

MODEL

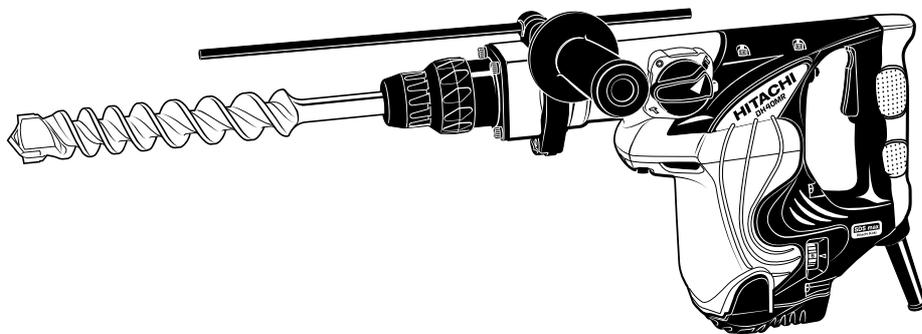
DH 40MR

HITACHI
POWER TOOLS

ROTARY HAMMER
DH 40MR

TECHNICAL DATA
AND
SERVICE MANUAL

D



LIST No. E467

Sep. 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	GBH5-40DE
D	HILTI	TE55
C	MAKITA	HR4000C



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1. PRODUCT NAME

Hitachi Rotary Hammer, Model DH 40MR

2. MARKETING OBJECTIVE

The Model DH 40MR is an upgraded version of the current Models DH 40MA and DH 40MB, which feature the use of SDS-max shank tools. The performance, durability and operability are greatly improved. With this competitive Model DH 40MR, we aim to enhance the share of SDS-max type rotary hammers.

The main specifications are as follows:

- (1) High drilling speed with low vibration and noise level
- (2) Self-drilling (Good feeling)
- (3) Internal double-insulation construction with sturdy aluminum frame
- (4) Constant speed with variable speed control
- (5) Soft-touch grip for easier handling
- (6) Variabel lock mechanism for easy working-angle adjustment of chisels etc.
- (7) A very original design

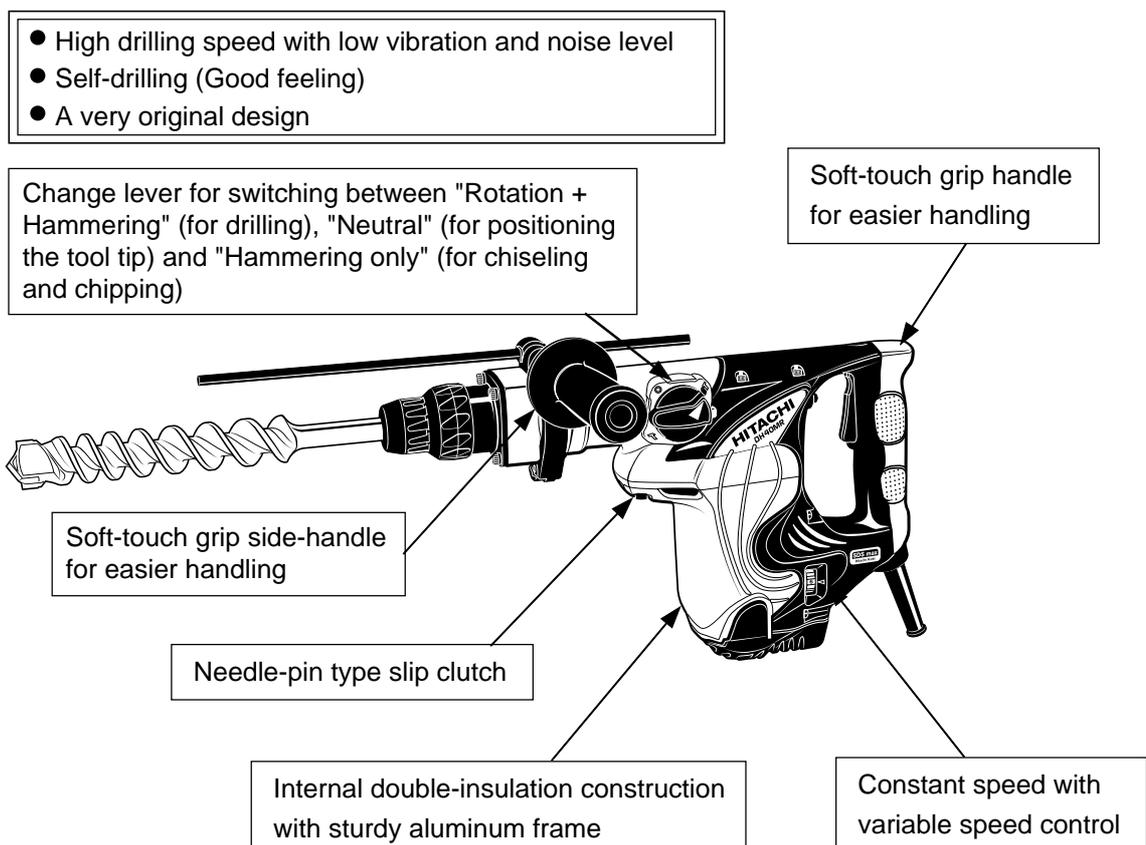
3. APPLICATIONS

- 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 with low vibration and noise level

The drilling speed is 10 % faster than that of similar products thanks to efficient striking energy transmission and speed setting. Even so, the Model DH 40MR produces lower vibration and noise levels than those of similar products.

Maker • Model		HITACHI DH 40MR	HITACHI DH 40MA/MB	B	D	C
Ratio of drilling speed	%	100	64	85	64	74
Full-load vibration level	dB (VL)	116.8	118.0	119.8	116.1	118.5
	m/s ²	6.9	7.9	9.8	6.4	8.4
Full-load noise level	dB (A)	92.4	94.6	93.7	93.2	93.5
No-load noise level	dB (A)	79.5	89.4	85.0	83.0	80.3

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

Full-load vibration and noise levels: A 20-mm dia. drill bit is used.

4-1-2. Self-drilling (Good feeling)

Thanks to the computer-simulated optimum striking characteristics, the quantity of body jumping is less than that of the current Model DH 40MA and the working tool smoothly penetrates into the workpiece with a light pressing force. The Model DH 40MR realizes quicker self-drilling with better impact feeling.

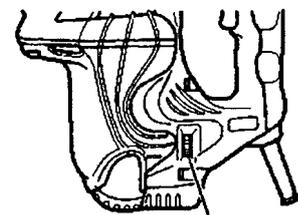
Impact efficiency	About 10 % up
Maximum compressed air force (piston force)	About 50 % down
Quantity of body jumping	About 25 % down

4-1-3. Internal double-insulation construction with sturdy aluminum frame

The aluminum die-cast outer frame is very sturdy (same as the Models H 45MR/H 45SR). 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 40MR is heavy-duty and the service life of the carbon brush is greatly prolonged (1.5 times longer than the conventional one) minimizing disconnection of the armature, deviation of the core and grease leakage.

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

The Model DH 40MR is equipped with a built-in electronic control circuit that can adjust the number of hammering steplessly between 1320 and 2650 min⁻¹ with the dial. Even though the load varies, the Model DH 40MR provides better operability and stable and efficient drilling performance because the constant speed control minimizes changes in number of rotation and hammering.



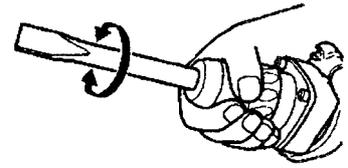
Speed-adjust dial

4-1-5. 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.

4-1-6. Change lever for switching between "Rotation + Hammering", "Neutral" and "Hammering only"

The Model DH 40MR 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".

4-1-7. Needle-pin type slip clutch

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

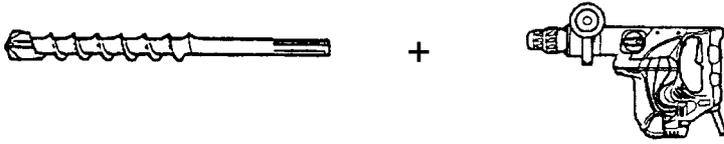
5. SPECIFICATIONS

5-1. Specifications

Capacity	Drill bit (Max. diameter): 40 mm (1-9/16") Core bit (Max. diameter): 105 mm (4-1/8")				
Power source	AC single phase 50 Hz or 60 Hz				
Voltage	110 V	120 V	220 V	230 V	240 V
Current	10 A	9.2 A	5 A	4.8 A	4.6 A
Power input	950 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 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: 240 to 480 min ⁻¹				
Impact rate	No load and full load: 1,320 to 2,650 min ⁻¹				
Weight	Product: 6.5 kg (14.3 lbs.); excluding cord and side handle Packed: 10.0 kg (22.1 lbs.)				
Packaging	Corrugated cardboard box with plastic tool case				
Standard accessories	<ul style="list-style-type: none"> • Plastic case1 • Side handle 1 • Hex. bar wrench (for M6) 1 • Hex. bar wrench (for M5) 1 • Hex. bar wrench (for M4) 1 • Stopper 1 • Grease (A) 1 				

5-2. Optional Accessories

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

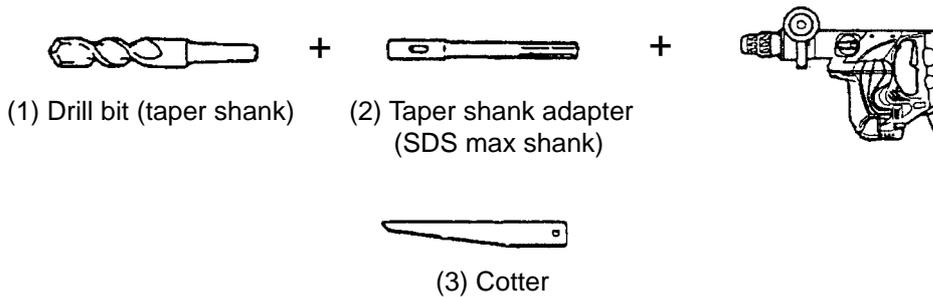


(1) Drill bit (SDS max shank)

Outer diameter (mm)	Over length (mm)	Code No.	Outer diameter (mm)	Over length (mm)	Code No.
16 (5/8")	340 (13-3/8")	313448	16 (5/8")	540 (21-1/4")	313456
19 (3/4")	340 (13-3/8")	313449	19 (3/4")	540 (21-1/4")	313457
22 (7/8")	320 (12-5/8")	313450	22 (7/8")	520 (20-15/32")	313458
25 (1")	320 (12-5/8")	313451	25 (1")	520 (20-15/32")	313459
28 (1-1/8")	370 (14-9/16")	313452	28 (1-1/8")	570 (22-7/16")	313460
32 (1-1/4")	370 (14-9/16")	313453	32 (1-1/4")	570 (22-7/16")	313461
38 (1-1/2")	370 (14-9/16")	313454	38 (1-1/2")	570 (22-7/16")	313462
40 (1-9/16")	370 (14-9/16")	313455	40 (1-9/16")	570 (22-7/16")	313463

