

MODEL

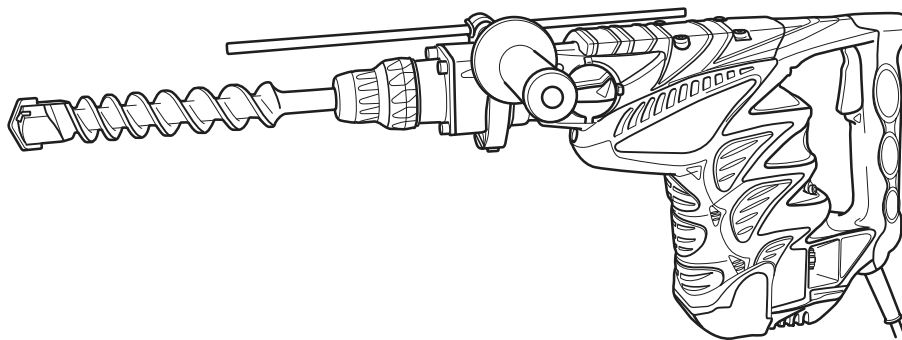
DH 45MR

Hitachi Power Tools

**ROTARY HAMMER
DH 45MR**

**TECHNICAL DATA
AND
SERVICE MANUAL**

D



LIST No. E491

Sept. 2005

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	GBH7-46DE
D	HILTI	TE76P-ATC
C	MAKITA	HR4500C

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1. PRODUCT NAME

Hitachi Rotary Hammer, Model DH 45MR

2. MARKETING OBJECTIVE

The Model DH 45MR is a rotary hammer which features the capability of drilling maximum 45-mm diameter holes into concrete and the use of SDS-max shank tools. The performance, durability and operability are greatly improved. With this competitive Model DH 45MR, we aim to enhance the share of SDS-max type rotary hammers. The main specifications are as follows:

- (1) High drilling speed and high demolishing performance
- (2) Internal double-insulation construction with sturdy aluminum frame
- (3) Constant speed with variable speed control
- (4) Soft-touch grip for easier handling
- (5) Variable lock mechanism for easy working-angle adjustment of chisels etc.
- (6) A very original design

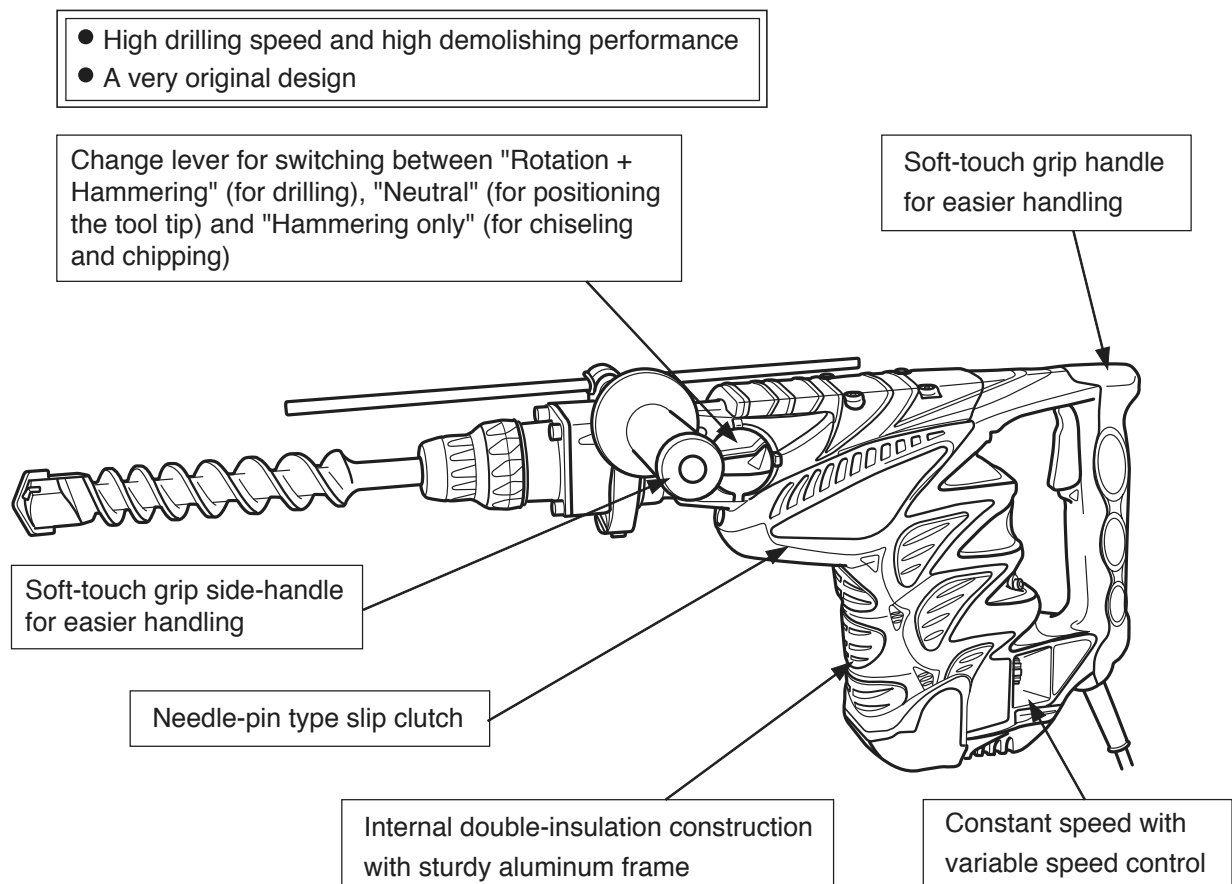
3. APPLICATIONS

- Drilling holes in concrete and drilling anchor holes
- Demolishing and chiseling of concrete. Edging, gravel road digging, compacting and tamping, grooving, cutting, stripping and roughing, etc.

[Application examples]

- Air conditioning
- Piping and wiring
- Electric fixtures
- Sanitary facilities
- Interior finishing
- Other building, construction and repair work

4. SELLING POINTS



4-1. Selling Point Descriptions

4-1-1. High drilling speed and high demolishing performance

The drilling speed is 30% faster and the chipping performance is 16% higher than those of similar products thanks to the high striking force by 15.5-J striking energy and the efficient striking energy transmission. Even so, the Model DH 45MR produces equivalent vibration and sound levels to those of similar products.

Maker · Model		HITACHI DH 45MR	B	D	C
Ratio of drilling speed	%	130	100	90	94
Ratio of chiseling amount	%	116	100	62	84
Full-load vibration level	dB (VL)	118	120	113	115
Full-load noise level	dB (A)	93	92	93	92

* Ratio of drilling speed: A 28-mm dia. drill bit is used.

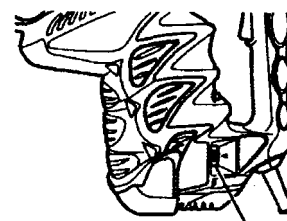
Full-load vibration and noise levels: A 25-mm dia. drill bit is used.

4-1-2. Internal double-insulation construction with sturdy aluminum frame

The aluminum die-cast outer frame is very sturdy (highly rigid) as well as the Model DH 40MR. In addition, a plastic internal S holder is adopted to realize double-insulation construction. Thus the housing has greater rigidity and the double-insulated motor has greater durability. The Model DH 45MR is heavy-duty and the service life of the carbon brush is greatly prolonged minimizing disconnection of the armature, deviation of the core and grease leakage.

4-1-3. Dial type, constant speed with variable speed control

The Model DH 45MR is equipped with a built-in electronic control circuit that can adjust the number of hammering steplessly. The number of hammering is steplessly adjustable between 1,200 and 2,500 min⁻¹ with the dial. Even though the load varies, the Model DH 45MR provides better operability and stable and efficient drilling performance because the constant speed control minimizes changes in number of rotation and hammering.



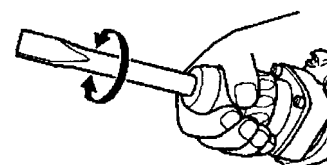
Speed-adjust dial

4-1-4. Soft-touch grip for easier handling

The double-layer molded handle consists of a nylon resin base covered with a soft plastic layer to ensure a soft touch and firm, non-slip grip of the handles.

4-1-5. Change lever for switching between "Rotation + Hammering", "Neutral" and "Hammering only"

The Model DH 45MR provides three functions, "rotation + hammering" function (for drilling), "neutral" function (for positioning the tool tip) and "hammering only" function (for chiseling and chipping). These function modes can be easily switched by using the change lever. The tool angle can be easily changed in 12 steps by turning the grip with the change lever positioned at "Neutral".



4-1-6. Needle-pin type slip clutch

The Model DH 45MR is equipped with a needle-pin type slip clutch for higher slip torque accuracy and enhanced safety (same as the Model DH 40MR).

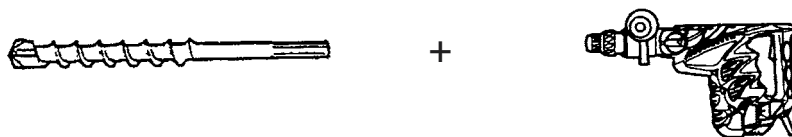
5. SPECIFICATIONS

5-1. Specifications

Capacity	Drill bit (Max. diameter): 45 mm (1-3/4") Core bit (Max. diameter): 125 mm (4-29/32")			
Power source	AC single phase 50 Hz or 60 Hz			
Voltage	110 V	120 V	230 V	240 V
Current	12.6 A	11.6 A	6 A	5.8 A
Power input	1,200 W			
Motor type	AC single-phase series commutator motor			
Insulation structure	Double insulation			
Enclosure	Materials: Aluminum alloy die casting Nylon resin (Handle, handle cover, tail cover, hood (A) and crank cover) Paint : Silver green metallic, black			
Switch	Trigger switch			
Type of handles	D-shaped handle and side handle			
Rotation rate	No load and full load: 120 to 240 min ⁻¹			
Impact rate	No load and full load: 1,200 to 2,500 min ⁻¹			
Weight	Product: 8.0 kg (17.6 lbs.); excluding cord and side handle Packed: 13.2 kg (29.1 lbs.)			
Packaging	Corrugated cardboard box with plastic tool case			
Standard accessories	<ul style="list-style-type: none"> • Plastic case 1 • Side handle 1 • Hex. bar wrench (for M6) 1 • Hex. bar wrench (for M5) 1 • Stopper 1 • Grease (A) 1 			

5-2. Optional Accessories

1. Drilling work for through-holes (Rotation + Hammering)



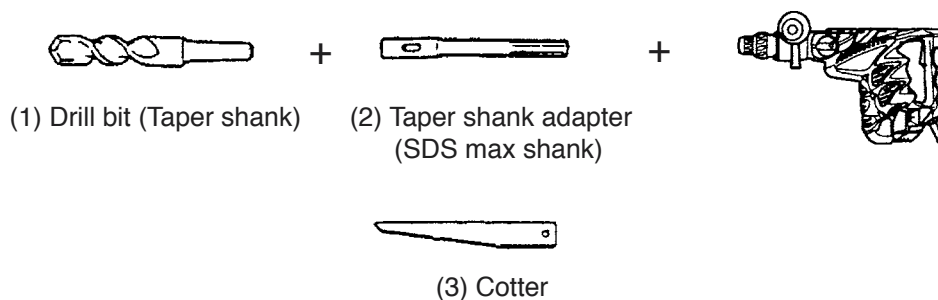
(1) Drill bit (SDS max shank)

Outer diameter (mm)	Over length (mm)	Code No.
16 (5/8")	340 (13-3/8")	313448
19 (3/4")	340 (13-3/8")	313449
22 (7/8")	320 (12-5/8")	313450
25 (1")	320 (12-5/8")	313451
28 (1-1/8")	370 (14-9/16")	313452
32 (1-1/4")	370 (14-9/16")	313453
38 (1-1/2")	370 (14-9/16")	313454
40 (1-9/16")	370 (14-9/16")	313455

Outer diameter (mm)	Over length (mm)	Code No.
16 (5/8")	540 (21-1/4")	313456
19 (3/4")	540 (21-1/4")	313457
22 (7/8")	520 (20-15/32")	313458
25 (1")	520 (20-15/32")	313459
28 (1-1/8")	570 (22-7/16")	313460
32 (1-1/4")	570 (22-7/16")	313461
38 (1-1/2")	570 (22-7/16")	313462
40 (1-9/16")	570 (22-7/16")	313463

