


Construction Products, LLC

OPERATOR'S MANUAL

Manual Part No. 002034
July 2, 2003



HY-RAM HAMMERS SMALL & MEDIUM BOX-MOUNTED MODELS

735

740

745

750

755, 755B

770

775, 775B

**Allied Hy-Ram Small & Medium Models
735, 740, 745, 750, 755, 755B, 770, 775, 775B****Document Change Notice**

| <u>Date</u> | <u>Page</u> | <u>Change</u> |
|-------------|-------------------|---|
| 7-15-98 | Throughout | Added Model 745CS |
| 12-30-98 | Throughout | Added Model 755CS |
| 12-30-98 | 4-1 | Revised Specifications |
| 03/25/00 | 4-1 thru 4-18 | Updated Specifications, Dimension Drawings and added Dimension Charts |
| 03/25/00 | Chapters 2 and 11 | Added Guardian Information, Updated Torque Charts |
| 5/5/00 | Chp 11 | Added 755 Torque Chart & Dwg |
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| 05-15-02 | Chps 1, 5, 11 | Updated Safety/Warranty Info |
| 05-15-02 | Chp 8 | Added Caution re Greasing Bushings and Tool |
| 05-15-02 | Chp 9 | Added Select Start |
| 07-02-03 | Chp 11 | Corrected Torque Tables |

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SECTION 1.0 INTRODUCTION

Hy-Ram Hammers Operator's Manual: Part Number 002037

This Operator's Manual is applicable to Small & Medium Box-Mounted Models:

Models: 735, 740, 745, 750, 755, 755B, 770, 775, 775B

Years of Manufacture: 1985 and beyond

Serial Number(s) _____

This manual contains important information for the safe use and maintenance of the Allied Hy-Ram Small & Medium Box-Mounted Models: Models 735, 740, 745, 750, 755, 755B, 770, 775, and 775B

Read this manual thoroughly before installing, operating or servicing the HyRam. This manual must be easily accessible to operators, service and transport personnel. Store this manual in a convenient location.

Pay careful attention to all instructions and follow all governing regulations. Operation or service other than in accordance with these instructions may subject the Hy-Ram to conditions beyond its design capability. Improper operation, service or the use of non-Allied parts may result in Hy-Ram failure or personnel injury.

1.1 Safety Information

When using the Hy-Ram, safety procedures must be followed. See Section 5.0 for further safety guidelines.

Pay particular attention to WARNINGS and CAUTIONS, identified with this symbol.



These instructions are important for personnel safety and full service life of the Hy-Ram Hammer. Follow them carefully.

1.2 Warranty Information

Warranty coverage of the Allied Hy-Ram depends on proper maintenance and operation of the Hy-Ram as detailed in this manual. Improper maintenance or operation shall void Hy-Ram warranty coverage. Immediately upon receipt of the Hy-Ram, read all Allied warranty documents delivered with the unit for a thorough understanding of warranty coverage.

Record the Hy-Ram Serial Number in the space provided above and in the Parts Manual.

1.3 Allied Product Policies

Allied reserves the right to make modifications to the design or changes to the specifications without prior notice.

In this manual, Allied recommends Hy-Ram applications, maintenance and service consistent with industry practices. Allied takes no responsibility for the results of actions not recommended in this manual and specifically the results of:

- Operation in non-recommended applications
- Incorrect operation
- Improper maintenance
- Use of service parts not approved or supplied by Allied.

These exclusions apply to damage to the Hy-Ram, associated equipment, and injury to personnel.

SECTION 2.0
OVERVIEW

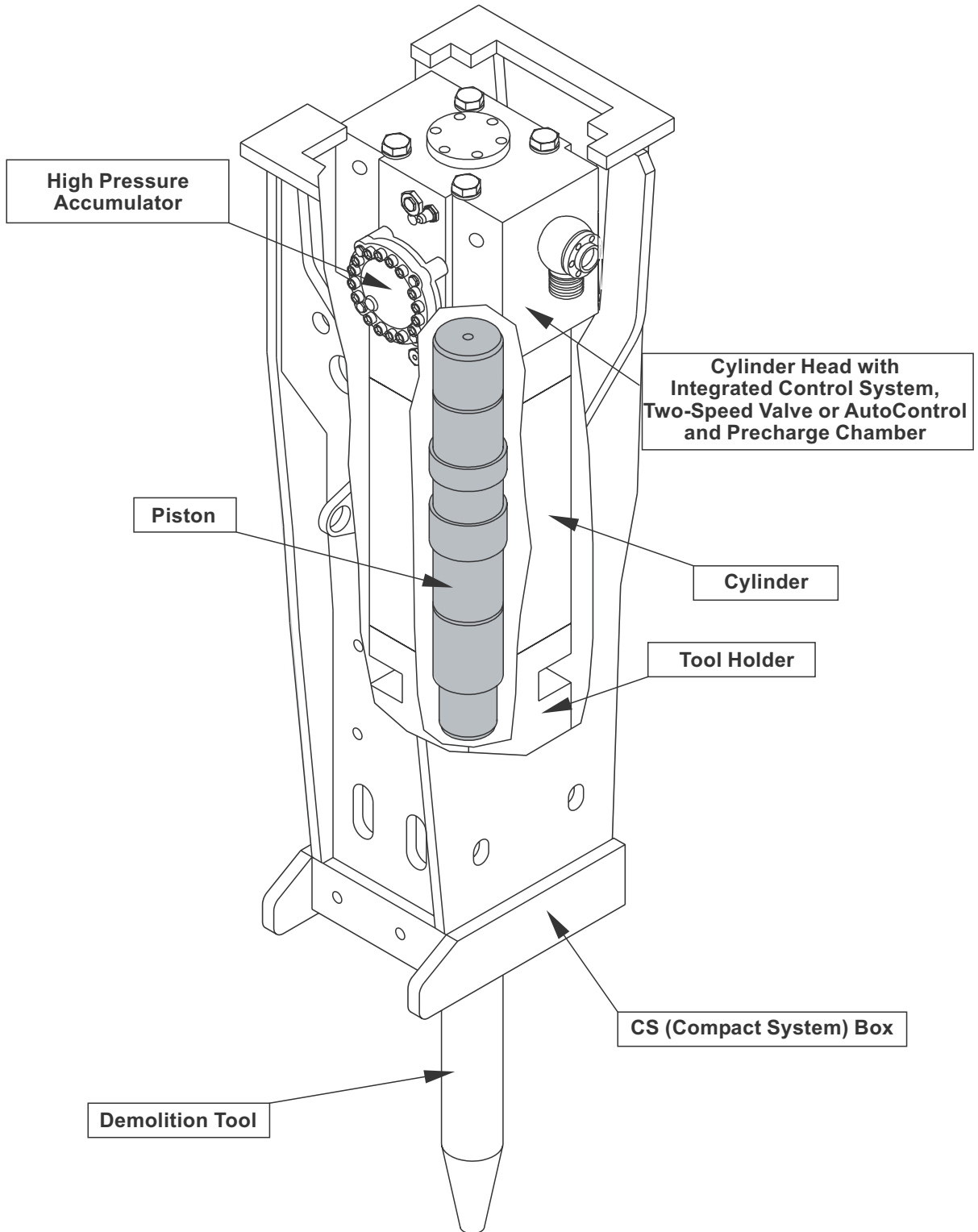


Figure 2-1. Typical Hy-Ram Main Components

2.1 Introduction - The Allied Hy-Ram

The Allied Hy-Ram impact hammer features high single blow energy and long stroke design. Models 750 and 770 feature selectable two-speed operation. Models 755, 755B, 775 and 775B feature automatic two-speed operation with AutoControl. These features are described in Section 9.10.

In place of side plates, found on most boom-mounted hammers, the Allied design suspends the hammer working body in a compact box enclosure. This isolates vibration forces, allows the hammer to work more efficiently and reduces vibration to the carrier.

The entire Hy-Ram body, including the demolition tool holder, is enclosed in the Compact System () Box. Close proximity to the material being broken makes the tool holder of any hammer susceptible to damage. Contact with demolished materials and dust from demolition can damage tool holder components. To extend hammer life, Hy-Ram construction protects the tool holder in three ways: the box protects the tool holder from contact damage; the tool bushings, made of heat-treated alloy steel, are replaceable; and Hy-Ram dust protection limits the amount of debris entering the tool bushing area. The Standard version Hy-Ram (all models) has a foam dust ring in the bottom of the box. The Guardian version Hy-Ram, featuring sophisticated dust deterrent components, is designed for dust-intensive environments. It is available for Models 755, 755B, 775 and 775. The Guardian dust protection components can be retrofit to a Standard Hy-Ram (755, 755B, 775 and 775B). Each of these arrangements is detailed under section 2.2 Description of Assembly Groups, Box.

Illustrations are representative of typical hammers. These illustrations are not to be used for repair or service.

2.2 Description of Assembly Groups

• **Compact System Box**

The Box is a closed unit with two wear resistant polyurethane guide plates located front and rear at the bottom of the hammer. Polyurethane shock absorbers and a top damper, located in the upper portion of the box, help absorb contact and recoil forces. These wear plates, shock absorbers and dampers reduce wear on the hammer and carrier, and extend the operating life of both.

Standard Hy-Ram Box

The Standard Hy-Ram Box has a replaceable dust ring located in the bottom of the box. The dust ring is a foam material and fits snugly around the demolition tool protecting the tool bushings, tool, retainer bars, and piston from wear from dust entering the tool holder.

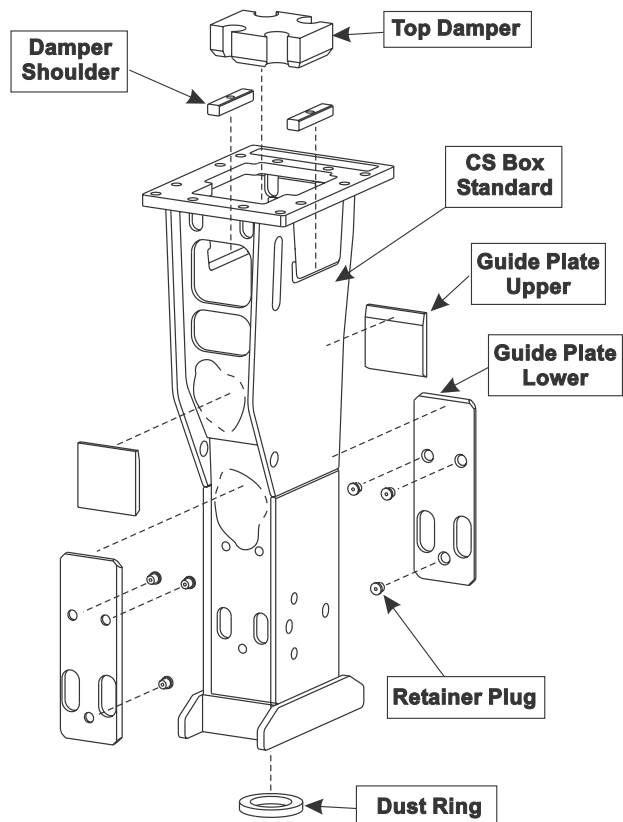


Figure 2-2. Box with Guide Plate - Standard

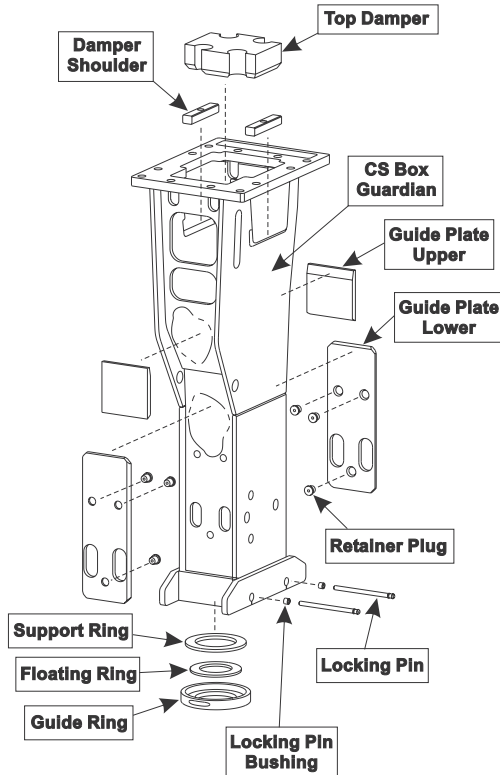


Figure 2-3. Box with Guide Plate - Guardian

Guardian Hy-Ram Box

The Guardian Hy-Ram is recommended for dust-intensive applications. The Guardian Box has a two-stage seal dust protection system.

The first stage of the Guardian system consists of a floating ring that encircles the tool and rides inside a groove within a guide ring. This floating ring is free to follow the movement of the tool as the hammer body moves inside the box. These components can be easily disassembled and cleaned without removing the demolition tool.

The second stage of the Guardian system consists of a pliable, abrasion resistant tool wiper attached to the bottom of the lower tool bushing. The bottom of this bushing is bell shaped--it does not contact the tool surface and cannot create wear ridges as the tool moves up and down. The tool remains smooth so dust cannot slip under the wiper or damage the wiper.

• **High-Pressure Accumulator**

The high-pressure accumulator is bolted to the front of the cylinder head or cylinder body depending on the model; the 740 accumulator is part of the cylinder casting; the 735 does not have an accumulator. The accumulator guarantees maximum single blow force and protects the hydraulic system of the carrier. Refer to section 11.2.13 Checking the High-Pressure Accumulator.

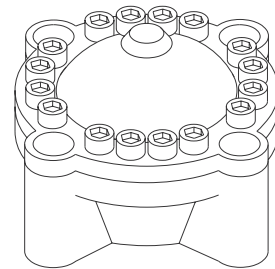


Figure 2-4. Typical High-Pressure Accumulator

• **Cylinder Head**

The cylinder head is the upper hammer section.

The hydraulic pressure connection (from the pump) is located on the cylinder head on Models 750, 770, 775 and 775B; it is on the cylinder body on Models 735, 740, 745, 755 and 755B. Connection **P**

The hydraulic return connection (to the tank) is located on the cylinder head on Models 750, 770, 775 and 775B; it is on the cylinder body on Models 735, 740, 745, 755 and 755B. Connection **T**

The following connections are located on the the cylinder head:

Nitrogen filling and measuring fitting for precharge chamber. Connection **G** (Gas)

Control connection for selectable two-speed operation on the 750 and 770.

Connection **F** (Frequency)

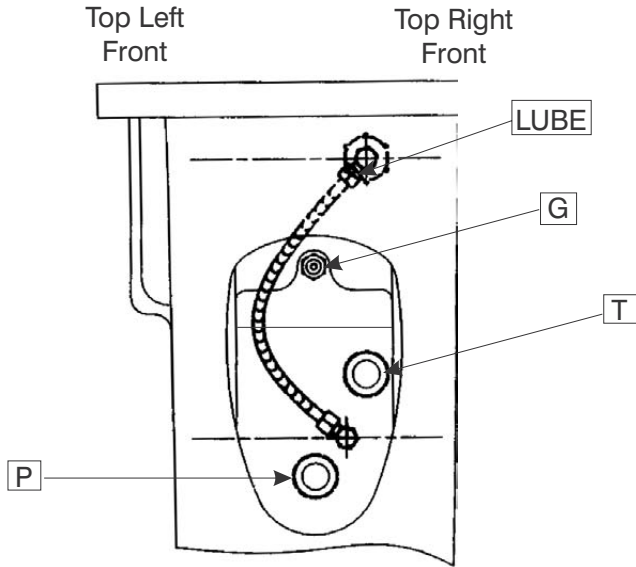


Figure 2-5-735. Cylinder Head

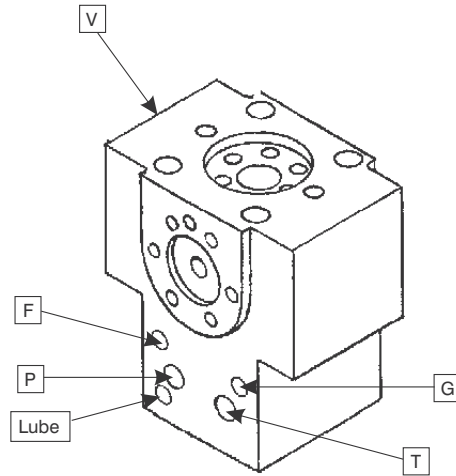


Figure 2-5-750. Cylinder Head

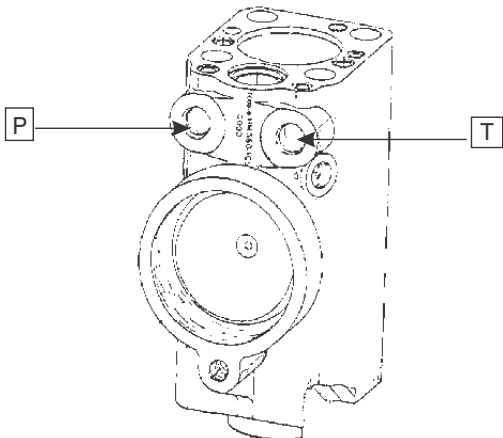
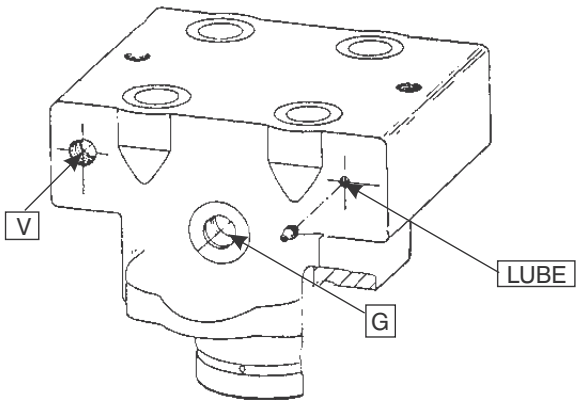


Figure 2-5-740 and 745. Cylinder Head and Body

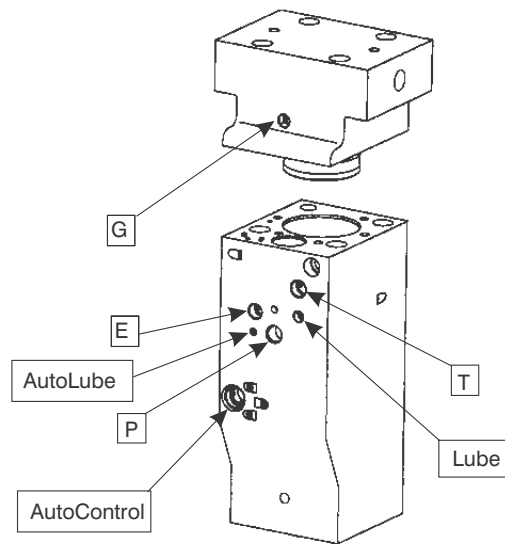


Figure 2-5-755/755B Cylinder Head and Body

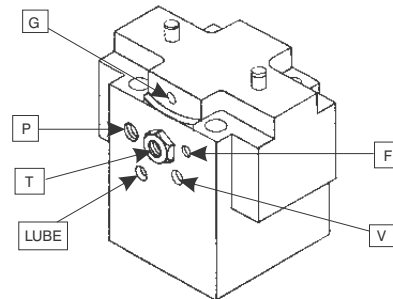


Figure 2-5-770. Cylinder Head

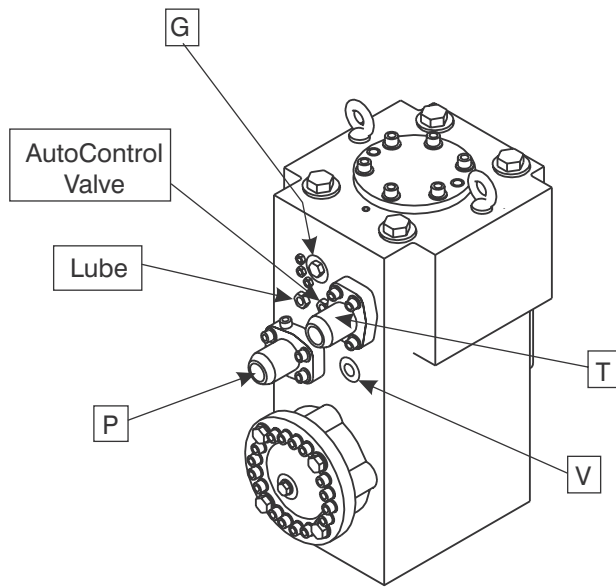


Figure 2-5-775/775B. Cylinder Head

Energy Recovery Valve access. The energy recovery valve is located inside the cylinder head on Models 735, 740, and 745. Connection E (Energy).

On Models 755 and 755B Hy-Ram, the selectable two-speed valve is replaced by the AutoControl System which is internal to the cylinder body.

On Models 775 and 775B Hy-Ram, the selectable two-speed and energy recovery connections are replaced by the AutoControl System which is internal to the cylinder head.

On Models 775 and 775B, the precharge chamber and control systems, including AutoControl, are located inside the cylinder head. On Models 755 and 755B, the control systems, including AutoControl, are located inside the cylinder body.

For underwater applications, Connection V (Vent) plug is removed and a hose connected to supply regulated compressed air. Model 735 cannot be used underwater. Refer to section 9.11.2. Connection V

Refer to Sections 8.5 and 8.6 for lubrication instructions and a description of the AutoLube automatic lubrication feature.

• **Cylinder**

The cylinder is the central section of the hammer between the cylinder head and the tool holder. These three assemblies are connected with tension rods on the 735, 740, 745, 750 and 770, and tension bolts on the 755, 755B, 775 and 775B, which pass through all three components. Unit Identification is located on the cylinder as shown in Figure 2-6.

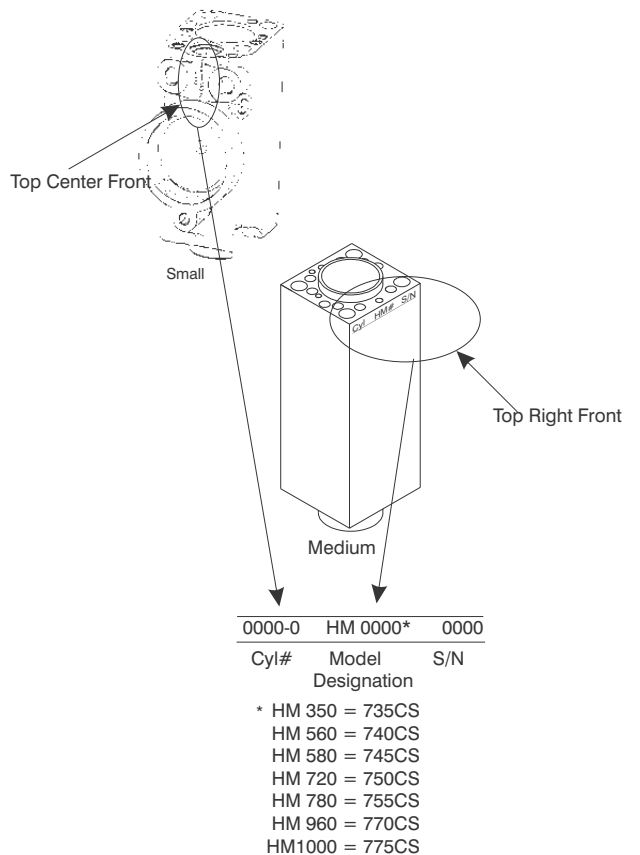


Figure 2-6. Typical Cylinder

• **Piston**

The piston reciprocates in the cylinder transferring its energy to the demolition tool upon impact. The upper end of the piston has an identification number which is explained in Figure 2-7.

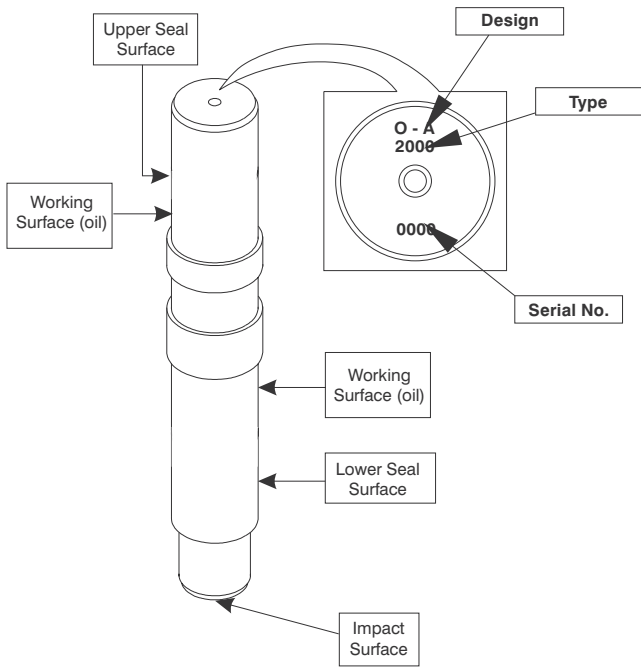


Figure 2-7. Typical Piston

• **Tool Holder**

On Models 750, 755, 755B, 770, 775 and 775B, the tool holder holds the demolition tool in place with retainer bars. The two tool bushings, upper and lower, and the impact ring are located in the tool holder.