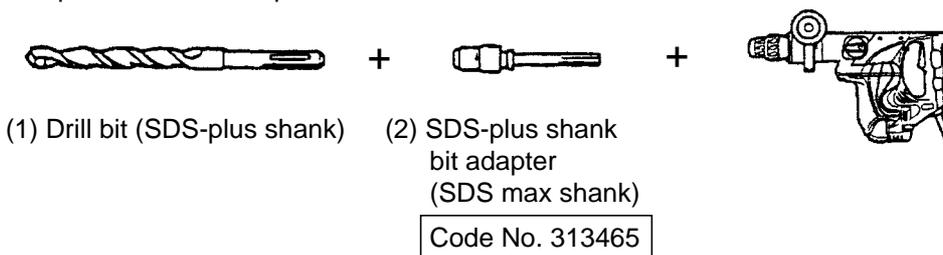
2. Drilling work for anchor holes (Rotation + Hammering)

① Drill bit (Taper shank)

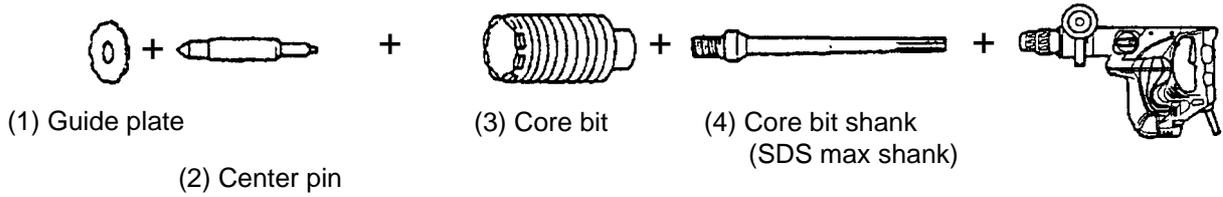


(1) Drill bit (Taper shank)		(2) Taper shank adapter		(3) Cotter
Outer diameter (mm)	Code No.	Taper dimension	Code No.	Code No.
11 (7/16")	944460	Morse taper No. 1	313464	944477
12.3 (15/32")	944461			
12.7 (1/2")	993038			
14.3 (9/16")	944462			
14.5 (9/16")	944500			
17.5 (11/16")	944463			

② SDS-plus shank bit adapter



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



(1) Guide plate

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

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

(2) Center pin

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

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

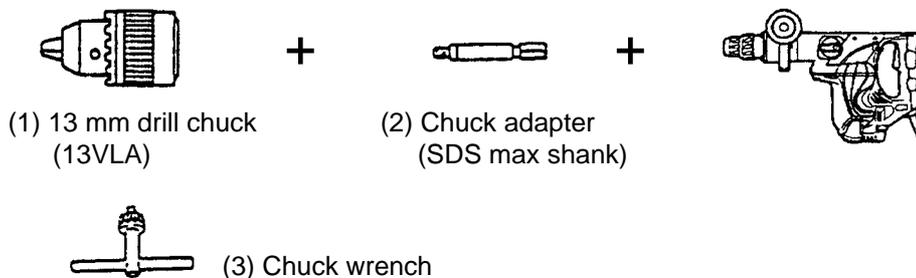
(3) Core bit

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		
45 (1-3/4")	955154	75 (2-15/16")	959709		

(4) Core bit shank (SDS max shank)

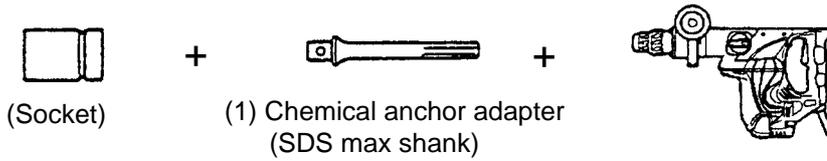
- Code No. 313466 for core bits with outer diameter of 25, 29, 32, 35 mm (1", 1-1/8", 1-1/4", 1-3/8")
- Code No. 313467 for core bits with outer diameter of 38, 45, 50, 54, 60, 64, 70, 75, 79, 94, 100, 105 mm (1-1/2", 1-3/4", 2", 2-1/8", 2-3/8", 2-1/2", 2-3/4", 2-15/16", 3-1/8", 3-11/16", 3-15/16", 4-1/8")

4. Hole drilling For drilling steel and wood



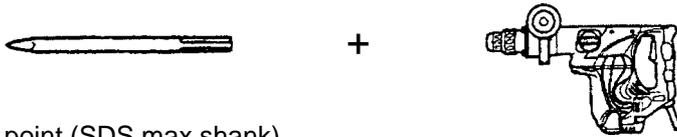
(1) 13 mm drill chuck (13VLA)	(2) Chuck adapter	(3) Chuck wrench
Code No. 950272	Code No. 313468	Code No. 930515

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



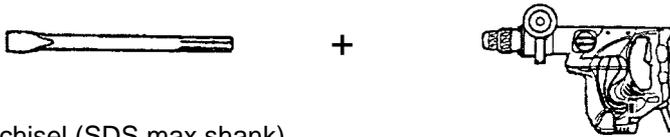
Socket square size	Code No.
12.7 mm (1/2")	313469
19.0 mm (3/4")	313470

6. Demolition work (Hammering)



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

7. Grooving and edging (Hammering)



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

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



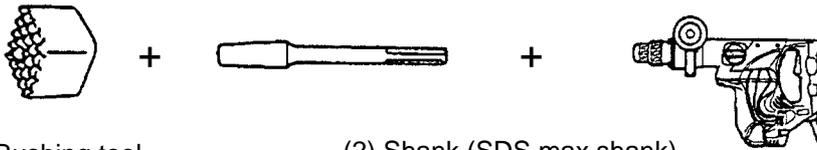
Overall length	Width	Code No.
400 mm (15-3/4")	50 mm (2")	313475

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



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

10. Surface roughing work (Hammering)



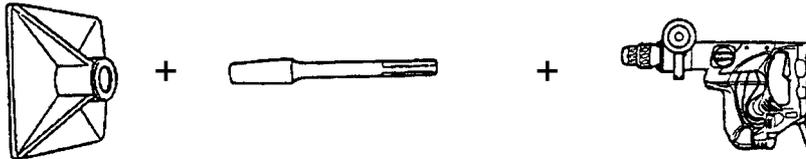
(1) Bushing tool

Code No.
313477

(2) Shank (SDS max shank)

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

11. Tamping work (Hammering)



(1) Rammer

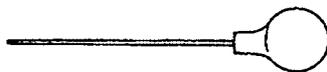
Code No.
313478

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)



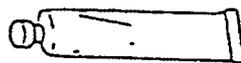
Code No. 944575

13. Impact drill grease



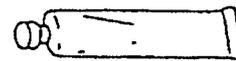
500 g (1.1 lbs.) Can

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

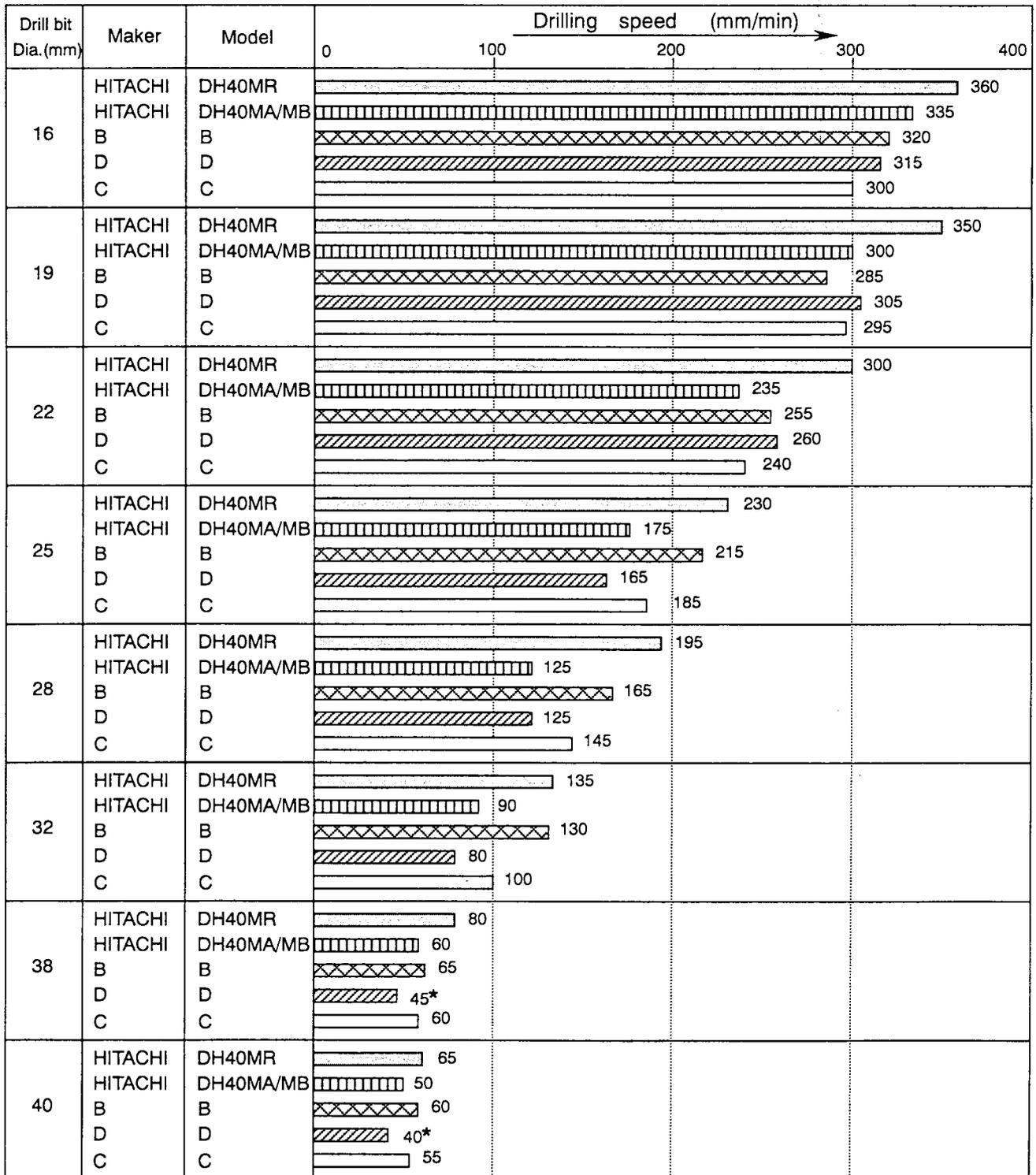
6-1. Specification Comparisons

Maker • Model		Hitachi DH 40MR	Hitachi DH 40MA/MB	B	D	C
Capacity	Drill bit dia. (mm)	40 (1-9/16")	40 (1-9/16")	40 (1-9/16")	32 (1-1/4")	40 (1-9/16")
	Core bit dia. (mm)	105 (4-1/8")	105 (4-1/8")	105 (4-1/8")	90 (3-17/32")	105 (4-1/8")
Power input (W)		950	950	1,100	900	900
Impact energy per stroke (J)		10	8	8.5	7	7
Full-load rotation rate (min ⁻¹)		240 – 480	360/ 180 – 360	0 – 340	0 – 480	230 – 450
Full-load impact rate (min ⁻¹)		1,320 – 2,650	2,800/ 1,400 – 2,800	0 – 3,300	0 – 2,630	1,250 – 2,500
Full-load vibration level (dB(VL))		116.8	118.0	119.8	116.1	118.5
Full-load noise level (dB(A))		92.4	94.6	93.7	93.2	93.5
No-load noise level (dB(A))		79.5	87.9	85.0	83.0	80.3
Dimensions	Length (mm)	435 (17-1/8")	444 (17-1/2")	450 (17-23/32")	440 (17-11/32")	455 (17-15/16")
	Height (mm)	255 (10-3/64")	252 (9-15/16")	255 (10-3/64")	230 (9-1/16")	250 (9-27/32")
	Width (mm)	104 (4-7/64")	103 (4-1/16")	102 (4-1/64")	90 (3-17/32")	104 (4-1/8")
Weight * (kg)		6.5 (14.3 lbs.)	6.5/6.6 (14.3/14.6 lbs.)	6.2 (13.7 lbs.)	5.9 (13.0 lbs.)	6.2 (13.7 lbs.)
Insulation structure		Double insulation	Double insulation	Double insulation	Double insulation	Double insulation

* 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 : 98 N (10 kgf)

Test material : Concrete panel with a compression strength of 2,919 N/cm² (240 kgf/cm²)

6-3. Chiseling Performance Comparison

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

Voltage supply	Maker	Model	Chiseling amount (kg/30min.)									
			0	10	20	30	40	50	60	70	80	90
230V	HITACHI	DH40MR	[Bar chart showing 59 kg/30min.]									
	HITACHI	DH40MA/MB	[Bar chart showing 57 kg/30min.]									
	D	D	[Bar chart showing 47 kg/30min.]									
	B	B	[Bar chart showing 74 kg/30min.]									
	C	C	[Bar chart showing 53 kg/30min.]									