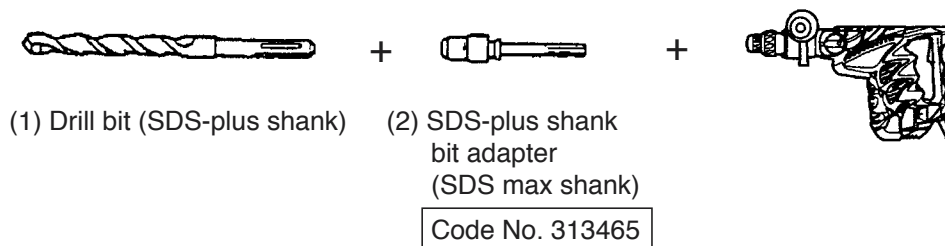
2. Drilling work for anchor holes (Rotation + Hammering)

① Drill bit (Taper shank)

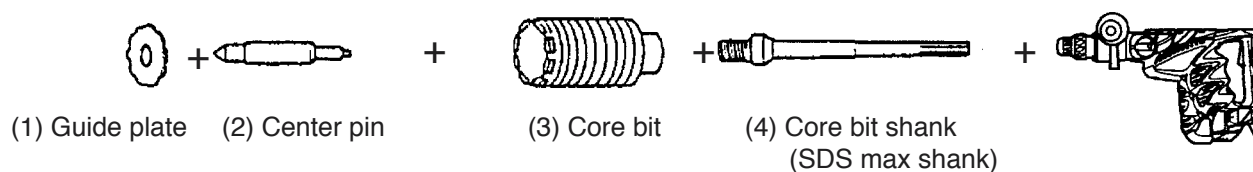


(1) Drill bit (Taper shank)		(2) Taper shank adapter		(3) Cotter
Outer diameter (mm)	Code No.	Taper dimension	Code No.	Code No.
11 (7/16")	944460	Morse taper No. 1	313464	944477
12.3 (15/32")	944461			
12.7 (1/2")	993038			
14.3 (9/16")	944462			
14.5 (9/16")	944500			
17.5 (11/16")	944463			

② SDS-plus shank bit adapter



3. Boring work for large-diameter holes (Rotation + Hammering)



(1) Guide plate

Core bits of outer diameter 32, 35, 38, 45, 50, 54, 60, 64, 70, 75, 79, 94, 100, 105, 120, 125 mm (1-1/4", 1-3/8", 1-1/2", 1-3/4", 2", 2-1/8", 2-3/8", 2-1/2", 2-3/4", 2-15/16", 3-1/8", 3-1/16", 3-15/16", 4-1/8", 4-3/4", 4-29/32")

[Guide plate is not used with core bits of outer diameter 25 mm (1") and 29 mm (1-1/8").]

(2) Center pin

- Code No. 956009 for core bits of outer diameter 32, 35 mm (1-1/4", 1-3/8")
- Code No. 955165 for core bits of outer diameter 38, 45, 50, 54, 60, 64, 70, 75, 79, 94, 100, 105, 120, 125 mm (1-1/2", 1-3/4", 2", 2-1/8", 2-3/8", 2-1/2", 2-3/4", 2-15/16", 3-1/8", 3-11/16", 3-15/16", 4-1/8", 4-3/4", 4-29/32")

[Center pin is not used with core bits of outer diameter 25 mm (1") and 29 mm (1-1/8").]

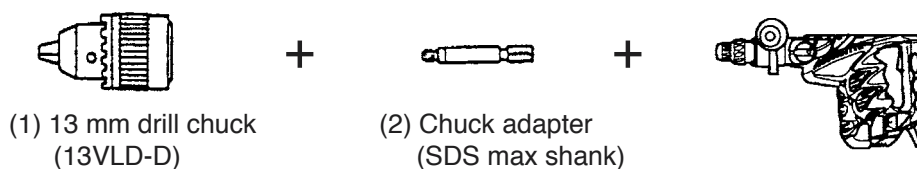
(3) Core bit

Outer diameter (mm)	Code No.	Outer diameter (mm)	Code No.	Outer diameter (mm)	Code No.
25 (1")	955994	50 (2")	959706	79 (3-1/8")	955157
29 (1-1/8")	955995	54 (2-1/8")	955155	94 (3-11/16")	956004
32 (1-1/4")	955996	60 (2-3/8")	959707	100 (3-15/16")	959710
35 (1-3/8")	955998	64 (2-1/2")	956002	105 (4-1/8")	955159
38 (1-1/2")	956000	70 (2-3/4")	959708	120 (4-3/4")	956006
45 (1-3/4")	955154	75 (2-15/16")	959709	125 (4-29/32")	987013

(4) Core bit shank (SDS max shank)

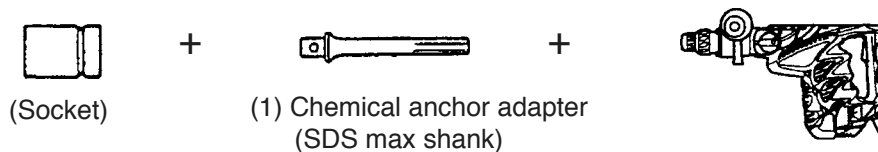
- Code No. 313466 for core bits of outer diameter 25, 29, 32, 35 mm (1", 1-1/8", 1-1/4", 1-3/8")
- Code No. 313467 for core bits of outer diameter 38, 45, 50, 54, 60, 64, 70, 75, 79, 94, 100, 105, 120, 125 mm (1-1/2", 1-3/4", 2", 2-1/8", 2-3/8", 2-1/2", 2-3/4", 2-15/16", 3-1/8", 3-11/16", 3-15/16", 4-1/8", 4-3/4", 4-29/32")

4. Hole drilling For drilling steel and wood



(1) 13 mm drill chuck (13VLD-D) with chuck wrench	(2) Chuck adapter
Code No. 321813	Code No. 313468

5. Chemical anchor holes drilling work (Rotation + Hammering)



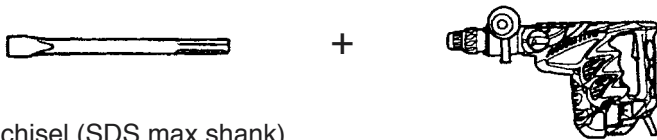
Socket square size	Code No.
12.7 mm (1/2")	313469
19.0 mm (3/4")	313470

6. Demolition work (Hammering)



Overall length	Code No.
280 mm (11")	313471
400 mm (15-3/4")	313472

7. Grooving and edging (Hammering)



(1) Cold chisel (SDS max shank)

Overall length	Code No.
280 mm (11")	313473
400 mm (15-3/4")	313474

8. Cutting and stripping (Asphalt cutting etc.) (Hammering)



(1) Cutter (SDS max shank)

Overall length	Width	Code No.
400 mm (15-3/4")	50 mm (2")	313475

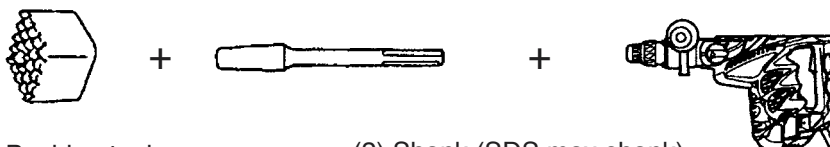
9. Digging (Substitute pick-ax) (Hammering)



(1) Scoop (SDS max shank)

Overall length	Code No.
400 mm (15-3/4")	313476

10. Surface roughing work (Hammering)



(1) Bushing tool

Code No.
313477

(2) Shank (SDS max shank)

Overall length	Code No.
220 mm (8-21/32")	313479

11. Tamping work (Hammering)



(1) Rammer

Code No.
313478

150 mm x 150 mm

(2) Shank (SDS max shank)

Overall length	Code No.
220 mm (8-21/32")	313479

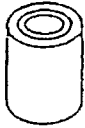
12. Syringe (for chip removal)



Code No. 318085 (Bellows)

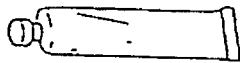
Code No. 944575 (Blow-out bulb)

13. Impact drill grease



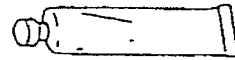
500 g (1.1 lbs.) Can

Code No. 980927



70 g (2.5 oz) Tube

Code No. 308471



30 g (1 oz) Tube

Code No. 981840

NOTE:

Code numbers listed above are subject to change without notice. Please refer to periodic Technical News Bulletins.

6. COMPARISONS WITH SIMILAR PRODUCTS

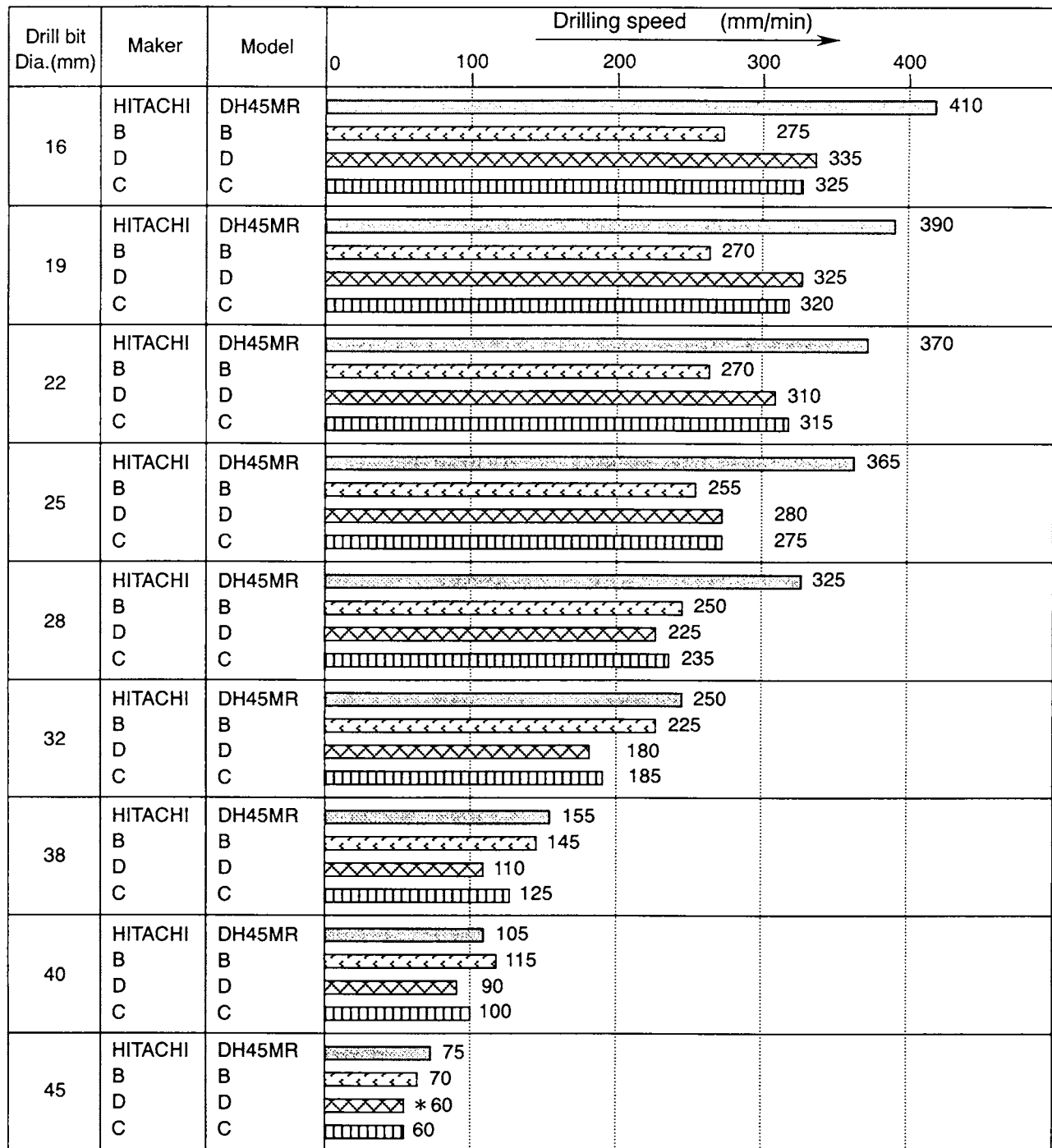
6-1. Specification Comparisons

Item \ Maker · Model		Hitachi DH 45MR	B	D	C
Capacity	Drill bit dia. (mm)	45 (1-3/4")	45 (1-3/4")	40 (1-9/16")	45 (1-3/4")
	Core bit dia. (mm)	125 (4-29/32")	150 (5-29/32")	150 (5-29/32")	125 (4-29/32")
Power input (W)		1,200	1,350	1,400	1,300
Impact energy per stroke (J)		15.5	15	—	8.3
Full-load rotation rate (min ⁻¹)		120 – 240	125 – 270	0 – 282	120 – 240
Full-load impact rate (min ⁻¹)		1,200 – 2,500	1,350 – 2,800	—	1,250 – 2,500
Full-load vibration level (dB(VL))		118	120	113	115
Full-load noise level (dB(A))		93	92	92	93
Dimensions	Length (mm)	500 (19-11/16")	545 (21-7/16")	510 (20-3/32")	488 (19-7/32")
	Height (mm)	270 (10-5/8")	288 (11-11/32")	288 (11-11/32")	270 (10-5/8")
	Width (mm)	108 (4-1/4")	110 (4-11/32")	115 (4-17/32")	118 (4-21/32")
Weight * (kg)		8.0 (17.6 lbs.)	8.2 (18.0 lbs.)	7.9 (17.4 lbs.)	7.8 (17.2 lbs.)
Insulation structure (Housing material)		Double insulation (Aluminum)	Double insulation (Plastic)	Double insulation (Plastic)	Double insulation (Plastic)

* Weight does not include cord and side handle.

