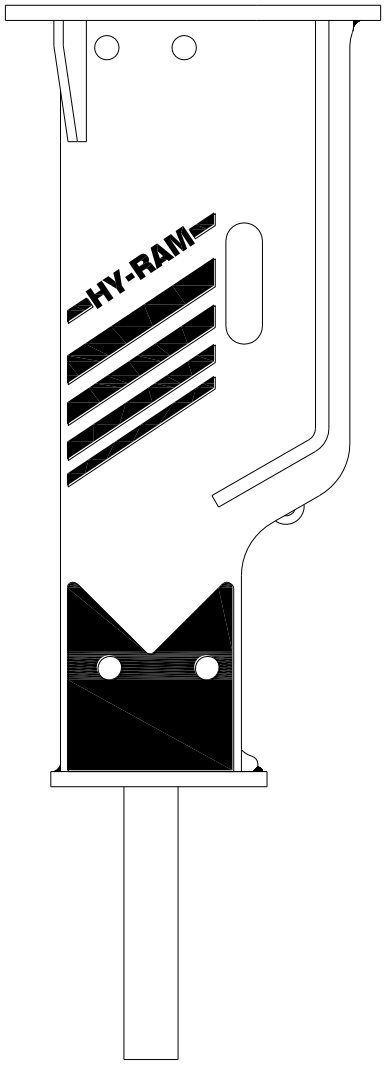
Manual Part No. 574603 REV JAN 10

HY-RAM

HYDRAULIC IMPACT BREAKER



HR25 HR50 HR75
HR100 HR150
HR200 HR300
HR400 HR500
HR750 HR1000
HR1200

ALLIED®
Construction Products, LLC

OPERATION and MAINTENANCE

Do not operate or service this equipment unless you have carefully read and understand all instructions and warnings contained in this manual.

Change Notice for Document 574603

Please note that material presented in this manual, including descriptions, illustrations and specifications, is subject to change without prior notice. Go to www.alliedcp.com for product or document updates.

Date	Page	Change
Jan 15, 2010	---	Original Issue of 574603
May 20, 2011	50, 51, 52	Add Tightening Torque Tables 12.4, 12.5

SAFETY INFORMATION

Be Alert to Safety Messages

Safety messages appear throughout this manual and on labels affixed to the Allied equipment. Read and understand the information contained in the safety message before attempting to install, operate, service or transport the Allied equipment.

Keep all safety labels clean. Words and illustrations must be readable. Before operating this equipment, replace damaged or missing labels.

Purpose of Safety Messages

The information provided in the safety message is important for your safety. These messages provide instructions on how to avoid injury from potential hazards associated with improper use, operation or handling of the Allied equipment. Read and follow the instructions in each safety message. Be aware of the consequence if these instructions are not followed.

Safety messages are arranged to provide the following information:

- Alert personnel to potential hazards
- Describe the severity of the hazard, if encountered
- Identify the nature of the hazard
- Instruct how to avoid the hazard

Safety Alert Symbol

ATTENTION, BECOME ALERT, YOUR SAFETY IS INVOLVED.
The exclamation point within an equilateral triangle is the safety alert symbol. The symbol is used to draw attention to the presence of potential hazards.

Signal Words

"DANGER", "WARNING" and "CAUTION" are used to express the different degrees of hazard seriousness. Learn to recognize and understand the severity and consequence associated with each of these signal words should a potentially hazardous condition be encountered.

"**DANGER"** identifies the highest degree of hazard seriousness. Its use is limited to the most extreme situations.

DANGER - Indicates an imminent hazard, which, if not avoided, **will** result in death or serious injury.

WARNING - Indicates an imminent hazard, which, if not avoided, **can** result in death or serious injury.

CAUTION - Indicates hazards which, if not avoided, **could** result in serious injury or damage to the equipment.

Additional Precautionary Messages and Instructions

Additional precautions and instructions found in this manual are preceded with – "**IMPORTANT"** and "**NOTE"**.

IMPORTANT - indicates instructions that if not followed, may damage the equipment.

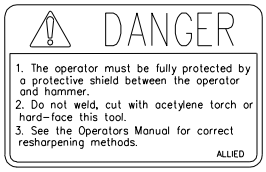
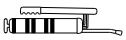
NOTE – Indicates instructions that highlight suggestions, which will result in enhanced installation, reliability, or operation.

SAFETY INFORMATION

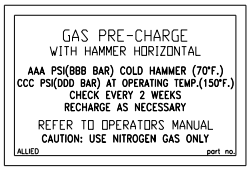
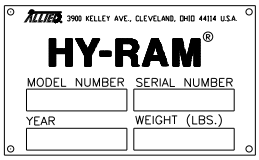
Label Description and Location

This section reviews the safety and identification labels affixed to the Allied equipment. These labels are in the location shown in Figure 3-1.

Keep all safety labels clean. Words and illustrations must be readable. Before operating this equipment, replace damaged or missing labels. Refer to the Parts Manual for part number identification.

Location	Label	Description
1		**TOOL SHARPENING** – Decal warns against welding, cutting, or hard-facing the tool. It directs personnel to the Operator's Manual for approved sharpening methods.
2		**FLYING PROJECTILES** – Decal alerts of a protective guard to shield the operator from projectiles thrown from the breaker. It directs personnel to the Operator's Manual for safety instructions. **NOTE: Place the smaller size decal in a conspicuous location inside the operator's cab.**
3		**STAY CLEAR** – Decal alerts personnel and by-standers to maintain a safe distance from the Breaker during operation.
4		**MAXIMUM PRESSURE** – Decal indicates the maximum operating pressure.
5		**ALLIED LOGO** – This decal is the Allied brand identifier and is a registered trademark of Allied Construction Products, LLC.
6	 	**LUBRICATION** – This decal identifies the lubrication point and frequency. Also directs personnel to position the breaker vertically and apply contact pressure to tool before lubricating.

SAFETY and IDENTIFICATION LABELS (Cont'd)

Location	Label	Description
7		**LIFT POINT** – Decal identifies approved lift points.
8	**HY-RAM HR 100**	**MODEL** – Decal identifies the specific model.
9		**PRESSURIZED NITROGEN ACCUMULATOR** – Decal warns of pressurized gas and directs personnel to the Repair Manual for service instructions.
10		**READ INSTRUCTIONS** - Decal directs personnel to the manual for further information / instructions.
11		**PRESSURE I.D. TAG** - The hydraulic supply hose is tagged for ease of identification.
12		**GAS PRE-CHARGE**– Decal identifies head cap charging point and pressure requirements. Directs personnel to position the breaker horizontally before checking or filling. Refers personnel to the Operator's Manual. Cautions personnel to use nitrogen gas only.
13		**ID PLATE** - Contains identifying information about the equipment, including: Manufacturer's name, address, product name, model number, serial number, year of manufacture, and weight.

