

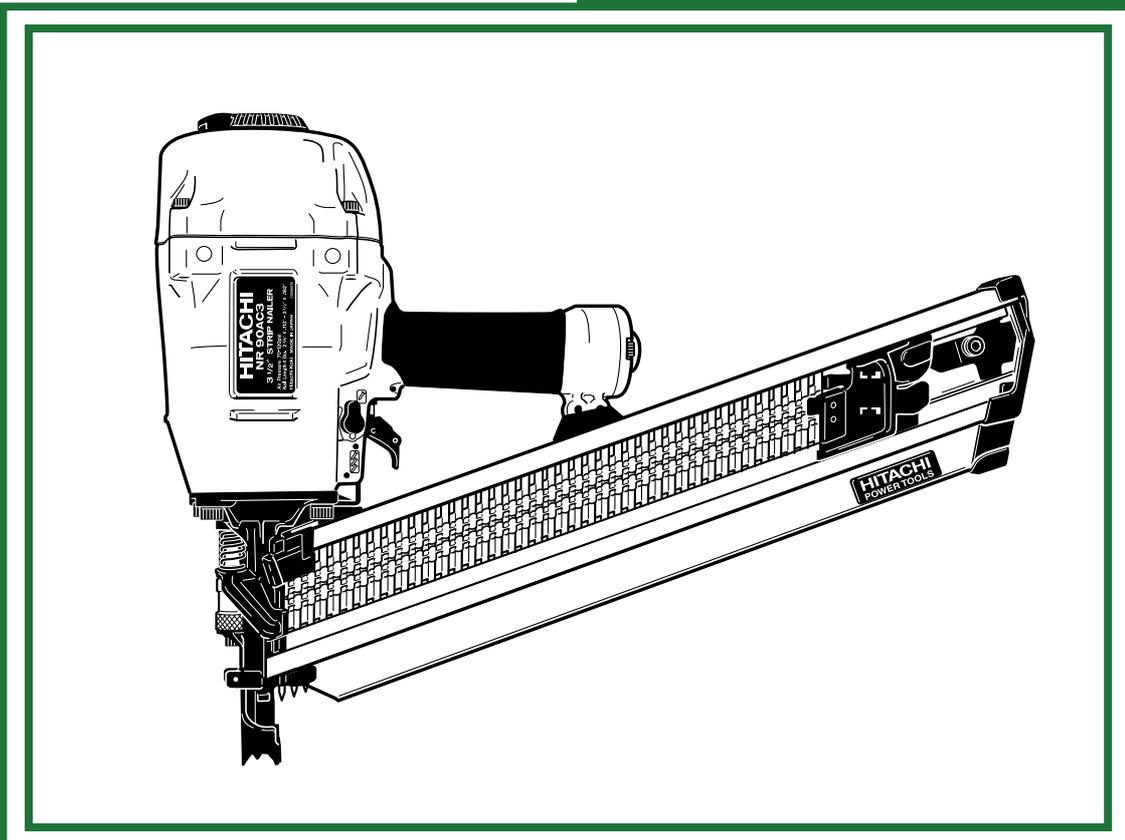
MODEL

NR 90AC3

Hitachi Power Tools

**STRIP NAILER
NR 90AC3**

**TECHNICAL DATA
AND
SERVICE MANUAL**



N

LIST No. E013

Sep. 2003

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
P	SENCO	SN65C
Q	Paslode	F-350SRH



CONTENTS

	Page
1. PRODUCT NAME	1
2. MARKETING OBJECTIVE	1
3. APPLICATIONS	1
4. SELLING POINTS	1
5. SPECIFICATIONS	2
5-1. Specifications	2
5-2. Explanation of the Nailing Action	3
5-3. Nail Selection	4
5-4. Nail Driving Force	4
5-5. Optional Accessories	5
6. COMPARISONS WITH SIMILAR PRODUCTS	6
7. PRECAUTIONS IN SALES PROMOTION	7
7-1. Handling Instructions	7
7-2. Warning Label	7
7-3. Related Laws and Regulations	8
8. MECHANISM AND OPERATION PRINCIPLE	9
8-1. Mechanism	9
8-2. Interchangeability	10
8-3. Operation Principle	12
9. TROUBLESHOOTING GUIDE	15
9-1. Troubleshooting and Correction	15
9-2. Possible Causes and Correction of Air Leakage	18
10. DISASSEMBLY AND REASSEMBLY	20
10-1. General Precautions in Disassembly and Reassembly	20
10-2. Disassembly and Reassembly of the Output Section	21
10-3. Disassembly and Reassembly of the Control Valve Section	23
10-4. Disassembly and Reassembly of the Driving Section	26
10-5. Disassembly and Reassembly of the Cap and the Magazine Section	27
11. INSPECTION AND CONFIRMATION AFTER REASSEMBLY	30
12. STANDARD REPAIR TIME (UNIT) SCHEDULES	31
Assembly Diagram for NR 90AC3	

1. PRODUCT NAME

Hitachi 90 mm (3-1/2") Strip Nailer, Model NR 90AC3

2. MARKETING OBJECTIVE

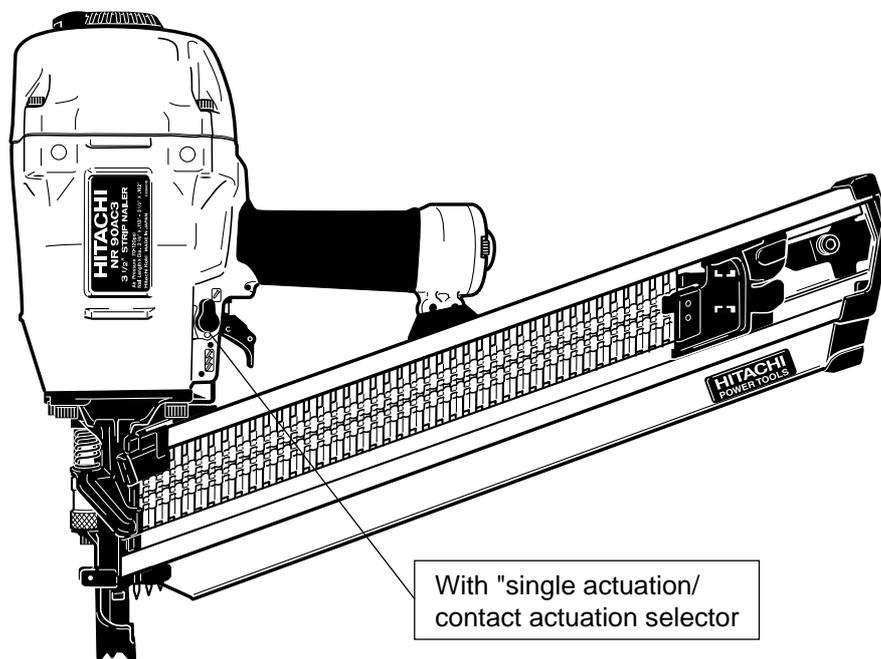
The new Model NR 90AC3 strip nailer is a minor-changed version of the current Model NR 90AC2. Owing to the modification of the ANSI standard, the current Model NR 90AC2 has gone out of production since the 1st of May 2003. To correspond to this, the switching device (change knob) was added to select the nailer operation between "single actuation (single sequential actuation)" and "contact actuation" (the current Model NR 90AC2 is provided with the contact actuation mechanism only).

Except the above, the construction is common to the current Model NR 90AC2 as well as the features such as driving response and balance.

3. APPLICATIONS

- Floor and wall framing
- Truss build-up, window build-up
- Subflooring and roof decking
- Wall sheathing
- Mobile home and modular housing construction

4. SELLING POINTS



5. SPECIFICATIONS

5-1. Specifications

Model	NR 90AC3
Driving system	Reciprocating piston type
Operating pressure	5 – 8.5 kgf/cm ² (70 – 120 psi, 4.9 – 8.3 bar) (Gauge pressure)
Driving speed	3 pcs./sec.
Weight	4.0 kg (8.9 lbs.)
Dimensions (Length x Height x Width)	503 mm x 353 mm x 121 mm (19-13/16" x 13-7/8" x 4-3/4")
Nail feed system	Spiral spring
Nail capacity	50 to 60 nails (2 strips)
Air consumption	2.7 ltr/cycle at 7 kgf/cm ² (0.095 ft ³ /cycle at 100 psi) (2.7 ltr/cycle at 6.9 bar)
Air inlet	3/8 NPT thread
Packaging	Corrugated cardboard box
Package dimensions (Length x Height x Width)	587 mm x 398 mm x 136 mm (23-1/8" x 15-21/32" x 5-11/32")
Standard accessories	<ul style="list-style-type: none"> • Nose cap (Code No. 881968) 1 • Hex. bar wrench for M5 screw (Code No. 944458) 1 • Hex. bar wrench for M6 screw (Code No. 944459) 1 • Hex. bar wrench for M8 screw (Code No. 872422) 1 • Safety glasses (Code No. 875769) 1
Optional accessories	Full sequential actuation mechanism kit (Code No. 884142) (Sequential trip mechanism kit) Pneumatic tool lubricant (1 oz oil feeder) (Code No. 877153) Pneumatic tool lubricant (4 oz oil feeder) (Code No. 874042) Pneumatic tool lubricant (1 quart can) (Code No. 876212) Grease (ATTOLUB No. 2) (500 g (1.1 lbs.)) (Code No. 317918) Case (Code No. 878898)

5-2. Explanation of the Nailing Action

To meet the requirements of "ANSI SNT-101-2002", the Model NR 90AC3 is equipped with a nailing operation switching device at the valve portion as shown in the figures below. Use SINGLE ACTUATION MECHANISM (SINGLE SEQUENTIAL ACTUATION MECHANISM) or CONTACT ACTUATION MECHANISM in accordance with the work to be performed. A FULL SEQUENTIAL ACTUATION MECHANISM KIT (SEQUENTIAL TRIP MECHANISM KIT) is also available as an option. Each nailing operation is as follows.

○ SINGLE ACTUATION MECHANISM (SINGLE SEQUENTIAL ACTUATION MECHANISM):

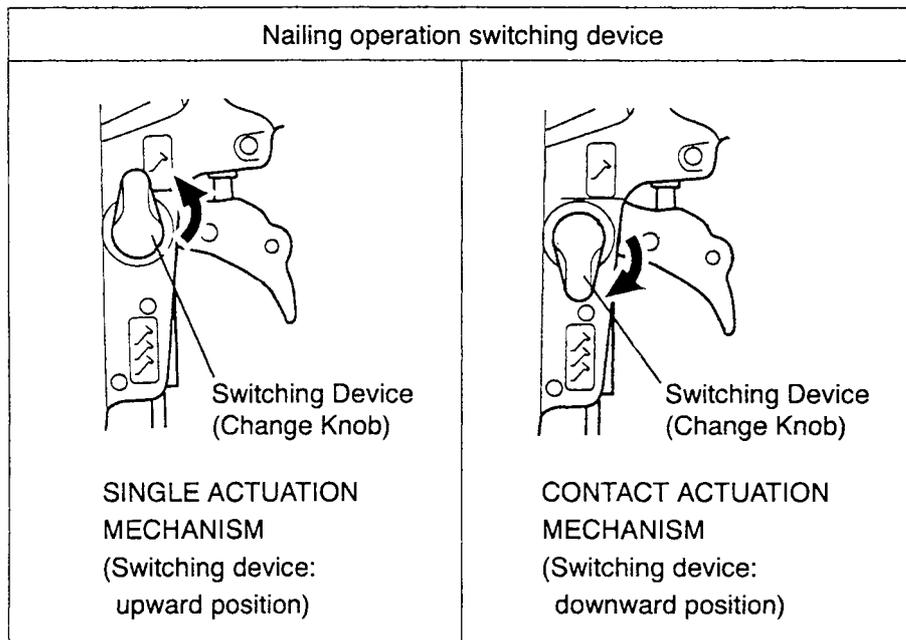
First, press the pushing lever against the wood; next, pull the trigger to drive the nail. First, pull the trigger; next, press the pushing lever against the wood to drive the nail. After nailing once, nailing will not be possible again until the trigger is released and pressed again.

○ CONTACT ACTUATION MECHANISM:

First, press the pushing lever against the wood; next, pull the trigger to drive the nail. First, pull the trigger; next, press the pushing lever against the wood to drive the nail. If the trigger is held back, a nail will be driven each time the pushing lever is pressed against the wood.

○ FULL SEQUENTIAL ACTUATION MECHANISM:

First, press the pushing lever against the wood; next, pull the trigger to drive the nail. Follow the same sequence to continue driving nails.



5-3. Nail Selection

The Model NR 90AC3 utilizes round-head nails collated with plastic resin into bands of 25 to 30 pieces. Applicable nail dimensions are shown below.

CAUTION: Ensure that nails are as specified in Fig. 1. Other nails will cause clogging of nails and subsequent damage to the nailer.

