

MODELS

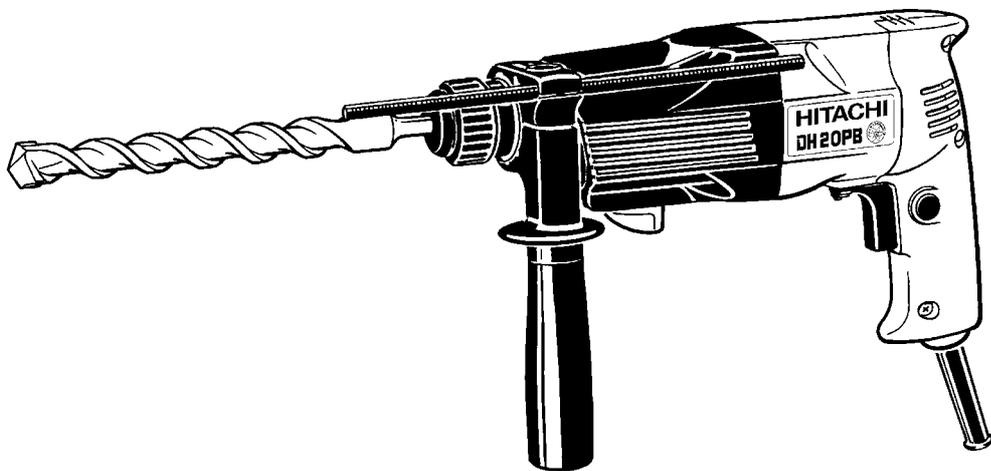
DH 20PB

HITACHI
POWER TOOLS

HAMMER DRILL
DH 20PB

TECHNICAL DATA
AND
SERVICE MANUAL

D



LIST No. E462

Feb. 2002

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

REMARK:

Throughout this TECHNICAL DATA AND SERVICE MANUAL, a symbol(s) is(are) used in the place of company name(s) and model name(s) of our competitor(s). The symbol(s) utilized here is(are) as follows:

Symbols Utilized	Competitors	
	Company Name	Model Name
B	BOSCH	GBH2-20SRE



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1. PRODUCT NAME

Hitachi Hammer Drill (variable speed and reversing), Model DH 20PB

2. MARKETING OBJECTIVE

The Model DH 20PB has been developed based on the Model DH 24PB inheriting the reliable striking mechanism. Thanks to the newly provided powerful motor, the Model DH 20PB has 20-mm drilling capacity (in concrete) and the drilling speed is far faster than the competitors. The Model DH 20PB is an excellent cost/performance hammer drill expected to expand our market share.

3. APPLICATIONS

(1) Rotation and striking 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 and 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

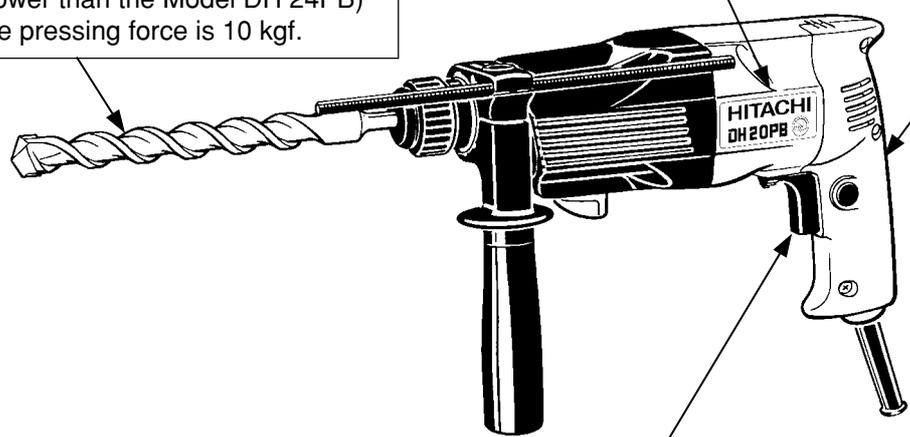
4. SELLING POINTS

Maker · Model	Overall length
HITACHI DH 20PB	: 318 mm (12-17/32")
B	: 334 mm (13-5/32")

Fast drilling speed:
40% faster than B
(10% slower than the Model DH 24PB)
when the pressing force is 10 kgf.

Powerful 520 W motor
(B: 500 W)

Convenient handle shape



Variable speed control switch
and reversing switch

4-1. Selling Point Descriptions

(1) Compact

Maker · Model	Overall length
Hitachi DH 20PB	318 mm (12-17/32")
B	334 mm (13-5/32")

The Model DH 20PB with gun-type handle has the same striking mechanism as the Model DH 24PB equipped with reciprocating bearing. The overall length is significantly reduced.

(2) Fast drilling speed

The drilling speed of the Model DH 20PB is 40% faster than B (10% slower than the Model DH 24PB) as the Model DH 20PB has great striking energy owing to the optimally designed rotation speed, striking frequency and weight of the striker.

(3) Powerful motor

The motor of the Model DH 20PB is more powerful than B because it is efficiently cooled in the same manner as the Model DH 24PB.

(4) Variable speed control switch with superior dust protection and operability

The variable speed control switch allows the rotation speed to be changed freely throughout the drilling operation. This permits easy centering and positioning, and ensures more effective drilling into fragile materials such as tile and brick.

(5) Equipped with reversing switch

By utilizing the newly designed optional accessory chuck adapter and appropriate driver bits, and through the combined functions of the variable speed control switch and reversing switch, the Model DH 20PB can be used to tighten and loosen a variety of screws.

5. SPECIFICATIONS

5-1. Specifications

Model		DH 20PB	
Capacity	Concrete	3.4 – 20 mm (1/8" – 13/16")	
	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		Voltage (V)	110 230
		Current (A)	5.0 2.4
		Input (W)	520
Rotation speed	No-load	0 – 1,000 /min ⁻¹	
	Full-load	0 – 750 /min ⁻¹	
Full-load blow		0 – 4,200/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	
Weight	Net*	2.3 kg (5.1 lbs.)	
	Gross	4.6 kg (10.1 lbs.)	
Packaging		Corrugated cardboard box with case	
Standard accessories		(1) Case	1
		(2) Side handle	1
		(3) Depth gauge	1

*: Weight excludes cord and side handle.

5-2. Optional Accessories

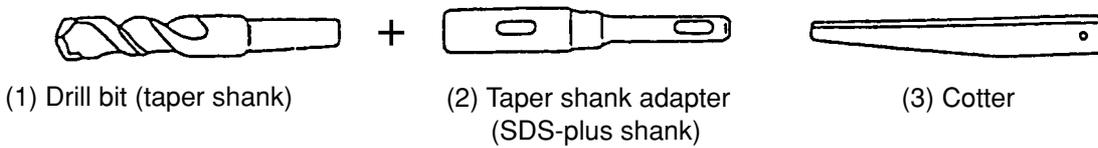
A. Drilling anchor holes (rotation + striking)

- Drill bit (slender shaft)



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)

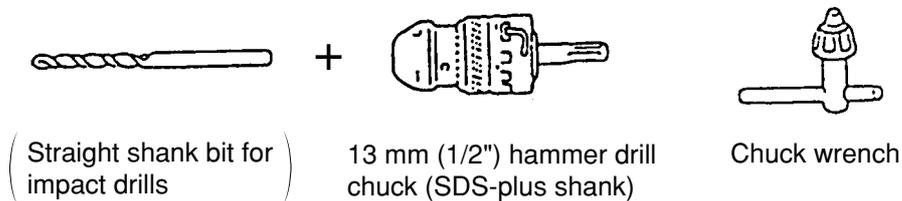


(1) Drill bit (taper shank)		(2) Taper shank adapter		(3) Cotter
Outer dia. (mm)	Code No.	Type	Code No.	Code No.
11 (7/16")	944460	Morse taper No. 1	303617	944477
12.3 (31/64")	944461			
12.7 (1/2")	993038			
14.3 (9/16")	944462			
14.5 (73/128")	944500			
17.5 (11/16")	944463			