SAFETY and IDENTIFICATION LABELS (Cont'd)

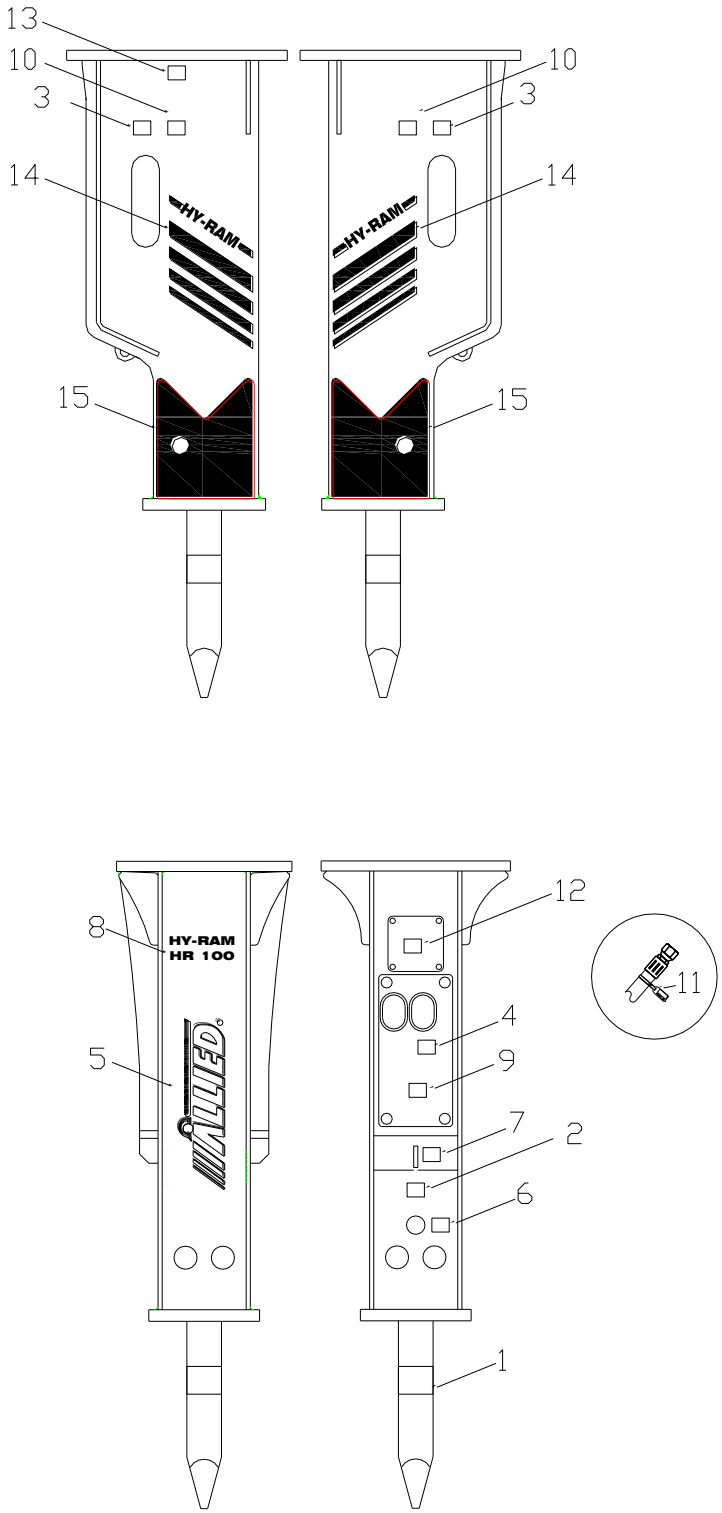


Fig. A
Label Locations

SAFETY INFORMATION

Overview of Safety Messages Used in This Manual

For the purposes of this manual, pictographs displayed in safety messages are defined as follows.

- Read the manual
- Refer to the manual for further details
- Procedures are explained in the manual

See the Service Manual For Additional Information

- Crush point

- Pinch point

Moving part (in direction indicated by arrow)

- Falling object
- Unsupported loads

Personal protection equipment

- Hearing protection

- Safety eyewear

- Gloves

- Safety shoes
- Falling part

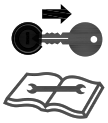
- Safety Alert Symbol
- Stay clear
- Maintain a safe distance

Flying projectiles

Fluid injection

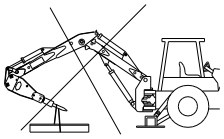
Part gets hot during operation

Pressurized gas



Shut off carrier & remove key before servicing

Identifies lift point



Prohibited action
Illustration covered with X-out

Prohibited action
Circle surrounding illustration with diagonal slash running from top left to bottom right

SAFETY INFORMATION

Before Operating Any Equipment

Read the Manual

This manual contains important information for the safe and proper use of the Allied attachment. Read, understand and follow all safety instructions described in this manual before installing, operating or servicing the Allied equipment.
Read and understand all safety precautions and operating instructions found in the manuals provided by the carrier manufacturer. Do not operate the carrier, or perform any inspection, maintenance or service to its systems unless you are qualified.

Qualified Person

For the purposes of this manual, a qualified person is one who:

- Has read, understands and adheres to all safety messages in this manual.
- Is competent in recognizing potential hazards and possess the skills and knowledge necessary to make prompt decisions resulting in appropriate actions to safeguard against personal injury and property damage.
- Has received adequate training in safe and proper installation, maintenance and operation for this Allied equipment.
- Is authorized to operate, service and transport the Allied equipment.

Allied cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this manual and labels affixed to the Allied attachment are therefore not all inclusive.

Owner's Responsibilities

The equipment owner is responsible to ensure that only qualified personnel operate and service the Allied attachment.

Qualified personnel must adhere to the procedures explained in this manual, especially regarding personnel safety.

If necessary, the owner or safety/training personnel must expand upon these general instructions and adapt them to particular applications.

General Construction Safety

Always follow procedures that promote safe conditions for workers and bystanders. The standard safety precautions expected and required of those working in construction shall include, but not limited to: locating existing underground service and utility lines, establishing pedestrian barriers and using personnel protection equipment, etc.

Federal, State, Local and OSHA Construction Guidelines and Regulations

Use the Allied equipment 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. Box 371954 Pittsburgh, Pa. 15250-7954

Website: www.osha.gov

Ask for Construction Industry OSHA Standards Stock #869-034-00107-6.

Operational Safety Program

The safe and efficient use of the Allied attachment depends upon proper installation, operation, maintenance and repair. Operational safety programs must encompass all of these factors.

Accident prevention through operational safety programs are most effective when the equipment owner further develops the program by taking into account his own experience in using and maintaining equipment.

Developing such programs will help minimize equipment downtime, while maximizing service life and performance. Most importantly, it will minimize the risk of personal injuries and equipment damage.

AEM Safety Manual

The Association of Equipment Manufacturers publishes a series of safe operation manuals, including Hydraulic Mounted Breakers. These are available by contacting:

Association of Equipment Manufacturers
Toll free 1-866-AEM-0442
E-mail: aem@aem.org
Website: www.aem.org

Ask for FORM MB-140. Or, contact Allied Construction Products, LLC for a copy of 953076.

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TABLE OF CONTENTS [cont'd]

LIST OF FIGURES

SECTION 1.0
ABOUT THIS MANUAL

1.1 Purpose of This Manual

The Operation and Maintenance Manual outlines important information for the safe and proper use of the Hy-Ram Breaker. The contents provide information regarding:

- Safety Messages
- Technical specifications
- Lubrication of Tool & Bushing
- Remove & Install breaker tool
- Gas charging instructions
- Impact blow adjustment
- Inspection & Maintenance
- Troubleshooting
- Lifting, transporting & storage

This manual is an integral part of this product. Keep it in a convenient location so that it is easily accessible for future reference.

Table 1.1 Operation and Maintenance Manual No. 574603

Product Name:	Hy-Ram
Model[s]:	HR25 HR50 HR75 HR100 HR150 HR200 HR300 HR400 HR500 HR750 HR1000 HR1200
Years of Manufacture:	2010 & Above

Material presented in this manual, including illustrations and descriptions, is intended solely for use with the equipment identified in this table and may not be suitable for other models. Prior to use, confirm that the information recorded on the Equipment Identification Plate corresponds with the above. For the location of the ID Plate, refer to Section 2.0.

Material presented in this manual, including descriptions, illustrations and specifications, is subject to change without prior notice. Amendments to this manual are described at the beginning of this manual under “Change Notice”.

1.2 Additional Manuals

Further information on the Hy-Ram Breaker can be found in the following manuals:

Parts Manual [Varies with model]

The Parts Manual identifies individual components for the purpose of replacement. It does not contain safety warnings, operating instructions or any information about the maintenance and repair of this Allied product.