On Models 735, 740, and 745, the tool holder holds the demolition tool in place with a retainer pin. The two tool bushings are located in the tool holder. The impact ring is part of the upper bushing.

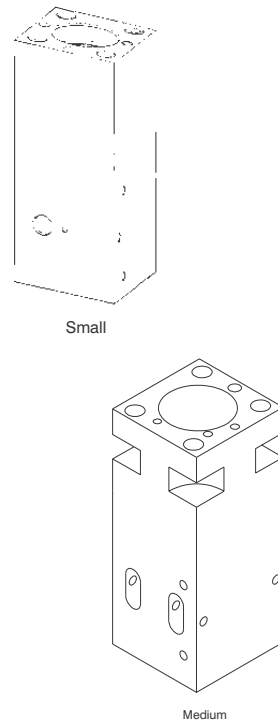


Figure 2-8. Typical Tool Holder

SECTION 3.0 THEORY OF OPERATION

Figure 3-1 is a diagram of basic Hy-Ram operation illustrating how the piston is moved up and down to impact the demolition tool.

Up and down piston travel within the cylinder is controlled by hydraulic pressure above piston surface f2.

- When the pressure above surface f2 is low, the high pressure against surface f1 forces the piston up the cylinder. This movement also compresses the nitrogen gas, increasing pressure on piston surface f3.
- The upward piston movement causes a control valve (not shown) to shift position. This shift results in a high pressure above surface f2.
- When the pressure above surface f2 is high, the piston is forced downward. The nitrogen pressure against piston surface f3 also drives the piston downward with even greater force.
- Just before tool impact, the control valve shifts again. This shift results in a low pressure above surface f2.

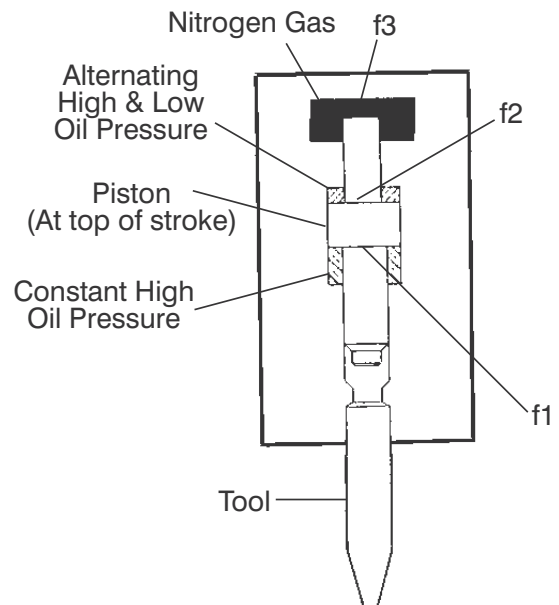


Figure 3-1. Hammer Block Diagram

SECTION 4.0 TECHNICAL INFORMATION

4.1 Technical Specifications

| Table 4-1. Technical Specifications | | | | |
|---|----------------------------------|------------------------------------|-------------------------------------|-------------------------------------|
| Hy-Ram Model | | 735 | 740 | 745 |
| Two-speed Operation Range 1 Range 2 | blows per minute Note 1 | 600-1000 N/A | 350-800 N/A | 350-800 N/A |
| Hydraulic Flow | gpm (lpm) | 16-26 (60-100) | 18 - 32 (70 - 120) | 18 - 32 (70 - 120) |
| Hydraulic Operating Pressure | psi (bar) | 1600-2300 (110-160) | 1750-2450 (120-170) | 1750-2600 (120-180) |
| Pressure in Nitrogen Precharge Chamber | psi(bar) psi(bar) Note 2 | 150 (10.4) 175 (12.0) | 140 (9.7) 165 (11.5) | 168 (11.6) 195 (13.5) |
| Pressure in Accumulator | psi (bar) | N/A | 725 (50) | 725 (50) |
| Length Note 3 | ins. (mm) | 75.3 (1913) | 88.9 (2258) | 83.9 (2131) |
| Weight Note 4 | lbs. (kg) | 1250 (568) | 1800 (817) | 2200 (998) |
| Demolition Tool Diameter Working Length | Std. in. (mm) in. (mm) | Cross Cut 3.54 (90) 18 (457) | Cross Cut 3.94 (100) 25 (648) | Cross Cut 3.94 (100) 20 (508) |
| Carrier Weight Class Backhoe Excavator | 1000 lbs. 1000 kg | 14-25 (6-11) 15-30 (7-14) | 16-25 (7-11) 20-40 (9-18) | 20-45 (9-20) 25-45 (11-20) |
| Hydraulic Hose Size | in. (mm) | 3/4 (19) | 1.00 (25) | 1.00 (25) |

Note 1: Actual blows per minute varies on models equipped with Energy Recovery or Auto-Control.

Note 2: First value at 70°F (21°C), second value at 150°F (65°C).

Note 3: Dimension D on dimension diagram; with average mounting bracket.

Note 4: Includes mounting bracket and tool.

NOTE

For decal descriptions and locations, refer to the Parts Manual for each individual model covered in this operator's manual.

| Table 4-2. Technical Specifications | | | | | |
|---|--------------------------------|-------------------------------------|---|-------------------------------------|-------------------------------------|
| Hy-Ram Model | | 750 | 755 and 755B | 770 | 775 and 775B |
| Two-speed Operation Range 1 Range 2 | blows per minute Note 1 | 350-600 700-1200 | N/A | 360-480 720-960 | N/A |
| AutoControl Operation Range 1 Range 2 | blows per minute | N/A | 350-680 | N/A | 360-600 |
| Hydraulic Flow | gpm (lpm) | 24-32 (90-120) | 27-37 (100-140) | 34-45 (130-170) | 34-42 (130-160) |
| Hydraulic Operating Pressure | psi (bar) | 2000-2450 (140-170) | 2200-2600 (150-180) | 1750-2000 (120-140) | 2300-2600 160-180 |
| Pressure in Nitrogen Precharge Chamber | psi(bar) psi(bar) Note 2 | 85 (5.9) 100 (7.0) | 163 (11) 190 (13) | 100 (6.9) 120 (8.2) | 154 (10.3) 180 (12.3) |
| Pressure in Accumulator | psi (bar) | 870 (60) | N/A | 870 (60) | 870 (60) |
| Length Note 3 | ins. (mm) | 93.8 (2381) | 96.0 (2438) | 102 (2578) | 109 (2778) |
| Weight Note 4 | lbs. (kg) | 2860 (1297) | 2900 (1315) | 3220 (1462) | 3900 (1769) |
| Demolition Tool Diameter Working Length | Std. in. (mm) in. (mm) | Cross Cut 4.53 (115) 21 (533) | Cross Cut 4.72 (120) Standard 25 (635) Guardian 24 (610) | Cross Cut 5.31 (135) 26 (660) | Cross Cut 5.51 (140) 26 (660) |
| Carrier Weight Class | 1000 lbs. 1000 kg | 30 - 60 (14 - 27) | 33 - 60 (15-27) | 42 - 70 (19 - 32) | 44 - 76 (20 - 34) |
| Hydraulic Hose Size | in. (mm) | 1.00 (25) | 1.00 (25) | 1.00 (25) | 1.00 (25) |

Note 1: Actual blows per minute varies on models equipped with Energy Recovery or Auto-Control.

Note 2: First value at 70°F (21°C), second value at 150°F (65°C).

Note 3: Dimension D on dimension diagram; with average mounting bracket.

Note 4: Includes mounting bracket and tool.

4.2 Dimensions

The dimensions listed in Tables 4-1 through 4-7 are illustrated in their corresponding dimension diagrams. Each dimension is indicated by a letter on the drawing. The tables list these letters, each dimension and an explanation of the dimension.

| Table 4-1. Dimensions of 735 Hy-Ram | | |
|-------------------------------------|-----------------------|--|
| Letter | Dimension in. (mm) | Description |
| A | 77.5 (1969) | Hammer length: Bracket top to tool tip |
| B | 16.1 (410) | Hammer width |
| C | 18.0 (457) | Tool length |
| D | 75.3 (1911) | Hammer working length |
| E | 12.1 (308) | Inside mounting width |
| F | 24.5 (622) | Bracket depth |
| G | 20.0 (508) | Stick pin to link pin length. |
| H | 3.54 (90) | Tool diameter |
| J | 9.50 (241) | Bracket mounting height |

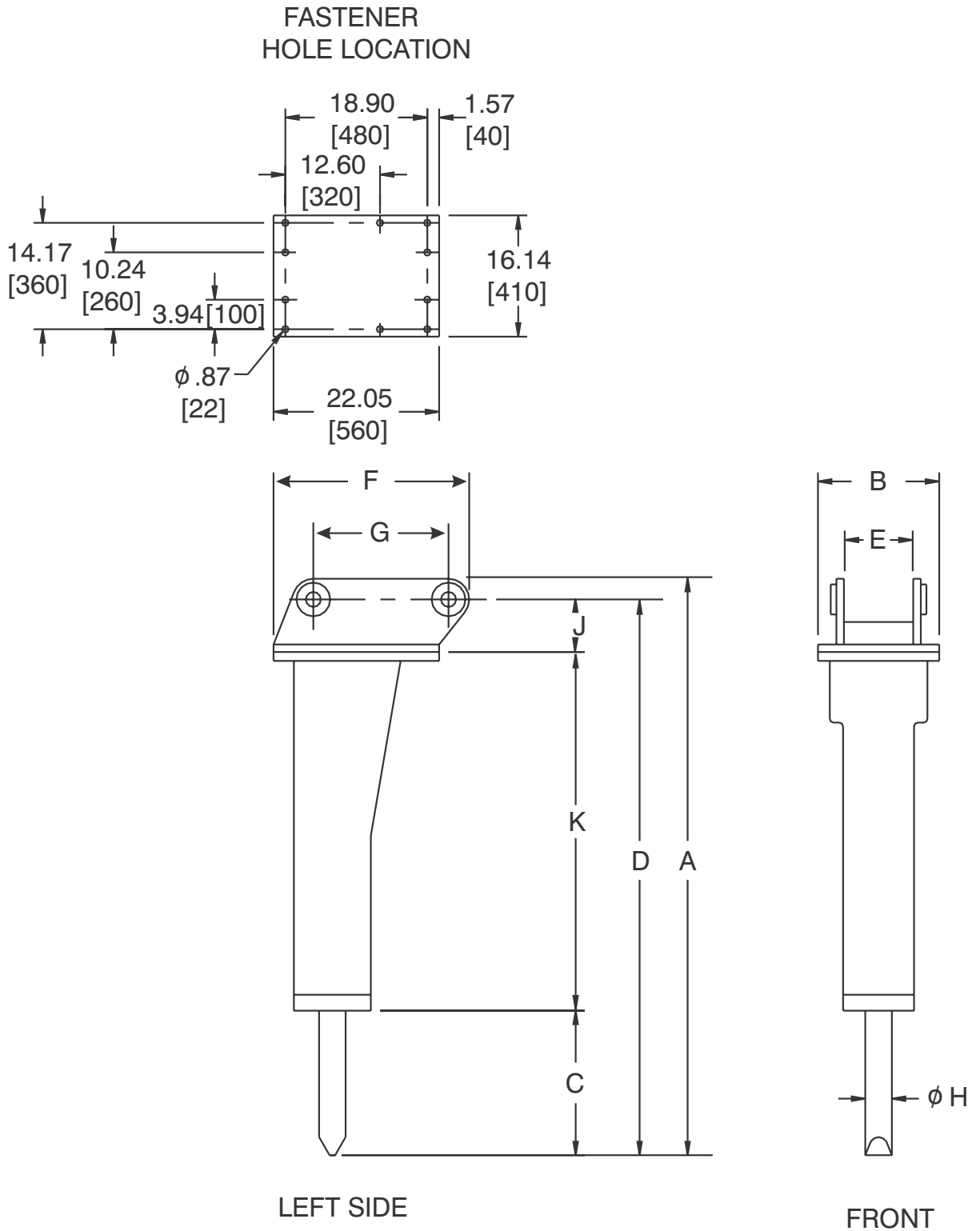


Figure 4-1. Dimension Drawing - Model 735

| Table 4-2. Dimensions of 740 Hy-Ram | | |
|-------------------------------------|-----------------------|--|
| Letter | Dimension in. (mm) | Description |
| A | 91.1 (2314) | Hammer length: Bracket top to tool tip |
| B | 16.1 (410) | Hammer width |
| C | 25.0 (635) | Tool length |
| D | 88.9 (2258) | Hammer working length |
| E | 12.1 (308) | Inside mounting width |
| F | 24.5 (62) | Bracket depth |
| G | 20.0 (508) | Stick pin to link pin length. |
| H | 3.94 (100) | Tool diameter |
| J | 9.50 (241) | Bracket mounting height |

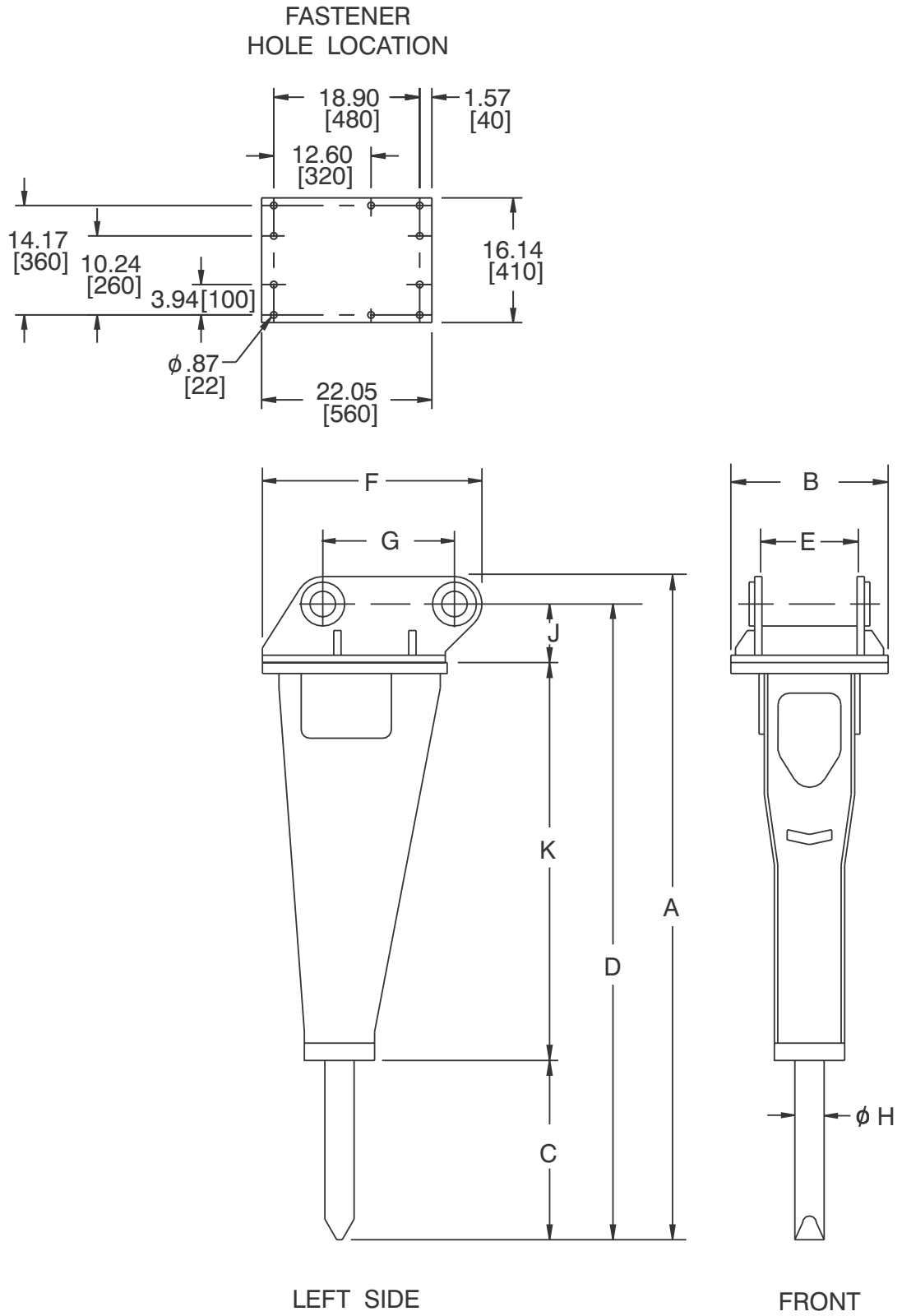
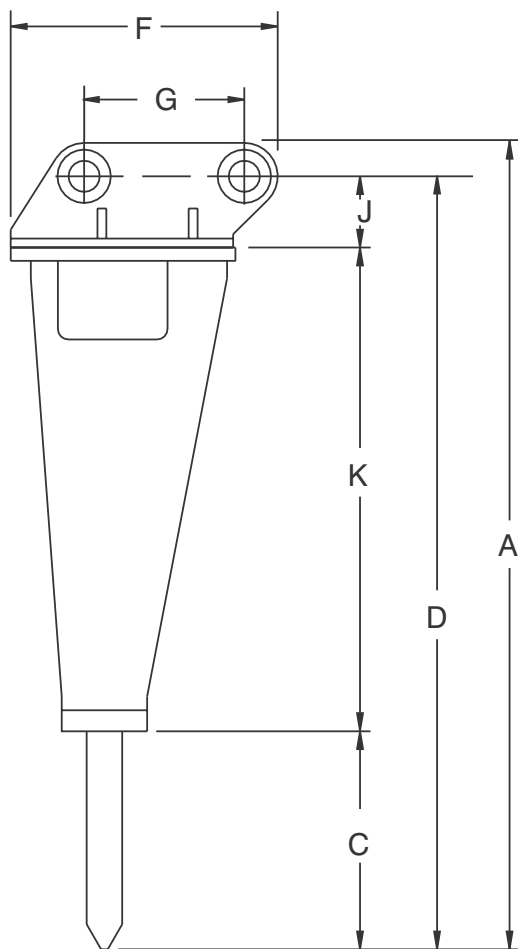
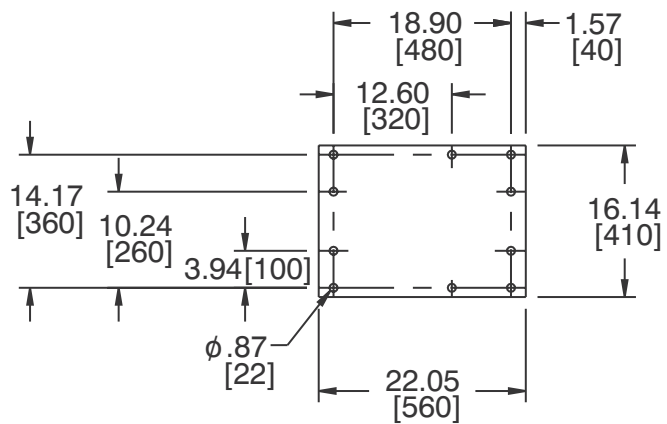


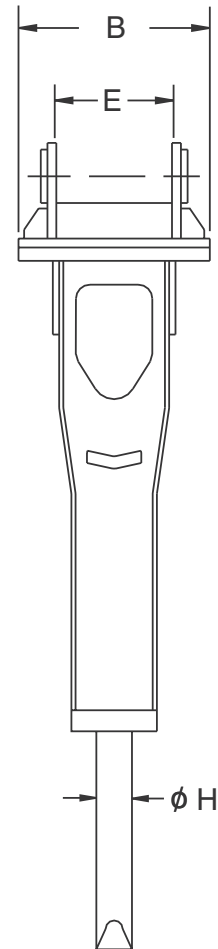
Figure 4-2. Dimension Drawing - Model 740

| Table 4-3. Dimensions of 745 Hy-Ram | | |
|-------------------------------------|-----------------------|--|
| Letter | Dimension in. (mm) | Description |
| A | 86.1 (2187) | Hammer length: Bracket top to tool tip |
| B | 16.1 (410) | Hammer width |
| C | 20.0 (508) | Tool length |
| D | 83.9 (2131) | Hammer working length |
| E | 12.1 (308) | Inside mounting width |
| F | 24.5 (622) | Bracket depth |
| G | 20.0 (508) | Stick pin to link pin length. |
| H | 3.94 (100) | Tool diameter |
| J | 9.50 (241) | Bracket mounting height |

FASTENER
HOLE LOCATION



LEFT SIDE



FRONT

| Table 4-4. Dimensions of 750 Hy-Ram | | |
|-------------------------------------|-----------------------|--|
| Letter | Dimension in. (mm) | Description |
| A | 97.5 (2476) | Hammer length: Bracket top to tool tip |
| B | 21.5 (546) | Hammer width |
| C | 21.0 (533) | Tool length |
| D | 93.8 (2381) | Hammer working length |
| E | 16.3 (413) | Inside mounting width |
| F | 30.0 (672) | Bracket depth |
| G | 18.0 (457) | Stick pin to link pin length. |
| H | 4.50 (114) | Tool diameter |
| J | 10.0 (254) | Bracket mounting height |

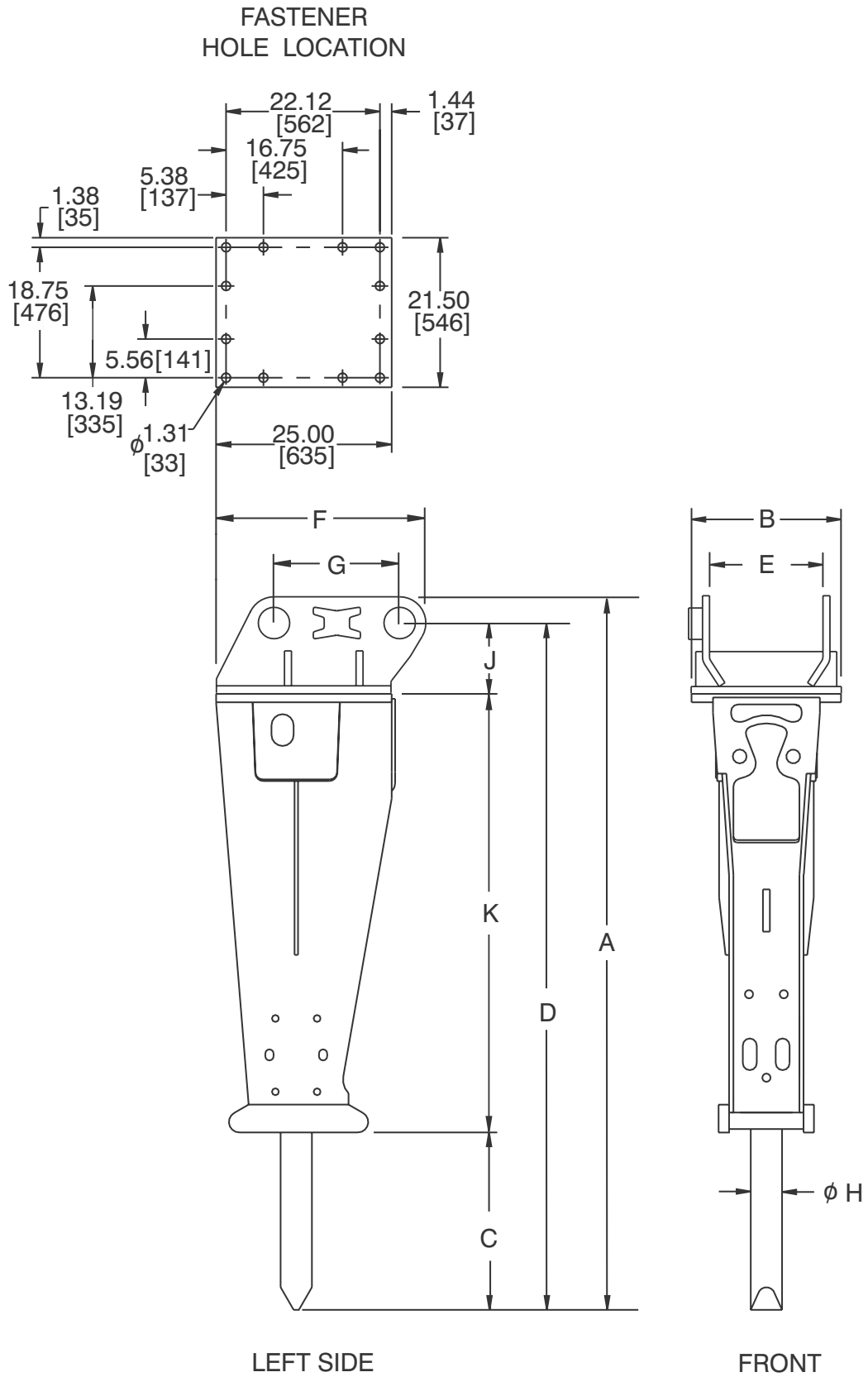


Figure 4-4. Dimension Drawing - Model 750

Table 4-5. Dimensions of 755/755B Hy-Ram

| Letter | Dimension in. (mm) | Description |
|--------|--------------------------|--|
| A | 100 (2540) | Hammer length: Bracket top to tool tip |
| B | 21.5 (546) | Hammer width |
| C | 25.0 (635) 24.0 (610) | Tool length - Standard Tool length - Guardian |
| D | 96.0(2438) | Hammer working length |
| E | 16.3 (413) | Inside mounting width |
| F | 30.0 (762) | Bracket depth |
| G | 18.0 (457) | Stick pin to link pin length. |
| H | 4.72 (120) | Tool diameter |
| J | 10.0 (254) | Bracket mounting height |