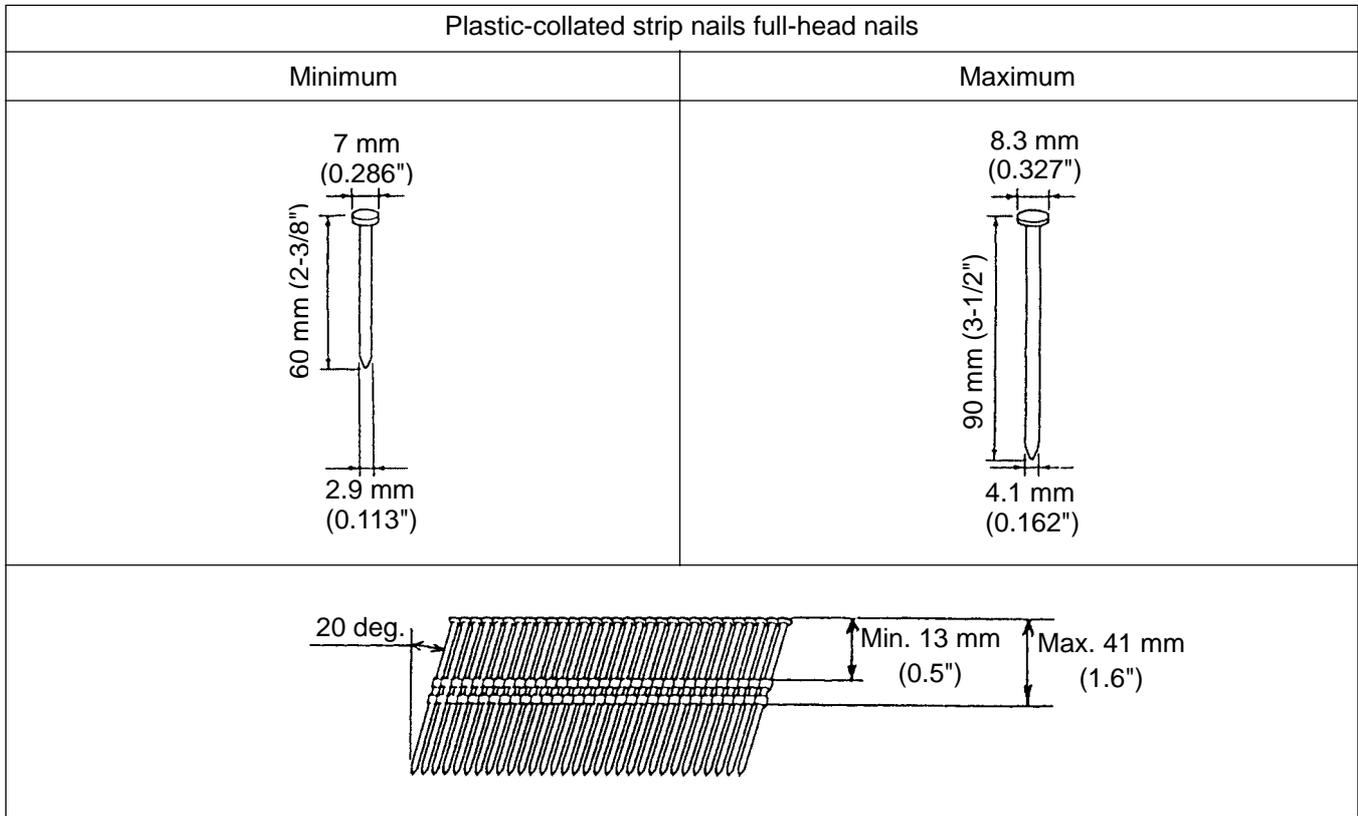


Fig. 1 Dimensions of nails

5-4. Nail Driving Force

Figure 2 shows by type of wood and nail, the nailer output energy provided by the supply pressure and the nailing energy required for driving the nail flush. Air pressure which exceeds the intersecting point between the nailer output energy and the required nailing energy for driving the nail allows the nail to be fully driven.

For example, when driving a nail of 4.1 mm dia. by 90 mm length (0.162" x 3-1/2") into a workpiece of hemlock spruce with the Model NR 90AC3, a pressure of about 6.4 bar (6.5 kgf/cm², 92 psi) allows the nailer to drive the nail flush to the wood surface. A pressure beyond this value causes the nail head to be driven below the wood surface. Figure 2 should be used as reference data because those values vary depending on the type, moisture content, and grain of wood.

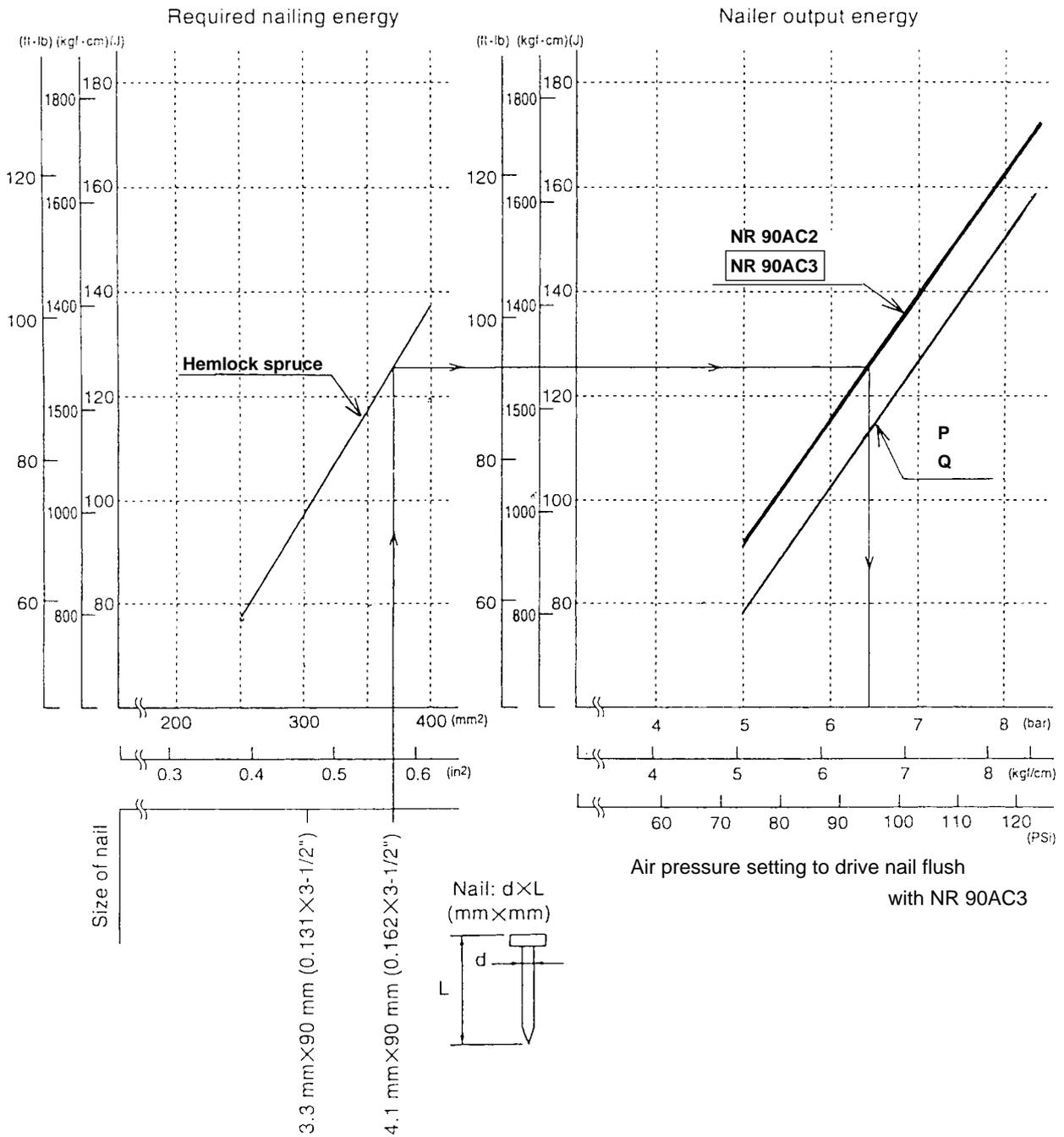


Fig. 2 Required nailing energy and nailer output energy

5-5. Optional Accessories

Full sequential actuation mechanism kit (Sequential trip mechanism kit) (Code No. 884142)

Full sequential actuation mechanism kit (Sequential trip mechanism kit) is provided as an optional accessory for the Model NR 90AC3. By using this optional accessory, a nail is driven by pressing the pushing lever first against a workpiece and then pulling the trigger, and no nail is driven when pulling the trigger first and then pressing the pushing lever against a workpiece (single actuation). Please recommend the sequential fire parts set to the customers who want to use it. Salespersons must instruct the customers to read the Handling Instructions attached to the sequential fire parts set and also the Handling Instructions of the Model NR 90AC3 thoroughly for correct use.

6. COMPARISONS WITH SIMILAR PRODUCTS

Maker	HITACHI		P	Q
Model	NR 90AC3	NR 90AC2		
Operating pressure	5 – 8.5 kgf/cm ² (70 – 120 psi)	5 – 8.5 kgf/cm ² (70 – 120 psi)	5 – 8.5 kgf/cm ² (70 – 120 psi)	5.6 – 8.5 kgf/cm ² (80 – 120 psi)
Weight	4.0 kg (8.9 lbs.)	4.3 kg (9.5 lbs.)	3.7 kg (8.2 lbs.)	3.9 kg (8.6 lbs.)
Dimensions (L x H x W)	503 x 353 x 121 mm (19-13/16 x 13-7/8 x 4-3/4")	548 x 353 x 121 mm (21-9/16 x 13-7/8 x 4-3/4")	501 x 343 x 111 mm (19-3/4 x 13-5/8 x 4-3/8")	569 x 332 x 130 mm (22-13/32 x 13-1/16 x 5-1/8")
Air consumption at 7 kgf/cm ² (100 psi)	2.7 ltr/cycle (.095 ft ³ /cycle)	2.7 ltr/cycle (.095 ft ³ /cycle)	2.3 ltr/cycle (.081 ft ³ /cycle)	2.4 ltr/cycle (.085 ft ³ /cycle)
Nail capacity (3-1/2 x .162")	50	50	50	50
Magazine type	Rear loading (Aluminum)	Rear loading (Aluminum)	Rear loading (Aluminum)	Top loading (Aluminum)
Driving depth adjustment mechanism	Tool not required	Tool not required	With wrench	With wrench
Idling protector	Provided	Provided	Provided	Not provided
Direction change of exhaust air	Tool not required	Tool not required	With wrench	With wrench
Handle grip	Rubber	Rubber	Leather	Rubber
Single actuation/ contact actuation selector	Provided	Not provided	Not provided	Not provided
Applicable nails	Dia.	2.9 – 4.1 mm (0.113" – 0.162")	2.9 – 4.1 mm (0.113" – 0.162")	2.9 – 4.1 mm (0.113" – 0.162")
	Length	60 – 90 mm (2-3/8" – 3-1/2")	60 – 90 mm (2-3/8" – 3-1/2")	60 – 90 mm (2-3/8" – 3-1/2")

Note:

The Model NR 90AC3 is equipped with a pushing lever stopper as an idling protector. The Pushing Lever Stopper [74] is placed over Pushing Lever (B) [33] to prevent Pushing Lever (B) [33] from being pushed up when no nail is loaded in the magazine or the number of nails remained in the magazine is five or less (depending on the types of nails). (See Fig. 3.)

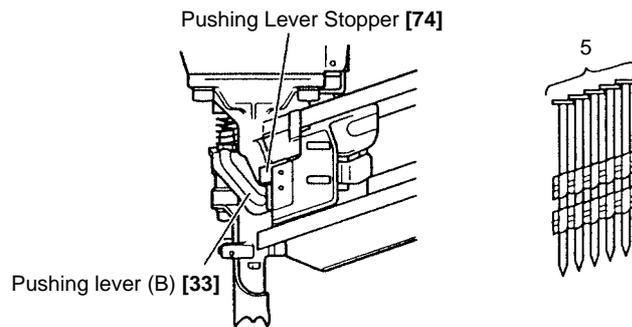


Fig. 3

7. PRECAUTIONS IN SALES PROMOTION

In the interest of promoting the safest and most efficient use of the Model NR 90AC3 Nailer 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 Warning Label attached to each tool.

The Model NR 90AC3 Nailer is designed for continuous nail driving (however, some of the Model NR 90AC3 are designed for single-shot operation only for some destinations). At time of sale, the salesperson must inform the customer that the sequential trip mechanism kit which can change the Model NR 90AC3 to a single-shot nailer is optionally available, and recommend it to the customers who want to use it. Refer to the leaflet attached together with the Instruction Manual for details.

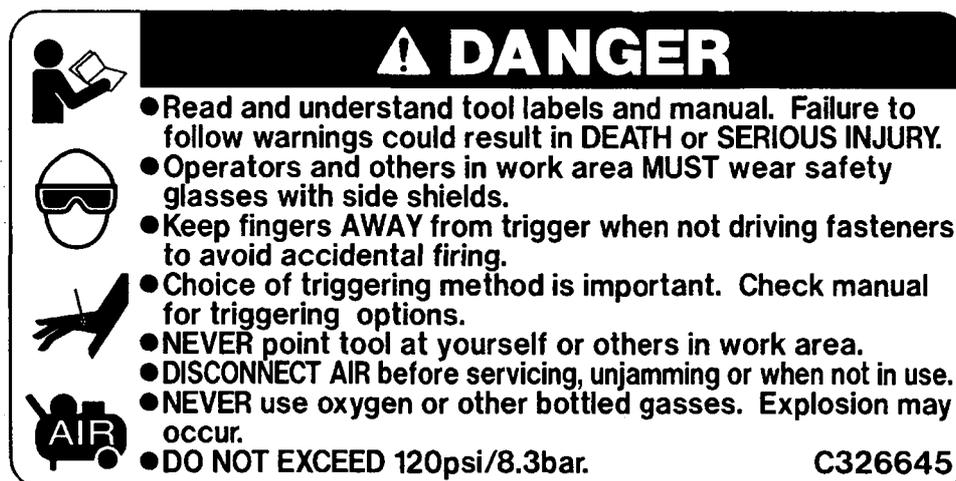
7-1. Handling Instructions

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 pneumatic tool cannot be completely eliminated. Accordingly, general precautions and suggestions for use of pneumatic tools, and specific precautions and suggestions for the use of the pneumatic nailer 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 customers during sales promotion.

7-2. Warning Label

Each Model NR 90AC3 unit is provided with a Warning Label (illustrated below) which lists basic safety precautions in its use. Carefully ensure that customers fully understand and follow these precautions before using the tool.



7-3. Related Laws and Regulations

As nailers and staplers are designed to instantaneously drive nails and staples, there is an ever-present danger of misfiring and subsequent possible serious injury. Accordingly, close attention in handling is absolutely necessary at all times. Carefully ensure that the customer is fully aware of the precautions listed in the Handling Instructions provided with each unit.

While there are no specific safety regulations, there are related items in various general safety regulations with which the salespersons should be familiar in order to properly advise the customer. Please check your national and/or local regulations for applicable items. Some applicable items are outlined below.

The U.S.A:

OSHA	1926.102 Eye and face protection
	1926.302 Power-operated hand tools
ANSI SNT-101-2002	Portable, Compressed-Air-Actuated, Fastener Driving Tools-Safety Requirements for

8. MECHANISM AND OPERATION PRINCIPLE

8-1. Mechanism

As illustrated in Fig. 3, the Model NR 90AC3 can be generally divided into four sections:

Output section, control valve section, driving section and magazine section.

