

MODEL

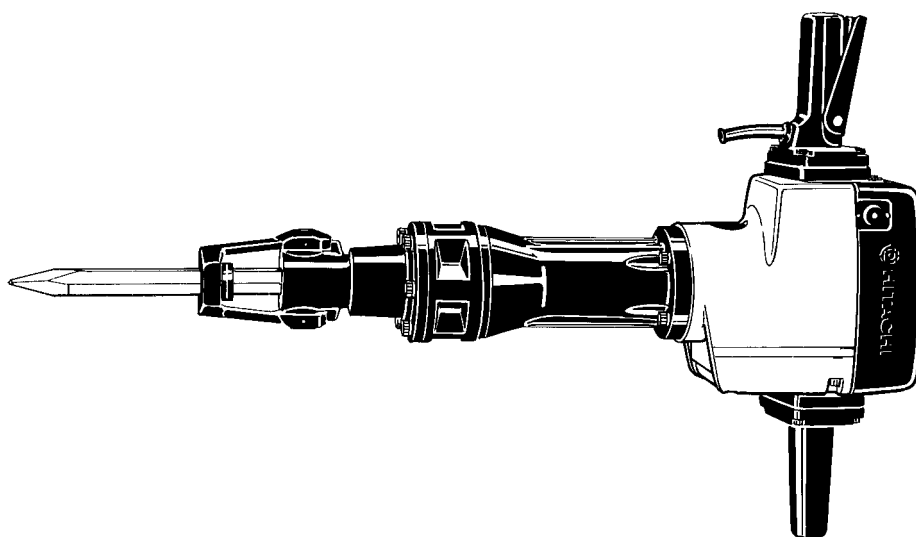
**H 90SE**

**HITACHI**  
**POWER TOOLS**

**HAMMER**  
**H 90SE**

**TECHNICAL DATA**  
**AND**  
**SERVICE MANUAL**

**H**



LIST No. E456

Apr. 2000

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

**Notice for use**

Specifications and parts are subject to change for improvement.  
Refer to the Hitachi Power Tool Technical News for further information.

**CONTENTS**

	<b>Page</b>
<b>1. PRODUCT NAME</b> .....	1
<b>2. MARKETING OBJECTIVE</b> .....	1
<b>3. APPLICATIONS</b> .....	1
<b>4. SELLING POINTS</b> .....	1
4-1. Selling Point Descriptions .....	2
<b>5. SPECIFICATIONS</b> .....	4
5-1. Optional Accessories .....	5
<b>6. COMPARISONS WITH SIMILAR PRODUCTS</b> .....	7
6-1. Specification Comparisons .....	7
6-2. Demolition Performance Comparisons .....	8
<b>7. PRECAUTIONS IN SALES PROMOTION</b> .....	9
7-1. Handling Instructions .....	9
7-2. Caution Plate .....	9
7-3. Grease Replacement .....	10
7-4. O-Ring Replacement .....	10
<b>8. REFERENCE INFORMATION</b> .....	11
8-1. Air Damper .....	11
8-2. Sealed and Dustproof Construction .....	11
8-3. Vibration-Absorbing Construction .....	12
8-4. Tool Retainer .....	14
<b>9. REPAIR GUIDE</b> .....	15
9-1. Precautions and Suggestions for Disassembly and Reassembly of the Main Body .....	15
<b>10. STANDARD REPAIR TIME (UNIT) SCHEDULES</b> .....	23
 <b>[ Appendix ]</b>	
Assembly Diagram for H 90SE .....	24

## 1. PRODUCT NAME

Hitachi Electric Hammer, Model H 90SE

## 2. MARKETING OBJECTIVE

The Model H 90SE is a grease-sealed and double-insulated electric hammer. It has a tool retainer that permits the use of three types of 28.5 mm (1-1/8") hexagonal shank hammer accessories (ie: collar, collar & groove and groove types). The Model H 90SE has been developed based on the current Model H 90SC, which features the use of Kango Model 2500 Accessory tools. Chipping and demolishing capabilities are equivalent to the Model H 90SC.

## 3. APPLICATIONS

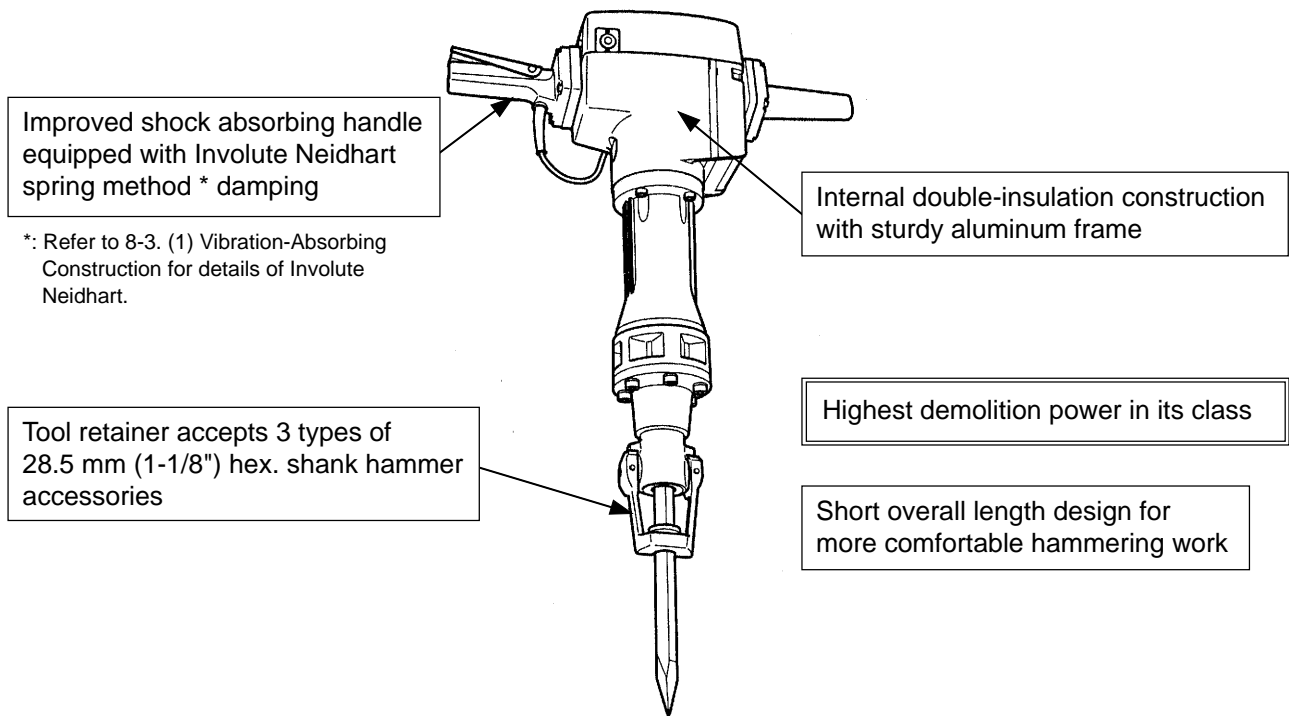
- Demolishing of concrete and similar materials.
- Groove and channel digging in concrete.
- Groove and channel digging in asphalt and gravel roads.
- Tamping/compacting of asphalt and graveled roads.
- Cutting of asphalt.

[Typical Applications]

Construction work, piping/wiring work, water supply/drain work, etc.

## 4. SELLING POINTS

Maker • Model		Weight	Overall length
HITACHI	H 90SE	32 kg (70.5 lbs.)	859 mm (33-13/16")
HITACHI	H 90SC	32 kg (70.5 lbs.)	842 mm (33-19/128")
HITACHI	H 85	33 kg (72.8 lbs.)	882 mm (34-23/32")
	C	29 kg (63.9 lbs.)	818 mm (32-13/64")
	B	29 kg (63.9 lbs.)	845 mm (33-17/64")



#### 4-1. Selling Point Descriptions

##### 4-1-1. Largest demolition power in this class

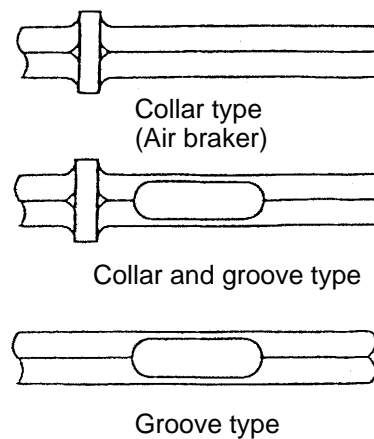
The powerful impact force of each blow ensures efficient and easy demolition of concrete.

The demolition performance is 1.0 – 1.4 times more powerful than that of similar products.

Maker • Model		Ratio of demolished weight (%)
HITACHI	H 90SE	100
HITACHI	H 90SC	100
HITACHI	H 85	85
C		70
B		85

##### 4-1-2. Tool retainer accepts 3 types of 28.5 mm (1-1/8") hex. shank hammer accessories

Three types of hex. shank tools (Fig. 1) can be used in the Model H 90SE by turning the tool retainer in the following two methods.



**Fig. 1**

(1) Mounting collar type and shank steel for air brakers and collar & groove type shank steels.

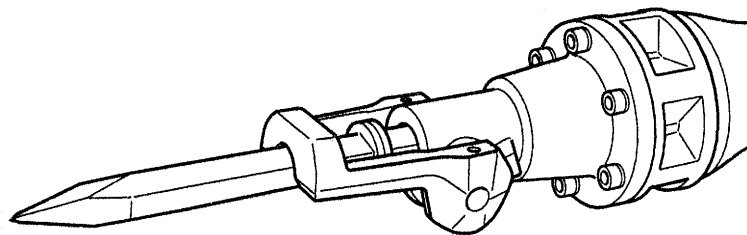


Fig. 2

(2) Mounting collar & groove and groove type shank steels.

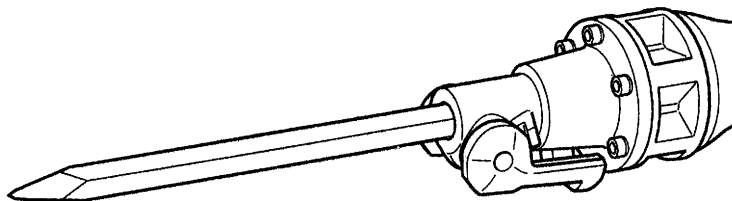


Fig. 3

#### 4-1-3. Improved shock absorbing handle equipped with Involute Neidhart spring method

The involute-type Neidhart Spring employed in the vibration-absorbing handle significantly reduces operator fatigue and permits comfortable operation for extended periods of time.