Fig. 2

(Note) B's chiseling amount is greater than the others because the circuit is controlled to make the number of hammering in the "Hammering only" mode higher than that in the "Rotation + Hammering" mode. However, B has inconveniences such as unbalanced hammering, heavy vibration, heavy tool shake, and difficulty in positioning the tool because B increases only the number of hammering without changing the weight of the striker (that is, hammering energy). The Model DH 40MR realizes self-chiseling in addition to self-drilling (4-1-2. Self-drilling (Good feeling)).

6-4. Comparison of Drilling Speed Change by Pushing Force

The graph shown in Fig. 3 illustrates the relationship between handle pushing force and drilling speed.

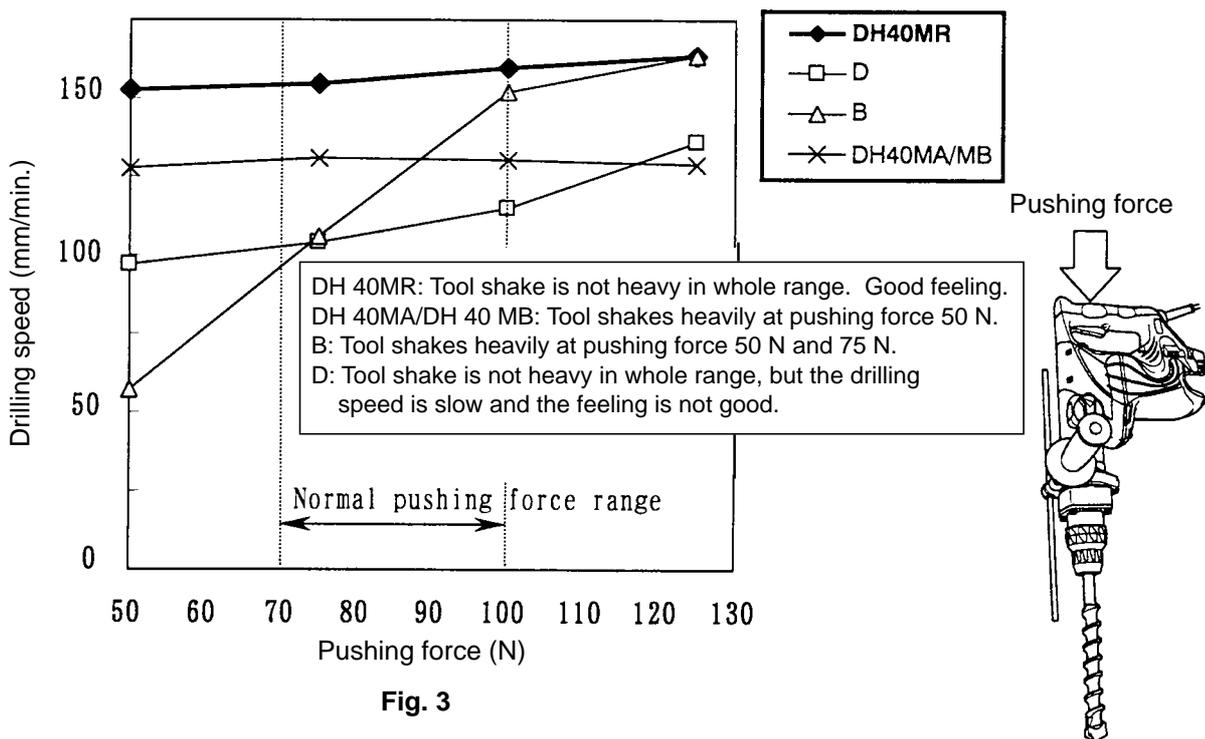


Fig. 3

6-5. Drilling Speed and Quantity of Body Jumping

The graph shown in Fig. 4 illustrates the relationship between drilling speed and quantity of body jumping. The quantity of body jumping is less than the similar products and the working tool quickly penetrates into the workpiece.

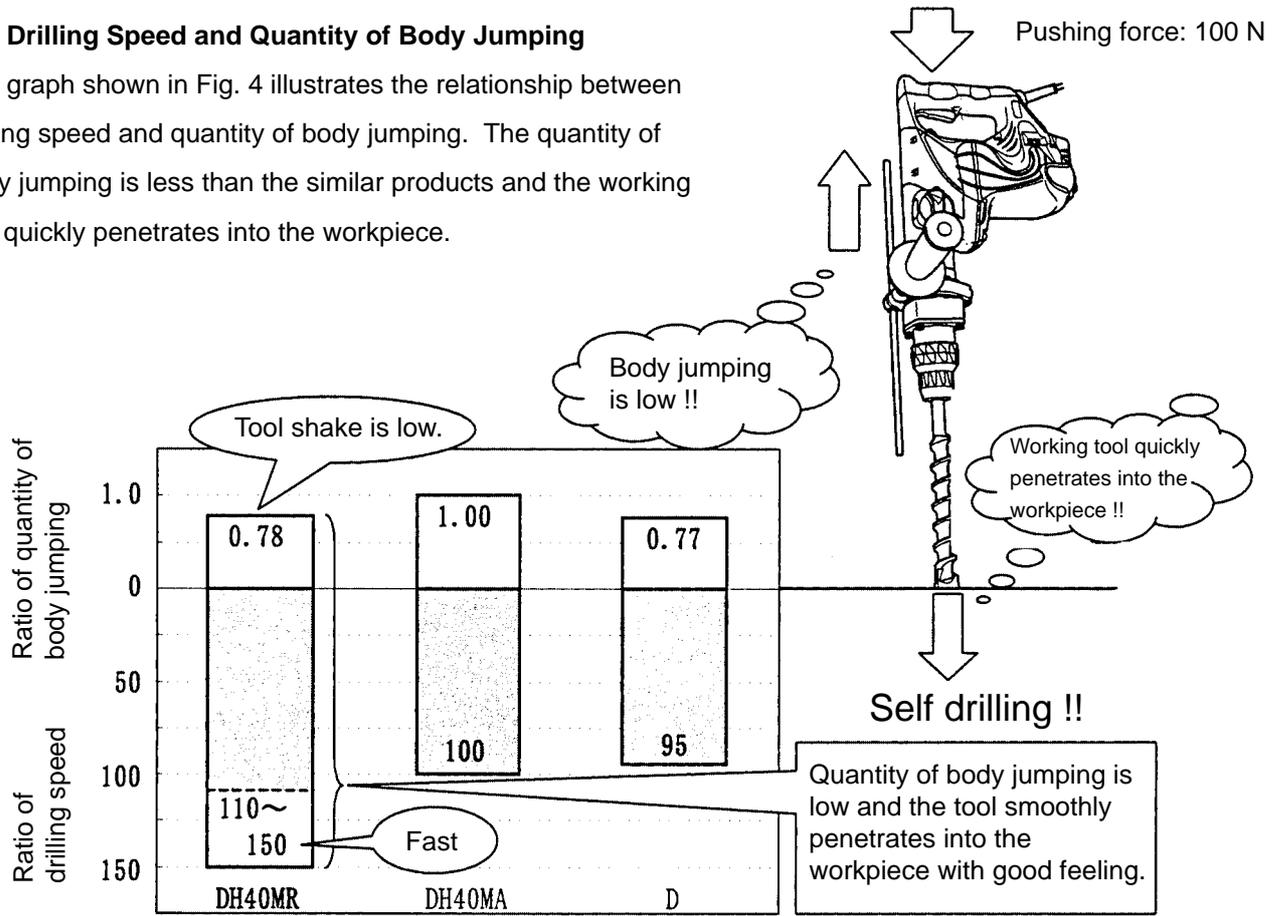


Fig. 4

7. PRECAUTIONS IN SALES PROMOTION

In the interest of promoting the safest and most efficient use of the Model DH 40MR 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 40MR 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 40MR 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 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). 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 30 g (1 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 by 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 DH 40MR Rotary Hammer

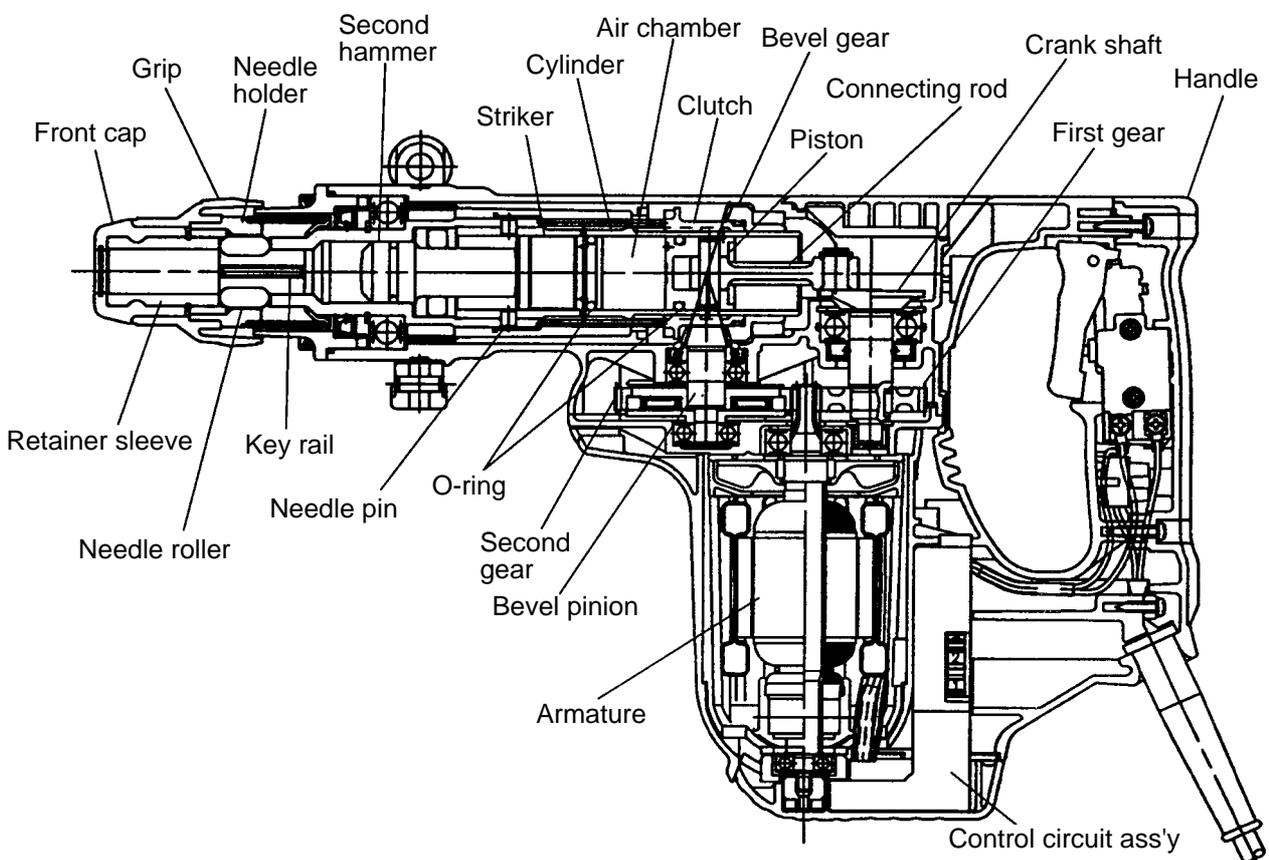


Fig. 5

○ Torque transmission

Armature revolution is transmitted to the second gear to rotate the bevel gear via the slip mechanism between the second gear and bevel pinion axes. 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 40MA 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. 6 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.