Although the basic construction of the Model NR 90AC3 is the same as that of the Model NR 90AC2 and interchangeable components are used as much as possible, the Model NR 90AC3 is provided with the single actuation (single sequential actuation)/contact actuation mechanisms in order to correspond to the modification of the ANSI standard. The driving section and the magazine section are common to those of the Model NR 90AC2. Primary differences from the Model NR 90AC2 are described below.

- Output section
 - Body: Newly designed.
- Control valve section Following parts were changed or added owing to the change of the construction (selectable either the single actuation mechanism or the contact actuation mechanism).
 - Plunger (A): Newly designed (common to the Model NT 65MA2).
 - Valve piston (B): Newly designed (common to the Model NT 65MA2).
 - Trigger (A): Newly designed (common to the Model NT 65MA2).
 - Change knob (switching device): Added new parts.

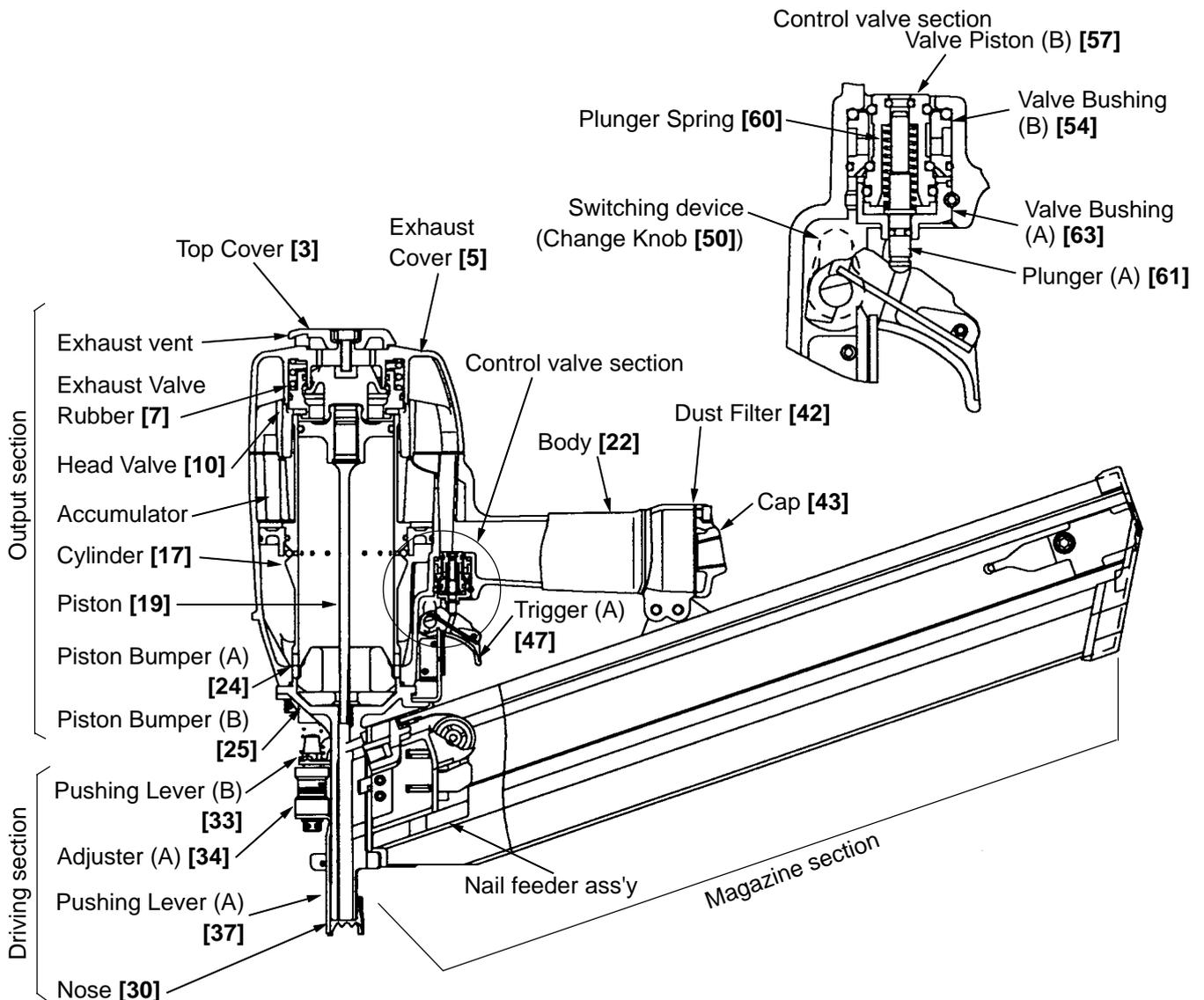
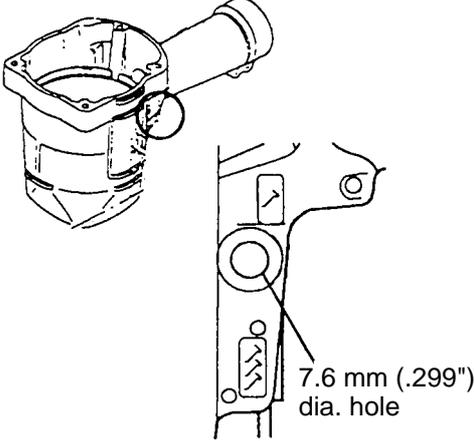
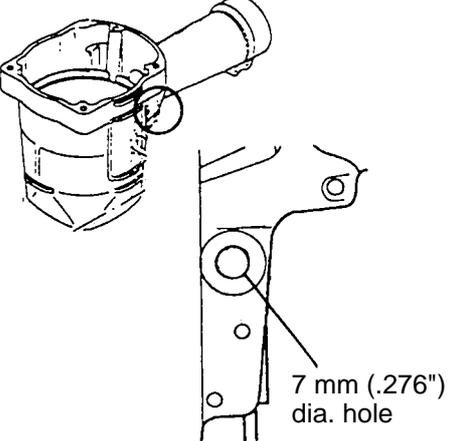


Fig. 4 Construction

8.2 Interchangeability

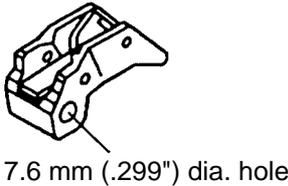
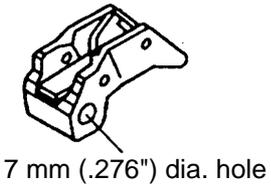
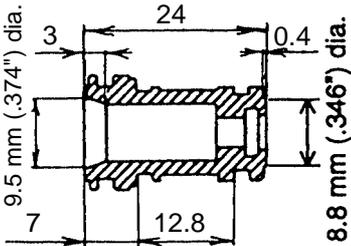
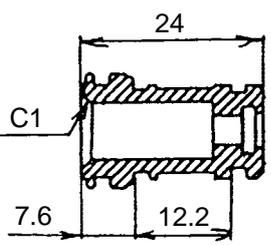
- Interchangeability of the parts between the Model NR 90AC3 and the Model NR 90AC2 is described below. As described in 8-1, the driving section and the magazine section are identical with those of the Model NR 90AC2 and all the parts of the driving section and the magazine section are interchangeable with those of the Model NR 90AC2. The parts that are newly designed, changed, or added for the Model NR 90AC3 and not interchangeable with those of the Model NR 90AC2 are described in detail.

(1) Output section

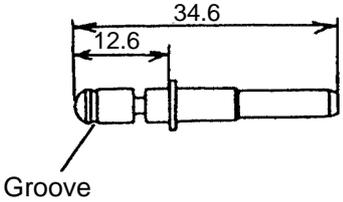
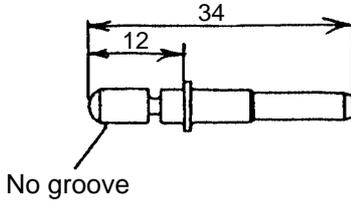
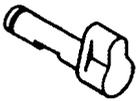
Part	NR 90AC3	NR 90AC2
Body [22]	 <p>7.6 mm (.299") dia. hole</p>	 <p>7 mm (.276") dia. hole</p>

The parts of the output section except the above are common to those of the Model NR 90AC2.

(2) Control valve section

Part	NR 90AC3	NR 90AC2
Trigger (A) [47]	<p>Common to the Model NT 65MA2.</p>  <p>7.6 mm (.299") dia. hole</p>	 <p>7 mm (.276") dia. hole</p>
Valve Piston (B) [57]	<p>Common to the Model NT 65MA2. Be careful not to make mistakes in mounting valve piston (B) because it is similar to that of the Model NR 65AK and other models but not interchangeable.</p>  <p>Color: Black</p>	 <p>Color: Aluminum (silver)</p>

(2) Control valve section (continued)

Part	NR 90AC3	NR 90AC2
<p>Plunger (A) [61]</p>	<p>Common to the Model NT 65MA2. Be careful not to make mistakes in mounting plunger (A) because it is similar to that of the Model NR 65AK and other models but not interchangeable.</p>  <p>Groove</p>	 <p>No groove</p>
<p>Steel Ball D3.97 [48]</p>	<p>Common to the Model NT 65MA2.</p>	<p>_____</p>
<p>Spring (C) [49]</p>	<p>Common to the Model NT 65MA2.</p>	<p>_____</p>
<p>Change Knob [50]</p>	<p>Newly designed</p> 	<p>_____</p>

The parts of the control valve section except the above are common to those of the Model NR 90AC2.

8-3. Operation Principle

(1) Before nailing (See Fig. 5 and Fig. 6.)

- 1) When compressed air is fed to the main body, it fills the accumulator ( portion).
- 2) At the same time, the compressed air flows into the valve piston lower chamber of the control valve section and forces Valve Piston (B) [57] upward. Compressed air is then fed through the air supply vent and air passage to the head valve chamber. As a result, the Head Valve Spring [8] is pushed down to seal the Head Valve [10] and Cylinder [17].

(2) When nailing (See Fig. 4 and Fig. 5.)

- 1) When Pushing Lever (A) [37] and Trigger (A) [47] are operated together and Plunger (A) [61] is pushed upward, the compressed air in the valve piston lower chamber is discharged from the bottom of Plunger (A) [61]. As a result, the compressed air in the accumulator ( portion) pushes down Valve Piston (B) [57], blocking the air supply vent and opening the exhaust valve.
- 2) When the exhaust valve opens, the compressed air in the head valve chamber is discharged into the atmosphere through the air passage.
- 3) When the air pressure on the bottom surface of the Head Valve [10] overcomes the strength of the Head Valve Spring [8], the Head Valve [10] is pushed upward. At this time, the Head Valve [10] seals with the Exhaust Valve Rubber [7], blocking the passage to the exhaust vent.
- 4) When the Head Valve [10] goes up, the compressed air in the accumulator flows rapidly into the Cylinder [17], forcing the Piston [19] downward to strike the nail. When the Piston [19] passes the cylinder hole, the compressed air flows into the return air chamber and is accumulated there.

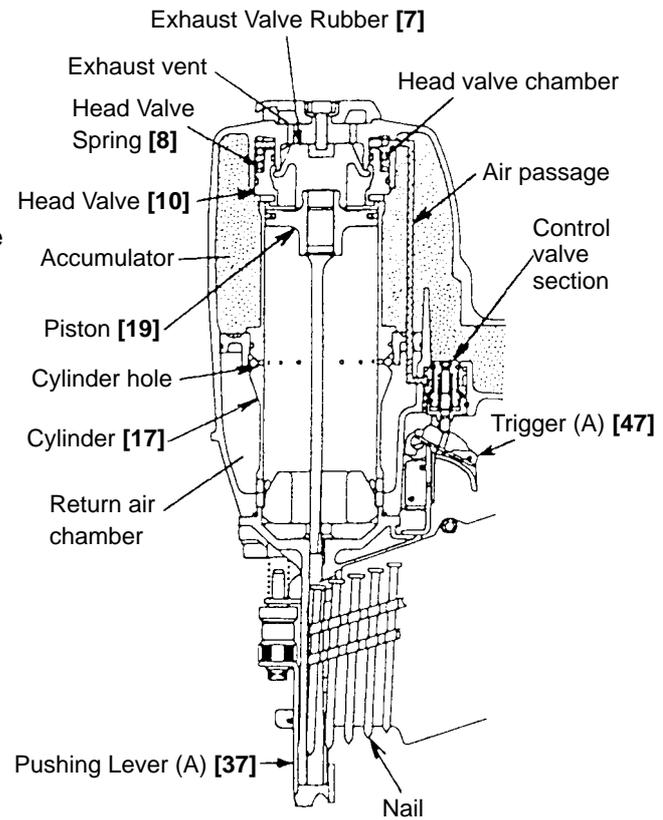


Fig. 5

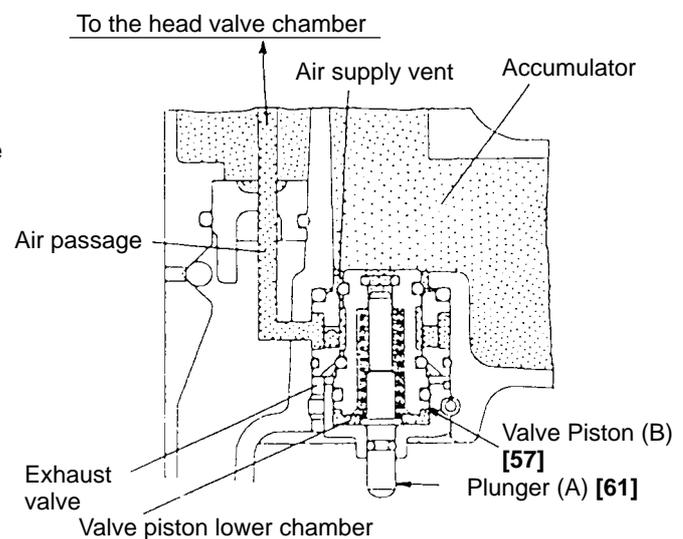


Fig. 6 Control valve section

(3) During return (See Fig. 7 and Fig. 8.)