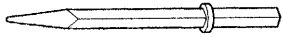
	HITACHI H 90SE	HITACHI H 90SC	HITACHI H 85	C	B
Vibration-absorbing handle	Provided	Provided	Not provided	Provided	Provided

## 5. SPECIFICATIONS

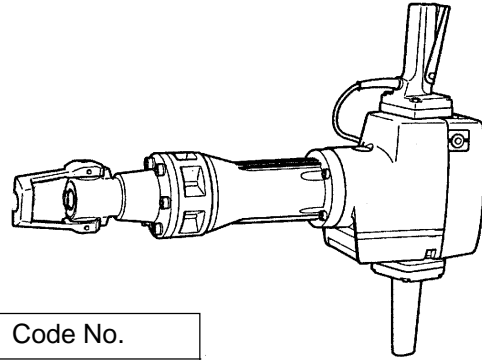
Item		H 90SE
Power source		Single-phase AC 50/60 Hz
Voltage (V)		110, 115, 230, 240
Motor type		AC single-phase series commutator motor
Insulation structure		Double insulation
Enclosure		Materials: Aluminum alloy die casting Glass-fiber reinforced plastic resin Paint: Hammer-net silver green and black
Switch		Trigger switch
Type of handles		T-shaped handle
Full-load current		13.9 A (110 V), 13.3 A (115 V), 6.6 A (230 V), 6.4 A (240 V)
Power input		1,450 W
Striking speed	No-load	1,100 /min.
	Full-load	850 /min.
Weight		Product: 32.0 kg (70.5 lbs.); excluding cord Packed: 36.0 kg (79.4 lbs.)
Packaging		Corrugated cardboard box
Standard accessories		<ul style="list-style-type: none"> <li>• Hex. bar wrench (for M12) ..... 1</li> <li>• Hex. bar wrench (for M6) ..... 1</li> <li>• Hex. bar wrench (for M4) ..... 1</li> </ul>

## 5-1. Optional Accessories

### 1. Demolition work



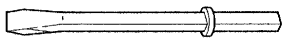
+



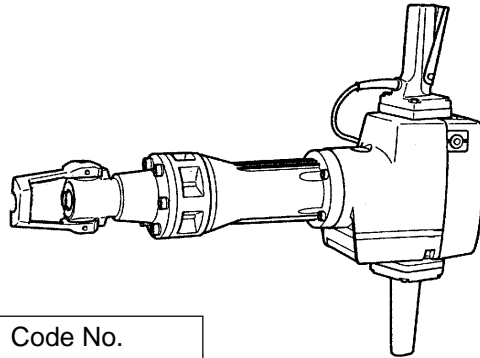
(1) Bull point

Overall length	Code No.
410 mm (16-9/64")	996372
520 mm (20-15/32")	985230

### 2. Grooving and chiseling work



+



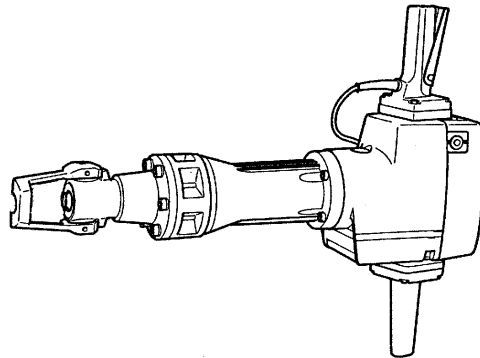
(1) Cold chisel

Overall length	Code No.
520 mm (20-15/32")	985231

### 3. Cutting and stripping work (asphalt cutting, etc.)



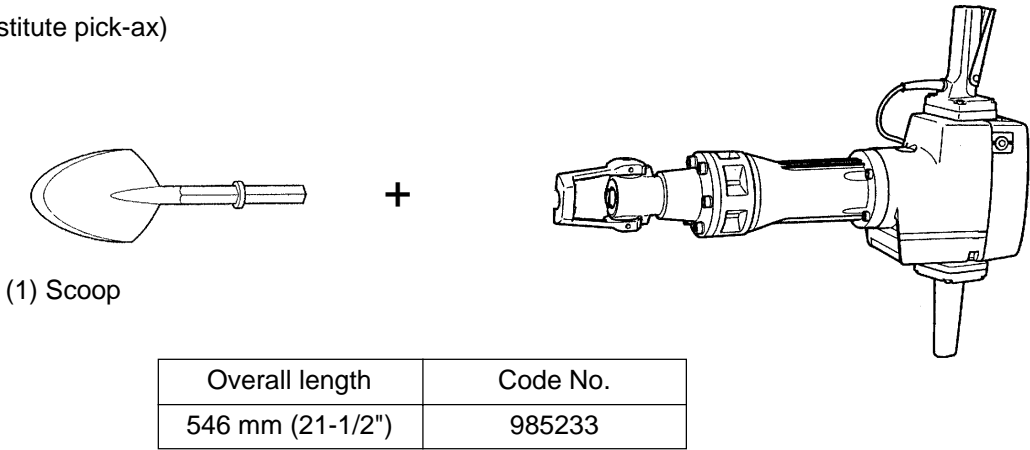
+



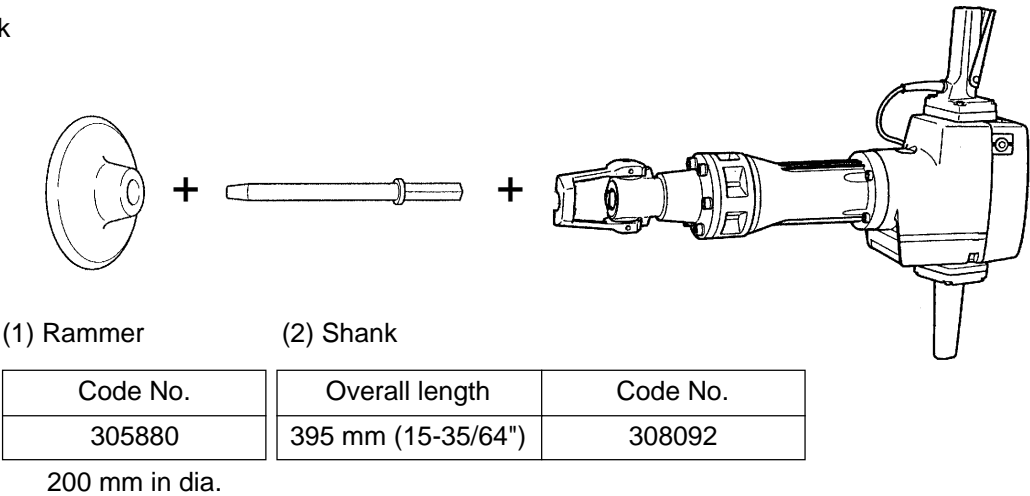
(1) Cutter

Width	Overall length	Code No.
75 mm (3")	520 mm (20-15/32")	985232

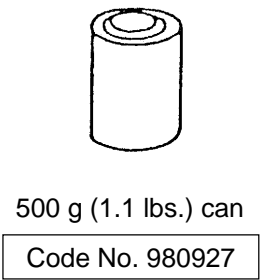
4. Digging (substitute pick-ax)



5. Tamping work



6. Grease for impact drill



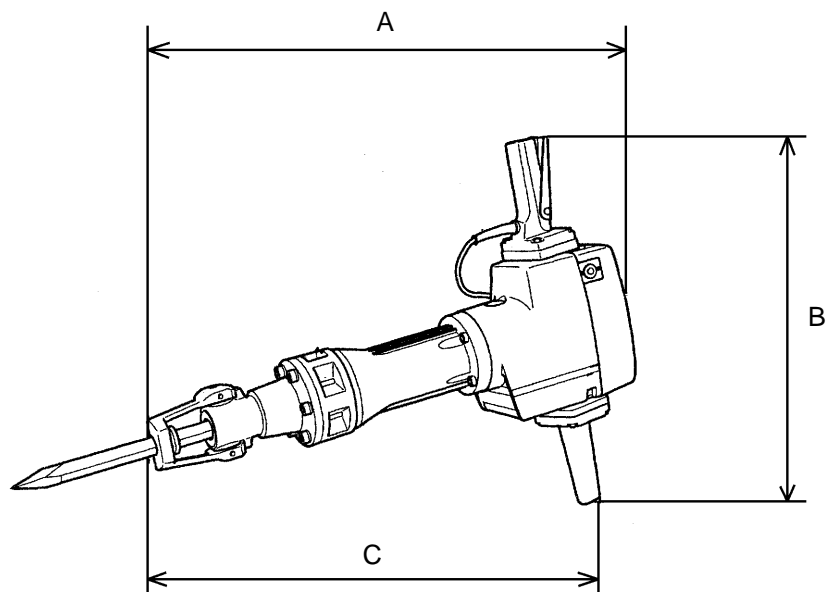
(Note)  
Code numbers listed above are subject to change. Please refer to periodic Technical News Bulletins.



## 6. COMPARISONS WITH SIMILAR PRODUCTS

### 6-1. Specification Comparisons

Maker			HITACHI			C	B
Model name			H 90SE	H 90SC	H 85		
Power input		W	1,450	1,450	1,330	1,700	1,800
Full-load impact rate		min <sup>-1</sup>	850	850	950	1,000	1,030
Dimensions (illustration below)	A	mm	859 (33-13/16")	842 (33-19/128")	882 (34-23/32")	818 (33-13/64")	845 (33-17/64")
	B	mm	634 (24-31/32")	634 (24-31/32")	642 (25-9/32")	588 (23-5/32")	594 (23-3/8")
	C	mm	728 (28-21/32")	711 (28")	—	—	700 (27-9/16")
Striking energy per stroke		J	55.0	55.0	51.0	55.3	50.0
		ft-lbs.	40.6	40.6	37.6	40.8	36.9
Insulation structure		—	Double insulation	Double insulation	Single insulation	Double insulation	Double insulation
Lubricating method		—	Grease	Grease	Oil	Grease	Grease
Vibration-absorbing handle		—	Provided	Provided	Not provided	Provided	Provided
No-load noise level		dB(A)	88.5	88.5	86.0	99.0	95.6
Weight (without cord)		kg	32 (70.5 lbs.)	32 (70.5 lbs.)	33 (72.8 lbs.)	29 (63.9 lbs.)	29 (63.9 lbs.)



6-2. Demolition Performance Comparisons

The data shown in Fig. 4 are obtained in actual factory tests, and are for reference only. The demolished amount may vary in accordance with operating conditions, operator skill, etc.

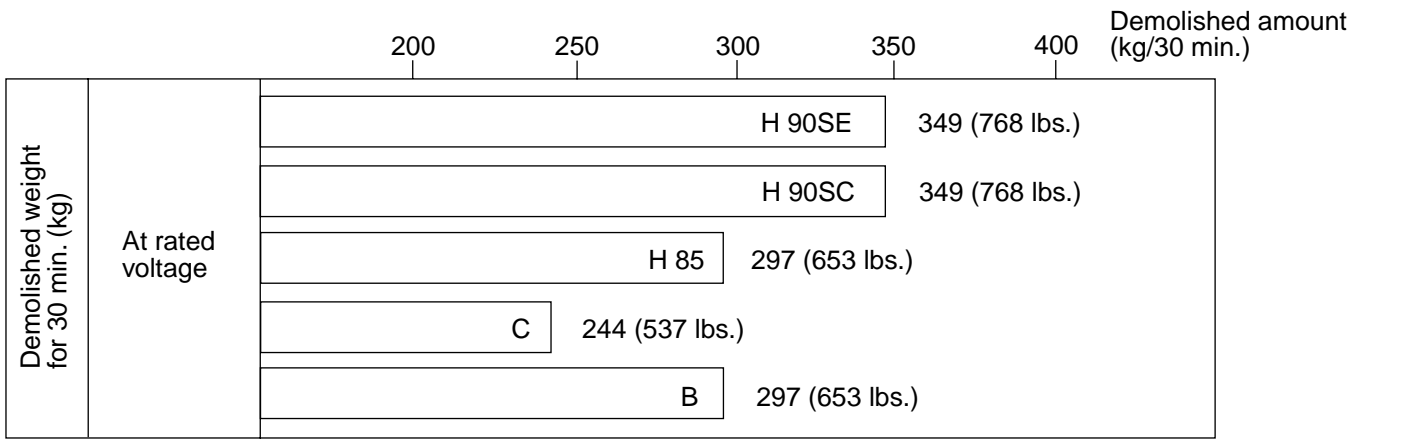


Fig. 4

## 7. PRECAUTIONS IN SALES PROMOTION

In the interest of promoting the safest and most efficient use of the Model H 90SE Electric 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 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 Electric 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 H 90SE unit is provided with a Caution Plate (illustrated below) which lists basic safety precautions in its use. Carefully ensure that the customer fully understands and follows these precautions before using the tool.