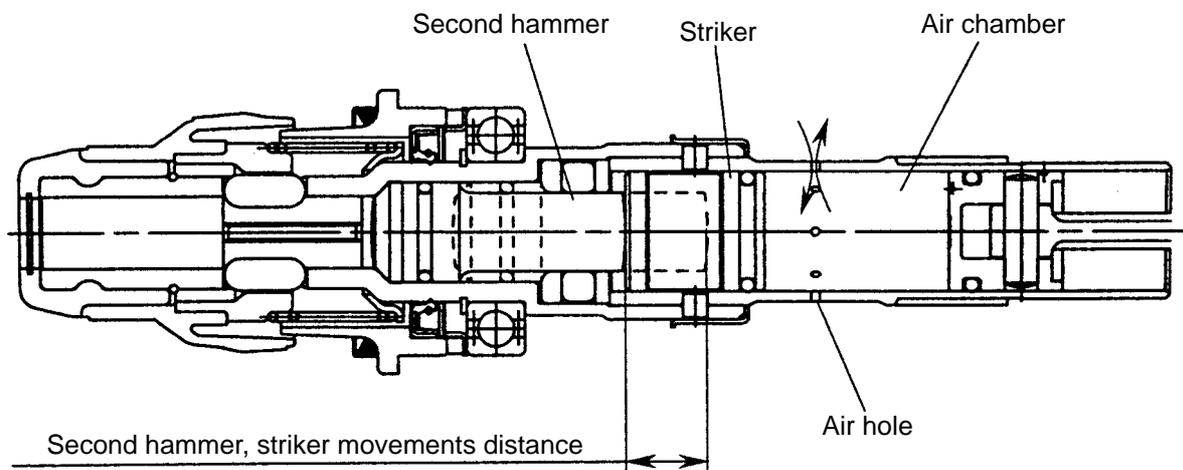


Fig. 6

○ Slip clutch mechanism

The slip clutch mechanism is described below with reference to Fig. 7. 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.

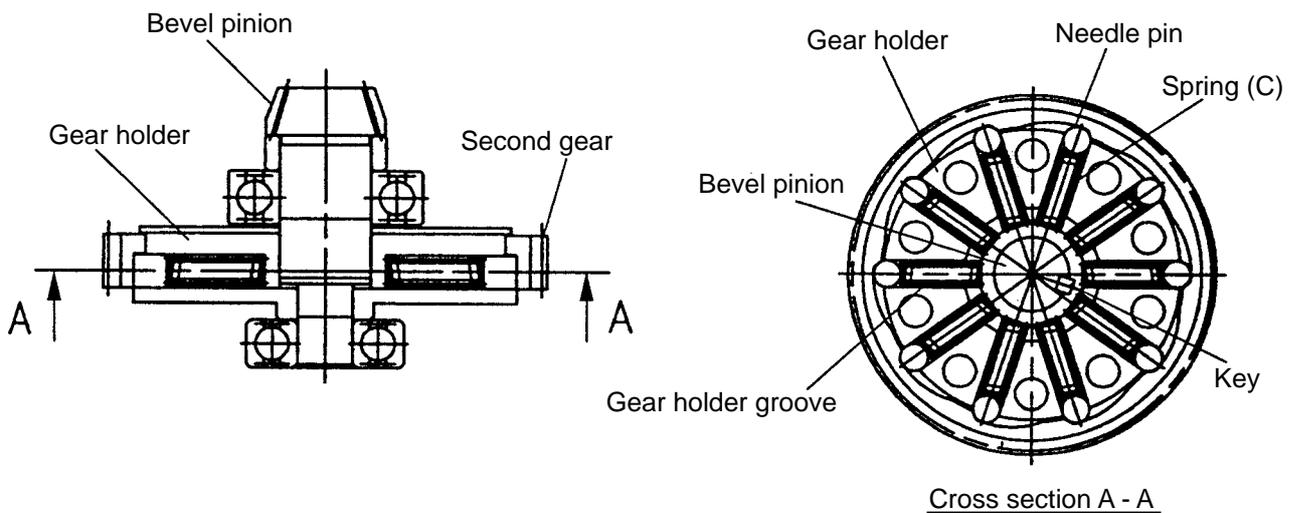


Fig. 7

○ Tool holder

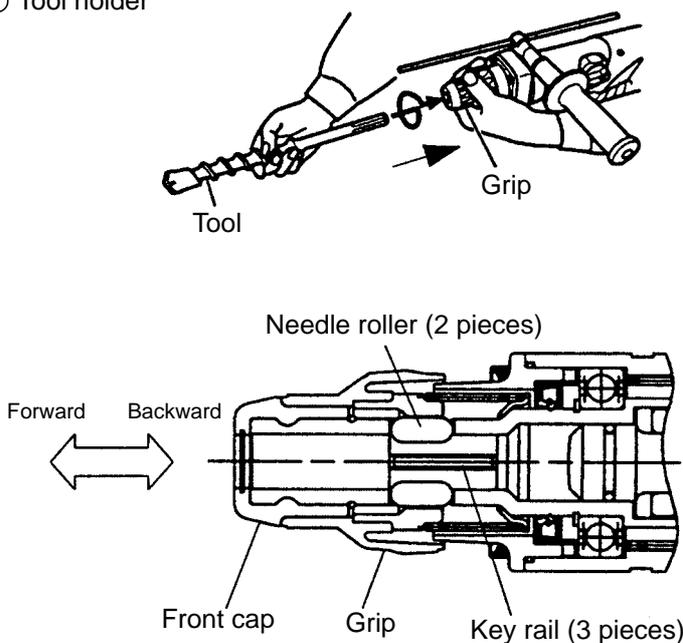


Fig. 8

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. 8).

○ Handle and side handle

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

The side handle also has a two-layer structure. The base is made of glassfiber-reinforced plastic base with a steel nut and the outside layer is soft resin. They are 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 crank case section is tightly sealed with three o-rings, three oil seals and rubber seal as shown in Fig. 9. 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.

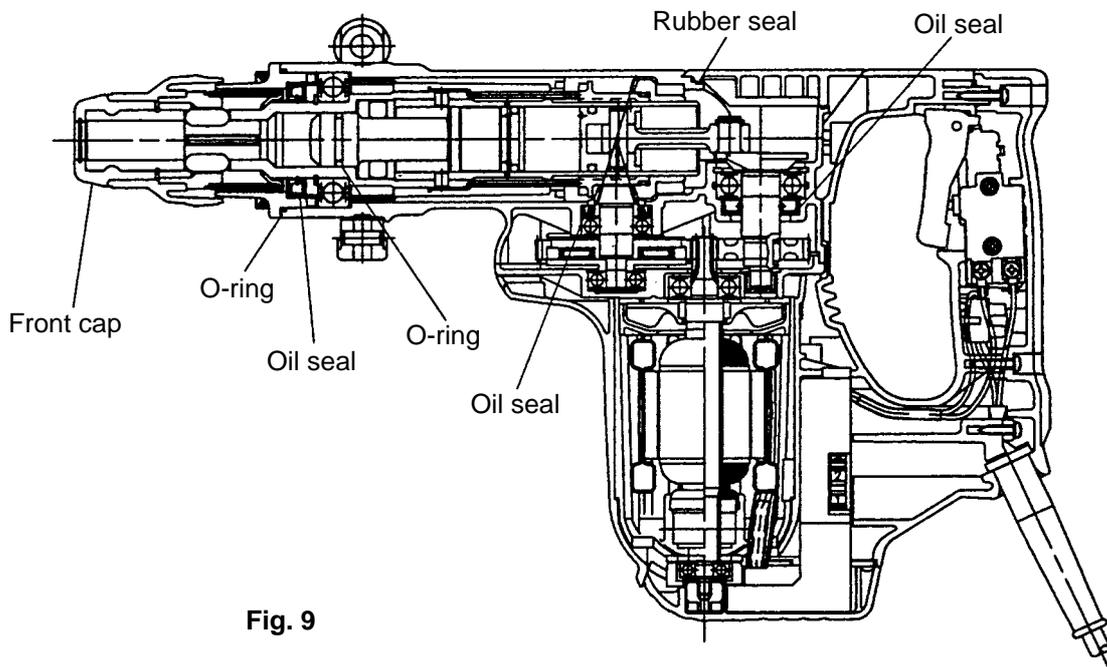


Fig. 9

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

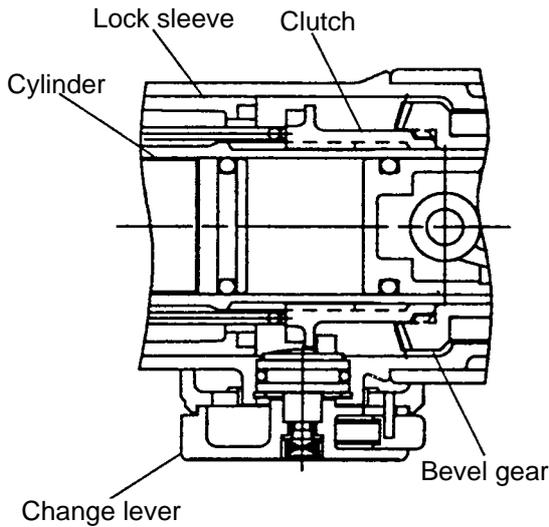


Fig. 10

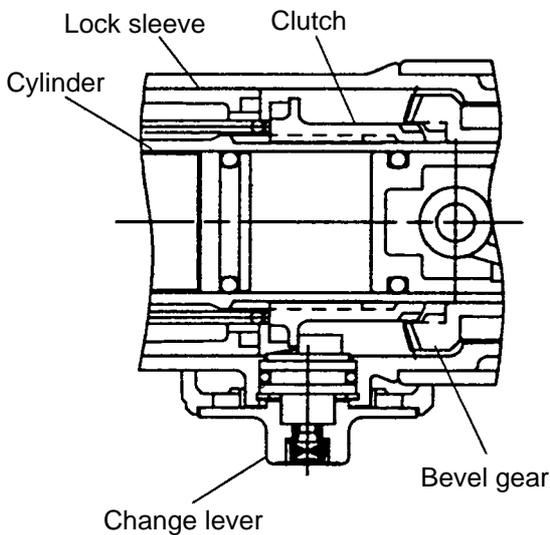


Fig. 11

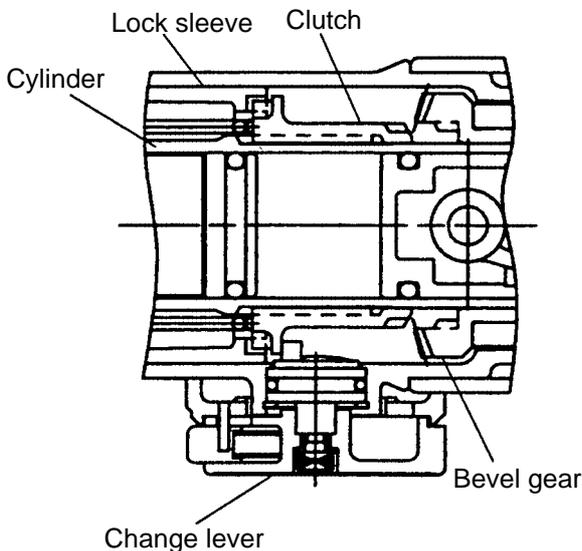


Fig. 13

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 40MR, it is necessary to stop the rotation and choose the "Hammering only" mode by means of the change lever to lock the working tool against rotation.