- 1) When either Pushing Lever (A) [37] or Trigger (A) [47] is released, Plunger (A) [61] goes down and the compressed air in the accumulator flows into the valve piston lower chamber.
- 2) As the air pressure in the valve piston lower chamber increases to overcome the air pressure applied on the upper portion of Valve Piston (B) [57], Valve Piston (B) [57] is forced upward. When this occurs, the exhaust valve is closed and the air supply vent is opened.
- 3) When the air supply vent opens, the compressed air in the accumulator (stippled portion) passes through the air passage and flows into the head valve chamber to push down the Head Valve [10]. As a result, the Head Valve [10] and the Cylinder [17] are sealed and, at the same time, the Head Valve [10] and the Exhaust Valve Rubber [7] separate to open the exhaust vent.
- 4) The compressed air above the Piston [19] is discharged into the atmosphere through the exhaust vent. In this way, the air pressure above the Piston [19] is reduced, and the greater pressure of the air accumulated in the return air chamber pushes the Piston [19] upward.
- 5) If the air pressure below the Piston [19] is higher than that of the atmosphere after the Piston [19] has fully returned, the excess air pressure is discharged into the atmosphere through the clearance between Piston Bumper (B) [25] and the driver blade.

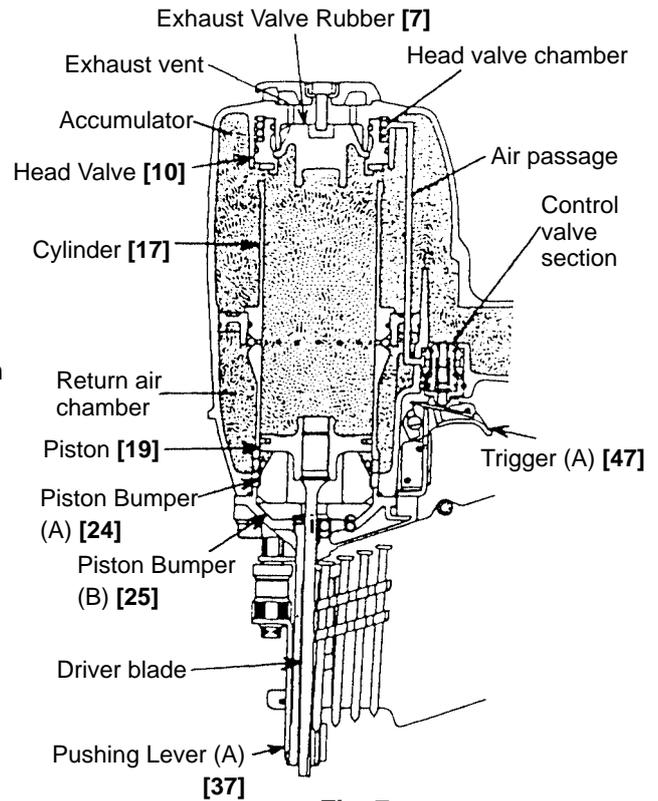


Fig. 7

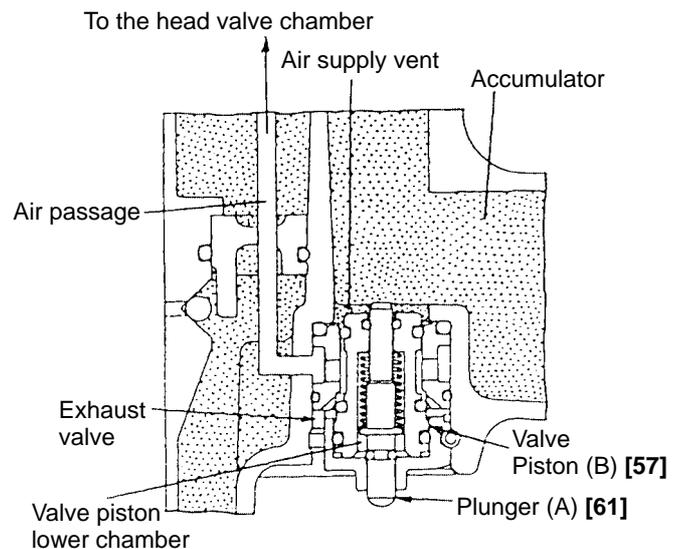


Fig. 8 Control valve section

(4) Single actuation mechanism/contact actuation mechanism: (Fig. 9 and Fig. 10)

Single/contact actuation mechanism changeover is accomplished by turning the switching device (Change Knob [50]).

◦ Single actuation mechanism (Switching device: upward position):

- 1) Immediately after driving the first nail, the control valve should be as shown in Fig. 8.
- 2) When only Pushing Lever (B) [33] is released and Trigger (A) [47] is held as shown in Fig. 9, the plate of Trigger (A) [47] contacts the Change Knob [50] and Plunger (A) [61] returns (lowers) only halfway. Because of this, compressed air does not flow into the valve piston lower chamber, and Valve Piston (B) [57] remains in the lowered position. Accordingly, the Piston [19] remains in the lowered position as shown in Fig. 7.

- 3) When Trigger (A) [47] is released, Plunger (A) [61] returns (lowers) completely as shown in Fig. 6. Compressed air then flows into the valve piston lower chamber, and Valve Piston (B) [57] is forced upward. The Piston [19] then returns fully upward. Therefore, unless Trigger (A) [47] is released after each nailing operation, the structural mechanism prevents the next nailing operation.

◦ Contact actuation mechanism (Switching device: downward position):

- 1) Immediately after the first nail is driven, the control valve should be as shown in Fig. 8.
- 2) Even when only Pushing Lever (B) [33] is released and Trigger (A) [47] is held, Plunger (A) [61] returns (lowers) completely as shown in Fig. 10. Thus the Piston [19] returns (raises) fully. Accordingly, continuous nailing can be accomplished by pushing only Pushing Lever (B) [33] up and down while holding Trigger (A) [47] depressed.

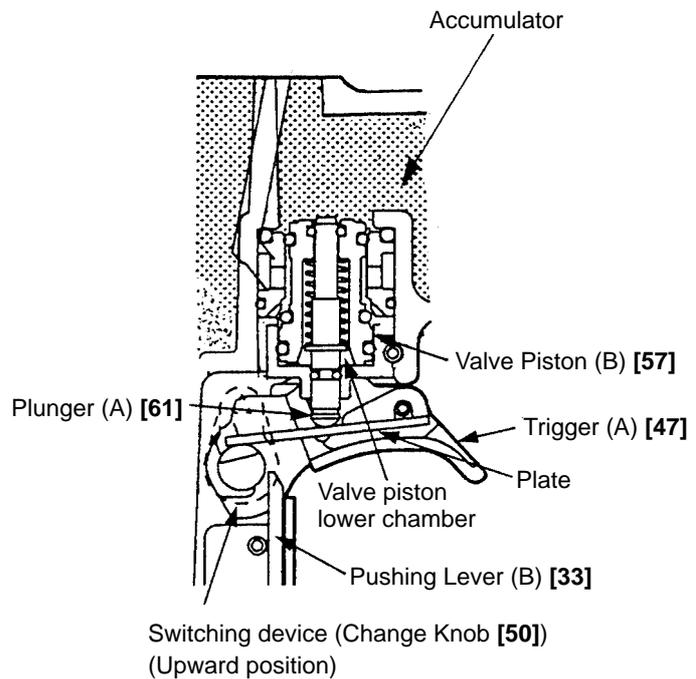


Fig. 9 Single actuation mechanism

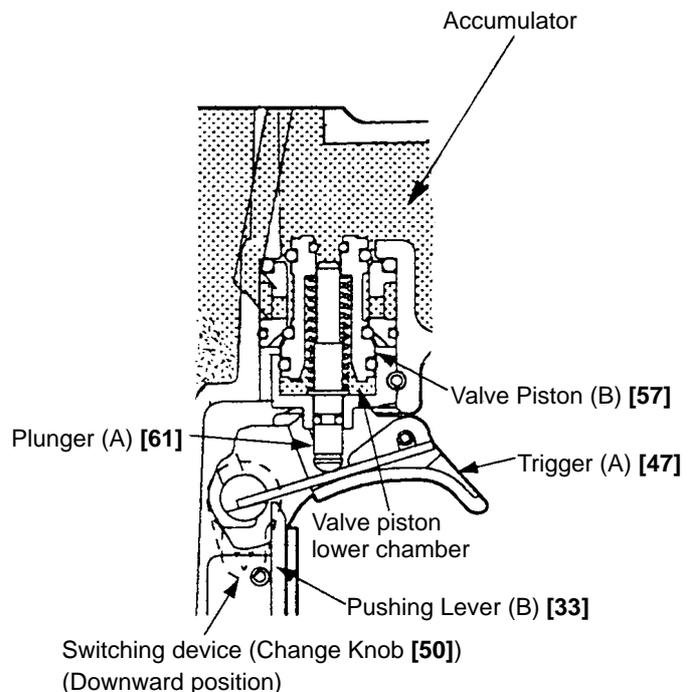


Fig. 10 Contact actuation mechanism

9. TROUBLESHOOTING GUIDE

9-1. Troubleshooting and Correction

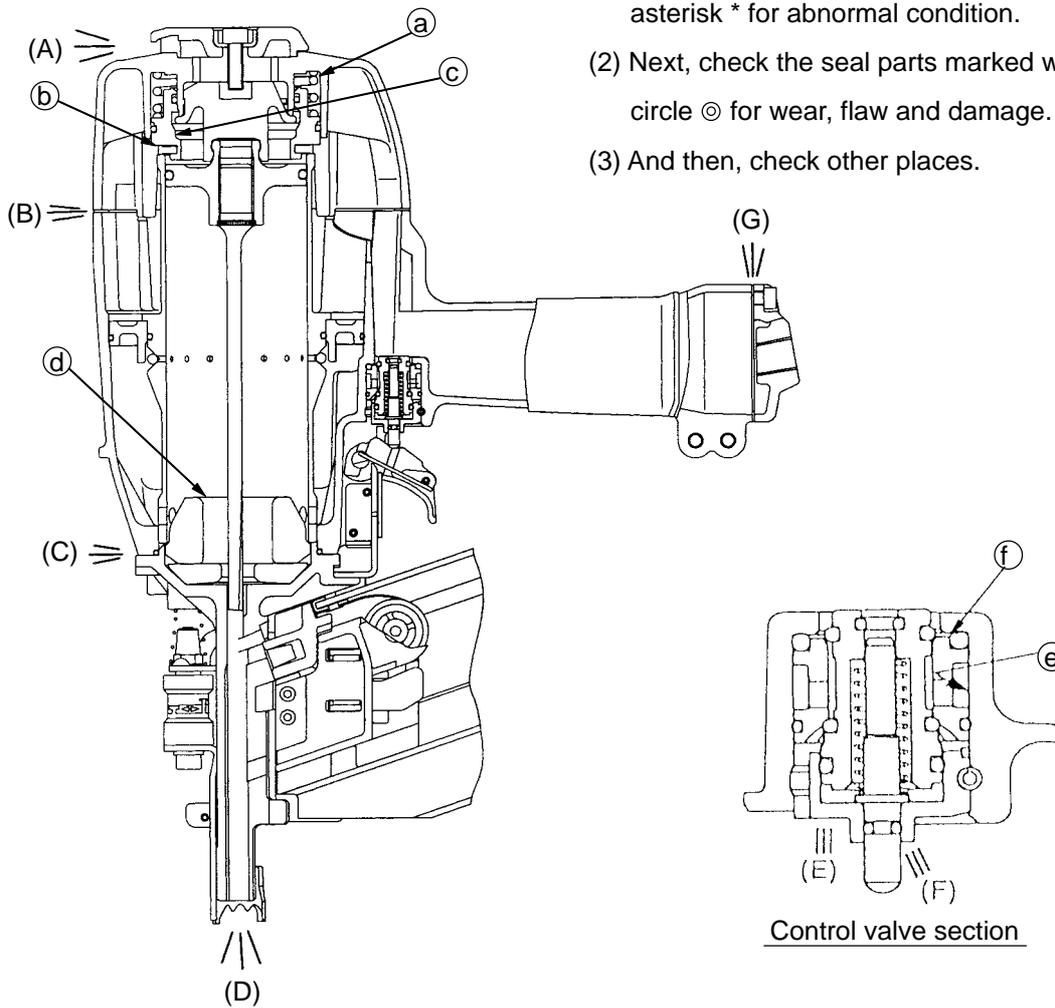
Problem	Possible cause	Inspection method	Remedy
1) Nails cannot be driven.	<p><Nails></p> <ul style="list-style-type: none"> • Magazine is not loaded with specified genuine nails. • Magazine is loaded with abnormal nails (bent nails, large or small round-head nails, abnormal collation, etc.). • Nail or collating band clogs. • Collating band is deformed or torn. 	<ul style="list-style-type: none"> • Check if the magazine is normally loaded with specified nails. 	<ul style="list-style-type: none"> • Use specified nails. • Remove the abnormal nails and load the magazine with normal nails.
	<p><Magazine></p> <ul style="list-style-type: none"> • Magazine is abnormal (deformed or damaged). • Nail feeder is abnormal (deformed or damaged). • Ribbon spring is abnormal (deformed or damaged). • Nail rail is abnormal (deformed, burrs, damaged or fatigued). • Adhesive fragments are on the nail rail or they need oil. • Foreign matter is found on the guide face of the nail feeder. 	<ul style="list-style-type: none"> • Check if the nail feeder operates smoothly in the magazine. • Check if nails (one strip) move smoothly in the magazine. 	<ul style="list-style-type: none"> • Repair or replace the defective part. • Remove the adhesive fragments and apply oil to the nail feeder, ribbon spring and the nail rail.
	<p><Nose></p> <ul style="list-style-type: none"> • Nail inlet groove of the nose is abnormal (deformed, burrs or damaged). • Adhesive fragments are in the nail inlet groove. 	<ul style="list-style-type: none"> • Check if nails (one strip) are fed smoothly into the nail injection port of the nose. 	<ul style="list-style-type: none"> • Repair or replace the defective part. • Remove the adhesive fragments.