For the U.S.A. and Canada

#### **Hitachi Koki** **MADE IN JAPAN**

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

For Australia

#### **CAUTION**

**• Read thoroughly HANDLING INSTRUCTIONS before use.**

### 7-3. Grease Replacement

Different kinds of grease are used in the electro-pneumatic hammering section and the speed-change gear section. It is not necessary to replenish the grease between 6-month (approx.) change intervals unless the tool is disassembled or there is grease leakage due to a damage or worn seal.

To ensure the smooth reciprocating of the striker and the second hammer, special grease (Part No. 980927 for impact drill) is used in the hammering section. If the hammering section [inside the cylinder case and housing (crank shaft side)] is disassembled, thoroughly wipe away all old grease from all parts, and apply 70 g (2.3 oz) of new grease within the cylinder case and 50 g (1.7 oz) of new grease within the housing (crank shaft side). Do not exceed the designated amounts of grease. If there is excessive grease, it may flow between the striker and piston and cause reduced hammering efficiency and/or increased recoil force.

N.P.C. SEP-3A (Part No. 930035) is used in the speed-change gear section (inside the gear cover). The proper supply amount is 100 g (3.3 oz). Never use the hammering section special grease in the speed-change section. The special soft grease would leak into the motor section and cause serious problems.

### 7-4. O-Ring Replacement

The O-ring mounted on the piston is extremely important to ensure adequate sealing of the air pressure. Although the O-ring is made of special rubber to ensure a long service life, it does nonetheless become worn and should be replaced periodically depending on the frequency of tool use. With average use, it is recommended that the O-ring should be replaced every six months to ensure maximum effectiveness.

## 8. REFERENCE INFORMATION

### 8-1. Air Damper

There is an air chamber constructed between the second hammer and the hammer holder. The compression of the air within the air chamber functions in the same way as a spring to maintain continuous and close contact between the second hammer and the accessory tool mounted in the retainer. Because of this continuous close contact between the second hammer and the accessory tool, digging and cutting work in asphalt, gravel and other such comparatively soft materials can be accomplished with ease and efficiency.

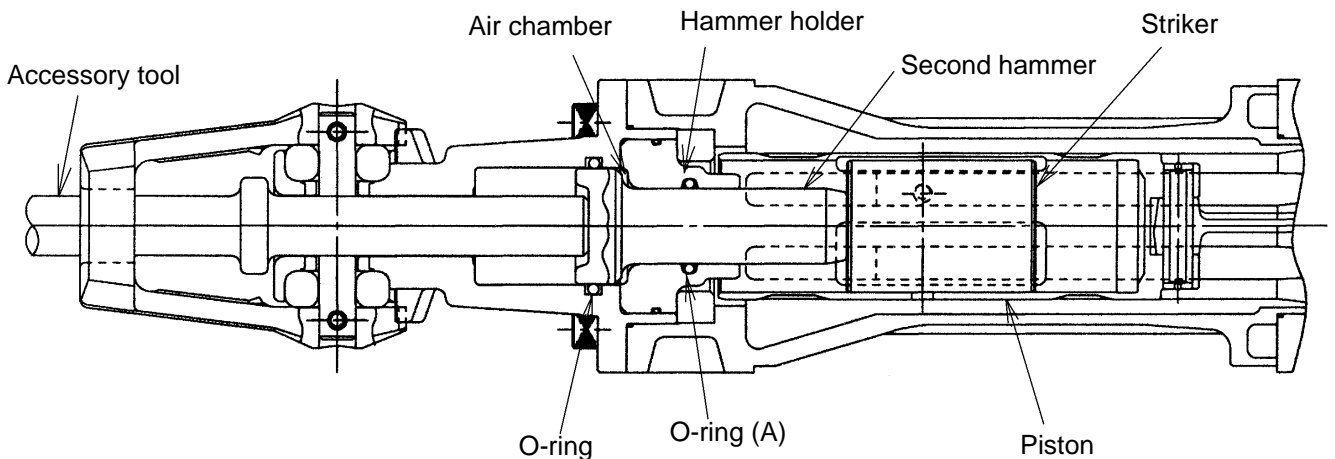


Fig. 5

### 8-2. Sealed and Dustproof Construction

The cylinder case section and the housing (crank shaft side) are sealed by six (6) O-rings, and the bearing portion of the crank shaft is sealed by an oil seal. These seals serve to prevent leakage of the grease, as well as to prevent dust and dirt from entering the mechanism.

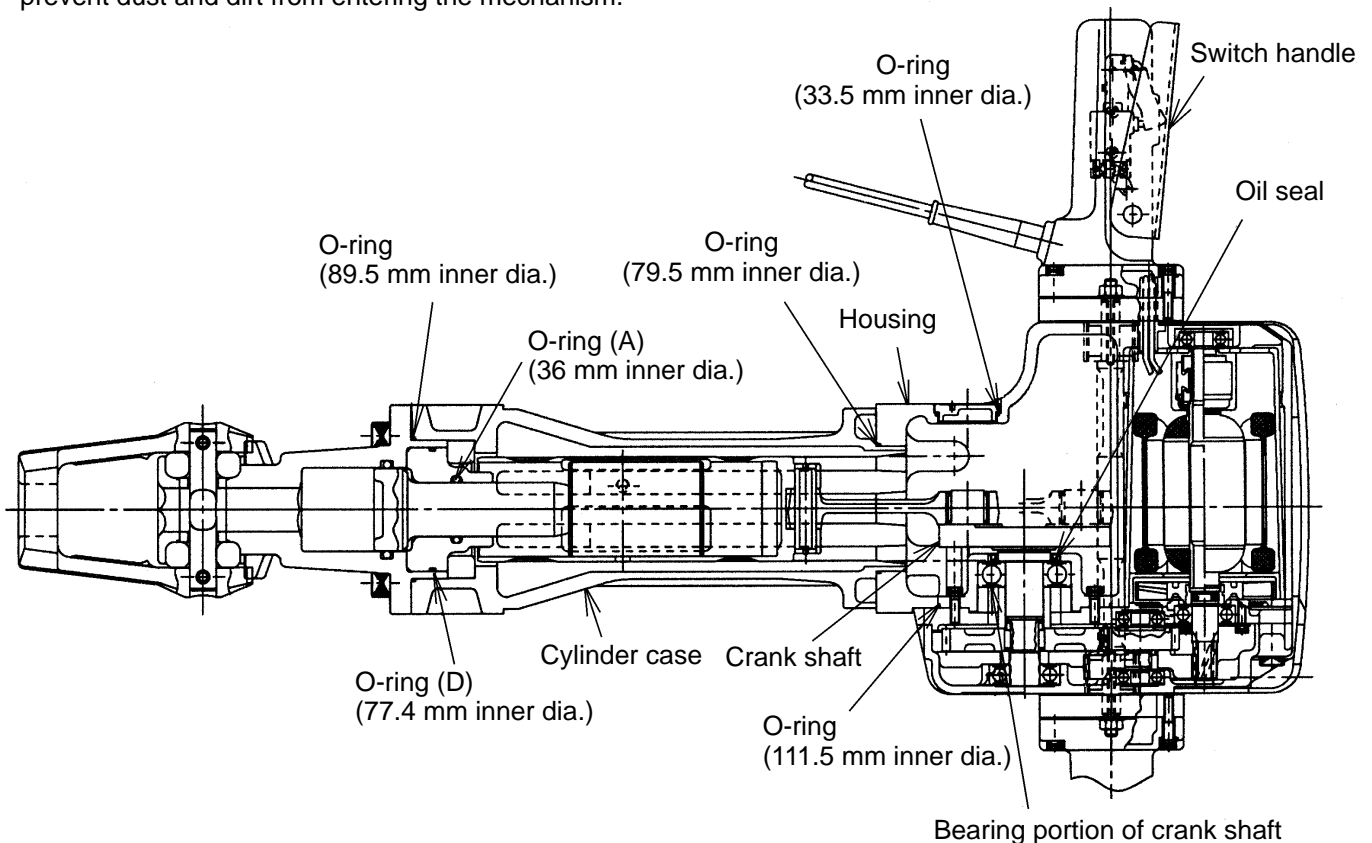


Fig. 6

### 8-3. Vibration-Absorbing Construction

#### (1) Vibration-absorbing construction

A hole passing through the housing ass'y houses a handle shaft which in turn supports a switch handle and side handle which are mounted in a T shape, at right angles to the operating direction of the main body of the tool. The handle shaft can be turned and is installed in a position slightly deviated from the handle operating point. Both ends of the handle shaft are equipped with Neidhart Springs, each of which consists of four rubber handle dampers inserted between a handle holder (B) and a handle holder (A). Each handle holder (A) has four involute-type, wing-shaped appendages. When the operator pushes down on the handles, each holder (A) rotates, bending the handle dampers and reducing vibration. Also, the angle of rotation of the handles is controlled by stoppers. Through adoption of this type of vibration-absorbing handle construction, the Model H 90SE causes much less operator fatigue and can be comfortably operated for significantly longer periods than conventional products.