6-2. Drilling Speed Comparisons

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



* Note that the data marked with asterisks are test results using drill bits which are beyond the tool's rated capacity. Use the above data as a reference, for comparisons only.

Fig. 1

[Test conditions]

Direction : Downward drilling

Pushing force : 147 N (15 kgf)

Test material : Concrete panel with a compression strength of 2,352 N/cm² (240 kgf/cm²)

6-3. Chiseling Performance Comparisons

Chiseling performance varies considerably depending on the work conditions. Use the factory test results shown in Fig. 2 for comparison purposes only.

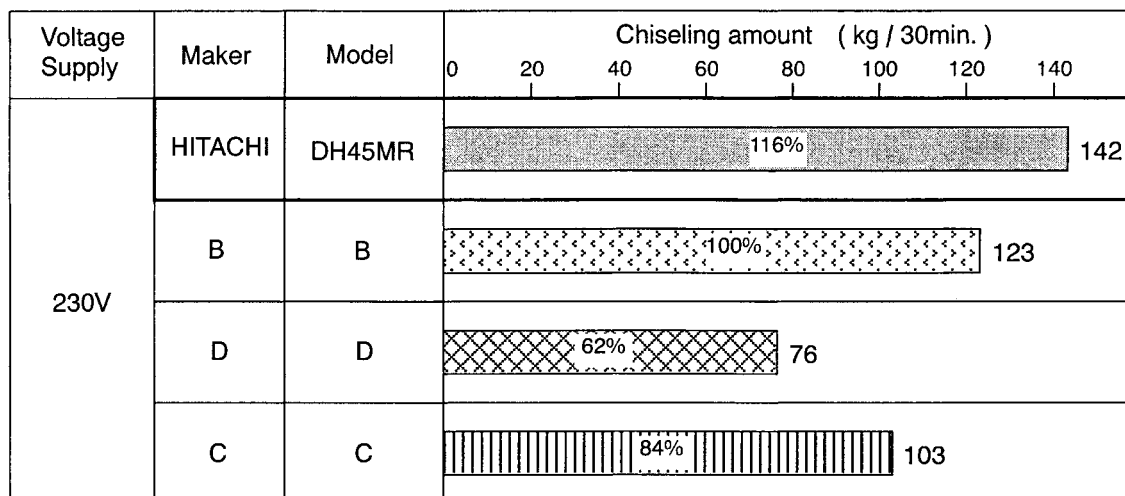


Fig. 2

7. PRECAUTIONS IN SALES PROMOTION

In the interest of promoting the safest and most efficient use of the Model DH 45MR 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 45MR 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.

8. REFERENCE INFORMATION

8-1. Grease Replacement

The striking portion and the speed reduction portion of the Model DH 45MR respectively use different types of grease. It is not necessary to replenish the grease unless the tool is disassembled for repair or there is grease leakage due to a damaged seal.

The striking portion uses special grease. To change the grease in the striking portion (inside the cylinder case and crank case), carefully wipe the old grease off the parts, and re-lube with 50 g (1.8 oz) into the cylinder crank case (connecting rod side) and 10 g (0.3 oz) into the cylinder case. Take care not to overfill the grease as an excessive amount of grease can cause hammer failure.

The speed reduction portion (inside the gear cover) uses Hitachi Motor Grease No. 29. The proper supply volume is 20 g (0.7 oz). Never use the striking portion special grease in the speed reduction portion. Special grease would leak into the motor portion and cause subsequent trouble.

Periodically replenish the inside of the slip clutch with Hitachi Motor Grease No. 29 to the full.

8-2. O-Ring Replacement

The O-rings (mounted on the striker and piston) are extremely important to ensure adequate sealing of the air pressure. Although the O-rings are made of special rubber to give them a long service life, they do nonetheless become worn, and should be replaced with new ones periodically depending on frequency of use of the tool. With average use, it is recommended that the O-rings be replaced at least every six months to ensure maximum effectiveness.

8-3. Structure of the Model DH 45MR Rotary Hammer

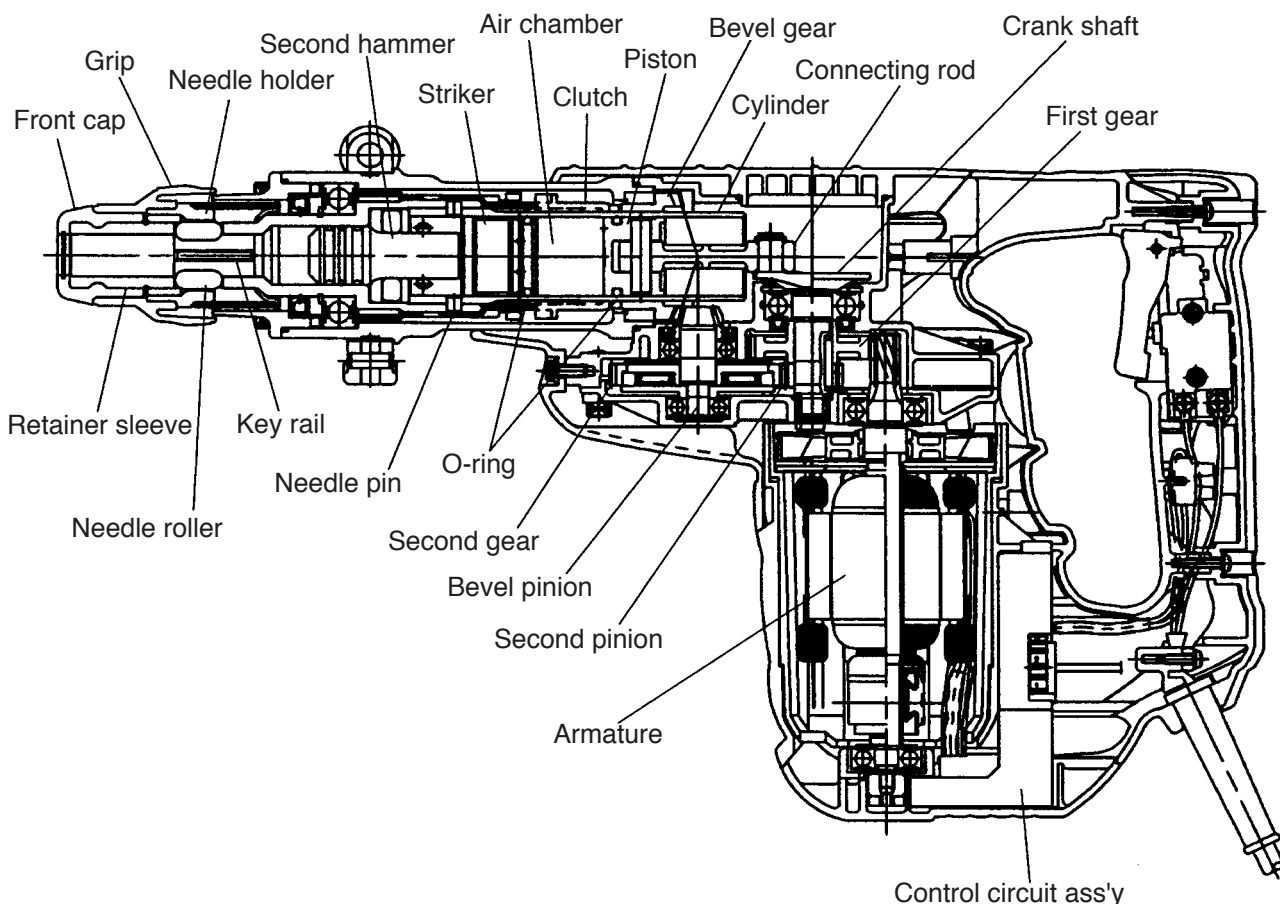


Fig. 3

○ Torque transmission

Armature rotation is transmitted to the second gear through the first gear of the crank shaft and second pinion. Then the rotation is transmitted from the second gear through the slip mechanism disposed between the second gear and bevel pinion shaft to turn the bevel gear. Rotation of the bevel gear is then transmitted to the cylinder keyed thereto through the clutch. Cylinder rotation is conveyed to the retainer sleeve coupled together by means of four needle pins and, then to the drill bit inserted into the retainer sleeve by way of three key rails and two needle rollers which couple them together.

○ Striking operation

The rotation of the armature is transferred to the crank shaft and connecting rod, which in turn cause the piston to reciprocate inside the cylinder. As the piston reciprocates, the changing air pressure inside the air chamber between the piston and the striker causes the striker to continuously strike against the end of the second hammer. At the same time, the air-cushion effect within the air chamber absorbs the impact of the striker. Should the air escape from the air chamber, the air-cushion effect would cease, and the impact energy would not be absorbed. Accordingly, the O-rings mounted on the striker and piston play an extremely important role in sealing the air within the air chamber.

○ Mechanism to prevent idle hammering

The arrangement against idle hammering of this rotary hammer is about the same as for the DH 40MR in which, when the drill bit or bull point is not longer pressed against the concrete or similar material, the second hammer moves to a position shown in Fig. 4 so that the striker is displaced from its hammering position. This opens the air hole so that piston movement causes no change in air pressure chamber, thus stopping the hammering action.

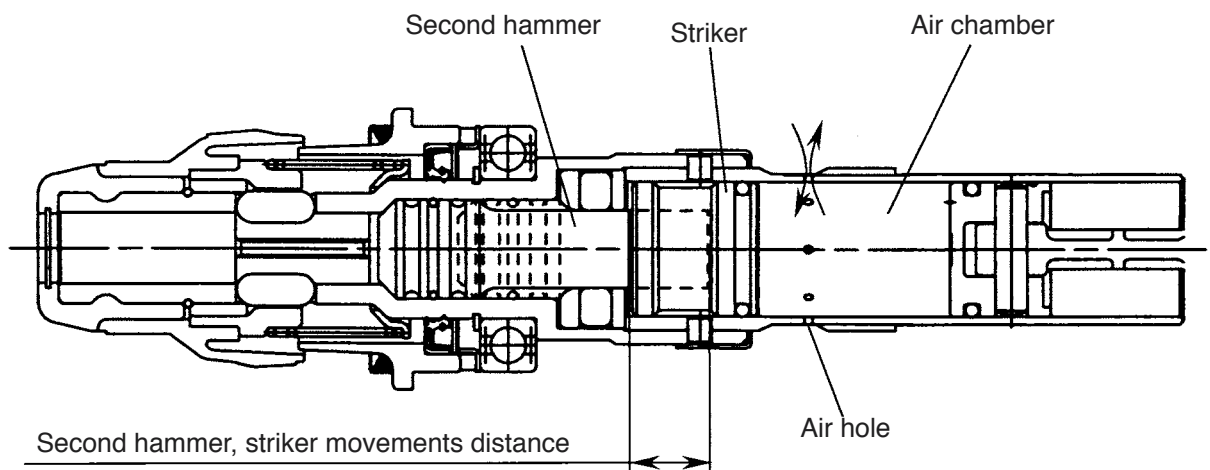


Fig. 4

○ Slip clutch mechanism

The slip clutch mechanism is described below with reference to Fig. 5. The bevel pinion and the gear holder are coupled together by the key and press-fitting. Spring (C) and needle pins are housed in elongated grooves of the gear holder. The needle pin is pressed against the inner face of second gear by spring (C) to allow idle rotation of the second gear relative to the gear holder. When an excess torque is exerted on the bevel pinion shaft, the needle pin is raised upon the projection of the second gear against the load of spring (C) to allow idle rotation of the second gear. With the arrangement, the clutch slips when an excessive torque is applied to the working tool as when the drill bit contacts steel bar/wire in the concrete, protecting the operator from unexpected motion of the side handle.