Problem	Possible cause	Inspection method	Remedy
	<p><Output section></p> <ul style="list-style-type: none"> • Air pressure is too low. • Piston O-ring is worn or damaged. • Piston bumper is abnormal (dislocated, deformed or damaged). • O-ring of the cylinder is abnormal (dislocated, deformed or damaged). • Driver blade is abnormal (deformed, burrs, damaged or fatigued). • Cylinder's internal surface is abnormal (deposits of dirt or worn). • Head valve sliding surface is abnormal (galled, damaged or needs oil). • Head valve spring is abnormal (fatigued or damaged). 	<ul style="list-style-type: none"> • Pull the nail feeder backward and perform idle driving. Check if the driver blade has returned. • Check if nails can be driven at 5 kgf/cm². • While operating the nailer without nails, check if the driving operation is performed. • After operating the nailer without nails, check if the driver blade is kept in the down position. 	<ul style="list-style-type: none"> • Adjust for 5 to 8.5 kgf/cm². • Replace the piston ring. • Replace the piston bumper. • Reassemble or replace. • Repair or replace. • Remove the dirt and apply oil, or replace. • Replace the defective part. • Apply grease. • Replace the head valve spring.
	<p><Control valve section></p> <ul style="list-style-type: none"> • Plunger (A), valve piston (B), valve bushing (A) or valve bushing (B) is abnormal (galled or damaged). • O-ring is worn or oiling is needed. 	<ul style="list-style-type: none"> • After making idle driving, check if the driver blade is kept in the down position. • Disassemble the control valve and check the O-ring. 	<ul style="list-style-type: none"> • Replace the defective part. • Apply grease, or replace.

Problem	Possible cause	Inspection method	Remedy
2) Nails are bent when being driven.	<ul style="list-style-type: none"> • For short nails, the adjuster is raised too high. • Nails are not fully fed into the injection port. • Unspecified nails are used. • Driver blade is worn. • Workpiece is very hard. 	<ul style="list-style-type: none"> • Check if the adjuster is raised too high. • See item 1). • Check if the driver blade tip is abnormally worn. • Drive a nail into soft wood workpiece and check if the nail is bent. 	<ul style="list-style-type: none"> • Turn the adjuster to the lower position to decrease the pressure. • See item 1). • Replace the driver blade. • Do not use unspecified workpieces.
3) Head of a nail driven into a workpiece protrudes from the wood surface.	<ul style="list-style-type: none"> • Adjuster is improperly adjusted. • Air pressure is too low. • Workpiece is very hard. • Driver blade is worn. • Piston ring is abnormal (worn or damaged). • Cylinder's internal surface is abnormal (worn or rough). 	<ul style="list-style-type: none"> • Turn the adjuster to the lowest position and drive a nail. • Drive a nail into soft wood workpiece and check if the head protrudes from the wood surface. • Operate the nailer without nails and check if the driver blade is projected from the nose tip. • Disassemble the output section and check the piston ring, O-ring and the inner/outer surfaces of the cylinder for abnormal condition. 	<ul style="list-style-type: none"> • Adjust the adjuster to the proper position. • Adjust for 5 to 8.5 kgf/cm². • Do not use unspecified workpieces. • Replace the driver blade. • Replace the defective part.
4) Single actuation mechanism is not possible.	<ul style="list-style-type: none"> *• O-ring in plunger (A) is worn. *• O-ring in valve piston (B) is worn. • Abnormal plunger (A) sliding surface of valve piston (B). (seized or deformed) • Abnormal plunger (A), trigger arm (A), pushing lever (B) and/or body (worn or damaged). • The position of a switching device is mistaken. 	<ul style="list-style-type: none"> • Disassemble the control valve section, and check the O-ring of plunger (A) and valve piston (B). • Check each part for abnormalities (worn, damaged, deformed, etc.). • The position of a switching device is checked. 	<ul style="list-style-type: none"> • Replace the part. • Replace the part. • Replace the part. • Replace the abnormal part. • A switching device is set to the correct position.

9-2. Possible Causes and Correction of Air Leakage

Air leakage repair location



- Repair procedure

- (1) Check the points of the following parts marked by an asterisk * for abnormal condition.
- (2) Next, check the seal parts marked with a double circle ⊙ for wear, flaw and damage.
- (3) And then, check other places.

Air leakage point	Possible cause	
	With control valve OFF	With control valve ON
A) Exhaust port	<ul style="list-style-type: none"> ⊙ Cylinder O-ring (B) [9] of the Head Valve [10] is abnormal or its sliding surface (a) is worn, deformed or flawed. ⊙ The Head Valve Rubber [12] is abnormal or the sealing surface (b) of the Cylinder [17] is worn or flawed. 	<ul style="list-style-type: none"> ⊙ The Exhaust Valve Rubber [7] is abnormal or the sliding surface (c) of the Head Valve [10] is worn or flawed.
B) Exhaust cover	<ul style="list-style-type: none"> ● The Hex. Socket Hd. Bolt (W/Flange) M6 x 35 [4] is loose. ⊙ Gasket (A) [6] is damaged. ● Seal surface of the Body [22] or the Exhaust Cover [5] is abnormal. 	

Air leakage point	Possible cause	
	With control valve OFF	With control valve ON
C) Nose 1		<ul style="list-style-type: none"> ⊙ The Cylinder O-ring [11] of the Body [22] or the groove is abnormal (broken or flawed). ● The Hex. Socket Hd. Bolt M8 x 30 [64] is loose.
D) Nose 2	<ul style="list-style-type: none"> ⊙ The O-ring (S-95) [14] of the Cylinder Plate [13] or the O-ring (I.D. 59.6/W2.4) [15] of the Cylinder [17] is abnormal (broken or flawed). 	<ul style="list-style-type: none"> ⊙ Piston Bumper (A) [24] is abnormal (portion ⊙ is damaged, deformed or cracked). ● The Piston [19] is abnormal (driver blade is deformed or seal surface is deformed).
E) Control Valve 1	<ul style="list-style-type: none"> ⊙ The O-ring (I.D. 11) [59] of Valve Piston (B) [57] is abnormal (worn, broken or flawed). ⊙ The lower O-ring (I.D. 8.8) [58] of Valve Piston (B) [57] is abnormal (worn, broken or flawed). ⊙ The O-ring (S-18) [55] of Valve Bushing (B) [54] is abnormal (broken or flawed). ✱ The internal surface ⊕ of the valve cavity of the Body [22] is abnormal. 	<ul style="list-style-type: none"> ⊙ The upper O-ring (I.D. 8.8) [58] of Valve Piston (B) [57] is abnormal (worn, broken or flawed). ⊙ The Head Valve O-ring (I.D. 16.8) [53] of Valve Bushing (B) [54] is abnormal (broken or flawed). ✱ The upper surface ⊕ of the valve cavity of the Body [22] is abnormal.
F) Control Valve 2	<ul style="list-style-type: none"> ⊙ The O-ring (I.D. 1.8) [62] of Plunger (A) [61] is abnormal (worn, broken or flawed). ● Valve Bushing (A) [63] is abnormal (sliding surface of Plunger (A) [61] is deformed or flawed). 	<ul style="list-style-type: none"> ⊙ The O-ring (S-4) [56] of Valve Piston (B) [57] is abnormal (worn, broken or flawed). ● Valve Piston (B) [57] is abnormal (sliding surface of Plunger (A) [61] is deformed or flawed).
G) Cap	<ul style="list-style-type: none"> ⊙ Gasket (B) [41] is damaged. ● The Hex. Socket Hd. Bolt M5 x 16 [44] is loose. ● Seal surface of the Body [22] or the Cap [43] is abnormal (damaged, deformed or flawed). 	

10. DISASSEMBLY AND REASSEMBLY

The items particularly necessary for disassembly and reassembly are described below. The **[Bold]** numbers in the descriptions below correspond to the item numbers in the Parts List and exploded assembly diagram.

[CAUTION]

- Before disassembly or reassembly, be sure to remove all nails and disconnect the air hose from the nailer (with your finger released from the trigger) to exhaust all the compressed air.

10-1. General Precautions in Disassembly and Reassembly

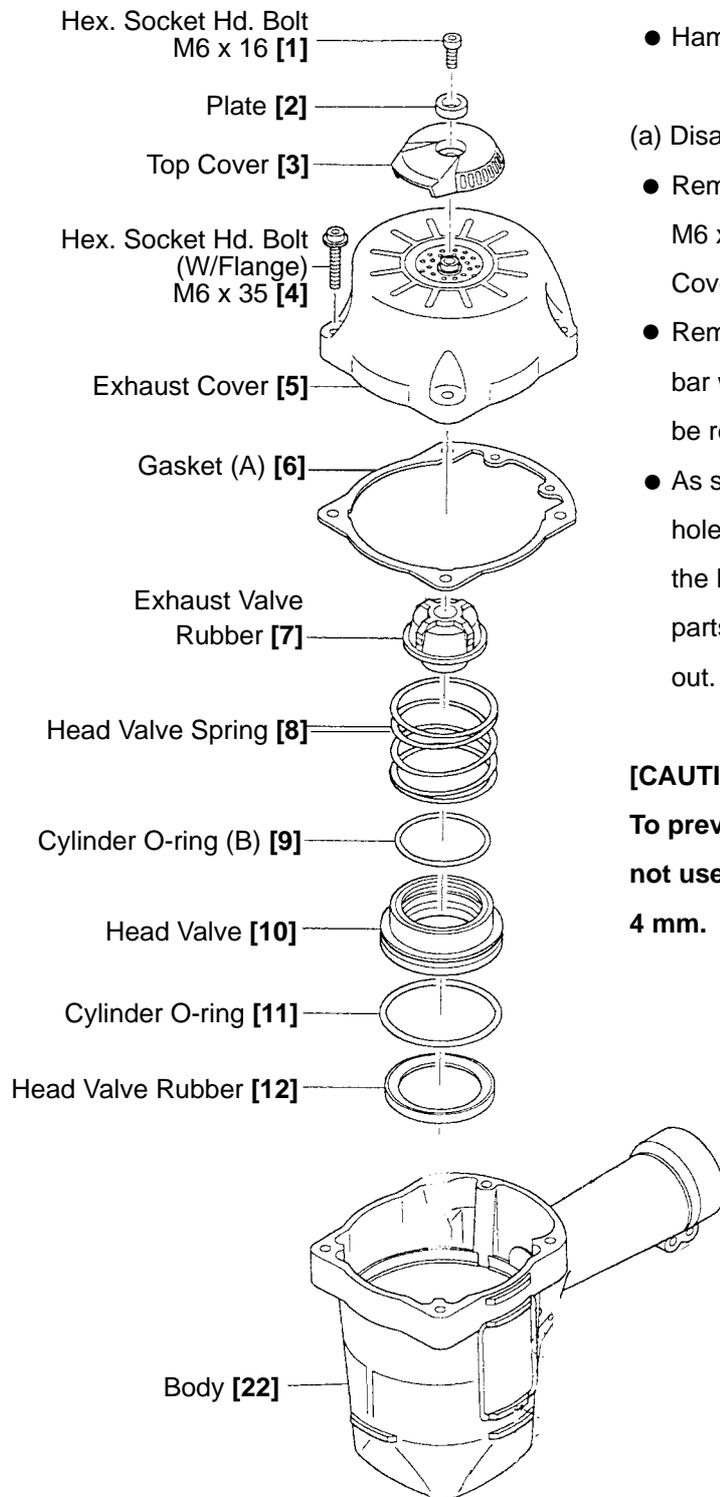
- Apply grease (ATTOLUB No. 2) (Code No. 317918) to the O-rings and O-rings' sliding portions.
When installing the O-rings, be careful not to damage the O-rings and prevent dirt entry.
- Oil required: Hitachi pneumatic tool lubricant
 - 1 oz (30 cc) oil feeder (Code No. 877153)
 - 4 oz (120 cc) oil feeder (Code No. 874042)
 - 1 quart (1 ltr) can (Code No. 876212)
- If Gasket (A) **[6]** is damaged, replace it and check that no air is leaking.
- Be especially careful to prevent the entry of foreign particles into the control valve section.
- Tightening torque for each part

Bolt	Tightening torque N•m (kgf•cm, ft-lb)
Hex. Socket Hd. Bolt M8 x 30 [64]	25.5 ± 2 (260 ± 20, 18.8 ± 1.4)
Hex. Socket Hd. Bolt M6 x 16 [1]	12.7 ± 0.8 (130 ± 8, 9.4 ± 0.6)
Hex. Socket Hd. Bolt M6 x 12 [39]	12.7 ± 0.8 (130 ± 8, 9.4 ± 0.6)
Hex. Socket Hd. Bolt (W/Flange) M6 x 35 [4]	12.7 ± 0.8 (130 ± 8, 9.4 ± 0.6)
Nylock Bolt (W/Flange) M6 x 20 [27]	12.7 ± 0.8 (130 ± 8, 9.4 ± 0.6)
Hex. Socket Hd. Bolt (W/Flange) M6 x 12 [80]	9.8 ± 0.8 (100 ± 8, 7.2 ± 0.6)
Hex. Socket Hd. Bolt M5 x 16 [44]	6.4 ± 0.5 (65 ± 5, 4.7 ± 0.4)

10-2. Disassembly and Reassembly of the Output Section

(1) Disassembly and reassembly of the Exhaust Cover [5], Head Valve [10], Exhaust Valve Rubber [7], etc.

(See Fig. 11A and Fig. 11B.)



[Tools required]

- Hex. bar wrench (5 mm)
- Hammer

(a) Disassembly

- Remove the four Hex. Socket Hd. Bolt (W/Flange) M6 x 35 [4] with a hex. bar wrench. The entire Exhaust Cover [5] can now be removed from the Body [22].
- Remove the Hex. Socket Hd. Bolt M6 x 16 [1] with a hex. bar wrench. The Plate [2] and the Top Cover [3] can now be removed.
- As shown in Fig. 9B, insert a 4 to 5 mm dia. bar into the hole of M6 screw in the Exhaust Cover [5] and force out the Exhaust Valve Rubber [7] with a hammer. Now, the parts forming the Exhaust Valve Rubber [7] can be taken out.

[CAUTION]

To prevent damage to the Exhaust Valve Rubber [7], do not use a pointed bar or a bar with a diameter of less than 4 mm.

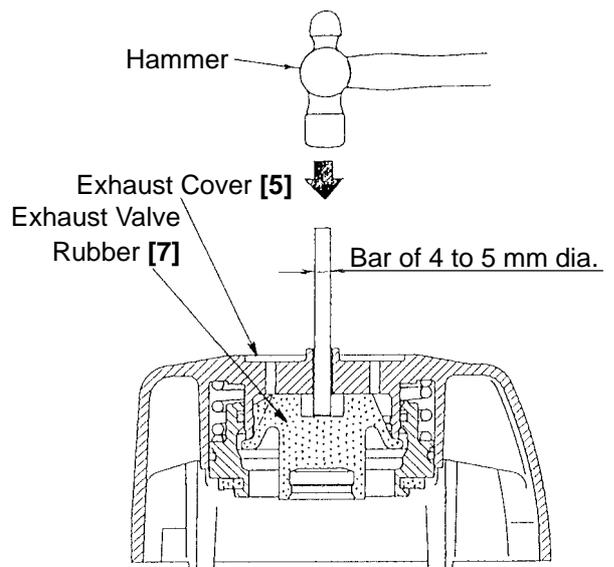


Fig. 11A Disassembly and reassembly of the exhaust cover, head valve, exhaust valve rubber, etc.