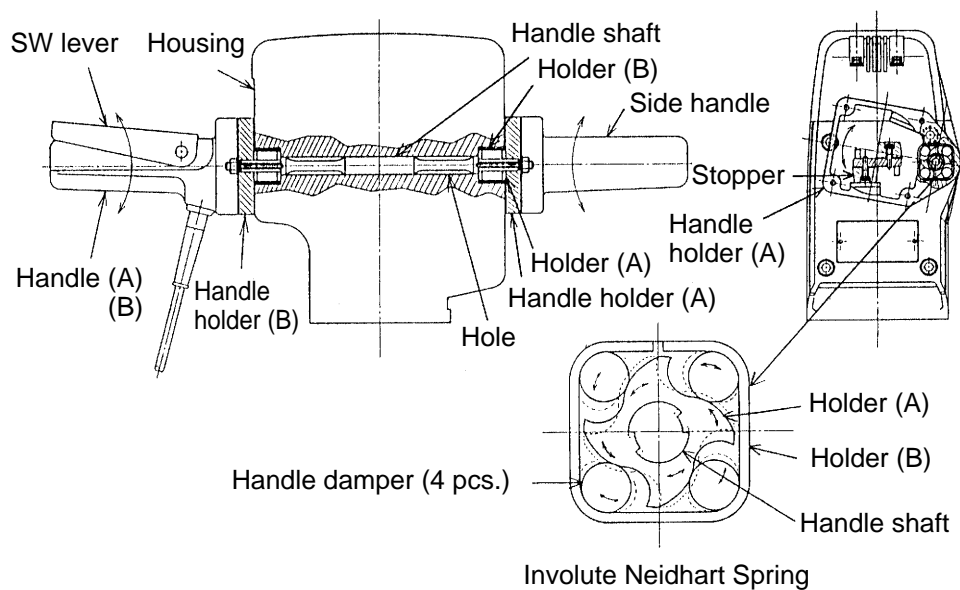


Fig. 7

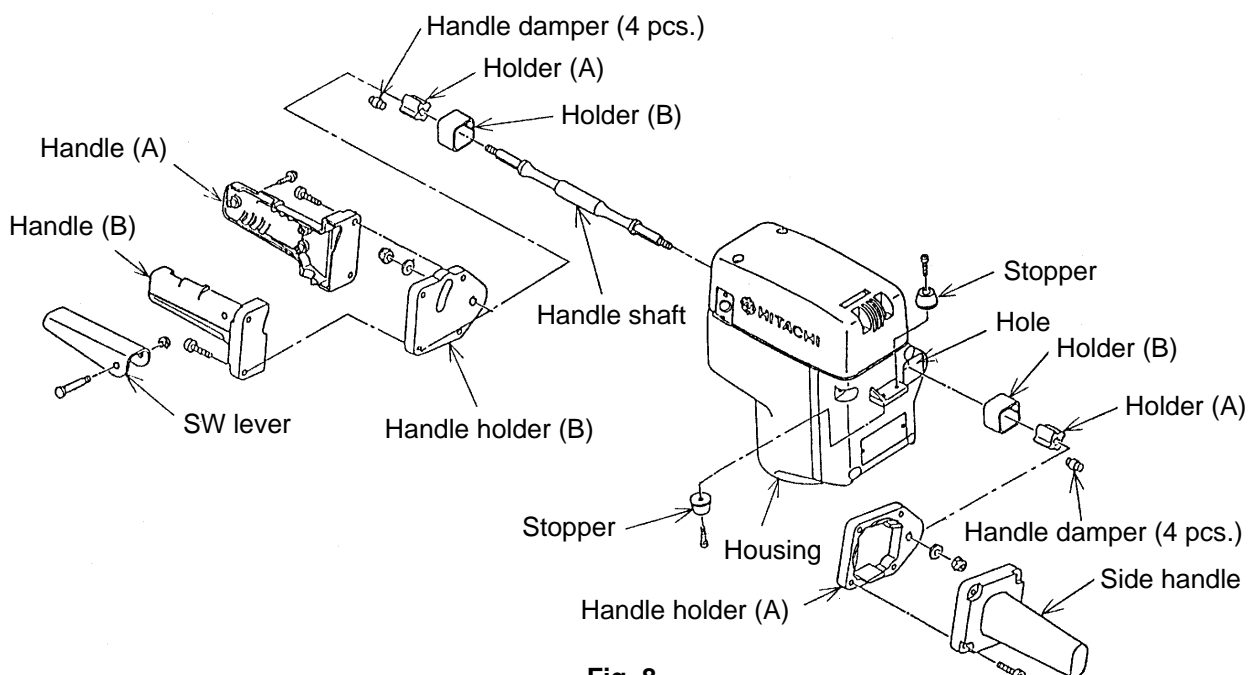
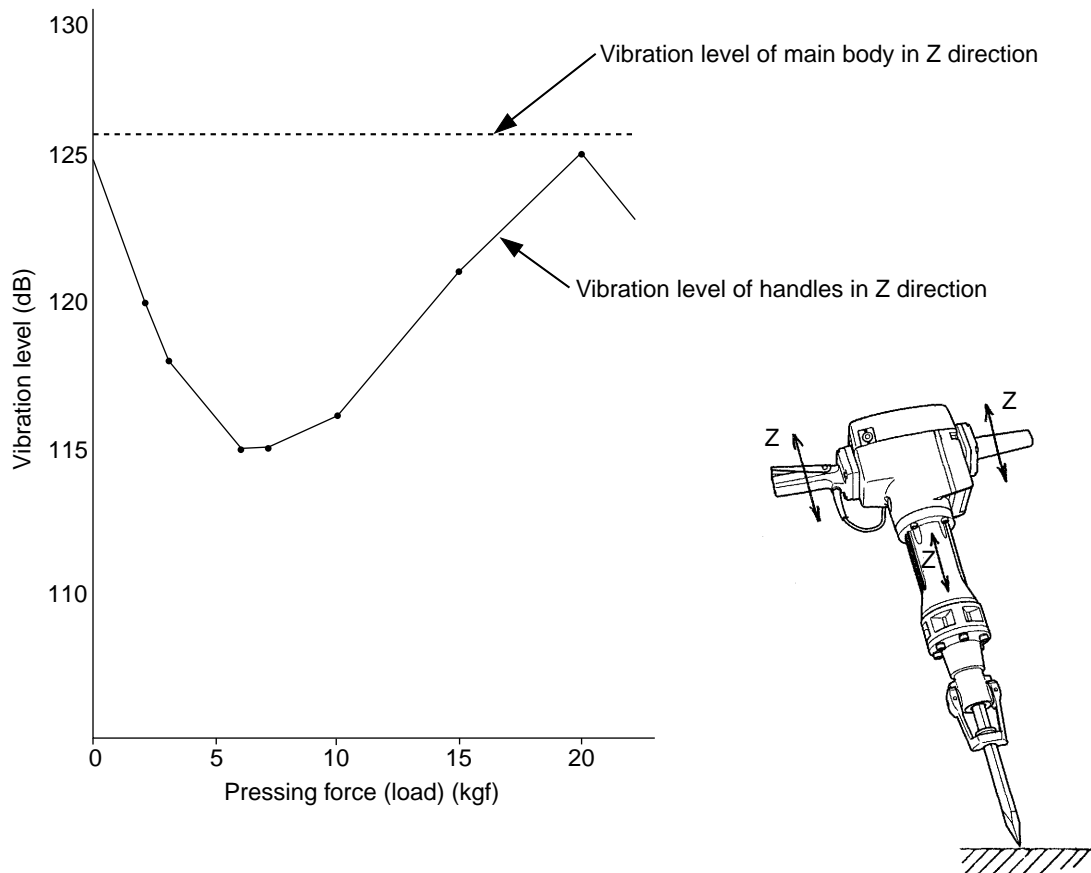


Fig. 8

(2) Level of handle vibration in 'Z' direction

The graph below illustrates the relationship between handle pressing force and handle vibration level in the 'Z' direction.



(Note) For improved operability in chipping and breaking operations, it is recommended that operating force be limited to the dead weight of the tool rather than pressing forcefully down on the handles. In keeping with this, the handle pressing force at which the vibration-absorbing effect is maximum is set for between 5 and 10 kg. The customer should be cautioned to avoid pressing fully down on the handles during operation.

#### 8-4. Tool Retainer

Three types of shank tools (Fig. 1) can be mounted to the Model H 90SE by turning the saddle-shaped retainer.

- (1) Mounting air tool shank tool and standard hex. shank tool

Raise the retainer in ① direction and insert the tool shank into the hexagonal hole of the front cover as far as it will go (Fig. 9). Put the retainer back in position to fix the tool shank (Fig. 10).

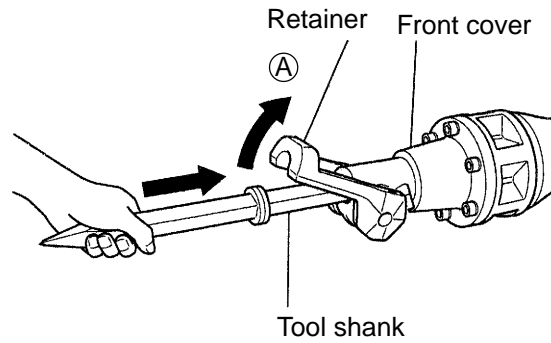


Fig. 9

- (2) Mounting standard hex. shank tool and retaining groove tool without collar

Lower the retainer in ② direction and insert the tool shank into the hexagonal hole of the front cover as far as it will go facing the recessed portion of the tool shank to the retainer (Fig. 11). Turn the retainer in ③ direction to fix the tool shank (Fig. 12).

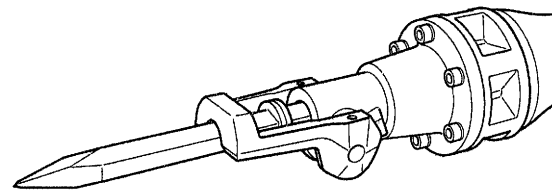


Fig. 10

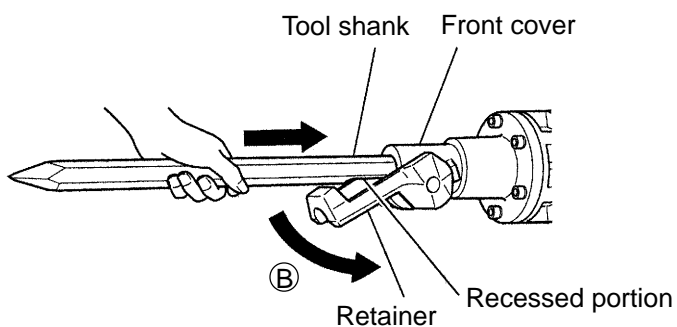


Fig. 11

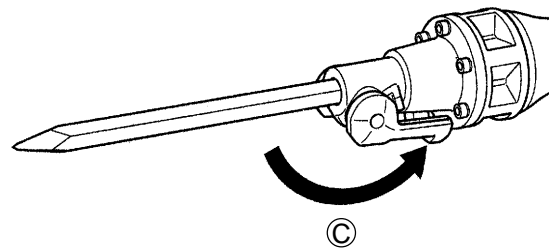


Fig. 12



## 9. REPAIR GUIDE

### 9-1. Precautions and Suggestions for Disassembly and Reassembly of the Main Body

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

#### 9-1-1. Disassembly

**[NOTE]** If it is difficult to loosen and remove the fixing bolts, use an appropriate heating device to heat them to approximately 80 °C (176 °F).

- Disassembly of the Armature Ass'y [99]

- (1) Remove the two Seal Lock Hex. Socket Hd. Bolts M4 x 10 [89], and disassemble the Cap Cover [90] and the Carbon Brushes [92].
- (2) Loosen the Lock Nut M8 (Nylon Insert) [48], and remove the Washer M8 [47]. Then, while pressing on the Switch Handle side, pull the Side Handle [55] and Handle Holder (A) [56] from the Handle Shaft [51]. Next, pull off the Switch Handle side and gently tap the end of the Handle Shaft [51] on one side to loosen and remove the Holder (A) [53] and Handle Dampers [54] (4 pcs.) from one side. The Handle Shaft [51] can then be extracted from the Housing Ass'y [85].
- (3) Remove the four Seal Lock Hex. Socket Hd. Bolts M10 x 60 [58] and two Seal Lock Hex. Socket Hd. Bolts M10 x 55 [66] and take off the Gear Cover Ass'y [59]. At the same time, also remove the First Gear [68] and Second Gear [69]. Next, by inserting a flat-blade screwdriver or similar tool into one of the air vents of the Inner Cover [76] and lifting it upwards, the Inner Cover [76], Armature Ass'y [99], Crank Shaft [84], and connected parts can be removed in a single body.
- (4) As illustrated in Fig. 13, support the Inner Cover [76] with an appropriate tubular jig (100 mm inner dia.), and push down on the pinion end of the Armature Ass'y [99] with an arbor press to separate the Armature Ass'y [99] from the Inner Cover [76]. At this time, be very careful not to lose the Bearing Washer [74] which is mounted on the fan ass'y portion of the Armature Ass'y.