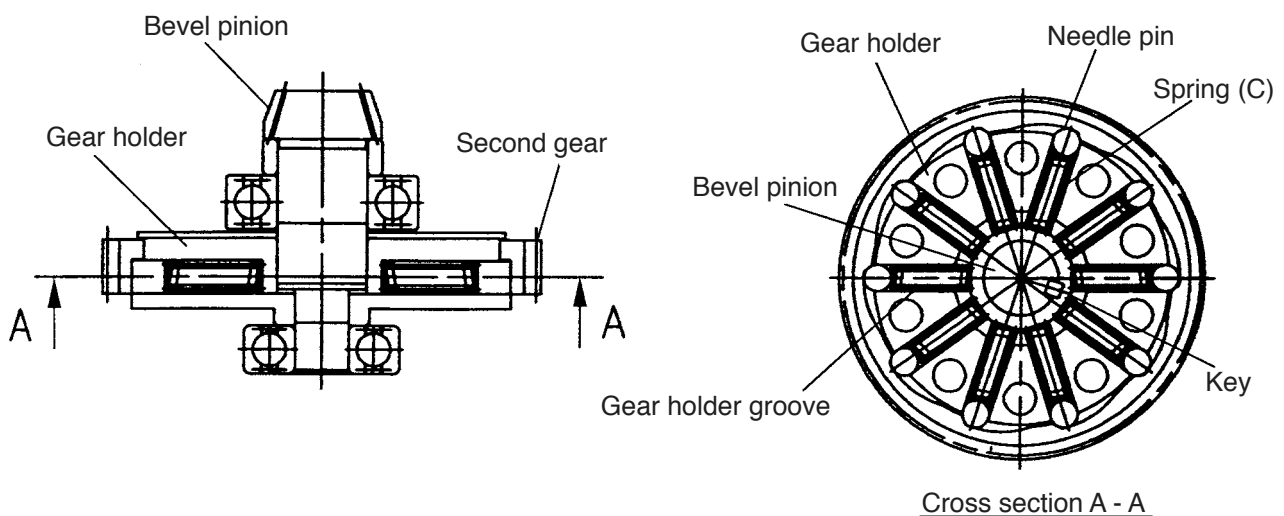


Fig. 5

○ Tool holder

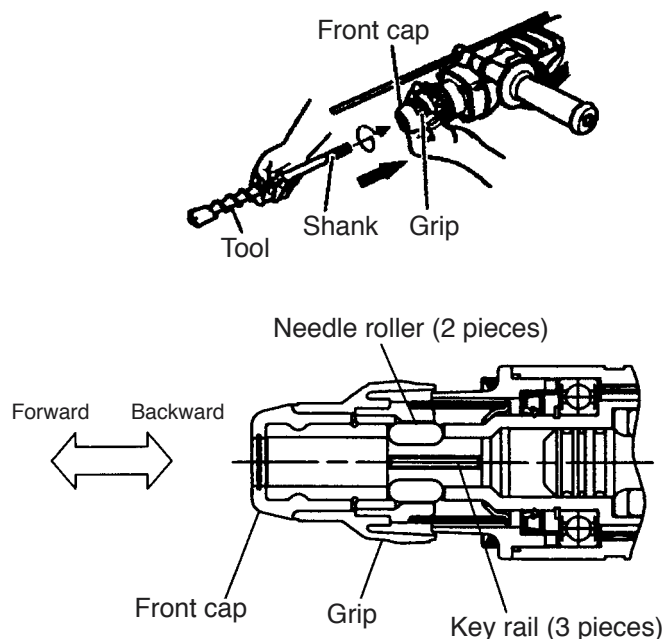


Fig. 6

The tool inlet is covered with the front cap (made of rubber) to prevent chips from entering inside. Two needle rollers fall into the round groove of the drill bit to retain the working tool, and three key rails transmit the rotation torque. To attach a working tool, align the groove positions turning the working tool, then insert the working tool into the hole until it contacts the innermost end of the hole. Releasing the grip reverts the grip and secures the tool in place. To remove the tool, fully pull the grip backward and pull out the tool (Fig. 6).

○ Handle and side handle

The handle section is of a two-layer structure consisting of the glassfiber-reinforced plastic base and the outside soft resin layer molded in one piece.

The side handle also has a two-layer structure consisting of the glassfiber-reinforced plastic base with a steel nut and the outside soft resin layer molded in one piece. The newly designed handle and side handle structure ensures more comfortable grip for improved operability.

○ Sealing and dust-proof structure

The cylinder case and the crank case section are tightly sealed with four O-rings and three oil seals as shown in Fig. 7. This prevents leakage of grease from the cases, while also protecting them against dust from outside. The tool holder is also protected from foreign dust by means of a rubber front cap.

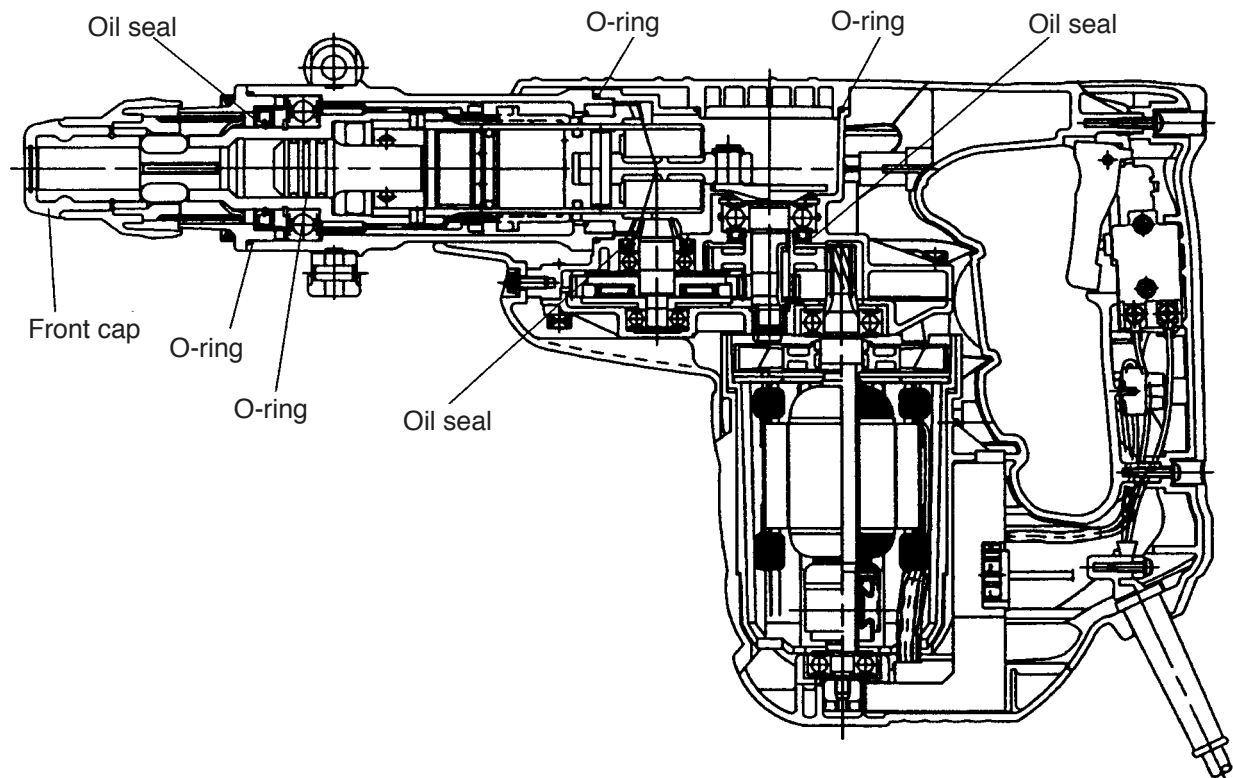


Fig. 7

○ Switching between "Rotation + Hammering", "Neutral" and "Hammering only"

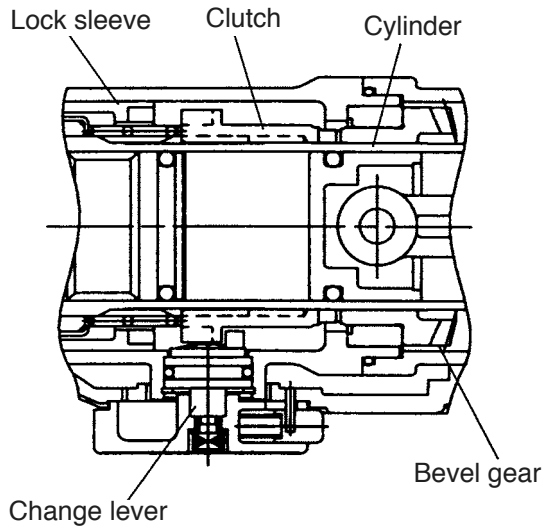


Fig. 8

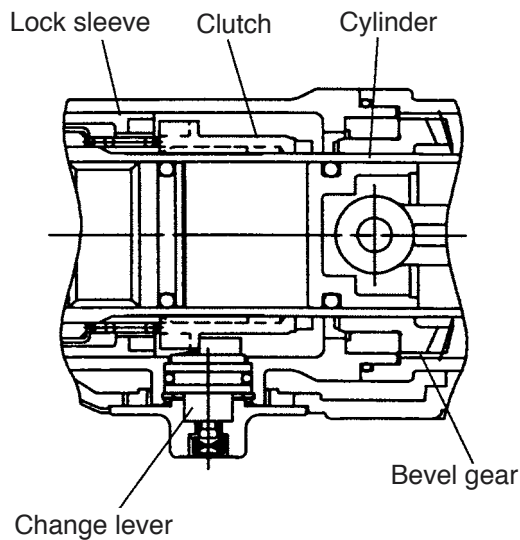


Fig. 9

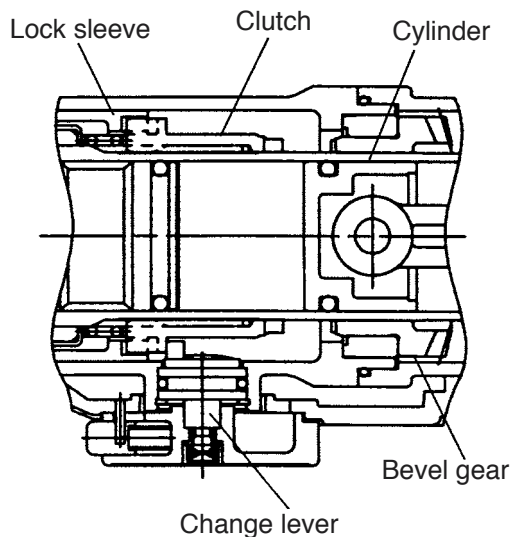


Fig. 11

All the shanks of the SDS-max type working tools such as drill bits (for drilling) and bull points (for chiseling) have the same shape. When chiseling or chipping with the Model DH 45MR, it is necessary to stop the rotation and choose the "Hammering only" mode by mean of the change lever to lock the working tool against rotation.

Figure 8 is a cross-sectional view showing the "Rotation + Hammering" mode, in which the bevel gear claw meshes with the clutch claw to transmit rotation to the cylinder keyed to the clutch, so as to rotate the working tool.

Figure 9 is a sectional view showing the "Neutral" mode, in which, with the change lever turned 90°, the bevel gear is brought out of engagement with the clutch to cut off transmission of rotation. In this position, the tool holder grip can be manually turned and the working tool (for chiseling or chipping) is adjustable to the desired position in 12 steps easily (Fig. 10).

Figure 11 is likewise a sectional view showing the "Hammering only" mode. With the change lever turned another 90°, the splines on the inner circumference of the lock sleeve come into mesh with the splines on the outer circumference of the clutch, so that the cylinder as well as the working tool are prevented from rotating.

Although the Model DH 45MR has three selectable modes as mentioned above, use of a working tool for chipping or chiseling in the "Rotation + Hammering" mode will result in an accident. Be sure to instruct the customers to select the "Hammering only" mode when doing chiseling or chipping work.

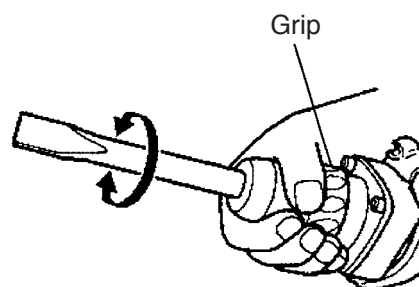


Fig. 10

9. REPAIR GUIDE

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

9-1. Disassembly

(1) Disassembly of the tool holder

Pull the Grip **[2]** in the arrow direction to the full as shown in Fig. 12. Remove the Front Cap **[1]**. (Front Cap **[1]** is made of rubber and fitted securely. Pull the Front Cap **[1]** forcefully to remove.) Thus the Grip **[2]** can be removed from the Retainer Sleeve **[17]**.