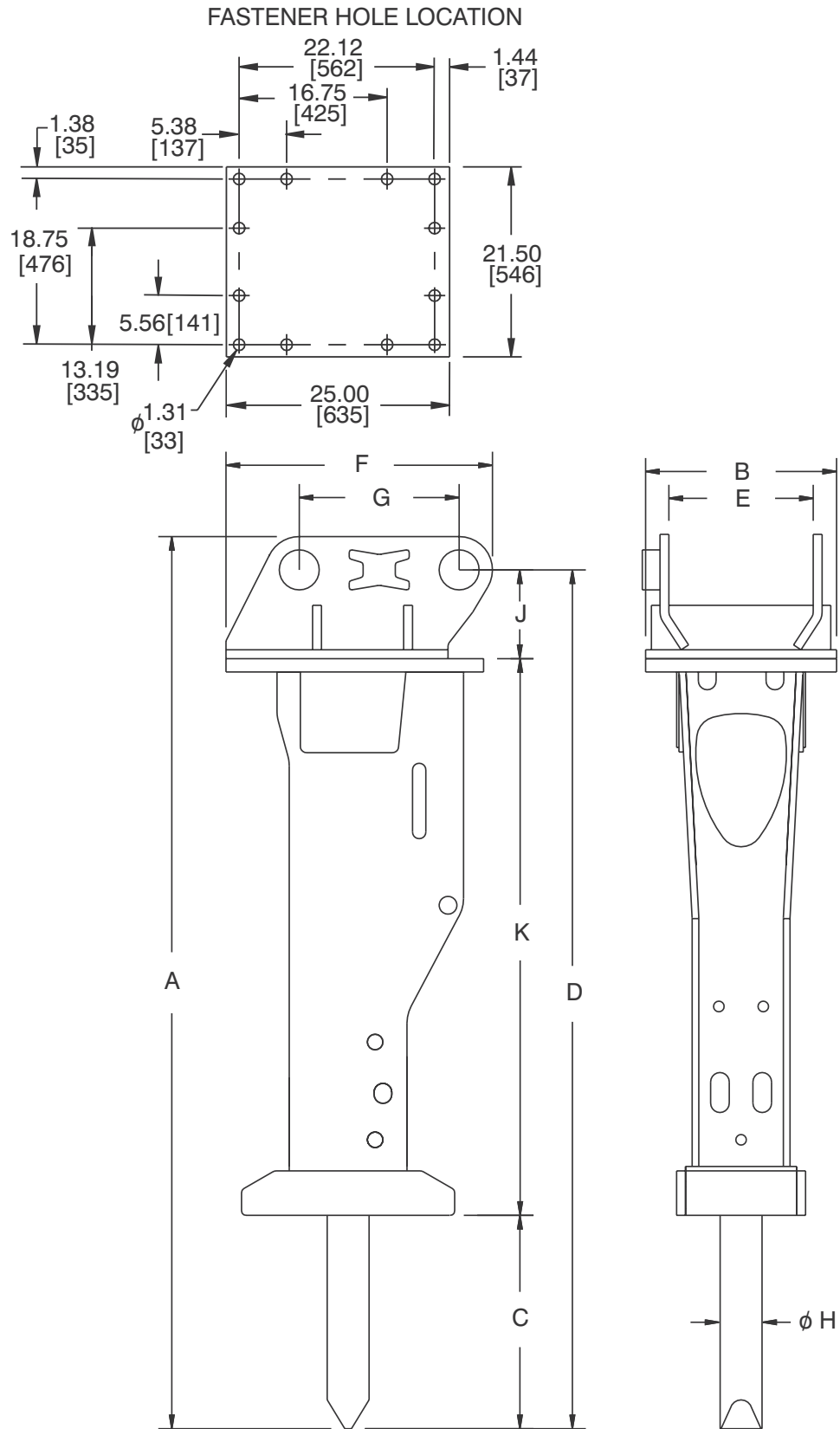
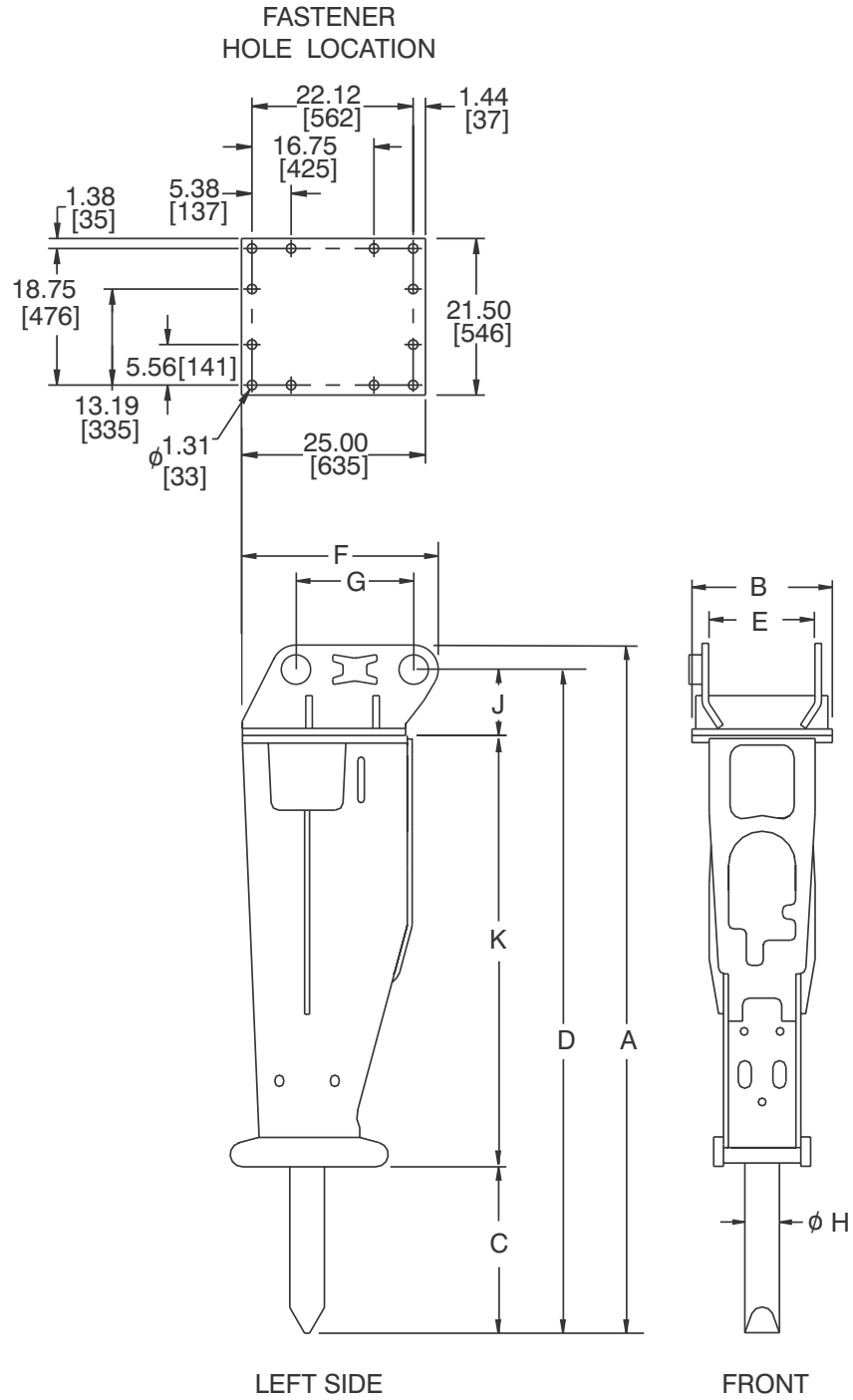


Figure 4-5. Dimension Drawing - Model 755/755B

| Table 4-6. Dimensions of 770 Hy-Ram | | |
|-------------------------------------|-----------------------|--|
| Letter | Dimension in. (mm) | Description |
| A | 105 (2673) | Hammer length: Bracket top to tool tip |
| B | 21.5 (546) | Hammer width |
| C | 26.0 (660) | Tool length |
| D | 102 (2578) | Hammer working length |
| E | 16.3 (413) | Inside mounting width |
| F | 30.0 (762) | Bracket depth |
| G | 18.0 (457) | Stick pin to link pin length. |
| H | 5.29 (134) | Tool diameter |
| J | 10.0 (254) | Bracket mounting height |



770 CS MCS

Figure 4-6. Dimension Drawing - Model 770

Table 4-7. Dimensions of 775/775B Hy-Ram

| Letter | Dimension in. (mm) | Description |
|--------|--------------------------|--|
| A | 112 (2836) | Hammer length: Bracket top to tool tip |
| B | 21.5 (546) | Hammer width |
| C | 26.0 (660) 25.0 (635) | Tool length - Standard Tool Length - Guardian |
| D | 108 (2743) | Hammer working length |
| E | 16.3 (413) | Inside mounting width |
| F | 30.0 (762) | Bracket depth |
| G | 18.0 (457) | Stick pin to link pin length. |
| H | 5.50 (140) | Tool diameter |
| J | 10.0 (254) | Bracket mounting height |

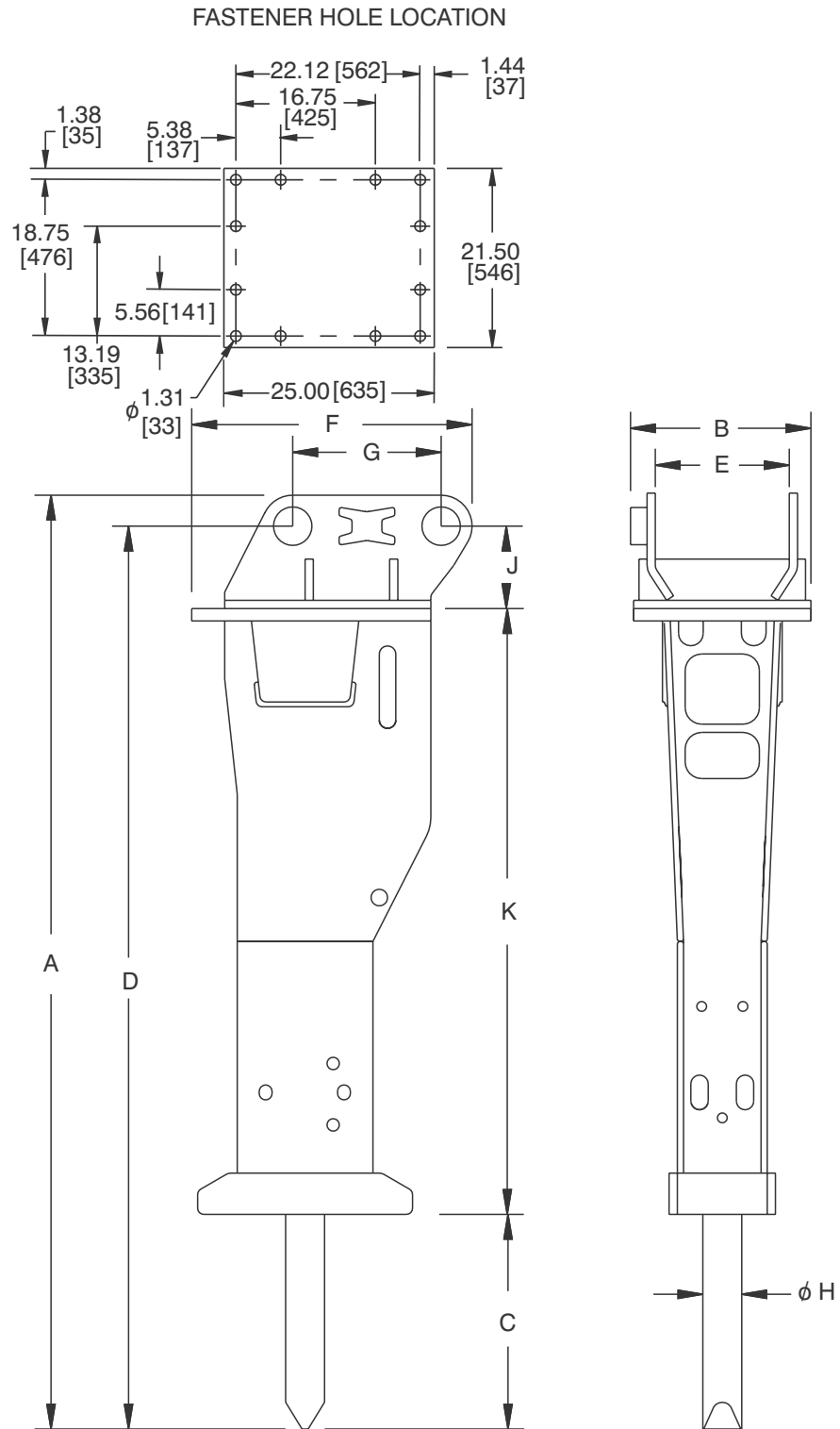


Figure 4-7. Dimension Drawing - Model 775/775B

SECTION 5.0 GENERAL CONSTRUCTION SAFETY

5.1 Owner's Responsibilities

The equipment owner shall:

- Provide this technical manual to the Hy-Ram Hammer operators.
- Train all operating personnel and enforce the procedures explained in this manual, especially regarding safety to personnel and equipment.
- Adapt these general instructions to specific applications.

5.2 General Construction Safety

Follow standard safety precautions expected and required of those working in construction, including but not limited to: locating existing underground service and utility lines, establishing pedestrian barriers and using personnel protection equipment, etc.

5.3 Federal, State, Local and OSHA Construction Guidelines and Regulations

Use the Hy-Ram in accordance with all federal, state and local regulations regarding construction practices and public safety. Identification of, and compliance to, governing regulations are the responsibility of the owner and operator.

In the United States, comply with the recommendations of the Occupational Safety and Health Administration standards of the U.S. Department of Labor. For OSHA construction guidelines contact your local federal government office or write:

U.S. Government Printing Office
Superintendent of Documents
P.O. Bo 371954
Pittsburgh, PA 15250

Ask for Construction Industry OSHA Standards 29 CFR 1926/1910.



5.4 General Safety Summary

The safe and effective use of any heavy construction equipment depends upon proper installation, operation, maintenance and repair. Operational safety must encompass all of these factors. This section includes minimum safety policies the Hy-Ram owner shall establish for all Hy-Ram installations. The operational safety program must be tailored by the Hy-Ram owner to the specific site and application. Such a program will result in increased equipment life and performance and reduced downtime. Most importantly, it will reduce the risk of equipment damage and personnel injuries.



5.4.1 CAUTIONS and WARNINGS

Throughout this manual detailed CAUTIONS and WARNINGS are included with instructions and procedures. Even experienced service technicians are to review these CAUTIONS and WARNINGS prior to performing a procedure. CAUTIONS and WARNINGS are highlighted by the symbol shown here and explained as follows:



 **WARNING** 

Instructions preceded by this symbol identify hazards to personnel. WARNING instructions must be followed to ensure safe handling and operation. These instructions shall be followed at all times. Improper operation or servicing can result in personal injury. Read this manual thoroughly before operating or maintaining the Ho-Pac.

 **CAUTION** 

Instructions identified with this symbol are important to prevent damage to equipment and to maintain full service life of the Ho-Pac. Follow them carefully. Operation or service not in accordance with these instructions may subject the Ho-Pac to conditions beyond its design capability. Read this manual thoroughly before operating or maintaining the Ho-Pac.

5.4.2 Initial Operating Precautions

Some pre-operational checks and scheduled maintenance must be performed more frequently on a new Hy-Ram installation. Refer to the Operator Checklist and the Care and Maintenance Schedule in Section 11.0 of this manual.

5.4.3 Carrier Precautions

- To assure stable carrier operation, the carrier load capacity must meet or exceed the Hy-Ram working weight listed in the Technical Specifications Table, Section 4.1.

- To protect the operator from hot, high pressure hydraulic fluid, do not run any hydraulic lines through the operator’s cab.
- Follow the carrier manufacturer’s guidelines regarding filtration of return fluid from the Hy-Ram. The carrier oil filter must be cleaned according to the Carrier Maintenance Schedule.
- To protect the operator from injury from flying rock splinters, the operator’s cab must have a protective shield. The shield must be closed during hammer operation.
- Refer to the carrier manufacturer’s manuals for proper carrier operation, service and maintenance procedures.
- Never lift or move loads with the Hy-Ram.
- Operate the Hy-Ram only from the carrier operator’s seat; and only after the carrier and Hy-Ram are correctly positioned.

5.4.4 Personnel Precautions

- The carrier operator shall perform some Hy-Ram procedures with an assistant. Both the operator and assistant must be experienced and thoroughly trained in these procedures.
- Always wear safety glasses and protective clothing when operating or handling the Hy-Ram.
- All personnel in the immediate area, including the carrier operator and the assistant, must wear ear protection.
- Avoid pinch points.
- Never put fingers in mounting bores or locking bars.
- Keep personnel away from the demolition tool while:
 - The demolition tool is jammed in the tool holder; it may release suddenly.
 - Trained technicians service the hydraulic system.
 - Trained technicians service the nitrogen precharge chamber.
 - Trained technicians service the accumulator nitrogen chamber.

5.4.5 Hydraulic Pressure

Precautions

- Before disconnecting any hydraulic lines, properly bleed all hydraulic system pressure.
- Make sure the Hy-Ram and carrier hydraulic systems are compatible, especially regarding:
 - Flow rate and pressure
 - Pressure relief valve setting
 - Hydraulic fluid compatibility
 - Heat exchanger if required

5.4.6 Nitrogen Gas Precautions

- To avoid an explosion and equipment damage, use only 99.8% pure nitrogen gas in the precharge chamber and the accumulator pressure chamber.
- Do not allow anyone into the service area while the service technicians are testing, measuring, filling or bleeding the nitrogen chambers.

5.4.7 Hoisting and Lifting Precautions

- The Hy-Ram and component weights are listed in the Technical Specifications table, Section 4.1. Before starting a procedure that requires hoisting, prepare the required lifting equipment.
- When hoisting the assembled Hy-Ram, use the designated lifting eyes on the -Box.
- Keep hands clear of any bores or fittings when moving, removing, attaching, or hoisting the Hy-Ram.

5.4.8 Maintenance Precautions

- Do not start maintenance on the Hy-Ram until it has cooled. The Hy-Ram is heated during operation and some components become very hot.



WARNING

Clearing a jammed demolition tool is hazardous. Properly protect personnel against sudden release.

- Jamming the demolition tool in the holder can damage internal hammer components and shorten Hy-Ram service life. To reduce the risk of jamming, carefully follow the operator checklist and the care and maintenance schedule, especially:
 - Lubricating the demolition tool. (See Section 8-5.)
 - Checking impact ring wear. (See Section 11.2.3.)
 - Checking piston impact face wear. (See Section 11.2.4.)
 - Checking demolition tool wear. (See Section 11.2.6.)

5.4.9 Site Precautions

- The danger area around the carrier is greater for hammer operation than for carrier operation due to the risk of flying rock splinters and debris. Immediately cease operation of the Hy-Ram if personnel without protective glasses or protective clothing enter the danger area.
- Never use the Hy-Ram in or under water unless compressed air is supplied to the hammer. Refer to Section 9.11.2 Working Underwater.
- When work site temperatures are below minus 4°F [-20°C], follow the carrier manufacturer's low temperature operating instructions. Refer to Section 9.13 Working in Low Outside Temperatures.



WARNING

Bodily injury and equipment damage could result if the Hy-Ram falls. After detaching it from the carrier, block the Hy-Ram securely.

SECTION 6.0 HY-RAM APPLICATIONS

The Hy-Ram is suited for many types of construction and mining applications. The following examples are typical and suggest the variety and limitations of standard applications. Please note that underwater applications require the addition of special adapters. Typical surface applications are:

Clearance Work: Demolition of buildings, bridges, reinforced foundations, etc.

Trenching: Breaking trenches out of rocky and frozen ground.

Mining and Quarry Applications: Demolishing and leveling quarry rock, breaking oversized minerals and other rock-like raw materials. Excavation of rock from trenches, foundations and tunneling.

Underwater: Demolition and deepening of shipping channels.

Recycling: Breakup of “skulls” from the steel industry.

Safety regulations for the Hy-Ram and the carrier must be observed at all times.

SECTION 7.0 HY-RAM ATTACHMENT & REMOVAL

7.1 Carrier Requirements

Refer to Section 4.1 Technical Specifications to determine the carrier weight required to adequately maneuver and handle the Hy-Ram.



CAUTION

Do not attempt to set the Hy-Ram operating pressure or flow without first consulting the installation instructions for your machine. Refer to Technical Specifications in Section 4.1 for the maximum operating pressure for the model being used. Do not exceed this value.

The hydraulic pressure and flow must be adequate for operation of both the carrier and the hammer simultaneously. Hydraulic pressure and flow requirements for the Hy-Ram model being used are given in Table 4.1 Technical Specifications.

The carrier must have an oil temperature gauge. Operating temperature range of the hydraulic oil is 140° F. (°C.) to 176° F. [80°C.]. If the ambient temperature is low, warm the oil to a minimum of 32° F. (0° C.) by running the carrier (see Section 9.13 for operating at low temperature). After oil temperature has reached 32° F. (0°C.), the oil can be cycled through the hammer in pressure-reduced mode (except for Model 770) without operating the demolition tool. This will flush out cold oil and allow oil to warm up to operating temperature of 140° F. (60°C.).

7.2 Installation Kits

Proper mounting hardware must be used to mount the Hy-Ram to the carrier. Allied installation kits are recommended; if others are used, they must satisfy the minimum requirements listed under Section 7.6 Attaching the Hy-Ram.

Allied Installation Kits are designed for most carrier makes and models and contain the parts required for the mechanical and hydraulic hookup.

7.3 Top Mounting Brackets

The Hy-Ram is designed for use of top mounting brackets. The top mounting brackets are designed to fit most carriers. Bracket hardware, such as spacers and bushings may also be provided.

7.4 Heat Exchanger

In some working environments with a high ambient temperature, a heat exchanger may be necessary to maintain a safe operating oil temperature. The oil temperature shall never exceed 176° F. [80°C.]. There are several operating problems that could cause oil to overheat. DO NOT install a heat exchanger before inspecting and correcting Hy-Ram or carrier malfunctions. Refer to Section 10.0 Troubleshooting and carrier troubleshooting.