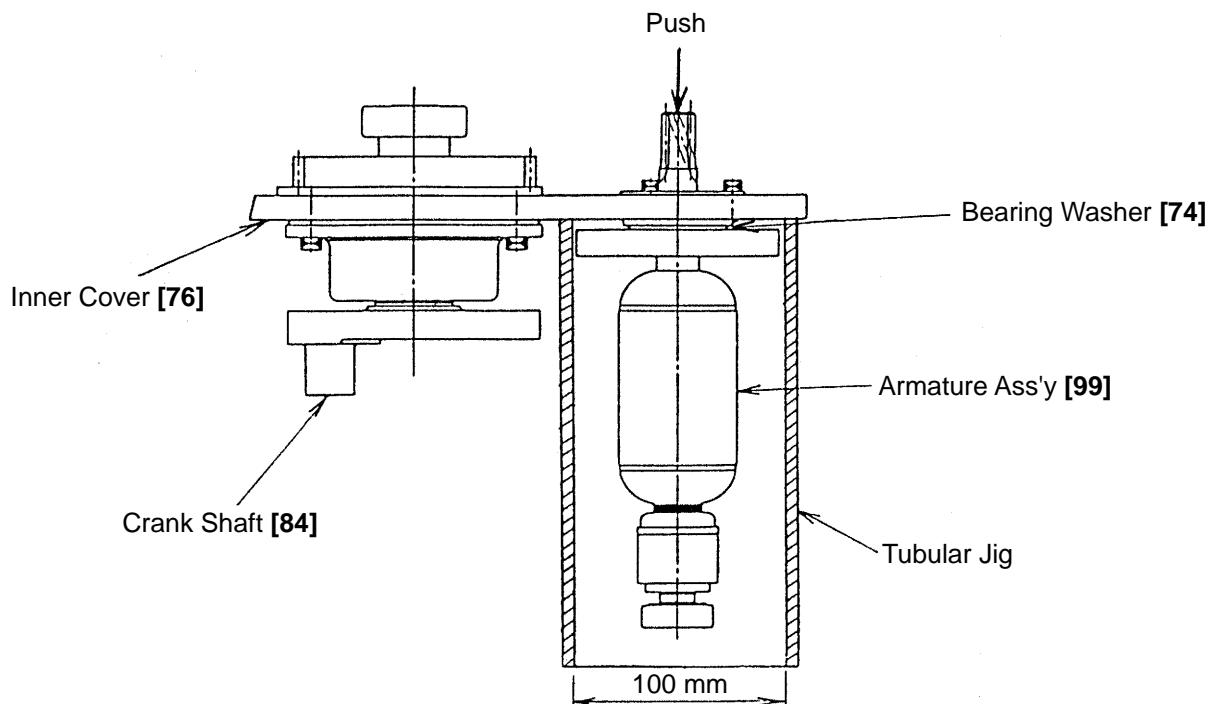


Fig. 13

- Disassembly of the Crank Shaft [84] section

Remove the four Seal Lock Hex. Socket Hd. Bolts M8 x 18 [81]. As illustrated in Fig. 14, support the lower surface of the Inner Cover [76] with an appropriate tubular jig (100 mm inner dia.), apply an appropriate steel rod (maximum diameter of 19 mm) to the end surface of the Crank Shaft [84], and push it downward with an arbor press. The Ball Bearing 6204VVCM [62], Distance Ring (A) [63], Distance Ring (B) [65], Distance Ring (C) [77], Final Gear [64], Feather Keys 4 x 4 x 10 [70], Bearing Boss [80], Ball Bearing 6305VVCM [78] and Crank Shaft [84] can then be removed from the Inner Cover [76].

Then, remove the three Seal Lock Hex. Socket Hd. Bolts M5 x 12 [71], and take off Bearing Cover (A) [72] and the Ball Bearing 6203DDCM [73].

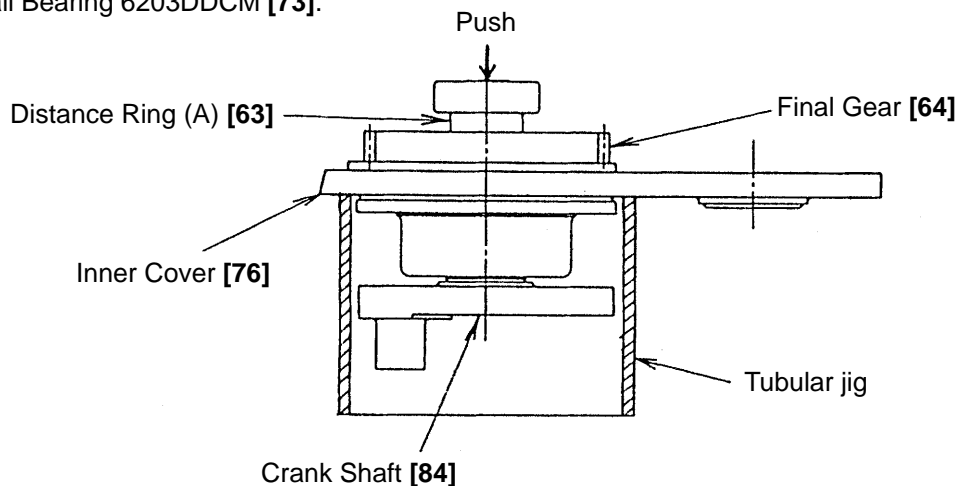


Fig. 14

- Disassembly of the Front Cover [7] section

Secure the Cylinder Case [15] in a vise, and heat the Cylinder Case mounting portion of the Front Cover [7] to a temperature of approx. 80 °C (176 °F) with an appropriate heating device. Then, remove the six Nylock High Tension Bolts M12 x 40 [4]. The Front Cover [7] together with the Second Hammer [10] and the Hammer Holder [13] can then be removed from the Cylinder Case [15] in a single body. The Damper [14] can then be taken out.

- Removal of O-Ring (A) [12]

As O-Ring (A) [12] is installed in the inner portion of the Hammer Holder [13], it may be difficult to remove. As illustrated in Fig. 15, pry O-Ring (A) upward gently with a small flat-blade screwdriver, being very careful not to damage the surface of the O-Ring.

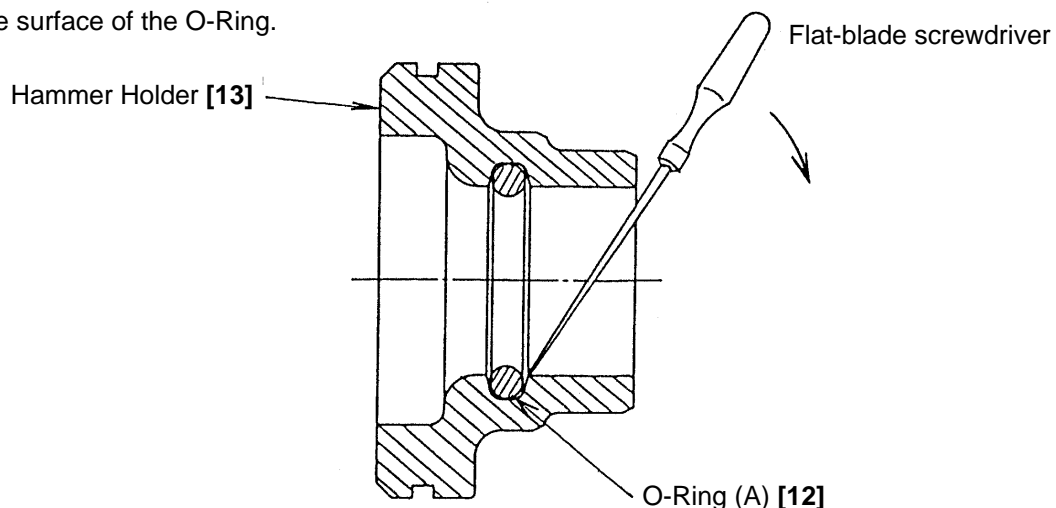


Fig. 15

- Removal of the Striker [19] and related parts

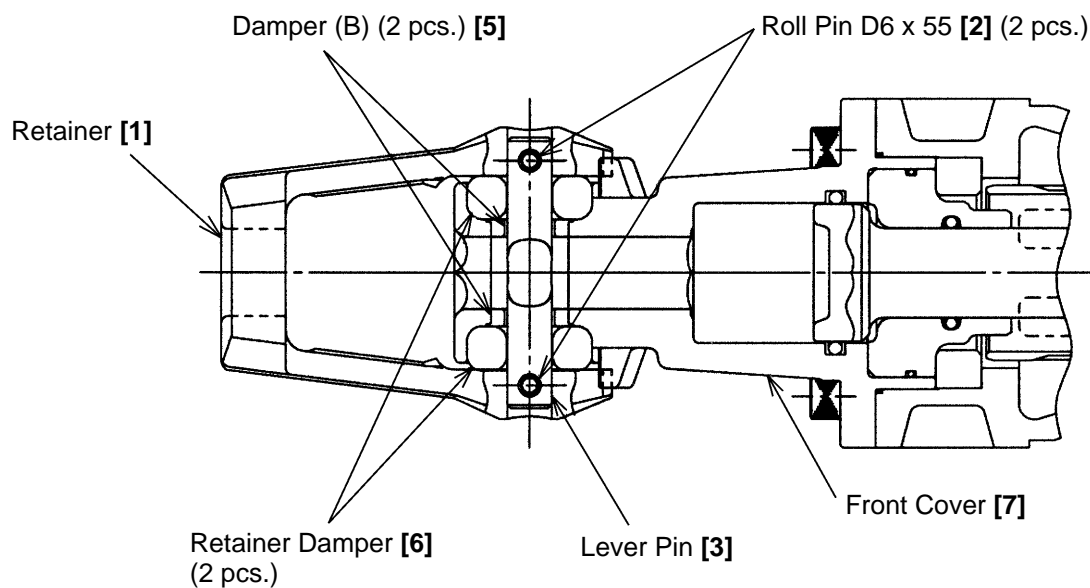
Remove the four Nylock Bolts M10 x 45 [16], and separate the Cylinder Case [15] from the Housing Ass'y [85]. From the Cylinder Case, take out the Striker [19], Piston [20] and Connecting Rod Ass'y [23] in a single body. Next, remove the O-Ring (P-46) [22] from the back of the Piston, and pull out the Piston Pin [21]. The Piston [20] can then be separated from the Connecting Rod Ass'y [23]. Finally, tap gently on the end of the Piston to remove the Striker [19].

- Disassembly of the Switch [43] and related parts

Pry off the Retaining Ring (E-Type) [27] with a small flat-blade screwdriver, pull out the Pin [25], and remove the Switch Lever [26]. Then, remove the two Seal Lock Hex. Socket Hd. Bolts M6 x 30 [28] on the Handle (B) side and the two Tapping Screws D4 x 20 [50], and remove Handle (B) [49].