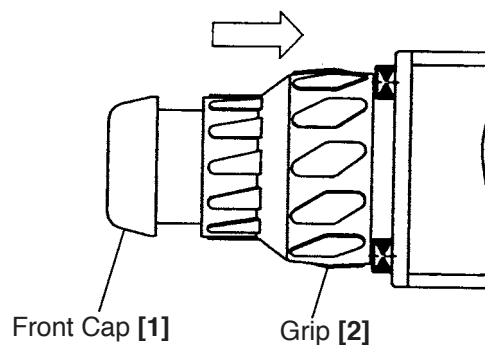


Fig. 12

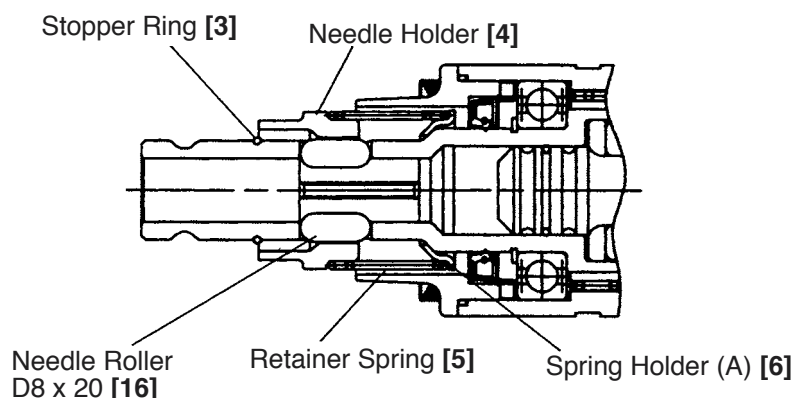


Fig. 13

Remove the Stopper Ring **[3]** using a retaining ring puller. Then the Needle Holder **[4]**, two Needle Rollers D8 x 20 **[16]**, Retainer Spring **[5]** and Spring Holder (A) **[6]** can be removed from the Retainer Sleeve **[17]** (Fig. 13).

(2) Disassembly of the piston and the striker

Remove the Hex. Socket Hd. Bolt (W/Flange) M5 x 16 **[56]** from the Crank Cover **[57]** then remove the Crank Cover **[57]** from the Crank Case **[96]**. Remove the Seal Lock Hex. Socket Hd. Bolt M4 x 12 **[39]** from the Change Lever **[40]** and remove the Change Lever **[40]** and the Lever Holder **[41]**. Remove the Hex. Socket Hd. Bolt (W/Flange) M6 x 25 **[36]** and remove the Cylinder Case **[35]** from the Crank Case **[96]**. Remove the Seal Lock Hex. Socket Hd. Bolt M6 x 25 **[7]** from the Front Cover **[8]**. Then the Retainer Sleeve **[17]**, Front Cover **[8]**, Lock Sleeve **[26]**, Lock Spring **[25]**, Second Hammer **[19]**, Clutch **[31]**, Clutch Spring **[28]**, Cylinder **[24]**, etc. can be removed from the Cylinder Case **[35]** in an assembled state (Fig. 14).

Remove the Striker **[29]** by tapping the Cylinder **[24]** with a plastic hammer. The Piston **[33]** remains in the Crank Case **[96]**. Remove the Retaining Ring for D10 Shaft **[48]** using a retaining ring puller and remove the Connecting Rod **[34]** from the Crank Shaft **[49]**. If it is difficult to remove the Cylinder **[24]** from the Retainer Sleeve **[17]**, place the Ball Bearing 6007DDUAV2S **[14]** mounted around the Retainer Sleeve **[17]** on an appropriate support and press the end surface of the Second Hammer **[19]** with an appropriate steel rod.

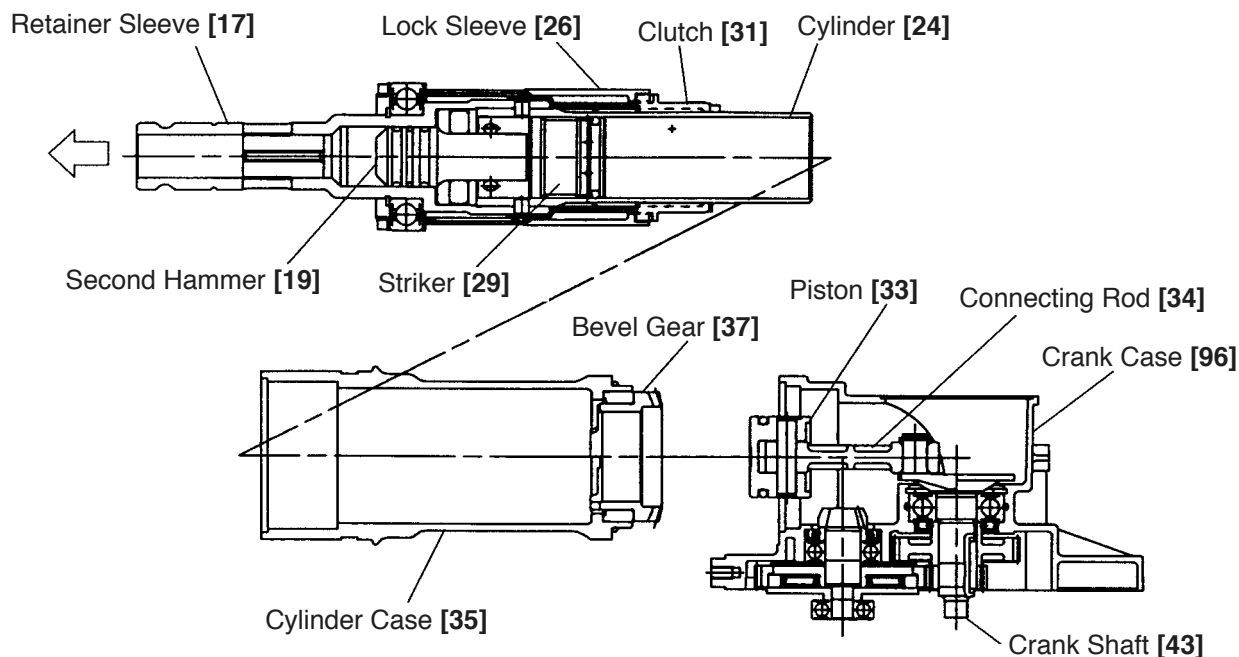


Fig. 14

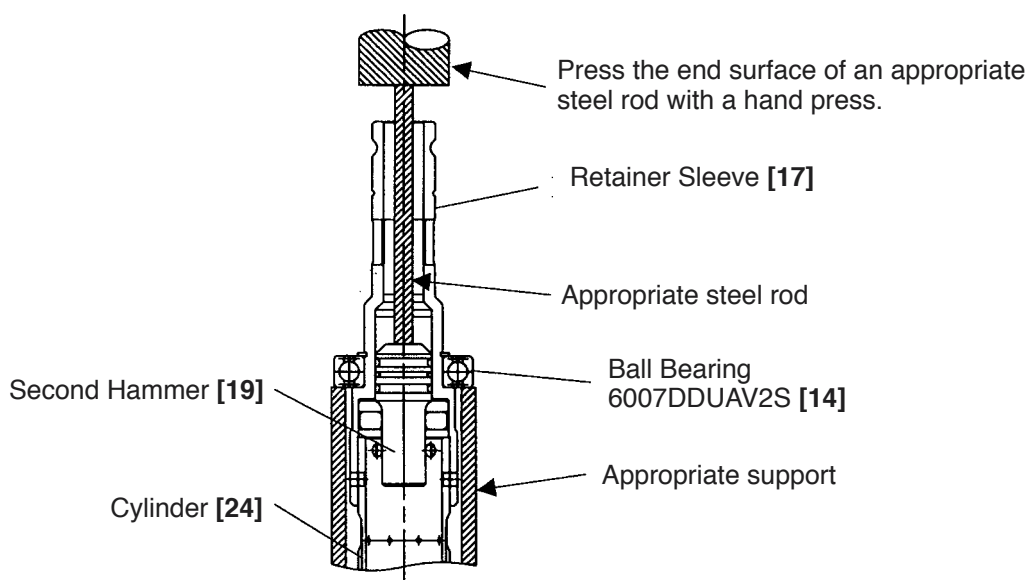


Fig. 15

(3) Disassembly of the gears and the crank shaft

Remove grease adhered to the Connecting Rod [34] side and the First Gear [97] side of the Crank Case [96].

Remove the Retaining Ring for D40 Hole [51] from the Ball Bearing 6203DDCMPS2L [52] using a retaining ring puller. At this time, shift the position of the crank pin of the Crank Shaft [49] as shown in Fig. 16 so that the hole of the retaining ring can be seen before removal. Face the Connecting Rod [34] side of the Crank Case [96] downward and place it on an appropriate support. Press the end surface of the Crank Shaft [49] with a hand press to remove the First Gear [97], Second Pinion [98] and the Crank Shaft [49] (Fig. 17).

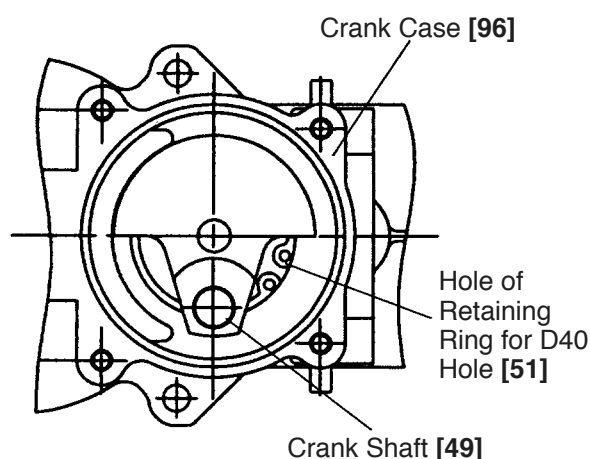


Fig. 16

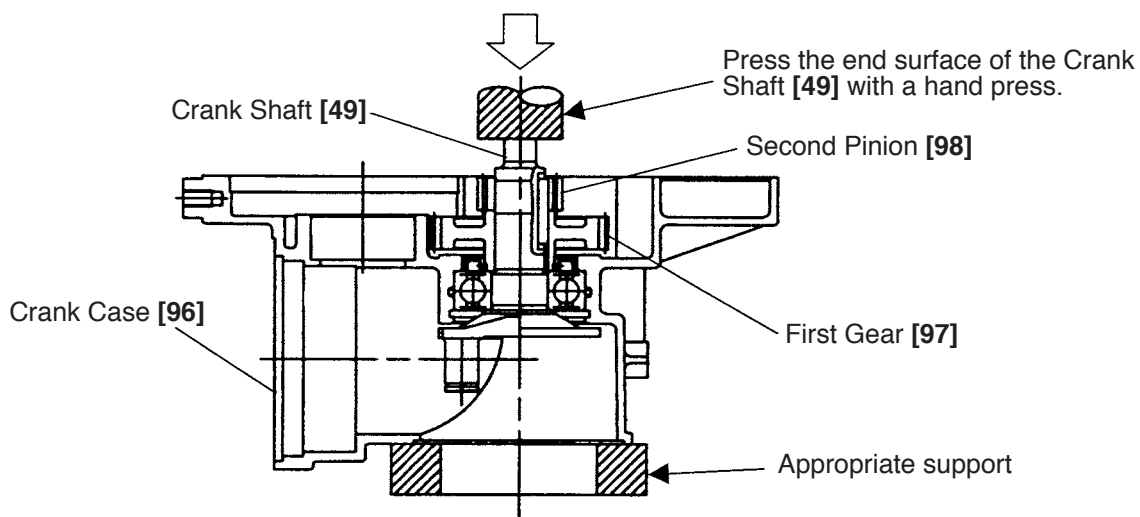


Fig. 17

(4) Disassembly of the slip clutch

Remove the Ball Bearing 629VVC2PS2L [71] with a bearing puller. Place the assembly on a sleeve-type support facing Washer (A) [65] downward as shown in Fig. 18. Push the Spacer [70] side of the Bevel Pinion [60] with a hand press to remove the Gear Holder [66] and the Spacer [70] from the Bevel Pinion [60].

Before removal of the Second Gear [69] from the Gear Holder [66], put the assembly in a poly bag and disassemble it to prevent missing of Spring (C) [67] and Needle [68].