Fig. 11B

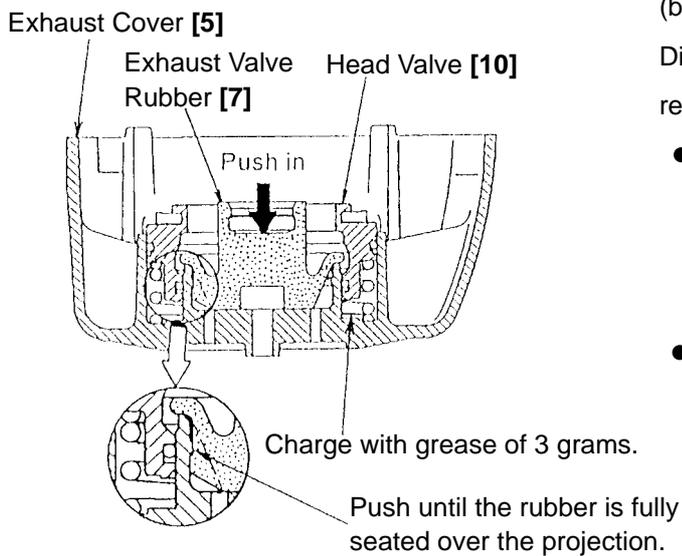


Fig. 12

(b) Reassembly

Disassembly procedures should be followed in the reverse order. Note the following points.

- Charge the sliding portion of the Head Valve [10] of the Exhaust Cover [5] with about 3 grams of grease and apply grease to each surface of the O-rings.
- As shown in Fig. 12, firmly push the Exhaust Valve Rubber [7] until it is fully seated over the projection of the Exhaust Cover [5].

(2) Disassembly and reassembly of the Cylinder [17], Piston [19], Piston Bumpers (A), (B) [24], [25], etc.

(See Fig. 13.)

(a) Disassembly

- Remove the Exhaust Cover [5] as described in item (1). Now, the Cylinder [17], Cylinder Plate [13], Piston [19], Piston Bumpers (A), (B) [24], [25], etc. can be taken out.

(b) Reassembly

Disassembly procedures should be followed in the reverse order. Note the following points.

- Apply designated grease to the O-ring (1AP-48) [18] and the internal side of the Cylinder [17].
- Apply designated grease to the O-ring (S-95) [14], O-ring (I.D. 59.6/W2.4) [15] and the O-ring [16], and then install them.

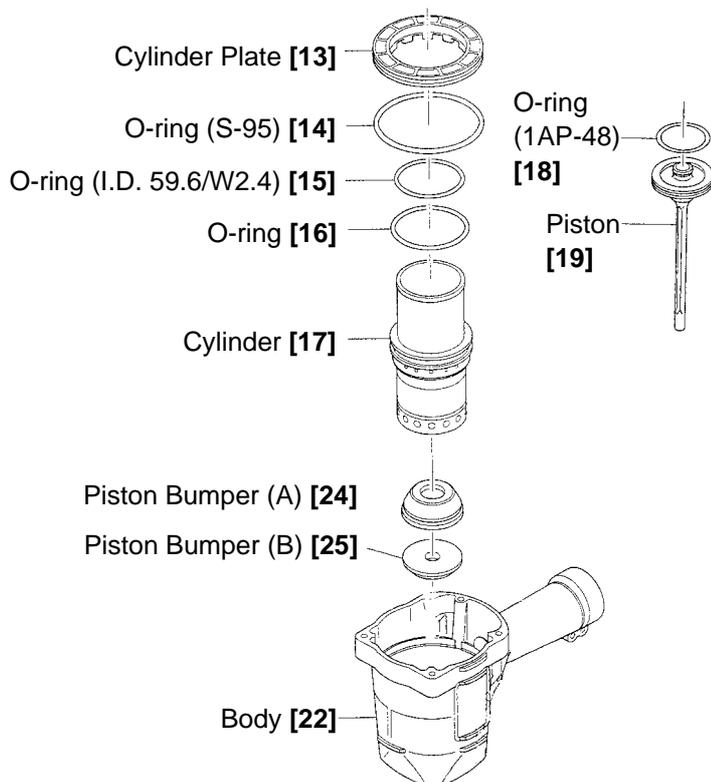


Fig. 13 Disassembly and reassembly of the cylinder, piston, piston bumper, etc.

10-3. Disassembly and Reassembly of the Control Valve Section (See Fig. 14.)

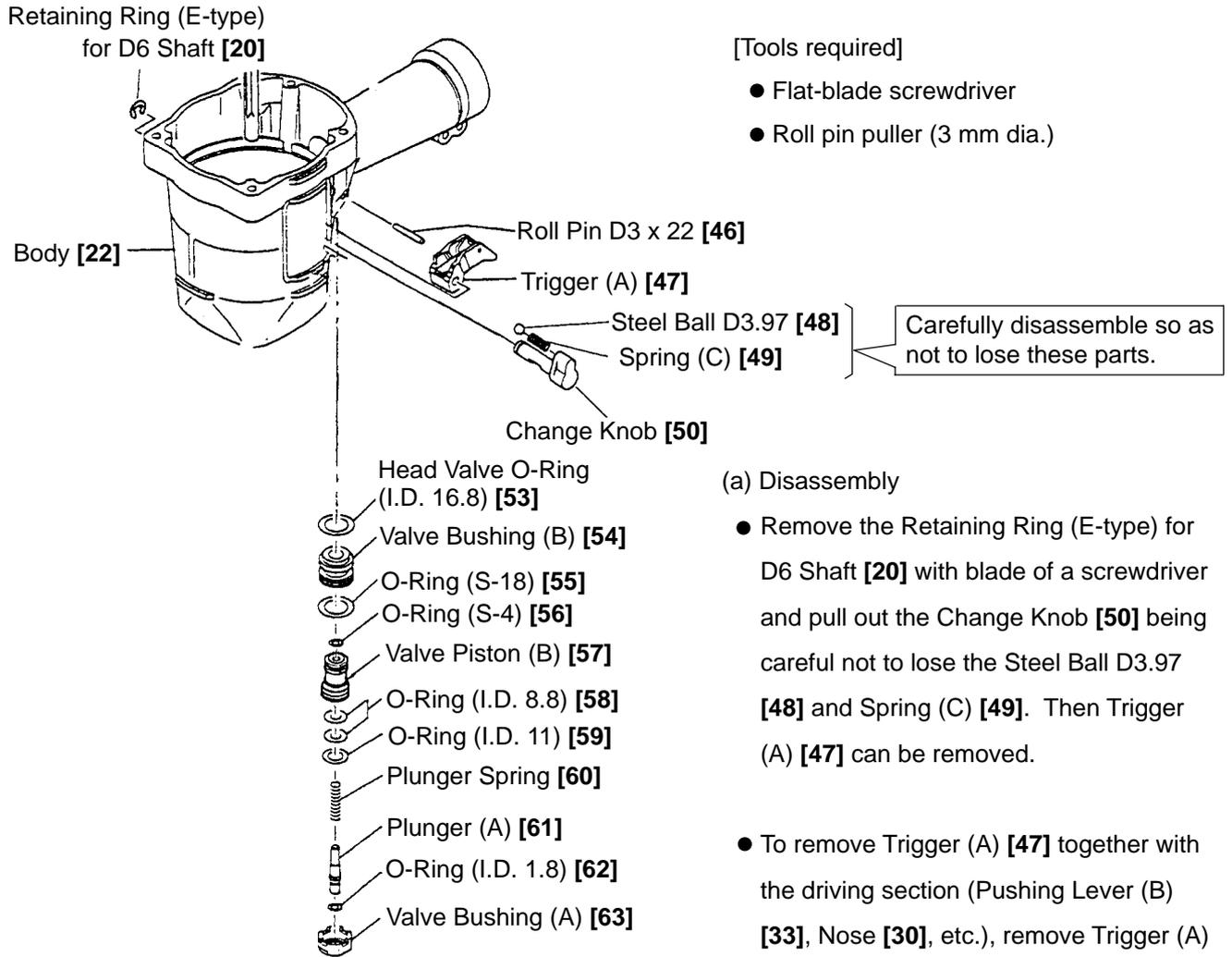


Fig. 14 Disassembly and reassembly of the control valve section

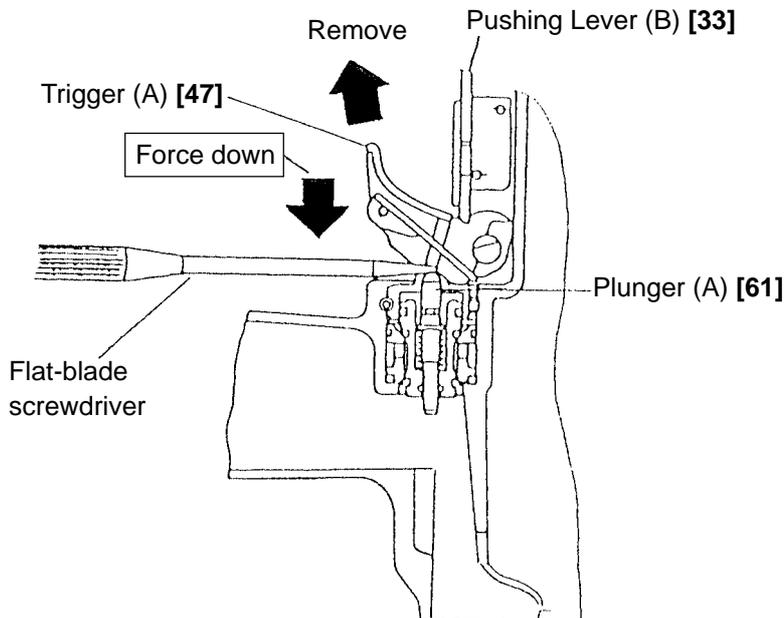


Fig. 15

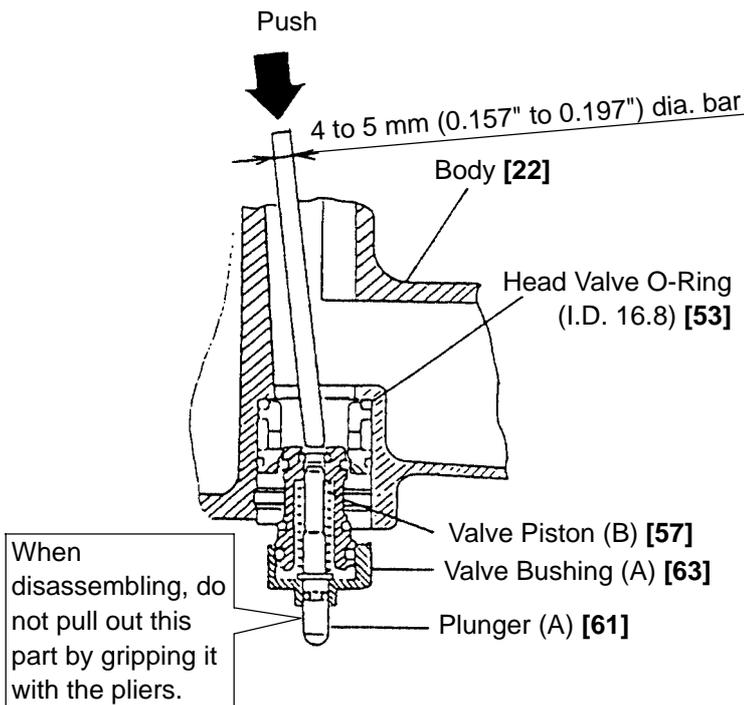


Fig. 16

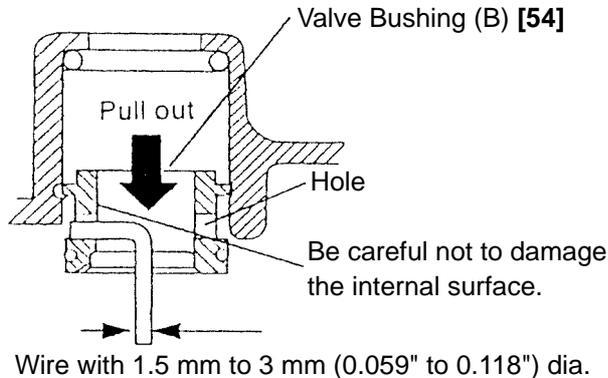


Fig. 17

- Pull out the Roll Pin D3 x 22 [46] with the roll pin puller (3 mm dia.), and take out the control valve in the following manner.

- 1) Remove the Exhaust Cover [5] by following the procedure in (1), item 10-2.
- 2) As shown in Fig. 16, put in the 4 to 5 mm (0.157" to 0.197") dia. bar from the upper side of the Body [22] and push the top of Valve Piston (B) [57]. Now, the parts forming the control valve can be taken out except Valve Bushing (A) [63] and the Head Valve O-Ring (I.D. 16.8) [53].

[CAUTION]

- Be careful not to damage Valve Piston (B) [57], Valve Bushings (A) [63] and (B) [54], etc.
- Do not pull out the end of Plunger (A) [61] with the pliers.

- 3) To take out Valve Bushing (B) [54], put a 1.5 to 3 mm (0.059" to 0.118") dia. wire with its end hooked into the hole in the bushing and pull it out while being careful not to damage the internal surface of Valve Bushing (B) [54], as shown in Fig. 17.

(b) Reassembly

Disassembly procedures should be followed in the reverse order. Note the following points.

- Be extremely careful to prevent the entry of foreign particles into the control valve section.
Thoroughly apply grease to the O-Ring (I.D. 1.8) [62] of Plunger (A) [61], the O-Rings (S-4) [56], (I.D. 8.8) [58] and (I.D. 11) [59] of Valve Piston (B) [57], and the shaft of Plunger (A) [61] shown in Fig. 15.
- As shown in Fig. 15, install Valve Bushing (A) [63] so that the roll pin groove in Valve Bushing (A) [63] will be aligned with the roll pin hole in the Body [22]. First, insert the roll pin puller (3 mm dia.) into the roll pin hole. Then, upon confirming that the puller passes through the hole, drive in the Roll Pin D3 x 22 [46].