- Disassembly of the Retainer [1] section

Remove the two Roll Pins D6 x 55 [2] from the 6 mm dia. holes of the Retainer [1] and remove the Lever Pin [3]. The Retainer [1] and two Retainer Dampers [6] and two Damper (B) [5] can then be removed from the Front Cover [7] (Fig. 16).



**Fig. 16**

### 9-1-2. Reassembly

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

- Reassembly of the Crank Shaft [84] section

Mount the Bearing Boss [80], Oil Seal [82] and Ball Bearing 6305VVCM [78], and Distance Ring (C) [77] onto the Crank Shaft [84], and secure the Bearing Boss [80] to the Inner Cover [76] with the four Seal Lock Hex. Socket Hd. Bolts M8 x 18 [81]. Support the inner race of the Ball Bearing 6305VVCM [78] with a J-127-5 Sleeve (Special Repair Tool, Part No. 970899), and press fit the Crank Shaft [84] into the Ball Bearing 6305VVCM [78]. Then, insert Distance Ring (B) [65] and the two Feather Keys 4 x 4 x 12 [83] onto the Crank Shaft [84] and press fit the Final Gear [64].

Finally, press fit the Ball Bearing 6204VVCM [62] and Distance Ring (A) [63] onto the Crank Shaft [84].

- Reassembly of the Armature Ass'y [99]

Press fit the Ball Bearing 6203DDCM [73] into the Inner Cover [76], cover it with Bearing Cover (A) [72], and secure the assembly with the three Seal Lock Hex. Socket Hd. Bolts M5 x 12 [71].

- Reassembly of the Striker [19]

Push the Striker [19] into the inside of the Piston [20] until a 'hissing' sound is heard. When the hissing sound is heard, the Striker is properly inserted in the Piston. (The hissing is the sound of the compressed air escaping from the Piston when the Striker reaches the respiratory chambers within the Piston.) In this state, align the piston pin inserting holes of the Piston [20] and Connecting Rod Ass'y [23], and insert the Piston Pin [21]. Finally, mount the O-Ring (P-46) [22] in the groove at the rear portion of the Piston [20].

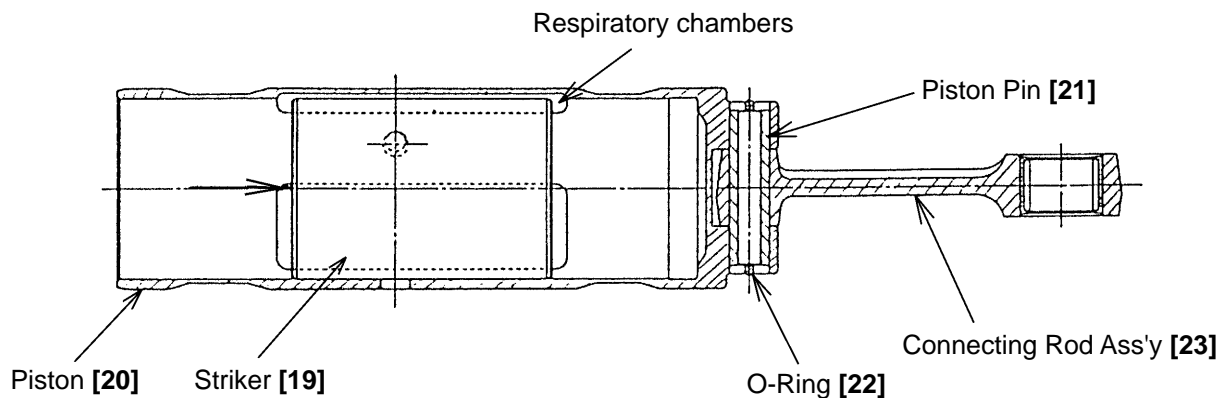


Fig. 17

- Reassembly of the Oil Seal [82]

When mounting the Oil Seal [82] in the Bearing Boss [80], carefully ensure that they are mounted in the proper direction as described below.

- (1) Mounting of the Oil Seal [82]

As illustrated in Fig. 18, the lip side of the Oil Seal [82] must be facing in the same direction in which the Crank Shaft [84] is assembled.

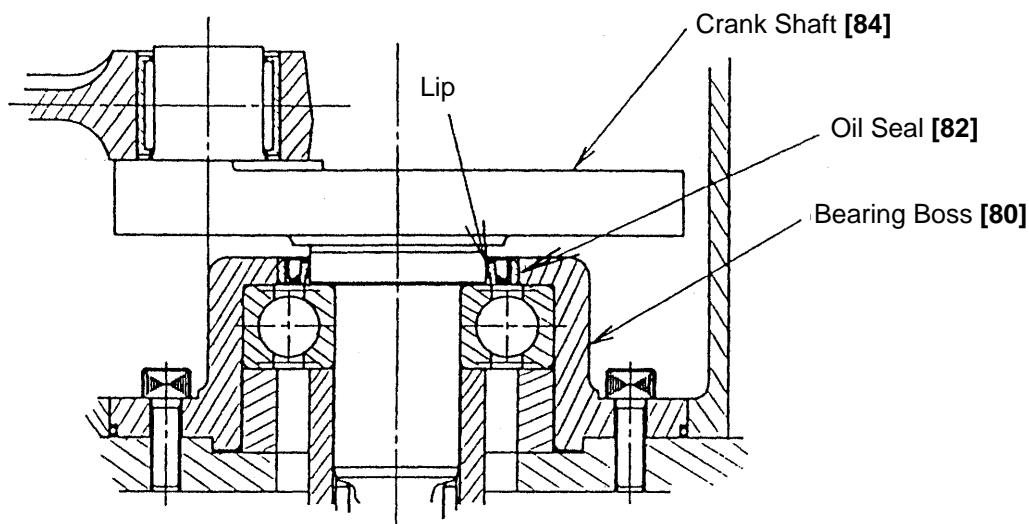


Fig. 18

- Reassembly of the Retainer [1] section

Before reassembly, apply grease (Doubrex #251 Part No. 980757) to the sliding portion between the Retainer [1] and the Retainer Damper [6] of the Front Cover [7], Damper (B) [5] and Lever Pin [3]. Mount the Damper (B) [5] and the two Retainer Dampers [6] to the Front Cover [7] and then mount the Retainer [1]. Insert the Lever Pin [3] into the 17.5 mm dia. hole of the Retainer [1] facing the recessed portion of the Lever Pin [3] to the hexagonal hole of the Front Cover [7]. At this time, align the 6.5 mm dia. hole of the Retainer [1] with the 7 mm dia. hole of the Lever Pin [3]. Drive the Roll Pin D6 x 55 [2] into the 6.5 mm dia. hole of the Retainer [1] approximately 5 mm under the end surface of the Retainer [1] (Fig. 19).

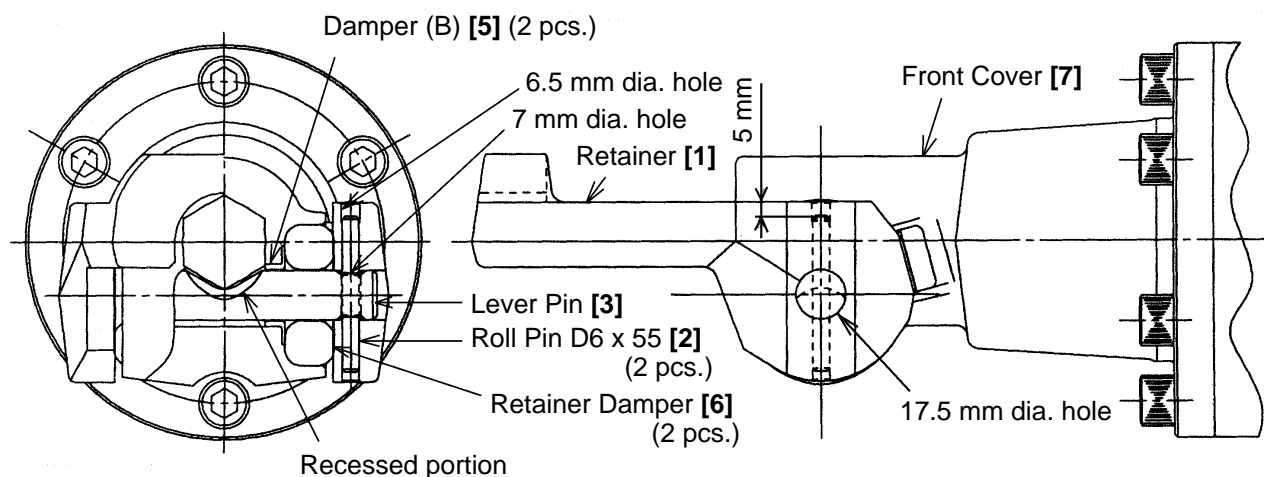


Fig. 19

### 9-1-3. Screw locking agent TB1401

- (1) Prior to reassembly, all M4, M5, M6, M8 and M10 hexagon socket hd. bolts and machine screws must be coated with screw locking agent TB1401.
- (2) The following parts must be replaced with new Hitachi genuine parts if they are loosened once.
  - Front cover fixing bolts: M12 x 40 [4]
  - Cylinder case fixing bolts: M10 x 45 [16]

**[CAUTION]** If fastening bolts come loose from vibration, it could cause serious damage to the machine.  
Ensure without fail that TB1401 screw locking agent is applied as directed above prior to reassembly. Before applying the TB1401, carefully clean any grease or other foreign matter from the male and female threads with gasoline, thinner or similar cleaning solvents.

### 9-1-4. Tightening torque

- |                                  |  |
|----------------------------------|--|
| (1) M4 hexagon socket hd. bolts  | $4.41^{+0.49}_{-0}$ N•m ( $45^{+5}_{-0}$ kgf•cm, $39.1^{+4.3}_{-0}$ in-lbs.)     |
| (2) M5 hexagon socket hd. bolts  | $7.84^{+1.96}_{-0}$ N•m ( $80^{+20}_{-0}$ kgf•cm, $69.5^{+12.4}_{-0}$ in-lbs.)   |
| (3) M6 hexagon socket hd. bolts  | $9.80^{+1.96}_{-0}$ N•m ( $100^{+20}_{-0}$ kgf•cm, $86.9^{+17.4}_{-0}$ in-lbs.)  |
| (4) M8 hexagon socket hd. bolts  | $19.6^{+1.96}_{-0}$ N•m ( $200^{+20}_{-0}$ kgf•cm, $173.8^{+17.4}_{-0}$ in-lbs.) |
| (5) M10 hexagon socket hd. bolts | $29.4^{+2.94}_{-0}$ N•m ( $300^{+30}_{-0}$ kgf•cm, $260^{+26}_{-0}$ in-lbs.)     |
| (6) M12 hexagon socket hd. bolts | $49.0^{+2.94}_{-0}$ N•m ( $500^{+30}_{-0}$ kgf•cm, $434.4^{+26}_{-0}$ in-lbs.)   |

**[NOTE]** If above bolts are tightened more than the designated values, it may cause breakage. Without fail, tighten the bolts and screws according to the above specified values.