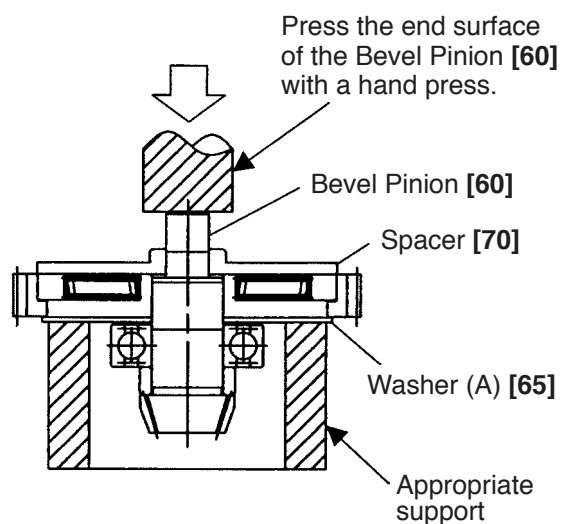


Fig. 18

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) Reassembly of the first gear and the crank shaft

Press-fit Oil Seal (A) [54] into the Crank Case [96] and mount O-ring (S-40) [53]. Press-fit the Ball Bearing 6203DDCMPS2L [52]. Mount the Retaining Ring for D40 Hole [51] using a retaining ring puller. Press-fit the Crank Shaft [49] into the Ball Bearing 6203DDCMPS2L [52]. Put the Feather Key 3 x 3 x 20 [50] in the groove of the Crank Shaft [49] and press-fit the First Gear [97] with an appropriate jig while holding the flat portion of the Crank Shaft [49] with an appropriate steel bar. Before press-fitting, make sure that the Feather Key 3 x 3 x 20 [50] fits in the key groove of the First Gear [97]. Press-fit the Crank Shaft [49] into the Second Pinion [98] in the same manner as the reassembly of the First Gear [97] (Fig. 19).

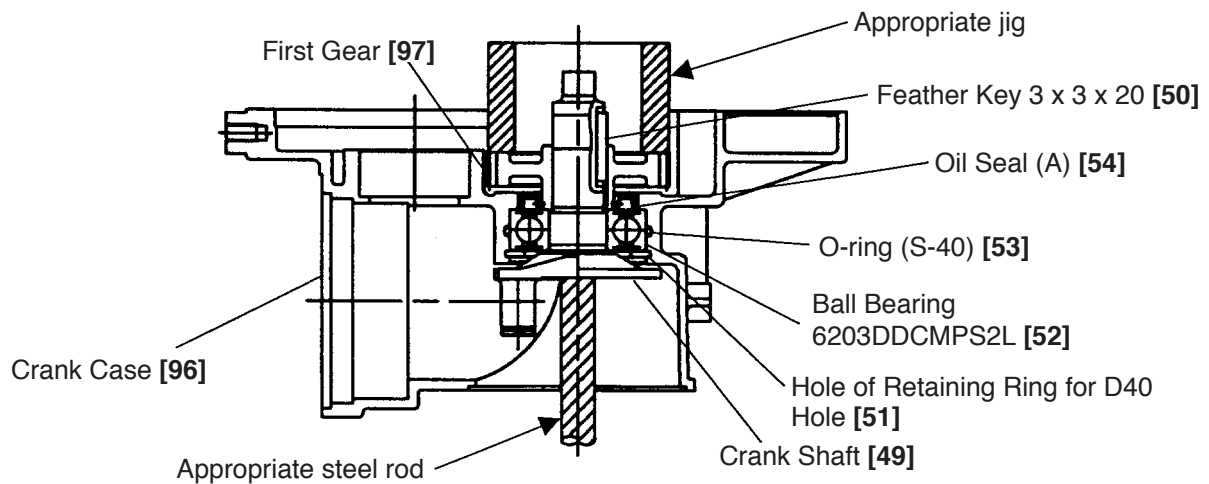


Fig. 19

(2) Reassembly of the piston

Insert the Piston Pin [32] into the 8-mm dia. hole (marked) of the Piston [33] and the Connecting Rod [34] then press-fit it. Mount the O-ring (I.D 27.2) [30] to the Piston [33]. Be careful not to protrude the Piston Pin [32] from the outside diameter of the Piston [33]. Move the crank pin of the Crank Shaft [49] to the bottom dead center and mount the piston assembly to the Crank Shaft [49] from the front cover side of the Crank Case [96]. Mount the Retaining Ring for D10 Shaft [48] using a retaining ring puller (Fig. 20).

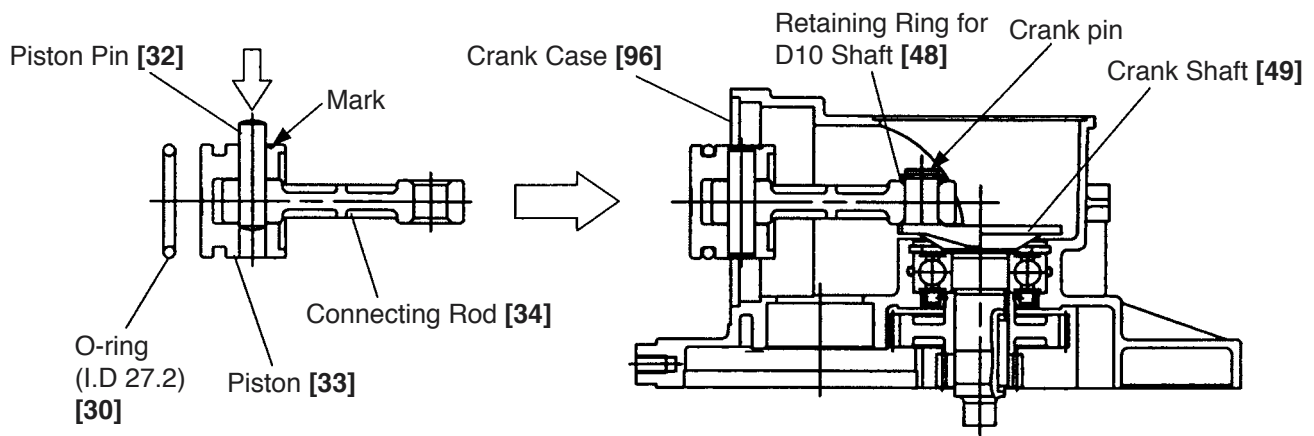


Fig. 20

(3) Reassembly of the cylinder and the retainer sleeve

Press-fit the Retainer Sleeve [17] into the Ball Bearing 6007DDUAV2S [14]. Secure it with the Retaining Ring for D35 Shaft [13]. Mount the Second Hammer [19], Damper Washer [20], Damper [21] and Damper Holder [22] to the Retainer Sleeve [17]. Mount the Damper Washer [20] aligning the rounded surface of the inside diameter with the rounded surface of the Second Hammer [19]. Insert the Striker [29] into the Cylinder [24] then insert the Cylinder [24] into the Retainer Sleeve [17]. Secure the Cylinder [24] and the Retainer Sleeve [17] with the four Needle Pins D6 x 6 [23] and cover it with Spring Holder (B) [27]. Mount the Bearing Washer [15], Lock Spring [25], Lock Sleeve [26], Clutch Spring [28] and Clutch [31] to the Cylinder [24]. Mesh the claw of the Lock Sleeve [26] with the claw of the Clutch [31]. Mount the retainer sleeve assembly into the Cylinder Case [35] aligning the spline of the Lock Sleeve [26] with the spline groove at the inner circumference of the Cylinder Case [35]. Insert the Bevel Gear [37] into the Cylinder Case [35] from the piston side (Fig. 21).

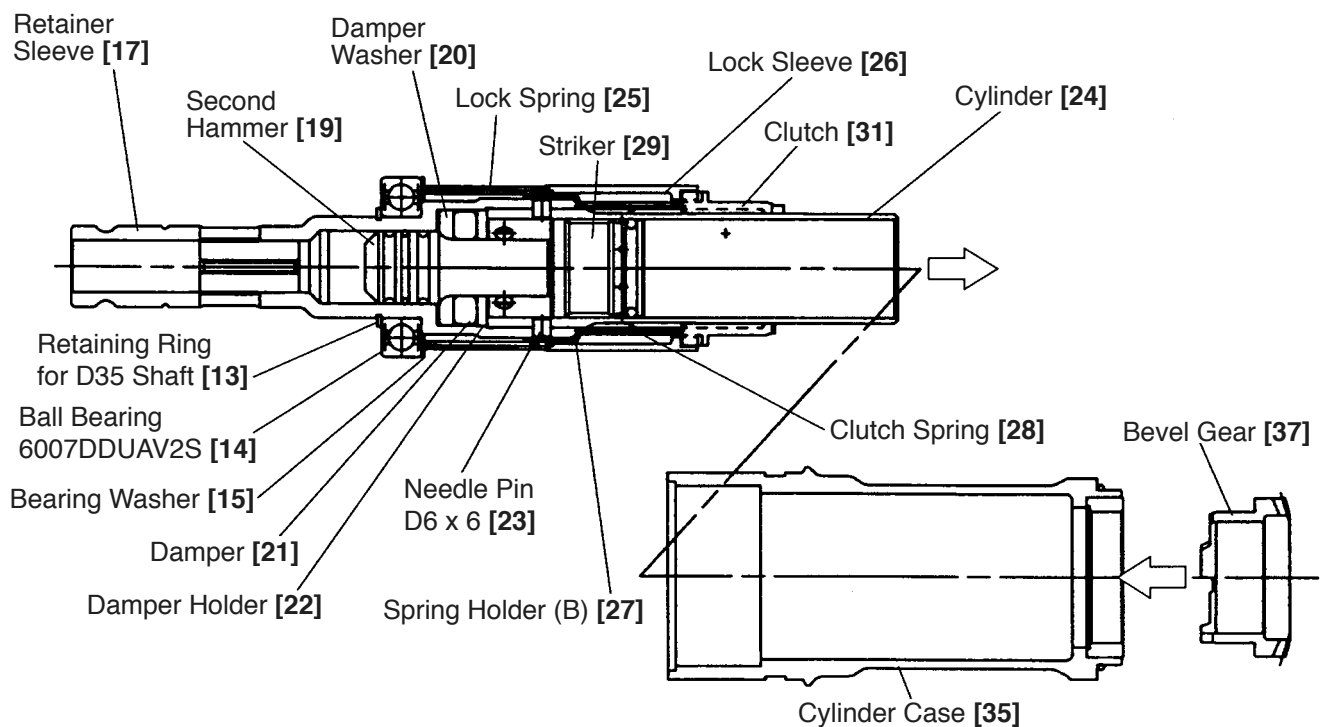


Fig. 21

(4) Reassembly of the slip clutch

Press-fit the Bevel Pinion [60] into the Collar [61] and the Ball Bearing 6002DDCMPS2L [63] then insert it into the Washer [64] and Washer (A) [65]. Mount the Feather Key 3 x 3 x 8 [59] to the Bevel Pinion [60] then press-fit into the Gear Holder [66]. Mount the Second Gear [69] around the outer circumference of the Gear Holder [66]. Before mounting, apply Hitachi Motor Grease No. 29 to the inner circumference of the Second Gear [69]. Insert the ten Needles [68] being careful not to incline them, then push in ten Springs (C) [67] as shown in Fig. 22. Fill the slots and the through holes of the Gear Holder [66] with Hitachi Motor Grease No. 29. Press-fit the Bevel Pinion [60] into the Spacer [70] and the Ball Bearing 629VVC2PS2L [71].