7.5 Tools Required to Attach Hy-Ram

No special tools are required, but the following tools should be available:

- safety glasses & gloves
- sledge hammer
- drift pin
- 3/4-inch drive socket wrench
- 3/4-inch sockets
- grease gun
- open end wrenches
- caliper for checking tool wear
- pry bar

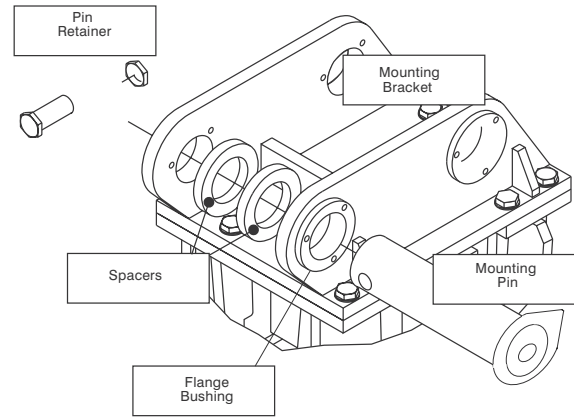




Figure 7-1. Attaching Hy-Ram on Carrier

7.6 Attaching the Small or Medium Hy-Ram to the Carrier
(Refer to Figure 7-1.)




WARNING

The Hy-Ram shall only be attached to a carrier with sufficient load capacity. If the carrier is too light, it may become unstable.




WARNING

An assistant is required for attachment and removal of the Hy-Ram to the carrier. All directions and signals must be agreed upon before beginning attachment or removal.



WARNING

Keep hands away from bores and pin areas when attaching the Hy-Ram. Do not touch any parts when the boom is moving. Never put fingers in bores to check alignment; use drift pin.



WARNING

Always wear safety glasses during attachment, operation, and removal of the Hy-Ram.

The following procedure must be performed by the carrier operator and an assistant.

1. Before attaching the Hy-Ram, remove the bucket or other tool attached to the stick of the carrier.
2. Attach a pin retainer to one side of the stick mounting pin.
3. Position the pin into the stick flange bushings and spacers.
4. Operator: With the assistant directing movement, carefully lower the stick into the Hy-Ram top mounting bracket until the bores in the stick are flush with those in the mounting bracket.
5. Assistant: Using a hammer, drive the stick mounting pin into the Hy-Ram bracket bore until it reaches the other Hy-Ram bracket bore.

6. Assistant: Using a pry bar, position the other spacer between the stick and the mounting bracket.
7. Assistant: Drive the stick mounting pin through the spacer and the mounting bracket bore.

NOTE

The carrier operator may have to move the stick slightly to align bores.

8. Assistant: Once the stick mounting pin is fully installed, install the other pin retainer on the stick mounting pin.
9. Operator: Raise the Hy-Ram until the top mounting bracket is a few feet off the ground.
10. Assistant: Attach a mounting pin retainer to one side of the link mounting pin.
11. Assistant: Insert the pin into one of the flange bushings in the back of the mounting bracket and into one of the spacers.
12. Operator: Extend the link cylinder until the bore in the end of the cylinder rod is flush with the mounting bracket bores.
13. Assistant: Hammer the link mounting pin into the mounting bracket through the link bore.
14. Assistant: Using a pry bar, position the other spacer between the link bore and the mounting bracket bore.
15. Assistant: Drive the link mounting pin through the spacer and the mounting bracket bore.

NOTE

The carrier operator may have to move the link arm slightly to align the bores.

16. Assistant: Once the link mounting pin is fully installed, install the other mounting pin retainer on the link mounting pin.

7.7 Connecting the Hy-Ram Hydraulic Lines

(Refer to Figure 7-2.)

If not attached, connect the hydraulic lines to the Hy-Ram as follows:

1. Unscrew the cap nuts from Hy-Ram connections **P** and **T** (see Figure 7-2).
2. Clean dirt from connection areas.
3. Put the cap nuts in the tool box for safekeeping. The pressure connection is marked "P".
4. Remove the plugs from the ends of the hydraulic lines that connect to the Hy-Ram.



WARNING

Do not run any hydraulic lines through the operator's cab, since they may leak or burst. The hydraulic oil becomes very hot during operation.

5. Check the connections on the Hy-Ram hoses. The connecting threads must be undamaged and free of sand or similar foreign bodies.
6. Connect the hydraulic lines to the Hy-Ram ports.
7. Remove the caps from the ends of the Hy-Ram hoses and connect the pressure hose to its ball valve on the stick and the return line to its ball valve.
8. Open the ball valves. Refer to Figure 7-3.

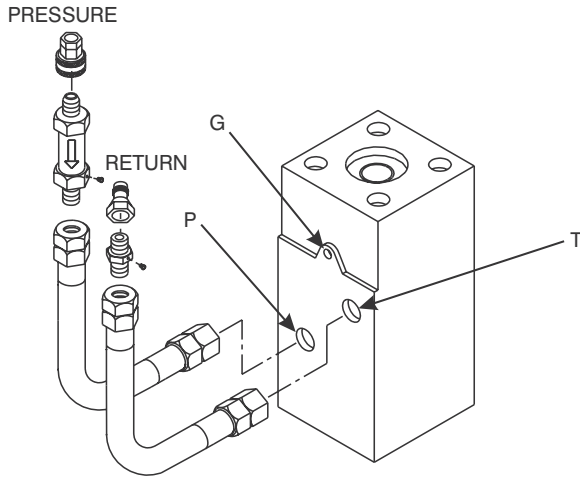


Figure 7-2-735. Connecting Hydraulic Lines

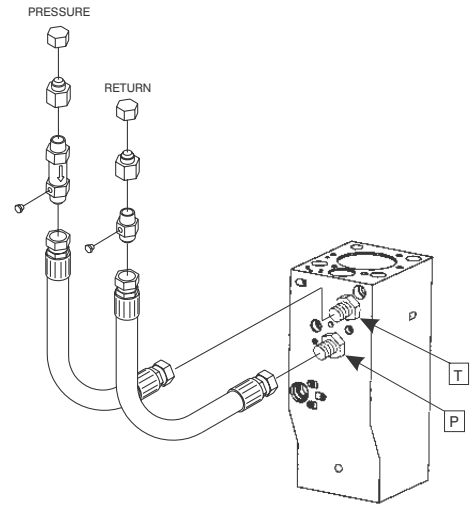


Figure 7-2-755/755B. Connecting Hydraulic Lines

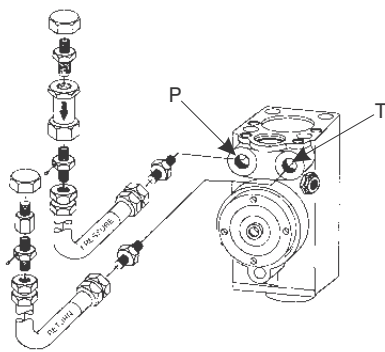


Figure 7-2-740 and 745. Connecting Hydraulic Lines

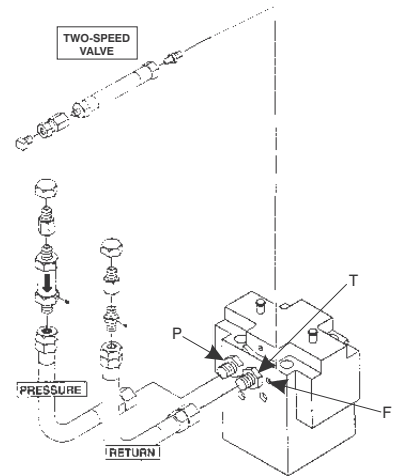


Figure 7-2-770. Connecting Hydraulic Lines

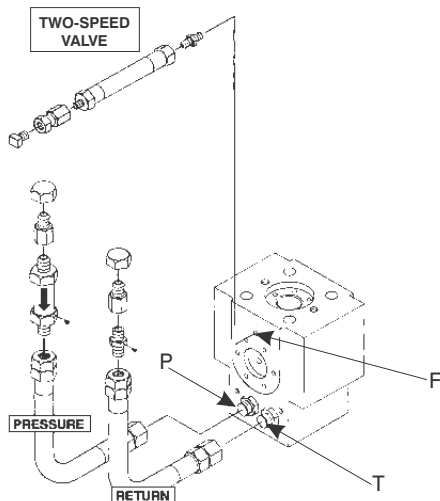


Figure 7-2-750. Connecting Hydraulic Lines

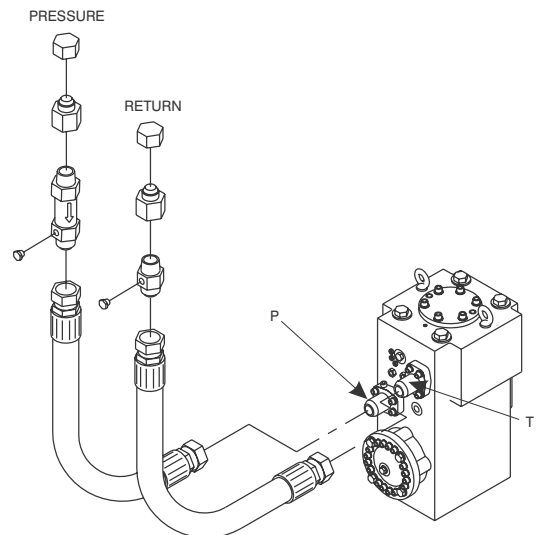


Figure 7-2-775/775B. Connecting Hydraulic Lines

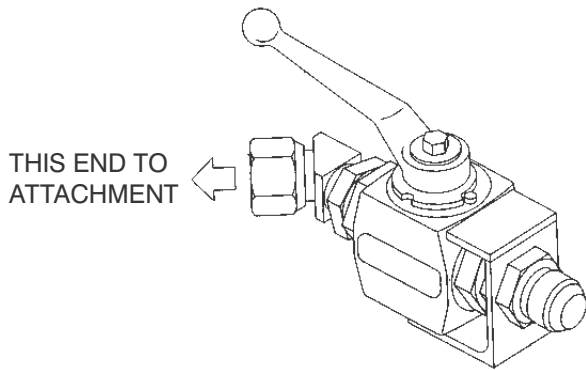
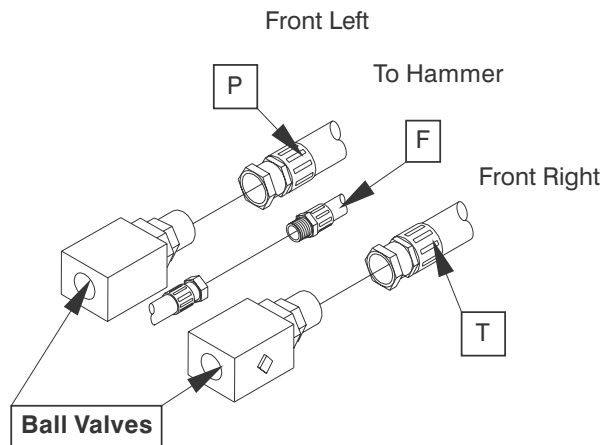


Figure 7-3. Ball Valve

7.8 Connecting the Hydraulic Line to the Two-Speed Valve

(Refer to Figures 7-2 and 7-4.)



Mounted on Stick


Figure 7-4. Connecting Two-Speed Valve On Stick

This hydraulic line is not required on Models 735, 740, 745, 755, 755B, 775 or 775B. These models do not have the two-speed function. Models 755, 755B, 775 and 775B Hy-Rams have the AutoControl System which replaces

the two-speed and energy recovery valves. The AutoControl System is completely internal and does not require a hydraulic hose connection.

Models 750 and 770 Hy-Rams are fitted with a two-speed valve which is used to change the blow speed. The two-speed valve is connected to the hydraulic system by a third 1/4-inch [6.35mm] diameter hose. Refer to connection **F** on Figure 7-2.


1. If the hose is not attached to the Hy-Ram, unscrew the plug from the two-speed valve on the Hy-Ram and put it in the tool box for safekeeping.
2. Clean dirt from connection areas.
3. Connect the hose to the valve port. Refer to Figure 7-2.
4. Remove the cap from the other end of the hose and screw the hose tightly to the connector on the carrier stick. Refer to Figure 7-4.



CAUTION

Check the connection on the Hy-Ram hose. The connecting threads must be undamaged and free of sand or similar foreign bodies.

7.9 Removing the Hy-Ram from the Carrier



WARNING

All directions and signals must be agreed upon beforehand with the assistant. Keep hands well clear of bores and mounting pin areas when removing the hydraulic hammer. Do not touch any parts when the boom is moving.

**CAUTION**

Collect any oil which leaks out and dispose of it correctly.

Removal of the Hy-Ram is done in reverse order of installation unless otherwise stated. Refer to section 5.4.5 for hydraulic pressure precautions.

1. Close the ball valves on the stick.
2. Lay the Hy-Ram on the ground horizontally.
3. Shut the carrier off.
4. Unscrew the high pressure hoses from the carrier stick and seal the connections with the appropriate caps.
5. On Models 750 and 770, unscrew the two-speed valve hose at the stick and cap.
6. Remove the mounting pins using a steel rod and a sledge hammer.
7. Store the Hy-Ram as instructed in Section 13.0.

SECTION 8.0 DEMOLITION TOOL

8.1 Demolition Tool

Only use genuine Allied demolition tools. Use of other demolition tools may render the warranty invalid.

It is important that the demolition tools be used correctly, especially longer demolition tools which are more susceptible to damage from prying. Pay particular attention to Section 9.0 Operation.



CAUTION

Always lubricate hammer bushings and tool manually whenever the demolition tool is removed and replaced. Damage could result if hammer is operated without adequate grease supplied to the tool and bushings.

Whenever the demolition tool is removed and replaced, lubricate the hammer bushings and tool manually (Section 8.5) even if there is an Automatic Lubrication System. The Automatic System may not be able to supply adequate grease for normal operation and to fill or purge an empty lube line. The tool and bushings may not get enough grease during normal operation and could be damaged.

8.2 Sharpening

Demolition tools shall only be remachined on suitable equipment. Conical and blunt demolition tools can be remachined on a lathe with carbide tooling. Chisels can be sharpened on a shaping or milling machine. During remachining, the demolition tool must be cooled thoroughly with liquid coolant.

Never attempt to burn or weld the demolition tools. The high temperatures involved can damage demolition tools.

8.3 Installing the Demolition Tool



WARNING

The demolition tool shall only be installed in the way described. Failure to do so could allow the demolition tool to be driven out of the tool holder with force possibly causing bodily injury or physical damage.



WARNING

Never put fingers in the slots for the retainer bars.



WARNING

Always wear safety glasses and gloves when installing the demolition tool.



WARNING

Clear the area of bystanders. Metal chips and debris may fly off when driving the locking pins in or out injuring workers or bystanders.

8.3.1 Locking Pin Style - Installation (Refer to Figure 8-1.)

1. Position the Hy-Ram horizontally to allow access from below.

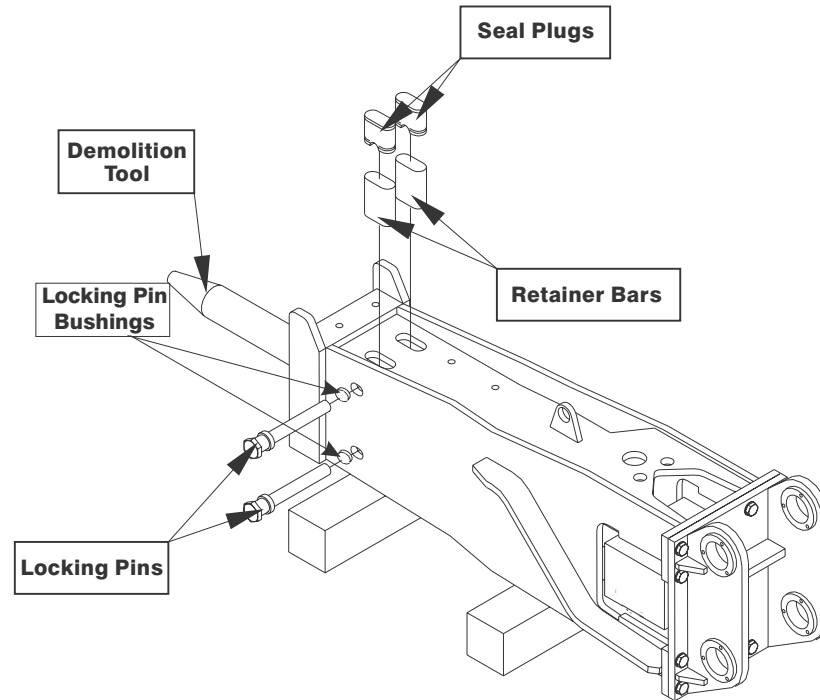


Figure 8-1. Installing Tool with Locking Pins

2. Using drift and hammer, remove the locking pins. When facing the top of the Hy-Ram, drive the pins out through the right side. See Figure 8-1.
3. Remove the retainer bars by removing the top seal plugs and lifting retainer bars out with a 1/2-13 thread x 1 inch long bolt or remove the bottom seal plugs and insert a long screwdriver to push the retainer bars out the top.
4. Clean tool holder bore and upp half of tool.
5. Lubricate the shank of the demolition tool and the retainer bars with Allied Chisel Paste.
6. Using a hoist, lift the demolition tool and insert it, turning it until the retainer bars can slide easily into the slots on the demolition tool. See Figure 8-2.
7. Replace the seal plugs.
8. Install the locking pins, small diameter first, making sure that the locking pin groove snaps into the locking pin bushing.

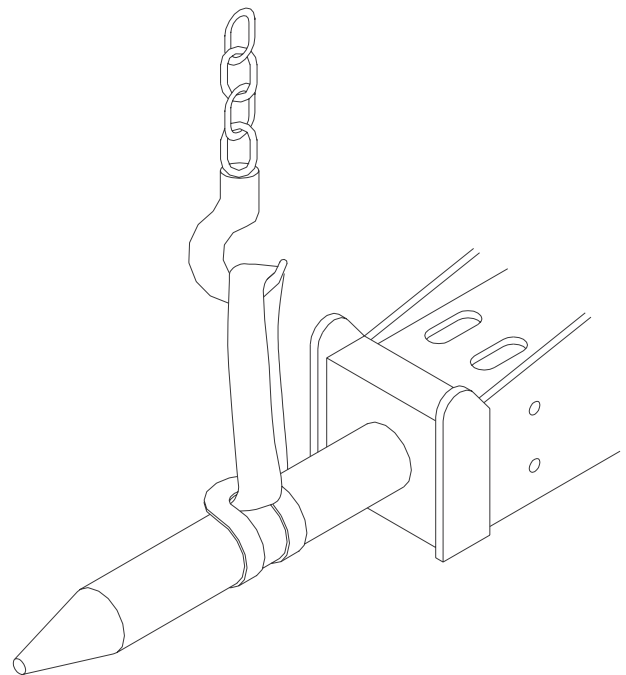


Figure 8-2. Lifting Demolition Tool

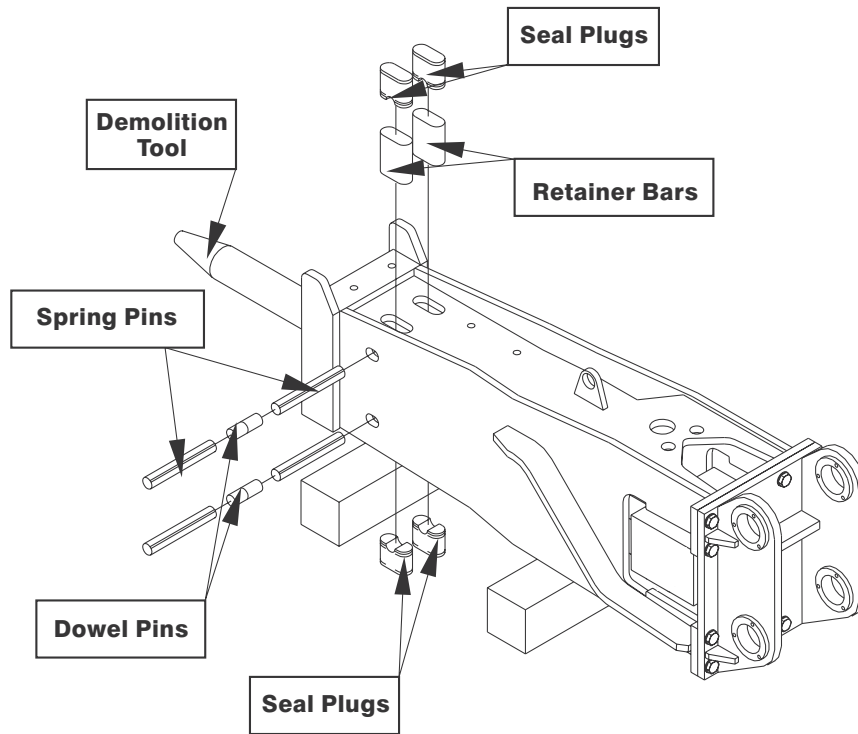


Figure 8-3. Installing Tool with Spring Pins

8.3.2 Spring Pin Style - Installation (Refer to Figure 8-3.)

1. Position the Hy-Ram horizontally to allow access from below.
2. Remove the two top seal plugs from retainer bar slots.

NOTE

For step 3, use a drift pin that fits inside the spring pin opening.

3. Insert the drift pin in one of the top spring pin openings. Refer to Figure 8-3.
4. Using a sledge hammer, drive the spring pin against the dowel pin. The spring pin on the opposite side will be pushed out towards the edge of the hammer box. Stop driving the spring pin when it clears the retainer bar.
5. Remove the drift pin and repeat procedure for other spring pin.
6. Using a screwdriver, slide the dowel pin to the center between the retainer bars.

7. Remove the retainer bars by removing the top seal plugs and lifting retainer bars out with a 1/2-13 thread x 1 inch long bolt or remove the bottom seal plugs and insert a long screwdriver to push the retainer bars out the top.
8. Clean tool holder bore and upper half of tool.
9. Thoroughly lubricate the shank of the demolition tool and the retainer bars using Allied Chisel Paste.
10. Using a hoist, lift the demolition tool and insert it into its bore, turning it until the retainer bars can slide easily into the slots. Refer to Figure 8-2.
11. Insert the retainer bars.
12. Using a sledge hammer, drive the spring pins into position so there is an equal amount of spring pin on both sides of the box.

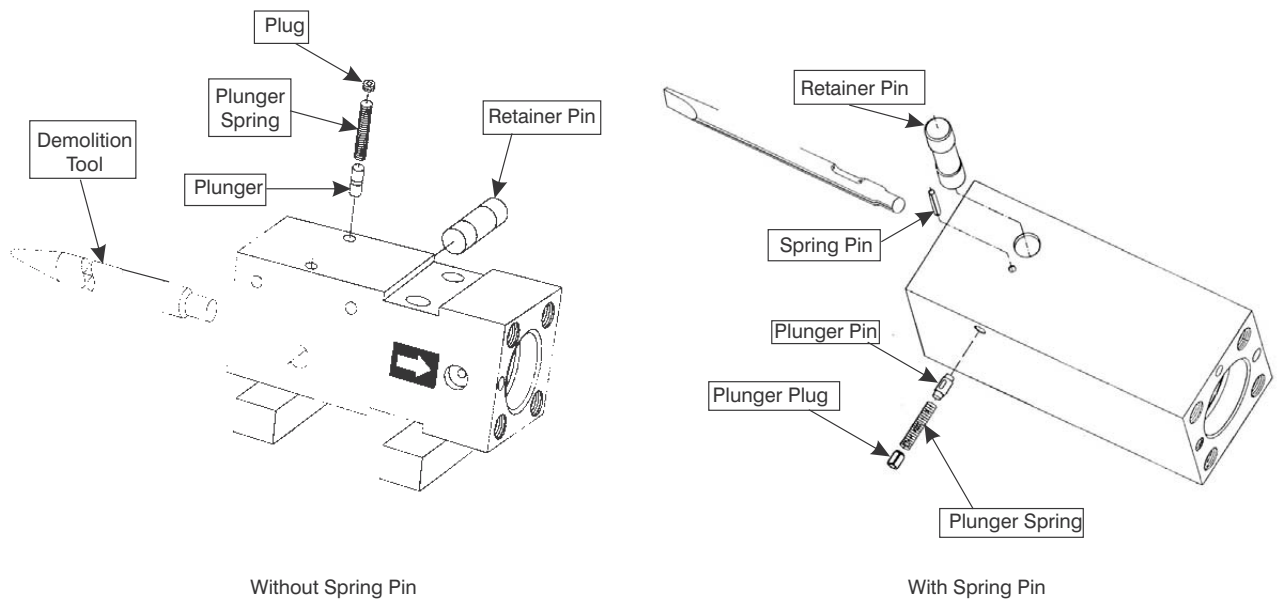


Figure 8-4. Installing Tool with Plunger Spring

8.3.3 Retainer Pin/Plunger Spring Style - Installation

(Refer to Figure 8-4.)

