH SPRING	1	
47	301-661	CLUTCH	1	
48	306-990	RECIPROCATING BEARING	1	
49	322-797	FIRST GEAR	1	
50	301-663	SPACER	1	
51	626-VVM	BALL BEARING 626VVC2PS2L	1	

PARTS

DH 22PB

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
52	322-816	FELT PACKING	1		
53	876-796	O-RING (P-22)	1		
54	322-818	PACKING WASHER	1		
55	608-DDM	BALL BEARING 608DDC2PS2L	1		
56	982-631	WASHER (A)	2		
*	57	360-650U	ARMATURE ASS'Y 110V-120V	1	INCLUD. 55, 56, 61
*	57	360-650E	ARMATURE 220V-230V	1	
*	57	360-650F	ARMATURE 240V	1	
	58	322-791	FAN GUIDE	1	
	59	961-672	HEX. HD. TAPPING SCREW D4X50	2	
*	60	340-583J	STATOR 110V	1	FOR TPE, GBR (110V)
*	60	340-583C	STATOR 110V-120V	1	
*	60	340-583E	STATOR 220V-230V	1	
*	60	340-583G	STATOR 230V	1	FOR IND
*	60	340-583F	STATOR 240V	1	
	61	608-VVM	BALL BEARING 608VVC2PS2L	1	
	62	322-836	HOUSING	1	
	63		HITACHI LABEL	1	
	64		NAME PLATE	1	
	65	322-790	PUSHING BUTTON	1	
	66	999-088	CARBON BRUSH (1 PAIR)	2	
	67	308-536	SPRING	2	
	68	306-945	TAPPING SCREW D3X10	4	
	69	322-838	BRUSH HOLDER	2	
*	70	322-826	INTERNAL WIRE (BROWN)	1	
*	70	322-827	CHOKE COIL (BROWN)	1	FOR NZL, AUS, GBR (230V), EUROPE, FIN, NOR, SWE, DEN, SUI, KOR, CHN
*	70	322-821	INTERNAL WIRE (BROWN)	1	FOR VEN,USA,CAN
*	70	322-828	CHOKE COIL (BROWN)	1	FOR TPE,GBR (110V)
*	71	322-829	INTERNAL WIRE (BLUE)	1	
*	71	322-830	CHOKE COIL (BLUE)	1	FOR NZL, AUS, GBR (230V), EUROPE, FIN, NOR, SWE, DEN, SUI, KOR, CHN
*	71	322-822	INTERNAL WIRE (BLUE)	1	FOR VEN, USA, CAN
*	71	322-831	CHOKE COIL (BLUE)	1	FOR TPE, GBR (110V)
	72	322-823	SUPPORT (B)	2	
*	73	322-825	SWITCH (B)	1	
*	73	322-820	SWITCH (A)	1	FOR VEN, TPE, GBR (110V), USA, CAN
*	74	930-039	NOISE SUPPRESSOR	1	FOR TPE, NZL, AUS, GBR, EUROPE, FIN, NOR, SWE, DEN, SUI, KOR, CHN
*	75	981-373	TUBE (D)	2	FOR CORD
*	76	953-327	CORD ARMOR D8.8	1	
*	76	938-051	CORD ARMOR D10.1	1	
*	77	500-390Z	CORD	1	(CORD ARMOR D8.8)
*	77	500-424Z	CORD	1	(CORD ARMOR D8.8) FOR SIN, KUW
*	77	500-234Z	CORD	1	(CORD ARMOR D8.8) FOR INA, KOR, IND
*	77	500-239Z	CORD	1	(CORD ARMOR D10.1) FOR THA
*	77	500-245Z	CORD	1	(CORD ARMOR D10.1) FOR SYR
*	77	930-055	CORD	1	(CORD ARMOR D10.1) FOR VEN
*	77	500-408Z	CORD	1	(CORD ARMOR D8.8) FOR NZL, AUS
*	77	500-249Z	CORD	1	(CORD ARMOR D8.8) FOR USA, CAN
*	77	500-214Z	CORD	1	(CORD ARMOR D10.1) FOR TPE



Hitachi Koki Co., Ltd.

Tokyo Japan