Operation and Maintenance 574603

The Operator’s Manual outlines important information for the safe and proper use of the Hy-Ram Breaker. It also provides:

- Technical specifications
- Lubrication of Tool & Bushing
- Remove & Install breaker tool
- Gas charging instructions
- Impact blow adjustment
- Inspection & Maintenance
- Troubleshooting
- Lifting, transporting & storage

Repair Manual 574604

The Repair Manual provides information for the disassembly & reassembly of the Hy-Ram Breaker. Contents of the Repair Manual include:

- Safety Messages
- Disassembly & Reassembly
- Bolt torque specifications
- Inspection of wear parts
- Gas charging instructions
- Bushing Replacement

SECTION 2.0
EQUIPMENT IDENTIFICATION

2.1 Serial Number Location

Refer to Figure 2-2. The Serial Number assigned to this equipment can be found in the following locations:

1. Stamped on the Equipment Identification Tag
2. Above the IN and OUT ports.

2.2 Equipment Identification Tag

Refer to Figure 2-2. The Equipment Identification Tag is affixed to the housing plates. It provides the following information:

- Manufacturer's name
- Address
- Product name
- Model number
- Serial number
- Year of manufacture
- Weight

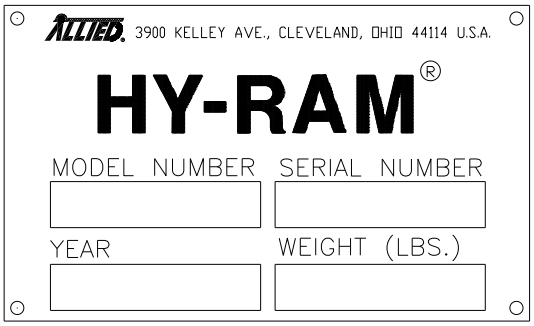


Fig 2-1
Equipment Identification Tag

Verify that the information contained on the Tag corresponds with the information provided in Section 1 of this manual.

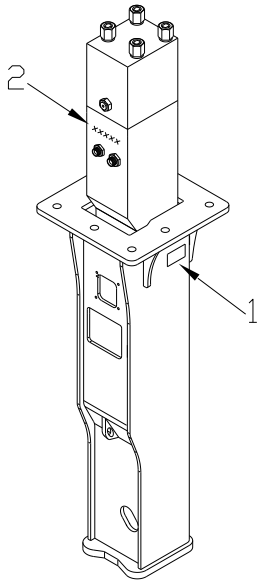


Fig 2-2
Equipment Identification (1) Equipment ID Tag, (2) Serial number located above hose connections [IN] [OUT]

2.3 Record Equipment ID Information for Future Reference

- Copy the Model and Serial Number from the Equipment Identification Tag to the space provided below.
- Indicate the date in which the Allied equipment was placed into service.

Model: _____

Serial Number: _____

In service date: _____

- Your local Allied dealer requires this information to better assist you with questions regarding parts, warranty, operation, maintenance, or repair.
- Register this equipment by returning the completed warranty registration form to Allied.

SECTION 3.0
WARRANTY PROTECTION SUMMARY

3.1 Overview

The Allied attachment is delivered assembled, lubricated, and factory tested. Upon receipt of the equipment, inspect for possible shipping damage.

For every new Breaker, Allied requires that a Warranty Registration form be completed and returned to Allied. The form has a section to record information about the carrier on which the breaker is being installed.

To keep the Allied equipment operating within its performance limits, familiarize yourself with the technical specifications section of this manual. Follow the specifications when calibrating the carrier. Improper installation, including failure to calibrate the carrier correctly may result in loss of performance or subject the equipment to conditions beyond their design. Use of non-Allied parts, unapproved service methods, modifications to the attachment, or installation, operation and maintenance, not in accordance with the instructions outlined in this manual may cause equipment failure or personal injury. For details regarding warranty terms and conditions, refer to document 574490.

3.2 Owner's Responsibilities

When properly installed, operated and maintained by qualified personnel, the Allied attachment will remain productive with a minimum of service. The following outlines general maintenance policies required for all Hy-Ram models. The equipment owner is strongly encouraged to further develop these general guidelines and adapt them in order to manage particular applications and operating environments.

Ensure that personnel entrusted with installation, operation, maintenance and transporting of the Allied equipment adhere to the following:

- Read and thoroughly understand the information and procedures detailed in this manual.
- Understand proper operating techniques for all recommended applications.
- Use the Allied attachment only if it is in sound operating condition. Immediately rectify any faults that, if left uncorrected, could lead to personal injury or further damage.
- Use the Allied attachment only for the purpose for which it is intended.
- Appoint Who Does What. Ensure that all personnel understand what their specific responsibilities include.
    1. Establish maintenance responsibilities to be performed by the OPERATOR.
    2. Establish maintenance responsibilities to be performed by the SERVICE TECHNICIAN.
- Recognize problems and know how to take corrective action as detailed in Troubleshooting Section 10.0.
- Conduct regular checks and inspections as scheduled in the Care and Maintenance Section 11.0.
- Allow only qualified operators and Allied trained service technicians to perform maintenance and repair as specified in the care and maintenance schedule.

- Use only genuine Allied replacement parts and recommended lubricants to protect total warranty coverage.

- Maintain written records of equipment maintenance, service and repair. These records are helpful if warranty coverage is ever in question.

Each record shall include at least:

- Date of service, maintenance or repair.

- 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.

3.3 Allied Product Policies

In this manual, Allied recommends Hy-Ram applications, maintenance and service consistent with industry practices.

Allied assumes no responsibility for the results of actions not recommended in this manual and specifically the results of:

- Improper Training

- Improper Installation

- Operation in unapproved applications

- Incorrect operation

- Improper maintenance

- Use of non-genuine Allied replacement parts

- Unapproved modifications

These exclusions apply to damage to the Allied equipment, associated equipment and injury to personnel.

SECTION 4.0
OVERVIEW

4.1 Description and Application

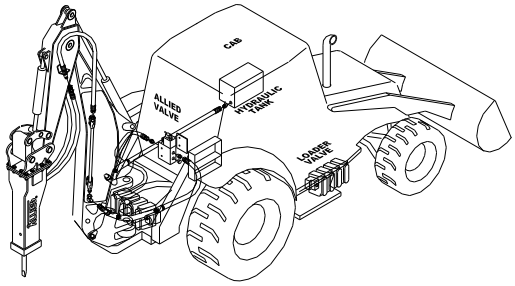


Fig 4-1
Hy-Ram on TLB

The Allied Hy-Ram is a hydraulic powered impact breaker designed for mounting on mobile equipment with hydraulic booms, such as rubber tired or track-type construction vehicles.

The Hy-Ram is suited for many types of construction and mining applications including -

- Clearance Work: Demolition of buildings, bridges, reinforced foundations etc.
- Trenching: Breaking trenches out of rocky and frozen ground.
- Mining and Quarrying 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.

4.2 Principle of Operation

- The hydraulic system of the host machine is utilized to supply power to the Breaker. Switching the Breaker on and off is managed from the operator's cab.
- Within the cylinder, the up and down travel of the piston is governed by the control valve located on the Breaker.
- As the piston travels up, the gas pre-charge inside the head cap is compressed like a spring under tension.
- When the piston has reached the top, the control valve shifts. The piston is driven down by oil pressure and assistance from the gas charge.
- The piston strikes the breaker tool and the cycle is repeated until the machine operator switches the valve located on the carrier off.

4.3 Main Components

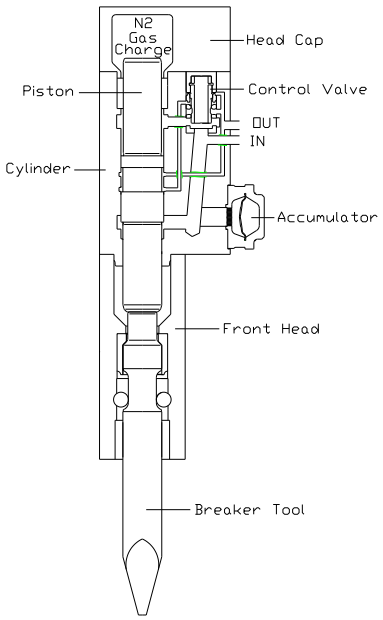


Fig 4-2
Main Components of Power Cell

SECTION 5.0
OPERATION

5.1 Before the Breaker is Used

Before the Breaker is used, check that it has been properly serviced with all scheduled maintenance and repairs completed.