1. Clean tool holder bore and upper half of tool.
2. Liberally apply Allied Chisel Paste to the tool shank.
3. Position hammer horizontally to allow access from below.
4. Using a hoist, lift the demolition tool and insert it into bore, turning it until the slot in the tool is in line with the retainer pin hole.
5. Insert retainer pin. Make sure plunger spring locks the retainer pin in place.

8.3.4 Retainer Pin/Spring Pin Style Installation

None of the hammers covered in this manual have the retainer pin/spring pin style demolition tool holder.

8.4 Removing the Demolition Tool

8.4.1 Tools that may be Required:

- Hand sledge
- Drift pin
- Large size screwdriver
- 3/8-in. diameter x 8-in. long steel rod

8.4.2 Locking Pin Style - Removal

1. Remove the Hy-Ram from the carrier and place the Hy-Ram in a horizontal position to allow access from below. See Figure 8-1.
2. While facing the top of the Hy-Ram, use a sledge hammer and drift pin to drive the locking pins out the right side.
3. Remove the retainer bars by removing the top seal plugs and lifting retainer bars out with a 1/2-13 thread x 1 inch long bolt or remove the bottom seal plugs and insert a long screwdriver to push the retainer bars out the top.

4. Using a hoist, remove the demolition tool from the Hy-Ram. Refer to Figure 8-2.
5. Refer to Section 13.0 for storage instructions.

8.4.3 Spring Pin Style - Removal

1. Place the Hy-Ram in a horizontal position to allow access from below. See Figure 8-3.
2. Remove the top seal plugs.

NOTE

For step 3, use a drift pin that fits inside the spring pins.

3. Insert the drift pin in one of the top spring pins until it makes contact with dowel pin. Refer to Figure 8-3.
4. Using a sledge hammer, drive the drift pin against the dowel pin. The spring pin on the opposite side will be pushed out towards the edge of the box. Stop driving the spring pin when it clears the retainer bar. This can be observed through the seal plug openings.
5. Remove the drift pin and repeat the procedure for the other spring pin.
6. Using a screwdriver or pry bar, slide the dowel pin to the center between the retainer bars.
7. Remove the retainer bars by removing the top seal plugs and lifting retainer bars out with a 1/2-13 thread x 1 inch long bolt or remove the bottom seal plugs and insert a long screwdriver to push the retainer bars out the top.

8. Using a hoist, remove the demolition tool from the Hy-Ram. Refer to Figure 8-2.
9. Refer to Section 13.0 for storage instructions.

8.4.4 Retainer Pin/Plunger Spring Style - Removal

1. Position the Hy-Ram horizontally to allow access from below.
2. Depress the plunger spring in the tool holder with a screwdriver to clear the retainer pin.
3. While keeping the plunger spring depressed, push or drive the retainer pin out, using a rod and hand sledge, if necessary, to clear the plunger spring. Remove the screwdriver and finish driving the retainer pin until tool slot is clear.
4. Using a hoist, remove the demolition tool from the Hy-Ram. Refer to Figure 8-2.
5. Refer to Section 13.0 for storage instructions.

8.4.5 Retainer Pin/Spring Pin Style Removal

None of the hammers covered in this manual have the retainer pin/spring pin style demolition tool holder.

8.5 Manually Lubricating the Demolition Tool

(Refer to Figures 8-5 and 8-6.)

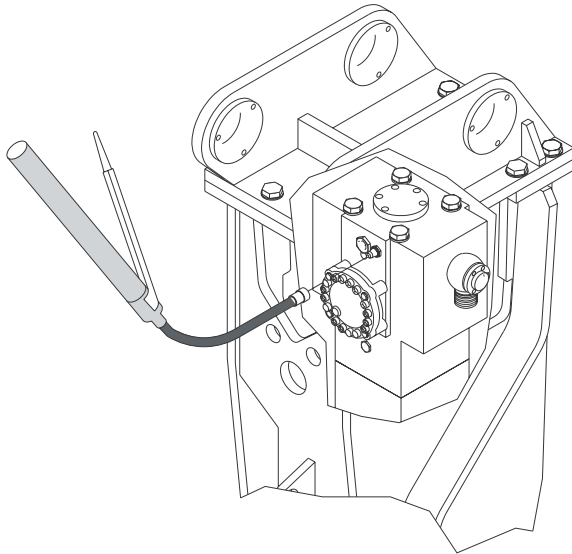


Figure 8-5. Lubricating the Demolition Tool

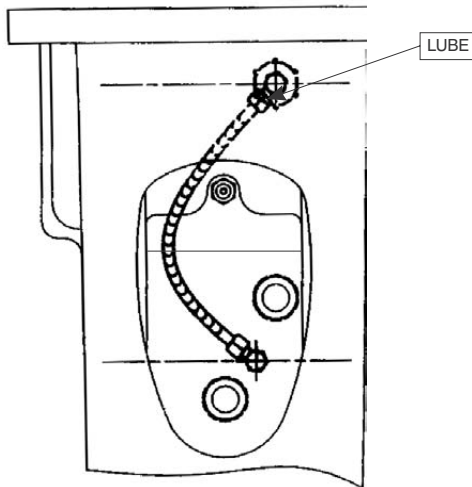


Figure 8-6. Lubrication Hose of Model 735

Allied Chisel Paste is recommended for lubrication. If Allied Chisel Paste is unavailable, a high quality, petroleum based, lubricating grease with molybdenum disulfide can be used.

The demolition tool must be lubricated every two hours during operation as follows:

1. Stand the hydraulic hammer vertically on the demolition tool and apply contact pres-

sure. This ensures that the tool is positioned in the maximum upward location within the Hy-Ram tool holder.

2. Attach grease gun to lubrication fitting. On the Model 735, there is a lubrication hose attached to the lube fitting on the hammer that extends to a fitting on the box. Attach grease gun to the end of this fitting (see Figures 8-5 and 8-6).
3. Lubricate until grease emerges from the gap between the lower tool bushing and the demolition tool.



CAUTION

Always lubricate hammer bushings and tool manually whenever the demolition tool is removed and replaced. Damage could result if hammer is operated without adequate grease supplied to the tool and bushings.

8.6 Allied AutoLube Automatic Lubrication Systems: AutoLube II and AutoLube CML

(Refer to Figures 8-7 and 8-8.)

The Hy-Ram can be automatically lubricated with an optional AutoLube attachment. There are two models of the Allied AutoLube Automatic Lubrication Systems: the AutoLube II and the AutoLube CML (Carrier Mounted Lubrication). Sections 8.5.1.1 and 8.5.1.2 describe specific information about each model.

These maintenance units provide semi-continuous lubrication to the Hy-Ram demolition tool and bushings while in operation. The operator can monitor the lubricant level from the carrier cab and supply lubricant on demand when needed.

The amount of lubricant supplied to the lubricating point in the tool holder depends on the stroke setting on the AutoLube slide piston and the frequency with which the hammer is started and stopped.

These operating cycles differ greatly from one application to another. The length of the slide piston stroke and the amount of lubricant delivered can be adjusted using the adjusting screw. Refer to the AutoLube Technical Manual.

- If during operation lubricant emerges from the lower wear bushing, the lubrication feed is too high.
- If dry areas are observed on the demolition tool during operation, the lubricant feed is too low.

When using either model AutoLube with the Allied Hy-Ram, the use of Allied Chisel Paste is recommended.

8.6.1 AutoLube II

The AutoLube II is mounted to the hammer box. Refer to Figure 8-7. The AutoLube II is Hy-Ram model specific and a retrofit kit is available for older models. Model 770 has an extra hose to reduce pressure. Refer to the AutoLube II Technical Manual for specific installation instructions.

The AutoLube II is powered by pressurized hydraulic oil from the carrier's hydraulic system. The oil temperature should never exceed 176° F. (80° C.), in accordance with the carrier manufacturer's recommendations. Lubricant is supplied from a cartridge that can be easily replaced or refilled.

Contact your Allied distributor for ordering information. The AutoLube II Technical Manual supplies detailed instructions on operation and installation of the AutoLube II.

8.6.2 AutoLube CML

The AutoLube CML is mounted to the carrier near the carrier cab. Refer to Figure 8-8.

The AutoLube CML is powered by an electric pump. Lubricant is supplied from a reservoir (8.5 lbs. or 17 lbs.) that is easily refilled.

Contact your Allied distributor for ordering information. The AutoLube CML Technical Man-

ual supplies detailed instructions on operation and installation of the AutoLube CML.

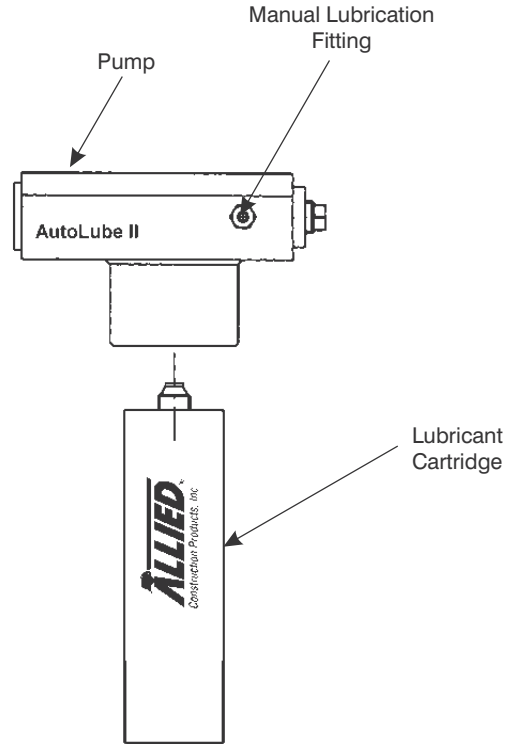


Figure 8-7. AutoLube II

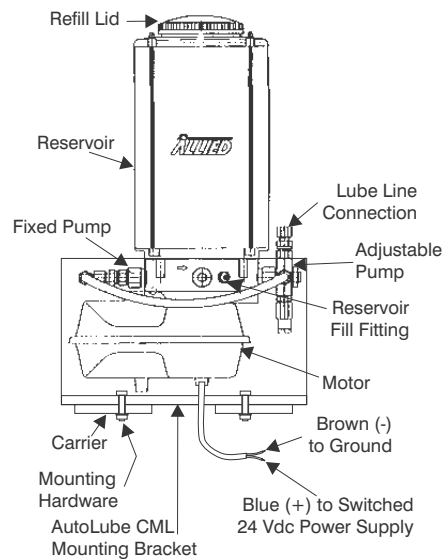


Figure 8-8. AutoLube CML

SECTION 9.0 OPERATION

9.1 Operator Check List

Before operating the Hy-Ram, inspect the following:

- Check that hose and tube connections are secure.
- Check all fasteners for wear and tightness.
- Check all fasteners according to the maintenance schedule (see Section 11.0).
- Check that demolition tool is inserted properly.
- Be sure scheduled maintenance is performed before operating the Hy-Ram.
- Frequently check the oil temperature. The temperature of the hydraulic oil must never exceed 176°F. [80°C].
- Be sure all tools that will be required for functions to be performed are available.
- Remember to lubricate the demolition tool every two hours during operation.

9.2 Tools Required By Operator

No special tools are required, but the following tools are recommended:

- safety glasses & gloves
- sledge hammer
- drift pin
- 3/4-inch socket wrench
- 3/4-inch sockets
- grease gun
- open end wrenches
- caliper for checking tool wear

9.3 Operating the Hy-Ram



WARNING

The precharge chamber and high pressure accumulator shall only be filled with 99.8% pure nitrogen gas. Make sure no other gas, i.e., air or oxygen, is allowed into the precharge chamber; this could result in an explosion.



CAUTION

Check the oil temperature often to ensure it does not exceed 176°F [80°C]. If higher temperatures are measured in the tank, refer to Section 10.0 Troubleshooting.

9.4 Startup



WARNING

Close the protective shield on the operator's cab to prevent possible injury from flying rock splinters during hammer operation.

All persons in the immediate area, including the carrier operator, must wear ear protection.

The Hy-Ram shall only be operated from the operator's seat and shall not be put into operation until both carrier and hammer are in the correct position.



WARNING

Immediately cease operating the Hy-Ram if anyone moves into the danger area, which is greater for hammer operation than for carrier operation due to the risk of flying debris.

When working with a hydraulic hammer, operation of the carrier is governed by the carrier manufacturer's safety regulations.

and down. The front part of the vehicle may be raised approximately 5 inches (12 centimeters) from the ground so that the weight of the carrier is exerted on the demolition tool.

9.5 Advance From Outer Edge

(Refer to Figure 9-1.)

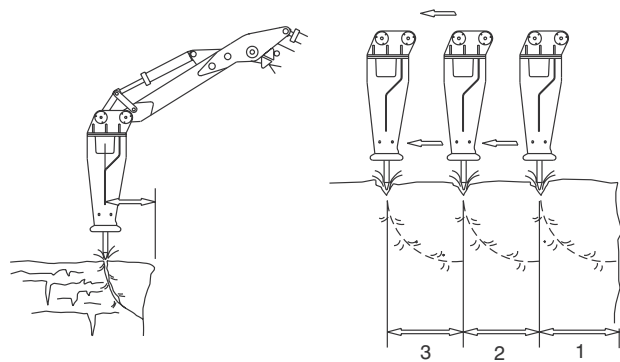


Figure 9-1. Advance From Outer Edge

Start breaking large and hard rocks near the outer edge.

Place the tool a short distance from the edge of the material. If the rock does not break away after thirty (30) seconds (maximum), the advance must either be reduced or breaking restarted at a different point.

Except for Model 770, the hydraulic fluid can be warmed up by operating the Hy-Ram in pressure-reduced mode. This is done by turning on the operating switch with **NO** contact pressure on the demolition tool. After oil has been warmed to operating temperature, turn off the hammer, position the tool for operation, then restart the hammer. With contact pressure on the demolition tool, the piston in the Hy-Ram is driven up to its starting position and the hammer will begin cycling the tool up

9.6 Angle of Operation
(Refer to Figure 9-2.)

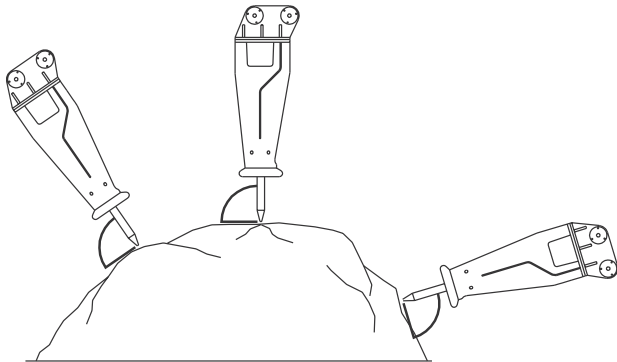


Figure 9-2. Angle Of Operation

Always place the demolition tool at right angles to the surface of the material. If not placed at right angles, the hammer will wear more quickly, leading to permanent damage.

9.7 Hammer Rocking
(Refer to Figure 9-3.)

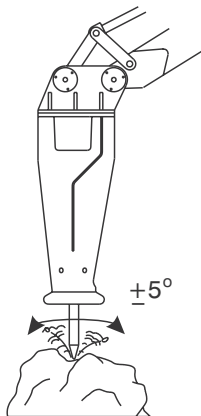


Figure 9-3. Rocking The Hammer

The hammer may be gently rocked backward and forward at a maximum of 5° to allow dust to escape which would otherwise dampen the impact power of the demolition tool. Do not rock the hammer at angles greater than 5° or bending strain will occur damaging the demolition tool and the Hy-Ram.

9.8 Incorrect Use of the Hydraulic Hammer

Carefully read through this section. The following sections describe functions that damage the Hy-Ram or cause personal injury.

9.8.1 Never Use as a Crowbar
(Refer to Figure 9-4.)

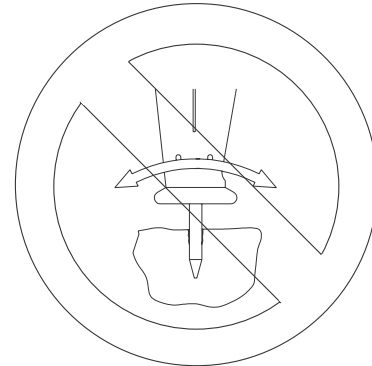


Figure 9-4. Never Use Hy-Ram As A Crowbar

Using the Hy-Ram as a crowbar may cause the demolition tool to break.

9.8.2 Never Drive Demolition Tool into The Material
(Refer to Figure 9-5.)

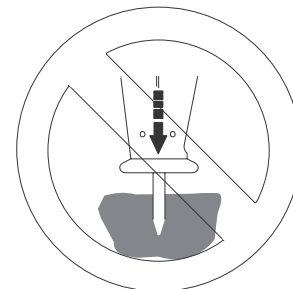


Figure 9-5. Never Drive Tool into Material

If the advance is too large and the hammer is not rocked to release the dust, the demolition tool will be driven into the material, causing the tip to glow red hot and become soft. It then could become wedged in the hole.

9.8.3 Never Pound with the Hammer and Demolition Tool
(Refer to Figure 9-6.)

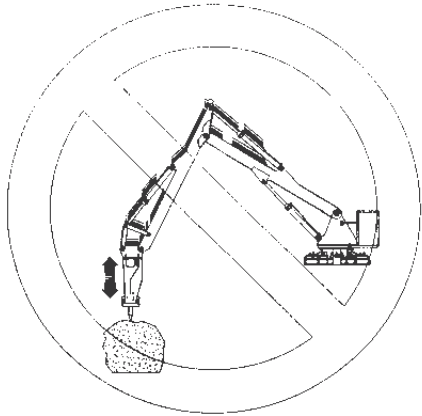



Figure 9-6. Do Not Pound With Hammer

Pounding at material with the hammer could cause damage to the Hy-Ram and the carrier.



CAUTION

The Hy-Ram is not designed to lift or transport loads. This practice will damage the Hy-Ram.

9.8.4 Never Lift or Transport Loads with the Hammer
(Refer to Figure 9-7.)

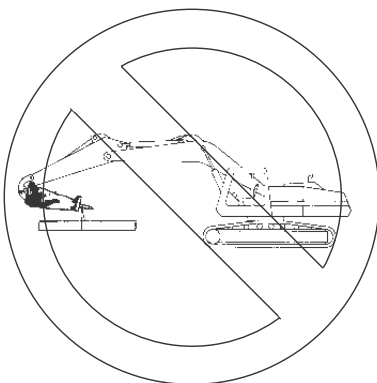


Figure 9-7. Do Not Use Hammer As Lift Or Transport

9.9 Never Use in or Under Water without Compressed Air Connection
(see 9.11.2 Working Underwater)
(Refer to Figure 9-8.)

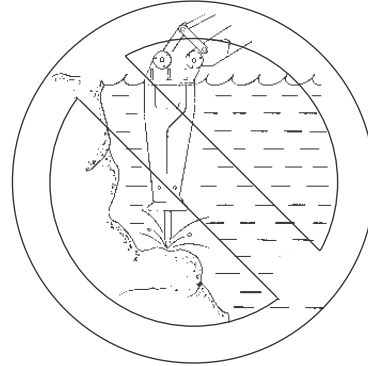


Figure 9-8. Under Water Operation

If water penetrates the impact chamber of the Hy-Ram, a pressure wave will build up with each stroke which will damage the wiper and seals of the hammer and cause the lower part of the impact piston to rust.

9.10 Special Operating Features

9.10.1 Energy Recovery

Models 750 and 770 do not have the Energy Recovery feature. In Model 775, Energy Recovery is incorporated in the AutoControl System. Refer to Section 9.10.3

The Energy Recovery system increases the performance of the hammer in hard material by utilizing piston recoil energy. Prior to fracture, hard material reflects a significant amount of breaking energy back to the piston. Without the energy recovery system, this reflected energy is lost into the hydraulic oil within the hammer.

The energy recovery valve quickly senses the piston recoil and reduces the hydraulic oil pressure above the piston. The lower oil pressure allows the piston to move upward more quickly and with less resistance. Once the recoil energy has partially lifted the piston, the hydraulic oil pressure completes the process.

The energy recovery system shortens the piston cycle time, thus increasing speed and overall performance. No additional oil flow is required for this increased operating speed. Since unused breaking energy is recovered, the efficiency of the hammer is increased.

9.10.2 Two-Speed Operation

Models 735, 740 and 745 do not have the two-speed function. In Models 755, 755B, 775 and 775B, the selectable two-speed feature has been replaced by the AutoControl System which automatically adapts the operating stroke to material requirements. Refer to Section 9.10.3.

The Model 750 and 770 Hy-Rams have a controllable two-speed valve in the cylinder head to change the operating speed. This allows operation to be adapted to specific requirements. The two-speed operation system can alter both the impact force and the speed of the demolition tool.

- The use of decreased impact force and increased operational speed is ideal for breaking small rocks or tearing up thin concrete surfaces.
- The use of maximum impact force and normal operating speed is good for breaking very large rocks or heavy concrete structures.

9.10.3 AutoControl

Models 735, 740, 745, 750 and 770 do not have the AutoControl System. In Models 755, 755B, 775 and 775B, the two-speed valve is replaced by the AutoControl System. In Models 775 and 775B Energy Recovery is incorporated into AutoControl:

- **Energy Recovery.** The AutoControl System improves hammer performance in hard materials. By opening the hydraulic pathways during the piston return (up) stroke, the AutoControl System allows recoil energy from the demolition tool to assist the piston return (up) stroke. (This corresponds to the special operating feature described in Section 9.10.1 Energy Recovery)
- **Auto-Adjustment to 100% or 50% of Impact**

Energy. The AutoControl System automatically adapts hammer operation to the requirements of the material. (This corresponds to the manual adjustment feature described in Section 9.10.2 Two Speed Operation.)

The AutoControl System automatically adjusts impact energy in response to the amount of piston travel upon impact with the tool. The AutoControl ports sense the piston travel and adjusts hydraulic oil flow to either increase or decrease impact force and speed. Deep or shallow penetration of the tool into the material determines the type of hammer operation used on the next stroke.

- When the material allows deep tool penetration, the system sets the hammer's next stroke for reduced impact energy. This produces a short piston stroke: less impact force, faster impact rate.
- When the material allows only shallow tool penetration, the system sets the hammer's next stroke for 100% impact energy. This produces a full piston stroke: more impact force, slower impact rate.
- When the material allows only a very shallow tool penetration, the system sets the hammer's next stroke for 100% impact energy with Energy Recovery. This produces a full piston stroke: more impact force, faster impact rate.

9.10.4 Auto Shut-Off

Model 770 does not have Auto Shut-Off. In all other Models covered in this manual, automatic shut-off refers to an automatic system of hydraulic pathways and controls which protects the hammer components from damage when the demolition tool is not in impact position. This feature eliminates blank-firing: the hammer automatically shuts down when there is no contact pressure on the tool.

9.10.5 Select Start (755B & 775B Models Only)

The Select Start feature allows the operator to choose between Auto Shut-Off and Easy Start. Auto Shut-Off, described above in Section 9.10.4, is the default mode of operation. In the Easy Start position, the hammer blank fires; the hammer starts without contact pressure on the tool and continues operating until stopped by the operator. Productivity is increased in difficult applications such as working with oversize rock, horizontally or underwater. The Auto-Control system protects the hammer against damaging, full-impact energy, idle blows.

9.10.5.1 Change Select Start from Auto Shut-Off to Easy Start
(Refer to Figure 9-9.)

The Select Start Valve is located on the right side of the cylinder.

1. Remove threaded plug with a 17mm Allen Wrench. The O-Ring is in the groove on the threaded plug.
2. Check O-Ring; replace if damaged.
3. Pull out Select Start Valve.
4. Turn Select Start Valve and insert opposite end into cylinder bore.
5. Insert threaded plug with O-Ring installed. Torque to 150 ft.-lbs. (200 Nm).
6. Follow steps 1 through 5 to change back to Auto Shut-Off.

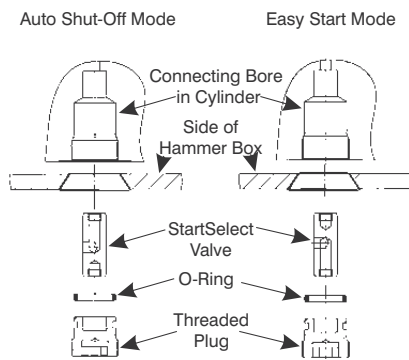


Figure 9-9. Select Start

9.10.6 Pressure-Reduced Mode

Model 770 does not have pressure-reduced mode. In all other Models covered in this manual, pressure-reduced mode can be used to warm oil by cycling it through the hammer without operating the demolition tool. This is done by turning on the operating switch with NO contact

pressure on the tool. After oil has been warmed to operating temperature, the hammer is turned off, the tool is set for operation, then the hammer is restarted. Refer to Section 9.4 Startup.