If an attempt is made to drive the roll pin with force when the roll pin groove in Valve Bushing (A) [63] is not aligned with the roll pin hole in the Body [22], it will damage the periphery of Valve Bushing (A) [63] and prevent disassembly or reassembly.

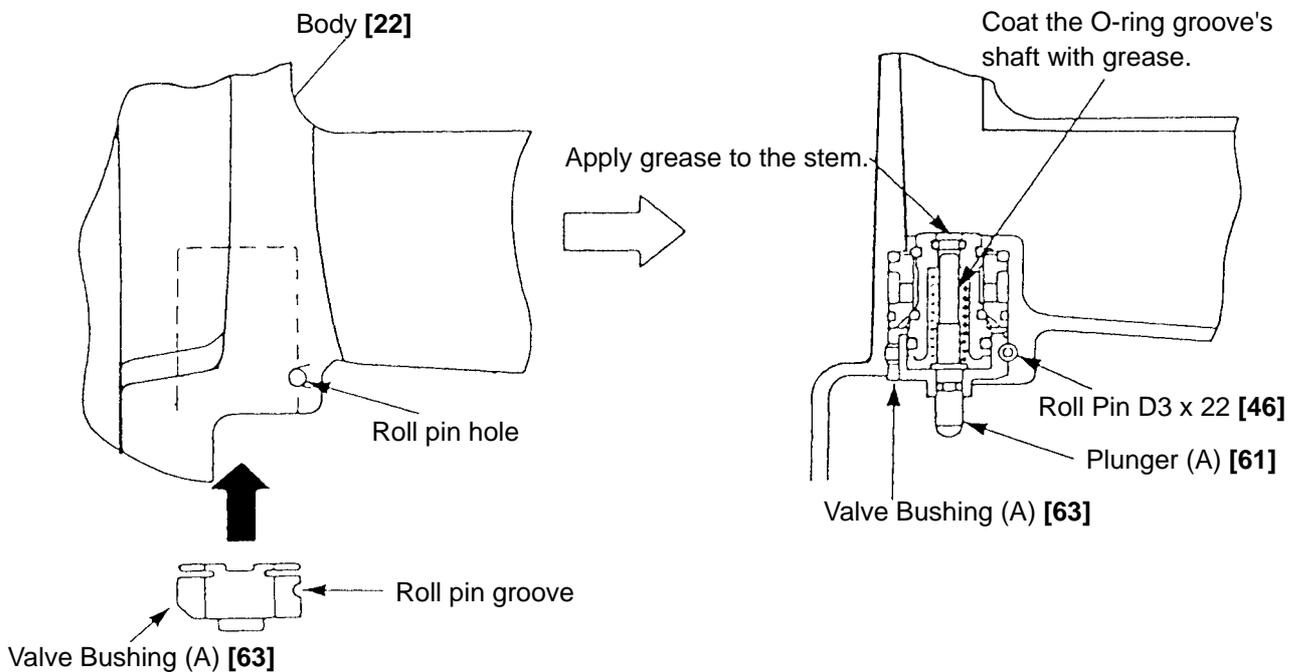
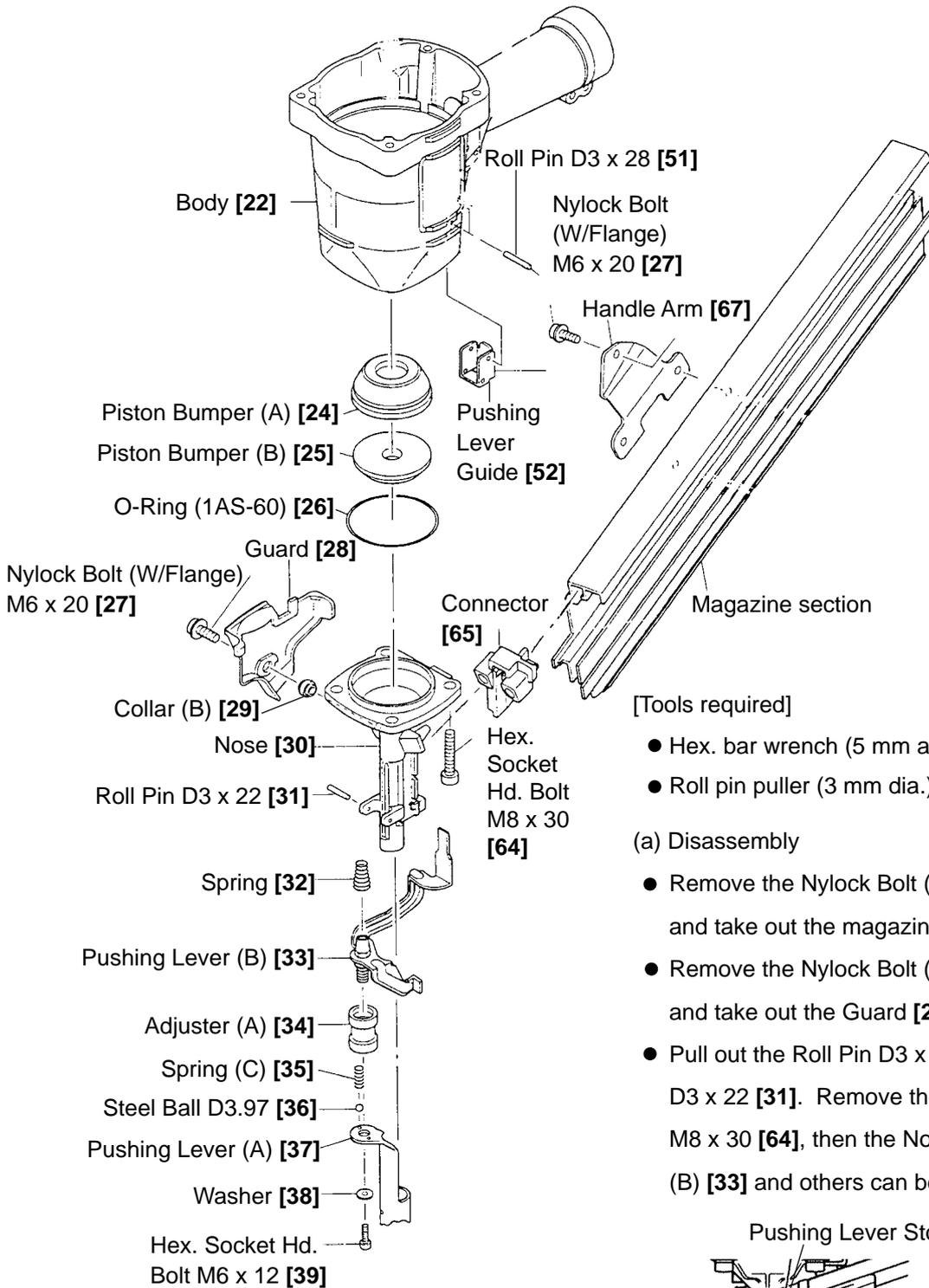


Fig. 18

After assembly, make sure that Plunger (A) [61] moves smoothly.

10-4. Disassembly and Reassembly of the Driving Section (See Fig. 19.)



[Tools required]

- Hex. bar wrench (5 mm and 6 mm)
- Roll pin puller (3 mm dia.)

(a) Disassembly

- Remove the Nylock Bolt (W/Flange) M6 x 20 [27] and take out the magazine section.
- Remove the Nylock Bolt (W/Flange) M6 x 20 [27] and take out the Guard [28].
- Pull out the Roll Pin D3 x 28 [51] and the Roll Pin D3 x 22 [31]. Remove the Hex. Socket Hd. Bolt M8 x 30 [64], then the Nose [30], Pushing Lever (B) [33] and others can be removed.

Fig. 19 Disassembly and reassembly of the driving section

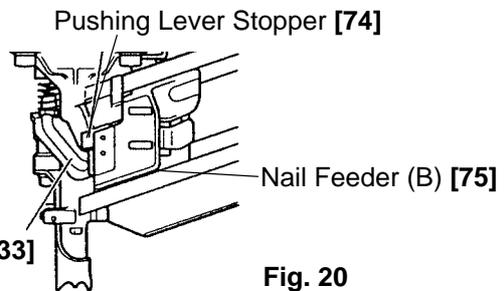


Fig. 20

(b) Reassembly

Disassembly procedures should be followed in the reverse order. Note the following points.

- Apply designated grease to the O-ring (1AS-60) [26] and then install it.
- Check that Nail Feeder (B) [75] moves smoothly. Check that the Pushing Lever Stopper [74] is placed over Pushing Lever (B) [33] when Nail Feeder (B) [75] is at the front end (See Fig. 20.).

10-5. Disassembly and Reassembly of the Cap and the Magazine Section

(1) Disassembly and reassembly of the cap (See Fig. 21.)

[Tool required]

- Hex. bar wrench (4 mm)

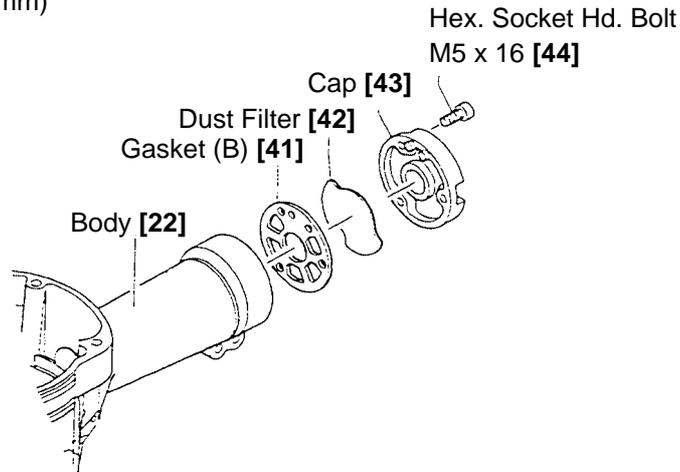


Fig. 21 Disassembly and reassembly of the cap

(a) Disassembly

- Remove the three Hex. Socket Hd. Bolts M5 x 16 [44] with the hex. bar wrench so that the Cap [43], Dust Filter [42] and Gasket (B) [41] can be removed.

(b) Reassembly

- Disassembly procedures should be followed in the reverse order.

(2) Magazine [79], Nail Feeder (B) [75] and the related parts (See Fig. 22.)

[Tool required]

- Hex. bar wrench (5 mm)

(a) Disassembly

- Perform disassembly according to 10-4 to remove the entire magazine section.
- The Connector [65], Nail Rail [66], Nail Feeder (B) [75], Ribbon Spring [77] and Needle Roller D4 x 20 [78] can be removed from the front of the Magazine [79].
- Remove the three Hex. Socket Hd. Bolts (W/Flange) M6 x 12 [80]. Then Handle Arm [67], Nail Stopper [81] and Magazine Cover [70] can be removed together with the other parts.
- The Nail Rail [66] that is press-fitted into the Magazine [79] has a protrusion at the rear end to prevent coming off. Tap at the front of the Magazine [79] using a hammer and a bar being careful not to scratch the parts.

(b) Reassembly

Disassembly procedures should be followed in the reverse order. Note the following points.

- Insert the Nail Rail [66] from the rear of the Magazine [79] and press-fit the Nail Rail [66] into the Magazine [79] by tapping with a wooden hammer so that the protrusion of the Nail Rail [66] becomes flush with the rear end of the Magazine [79].
- Hook the hook of the Ribbon Spring [77] on the Magazine [79] then mount Nail Feeder (B) [75] to the Magazine [79].
- Press the mounting surface of the Nail Stopper [81] against the Magazine [79] and slide it backward until the "A" portion fits into the concave portion of the Magazine Cover [70] then secure them with the bolt. At this time, mount the Sleeve [69] without fail.

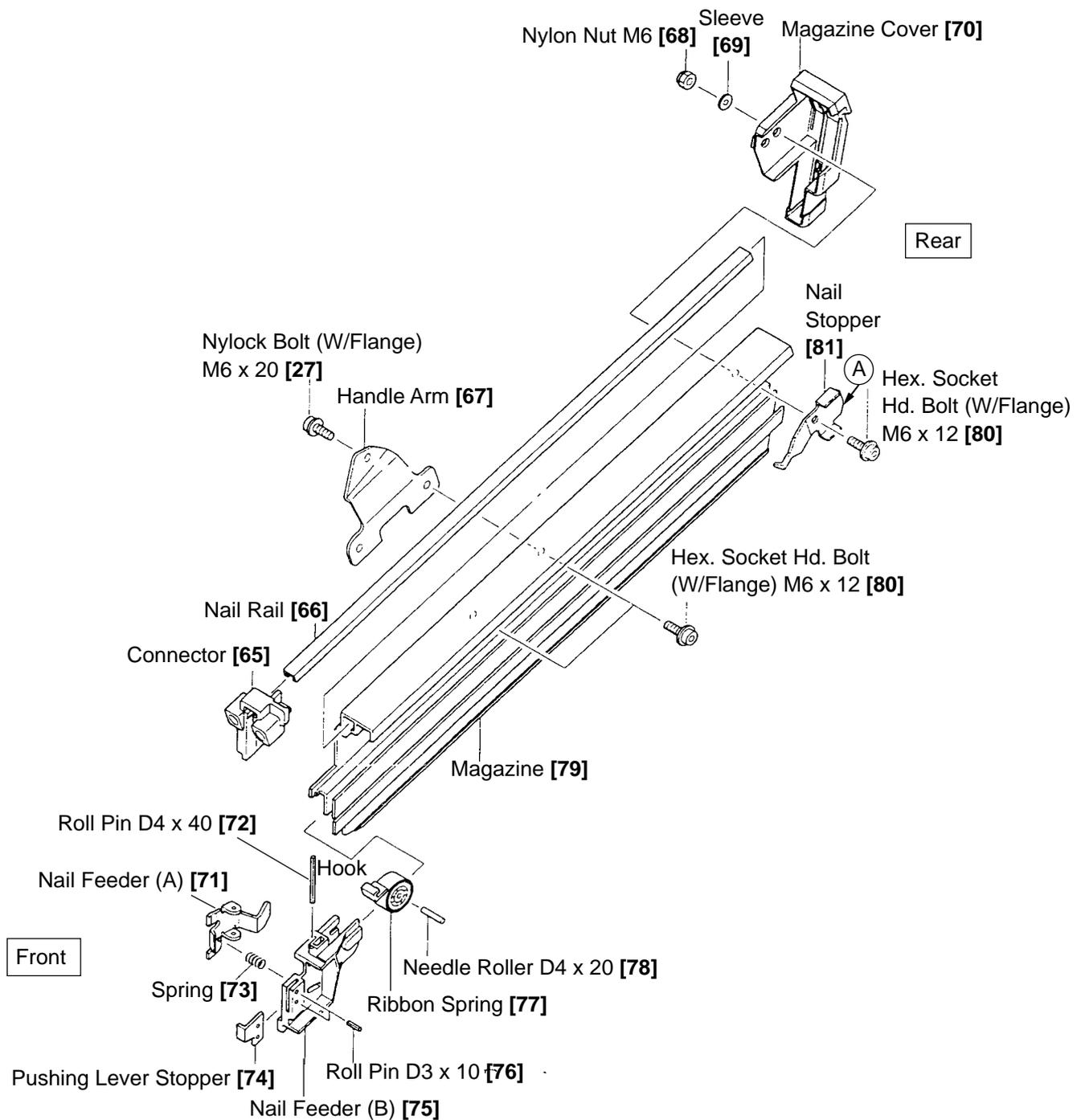


Fig. 22

(3) Nail Feeders (A) [71], (B) [75] and the related parts

[Tool required]

- Roll pin puller (3 mm (0.118"), 4 mm (0.157") dia.)