5.1.1 Pre-Operation Check List

The following must be conducted by qualified personnel.

- ❑ Breaker is properly secured to the carrier.
- ❑ Breaker tool is lubricated
- ❑ Test operation of Autolube (if equipped). Check grease level
- ❑ Breaker tool is locked securely in the front head
- ❑ Hose clamps are secure
- ❑ Check for missing or loose fasteners

Do not operate breaker until all faults are corrected.

5.1.2 Tools Required for Maintenance

NOTE: Be sure service tools are readily available. The following tools are required:

- Safety eyewear & gloves
- Grease gun
- Gas charge kit
- Sledge Hammer
- Screw driver
- Drift pin
- Socket wrenches
- Combination wrenches
- Tool for measuring tool wear

5.2 Operating the Breaker

⚠ CAUTION

Protect against injury from flying projectiles. The operator's cab must be fitted with a guard to shield against rock fragments thrown from the breaker.

⚠ CAUTION

Prolonged exposure to high noise levels may cause hearing impairment or loss. All persons in the immediate area, including the carrier operator, must wear hearing protection.

⚠ CAUTION

The breaker shall be operated by qualified personnel only. Operate the breaker only when seated in the operator's seat and only after the carrier and breaker are correctly positioned.

IMPORTANT

Serious equipment damage may result if proper procedures are not followed. To increase the equipment's service life, pay particular attention to correct working methods.

- Do not start work until all work site hazards are identified, including electrical and gas utilities. Clear out all personnel before maneuvering the carrier and breaker into the work area.
- Use the boom and arm controls to extend the breaker away form the carrier.
- Position the breaker tool against the material to be broken.

NOTE: Always place the breaker tool at right angles to the material surface. See

Fig. 5-1. This will keep the tool centered and prevent it from binding against the bushings. Use the boom, arm and bucket controls to square the breaker up to the material.

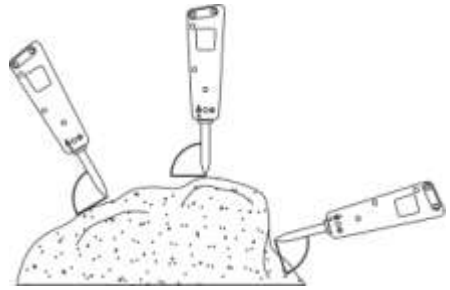


Fig. 5-1
Operate at 90° Angle to Work Surface

- With a "firm preload" applied on the breaker tool, the breaker is ready to operate.

IMPORTANT
Serious equipment damage may result if proper procedures are not followed. Select proper engine speed and set function mode to "BREAKER".

- Actuate the control that fires the breaker.

- Use the boom, arm and bucket controls to follow the progress of the breaker through the material.

NOTE: Maintain a constant feed force on the tool as it penetrates the material. Insufficient force will generate strong vibrations back to the carrier.

- Stop the breaker immediately when the tool breaks through.

NOTE: Pay attention to the sound coming from the breaker and adjust accordingly.

- A metallic sound coming from the breaker indicates that the tool is striking against the retainer pins. "Idle strokes" are damaging to the breaker and will cause rapid wear of the retainer pin. Use the boom, arm and bucket controls to follow the progress of the breaker through the material. Maintain constant contact with the material. If the material is weak and fractures easily after only a few short blows, anticipate when it will break and stop the breaker before idle strokes begin.

- A hollow sound, usually accompanied by a drop in blow frequency and reduced impact energy, is a sign that the tool is binding in the bushing. Operate at 90° angles to the work surface. Keep the tool centered in the bushing by using the boom, arm and bucket controls. See figure 5-1. Binding also indicates that the tool is dry and requires immediate lubrication.

NOTE: Failure to work the breaker at right angles will accelerate tool and bushing wear.

NOTE: Start breaking large and hard material near the outer edge and advance inward. See figure 5-2.

NOTE: It is normal for the breaker tool to become hot during use. When breaking extremely hard materials, exercise care to prevent overheating the breaker tool. Avoid long continuous hammering in one spot, which will rapidly heat the breaker tool. If the material is not broken after 15 seconds of hammering, stop the breaker and reposition the breaker tool nearer the edge. Refer to Figure 5-2.

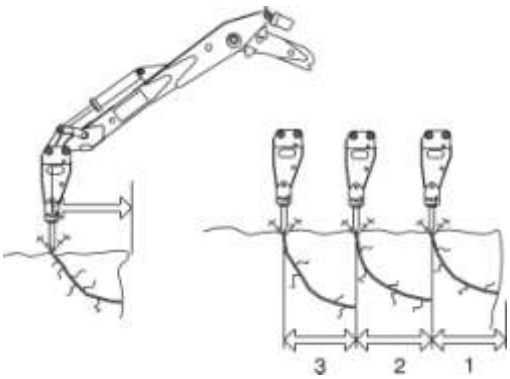


Fig 5-2
Work From Outer Edge and Advance Inward

NOTE: If rock dust accumulates under the breaker tool, this can absorb some of the breaker's impact energy. Use the boom, arm and bucket controls to carefully tilt the breaker, and expel the rock dust. To avoid bending strain, which can damage the breaker tool, bushing and housing, limit the tilt angle to no more than 5º.

Fig 5-3
Tilt the Breaker No More Than 5°

5.3 Incorrect Use of the Breaker

IMPORTANT
Serious equipment damage may result if proper procedures are not followed. Carefully read through this section. It describes actions that can damage the breaker if not avoided.

5.3.1 Do Not Pry With the Breaker
[Refer to Fig 5-4]

Bending the breaker tool is the leading cause of tool breakage. Bending is the result of misalignment or prying. By using the Breaker as a pry bar, an enormous amount of force is leveraged over the entire Breaker, including the breaker tool, bushings and housing. In the occurrences of failure, the length of the tool, skill of the operator and lubrication management, all play a decisive role.

Fig 5-4
Do Not Pry With The Breaker

5.3.2 Do Not Drive Breaker Tool into the Material [Refer to Fig 5-5]

Fig 5-5
Never Drive Breaker Tool Into Material

Do not bury the breaker tool. It then could become wedged in the hole.

5.3.3 Do Not Pound (or Hack) the Breaker At the Material
[Refer to Fig 11-6]

Fig 5-6
Do Not Pound the Breaker at the Material

Pounding (hacking) the Breaker into the material is damaging to the breaker and will rapidly deteriorate the thrust ring.

5.3.4 Do Not Lift or Transport Loads with the Breaker
[Refer to Fig 5-7]

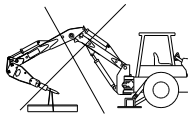
⚠ **CAUTION**
 The Breaker is not designed to lift or transport loads. This practice is unsafe and can damage the Breaker.

Fig 5-7
Do Not Use Breaker To Lift Or Transport Objects

5.4 Special Operating Conditions

5.4.1 Stroke Adjuster

Hy-Ram Breakers, models HR150 thru HR1200, are equipped with a stroke adjuster. The stroke adjuster changes the stroke length of the piston, which in turn changes the Breaker's impact force and the number of blows per minute.

The stroke adjuster is used to match the impact force of the breaker with the type or thickness of the material being broken. Thinner or softer materials require less force to break through. Breaking materials when full energy is unnecessary can result in damaging idle blows. Lowering the impact force offers the operator better control in applications such as breaking rip rap or weakened concrete.

The breaker is sent from the factory with the stroke adjuster closed. This setting provides maximum impact force.

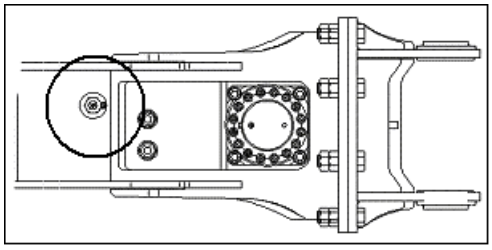


Fig 5-8
Location of Stroke Adjuster

The stroke adjuster is located on the hose side of the breaker, just below the hose connection.