9.10.7 Precharge Chamber All Models

The precharge chamber is located in the cylinder head above the piston and is filled with nitrogen. As the piston moves to its upper most position, the nitrogen is compressed. The force arising from this compression is transferred to the top of the piston and helps drive the piston down.

Both the precharge chamber and the hydraulic system of the carrier provide the force for the working stroke. This design feature makes the impact energy of the hammer largely independent of fluctuations in the hydraulic system of the carrier during operation.

9.11 Special Operation Environments


9.11.1 Working Underground


When using the Hy-Ram underground (tunneling or mining applications) special regulations may apply. Additional considerations include:

- use water sprays to suppress dust
- use fire-resistant hydraulic fluids when required.

Hydraulic systems using fire resistant fluids require special engineering consideration when using the Hy-Ram. With some fluids, decreased flow and/or pressure to the hammer may be necessary. Contact Allied well before installation for specific parameters for your particular fluid.

9.11.2 Working Underwater
All Models except Model 735
 (Refer to Figures 9-10, 9-11 and 9-12.)

 **WARNING**
 Never use a 735 Hy-Ram Hammer underwater. The Model 735 is not built for underwater use.

 **CAUTION**
 NEVER use the Hy-Ram in or under water unless compressed air is supplied to the hammer. If water penetrates the impact chamber of the hammer, a pressure wave builds up with each stroke and will damage the wiper and seals of the hammer. The lower portion of the piston will also rust.

The Hy-Ram can only be used under water if a compressor is connected to provide compressed air. The compressed air prevents water from entering the impact chamber.

NOTE

If no provision is made for impact chamber ventilation, no claims can be made under the terms of the warranty for damage incurred during underwater operation.

The compressor must have a delivery of 124 to 176.5 s.c.f.m. and be equipped with a pressure regulator.

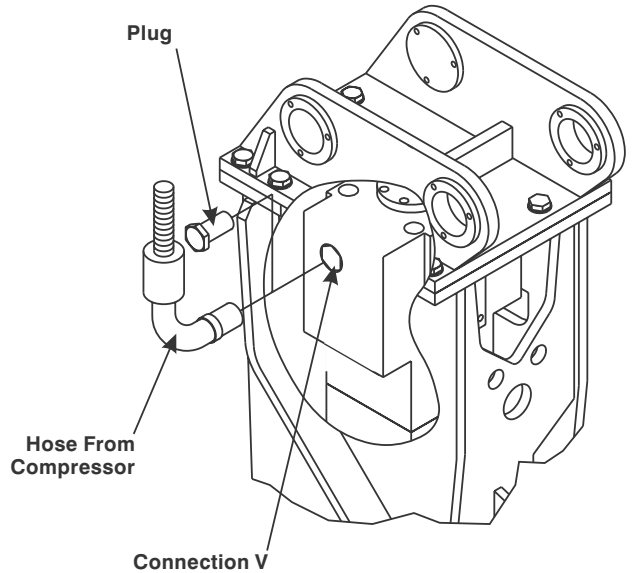


Figure 9-10. Typical Underwater Connection

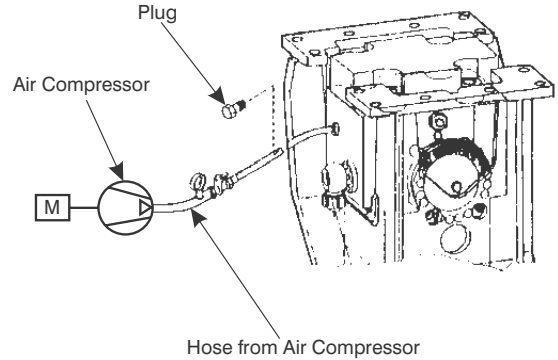


Figure 9-11. Installation Kit Connecting Compressor

An installation kit is required to connect the air compressor. Allied installation kits are available and include a pressure regulator and automatic shut-off valve to protect the Hy-Ram.

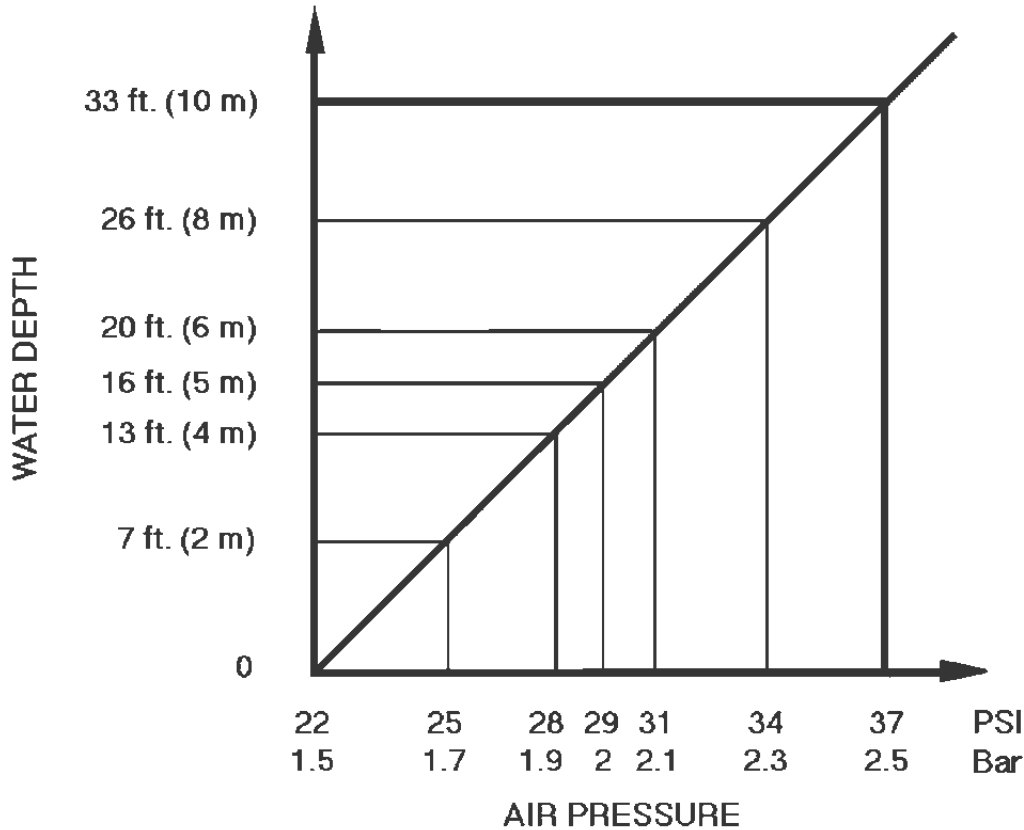





Figure 9-12. Air Pressure Chart For Underwater Operation

 **CAUTION**
 The Hy-Ram shall never be left in or under water with the compressed air supply off. Without the compressed air supply, the cylinder will fill up with water, which will result in serious damage the next time the hammer is started.

 **CAUTION**
 Depth markings **MUST BE** made on the Hy-Ram and boom to facilitate accurate operation.

3. Connect the compressor with the pressure reducer regulator.

 **CAUTION**
 Make sure the pressure is set correctly. If the pressure is 7 PSI [0.5 bar] too low, water will get into the impact chamber; if it is 7 PSI [0.5 bar] too high, the pressure in the impact chamber is too high. Either case may result in damage to the wiper and seals of the hydraulic hammer.

1. Remove the plug from connection V (Refer to Figure 9-10).

2. Attach the Allied installation kit.

4. Connect the pressure switch. This electric switch shuts off the Hy-Ram if the pressure drops below the minimum permissible level.

5. Refer to the graph shown in Figure 9-12. Find the air pressure required for the maximum water depth in which the Hy-Ram will be immersed.
6. Set the pressure regulator so the gauge reads 15 psi higher than the air pressure found on the graph in step 5.
7. Switch on compressor and move the Hy-Ram into working position at maximum depth.
8. Apply contact pressure to the Hy-Ram and start the hammer.
9. In order to set the pressure switch to shut down the Hy-Ram for safe operation, reduce the setting of the pressure regulator to that obtained from the graph in step 5.
10. Remove hammer from underwater.
11. With the Hy-Ram running, adjust the pressure switch until the Hy-Ram shuts down.
12. Adjust the pressure regulator back to 15 psi above the air pressure (same setting as step 6).

**CAUTION**

Impact chamber ventilation must be activated prior to submersion of the hammer.

13. Open the air supply.
14. Lubricate the demolition tool thoroughly and frequently, since the compressed air disperses the grease quickly. Only biodegradable lubricants shall be used for underwater applications. Use of Allied AutoLube is recommended. The AutoLube must never be immersed in water. See Section 8.5.1.1
15. After underwater usage, leave the compressed air supply on for a few minutes to dry out the impact chamber.

16. After drying the impact chamber:

- Switch off the compressed air supply.
- Remove the hose from the hammer.
- Replace plug in Connection V.

9.12 Working in High Outside Temperatures

Check the oil temperature frequently to ensure it does not exceed 176°F [80°C]. If higher temperatures are measured in the tank, a heat exchanger must be installed. Use only hydraulic oils with adequate viscosity.

**CAUTION**


When working in temperature conditions below minus 4°F [-20°C], the hydraulic hammer shall not be put into operation while the hydraulic oil is still cold. Operating the hammer with cold hydraulic oil may cause the seals in the hammer to break and the diaphragm in the high-pressure accumulator to tear. Observe the carrier manufacturer's regulations.


9.13 Working in Low Outside Temperatures

When the temperature is below minus 4° F. (-20° C.), warm up the oil by running the carrier before starting the Hy-Ram. Once the oil has reached 32° F. (0° C.), the hammer can be run in pressure-reduced mode (except for Model 770) as described in Section 9.10.5, to flush out the cold oil and warm circulating oil to operating temperature of 140° F. (60° C.).

Keep oil circulating in the carrier and in Hy-Ram pressure-reduced mode during breaks in work so that the oil does not get too cold for normal operation.

**SECTION 10.0
OPERATOR TROUBLESHOOTING CHART**

 **WARNING**
Before removing the hydraulic lines, bleed off all hydraulic pressure. When rectifying faults, observe all safety regulations.

 **CAUTION**
Before disassembling the Hy-Ram, bleed off all nitrogen pressure in the precharge chamber.

| Problem | Cause | Remedy |
|-------------------------|--|---|
| Hammer does not start. | Pressure and return lines crossed. | Reverse hoses. |
| | Insufficient impact pressure. | Force tool fully into tool holder by pushing down with the carrier. |
| | Nitrogen precharge is too high. | Check and reset pressure if needed. |
| | Quick disconnects not opening. (Model 735 only) | Repair or replace. |
| | Ball valves closed. | Open ball valves. |
| | Operating pressure is too low. | Check and reset pressure if needed. |
| | Fault in electrical circuit. | Check for power at solenoid. |
| Hammer runs slow. | Insufficient flow of oil. | Increase flow if possible. |
| | Return oil pressure too high. | Find and repair restriction to return flow. |
| | Nitrogen precharge is too high. | Check and reset pressure as needed. |
| Reduced breaking power. | Operating pressure is too low. | Check and reset pressure as needed. |
| | Nitrogen precharge pressure is too low. | Check and reset as needed. |
| | Two-speed switch in high position. (Models 750 and 770) | Set switch to "low". |
| | Lock out spacer installed in high position. (Models 750 and 770) | Remove lock out spacer. |
| | Operating temperature is too high. | Correct overheating problem. |
| | Tool binding in bushing(s). | Repair or replace as needed—check for proper lubrication. |
| | Return line pressure is too high. | Locate and correct problem. |

10.0 OPERATOR TROUBLESHOOTING CHART (cont')

| Problem | Cause | Remedy |
|----------------------------------|---|---|
| Operating pressure is too low. | Relief valve set too low. | Reset pressure, check dynamically. |
| | Damaged relief cartridge or seals. | Inspect, repair or replace. |
| | Insufficient pump delivery (low flow means low pressure at the hammer). | Check pump with flow meter (check dynamic pressure). |
| | Flow control not set properly. | Set flow control. |
| Return line pressure too high. | Failed hoses or blockage at crimp on fitting. | Replace hoses that are frayed or damaged. |
| | Heat exchanger and return filters plugged. | Change filter and repair or replace plugged heat exchanger. |
| | Return line connected to valve bank. | Hammer return must bypass valve bank. |
| | Hoses or fittings too small for installation. | Always use proper hose and fitting sizes. |
| Repeated HP accumulator failure. | No check valve in pressure line, accumulator discharges suddenly. | Install check valve Inspect check valve for damage. |
| | Operating temperature too high. Heat deteriorates rubber diaphragm. | Repair overheating problem. |
| | Nitrogen charge too high or too low. | Charge to factory spe. after re-building. |
| | Operating pressure is too high or too low. | Check and adjust hydraulic operating pressure. |
| | Return line pressure is too high | Locate and correct problem |

10.0 OPERATOR TROUBLESHOOTING CHART

| Problem | Cause | Remedy |
|---------------------------------|-----------------------------------|--|
| Operating temperature too high. | Operating pressure too high. | Adjust as needed. |
| | Excessive leakage through hammer. | Damaged piston. Repair or replace worn parts. |
| | Ambient temperature is high. | A heat exchanger may be necessary — check with carrier manufacturer. |
| | Tool binding in bushing(s). | Repair or replace as needed. Check for proper lubrication. |
| | Return line pressure is too high. | Locate and correct problem. |
| | Engine speed too high. | Repair flow control. |
| | Breaking cycle too long. | Reduce advance. |
| | Excessive cycle time. | Limit Hy-Ram operation to 30 second bursts. |

SECTION 11.0 CARE AND MAINTENANCE

11.1 Care and Maintenance Schedule

During Shift

- Lubricate demolition tool every two hours or anytime the tool appears dry. (See 8-5.)
- Check lube fitting for damage.

Daily

- Tighten threaded connections (during first 50 hours)
- Check for leaks in hydraulic lines.
- Check that pipe clamps fit correctly.
- Check mounting bracket and box for wear.

Twice a Week

- STANDARD: Inspect dust ring, and clean retaining groove.

Weekly

- Check threaded connections.
- Check mounting bracket pins for wear.
- Check spring pins (locking pins) and bushings in tool holder for tight fit.
- Check demolition tool for burrs. Pay special attention to slot area.
- Check retainer bars for burrs.
- Check that retainer bar seals are installed and in good condition.
- GUARDIAN: Inspect and clean guide ring, floating ring and support ring.

Every Two Weeks

- Check precharge chamber pressure.
- Check demolition tool for wear.
- Check lower tool bushing for wear.
- Check box for wear.
- GUARDIAN: Remove and clean tool wiper. Check for wear.

Monthly

- Check piston impact surface for dents.
- Check impact surface (top) of demolition tool for chips.
- Check impact ring for cracks, chips, wear or looseness.

At Hammer Rebuild

- Check high pressure accumulator for proper nitrogen pressure.

As Required

- Replace bent and damaged tubes.
- Replace any damaged hose(s).
- Clean hydraulic oil filter.

11.1.1 Warranty Protection

Maintain written records of Hy-Ram Hammer maintenance, service and repair. These records will be helpful if warranty coverage is ever in question. Each record shall include :

- The date of service, maintenance or repair.
- A description of the service, maintenance or repair performed. Include part numbers if applicable.
- Copies of purchase order(s) and invoice(s) for repair parts and service.
- The name and signature of the person performing the service, maintenance or repair.

11.2 Care And Maintenance Instructions

11.2.1 Checking Hydraulic Lines For Leaks Before Starting Work

1. Visually check all hydraulic lines (tubes and hoses) from the pump to the hydraulic hammer and back into the tank.
2. Tighten any loose fasteners and hose clamps.
3. Replace any damaged tubes or hoses.

11.2.2 Daily Checking For Cracks

Check the mounting bracket and the box for cracks everyday.

11.2.3 Checking Wear To The Tool Bushings and Impact Ring

(Refer to Figure 11-1.)

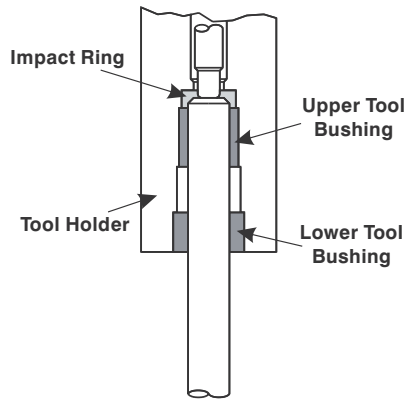


Figure 11-1. Checking Wear Of Tool Bushings and Impact Ring

NOTE

It is recommended that the Hy-Ram be taken to an Allied distributor service department if repair is required.

Check the inside diameter of the lower tool bushing every time the demolition tool is changed or every 100 hours of hammer operation hours (every 2 weeks). Determine the allowable diameter from the following table. If the diameter has increased to more than the specified dimension, both tool bushings and the impact ring must be replaced. The lower tool bushing can be inspected without removing the hammer from the box as follows:

- Standard Hy-Ram
 1. Remove tool. Refer to Section 8.4.
 2. Remove dust ring. Refer to Section 11.2.8.
 3. Flex and pull out plastic retaining rings.

- Guardian Hy-Ram

Remove guide, floating, and support rings. Refer to Section 11.2.9.

| Tool Bushing Inside Diameter | | |
|------------------------------|---------------------|---------------------|
| 735 | 740 745 | 750 |
| 3.66 in. (93mm) | 4.06 in. (103mm) | 4.72 in. (120mm) |
| 755/755B | 770 | 775/775B |
| 4.92 in. (125mm) | 5.51 in. (140mm) | 5.71 in. (145mm) |

NOTE

Refer to the specific hammer model Parts Manual for illustrations and part numbers of the parts noted above.

The tool bushing and impact ring must be replaced by a service technician in a suitably equipped workshop.

11.2.4 Check Impact Face Of Piston for Wear

The impact face of the piston must be checked each time the demolition tool is changed or at least once a month. After the demolition tool has been removed, proceed as follows:

1. Shine a light on the piston's impact surface and check for dents or chipping.
2. If cracks or chips are discovered, the Hy-Ram must not be operated.
3. Contact your authorized Allied service center.

11.2.5 Check Wear to the Retainer Bars:

11.2.5.1 Before Daily Operation

1. Visually check that all four seals for the retainer bars are in place and secure.
2. Visually check that the seals are not damaged.


11.2.5.2 When Changing Demolition Tool

1. Check the retainer bars every time the demolition tool is changed or removed.
2. If excessive wear such as sharp edges, notches or dents are found, rotate or replace the retainer bars.
3. Carefully smooth off any burrs found on the retainer bars.
4. Check that the seal plugs are not cracked or damaged. Replace if necessary.

11.2.6 Checking Wear To The Demolition Tool

(Refer to Figure 11-2.)

Check the demolition tool diameter each time it is changed or, every 100 hours of hammer operation (every 2 weeks). If the shank diameter of the demolition tool has worn to less than the dimension listed in the following table, the demolition tool must be replaced.



CAUTION

Do not allow the shank of the tool to get too hot if using a grinder to remove burrs.

| Demolition Tool Outside Diameter | | |
|----------------------------------|---------------------|---------------------|
| 735 | 740 745 | 750 |
| 3.43 in. (87mm) | 3.82 in. (97 mm) | 4.37 in. (111mm) |
| 755/755B | 770 | 775/775B |
| 4.61 in. (117mm) | 5.20 in. (132mm) | 5.40 in. (137mm) |

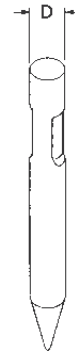


Figure 11-2. Check Wear To Demolition Tool

Burrs on the shank of the demolition tool and on the retainer bars must be smoothed off carefully. A grinder may be used with caution.

11.2.7 Checking Wear to Guardian Tool Wiper

Remove, clean and inspect the tool wiper whenever the demolition tool is removed or every 100 hours of hammer operation (every 2 weeks).

11.2.7.1 Remove and Inspect Tool Wiper
(Refer to Figure 11-3.)

1. Remove demolition tool; refer to Section 8.0.
2. Remove tool wiper with special tool, P/N 676762; refer to Figure 11-3.
3. Inspect wiper for cracks or tears. Replace a damaged wiper.
4. Clean wiper thoroughly.

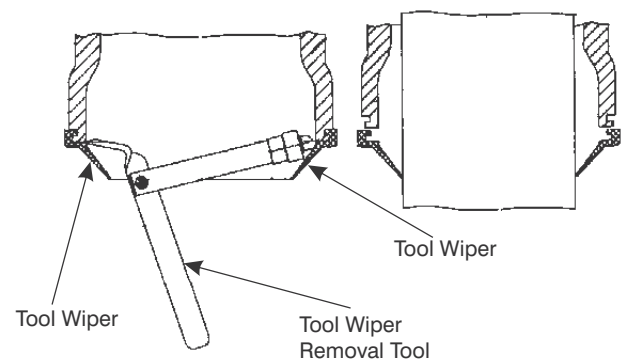


Figure 11-3. Removing and Installing Tool Wiper

11.2.7.2 Install Tool Wiper



CAUTION

Never install the wiper before installing the tool; the tool will invert the wiper and severely reduce its effectiveness.

1. Install the tool, retainer bars and seal as instructed in Section 8.0.
2. Thoroughly grease the inside of the tool wiper.
3. With the grooved edge of the wiper facing the top of the hammer, push the wiper onto the tool as far up to the bushing as possible.
4. Use a rod or the handle of a hand hammer to press the wiper into the groove on the bottom of the bushing.

11.2.8 Inspect Standard Dust Ring

The dust ring is made of a spongy material that allows the tool to slide up and down smoothly. Every time the tool is changed, whenever grease runs down the shank of the tool, or every 100 hours of hammer operation (every 2 weeks), inspect dust ring as follows.

1. Remove demolition tool; refer to Section 8.0.
2. Pull dust ring out of groove. It may be necessary to pry the dust ring out of groove with a screwdriver.
3. Inspect dust ring for tears and wear. Replace a worn or damaged dust ring.
4. Clean dust ring groove.

Every 20 hours of hammer operation (twice a week), visually inspect the dust ring for tears without removing the tool. If the dust ring appears damaged, follow steps 1 through 4 above.

11.2.9 Inspect Guardian Guide, Floating and Support Rings

(Refer to Figure 11-4.)

NOTE

It is not necessary to remove the tool to remove the lower dust protection components.

The Guardian Hy-Ram provides superior dust protection for the tool holder components. These components are easy to maintain; regular cleaning and inspection will enhance hammer life and function. Inspect the guide ring, floating ring and support ring every time the tool is changed or every 100 hours of hammer operation (every 2 weeks). If working conditions are extremely dusty, clean and inspect these components every 50 hours of hammer operation (every week). Remove, clean and inspect components as follows.

Position the Hy-Ram vertically, resting on the tool:

1. Drive 2 lock pins out of bores with a drift and hammer. The guide ring will be released from the weldment.
2. Remove guide ring, floating ring and support ring.
3. Use a small scraper and compressed air to dislodge any packed in debris.
4. Inspect each ring and remove any rough edges with a file or grinder.

Reassemble the lower dust protection components in reverse order of removal. Be sure to install each ring in the correct orientation; refer to Figure 11-4.

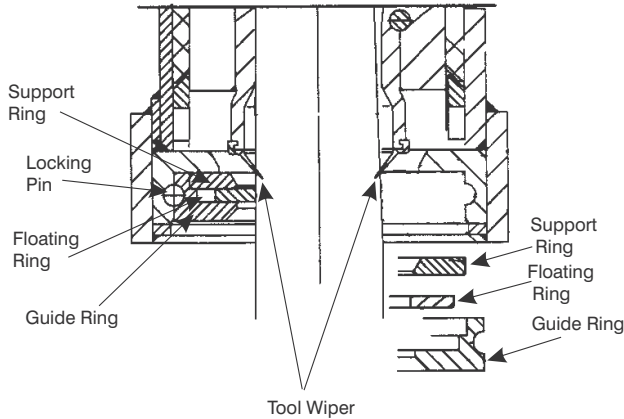


Figure 11-4. Guardian Dust Protection Components

11.2.10 Check Tightness Of Threaded Connections

The hydraulic hammer threaded connections are subjected to high stresses. All hydraulic hammer threaded connections must be checked daily for the first 50 operating hours and thereafter once a week. Loose connections shall be tightened to the specified torque. Connection locations for each model Hy-Ram covered in this manual are shown in Figures 11-5 through 11-10; torques are given in the corresponding Torque Tables.