### 9-1-5. Internal wiring

- Wiring diagram of products with noise suppressor

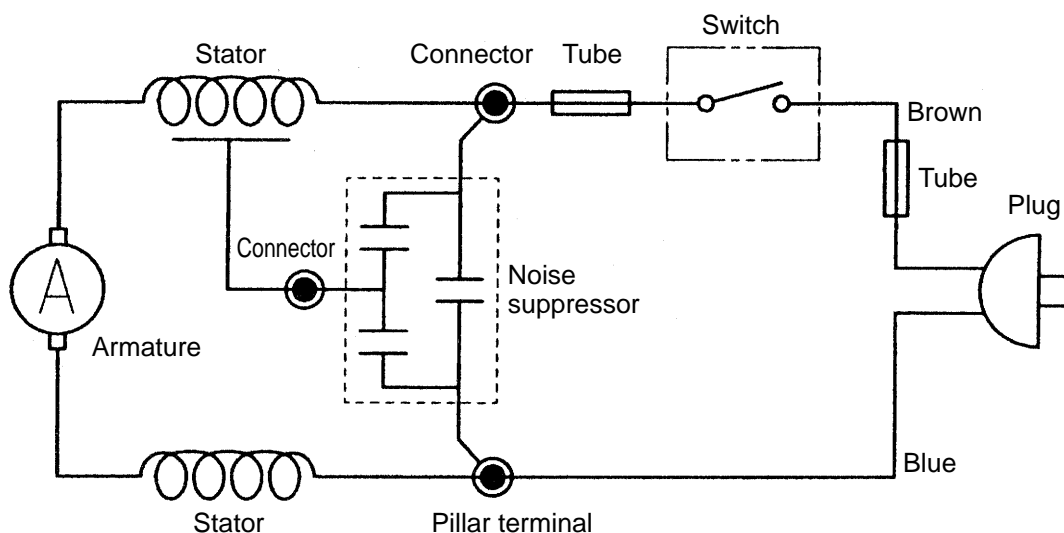


Fig. 20

- Wiring diagram of products without noise suppressor

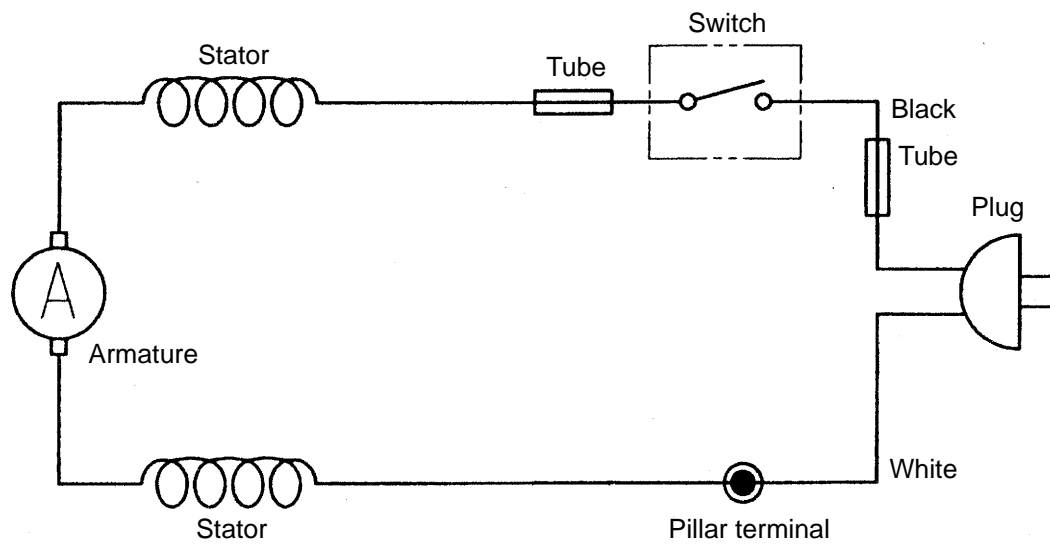


Fig. 21

- Schematic diagram

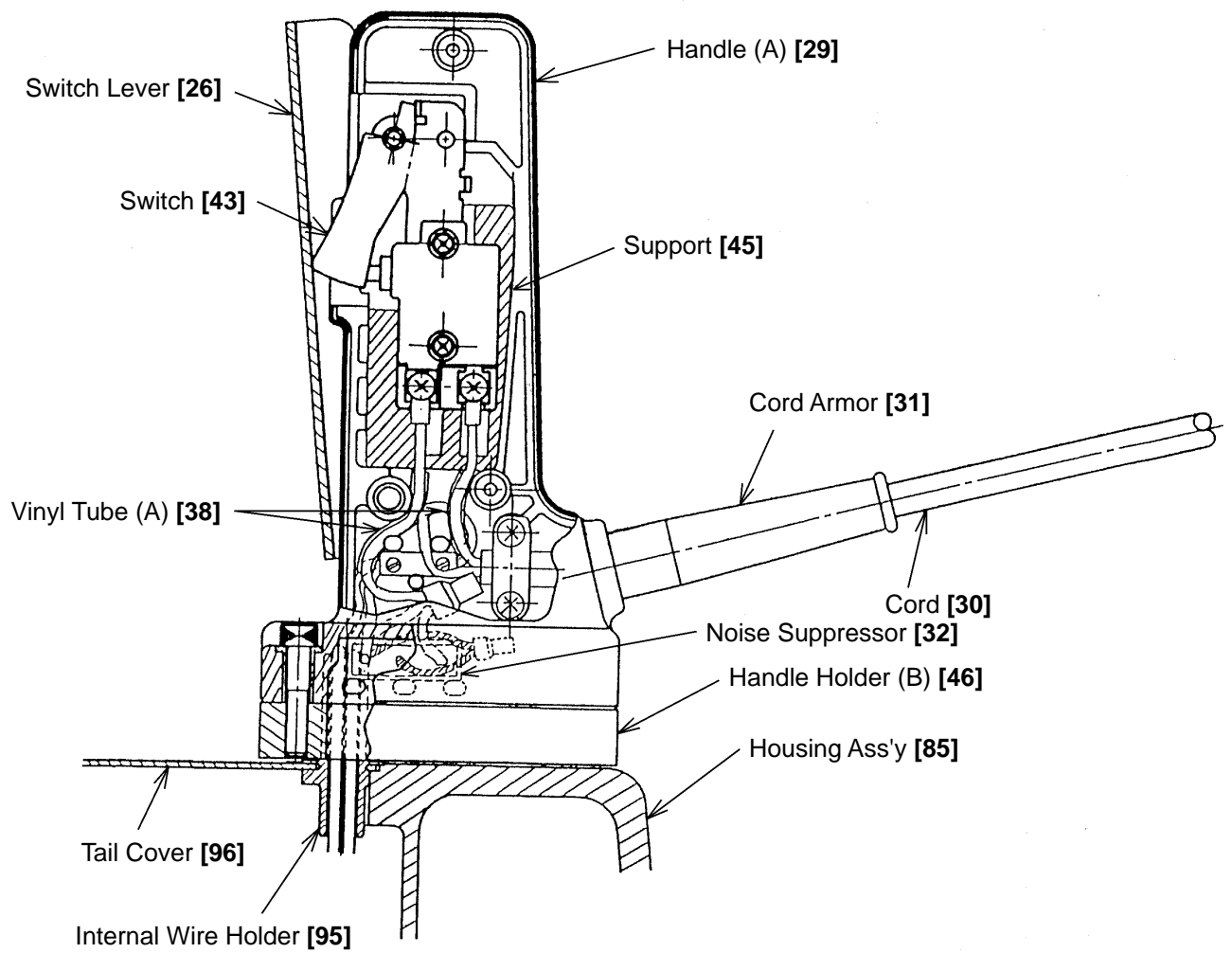


Fig. 22

- Safety precautions in wiring work (See Fig. 22.)

The Switch [43] is flexibly supported by the Support [45] to protect it from excessive vibration and extend its service life.

The outer surfaces of lead wires are covered by Vinyl Tubes (A) [38]. The vinyl tubes are utilized to protect the lead wires from damage. Ensure without fail that they are properly mounted during reassembly. When reassembling the Internal Wire Holder [95], carefully ensure it is properly installed between Tail Cover [96] and Housing Ass'y [85].

#### 9-1-6. 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 4000 V/1 minute, with no abnormalities ... 220 V – 240 V  
(and 110 V for U.K. products)  
AC 2500 V/1 minute, with no abnormalities ... 110 V – 127 V  
(except U.K. products)

#### 9-1-7. No-load current value

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

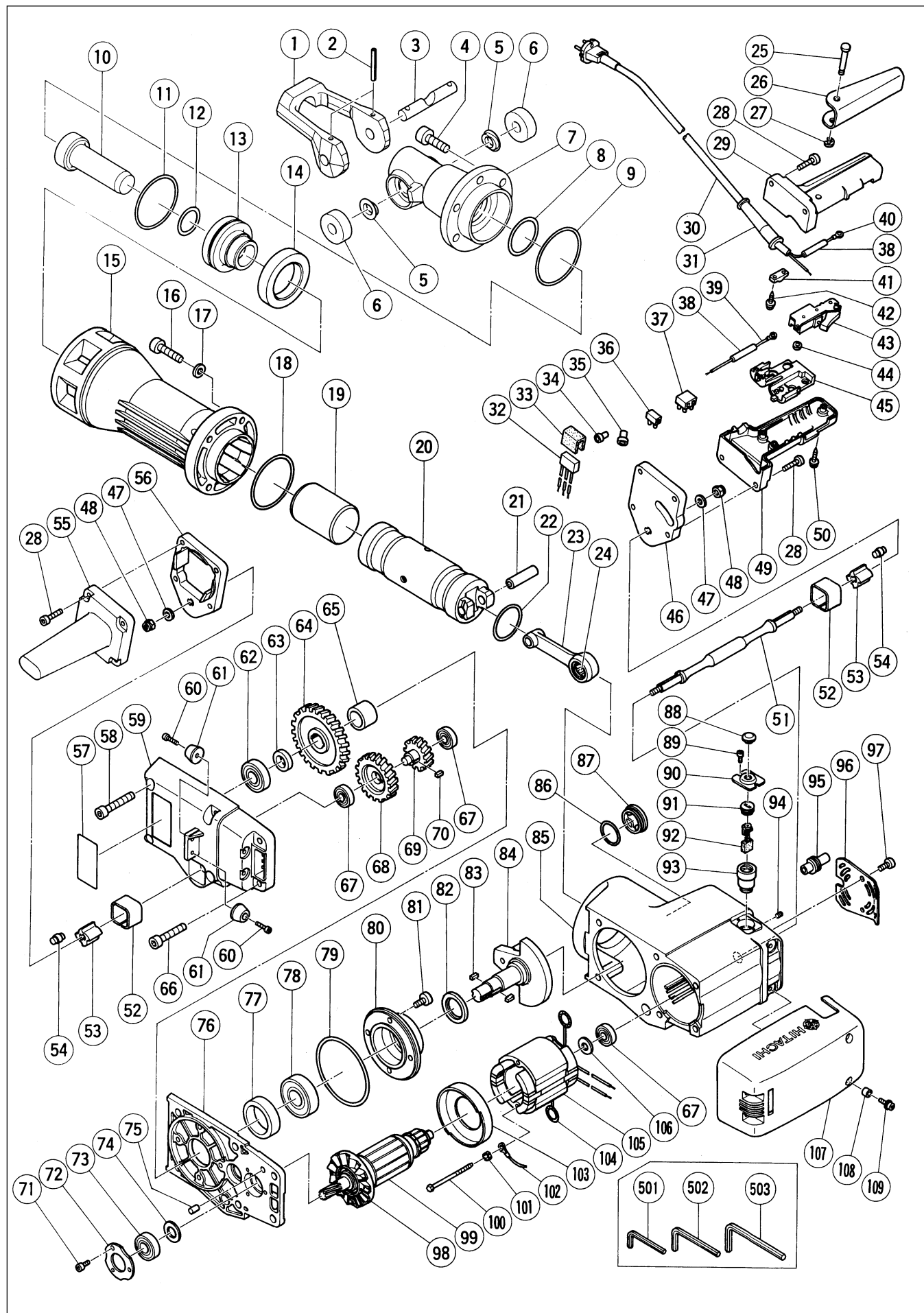
Voltage (V)	110	115	120	127	220	230	240
Current (A) max.	5.8	5.7	5.5	5.3	3.6	3.5	3.4