To change the stroke adjuster setting requires the following tools:

- Open end wrench
- Hex wrench
-

⚠ WARNING

Avoid serious injury or death. If attached to a carrier, lower the breaker to a flat stable surface. Ensure all loads are stabilized.

⚠ CAUTION

Hot parts may cause burns. Do not touch until cool. It is normal for the breaker tool to become hot during operation. Before handling, allow sufficient time for parts and fluids to cool.

1. Lower Breaker to ground, shut off engine
2. Remove cover
3. Loosen lock nut
4. Turn adjuster counter-clockwise to decrease impact force
5. Each 1/8 turn of the adjuster will change the number of blows by approximately 10 – 15 blows per minute.
6. Tighten lock nut.
7. Operate the breaker several times to ensure that the impact force is adjusted to the desired level.
8. Reinstall cover

IMPORTANT

Serious equipment damage may result if proper procedures are not followed. Do not turn the adjuster counter-clockwise more than one full turn. After one full turn there is no further affect on the frequency.

5.4.2 Working Underwater

IMPORTANT

Serious equipment damage may result if proper procedures are not followed. Never submerge the Breaker in water without proper modifications.

Working underwater requires special precautions and preparation to avoid damaging internal components, including

the piston and seals. Contact Allied's Technical Service Department for further instructions.

5.4.3 Working Underground

When using the Breaker underground [tunneling or mining applications] special safety 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 Breaker. With some fluids, decreased flow and/or pressure to the Breaker may be necessary.

5.4.4 Working in Hot Temperatures

IMPORTANT
Serious equipment damage may result if proper procedures are not followed. Check the oil temperature often to insure it does not exceed 176ºF [80ºC]. If higher temperatures are measured in the tank, refer to the Troubleshooting Section in this manual.

Check the oil temperature frequently to ensure it does not exceed 176ºF [80ºC]. If higher temperatures are measured in the tank, check the following:

- Reservoir is filled to proper level
- In general, the hydraulic oil that was originally specified for the machine by the carrier manufacturer can be used with this equipment. Specify hydraulic oils with viscosity suitable for the climate conditions. Use oil viscosity based on the expected air temperature range during the period between oil changes.
- Inspect the cooling system. Good air circulation is essential in dissipating heat from the hydraulic oil. Make sure the cooler is clean.

5.4.5 Working in Cold Temperatures

IMPORTANT
Serious equipment damage may result if proper procedures are not followed. When working in temperature conditions below minus 4ºF [-20ºC], operating the Breaker with cold hydraulic oil may damage the seals.

At temperatures below minus 4º F [-20º C], the hydraulic oil must be warmed up before starting the Breaker.

- Refer to the manuals provided by the carrier manufacturer for instructions on warming up the carrier.
- Keep the oil circulating in the carrier during pauses in work to prevent it from falling below a temperature that is too cold for normal operation.
- In general, the hydraulic oil that was originally specified for the machine by the carrier manufacturer can be used with this equipment. Specify hydraulic oils with viscosity suitable for the climate conditions. Use oil viscosity based on the expected air temperature range during the period between oil changes.

SECTION 6.0
CARE and MAINTENANCE

6.1 Inspection & Maintenance Schedule

During Shift

- ❑ Lubricate breaker tool every two hours or anytime the tool appears dry
- ❑ Check for correct operation of autolube, if equipped
- ❑ Monitor hydraulic oil temperature to assure readings are within the normal operating range
- ❑ Check for fluid leaks
- ❑ Observe breaker efficiency and smoothness of operation, always looking and listening for anything unusual

Daily

- ❑ Check breaker tool is secured in front head
- ❑ Check for loose or missing fasteners
- ❑ Check tubes and hoses for fluid leaks
- ❑ Check tubes and hoses for movement inside clamp
- ❑ Check condition of mounting bracket for wear or cracks
- ❑ Check mounting pins and keepers – Ensure breaker is securely attached to carrier
- ❑ Check housing for wear and cracks
- ❑ Inspect housing pads and dampers for wear. Check for excessive movement inside housing.

Weekly

- ❑ Check breaker tool and bushing clearance

Every Two Weeks

- ❑ Measure gas charge in head cap
- ❑ Remove breaker tool. Check pin slot area for burring
- ❑ Check breaker tool (impact face) for wear, cracks or chips
- ❑ Check condition of retainers for wear, cracks or chips
- ❑ Check piston (impact face) for wear, cracks or chips
- ❑ Check thrust ring (impact face) for wear, cracks or chips

Monthly

- ❑ Measure hydraulic oil pressures

At Rebuild

- ❑ Replace all seals, accumulator membranes and bushings.
- ❑ Charge accumulator

After rebuild, check carrier for:

- ❑ Condition of hydraulic oil
- ❑ Service hydraulic oil filter
- ❑ Test the Breaker circuit using a flow meter and pressure gages.

If any step in the inspection indicates a problem, have it checked out and repaired immediately. Keep a detailed log of inspection and service information. This can be used to identify problem areas and trends.

	By	Date

6.2 Importance of Inspection and Maintenance Records

Routine maintenance and following recommended service intervals help identify parts in need of repair or replacement.

Maintain written records of equipment maintenance, service and repair. These records are helpful if warranty coverage is ever in question.

Each record shall include at least:

- Description of the service, maintenance or repair performed.
- Copy of the purchase order or invoice, including part numbers used in the repair, if applicable
- The name of the person performing the service, maintenance or repair
- Date of service, maintenance or repair

6.3 Care and Maintenance Details

6.3.1 Lubricating the Breaker Tool

The location of the lubrication point will vary with model. For all models, only one lubrication nipple is used.

IMPORTANT
Serious equipment damage may result if proper procedures are not followed. Minimize friction related damage by regularly lubricating the breaker tool every two hours or whenever the breaker tool looks dry.

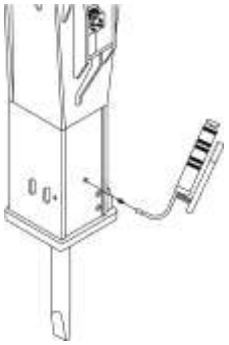
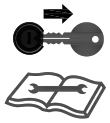


Fig 6-1
Lubrication Point for Breaker Tool
(Location Varies with model)

WARNING
 Engage interlock and shut off carrier. Follow all safety instructions in the manual provided by the carrier manufacturer.

WARNING
 Avoid serious injury or death. Breaker must be supported when lubricating the tool.

WARNING
 Avoid serious injury or death. Do not crawl between carrier and breaker.

IMPORTANT
Serious equipment damage may result if proper procedures are not followed. Refer to Fig. 6-2. Conventional greasing with a standard hand-operated or power-assisted grease gun requires standing the breaker upright and with the breaker tool pressed firmly into the ground before lubricating. At no time is it permissible to lubricate the breaker without contact pressure applied to the breaker tool.

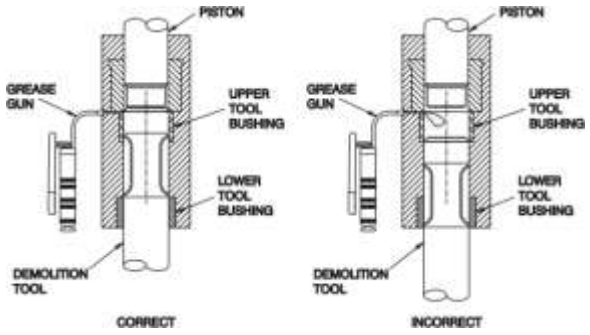


Fig 6-2
Correct vs. Incorrect Lubricating Position

How to lubricate the breaker tool:

1. On stable and level ground, stand the breaker vertically and push the breaker tool firmly against the ground.

2. Engage interlock and shut off carrier.

3. A standard hand-operated grease gun can be used to lubricate the tool.

4. Remove cover and press grease gun over lubrication nipple. Pump lever until lubricant emerges from around lower tool bushing.