(a) Disassembly

- Fix Nail Feeder (B) [75] using a V-block and pull out the Roll Pin D4 x 40 [72] from the top using a roll pin puller (4 mm (0.157") dia.). Then Nail Feeder (A) [71], Nail Feeder (B) [75] and Spring [73] can be removed.
- Pull out the Roll Pin D3 x 10 [76] with the roll pin puller (3 mm (0.118")). Then the Pushing Lever Stopper [74] can be removed from Nail Feeder (B) [75].

(b) Reassembly

Disassembly procedures should be followed in the reverse order. Note the following points.

- Insert the Pushing Lever Stopper [74] in Nail Feeder (B) [75] and secure with the Roll Pin D3 x 10 [76].
- Insert the Roll Pin D4 x 40 [72] into Nail Feeder (B) [75]. Insert the Spring [73] into the hole of Nail Feeder (B) [75] and compress the Spring [73] until it is engaged with the protrusion of Nail Feeder (A) [71].

11. INSPECTION AND CONFIRMATION AFTER REASSEMBLY

- Check that the Pushing Lever Stopper [74] is not placed over Pushing Lever (B) [33] without loading nails.
(See Fig. 23.)

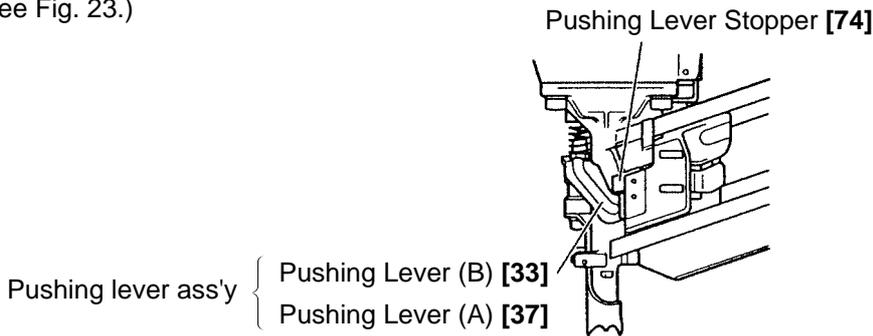


Fig. 23

Note:

The Model NR 90AC3 is equipped with a pushing lever stopper as an idling protector. The Pushing Lever Stopper [74] is placed over Pushing Lever (B) [33] to prevent the pushing lever ass'y from being pushed up when no nail is loaded in the magazine or the number of nails remained in the magazine is five or less.

Pull Nail Feeder (B) [75] backward before checking the operation of the pushing lever ass'y.

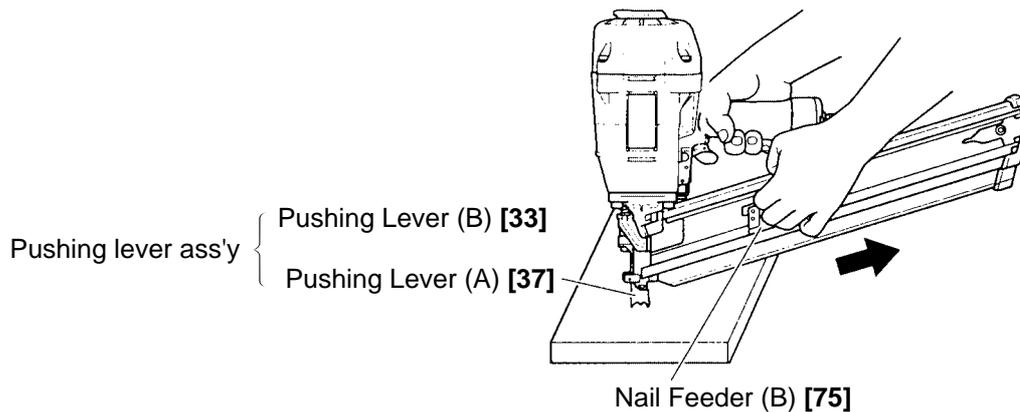


Fig. 24

- Check that Nail Feeder (B) [75] slides in the Magazine [79] smoothly.
- Check that Plunger (A) [61] moves smoothly.
- Check that Adjuster (A) [34] turns smoothly by hand.
- Check that there is no air leakage from each part.
- Set the Change Knob [50] to "contact actuation" (see 5-2). While driving nails with an air pressure of 4.5 kgf/cm² (63 psi), check that there is no misfiring and bending of nails.

Note: Before conducting the driving test, turn Adjuster (A) [34] to the deepest position.

- Set the Change Knob [50] to "single actuation (single sequential actuation)" (see 5-2). Check that the Model NR 90AC3 operates by pressing the Pushing Lever (A) [37] against a test piece first then pulling Trigger (A) [47]. Check that the Piston [19] is still showing from the Nose [30] tip (outlet of nails) after the Pushing Lever (A) [37] is released from the test piece with the Trigger (A) [47] pulled.
- Recheck the tightening torque of each screw.
- Check that the pushing lever ass'y slides smoothly.
- Check that the machine will not operate only by pulling Trigger (A) [47]. Also check that the machine will not operate only by depressing Pushing Lever (A) [37].

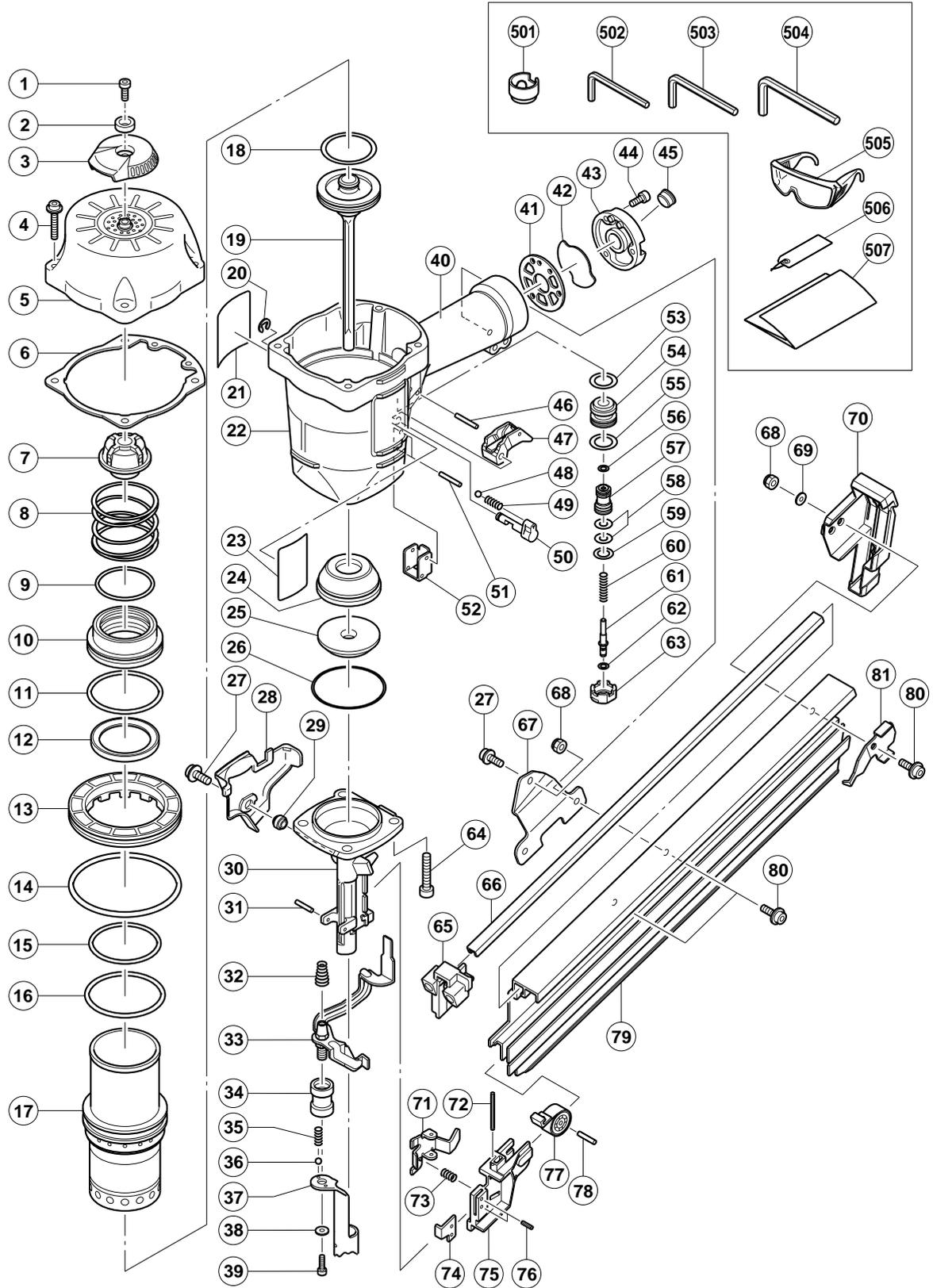
12. STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable		10	20	30	40	50	60 min.
	Fixed							
NR 90AC3		Work Flow						
				Exhaust Cover Gasket (A) Exhaust Valve Rubber Head Valve Spring Cylinder O-ring (B) Head Valve Cylinder O-ring Head Valve Rubber	Nose Magazine Magazine Cover Nail Feeder (A) Nail Feeder (B) Ribbon Spring			
	General Assembly			Pushing Lever (B) Spring Adjuster (A) Pushing Lever (A) Piston O-ring Trigger (A) Pushing Lever Guide Head Valve O-ring Valve Bushing (B) O-ring x 6 Valve Piston (B) Plunger Spring Plunger (A) Valve Bushing (A)	Cylinder Cylinder Plate O-ring x 4 Piston Bumper (A) Piston Bumper (B)			Body
				Adjustment (Cylinder, Body, Valve)				

PNEUMATIC TOOL PARTS LIST

STRIP NAILER
Model NR 90AC3

2003 • 9 • 10
(E1)



PARTS

NR 90AC3

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS
1	949-755	HEX. SOCKET HD. BOLT M6X16 (10 PCS.)	1	
2	880-515	PLATE	1	
3	880-514	TOP COVER	1	
4	882-793	HEX. SOCKET HD. BOLT (W/FLANGE) M6X35	4	
5	881-946	EXHAUST COVER	1	
6	881-940	GASKET (A)	1	
7	881-945	EXHAUST VALVE RUBBER	1	
8	881-944	HEAD VALVE SPRING	1	
9	883-676	CYLINDER O-RING (B)	1	
10	881-942	HEAD VALVE	1	
11	883-677	CYLINDER O-RING	1	
12	881-943	HEAD VALVE RUBBER	1	
13	881-941	CYLINDER PLATE	1	
14	878-907	O-RING (S-95)	1	
15	878-376	O-RING (I.D 59.6/W2.4)	1	
16	881-972	O-RING	1	
17	881-939	CYLINDER	1	
18	877-368	O-RING (1AP-48)	1	
19	883-680	PISTON	1	
20	955-479	RETAINING RING (E-TYPE) FOR D6 SHAFT	1	
21	884-070	WARNING LABEL	1	
22	884-140	BODY	1	
23		NAME PLATE	1	
24	883-670	PISTON BUMPER (A)	1	
25	883-671	PISTON BUMPER (B)	1	
26	956-996	O-RING (1AS-60)	1	
27	881-969	NYLOCK BOLT (W/FLANGE) M6X20	2	
28	881-935	GUARD	1	
29	883-674	COLLAR (B)	1	
30	883-672	NOSE	1	
31	949-864	ROLL PIN D3X22 (10 PCS.)	1	
32	883-691	SPRING	1	
33	883-673	PUSHING LEVER (B)	1	
34	881-974	ADJUSTER (A)	1	
35	982-454	SPRING (C)	2	
36	959-155	STEEL BALL D3.97 (10 PCS.)	2	
37	881-933	PUSHING LEVER (A)	1	
38	880-081	WASHER	1	
39	949-657	HEX. SOCKET HD. BOLT M6X12 (10 PCS.)	1	
40		GRIP RUBBER	1	(SUPPLIED WITH ITEM NO. 606, 607)
41	883-678	GASKET (B)	1	
42	883-679	DUST FILTER	1	
43	881-949	CAP	1	
44	949-821	HEX. SOCKET HD. BOLT M5X16 (10 PCS.)	3	
45	872-035	DUST CAP	1	
46	949-864	ROLL PIN D3X22 (10 PCS.)	1	
47	884-145	TRIGGER (A)	1	
48	959-155	STEEL BALL D3.97 (10 PCS.)	1	
49	982-454	SPRING (C)	1	
50	884-141	CHANGE KNOB	1	
51	949-865	ROLL PIN D3X28 (10 PCS.)	2	