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 hammer drill

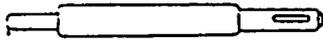


Part name	Code No.
13 mm (1/2") hammer drill chuck (including chuck wrench)	303332
Chuck wrench	303334
Rubber cap	303335

B. Anchor setting

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

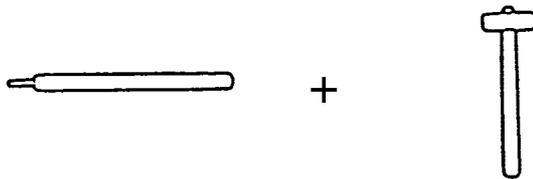
Anchor setting bar



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

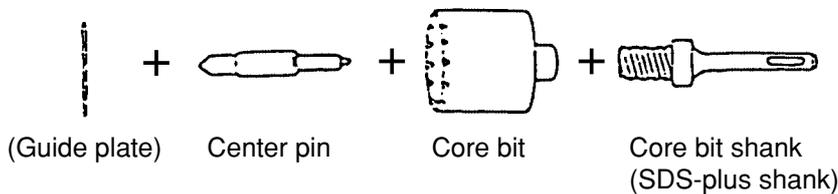


Anchor setting adapter

Part name	Code No.	Part name	Code No.
W - 1/4 anchor setting adapter - A	971974	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 + striking)

- 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		

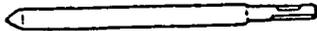
(3) Core bit with guide plate (The guide plate is not equipped with core bit with outer diameter of 25 mm (31/32") and 29 mm (1-5/32").)

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 – 90 mm (1-25/32" – 3-9/16")	Overall length 300 mm (11-52/64")	Code No. 303627

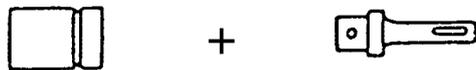
D. Crushing operation (rotation + striking)



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

Code No. 303046

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



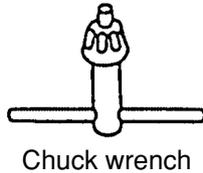
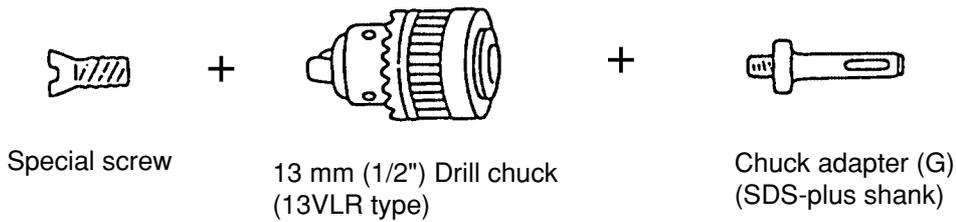
(Standard sockets available on the market)

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)

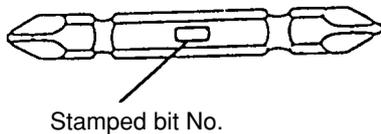
If the tool is to be used for loosening screws, open the three jaws of the drill chuck and securely fix the drill chuck to the chuck adapter (G) with the special screw (a left-hand threaded M6 screw) when mounting the drill chuck onto the chuck adapter (G).

Part name		Code No.
Drill chuck adapter set (SDS-plus) (including a-c)		303820
a.	Chuck adapter (G) for SDS-plus shank system	303623
b.	13 mm (1/2") drill chuck 13VLR (with chuck wrench)	950275
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	3 – 5
No. 3	955655	6 – 8

(2) Slotted-head (minus) bit

[Overall length: 50 mm]

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



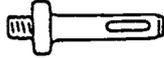
Bit tip thickness	Code No.	Applicable screw dia. (mm)
0.8	955658	4
1	955673	5 – 6

G. Driving screws (rotation only) For drilling holes in steel and wood

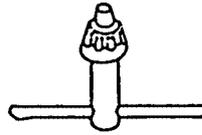


Drill chuck
(13VLA)

+



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 13VLA (with chuck wrench)	950272

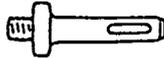
H. Drilling screws (rotation only)

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



Bit No.

+

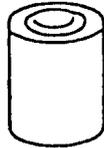


Chuck adapter (D)
(SDS-plus shank)

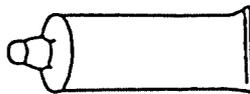
Bit No.	Screw size	Code No.
No. 2	3 – 5 mm	971511Z
No. 3	6 – 8 mm	971512Z

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

Maker		Hitachi		B	
Model		DH 20PB	DH 24PB		
Capacity	Concrete	mm	20 (13/16")	24 (15/16")	20 (13/16")
	Steel	mm	13 (1/2")	13 (1/2")	10 (3/8")
	Wood	mm	32 (1-1/4")	32 (1-1/4")	30 (1-3/16")
Input	W	520	620	500	
No-load rotation speed	/min.	0 – 1,000	0 – 1,050	0 – 1,100	
Full-load rotation speed	/min.	0 – 750	0 – 800	0 – 850	
Full-load blow	/min.	0 – 4,200	0 – 4,400	0 – 3,900	
No-load sound pressure level	dB(A)	90	90	88	
Variable speed		○	○	○	
Reversing switch		○	○	○	
Safety-release clutch		○	○	○	
Bit drive system		SDS-plus shank	SDS-plus shank	SDS-plus shank	
Dimensions	Length	mm	318 (12-17/32")	318 (12-17/32")	334 (13-5/32") 360 (14-3/16")
	Height	mm	185 (7-9/32")	185 (7-9/32")	205 (8-1/16")
	Width	mm	72 (2-27/32")	72 (2-27/32")	79 (3-1/8")
Weight	kg	2.3 (5.1 lbs.)	2.3 (5.1 lbs.)	2.3 (5.1 lbs.)	

Note 1) Mark "○" ... Equipped

2) Weight excludes cord and side handle.

6-2. Drilling Speed Comparisons

Drilling speed depends on the operating conditions. The test results shown in Fig. 1 are based on actual factory tests, and are used as a reference only. Fig. 1 shows the drilling speed comparisons for downward drilling. The drill bits used are the Hitachi genuine SDS-plus shank bits.