6.3.2 Automatic Grease Lubricators

[Refer to Fig. 6-3 & 6-4]

As an option, Allied offers automatic grease lubricators that pump a semi-continuous supply of lubricant to the demolition tool and bushings. There are two styles of lubricators to choose from. One is designed for mounting to the carrier. The other is mounted directly to the breaker.

- The Carrier Mounted Lubricator (BreakerLube CML) is shown in Fig 6-3. This unit is powered by an electric motor and comes with a large refillable reservoir. It features a low level monitoring circuit that prevents breaker operation if the reservoir is empty. To accommodate larger breakers, the lubricator is configured with up to three pumping elements. Standard pumping elements are fixed displacement. Variable displacement elements are available upon request. Install kits are available from Allied and include mounting hardware, hoses and connections.

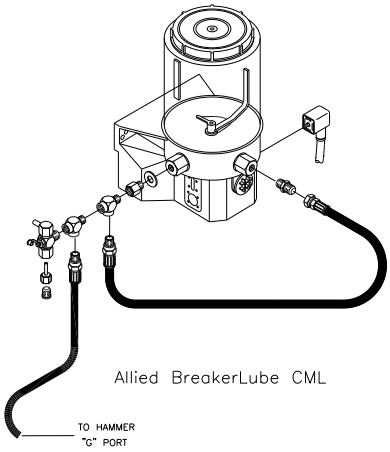


Fig 6-3
Carrier Mounted Lubricator

- The Breaker Mounted Lubricator is a compact unit and is mounted directly on the breaker. Typical mounting locations include the housing or mounting bracket, as shown in Fig 6-4. This model is hydraulically powered and uses a standard grease cartridge. The tool and bushing receive a shot of grease each time the breaker starts. When stopped, the piston inside the lubricator is reset by a spring. This action draws grease from the cartridge and into the pump chamber. When the breaker is started again, hydraulic pressure strokes the piston and delivers another shot of grease to the breaker tool. Install kits are available from Allied and include mounting hardware, hoses and connections.

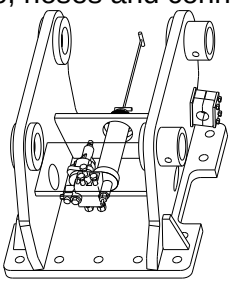


Fig 6-4
Breaker Mounted Lubricator

6.3.3 Chisel Paste

A key element in improving the wear resistance of the bushing and tool is through the regular use of a high-quality lubricant. Allied Chisel Paste performs exceptionally well in this application because it's a "specialty" lubricant, formulated for use in heavy loaded reciprocating motion and high heat applications. If Allied Chisel Paste is not available, use a high quality, high temperature, EP-type grease containing the highest percentage of molybdenum disulfide [MoS2] available.

6.4 Front Head Components

[Refer to Fig. 6-5]

Front head components consist of the breaker tool, bushings, thrust ring and retainers. Due to the harsh conditions that these components are exposed to, frequent inspections are required. The condition of these parts can deteriorate quickly unless they receive regular maintenance. Over time, these parts will wear and will eventually require replacement. When the time comes to replace these parts, special tools and training are necessary. Contact your Allied distributor.

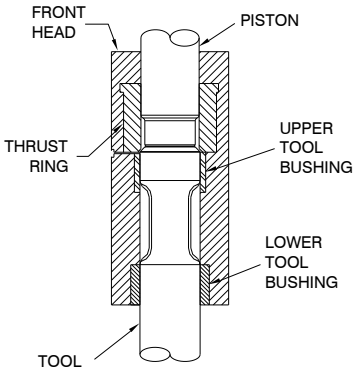


Fig 6-5
Front Head Components

6.4.1 Inspect Front Head Components – Every 2 Hours

The breaker tool must be lubricated every 2 hours. Use this opportunity to make a quick inspection of the front head components.

- Check that the tool is properly secured by the retainers
- Inspect the shank of the tool for galling
- Look at the gap between the tool and lower bushing. See Section 6.4.3 for further details.
- Take notice of any oil seepage on the tool, as this may indicate a more serious condition

6.4.2 Inspect Front Head Components – Every 100 Hours

Some front head components are viewable only when the breaker tool is removed. A thorough inspection of all front head components must be done each time the tool is removed. Every 100 hours, remove the breaker tool. Use a rag to wipe off the grease from the bushings and retainers.

Check the front head components for wear and damage. Table 6.1 includes a list of conditions commonly associated with Front Head components

- Breaker Tool for burring (1) in pin slot
- Retainers for burring (1), heavy wear (3) or chipping (2).
- Tool, bushings and retainer for galling (3)
- Bushing is cracked (4)
- Piston impact face for chipped edges (5)

Table 6.1 Front Head Inspection		
(#)	Cause*	Remedy

1	Tool is twisting in material	Conical point is less susceptible to burring
2	Idle blows	Apply down pressure. Stop breaker as soon as material breaks.
3	Lack of lubrication	Grease every 2 hours or if tool appears dry
4	Side loading	Do not pry with Breaker
5	Tool misalignment	Worn tool and / or bushing

*If left uncorrected, these can lead to serious damage that may result in costly repairs.

6.4.3 Measure Tool and Bushing Wear

When the breaker tool and bushing are new, only a slight amount of side-to-side movement exists between them. Over time, these parts will wear. Several factors affect the longevity of these components. The most apparent of these are operator technique, lubrication frequency and the abrasiveness of the material. Wear of the bushing and breaker tool cannot be prevented, however it can be minimized through proper operating techniques and frequent lubrication with chisel paste. As these parts wear, the gap between these components will increase. Serious damage can occur to the breaker if the gap is beyond the limits shown in the table. Check the gap between the breaker tool and bushing weekly. Replace worn parts if necessary.

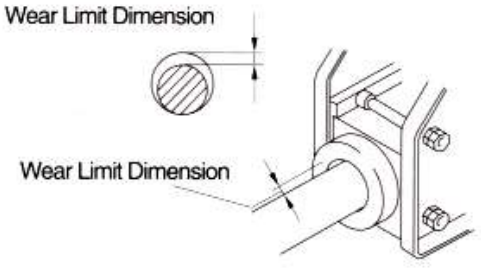


Fig 6-6
Measuring Bushing & Tool Wear

Table 6.2 Tool & Bushing Wear Limit	
Model	Gap Inch [mm]
HR25, HR50, HR75, HR100	3/16 [5]
HR150, HR200, HR300, HR400	1/4 [6]
HR500, HR750	5/16 [8]
HR1000, HR1200	3/8 [10]

IMPORTANT
Use caution when using a grinder to remove burrs. Gradually remove burrs to prevent over-heating the steel.

6.4.4 Check Tool Retainers

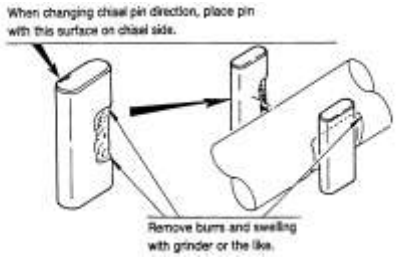


Fig 6-7
Inspect Tool Retainer & Tool Slot

1. Inspect tool retainers each time the breaker tool is removed.

2. Retainers should be rotated when surfaces show uneven wear or possess deep notches.

6.4.5 Inspect Impact Face of Piston

Inspect the impact face of the piston each time the breaker tool is removed or at least once a month.

Remove the breaker tool and inspect the piston's impact surface. The impact surface should be flat and smooth.

If surface is cupped or cracked, or if indentations, chips or sharp edges are visible do not operate the Breaker. Contact your authorized Allied service center.

Fig 6-8
Damaged Piston Impact Face

6.4.6 Threaded Connections

IMPORTANT
Keep fasteners tight. Replacement fasteners must be the same type and grade. Replace damaged or missing fasteners prior to operating equipment.