Figure 10 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 11 is a cross-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. 12).

Figure 13 is likewise a cross-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 40MR 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.

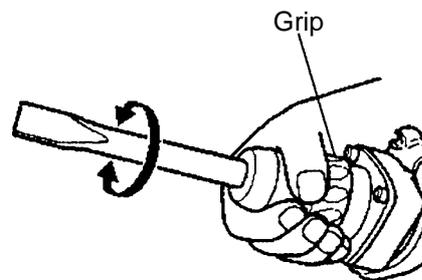


Fig. 12

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. 14. 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]**.

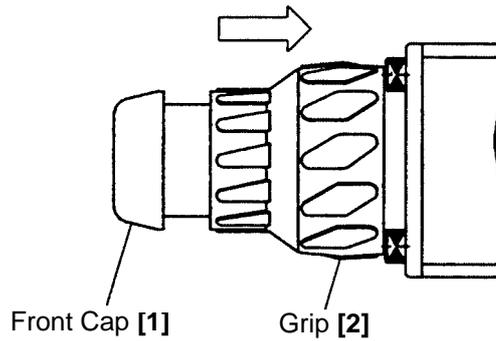


Fig. 14

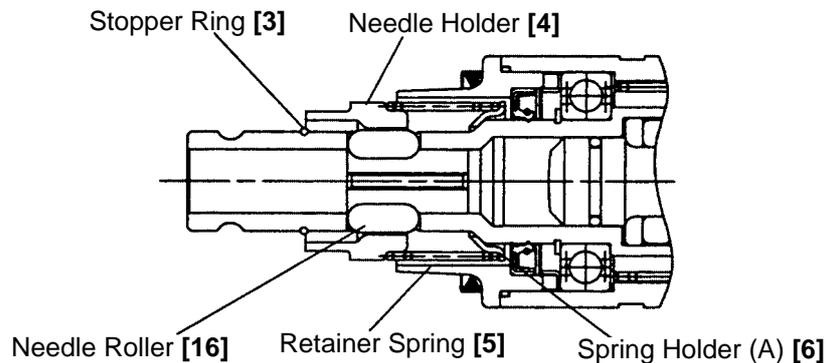


Fig. 15

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. 15).

(2) Disassembly of the piston and the striker

Remove the Seal Lock Hex. Socket Hd. Bolt M4 x 12 **[37]** from the Crank Cover **[39]** then remove the Crank Cover **[39]** from the Cylinder Crank Case **[49]**. Remove the Seal Lock Hex. Socket Hd. Bolt M6 x 45 **[36]** and Seal Lock Hex. Socket Hd. Bolt M6 x 22 **[89]**. Remove the Gear Cover **[66]** from the Cylinder Crank Case **[49]**. Remove the Bevel Pinion **[50]** (slip clutch) from the Cylinder Crank Case **[49]** (otherwise, Bevel Gear **[35]** cannot be removed later). Remove the Seal Lock Hex. Socket Hd. Bolt M4 x 12 **[37]** from the Change Lever **[72]** then remove the Change Lever **[72]**. Remove the Retaining Ring for D20 Hole **[74]** using a retaining ring puller and remove the Lever Shaft **[75]** (otherwise, Bevel Gear **[35]** cannot be removed later). 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 Crank Case **[49]** in an assembly state. Remove the Bevel Gear **[35]** from the Cylinder Crank Case **[49]** by tapping the Front Cover **[8]** side with a plastic hammer. Remove the Striker **[29]** from the Cylinder **[24]** by tapping with a plastic hammer. The Piston **[32]** remains in the Cylinder Crank Case **[49]**. Remove the Retaining Ring for D10 Shaft **[42]** using a retaining ring puller and remove the Connecting Rod **[34]** from the Crank Shaft **[43]** (Fig. 16).

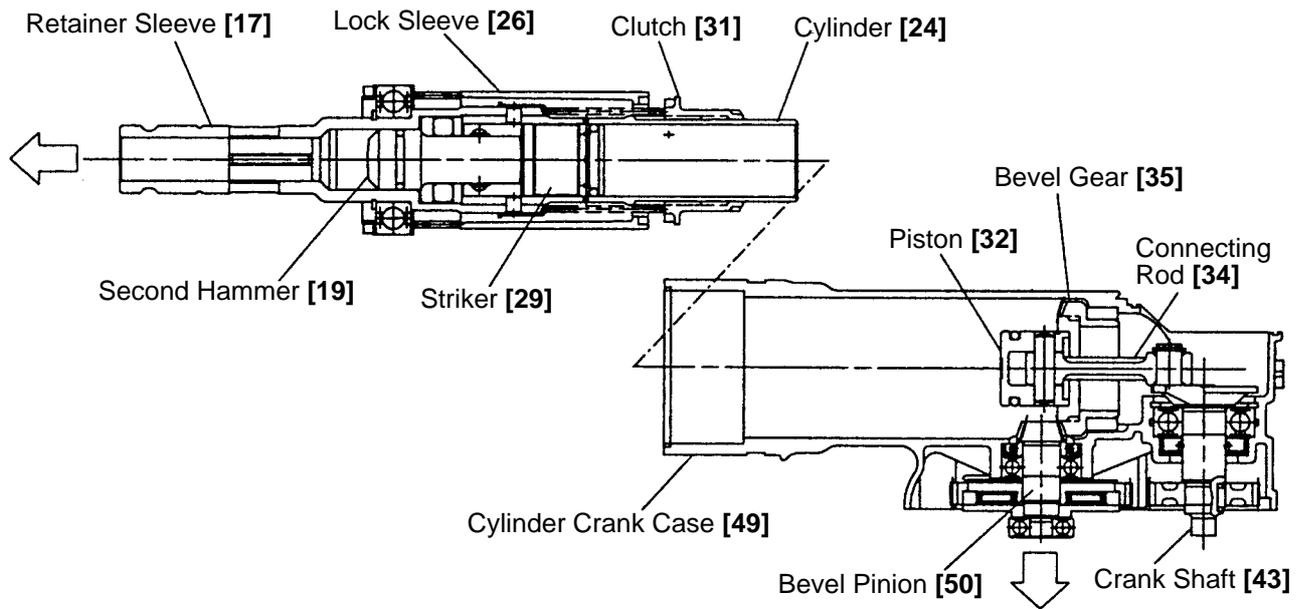


Fig. 16

(3) Disassembly of the first gear and the crank shaft

Remove grease from the Connecting Rod [34] side and the First Gear [64] side of the Cylinder Crank Case [49]. Remove the Retaining Ring for D40 Hole [45] from the Ball Bearing 6203DDCMPS2L [46] using a retaining ring puller. At this time, shift the position of the crank pin of the Crank Shaft [43] as shown in Fig. 17 so that the hole of the retaining ring can be seen before removal. Face the Connecting Rod [34] side of the Cylinder Crank Case [49] downward and place it on a support. Press the end surface of the Crank Shaft [43] with a hand press to remove the First Gear [64] and the Crank Shaft [43] (Fig. 18).

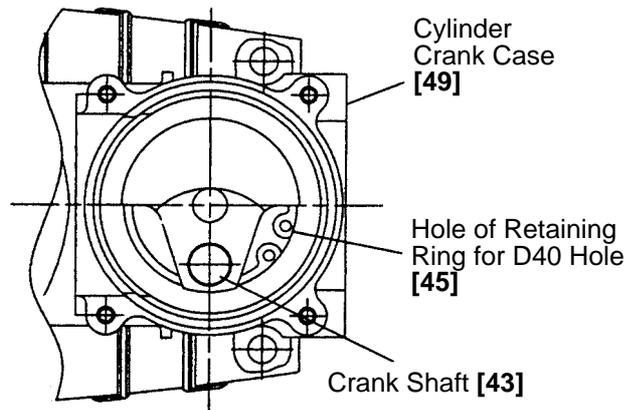


Fig. 17

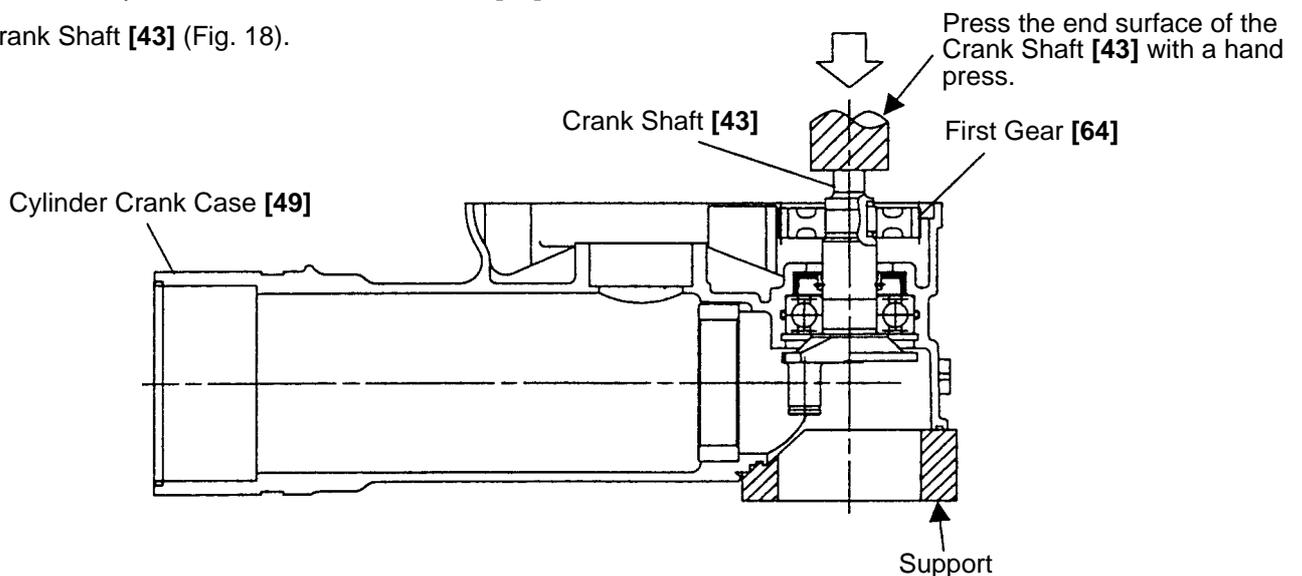


Fig. 18

(4) Disassembly of the slip clutch

Remove the Ball Bearing 629VVC2PS2L [61] with a bearing puller. Place the assembly on a sleeve-type support facing Washer (A) [55] downward as shown in Fig. 19. Push the Spacer [60] side of the Bevel Pinion [50] with a hand press to remove the Gear Holder [56] and the Spacer [60] from the Bevel Pinion [50]. Before removal of the Second Gear [59] from the Gear Holder [56], put the assembly in a poly bag and disassemble it inside the poly bag to prevent missing of Spring (C) [57] and the Needle [58].