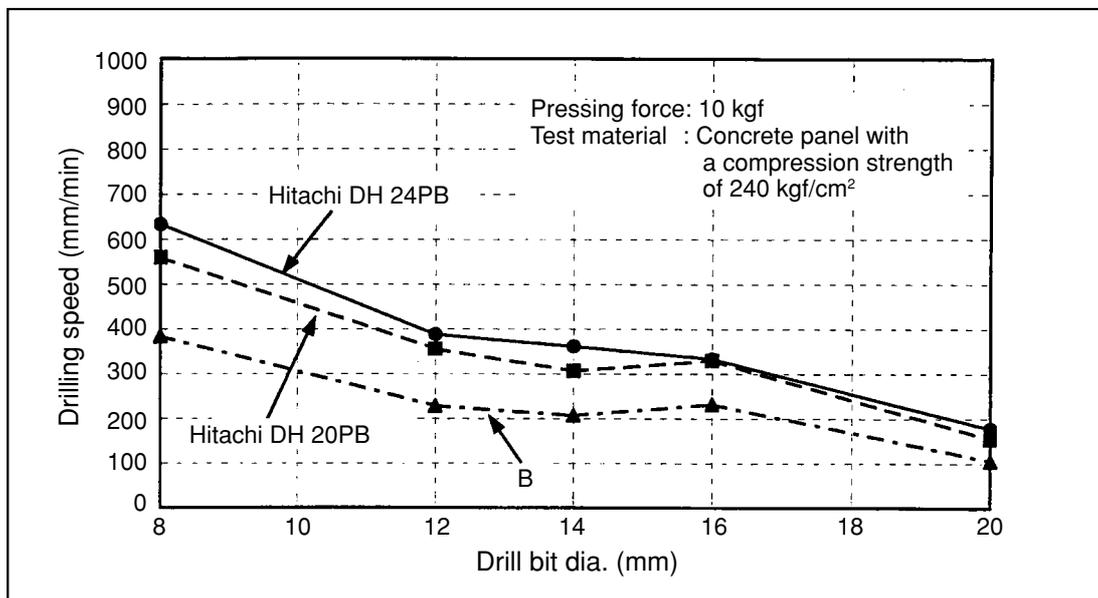


Fig. 1 Drilling speed comparisons (downward drilling)

7. PRECAUTIONS IN SALES PROMOTION

In the interest of promoting the safest and most efficient use of the Model DH 20PB Hammer Drill by all of our customers, it is very important that at the time of sales 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 Hammer Drill 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.

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 70 g (0.15 lbs.) of new grease into the gear cover. Be careful not to exceed the designed amount of grease. Excessive grease will reduce striking efficiency.

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 hammer drills, the armature shaft in the Model DH 20PB 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 20PB more compact for easier handling and operability. Thus, the appearance of the Model DH 20PB 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 hammer drills, a piston is caused to reciprocate by a connecting rod and crank shaft, and the crank shaft and the cylinder axis are at a 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 20PB 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.

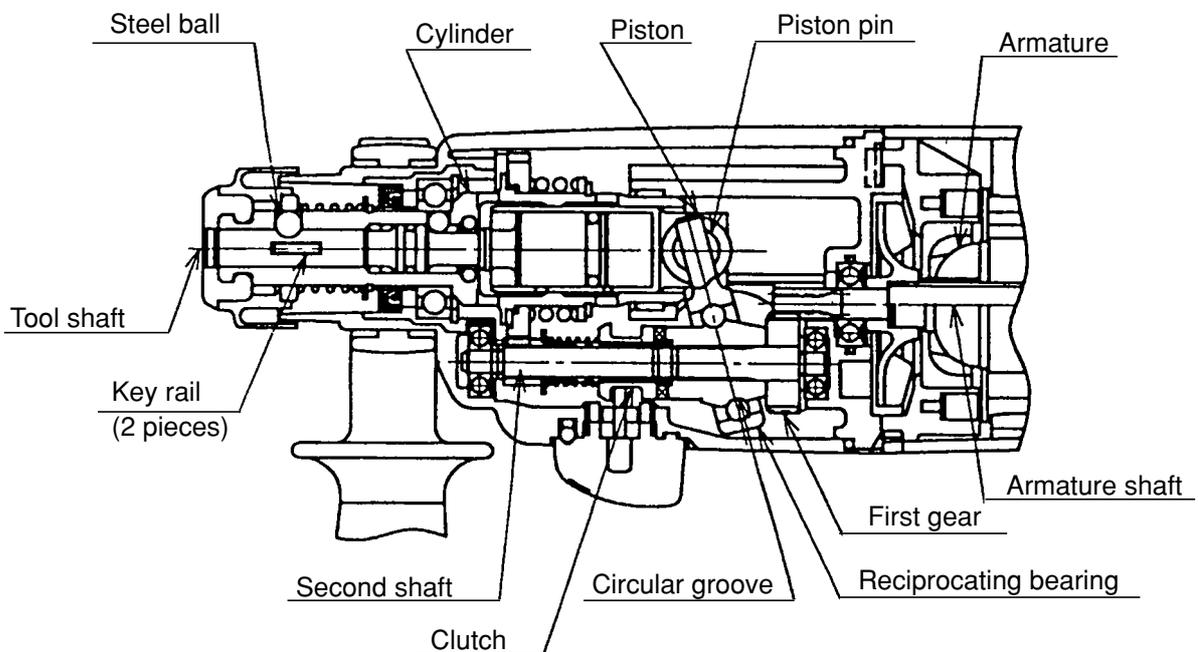


Fig. 2

- Striking function

The piston reciprocates within the cylinder to move the striker in the same manner as in conventional hammer drills. As the piston reciprocates, the changing air pressure inside the air chamber between the piston and the striker causes the striker to move the 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 striking 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 striking prevention mechanism

The idle striking prevention mechanism in the Model DH 20PB is different from that of conventional hammer drills. 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 the o-ring mounted on the inner wall of the cylinder. 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 striking operation) is prevented. The gripping force of the o-ring 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 striking operation.

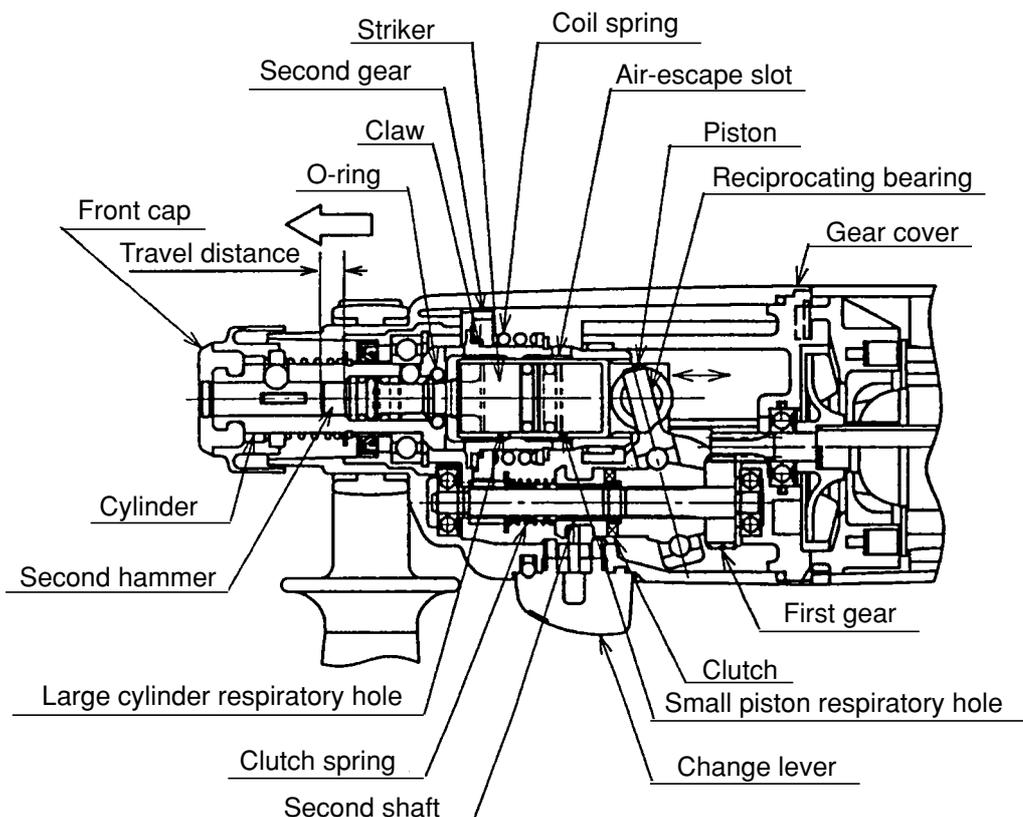


Fig. 3

- Slip mechanism

The slip mechanism in the Model DH 20PB 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 into 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 fully dust-proofed type to prevent dust and chips from entering the handle section and causing possible operational trouble or a breakdown of the insulation.