Threaded fasteners are subjected to high stresses. All threaded fasteners must be checked daily for the first 50 operating hours and once a week thereafter. Tighten loose fasteners to the specified torque.

6.4.7 High-Pressure Accumulator

⚠ WARNING

The accumulator contains gas under pressure. The gas must be released before disassembly. Special tools and training are required to service the accumulator.

⚠ WARNING

If breaker is attached to carrier, relieve all hydraulic pressure inside breaker and attachment circuit before accumulator is serviced.

The accumulator does not require any service between rebuilds. Only a daily visual inspection of the accumulator housing and bolts is required. Oil leaking from the accumulator is an indication of damaged seals, membrane or loose bolts. If the rubber membrane should fail, the gas charge is lost.

Losing the gas charge does not stop the Breaker from functioning, but the operator should notice a reduction in performance. Indications of a blown accumulator include one or more of the following conditions:

- Loss in breaking power
- Decrease in blow frequency
- Strong pulsations in hoses
- Oil leaking from around the accumulator

The operator must remain alert, always looking and listening to signs that may indicate a potential problem. If any of these symptoms are observed, the operator shall cease Breaker operation immediately and call the service technician for repair. Neglecting or delaying repair will cause serious damage the equipment.

6.4.8 Checking the Pins on the Top Mounting Bracket for Wear

Each time the Breaker is removed from the carrier, visually check the mounting pins for signs of wear and damage. Replace worn or damaged pins.

6.4.9 Check Housing

Inspect the housing for cracks and wear. If the Breaker is used extensively to rake or if the material is highly abrasive, repairs to build up the worn area will be more frequent. Make repairs to cracks before they spread or multiply. Build up worn areas before the cost to make repairs becomes extensive.

6.4.10 Check Vibration Isolators

Inside the housing is a system of dampers and pads that isolate and suspend the power cell from the housing. Made from wear-resistant materials, isolators are used to control vibration and shock. This system helps minimize unwanted vibrations that contribute to noise and wear on the carrier.
System components should be inspected periodically and eventually will require replacement. When isolators become

worn, the operator will observe excessive movement of the power cell during operation. The power cell should never contact the housing. Continued operation could lead to serious damage. Replace worn parts before the cost to make repairs becomes extensive.

6.4.11 Check Hoses

Replace hoses if any of the following conditions are present:

- End fittings are damaged or leaking
- Outer coverings are chafed or cut.
- Wires are exposed
- Outer coverings are ballooning
- Flexible part of the hoses are kinked
- Outer covers have embedded armoring
- End fittings are displaced

6.4.12 Check the Hydraulic Oil and Filter on the Carrier

⚠ CAUTION

Refer to the manuals provided by the carrier manufacturer for proper carrier operation, service and maintenance procedures.

Follow the maintenance schedule recommended by the carrier manufacturer for changing the carrier's hydraulic oil and filter.

Check that there is sufficient hydraulic oil and that it is not contaminated.

6.4.13 Measuring Operating Pressure

⚠ WARNING

Avoid injury from fluid injection. This equipment operates at high hydraulic pressures. Always relieve pressure from the pump and supply lines before servicing. If any fluid appears to penetrate the skin, seek immediate medical attention. Special tools and training are required when testing the hydraulic system. Only qualified technicians may service the hydraulic system.

The hydraulic operating pressure should be checked during the initial installation and after every 100 hours of operation. To do so:

- Lower the Breaker to the ground and stop the carrier engine.
- Attach a pressure gauge [0-5000 PSI] to the Breaker's supply hose.
- Start the carrier and set the engine rpm at the normal operating speed
- Set mode to breaker.
- With the oil temperature warmed to normal operating temperature (150 F – 170 F), set the breaker tool on a thick steel plate and start the Breaker.
- Read the average pressure and compare with the values listed in the Specifications Section of this manual.
- When the operating pressure is properly adjusted, stop the carrier engine and remove the gauge.

SECTION 7.0
LIFTING, TRANSPORTING & STORAGE

⚠ CAUTION

Do not lift the breaker by the mounting pins. The breaker may shift and cause damage or personnel injury. Use the designated lifting eye located on the housing.

⚠ WARNING

Approved lift points are identified by the LIFT POINT label. Do not lift the Breaker by the mounting pins or hose.

Crush hazard. Injury may result if the Breaker shifts or falls. Lifting devices must safely carry the loads to which they will be subjected. Lift away from people. Do not enter the danger zone while the Breaker is being lifted.

7.1 Transport Breaker Independently of Carrier:

1. Remove all loose debris from Breaker.
2. Follow removal instructions in Section 8.6.
3. Secure hoses to unit to avoid accidental damage.
4. Lift the Breaker at approved lift points only with appropriate lifting equipment.
5. Adequately stabilize and secure the Breaker for transport.

7.2 Transport Breaker Installed on Carrier:

1. Remove all loose debris from BREAKER.
2. Secure hoses to unit to avoid accidental damage.
3. Inspect the mounting pins and hardware for damage and integrity.
4. Transport carrier in accordance with the carrier manufacturer's recommendations

7.3 BREAKER Storage – Short Term [14 Days or Less]

IMPORTANT

Serious equipment damage may result if proper procedures are not followed. Condensation can cause destructive rust and pitting. Protect the piston. If positioned horizontally, elevate the top end slightly higher to prevent water from entering the gap between the tool and bushing.

1. The Breaker may be stored vertically or horizontally.

If the Breaker is stored off the carrier -

2. Seal all hydraulic connections.
3. If stored outside, cover the Breaker with a waterproof tarp.

7.4 Breaker Storage – Long Term [More than 14 Days]

1. Remove the breaker tool from the Breaker. [Refer to Section 9.4]
2. Seal all hydraulic connections.

IMPORTANT

Contamination can shorten service life. Prevent dirt and debris from contaminating the oil. Always clean the area around the connections prior to removal of plugs or caps.

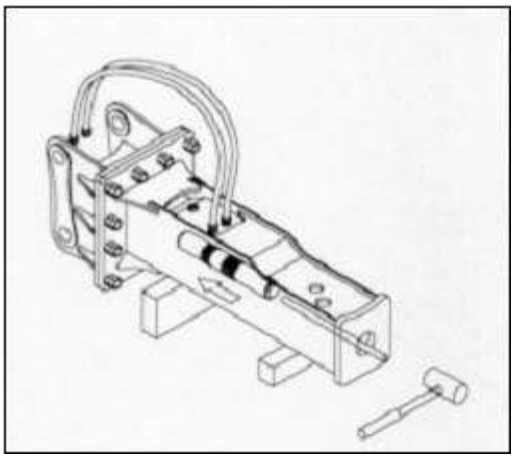


Fig 7-1
Push Piston into Cylinder

3. Protect the lower end of the piston with grease

IMPORTANT
Serious equipment damage may result if proper procedures are not followed. Condensation can cause destructive rust and pitting. Protect the piston by coating the exposed lower surface with grease.

4. The Breaker must be stored in the vertical position.

⚠ CAUTION
Bodily injury and equipment damage could result if the Breaker falls. Use sufficient blocking to prevent it from falling.

5. If stored outside, cover the Breaker with a waterproof tarp.

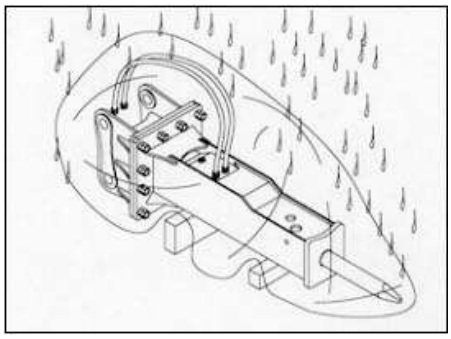


Fig 7-2
Cover with waterproof tarp

SECTION 8.0
ATTACH BREAKER TO AND FROM CARRIER

8.1 Carrier Requirements

⚠ CAUTION

Prevent injury or equipment damage. If the carrier is too light, it may become unstable.