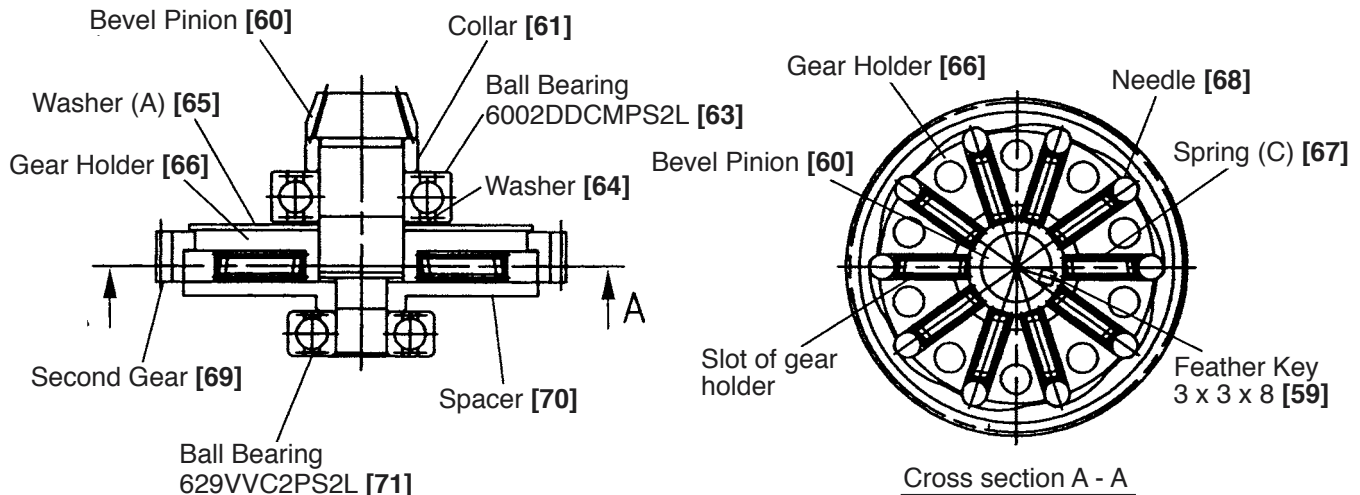


Fig. 22

(5) Carbon brush inspection

The motor employs Carbon Brushes [105] which are consumable parts. Use of excessively worn carbon brushes could result in the motor trouble. Replace the Carbon Brushes [105] with new Hitachi carbon brushes which are numbered "71" as shown in Fig. 23 when they become worn to or near "wear limit" (7 mm). In addition, always keep Carbon Brushes [105] clean and ensure that they slide freely within the brush holders.

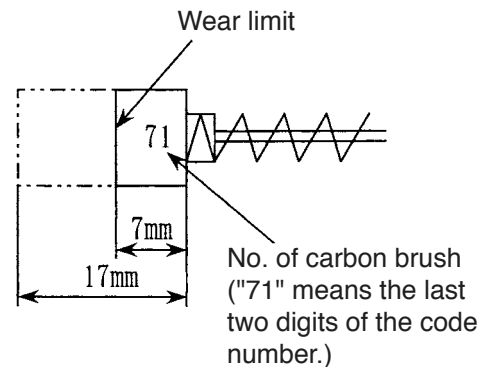


Fig. 23

(6) Application of lubricant

Apply special grease (for hammer and rotary hammer) to the inner circumference of the Connecting Rod [34], the O-rings (I.D 27.2) [30] of the Striker [29] and the Piston [33], the sliding portion of the Second Hammer [19], Oil Seal [10], Oil Seal (A) [54], Oil Seal (A) [62], Damper [21] and the inner and outer circumference of the Bevel Gear [37]. Fill 50 g of the special grease in the Crank Case [96] on the connecting rod side and 10 g in the Cylinder Case [35].

Apply Hitachi Motor Grease No. 29 to the Needle Bearing (M661) [99], the pinion portion of the Armature Ass'y [119] and the Needle Roller D8 x 20 [16]. Fill 20 g of the Hitachi Motor Grease No. 29 in the Crank Case [96] on the First Gear [97] side and the Gear Cover [74] side.

(7) Oil seal and others

Take care not to scratch or cut Oil Seal (A) [54] and Oil Seal (A) [62] of the Crank Case [96], Oil seal [10] and O-ring (1AS-60) [9] of the Front Cover [8], O-ring (C) [18] of the Second Hammer [19], O-ring (1AS-60) [9] of the Crank Cover [57], O-ring (1AS-60) [9] of the Cylinder Case [35] and O-ring (I.D 27.2) [30] of the Piston [33] and the Striker [29].

9-3. Screw Locking Agent TB1401

Apply screw locking agent TB1401 to all hex. socket head bolts M4, M5 and M6.

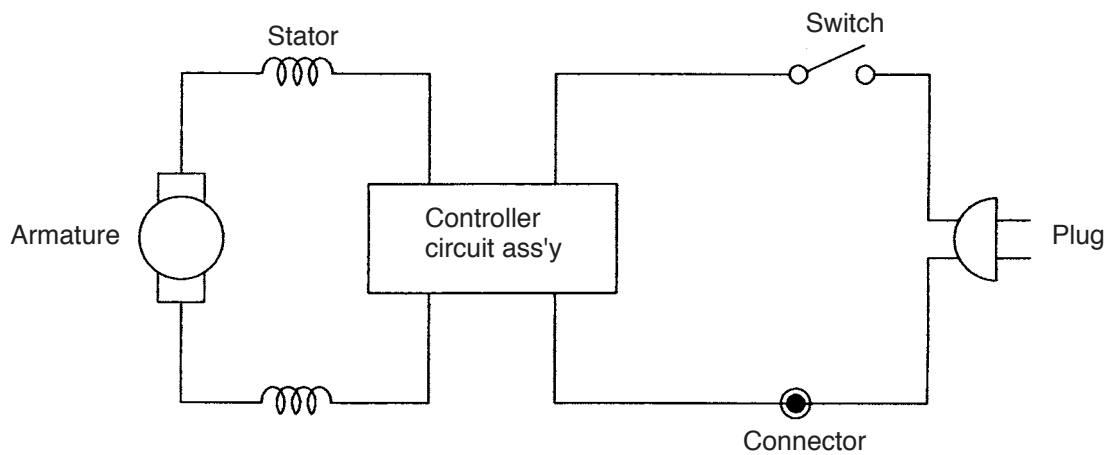
NOTE: Be sure to apply screw locking agent ThreeBond TB1401 to the threads during reassembly, as the bolts loosened with vibration may cause damage to the tool body.

9-4. Tightening Torque

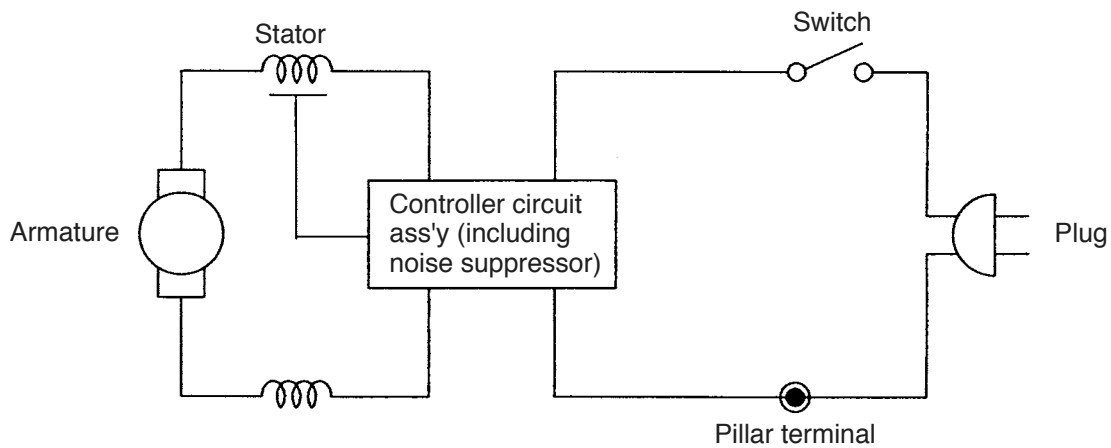
Front cover mounting bolts.....	13.7 $^{+2.94}_0$ N·m (140 $^{+30}_0$ kgf·cm)
(Hex. socket head bolt M6 x 25)	
Tapping screw D5.....	2.94 ± 0.49 N·m (30 ± 5 kgf·cm)
Housing mounting bolt	9.8 $^{+1.96}_0$ N·m (100 $^{+20}_0$ kgf·cm)
(Hex. socket head bolt M6 x 45)	
(Hex. socket head bolt M6 x 22)	
Cylinder case mounting bolt	
(Hex. socket head bolt (w/flange) M6 x 25)	
Tail cover mounting bolt	4.41 ± 0.49 N·m (45 ± 5 kgf·cm)
(Hex. socket head bolt M5 x 20)	
Lever shaft mounting bolt.....	4.41 ± 0.49 N·m (45 ± 5 kgf·cm)
(Hex. socket head bolt M4 x 12)	
Tapping screw (w/flange) D4.....	1.96 ± 0.49 N·m (20 ± 5 kgf·cm)
Crank cover mounting bolt	7.84 $^{+1.96}_0$ N·m (80 $^{+20}_0$ kgf·cm)
(Hex. socket head bolt M5 x 16)	
Handle mounting bolt	3.92 ± 0.49 N·m (40 ± 5 kgf·cm)
(Hex. socket head bolt (w/flange) M5 x 16)	
(Hex. socket head bolt (w/flange) M5 x 40)	
Hood (A) mounting bolt	
(Hex. socket head bolt (w/flange) M5 x 12)	

9-5. Internal Wiring

- Wiring diagram for products without noise suppressor



- Wiring diagram for products with noise suppressor



- Mounting diagram (for products with noise suppressor)

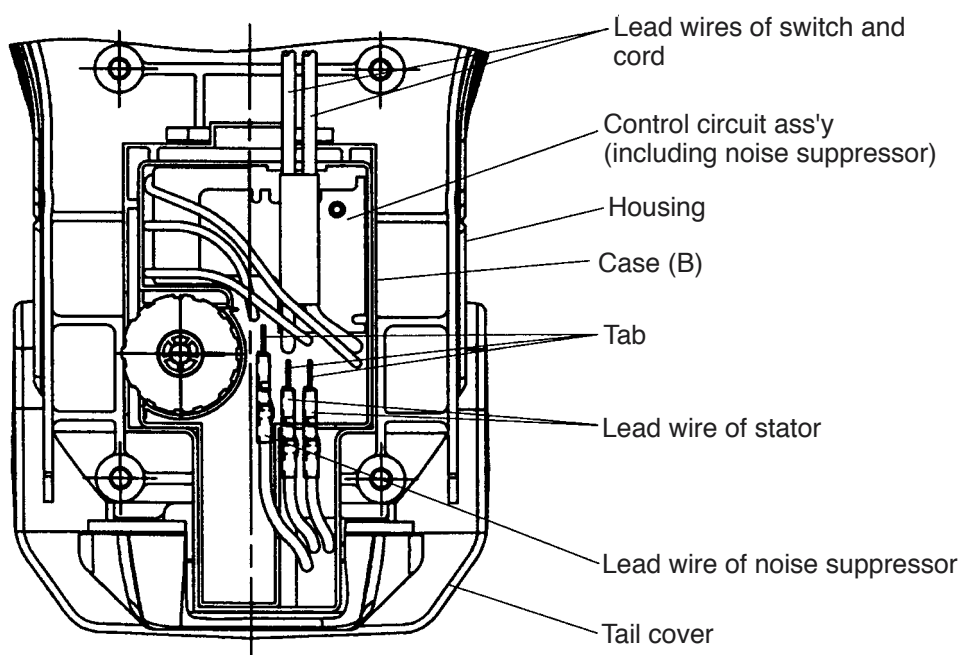


Fig. 24

9-6. Insulation Tests

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

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 – 127 V
(except U.K. products)