- Speed control

The Model DH 20PB is equipped with a variable speed control switch which permits free change of the rotation speed and striking force. When drilling fragile materials, pull the switch trigger gently for low rotation speed (striking force) to achieve optimum results.

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

The change lever on the Model DH 20PB permits quick and easy changeover between the "Rotation Only" and "Rotation + Striking" functions.

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 + Striking"). The reciprocating bearing is fitted on the second shaft with some play. When the change lever is set to the "Rotation Only" ( "drill" 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" ( "hammer" 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 striking)

Turn the change lever fully clockwise to the "drill" mark position to obtain "Rotation Only" function. To use the tool for drilling or driving screws, the chuck adapter and a drill chuck (optional accessories) must be used. In older models such as the Models DH 22 and DH 22V, when the chuck adapter is mounted the second hammer moves forward, the striker slips out of striking position to open up an air vent and stop striking operation and "Rotation Only" operation is automatically obtained. However, since the Models DH 24PA and DH 24PB are equipped with a change lever for changeover between "Rotation + Striking" and "Rotation Only" functions, merely mounting the chuck adapter will not stop the striking 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 + Striking" position when the tool is used for drilling, the striking 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. Compared with the conventional structure that uses two needle rollers to both transmit rotating torque and prevent the bit from falling out, this new structure reduces damage to the shank of the drill bit and extends the service life of the chuck section.

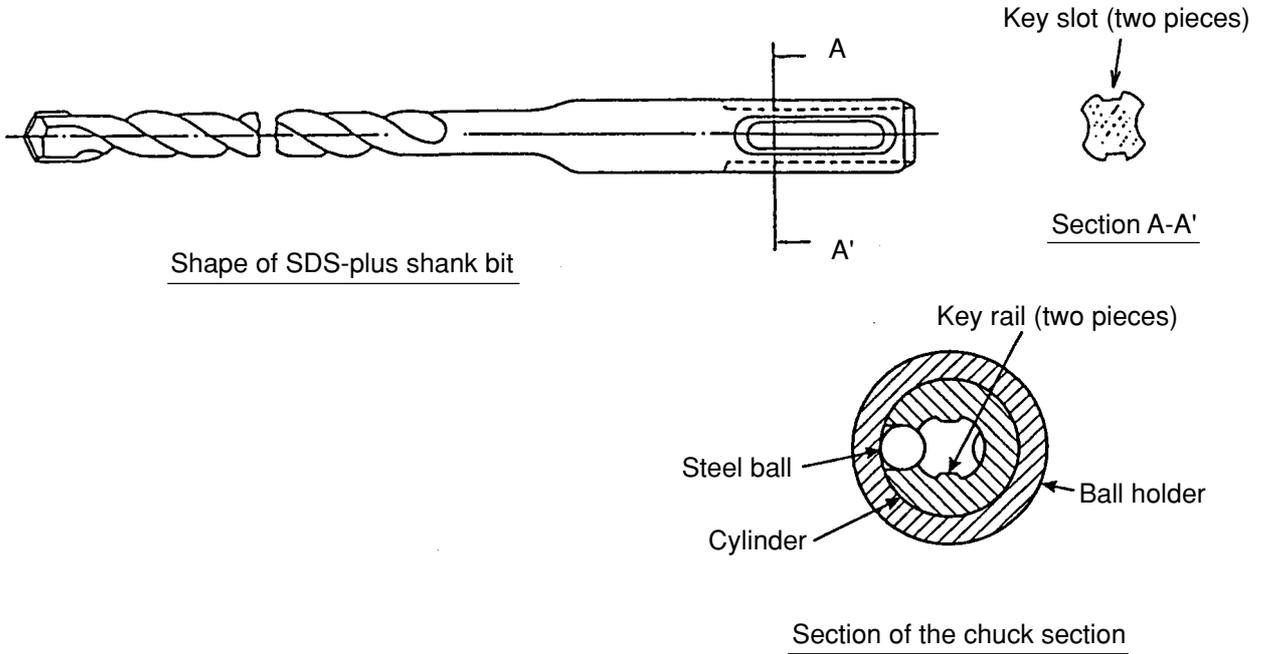


Fig. 4

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. Fig. 5 shows the regrinding angle.

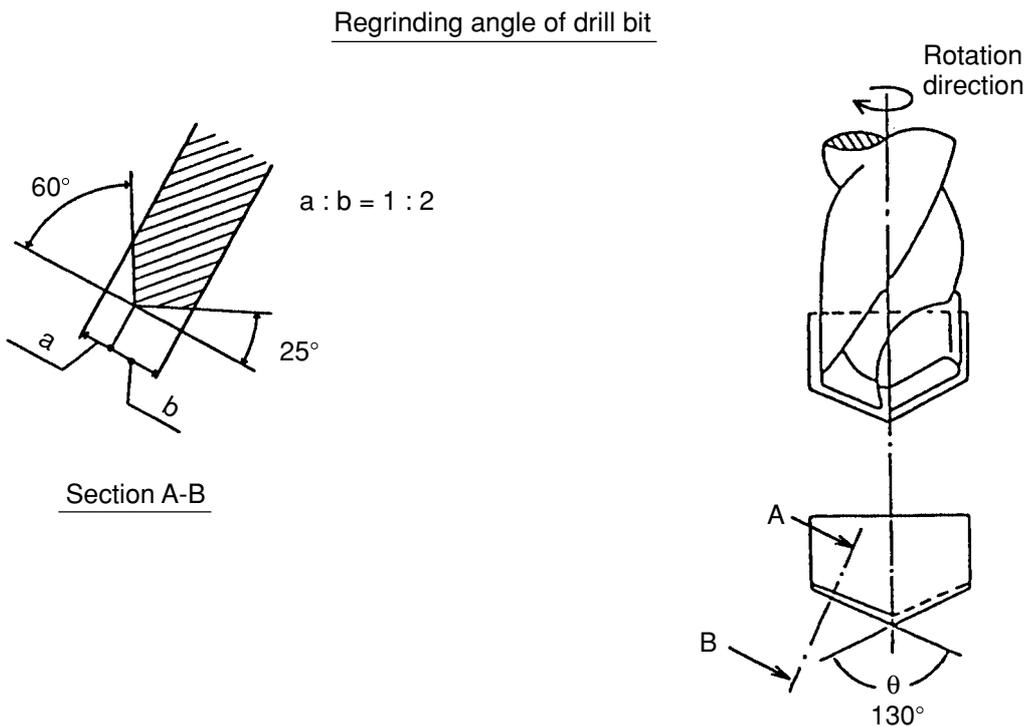


Fig. 5

8-6. Chuck Section

Fig. 6 shows the construction of the chuck section.