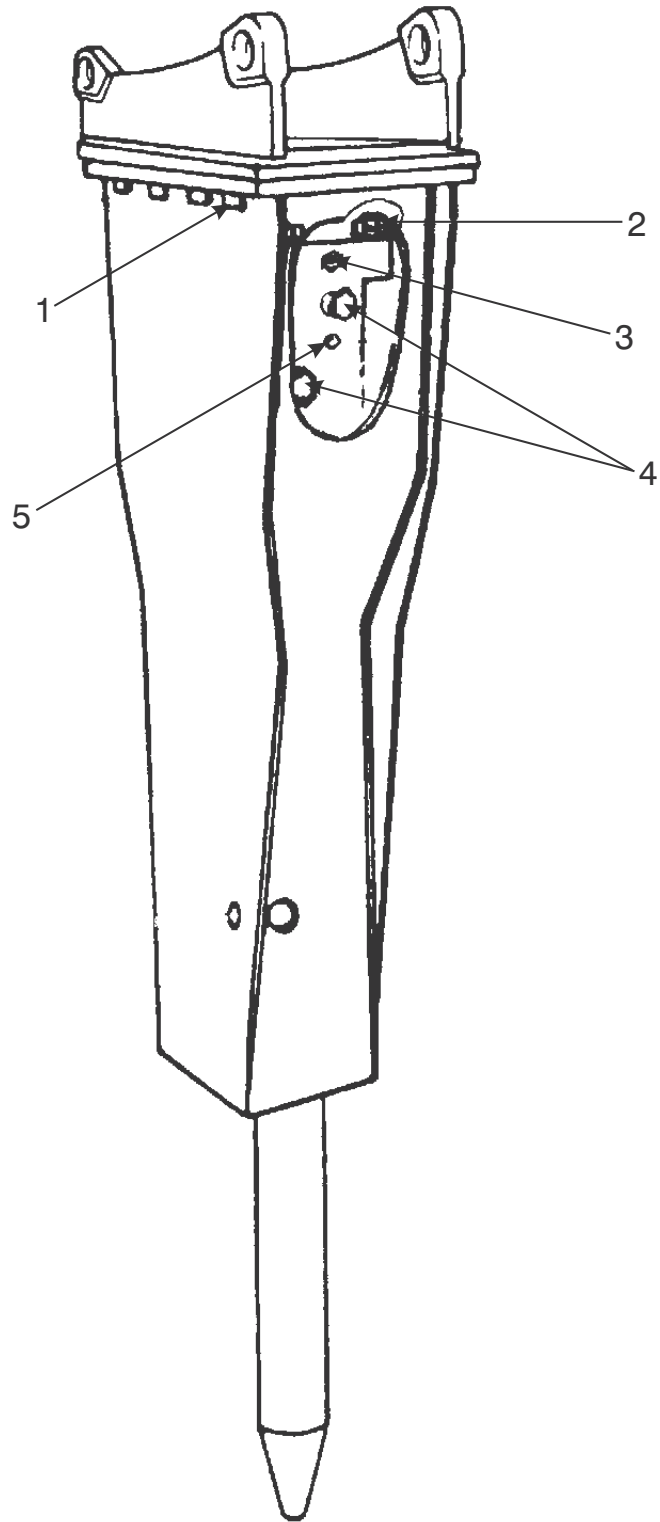
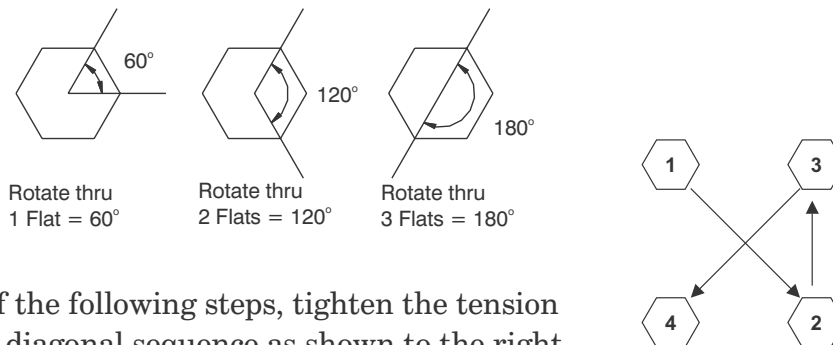


Figure 11-5. Model 735 Torque Items on Hammer

| Torque Table for Allied Hy-Ram Model 735 | | | | |
|--|----------|------------------|--|---|
| Connection | Item No. | Interval | Tool Required | Torque Req'd. Ft. Lbs. (N·m) (Lubricated) |
| Top Mounting Bracket Nuts & Bolts | 1 | Daily | Wrench & Socket Wrench, 1-1/8" | 250 (340) |
| Tension Bolts* | 2 | As Req'd. | Socket Wrench, 55 mm | 150 (200) +90° (1-1/2) +120° (2)** |
| Fill Valve G Plug | 3 | Weekly Weekly | Socket Wrench, 22mm Socket Head, 5mm | 95 (130) 15 (20) |
| Connections P & T | 4 | As Req'd. | Open End Wrench, 1-1/4" | 300 (400) |
| Lube Fitting Connection Screw | 5 | As Req'd. | Socket Wrench, 14mm Socket Wrench, 17mm | 45 (60) 300 (400) |

**The tension bolts are only accessible when the hammer is removed from the Box.

**A flat is one of the six hexagonal edges of the top of the tension bolts. The number in parentheses () indicates the number of flats that correspond to the number of degrees to be tightened.



In each of the following steps, tighten the tension bolts in a diagonal sequence as shown to the right.

- Step 1: Tighten all bolts to specified torque.
- Step 2: Tighten all bolts specified number of degrees.
- Step 3: Tighten all bolts specified number of degrees.

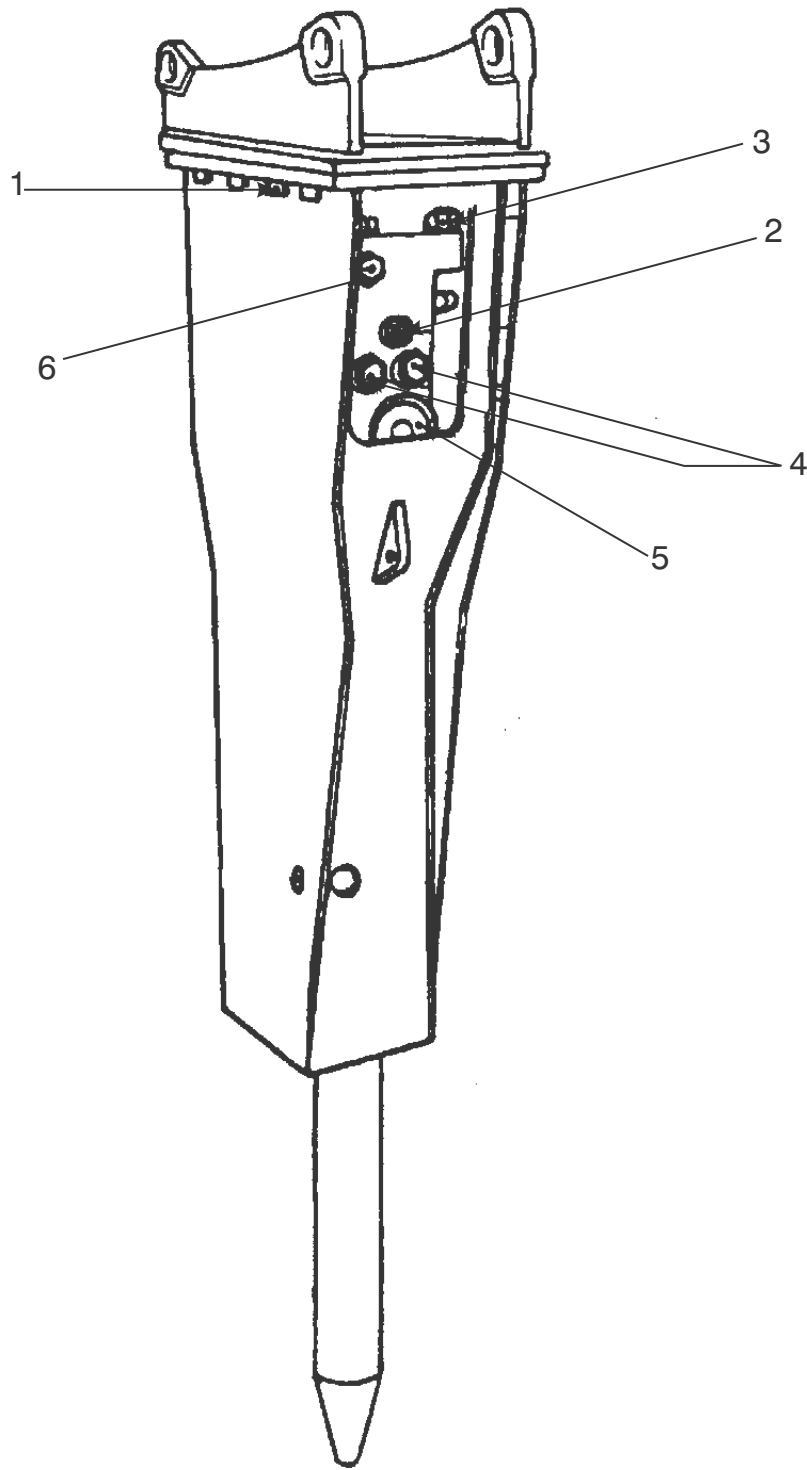
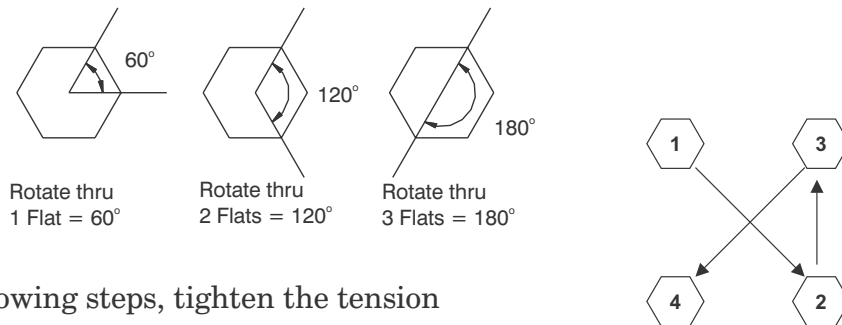


Figure 11-6. Models 740 and 745 Torque Items on Hammer

| Torque Table for Allied Hy-Ram Models 740 and 745 | | | | |
|---|----------|------------------|--|--|
| Connection | Item No. | Interval | Tool Required | Torque Req'd. Ft. Lbs (N-m) (Lubricated) |
| Top Mounting Bracket Nuts & Bolts | 1 | Daily | Wrench & Socket Wrench, 1-1/2" | 1500 (2000) |
| Fill Valve G Plug | 2 | Weekly Weekly | Socket Wrench, 22mm Socket Head, 5mm | 150 (200) 15 (20) |
| Tension Bolts * | 3 | As Req'd. | Socket Wrench, 50 mm | 150 (200) +120°(2) +210° (3-1/2)** |
| Connections P & T | 4 | As Req'd. | Open End Wrench, 1-1/2" | 300 (400) |
| High Pressure Accumulator | 5 | As Req'd. | Allied P/N 667341 | 1500 (2000) |
| Underwater Vent Plug | 6 | As Req'd. | Socket Wrench, 41 mm | 300 (400) |
| Lube Fitting Connection Screw | 7 | As Req'd. | Socket Wrench, 14mm Socket Wrench, 17mm | 45 (60) 300 (400) |

*The tension bolts are only accessible when the hammer is removed from the Box.

**A flat is one of the six hexagonal edges of the top of the tension bolts. The number in parentheses () indicates the number of flats that correspond to the number of degrees to be tightened.



In each of the following steps, tighten the tension bolts in a diagonal sequence as shown to the right.

- Step 1: Tighten all bolts to specified torque.
- Step 2: Tighten all bolts specified number of degrees.
- Step 3: Tighten all bolts specified number of degrees.

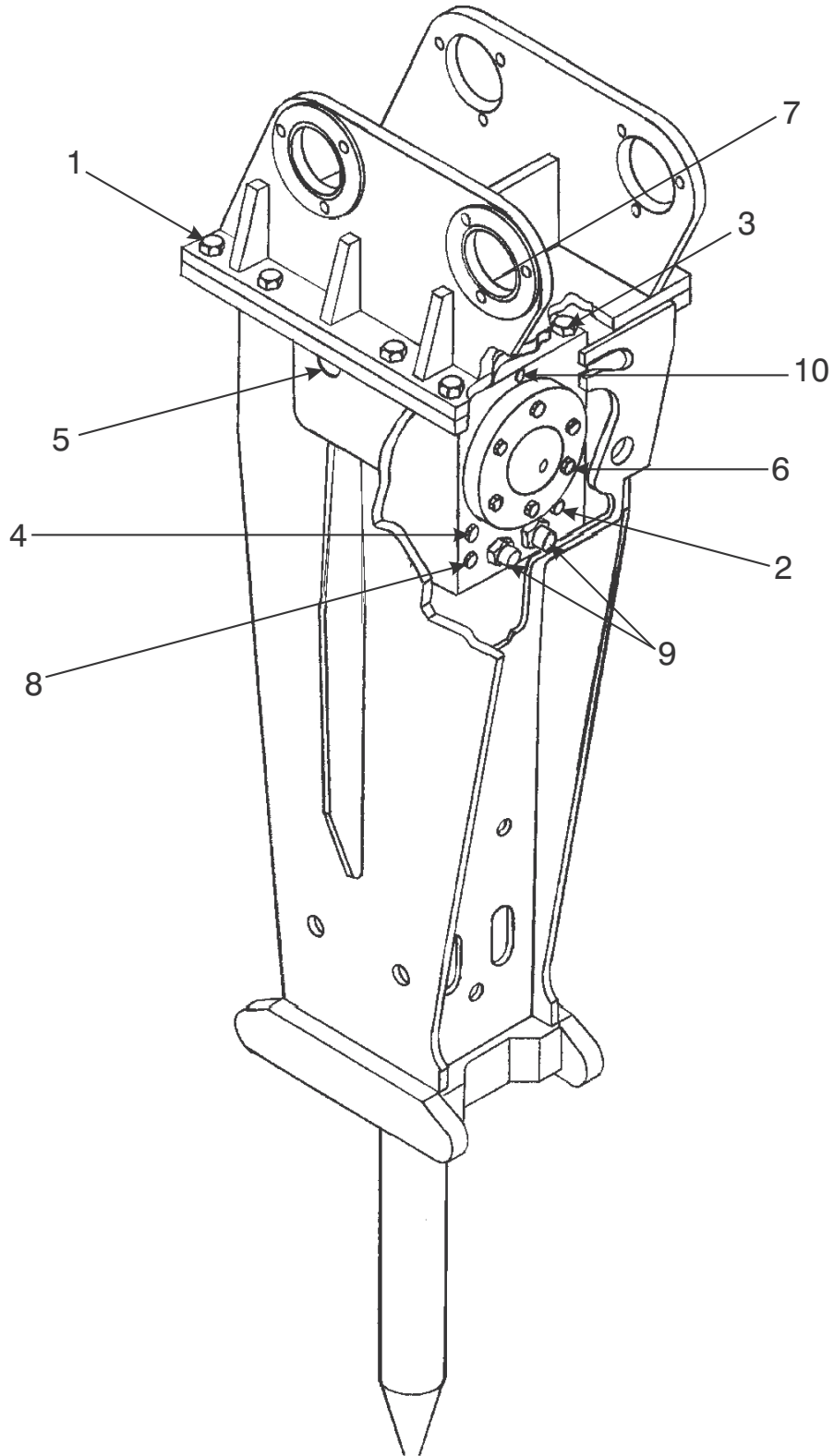
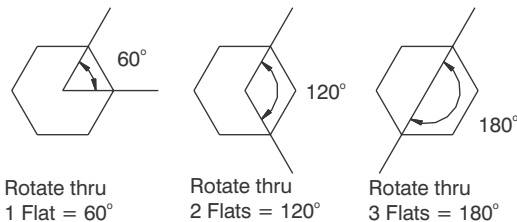


Figure 11-7. Model 750 Torque Items On Hammer

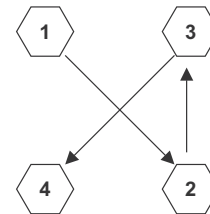
| Torque Table for Allied Hy-Ram Model 750 | | | | |
|--|----------|------------------|--|--|
| Connection Point | Item No. | Interval | Tool Required | Torque Req'd. Ft. Lbs.(N-m) (Lubricated) |
| Top Mounting Bracket Nuts & Bolts | 1 | Daily | Wrench & Socket Wrench, 1-1/2" | 1500 (2000) |
| Fill Valve G Plug | 2 | Weekly Weekly | Socket Wrench, 22mm Socket Head, 5mm | 150 (200) 15 (20) |
| Tension Rods* | 3 | As Req'd. | Socket Wrench, 50mm | 370 (500) +60° (1) +120° (2)** |
| Two-Speed Valve Plug | 4 | Weekly | Socket Wrench, 27mm | 280 (380) |
| Male Connector Hose Fitting | | Weekly | Socket Wrench, 13mm | 30 (40) |
| | | Weekly | Socket Wrench, 3/4" | 37-41 (50-55) |
| | | As Req'd. | Open End Wrench 3/4" | 20 (27) |
| Underwater Vent Plug | 5 | Weekly | Socket Wrench, 41mm | 300 (400) |
| High Pressure Accumulator Bolts | 6 | Weekly | Socket Head, 14mm | 150 (200) |
| Control Valve Cover | 7 | As Req'd. | Socket Head, 14mm | 150 (200) |
| Lube Fitting Connection Screw | 8 | As Req'd. | Socket Wrench, 14mm Socket Wrench, 27mm | 45 (60) 300 (400) |
| Connections P & T | 9 | As Req'd. | Open End Wrench, 1-1/2" | 300 (400) |
| Fixed Frequency Plug | 10 | Weekly | Socket Head 14mm | 280 (380) |

*The tension bolts are only accessible when the hammer is removed from the Box.

**A flat is one of the six hexagonal edges of the top of the tension bolts. The number in parentheses () indicates the number of flats that correspond to the number of degrees to be tightened.



In each of the following steps, tighten the tension bolts in a diagonal sequence as shown to the right.



- Step 1: Tighten all bolts to specified torque.
- Step 2: Tighten all bolts specified number of degrees.
- Step 3: Tighten all bolts specified number of degrees.

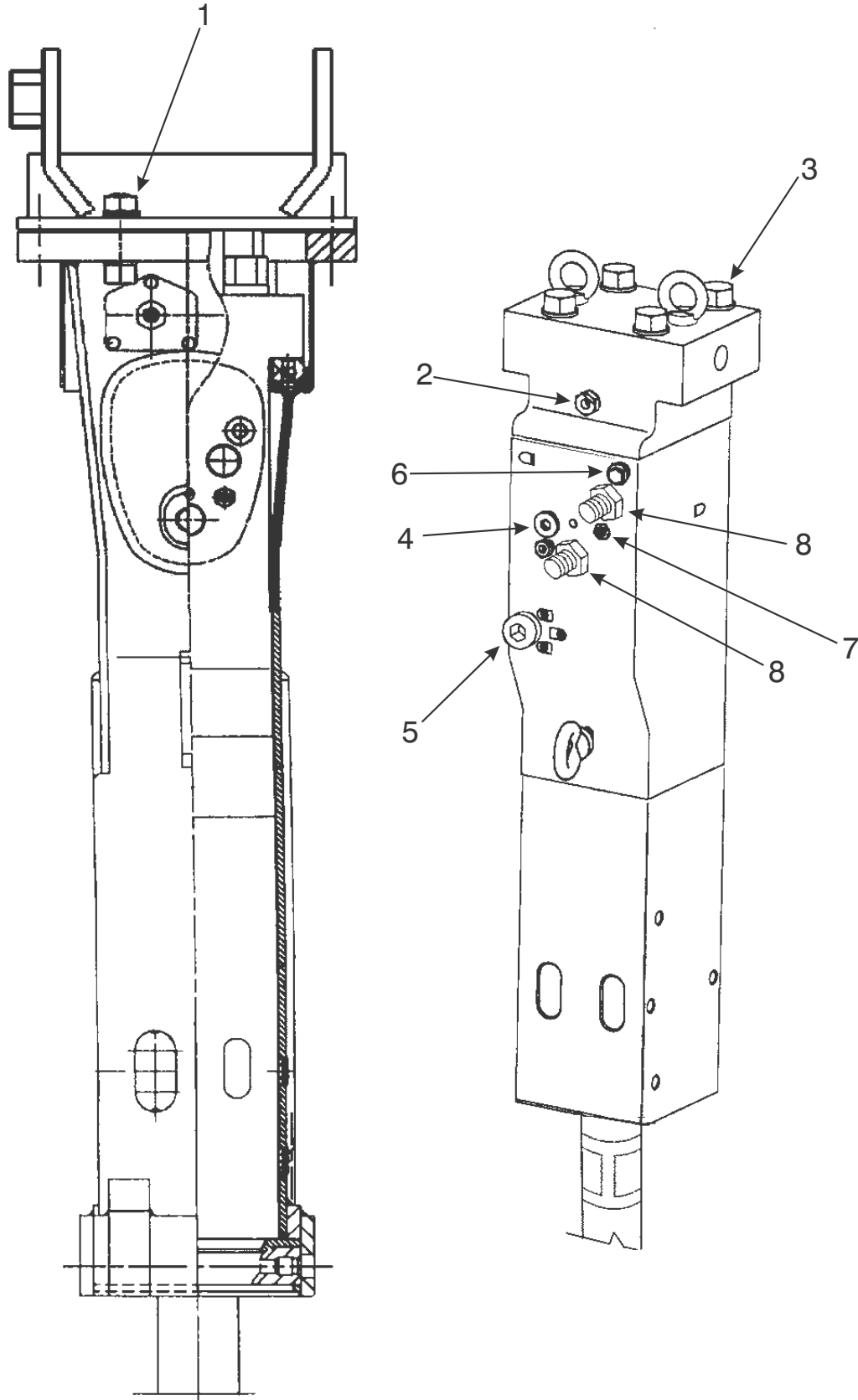
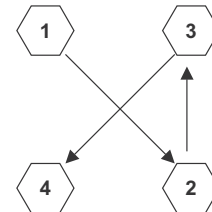
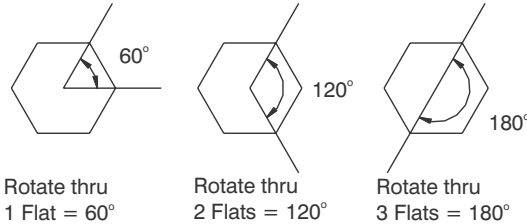


Figure 11-8. Models 755 and 755B Torque Items On Hammer

| Torque Table for Allied Hy-Ram Models 755 and 755B (Information to be supplied at a later date) | | | | |
|--|----------|------------------|--|---|
| Connection Point | Item No. | Interval | Tool Required | Torque Req'd. Ft. Lbs.(N·m) (Lubricated) |
| Top Mounting Bracket Nuts & Bolts | 1 | Daily | Wrench & Socket Wrench, 1-1/2" | 1500 (2000) |
| Fill Valve G Plug | 2 | Weekly Weekly | Socket Wrench, 22mm Socket Head, 5mm | (96) 15 (20) |
| Tension Bolts* | 3 | As Req'd. | Socket Wrench, 55mm | 370 (500) + 120 ^o (2) + 120 ^o (2)** |
| Energy Recovery | 4 | As Req'd. | Socket Head, 12 mm | (74) |
| AutoControl System | 5 | As Req'd. | Socket Head, 24mm | (258) |
| Underwater Vent Plug | 6 | Weekly | Socket Head, 19mm | (150) |
| Lube Fitting Connecting Screw | 7 | As Req'd. | Socket Wrench, 14mm Socket Wrench, 27mm | 15 (20) 150 (200) |
| Connections P & T | 8 | As Req'd. | Open End Wrench, 50mm | (295) |

*The tension bolts are only accessible when the hammer is removed from the Box.