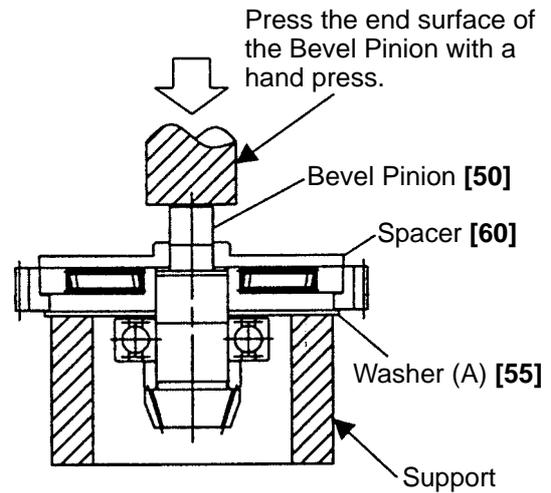


Fig. 19

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 (B) [48] into the Cylinder Crank Case [49] and mount O-ring (S-40) [47]. Press-fit the Ball Bearing 6203DDCMPS2L [46]. Mount the Retaining Ring for D40 Hole [45] using a retaining ring puller. Press-fit the Crank Shaft [43] into the Ball Bearing 6203DDCMPS2L [46]. Put the Feather Key 3 x 3 x 8 [44] in the groove of the Crank Shaft [43] and press-fit the First Gear [64] with a suitable tool while holding the flat portion of the Crank Shaft [43] with a steel bar. Before press-fitting, make sure that the Feather Key 3 x 3 x 8 [44] fits in the key groove of the First Gear [64] (Fig. 20).

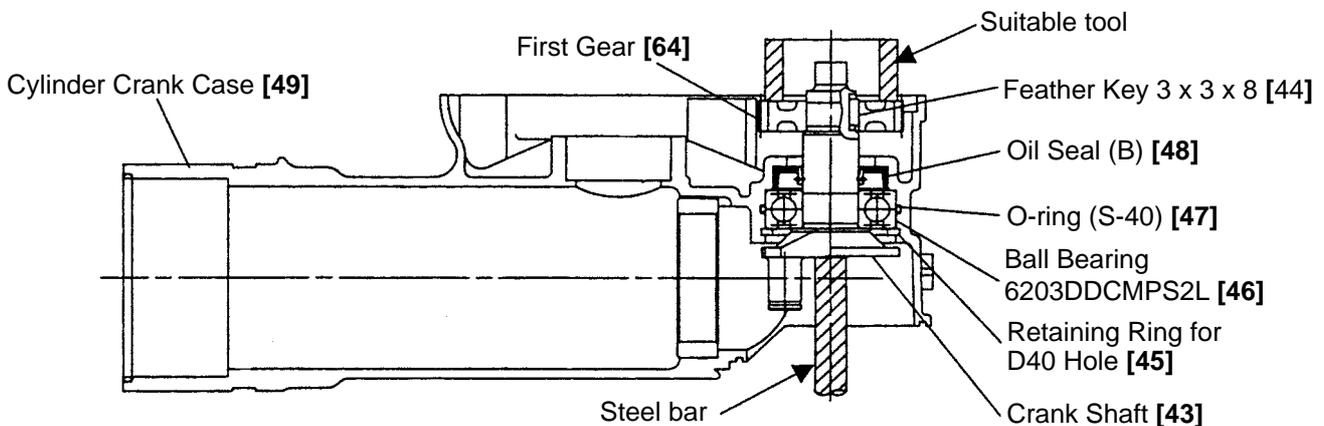


Fig. 20

(2) Reassembly of the piston

Insert the Piston Pin [33] into the 8-mm dia. hole (marked side) of the Piston [32] and the Connecting Rod [34] then press-fit it. Mount the O-ring [30] to the Piston [32]. Be careful not to protrude the Piston Pin [33] from the outside diameter of the Piston [32]. Move the crank pin of the Crank Shaft [43] to the bottom dead center and mount the piston assembly to the Crank Shaft [43] from the front cover side of the Cylinder Crank Case [49]. Mount the Retaining Ring for D10 Shaft [42] using a retaining ring puller (Fig. 21).

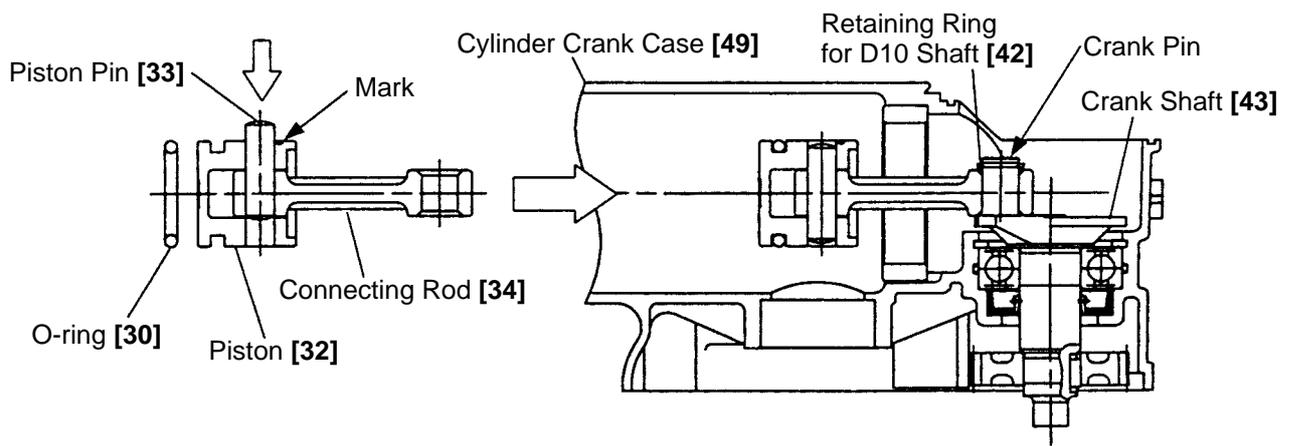


Fig. 21

(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 R surface of the inside diameter with the R 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], Clutch [31] and Bevel Gear [35] to the Cylinder [24]. Mesh the claw of the Lock Sleeve [26] with the claw of the Clutch [31]. Insert the retainer sleeve assembly into the Cylinder Crank Case [49] aligning the spline of the Lock Sleeve [26] with the spline groove at the inner circumference of the Cylinder Crank Case [49]. If the slip clutch assembly and the Lever Shaft [75] are mounted in the Cylinder Crank Case [49] first, the Bevel Gear [35] will be an obstacle to reassembly. Before mounting the slip clutch assembly and the Lever Shaft [75], mount the retainer sleeve assembly to the Cylinder Crank Case [49] (Fig. 22).

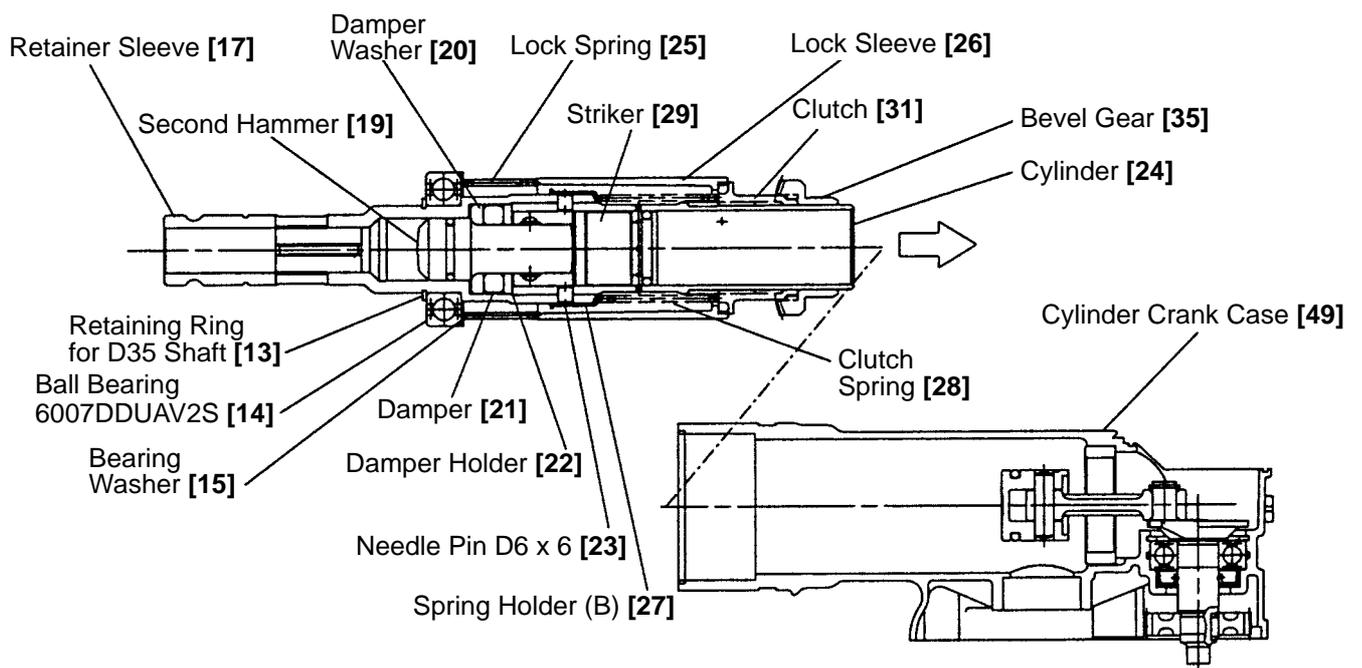


Fig. 22

(4) Reassembly of the slip clutch

Press-fit the Bevel Pinion [50] into the Collar [51] and the Ball Bearing 6002DDCMPS2L [53] then insert it into the Washer [54] and Washer (A) [55]. Mount the Feather Key 3 x 3 x 8 [44] to the Bevel Pinion [50] then press-fit into the Gear Holder [56]. Mount the Second Gear [59] around the outer circumference of the Gear Holder [56]. Before mounting, apply Hitachi Motor Grease No. 29 to the inner circumference of the Second Gear [59]. Insert the ten Needles [58] being careful not to incline them, then push in ten Springs (C) [57] as shown in Fig. 23. Fill the slots and the through holes of the Gear Holder [56] with Hitachi Motor Grease No. 29. Press-fit the Bevel Pinion [50] into the Spacer [60] and the Ball Bearing 629VVC2PS2L [61].