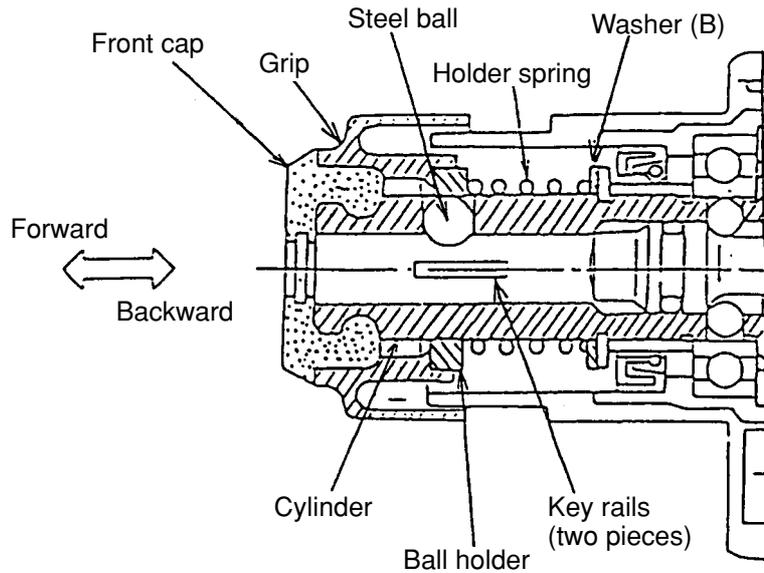


Fig. 6

The opening where the drill bit is inserted is covered with a front cap (rubber) to prevent dust from entering inside. When the drill bit is inserted, the steel ball fits into the matching groove on the drill bit to lock it in place and prevent it from falling out. Two key rails transmit rotating torque to the drill bit. The drill bit can be released by simply pulling the grip back. The grip is held forward by a holder spring. To mount a drill bit, pull the grip back to compress the holder spring. The steel ball then moves outward. While turning the drill bit, push it until it makes contact and is fully inserted. Then release the grip so that it moves forward and fixes the drill bit. To remove the drill bit, simply pull the grip back fully and pull the drill bit out.

8-7. Dust Collector (B)

While drilling holes overhead, dust collector (B) can be mounted on the Model DH 24PE 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 or 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.

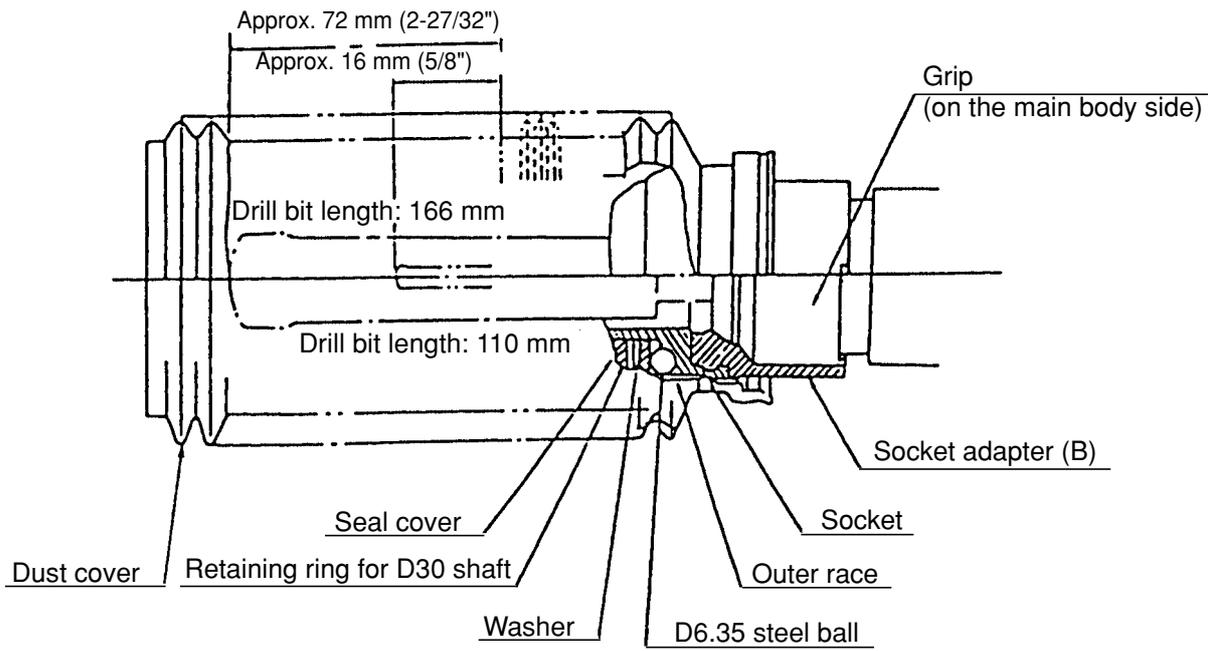


Fig. 7 Dust collector (B) structure

9. PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY

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

9-1. Disassembly

(1) Disassembly of the Striking Mechanism Section

- With a drill bit or screwdriver bit, push in the Second Hammer **[25]** to release the Striker **[28]** from the O-Ring (I.D.10.5) **[27]**.
- Set the Change Lever **[13]** to a position halfway between the "Drill" and "Hammer" marks on the Gear Cover **[7]**, insert a small flat-blade screwdriver into the concave position located on the rear end of the Change Lever **[13]**, and pull it off. (It is very important to ensure that the Change Lever **[13]** is positioned halfway between the "Drill" and "Hammer" marks when it is disassembled or assembled.)
- Loosen the four Tapping Screws (W/Flange) D5 x 35 **[8]**, and remove the Gear Cover **[7]**. The Inner Cover **[33]** and the Housing **[53]** are loosely fitted together. Attempting to pull them out first could cause the Armature **[46]** to be pulled out at the same time, causing damage to the Carbon Brushes **[62]**.
- Remove Spring (B) **[34]** from the end of the Gear Shaft Set **[35]**, and turn the Gear Shaft Set **[35]** so that the Piston **[30]** moves to its maximum upper position (inner cover side). The arm of the Reciprocating Bearing **[40]** can then be disconnected from the Piston Pin **[31]**, and the Gear Shaft Set **[35]** and the components mounted on it can be removed from the Inner Cover **[33]** as a unit.
- With a bearing puller (Special Repair Tool J-30 Bearing Puller Ass'y, Code No. 970804, is recommended), remove the Spacer **[41]** from the Gear Shaft Set **[35]**. Then take off the Reciprocating Bearing **[40]**. At this time, carefully note that the Spacer **[41]** must be aligned with and press-fitted onto the 9 mm diameter end of the Gear Shaft Set **[35]**.
- Move the Clutch **[38]** to the pinion side of the Gear Shaft Set **[35]**, and pull off the O-Ring (S-8) **[39]**. The Clutch Spring **[37]** and Washer (B) **[36]** can then be removed from the Gear Shaft Set **[35]**.

(2) Disassembly of the chuck section

As shown in Fig. 8, slide the Grip **[2]** in the direction indicated by the arrow mark, and remove the Front Cap **[1]**. The Grip **[2]**, the Ball Holder **[3]** inside the grip, the Holder Spring **[4]**, Washer (B) **[5]** and the Steel Ball D7.0 **[18]** can then be removed from the Cylinder **[20]**.

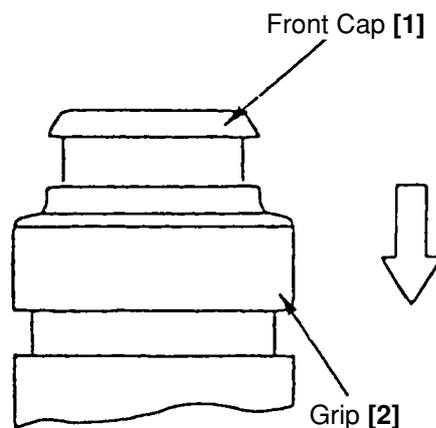


Fig. 8

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

- Take the Inner Cover [33] off from the Gear Cover [7] and remove the entire chuck section. Extract the Retaining Ring for D20 Shaft [6]. (For easy removal of this retaining ring, use of Special Repair Tool J-200 Snap Ring Pliers [Code No. 970976] is recommended.) Then, turn the Gear Cover [7] upright and use a hand press to extract the Cylinder [20] from the Gear Cover [7]. The Sleeve [15] can then be extracted from the Cylinder [20]. At this time, be very careful not to lose the three Steel Balls D5.556 [19]. Remove the Retaining Ring for D30 Shaft [24] from the upper part of the Cylinder [20]. The Second Gear [21], Spring (A) [22] and Washer (A) [23] can then be removed from the Cylinder [20]. Then, extract the O-Ring (I.D.10.5) [27] from the inner part of the Cylinder [20] and the Second Hammer [25] can be extracted from the Cylinder [20]. (For easy extraction of this O-Ring (I.D.10.5) [27], fit a Special Repair Tool J-201 Spring Hook [Code No. 970977] onto the outer circumference of the O-Ring (I.D.10.5) [27] and pull it out.) As the O-Ring (I.D.10.5) [27] is employed to prevent idle striking, please advise customers to replace it with a new one whenever it is disassembled.