9-7. No-load Current Value

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

Voltage (V)	110	120	230	240
Current (A) (Max.)	6.6	6.1	3.2	3.0

10. STANDARD REPAIR TIME (UNIT) SCHEDULES

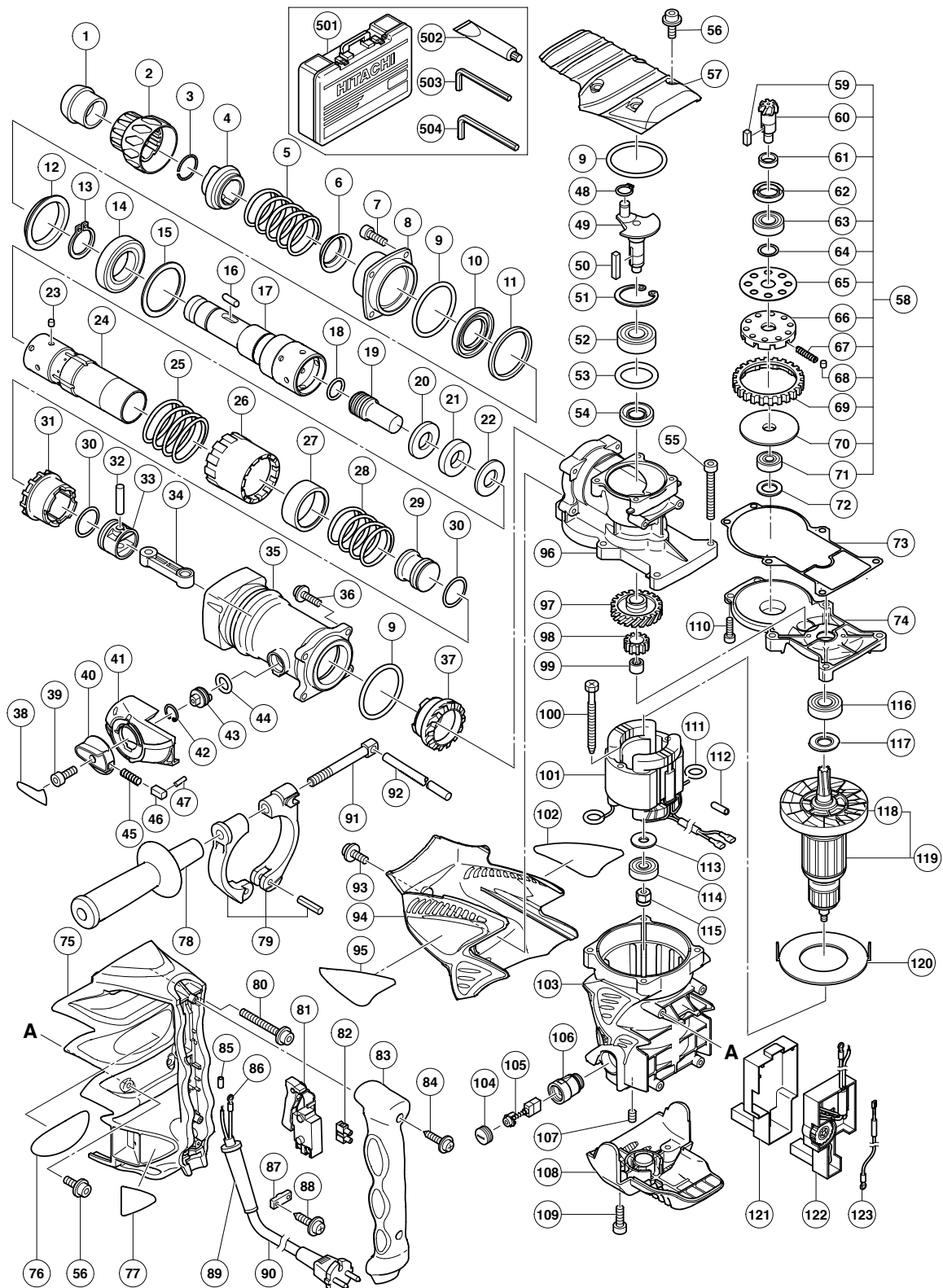
MODEL	Variable		10	20	30	40	50	60 min.	
	Fixed								
DH 45MR		Work Flow							
		Handle Cover Switch (C) Cord							
		Tail Cover							
		Crank Cover O-ring (1AS-60)							
	General Assembly			Controller Circuit Handle					
		Front Cap Grip Needle Holder Retainer Spring Spring Holder (A)	Front Cover O-ring (1AS-60) Oil Seal Rubber Ring Urethane Ring Holder						
		O-ring (P-16) Lever Shaft Lever Holder Change Lever Lever Spring Pushing Button	Ball Bearing (6007DD) Bearing Washer Needle Roller Retainer Sleeve O-ring (C) Second Hammer Damper Washer Damper Damper Holder						
				Striker O-ring x 2 Piston Piston Pin Connecting Rod					

ELECTRIC TOOL PARTS LIST

■ ROTARY HAMMER Model DH 45MR

2005 · 9 · 8

(E1)



PARTS

DH 45MR

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
1	321-306	FRONT CAP	1		
2	321-305	GRIP	1		
3	318-590	STOPPER RING	1		
4	321-304	NEEDLE HOLDER	1		
5	321-303	RETAINER SPRING	1		
6	321-302	SPRING HOLDER (A)	1		
7	981-942	SEAL LOCK HEX. SOCKET HD. BOLT M6X25	4		
8	321-300	FRONT COVER	1		
9	956-996	O-RING (1AS-60)	3		
10	321-301	OIL SEAL	1		
11	325-229	RUBBER RING	1		
12	315-868	URETHANE RING HOLDER	1		
13	948-131	RETAINING RING FOR D35 SHAFT	1		
14	600-7DD	BALL BEARING 6007DDUAV2S	1		
15	321-297	BEARING WASHER	1		
16	313-421	NEEDLE ROLLER D8X20	2		
17	324-919	RETAINER SLEEVE	1		
18	324-921	O-RING (C)	1		
19	324-920	SECOND HAMMER	1		
20	324-922	DAMPER WASHER	1		
21	324-923	DAMPER	1		
22	324-924	DAMPER HOLDER	1		
23	313-057	NEEDLE PIN D6X6	4		
24	324-925	CYLINDER	1		
25	324-930	LOCK SPRING	1		
26	324-931	LOCK SLEEVE	1		
27	324-927	SPRING HOLDER (B)	1		
28	324-928	CLUTCH SPRING	1		
29	324-926	STRIKER	1		
30	324-918	O-RING (I.D 27.2)	2		
31	324-929	CLUTCH	1		
32	324-917	PISTON PIN	1		
33	324-915	PISTON	1		
34	324-916	CONNECTING ROD	1		
35	324-932	CYLINDER CASE	1		
36	991-712	HEX. SOCKET HD. BOLT (W/FLANGE) M6X25	4		
37	324-933	BEVEL GEAR	1		
38	321-867	LEVER LABEL	1		
39	983-162	SEAL LOCK HEX. SOCKET HD. BOLT M4X12	1		
40	321-309	CHANGE LEVER	1		
41	324-935	LEVER HOLDER	1		
42	311-229	RETAINING RING FOR D20 HOLE	1		
43	324-934	LEVER SHAFT	1		
44	873-095	O-RING (P-16)	1		
45	321-310	LEVER SPRING	1		
46	321-311	PUSHING BUTTON	1		
47	321-312	PIN D2X10	1		
48	939-540	RETAINING RING FOR D10 SHAFT (10 PCS.)	1		
49	324-909	CRANK SHAFT	1		
50	971-750	FEATHER KEY 3X3X20	1		
51	948-391	RETAINING RING FOR D40 HOLE	1		

PARTS

DH 45MR

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
52	620-3DD	BALL BEARING 6203DDCMPS2L	1		
53	996-363	O-RING (S-40)	1		
54	971-745	OIL SEAL (A)	1		
55	986-940	SEAL LOCK HEX. SOCKET HD. BOLT M6X45	4		
56	994-192	HEX. SOCKET HD. BOLT (W/FLANGE) M5X16	8		
57	324-937	CRANK COVER	1		
58	324-912	SLIP CLUTCH ASS'Y	1	INCLUD. 59-61, 63-71	
59	944-109	FEATHER KEY 3X3X8	1		
60	324-913	BEVEL PINION	1		
61	321-279	COLLAR	1		
62	313-050	OIL SEAL (A)	1		
63	600-2DD	BALL BEARING 6002DDCMPS2L	1		
64	313-058	WASHER	1		
65	313-053	WASHER (A)	1		
66	321-281	GEAR HOLDER	1		
67	321-282	SPRING (C)	10		
68	320-343	NEEDLE	10		
69	324-914	SECOND GEAR	1		
70	321-283	SPACER	1		
71	629-VVM	BALL BEARING 629VVC2PS2L	1		
72	944-525	BEARING WASHER (C)	1		
73	325-230	SEAL PACKING	1		
74	324-944	GEAR COVER	1		
75	324-947	HANDLE	1		
76		NAME PLATE	1		
77	324-938	SDS MAX LABEL	1		
78	313-078	SIDE HANDLE	1		
79	313-079	HANDLE HOLDER	1		
80	980-673	HEX. SOCKET HD. BOLT (W/FLANGE) M5X40	2		
81	313-093	SWITCH (C) (2P SCREW TYPE W/O LOCK)	1		
82	938-307	PILLAR TERMINAL	1		
83	324-948	HANDLE COVER	1		
84	301-653	TAPPING SCREW (W/FLANGE) D4X20 (BLACK)	2		
* 85	981-373	TUBE (D)	2	FOR CORD	
* 86	980-063	TERMINAL	1		
* 86	930-804	TERMINAL M4.0 (10 PCS.)	1	FOR GBR (110V), USA, CAN	
* 87	960-266	CORD CLIP	1		
* 87	981-987Z	CORD CLIP	1	FOR SUI	
88	984-750	TAPPING SCREW (W/FLANGE) D4X16	2		
* 89	953-327	CORD ARMOR D8.8	1		
* 89	938-051	CORD ARMOR D10.1	1		
* 90	500-390Z	CORD	1	(CORD ARMOR D10.1)	
* 90	500-467Z	CORD	1	(CORD ARMOR D10.1) FOR GBR (110V)	
* 90	500-446Z	CORD	1	(CORD ARMOR D10.1) FOR GBR (230V)	
* 90	500-391Z	CORD	1	(CORD ARMOR D10.1) FOR SUI	
* 90	500-434Z	CORD	1	(CORD ARMOR D10.1) FOR USA, CAN	
* 90	500-439Z	CORD	1	(CORD ARMOR D8.8) FOR AUS	
* 90	500-408Z	CORD	1	(CORD ARMOR D8.8) FOR NZL	
91	313-080	HANDLE BOLT	1		
92	971-786	STOPPER ROD	1		
93	998-471	HEX. SOCKET HD. BOLT (W/FLANGE) M5X12	1		

PARTS

DH 45MR

[illegible]

STANDARD ACCESSORIES

DH 45MR

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
501	324-820	CASE (PLASTIC)	1		
502	981-840	GREASE (A) FOR HAMMER. HAMMER DRILL (30G)	1		
503	944-458	HEX. BAR WRENCH 4MM	1		
504	944-459	HEX. BAR WRENCH 5MM	1		

OPTIONAL ACCESSORIES

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
601	308-471	GREASE FOR HAMMER. HAMMER DRILL (70G)	1		
602	980-927	GREASE FOR HAMMER. HAMMER DRILL (500G)	1		
603	320-859	SYRINGE (BLOW-OUT BULB TYPE)	1		
604	318-085	SYRINGE (BELLOWS TYPE)	1		
605	313-448	DRILL BIT (SDS MAX) D16X340	1		
606	313-456	DRILL BIT (SDS MAX) D16X540	1		
607	313-449	DRILL BIT (SDS MAX) D19X340	1		
608	313-457	DRILL BIT (SDS MAX) D19X540	1		
609	313-450	DRILL BIT (SDS MAX) D22X320	1		
610	313-458	DRILL BIT (SDS MAX) D22X520	1		
611	313-451	DRILL BIT (SDS MAX) D25X320	1		
612	313-459	DRILL BIT (SDS MAX) D25X520	1		
613	313-452	DRILL BIT (SDS MAX) D28X370	1		
614	313-460	DRILL BIT (SDS MAX) D28X570	1		
615	313-453	DRILL BIT (SDS MAX) D32X370	1		
616	313-461	DRILL BIT (SDS MAX) D32X570	1		
617	313-454	DRILL BIT (SDS MAX) D38X370	1		
618	313-462	DRILL BIT (SDS MAX) D38X570	1		
619	313-455	DRILL BIT (SDS MAX) D40X370	1		
620	313-463	DRILL BIT (SDS MAX) D40X570	1		
621	944-460	TAPER SHANK DRILL BIT D11X100	1		
622	944-461	TAPER SHANK DRILL BIT D12.3X110	1		
623	993-038	TAPER SHANK DRILL BIT D12.7X110	1		
624	944-462	TAPER SHANK DRILL BIT D14.3X110	1		
625	944-500	TAPER SHANK DRILL BIT D14.5X110	1		
626	944-463	TAPER SHANK DRILL BIT D17.5X120	1		
627	313-464	TAPER SHANK ADAPTER ASS'Y (SDS MAX) NO. 1	1	INCLUD. 628	
628	944-477	COTTER	1		
629	313-465	ADAPTER (SDS MAX) FOR SDS PLUS SHANK BIT	1		
630	955-994	CORE BIT 25MM	1		
631	955-995	CORE BIT 29MM	1		
632	955-996	CORE BIT 32MM	1	INCLUD. 633	
633	955-997	GUIDE PLATE (FOR CORE BIT 32MM)	1		
634	955-998	CORE BIT 35MM	1	INCLUD. 635	
635	955-999	GUIDE PLATE (FOR CORE BIT 35MM)	1		
636	956-000	CORE BIT 38MM	1	INCLUD. 637	
637	956-001	GUIDE PLATE (FOR CORE BIT 38MM)	1		
638	955-154	CORE BIT 45MM	1	INCLUD. 639	
639	955-166	GUIDE PLATE (FOR CORE BIT 45MM)	1		
640	955-155	CORE BIT 54MM	1	INCLUD. 641	
641	955-167	GUIDE PLATE (FOR CORE BIT 54MM)	1		

OPTIONAL ACCESSORIES

DH 45MR

[illegible]