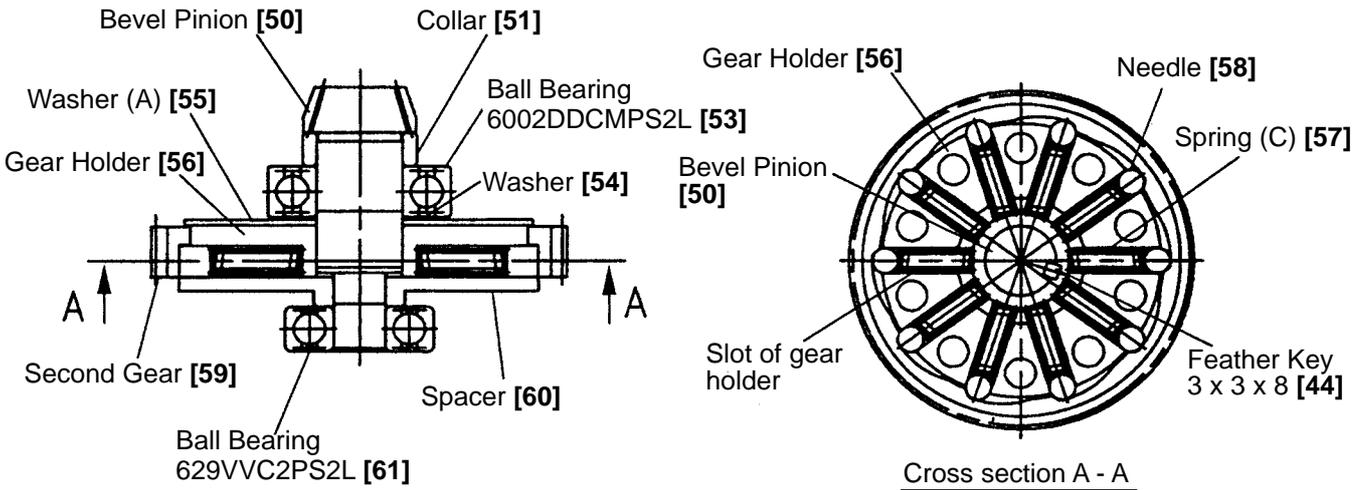


Fig. 23

(5) Carbon brush inspection

The motor employs Carbon Brushes [91] which are consumable parts. When they become worn to or near "wear limit" (7 mm), it could result in motor trouble. Replace the Carbon Brushes [91] with new ones which are numbered "73" as shown in Fig. 24. In addition, always keep Carbon Brushes [91] clean and ensure that they slide freely within the brush holders.

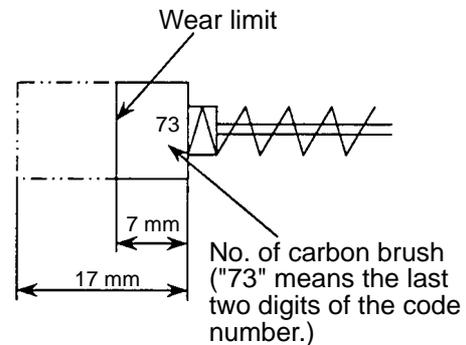


Fig. 24

(6) Application of lubricant

Apply special grease (for hammer and rotary hammer) to the inner circumference of the Connecting Rod [34], the O-rings [30] of the Striker [29] and the Piston [32], the sliding portion of the Second Hammer [19], the Oil Seal [10], Oil Seal (A) [52], Oil Seal (B) [48], the Damper [21] and inner and outer circumferences of the Bevel Gear [35]. Fill 50 g of the special grease in the Cylinder Crank Case [49] on the Connecting Rod [34] side and 20 g in the Cylinder Crank Case [49] on the Clutch [31] side. Apply Hitachi Motor Grease No. 29 to the Needle Bearing (M661) [65], the pinion portion of the Armature [82] and the Needle Roller D8 x 20 [16]. Fill 30 g of the Hitachi Motor Grease No. 29 in the Cylinder Crank Case [49] on the First Gear [64] side and the Gear Cover [66] side.

(7) Oil seal and others

Take care not to scratch or cut Oil Seal (A) [52] and Oil Seal (B) [48] of the Cylinder Crank Case [49], Oil Seal [10] and O-ring (1AS-60) [9] of the Front Cover [8], O-ring (C) [18] of the Second Hammer [19], Rubber Seal [41] of the Crank Cover [39] and the O-ring [30] of the Piston [32] 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.

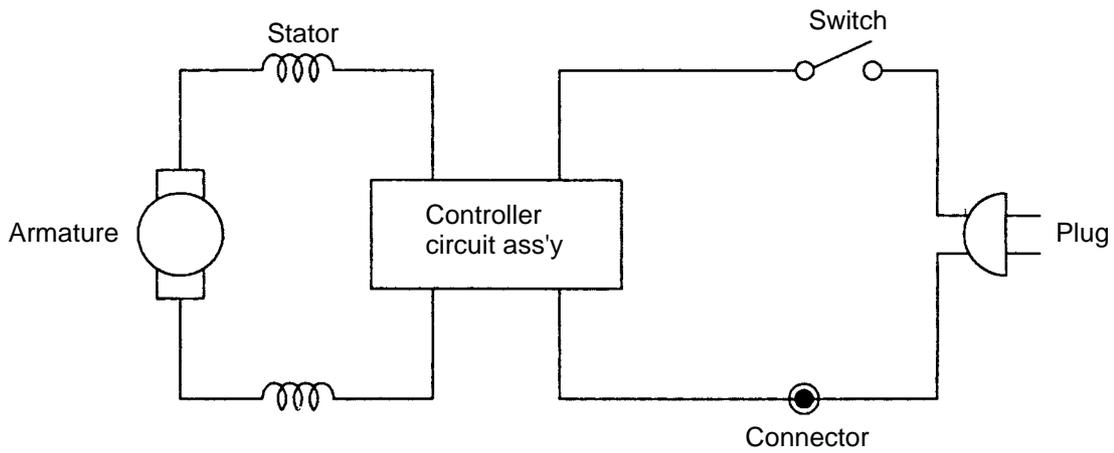
(Note) Be sure to apply screw locking agent ThreeBond TB1401 to the threads during reassembly, as the bolts loosened with vibration may cause damage to the tool body.

9-4. Tightening Torque

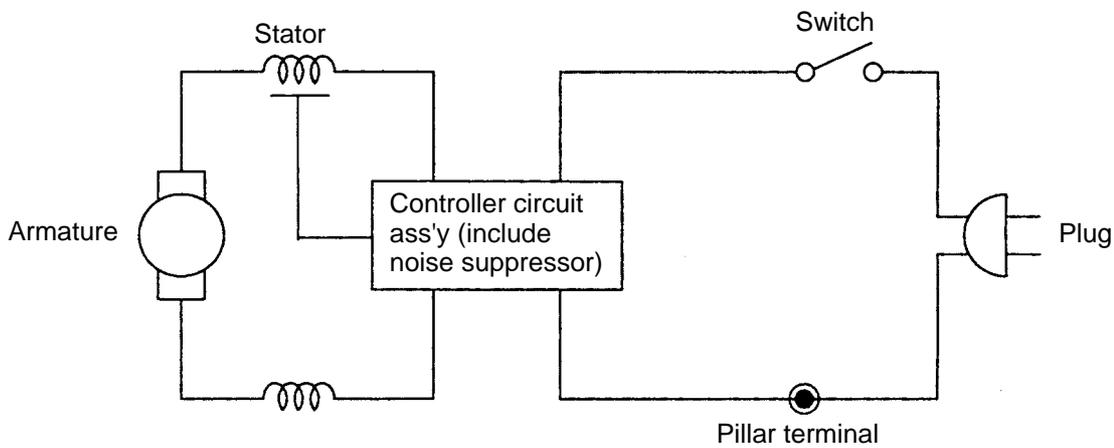
Front cover mounting bolts	13.7 ^{+0.98} ₀ N•m (140 ⁺¹⁰ ₀ kgf•cm)
(Hex. socket head bolt M6 x 25)	
Tapping screw D5.....	2.94 ± 0.49 N•m (30 ± 5 kgf•cm)
Hex. socket head bolt M6 x 45	9.8 ^{+1.96} ₀ N•m (100 ⁺²⁰ ₀ kgf•cm)
Hex. socket head bolt M6 x 22	
Tail cover mounting bolt	4.41 ± 0.49 N•m (45 ± 5 kgf•cm)
(Hex. socket head bolt M5 x 10)	
Crank cover mounting bolt	4.41 ± 0.49 N•m (45 ± 5 kgf•cm)
Lever shaft mounting bolt	
(Hex. socket head bolt M4 x 12)	
Tapping screw (W/Flange) D4.....	1.96 ± 0.49 N•m (20 ± 5 kgf•cm)
Handle mounting bolt	4.41 ± 0.49 N•m (45 ± 5 kgf•cm)
(Hex. socket head bolt (W/Flange) M5x14)	

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

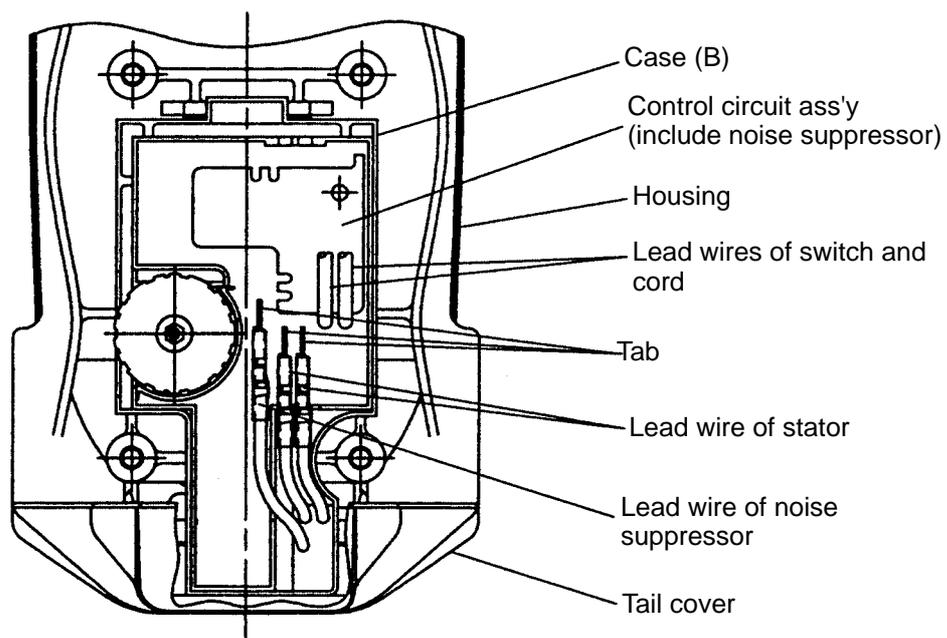


Fig. 25

9-6. Insulation Tests

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

Insulation resistance: 7 MΩ 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	220	230	240
Current (A) (Max.)	6.4	5.9	3.2	3.1	2.9