Extract the Retaining Ring for D37 Hole [17], turn the Gear Cover [7] so that its tip portion is upward, and use a hand press to extract the Ball Bearing 6904DDPS2L [16] from the Gear Cover [7]. Next, turn the Gear Cover [7] over and use the hand press to extract the Oil Seal [14] from the Gear Cover [7]. Ensure that the Oil Seal [14] is replaced with a new one whenever it is disassembled.

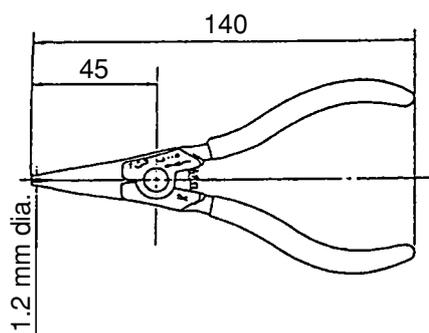
- Use of Special repair tools

- Snap ring pliers [J-200]: (See Fig. 9.)

Used to remove the Retaining Ring for D20 Shaft [6] which fixes the Cylinder [20] at the tip end of the Gear Cover [7].

- Spring hook [J-201]: (See Fig. 10.)

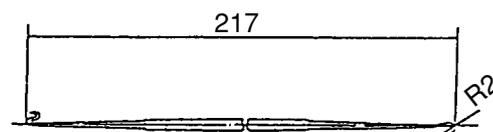
Used to extract the O-Ring (I.D.10.5) [27] inserted at the inner part of the Cylinder [20] which is designed to catch and grip the striker to prevent idle hammering. As shown in Fig. 11, fit the Spring Hook [J-201] onto the o-ring from its outer circumference, and pull it out.



(1) Snap ring pliers (J-200)

Code No. 970976

Fig. 9



(2) Spring Hook

Code No. 970977

Fig. 10

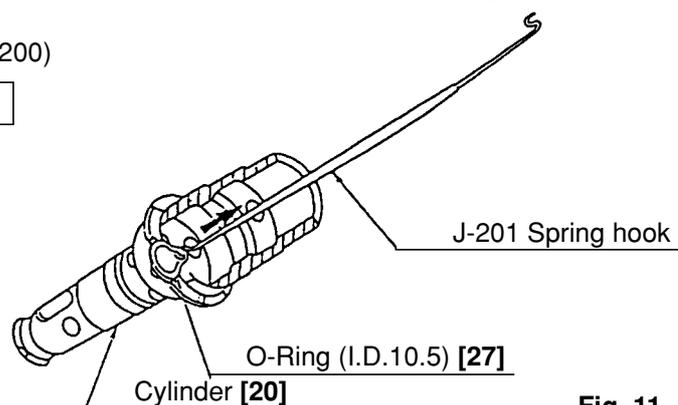


Fig. 11

9-2. Reassembly

Perform reassembly in the reverse order of disassembly while observing the given precautions and taking care of the following points.

(1) To make reassembly easier, coat grease on the Steel Balls [11], [18], [19].

(2) Reassembly of the Change Lever [13]

With a flat-blade screwdriver or similar tool, move the Clutch [38] and the Reciprocating Bearing [40] so that the claw (protruding portion) of the Reciprocating Bearing [40] and the claw (protruding portion) of the Clutch [38] are in contact.

After inserting Spring (H) [10] and Steel Ball D3.97 [11] into the recessed portion of the Gear Cover [7], apply grease to the pin portion of the Change Lever [13] into the Gear Cover [7] so that it is positioned midway between the "Hammer" mark and the "Drill" mark. Be careful that should the mounting position of the change lever be incorrect, it will deform the claws of the change lever.

(3) Reassembly of the Oil Seal [14]

Prior to reassembly, apply grease to the inner circumference of the Oil Seal [14]. However, do not apply grease to its outer circumference. Also, when press-fitting the Oil Seal [14], ensure it is straight and level.

9-3. Lubrication

Apply special grease (N.P.C. FG-6A, Code No. 980927 is recommended) to the inner and outer circumferences of the Piston Pin [31] and Piston [30], O-Ring (A) [29] mounted on the Striker [28], O-Ring (B) [26] mounted on the Second Hammer [25], the Reciprocating Bearing [40], the Reciprocating Bearing [40] mounting portion of the Gear Shaft Set [35], the O-Ring (I.D.10.5) [27] and the clutch-claw portions of the Cylinder [20], the inner circumferences of the metal inside the Inncer Cover [33], and external grooves of the Clutch [38]. Also, without fail, insert 70 g (0.15 lbs.) of special grease inside the Gear Cover [7].

9-4. Tightening Torque

Tapping Screws (W/Flange) D4 [57] [69] 2.0 ± 0.5 N·m (20 ± 5 kgf·cm, 17.4 ± 4.3 in-lbs.)

Tapping Screws (W/Flange) D5x35 [8] 2.9 ± 0.5 N·m (30 ± 5 kgf·cm, 26.0 ± 4.3 in-lbs.)