## 10. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		20	40	60	80	100	120 min.
	Fixed							
H 90SE		Work Flow						
		Switch	→		Gear Cover	→	Counter Gear Ball Bearing (6201) x 2 Ball Bearing (6204)	
				Cord	→			
		General Assembly						
		Fixed Cost				Armature Ass'y Ball Bearing (6301) Ball Bearing (6303)	Stator Ass'y	Housing
		Switch	} 0 min.					
		Front Cover						
		Lever						
		Cord	10 min.					
		Others	20 min.					
							Inner Cover Ball Bearing (6305) Crank Shaft Final Gear	
		Front Cover Lever	→	Hammer Holder O-Ring x 4 Damper Damper Plate	→	Cylinder Case		
				Striker O-Ring x 2	→	Connecting Rod Piston Needle Bearing Piston Pin		

# Assembly Diagram for H 90SE



# PARTS

H 90SE

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
1	318-650	RETAINER	1		
2	994-416	ROLL PIN D6X55	2		
3	318-651	LEVER PIN	1		
4	306-373	NYLOCK HIGH TENSION BOLT M12X40	6		
5	318-655	DAMPER (B)	2		
6	305-621	RETAINER DAMPER	2		
7	318-652	FRONT COVER	1		
8	993-188	O-RING	1		
9	877-316	O-RING (S-90)	1		
10	318-653	SECOND HAMMER	1		
11	992-865	O-RING (D)	1		
12	956-503	O-RING (A)	1		
13	318-654	HAMMER HOLDER	1		
14	992-859	DAMPER	1		
15	305-615	CYLINDER CASE	1		
16	306-372	NYLOCK BOLT M10X45	4		
17	949-445	WASHER M10 (10 PCS.)	4		
18	993-195	O-RING	1		
19	305-612	STRIKER	1		
20	305-611	PISTON	1		
21	305-614	PISTON PIN	1		
22	878-716	O-RING (P-46)	1		
23	305-613	CONNECTING ROD ASS'Y	1	INCLUD.24	
24	956-485	NEEDLE BEARING (NSK RLM2220)	1		
25	992-870	PIN	1		
26	992-869	SWITCH LEVER	1		
27	968-643	RETAINING RING (E-TYPE) FOR D4 SHAFT	1		
28	993-496	SEAL LOCK HEX. SOCKET HD. BOLT M6X30	8		
29	305-636	HANDLE (A)	1		
*	30	500-390Z	CORD	1	(CORD ARMOR D10.7)
*	30	500-246Z	CORD	1	(CORD ARMOR D10.7) FOR GBR(110V)
*	30	500-408Z	CORD	1	(CORD ARMOR D10.7) FOR AUS
*	30	500-450Z	CORD	1	(CORD ARMOR D10.7) FOR GBR(230V)
*	30	500-391Z	CORD	1	(CORD ARMOR D10.7) FOR SUI
*	30	500-453Z	CORD	1	(CORD ARMOR D10.7) FOR USA
*	31	940-778	CORD ARMOR D10.7	1	
*	31	958-049	CORD ARMOR D8.2	1	
*	32	994-273	NOISE SUPPRESSOR	1	EXCEPT AUS,USA
*	33	930-153	SUPPORT (B)	1	EXCEPT AUS,USA
*	33	963-243	SUPPORT	1	FOR SUI
*	34	959-140	CONNECTOR 50091 (10 PCS.)	1	EXCEPT AUS,FIN,USA
*	35	959-141	CONNECTOR 50092 (10 PCS.)	1	EXCEPT AUS,FIN,USA
*	36	938-307	PILLAR TERMINAL	1	EXCEPT AUS
*	37	958-308Z	PILLAR TERMINAL (A)	1	FOR FIN
*	38	996-438	VINYL TUBE (A) (I.D.7XT0.5X50)	2	
*	39	981-974	INTERNAL WIRE	1	EXCEPT AUS,USA
*	39	306-681	INTERNAL WIRE	1	FOR GBR
*	40	992-810	TERMINAL	1	FOR CORD
*	40	930-804	TERMINAL M4.0 (10 PCS.)	1	FOR CORD FOR GBR(110V),USA
*	40	981-373	TUBE (D)	2	FOR CORD FOR AUS
*	41	960-266	CORD CLIP	1	

\* : ALTERNATIVE PARTS

2 - 00

# PARTS

H 90SE

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
* 41	981-987Z	CORD CLIP	1	FOR SUI	
42	982-095	TAPPING SCREW (W/WASHER) D4X20	2		
* 43	992-891	SWITCH (A) (1P SCREW TYPE) W/O LOCK	1		
* 43	981-533Z	SWITCH (2P PILLAR TYPE) W/O LOCK	1	FOR AUS	
* 44	949-423	WASHER M4 (10 PCS.)	1	EXCEPT AUS,USA	
* 45	990-082	SUPPORT (E)	1		
* 45	981-986Z	SUPPORT (A)	1	FOR AUS	
46	305-634	HANDLE HOLDER (B)	1		
47	949-426	WASHER M8 (10 PCS.)	2		
48	305-632	LOCK NUT M8 (NYLON INSERT)	2		
49	305-631	HANDLE (B)	1		
50	301-653	TAPPING SCREW (W/FLANGE) D4X20 (BLACK)	2		
51	305-624	HANDLE SHAFT	1		
52	305-598	HOLDER (B)	2		
53	305-623	HOLDER (A)	2		
54	305-622	HANDLE DAMPER	8		
55	305-633	SIDE HANDLE	1		
56	305-625	HANDLE HOLDER (A)	1		
57		NAME PLATE	1		
58	992-851	SEAL LOCK HEX. SOCKET HD. BOLT M10X60	4		
59	305-637	GEAR COVER ASS'Y	1	INCLUD.52	
60	949-699	HEX. SOCKET HD. BOLT M4X20 (10 PCS.)	2		
61	305-629	STOPPER	2		
62	620-4VV	BALL BEARING 6204VVCMP2L	1		
63	305-609	DISTANCE RING (A)	1		
64	305-608	FINAL GEAR	1		
65	305-607	DISTANCE RING (B)	1		
66	996-433	SEAL LOCK HEX. SOCKET HD. BOLT M10X55	2		
67	620-1VV	BALL BEARING 6201VVCMP2L	3		
68	305-605	FIRST GEAR	1		
69	305-604	SECOND GEAR	1		
70	930-511	FEATHER KEY 4X4X10	1		
71	991-690	SEAL LOCK HEX. SOCKET HD. BOLT M5X12	3		
72	305-600	BEARING COVER (A)	1		
73	620-3DD	BALL BEARING 6203DDCMP2L	1		
74	992-841	BEARING WASHER	1		
75	949-480	PIN D8X14 (10 PCS.)	1		
76	305-599	INNER COVER	1		
77	305-602	DISTANCE RING (C)	1		
78	630-5VV	BALL BEARING 6305VVCMP2S	1		
79	992-847	O-RING (A)	1		
80	305-601	BEARING BOSS	1		
81	305-603	SEAL LOCK HEX. SOCKET HD. BOLT M8X18	4		
82	992-846	OIL SEAL	1		
83	931-008	FEATHER KEY 4X4X12	2		
84	305-606	CRANK SHAFT	1		
85	305-596	HOUSING ASS'Y	1	INCLUD.52,93,94	
86	980-717	O-RING (S-38)	1		
87	990-945	OIL CAP ASS'Y	1	INCLUD.86	
88	992-894	CAP RUBBER	2		
89	878-356	SEAL LOCK HEX. SOCKET HD. BOLT M4X10	4		

# PARTS

H 90SE

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
90	305-635	CAP COVER	2		
91	937-949	BRUSH CAP	2		
92	999-086	CARBON BRUSH (AUTO STOP TYPE) (1 PAIR)	2		
93	305-597	BRUSH HOLDER	2		
94	938-477	HEX. SOCKET SET SCREW M5X8	2		
95	305-627	INTERNAL WIRE HOLDER	1		
96	305-630	TAIL COVER	1		
97	990-935	SEAL LOCK HEX. SOCKET HD. BOLT M6X16	2		
98	996-370	FAN	1		
* 99	360-262U	ARMATURE ASS'Y 110V-115V	1	INCLUD.67,73,74,98,106	
* 99	360-262E	ARMATURE ASS'Y 220V-230V	1	INCLUD.98	
* 99	360-262F	ARMATURE ASS'Y 240V	1	INCLUD.98	
100	993-185	HEX. HD. TAPPING SCREW D5X85	2		
101	956-764	SPECIAL WASHER	2		
* 102	305-798	INTERNAL WIRE	1	EXCEPT AUS,USA	
103	305-610	FAN GUIDE	1		
104	945-932	BRUSH TERMINAL	2		
* 105	340-238C	STATOR ASS'Y 110V-115V	1	INCLUD.104	
* 105	340-238E	STATOR ASS'Y 220V-230V	1	INCLUD.104	
* 105	340-238G	STATOR ASS'Y 240V	1	INCLUD.104	
* 105	340-238H	STATOR ASS'Y 115V	1	INCLUD.104 FOR USA	
106	944-954	BEARING WASHER	1		
107	305-628	HOUSING COVER	1		
108	996-437	COLLAR	4		
109	301-582	HEX. SOCKET HD. BOLT (W/FLANGE) M6X16	4		

# STANDARD ACCESSORIES

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
501	943-277	HEX. BAR WRENCH 3MM	1		
502	944-459	HEX. BAR WRENCH 5MM	1		
503	993-740	HEX. BAR WRENCH 10MM	1		

# OPTIONAL ACCESSORIES

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
601	996-372	BULL POINT 410MM (HEX. SHANK TYPE)	1		
602	985-230	BULL POINT 20-1/2" (HEX. SHANK TYPE)	1		
603	985-231	COLD CHISEL 520MM (HEX. SHANK TYPE)	1		
604	985-232	CUTTER W75X520MM (HEX. SHANK TYPE)	1		
605	305-880	RAMMER 200MM	1		
606	308-092	SHANK	1		
607	985-233	SCOOP 546L (HEX. SHANK TYPE)	1		
608	305-626	CYLINDER CASE COVER	1		
609	936-728	WRENCH	1		
610	980-927	GREASE FOR HAMMER.HAMMER DRILL (500G)	1		

\* : ALTERNATIVE PARTS