10. STANDARD REPAIR TIME (UNIT) SCHEDULES

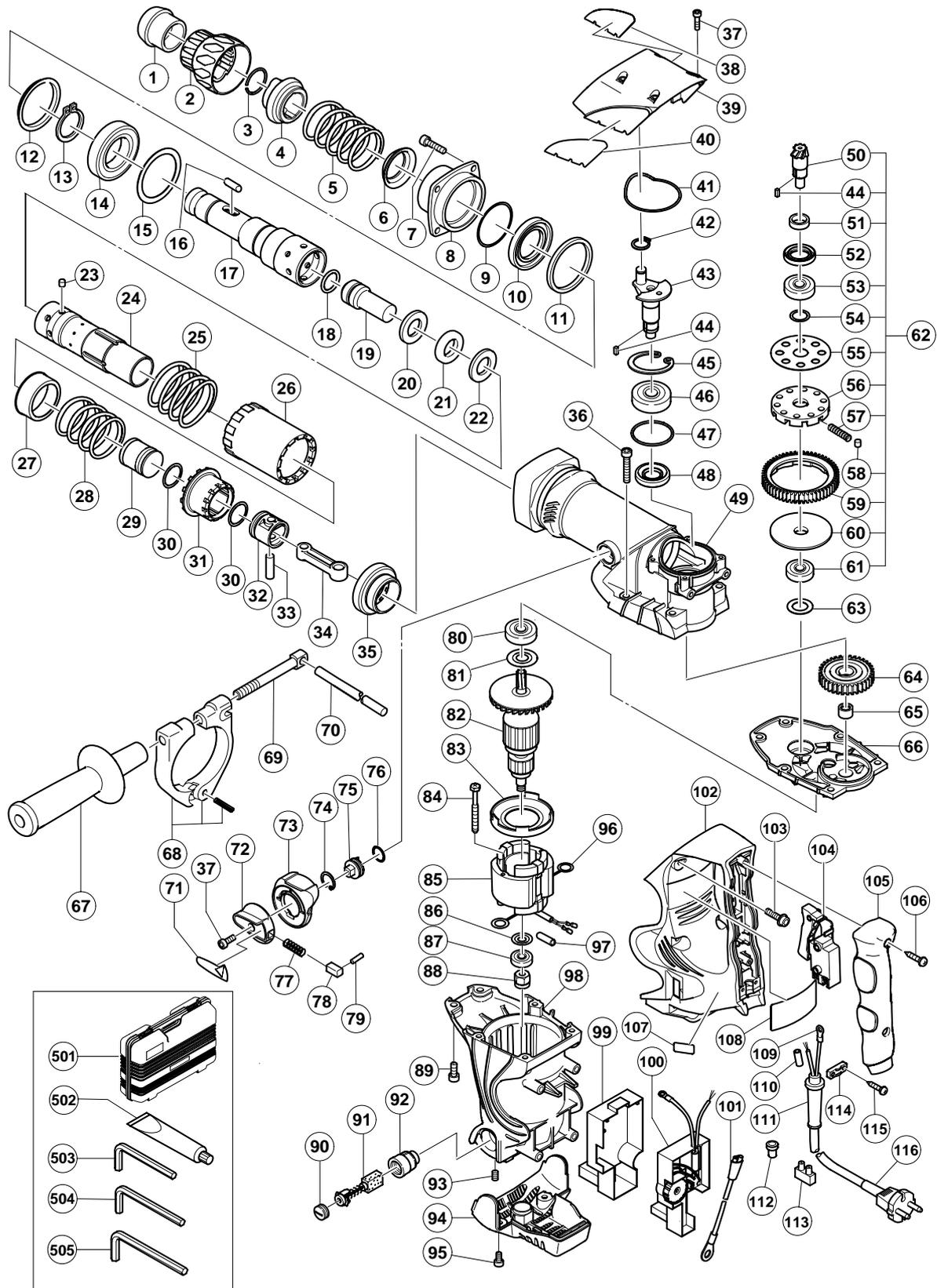
MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
DH 40MR		Work Flow						
		Handle Cover Switch (C) Cord					Gear Cover Needle Bearing	Housing Ass'y Stator Ass'y
		Tail Cover					Armature	
		Crank Cover Rubber Seal					Ball Bearing (6201DD) Ball Bearing (608VV) Washer (A) Dust Washer (B)	
	General Assembly				Handle Controller Circuit		Crank Shaft Ball Bearing (6203DD) Oil Seal (B) O-ring First Gear	Cylinder Crank Case
		Front Cap Grip Needle Holder Retainer Spring Spring Holder (A)	Front Cover O-ring (1AS-60) Oil Seal Urethane Ring Urethane Ring Holder					
		O-ring 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				Slip Clutch Ass'y	
					Striker O-ring x 2 Piston Piston Pin Connecting Rod			
							Needle Cylinder Lock Spring Lock Sleeve Spring Holder Clutch Spring Clutch Bevel Gear	

ELECTRIC TOOL PARTS LIST

■ ROTARY HAMMER Model DH 40MR

2002 • 9 • 30

(E1)



PARTS

DH 40MR

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)	1	
10	321-301	OIL SEAL	1	
11	981-859	URETHANE 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	321-286	RETAINER SLEEVE	1	
18	313-396	O-RING (C)	1	
19	321-287	SECOND HAMMER	1	
20	321-288	DAMPER WASHER	1	
21	321-289	DAMPER	1	
22	321-290	DAMPER HOLDER	1	
23	313-057	NEEDLE PIN D6X6	4	
24	321-291	CYLINDER	1	
25	321-298	LOCK SPRING	1	
26	321-299	LOCK SLEEVE	1	
27	321-293	SPRING HOLDER (B)	1	
28	321-294	CLUTCH SPRING	1	
29	321-292	STRIKER	1	
30	986-104	O-RING	2	
31	321-295	CLUTCH	1	
32	321-284	PISTON	1	
33	980-708	PISTON PIN	1	
34	321-285	CONNECTING ROD	1	
35	321-296	BEVEL GEAR	1	
36	986-940	SEAL LOCK HEX. SOCKET HD. BOLT M6X45	4	
37	983-162	SEAL LOCK HEX. SOCKET HD. BOLT M4X12	5	
38		HITACHI LABEL	1	
39	321-315	CRANK COVER	1	
40		HITACHI LABEL	1	
41	321-314	RUBBER SEAL	1	
42	939-540	RETAINING RING FOR D10 SHAFT (10 PCS.)	1	
43	321-275	CRANK SHAFT	1	
44	944-109	FEATHER KEY 3X3X8	2	
45	948-391	RETAINING RING FOR D40 HOLE	1	
46	620-3DD	BALL BEARING 6203DDCMPS2L	1	
47	996-363	O-RING (S-40)	1	
48	321-274	OIL SEAL (B)	1	
49	321-273	CYLINDER CRANK CASE	1	
50	321-278	BEVEL PINION	1	
51	321-279	COLLAR	1	

PARTS

DH 40MR

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS
52	313-050	OIL SEAL (A)	1	
53	600-2DD	BALL BEARING 6002DDCMPS2L	1	
54	313-058	WASHER	1	
55	313-053	WASHER (A)	1	
56	321-281	GEAR HOLDER	1	
57	321-282	SPRING (C)	10	
58	320-343	NEEDLE	10	
59	321-280	SECOND GEAR	1	
60	321-283	SPACER	1	
61	629-VVM	BALL BEARING 629VVC2PS2L	1	
62	321-277	SLIP CLUTCH ASS'Y	1	INCLUD.44,50,51,53-61
63	944-525	BEARING WASHER (C)	1	
64	321-276	FIRST GEAR	1	
65	939-299	NEEDLE BEARING (M661)	1	
66	321-319	GEAR COVER	1	
67	313-078	SIDE HANDLE	1	
68	313-079	HANDLE HOLDER	1	
69	313-080	HANDLE BOLT	1	
70	971-786	STOPPER ROD	1	
71		LEVER LABEL	1	
72	321-309	CHANGE LEVER	1	
73	321-308	LEVER HOLDER	1	
74	311-229	RETAINING RING FOR D20 HOLE	1	
75	321-307	LEVER SHAFT	1	
76	873-095	O-RING (P-16)	1	
77	321-310	LEVER SPRING	1	
78	321-311	PUSHING BUTTON	1	
79	321-312	PIN D2X10	1	
80	620-1DD	BALL BEARING 6201DDCMPS2L	1	
81	302-429	DUST WASHER (B)	1	
*	82	360-591U	ARMATURE ASS'Y 110V-120V	1 INCLUD.80,81,86,87
*	82	360-591E	ARMATURE 220V-230V	1
*	82	360-591F	ARMATURE 240V	1
	83	321-320	FAN GUIDE	1
	84	953-174	HEX. HD. TAPPING SCREW D5X55	2
*	85	340-542C	STATOR ASS'Y 110V	1 INCLUD.96
*	85	340-542G	STATOR ASS'Y 120V	1 INCLUD.96
*	85	340-542E	STATOR ASS'Y 220V-230V	1 INCLUD.96
*	85	340-542H	STATOR ASS'Y 220V	1 INCLUD.96 FOR HKG
*	85	340-542F	STATOR ASS'Y 240V	1 INCLUD.96
	86	982-631	WASHER (A)	1
	87	608-VVM	BALL BEARING 608VVC2PS2L	1
	88	318-721	MAGNET	1
	89	321-313	SEAL LOCK HEX. SOCKET HD. BOLT M6X22	2
	90	935-829	BRUSH CAP	2
*	91	999-073	CARBON BRUSH (AUTO STOP TYPE) (1 PAIR)	2
*	91	999-043	CARBON BRUSH (1 PAIR)	2 FOR HKG
	92	971-001	BRUSH HOLDER	2
	93	938-477	HEX. SOCKET SET SCREW M5X8	2
	94	321-321	TAIL COVER	1
	95	877-839	SEAL LOCK HEX. SOCKET HD. BOLT M5X10	2

STANDARD ACCESSORIES

DH 40MR

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS
501	321-325	CASE	1	
502	981-840	GREASE (A) FOR HAMMER.HAMMER DRILL (30G)	1	
503	943-277	HEX. BAR WRENCH 3MM	1	
504	944-458	HEX. BAR WRENCH 4MM	1	
505	944-459	HEX. BAR WRENCH 5MM	1	

OPTIONAL ACCESSORIES

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS
601	313-448	DRILL BIT (SDS MAX) D16X340	1	
602	313-456	DRILL BIT (SDS MAX) D16X540	1	
603	313-449	DRILL BIT (SDS MAX) D19X340	1	
604	313-457	DRILL BIT (SDS MAX) D19X540	1	
605	313-450	DRILL BIT (SDS MAX) D22X320	1	
606	313-458	DRILL BIT (SDS MAX) D22X520	1	
607	313-451	DRILL BIT (SDS MAX) D25X320	1	
608	313-459	DRILL BIT (SDS MAX) D25X520	1	
609	313-452	DRILL BIT (SDS MAX) D28X370	1	
610	313-460	DRILL BIT (SDS MAX) D28X570	1	
611	313-453	DRILL BIT (SDS MAX) D32X370	1	
612	313-461	DRILL BIT (SDS MAX) D32X570	1	
613	313-454	DRILL BIT (SDS MAX) D38X370	1	
614	313-462	DRILL BIT (SDS MAX) D38X570	1	
615	313-455	DRILL BIT (SDS MAX) D40X370	1	
616	313-463	DRILL BIT (SDS MAX) D40X570	1	
617	944-460	TAPER SHANK DRILL BIT D11X100	1	
618	944-461	TAPER SHANK DRILL BIT D12.3X110	1	
619	993-038	TAPER SHANK DRILL BIT D12.7X110	1	
620	944-462	TAPER SHANK DRILL BIT D14.3X110	1	
621	944-500	TAPER SHANK DRILL BIT D14.5X110	1	
622	944-463	TAPER SHANK DRILL BIT D17.5X120	1	
623	313-464	TAPER SHANK ADAPTER ASS'Y (SDS MAX) NO.1	1	INCLUD.624
624	944-477	COTTER	1	
625	313-465	ADAPTER (SDS MAX) FOR SDS PLUS SHANK BIT	1	
626	955-994	CORE BIT 25MM	1	
627	955-995	CORE BIT 29MM	1	
628	955-996	CORE BIT 32MM	1	INCLUD.629
629	955-997	GUIDE PLATE (FOR CORE BIT 32MM)	1	
630	955-998	CORE BIT 35MM	1	INCLUD.631
631	955-999	GUIDE PLATE (FOR CORE BIT 35MM)	1	