9-5. Wiring Diagram

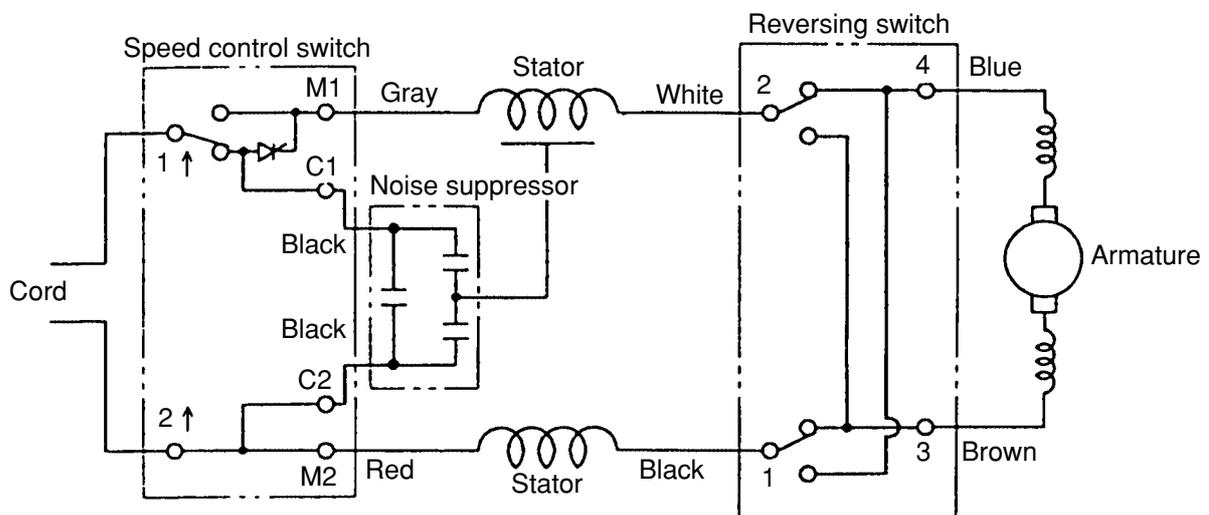


Fig. 12

9-6. Internal Wire Arrangement and Wiring Work

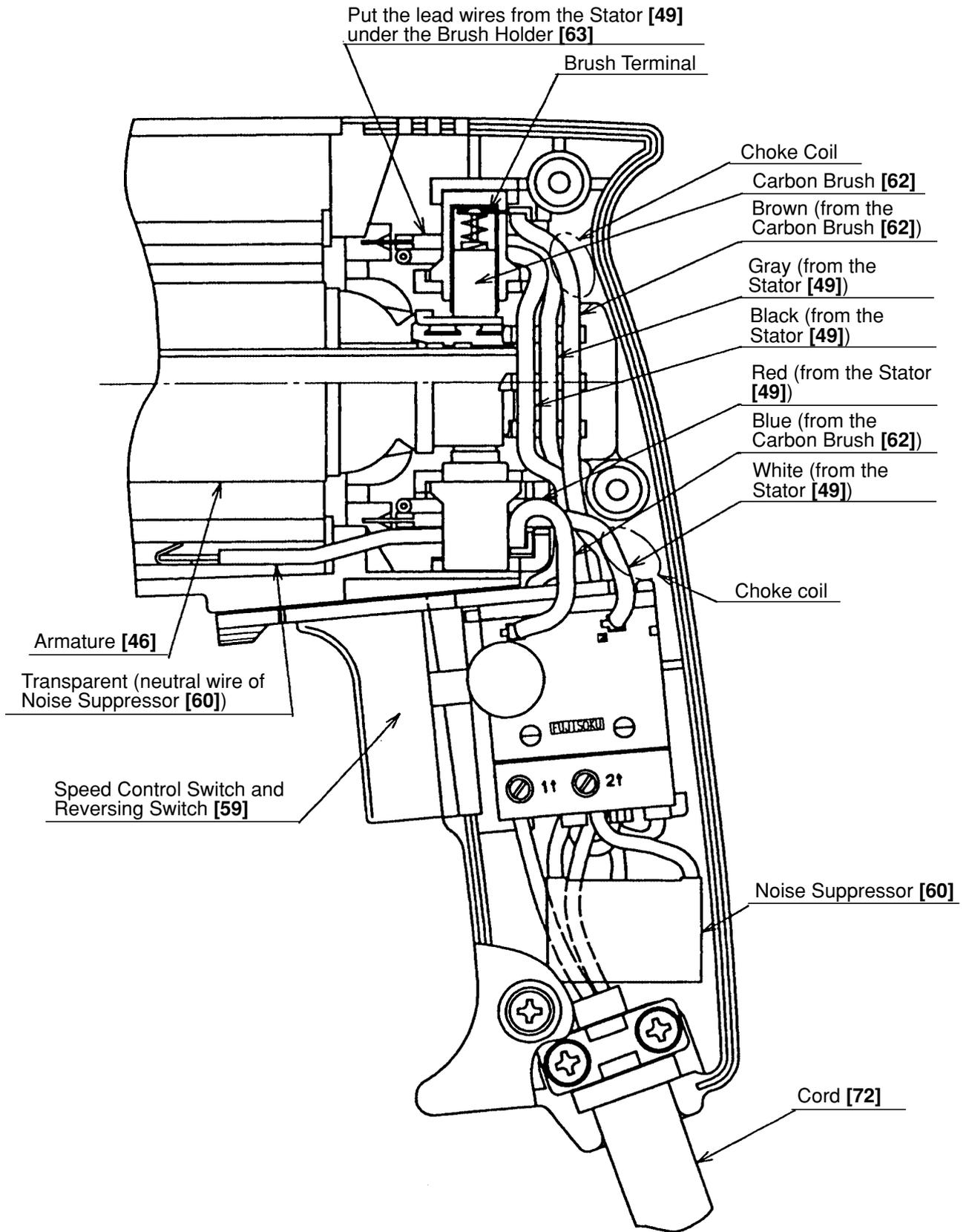


Fig. 13 Schematic diagram

Additional Wiring Work

General internal wiring can be accomplished by referring to paragraphs 9-4 and 9-5. 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. 14. Insert the lead wire (brown) coming from the carbon brush 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.

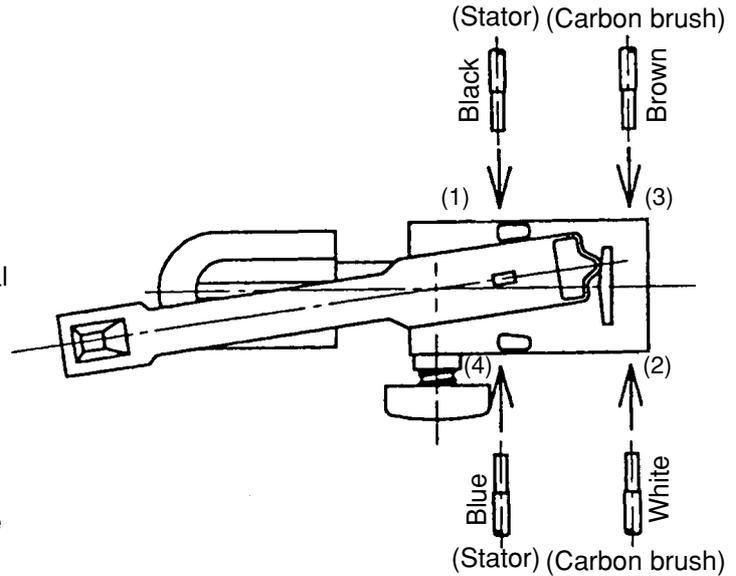


Fig. 14 Wiring of reversing switch

(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. 15 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 (black) coming from the noise suppressor into the terminals C1 and C2. After the insertion, pull each lead wire slightly to check that 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.

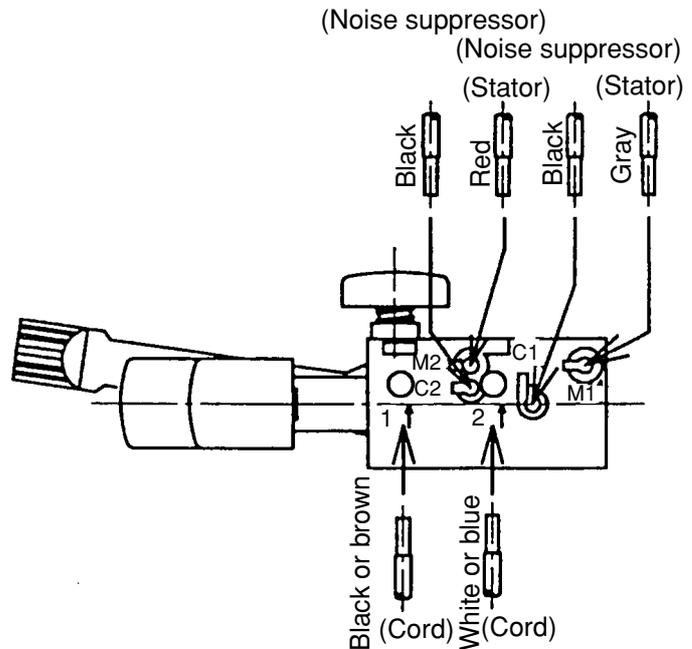


Fig. 15 Wiring of speed control switch (DH 20PB)