**A flat is one of the six hexagonal edges of the top of the tension bolts. The number in parentheses () indicates the number of flats that correspond to the number of degrees to be tightened.



In each of the following steps, tighten the tension bolts in a diagonal sequence as shown to the right.

- Step 1: Tighten all bolts to specified torque.
- Step 2: Tighten all bolts specified number of degrees.
- Step 3: Tighten all bolts specified number of degrees.

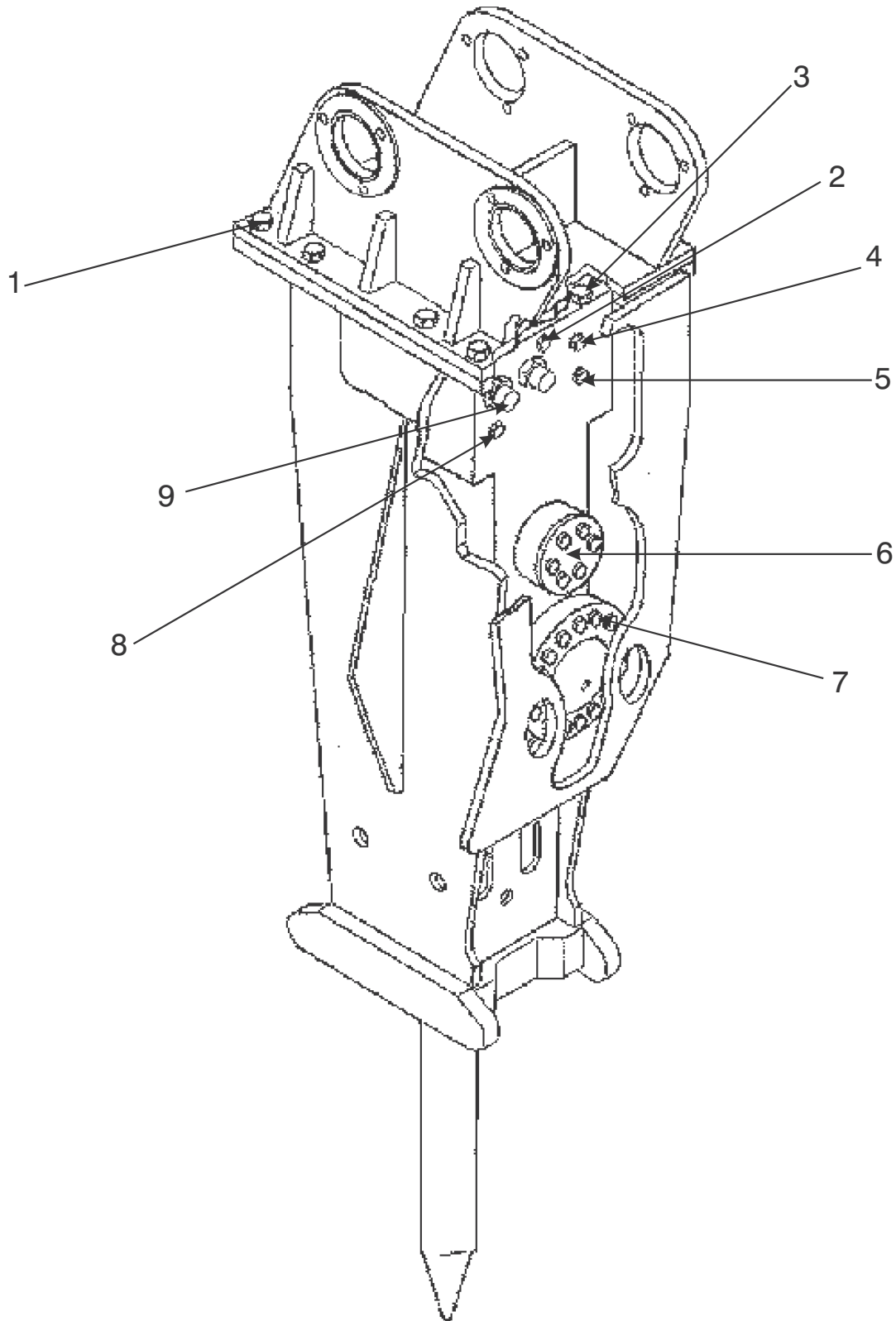
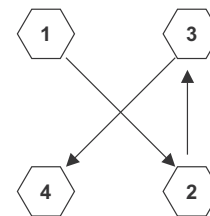
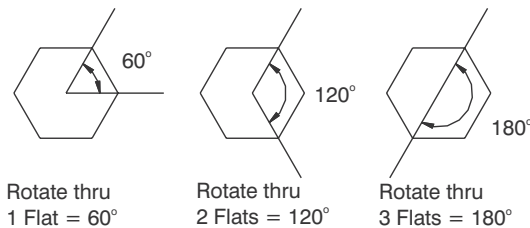


Figure 11-9. Model 770 Torque Items On Hammer

| Torque Table for Allied Hy-Ram Model 770 | | | | |
|--|----------|------------------|--|---|
| Connection Point | Item No. | Interval | Tool Required | Torque Req'd. Ft. Lbs. (N·m) (Lubricated) |
| Top Mounting Bracket Nuts & Bolts | 1 | Daily | Wrench & Socket Wrench, 1-1/2" | 1500 (2000) |
| Fill Valve G Plug | 2 | Weekly Weekly | Socket Wrench, 22mm Socket Head, 5mm | 150 (200) 15 (20) |
| Tension Rods* | 3 | As Req'd. | Socket Wrench, 55mm | 370 (500) +120° (2) +120° (2)** |
| Two-Speed Valve Plug | 4 | Weekly | Socket Wrench, 30mm | 280 (380) |
| Male Connector | | Weekly | Socket Wrench, 13mm | 30 (40) |
| Hose Fitting | | Weekly | Socket Wrench, 3/4" | 37-41 (50-55) |
| Underwater Vent Plug | 5 | Weekly | Open End Wrench 3/4" | 20 (27) |
| Control Valve Cover | 6 | As Req'd. | Socket Wrench, 41mm | 300 (400) |
| High Pressure Accumulator Bolts | 7 | As Req'd. | Socket Head, 30mm | 280 (380) |
| Lube Fitting | 8 | Weekly | Socket Wrench, 30mm | 280 (380) |
| Connection Screw | | As Req'd. | Socket Wrench, 14mm Socket Wrench, 27mm | 45 (60) 300 (400) |
| Connections P & T | 9 | As Req'd. | Open End Wrench, 1-1/2" | 300 (400) |

*The tension bolts are only accessible when the hammer is removed from the Box.

**A flat is one of the six hexagonal edges of the top of the tension bolts. The number in parentheses () indicates the number of flats that correspond to the number of degrees to be tightened.



In each of the following steps, tighten the tension bolts in a diagonal sequence as shown to the right.

- Step 1: Tighten all bolts to specified torque.
- Step 2: Tighten all bolts specified number of degrees.
- Step 3: Tighten all bolts specified number of degrees.

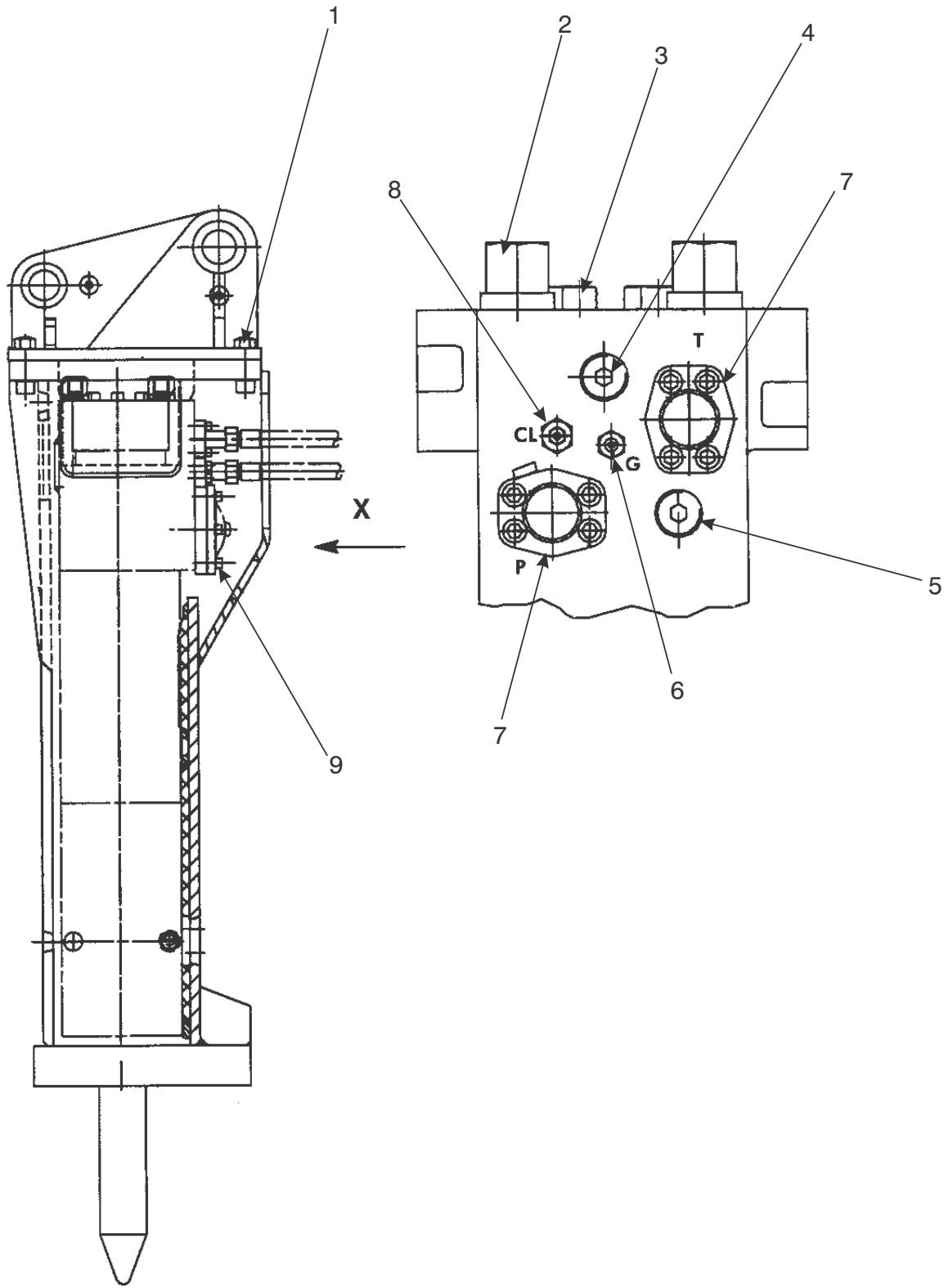
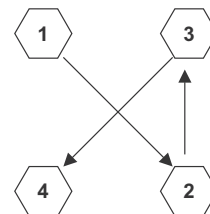
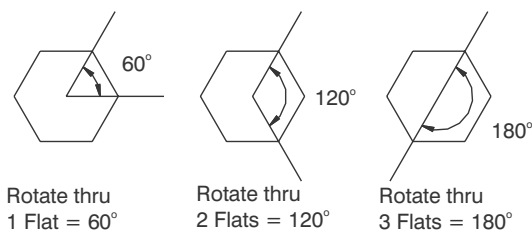


Figure 11-10. Model 775 and 775B Torque Items On Hammer

| Torque Table for Allied Hy-Ram Models 775 and 775B | | | | |
|--|----------|------------------|--|--|
| Connection Point | Item No. | Interval | Tool Required | Torque Req'd. Ft. Lbs.(N·m) (Lubricated) |
| Top Mounting Bracket Nuts & Bolts | 1 | Daily | Wrench & Socket Wrench, 1-1/2" | 1500 (2000) 120° |
| Tension Bolts* | 2 | As Req'd. | Socket Wrench, 55mm | 370 (500) + 120° (2) + 150° (2.5)** |
| Control Valve Cover | 3 | Daily | Socket Head, 17mm | 280 (380) |
| AutoControl System | 4 | As Req'd. | Socket Head, 24 mm | 220 (300) |
| Underwater Vent Plug | 5 | Weekly | Socket Wrench, 41mm | 300 (400) |
| Fill Valve G Plug | 6 | Weekly Weekly | Socket Wrench, 22mm Socket Head, 5mm | 95 (130) 15 (20) |
| Connections P & T | 7 | Weekly | Open End Wrench, 1-1/2 in. | 300 (400) |
| Lube Fitting Connecting Screw | 8 | As Req'd. | Socket Wrench, 14mm Socket Wrench, 27mm | 15 (20) 150 (200) |
| High Pressure Accumulator Bolts | 9 | Weekly | Socket Head, 14mm | 150 (200) |

*The tension bolts are only accessible when the hammer is removed from the Box.

**A flat is one of the six hexagonal edges of the top of the tension bolts. The number in parentheses () indicates the number of flats that correspond to the number of degrees to be tightened.




In each of the following steps, tighten the tension bolts in a diagonal sequence as shown to the right.

Step 1: Tighten all bolts to specified torque.

Step 2: Tighten all bolts specified number of degrees.

Step 3: Tighten all bolts specified number of degrees.

11.2.11 Checking the Nitrogen Precharge Chamber.
(Refer to Figure 11-11.)



WARNING

When checking the nitrogen precharge chamber, make sure no one is in the vicinity of the demolition tool. If the demolition tool has jammed, an increase in pressure in the chamber may release it suddenly.

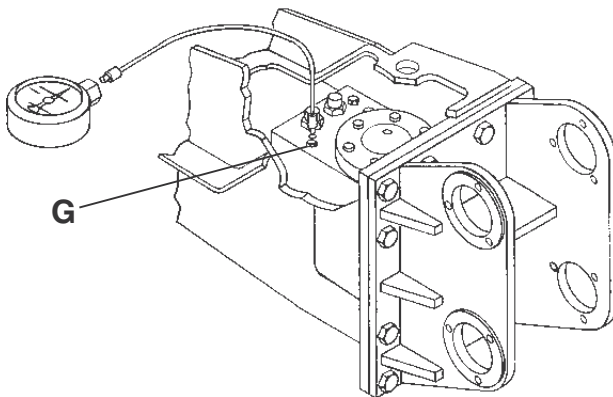



Figure 11-11. Typical Hy-Ram Nitrogen Precharge Chamber

1. Clean the area around the fill valve plug **G** on cylinder head.
2. To check the pressure, lay the Hy-Ram on its side with no contact pressure on the demolition tool.
3. Remove the screw plug from fill valve **G**.
4. Firmly insert test gauge hose into fill valve. Refer to Figure 11-11.
5. Read the pressure.
6. Refer to the following table for the correct pressure. A tolerance of plus 0/minus 5 psi is acceptable. Pressures are given for temperatures at 70°F. (21°C.) and 150°F. (65°C.)

| Nitrogen Precharge Chamber Pressure psi (bar) 70°F. (21°C.) | | | |
|---|-----------------------|-----------------------|-----------------------|
| 735 | 740 | 745 | |
| 150 psi (10.4 bar) | 140 psi (9.7 bar) | 170 psi (11.6 bar) | |
| 150°F. (65°C.) | | | |
| 735 | 740 | 745 | |
| 175 psi (12.0 bar) | 165 psi (11.5 bar) | 195 psi (13.5 bar) | |
| 70°F. (21°C.) | | | |
| 750 | 755/755B | 770 | 775/775B |
| 85 psi (5.9 bar) | 163 psi (11 bar) | 100 psi (6.9 bar) | 153 psi (10.3 bar) |
| 150°F. (65°C.) | | | |
| 750 | 755/775B | 770 | 775/775B |
| 100 psi (7.0 bar) | 190 psi (13 bar) | 120 psi (8.1 bar) | 178 psi (12.3 bar) |


remove test gauge nozzle from fill valve **G**. The fill valve check will automatically close to seal.

8. Replace fill plug in fill valve.



WARNING

Before removing the complete fill valve **G** for repair, the precharge chamber must be totally depressurized or injury could result.



CAUTION

Use only the hose nozzle to relieve the pressure. Using nails, screwdrivers or similar objects will damage the fill valve.

7. After pressure reading is obtained, quickly

11.2.12 Refilling the Precharge Chamber

(Refer to Figure 11-12.)

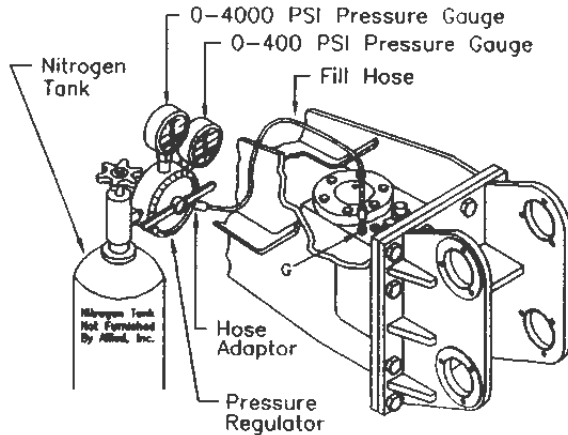



Figure 11-12. Filling the Nitrogen Precharge Chamber




WARNING

The nitrogen precharge chamber shall only be filled with 99.8% pure nitrogen gas . Make sure no other gas, e.g. air or oxygen, is allowed into the precharge chamber: THIS COULD RESULT IN AN EXPLOSION!

When the pressure in the nitrogen precharge chamber drops more than 15 psi (1 bar) at 70°F. (21°C.) or 20 psi (1.5 bar) at 150°F. (65°C.), the chamber must be refilled as follows:

1. Connect nitrogen regulator valve to nitrogen cylinder.
2. Clean the area around fill valve plug on cylinder head.
3. Connect one nozzle of the filling hose to the nitrogen regulator valve.
4. Back out the nitrogen regulator pressure adjustment.

5. Open valve on nitrogen cylinder.
6. Remove plug from fill valve **G**.
7. Carefully blow out filler assembly to remove any internal foreign matter.
8. Press free nozzle of filling hose into fill valve **G**. Maintain in this position by applying a steady but moderate force.
9. Open the nitrogen regulator valve slowly, allowing nitrogen into precharge chamber. Pressure increase can be read on the pressure gauge.
10. Allow approximately 15 seconds for gas chamber in Hy-Ram to fill, or, under quiet conditions, until the gas can no longer be heard entering the cylinder head.
11. Close the nitrogen cylinder valve when the reference value has been reached. Quickly remove fill nozzle from fill valve. The fill valve check will automatically close to seal. Refer to the table on page 11-12 for the correct pressure for the model number Hy-Ram being filled. Pressures are given for temperatures at 70°F. (21°C.) and 150°F. (65°C.)
12. Bleed remaining gas from regulator and disconnect it from nitrogen tank



CAUTION

Use only the hose nozzle to relieve the pressure. Using nails, screwdrivers or similar objects will damage the fill valve.

13. Press free nozzle of test hose into fill valve **G** and read pressure.
14. Make any adjustments necessary so that the correct pressure is set.
15. Close fill valve **G** with screw plug.
16. Remove nitrogen regulator from cylinder and recap.

11.2.13 Checking the High-Pressure Accumulator



WARNING

Never attempt to open or repair the high-pressure accumulator without the proper tools. Defective high-pressure accumulators must be replaced or rebuilt by a qualified service technician.

If the return line hose from the hammer (which normally pulsates lightly to moderately) starts to pulsate strongly, the high-pressure accumulator may not be working properly.

Turn off the Hy-Ram immediately. The high-pressure accumulator must be repaired or replaced by a qualified service technician.

11.2.14 Checking the Pins on the Top Mounting Bracket for Wear

Visually check the top mounting bracket pins every time the hammer is removed from the carrier. If the pins show signs of excessive wear, cracks, notches or dents, they must be replaced.

11.2.15 Checking Wear to the Box

The box shall be checked at least twice a month for cracks or heavy wear. Contact Allied for recommended repair or rebuild procedures.

11.2.16 Checking and Cleaning the Hydraulic Oil Filter Where Applicable

1. On new hydraulic hammer installations, clean the oil filter for the first time after eight (8) operating hours, and the second time after fifty (50) operating hours.
2. Thereafter, check the oil filter every 500 hours and clean if necessary.

11.2.17 Checking and Cleaning the Hydraulic Oil Filter on the Carrier

Refer to the carrier manual and change and clean the oil filter in the carrier as instructed.

SECTION 12.0

LIFTING & TRANSPORT


If the hammer is to be transported independently of the carrier:

1. Remove all loose debris from hammer.
2. Follow removal instructions in Section 7.9.
3. Secure hoses to unit to avoid accidental damage.
4. Lift the hammer at approved lift points only with appropriate lifting equipment. See Figure 12-1.

5. Adequately stabilize and secure the hammer for transport.

If the hammer is transported while installed on the carrier:

1. Remove all loose debris from hammer.
2. Secure hoses to unit to avoid accidental damage.
3. Inspect the mounting pins and hardware for damage and integrity.



WARNING

Do not lift the hammer by the mounting pins. The hammer may shift and cause damage or personnel injury.

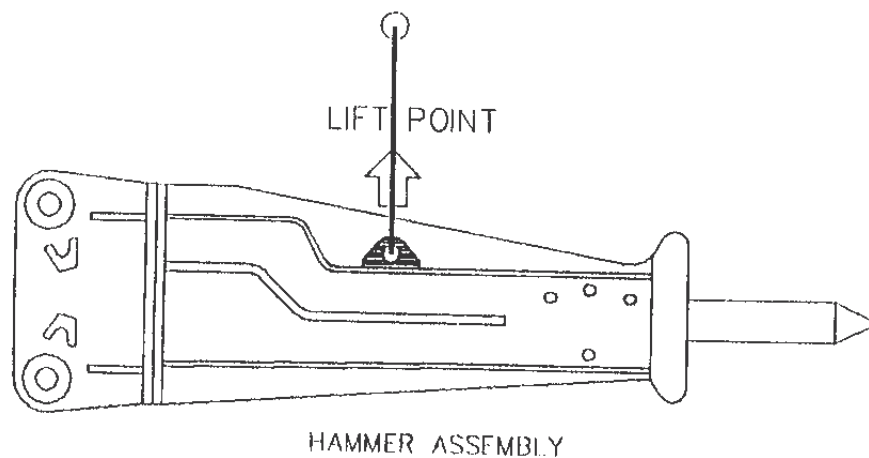


Figure 12-1. Hammer Lift Point

SECTION 13.0

STORAGE OF THE HAMMER

13.1 Storing Hy-Ram on the Carrier

The Hy-Ram shall be stored in the vertical position with the tool pushed all the way in. This lifts the piston into its uppermost position. In this position, the sliding surfaces are covered by oil.

13.2 Short Term Hy-Ram Storage off the Carrier—14 Days or Less

1. The Hy-Ram may be stored on or off the carrier in a vertical or horizontal position with no special storage requirements.
2. If storing the Hy-Ram in a horizontal position, the top of the hammer should be higher than the tool end to prevent water from entering the tool holder.
3. If outside, cover with a waterproof tarp.

13.3 Long Term Hy-Ram Storage off the Carrier—More than 14 Days

1. Refer to Section 8.3 and remove the demolition tool from the Hy-Ram.
2. Drain the nitrogen precharge chamber.
3. Remove the hydraulic hoses.



CAUTION

Several liters of oil will run out when threaded connections **P** and **T** are opened. This oil must be collected and disposed of correctly.

4. Open threaded connections **P** and **T**.

5. Using a rod or tube, push the piston to its highest position.
6. Block the piston with a rod or tube so it cannot return to the down or out position.
7. Fill the connections on the hammer with hydraulic oil.
8. Close threaded connections **P** and **T**.
9. Close the bore for the demolition tool using either the protective plug or a clean rag.
10. Plug all hydraulic connections on the carrier.



CAUTION

DO NOT store the Hy-Ram in the horizontal position.

The weight of the piston can cause flattening and damage to the seals and O-rings when storing a Hy-Ram in the horizontal position.

Surface condensation on the normally exposed lower area of the piston can cause destructive rust and pitting of the piston in the lower seal contact area.



CAUTION

Secure the hammer so that it cannot fall over.

11. Store the Hy-Ram blocked in an upright position or on a stand. The piston must be blocked in the upper position.

12. If possible, stand the hammer upside down.
The piston will slide to the top of the hammer.
13. If outside, cover hammer with a waterproof tarp.



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