9-7. Insulation Tests

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

Insulation resistance: $7M\Omega$ 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 - 127 V (except U.K. products)

9-8. No-load Current Values

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

Voltage (V)	110	230
Current (A) Max.	3.0	1.9

10. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
DH 20PB		Work Flow						
		Switch Cord		Armature Ass'y Inner Cover O-Ring Ball Bearing (608DD) Washer (A) x2 Ball Bearing (608VV)	Housing Stator			
	General Assembly	Change Lever O-Ring	Front Cap Grip Ball Holder Holder Spring Oil Seal Steel Ball	Retaining Ring Cylinder Steel Ball x 4 Second Gear Spring (A) Washer (A) Retaining Ring Second Hammer O-Ring (B) O-Ring	Gear Cover Ball Bearing (6904DD) Retaining Ring			
			Striker O-Ring (A) Piston Piston Pin Washer (C)	Spring (B) Gear Shaft Set Spacer Ball Bearing (626VV)				

HITACHI

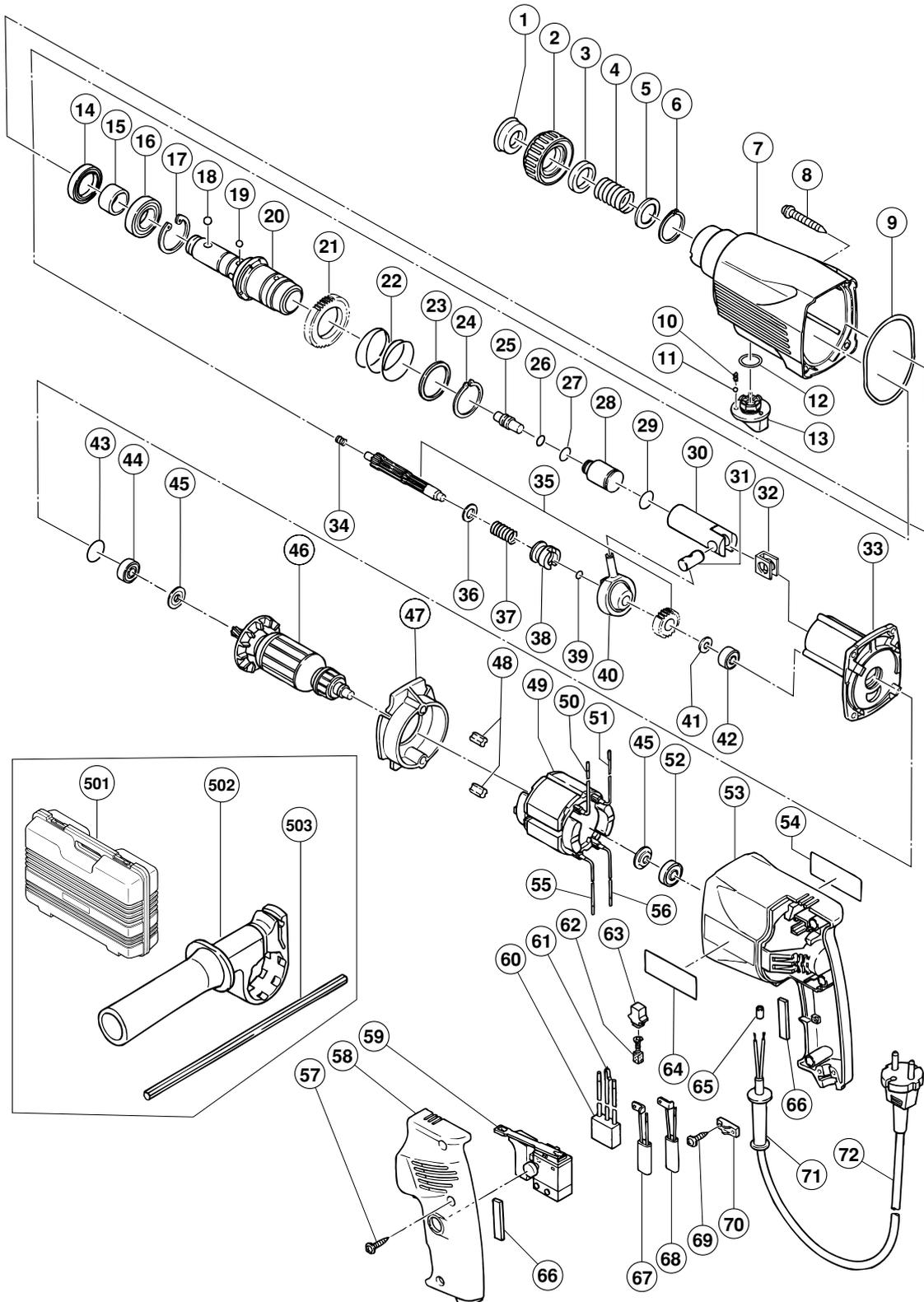
LIST NO. E462

ELECTRIC TOOL PARTS LIST

■ HAMMER DRILL
Model DH 20PB

2002 · 2 · 5

(E1)



PARTS

DH20PB

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS
1	306-345	FRONT CAP	1	
2	306-992	GRIP	1	
3	306-343	BALL HOLDER	1	
4	306-342	HOLDER SPRING	1	
5	984-118	WASHER (B)	1	
6	939-547	RETAINING RING FOR D20 SHAFT (10 PCS.)	1	
7	314-876	GEAR COVER	1	
8	301-654	TAPPING SCREW (W/FLANGE) D5X35	4	
9	314-881	O-RING	1	
10	981-328	SPRING (H)	1	
11	959-155	STEEL BALL D3.97 (10 PCS.)	1	
12	314-878	O-RING	1	
13	314-877	CHANGE LEVER	1	
14	307-688	OIL SEAL	1	
15	307-690	SLEEVE	1	
16	690-4DD	BALL BEARING 6904DDPS2L	1	
17	986-147	RETAINING RING FOR D37 HOLE	1	
18	959-156	STEEL BALL D7.0 (10 PCS.)	1	
19	959-154	STEEL BALL D5.556 (10 PCS.)	3	
20	314-882	CYLINDER	1	
21	301-677	SECOND GEAR	1	
22	301-678	SPRING (A)	1	
23	301-679	WASHER (A)	1	
24	948-310	RETAINING RING FOR D30 SHAFT	1	
25	301-671	SECOND HAMMER	1	
26	301-672	O-RING (B)	1	
27	301-680	O-RING (I.D. 10.5)	1	
28	315-148	STRIKER	1	
29	301-670	O-RING (A)	1	
30	301-668	PISTON	1	
31	301-666	PISTON PIN	1	
32	303-977	WASHER (C)	1	
33	314-880	INNER COVER	1	
34	301-664	SPRING (B)	1	
35	315-161	GEAR SHAFT SET	1	
36	301-659	WASHER (B)	1	
37	301-660	CLUTCH SPRING	1	
38	301-661	CLUTCH	1	
39	992-912	O-RING (S-8)	1	
40	306-990	RECIPROCATING BEARING	1	
41	301-663	SPACER	1	
42	626-VVM	BALL BEARING 626VVC2PS2L	1	
43	876-796	O-RING (P-22)	1	
44	608-DDM	BALL BEARING 608DDC2PS2L	1	
45	982-631	WASHER (A)	2	
* 46	360-446U	ARMATURE ASS'Y 110V-115V	1	INCLUD.44,45,52
* 46	360-446E	ARMATURE 220V-230V	1	
47	314-879	FAN GUIDE ASS'Y	1	INCLUD.48
48	994-343	RUBBER BUSHING	2	
* 49	340-398C	STATOR 110V-115V	1	
* 49	340-398F	STATOR 230V-240V	1	