- The Breaker shall only be attached to carriers that are capable of providing sufficient load carrying capacity.
- Know the capacities and limitations of your machine and do not exceed them.
- Consult the manual provided by the carrier manufacturer for the lift capacity of the machine.
- Lift capacities decrease as the load moves away from the machine.
- Factors such as stick length, undercarriage, counterweights, etc., all affect the lifting capacity of the carrier.
- Any modifications made to the Breaker or the carrier must be taken into consideration to prevent machine instability

8.2 Mounting Kits

A mounting bracket is required to attach the Allied Breaker to a carrier. Allied offers an array of mounting brackets to fit virtually any carrier, including those equipped with quick mounting couplers.

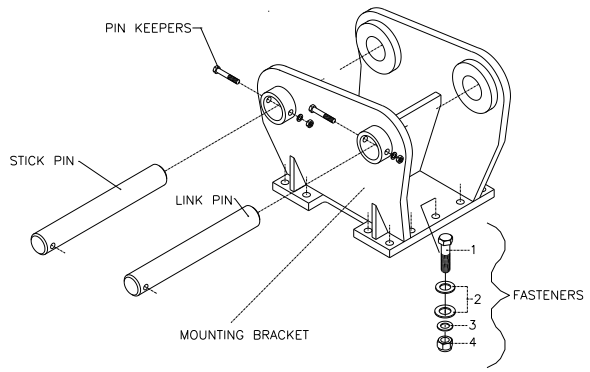


Fig 8-1
Typical Top Mounting Bracket

8.3 Tools Required to Attach the Breaker

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

- Safety eyewear & gloves
- Sledge Hammer
- Drift pin
- 3/4 drive socket wrench
- 3/4 drive metric sockets
- Grease gun
- Standard and Metric open end wrenches
- Pry bar
- Rags

8.4 Attaching the Breaker to the Carrier

The Hy-Ram is attached to the carrier in the same manner as mounting a bucket. Use standard mechanic's techniques and tools to attach the Hy-Ram to the carrier. The installation described is for a typical pin on type. Procedures may vary and you should follow the instructions in the manual provided by the carrier manufacturer.

For carriers equipped with a quick coupler, refer to the owner's manual provided by the coupler manufacturer for instructions.

⚠ CAUTION

To avoid injury, wear protective equipment including appropriate clothing, gloves, safety eyewear and shoes when handling the breaker.

⚠ CAUTION

Some procedures, such as attaching the Breaker to and from the carrier will require an assistant. Both the operator and assistant must be qualified in these procedures. All directions and signals must be agreed upon in advance.

⚠ CAUTION

Prevent serious injury. When attaching the Breaker, keep hands and fingers away from pinch points. Keep all body parts clear and do not touch any parts when the linkage or other member of boom/arm is moving.

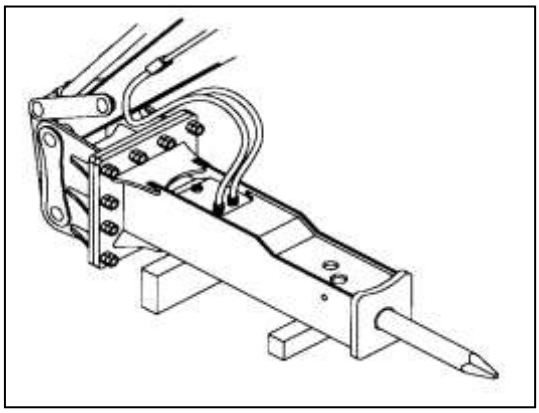


Fig. 8-2
Attaching the Breaker to and from Carrier

⚠ CAUTION

Crush hazard. Keep hands and feet clear of crush points. Always use sufficient blocking to avoid accidental or sudden movement of the Breaker.

The machine operator and an assistant shall perform the following procedure:

1. Operator: Move carrier and Breaker to a firm level surface. Position the Breaker horizontally with the hose side up and the breaker tool pointing toward the carrier.

2. Assistant: Check that the Breaker is stable and all loads are supported.

3. Operator: Maneuver the stick into the mounting bracket until the stick pin holes and mounting bracket holes align with each other.

4. Assistant: Pins must be free of rust and debris before they are installed. Clean pin and lightly coat with lubricant. Push the stick pin through the holes. **NOTE:** If further alignment is necessary, operator can carefully adjust the stick to achieve full pin engagement.

5. Assistant: Use a sledge hammer to tap the pin through holes.

6. Secure pin with keeper pin.

7. Repeat this procedure with link pin.

8.5 Connecting Pressure and Return Lines

[Refer to Fig 8-2]

IMPORTANT

The location of the Pressure Line can vary from one carrier to another. Determine carefully if the pressure line on the carrier is located on the right-hand or left-hand side. Do not guess. Connect the hose on the breaker tagged with “pressure line” to the carrier’s pressure line.

IMPORTANT

Collect any fluid that leaks out when hoses are disconnected and dispose of it properly.

Care must be taken to ensure that fluids are contained while performing maintenance and service. Use a suitable container to collect fluids before any component containing fluids is disassembled. Clean up any spilled oil. Obey all local regulations for the disposal of these fluids.

IMPORTANT

Contamination can shorten service life. Prevent dirt and debris from contaminating the oil. Always clean the area around the connections prior to removal of plugs or caps.

Follow these steps when attaching the hydraulic hoses to the Breaker -

1. Clean dirt from connection areas.
2. Remove the cap nuts from Breaker's oil ports.
3. Remove the plugs from the ends of the hydraulic hoses.
4. Set the cap nuts and plugs aside. Store them for later use when the Breaker is removed.
5. Connect the hydraulic lines to the Breaker ports. The ports are marked [**IN**] and [**OUT**].
6. Remove the caps from other hose end. Continue to connect the hoses to the ball valves on the carrier.

IMPORTANT
The Breaker will not operate if the pressure and return hoses are reversed. Be sure that the hose carrying the supply oil (pressure line) from the carrier is connected to the port marked [**IN**] on the Breaker.

NOTE: For ease of identification, the supply hose is tagged with a red colored cable tie and marked "PRESSURE LINE". [Fig. 8-3]

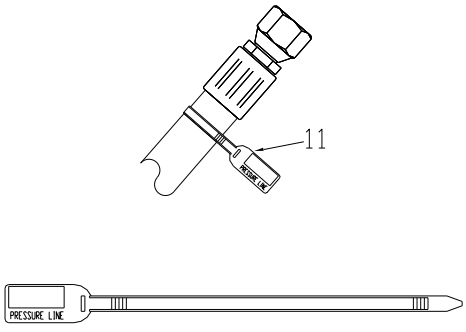


Fig. 8-3
A Red Colored Cable Tie Marked "PRESSURE LINE" Identifies the Supply Hose

7. Raise the Breaker off the ground. Tilt with the bucket cylinder to assure the hoses will not be pinched or restricted.

8.6 Removing Breaker from the Carrier

⚠ CAUTION
Some procedures, such as attaching the Breaker to and from the carrier will require an assistant. Both the operator and assistant must be qualified in these procedures. All directions and signals must be agreed upon in advance.

⚠ CAUTION
 Prevent serious injury. When attaching the Breaker, keep hands and fingers away from pinch points. Keep all body parts clear and do not touch any parts when the linkage or other member of boom/arm is moving.

⚠ CAUTION
 Hot parts may cause burns. Do not touch until cool. Some components of the Breaker become hot during operation. Allow sufficient time for parts and fluids to cool before handling.

IMPORTANT
Collect any fluid that leaks out when hoses are disconnected and dispose of it properly.

⚠ CAUTION
 To avoid injury, wear protective equipment including appropriate clothing, gloves, safety eyewear and shoes when handling the breaker.

IMPORTANT
Contamination can shorten service life. Prevent dirt and debris from contaminating the oil. Always clean the area around the connections prior to removal of plugs or caps.

1. Operator: Move carrier and Breaker to a firm level surface. Position the Breaker horizontally with the hose side up and the breaker tool pointing toward the carrier.

2. Shut the carrier off and relieve the pressure in the hydraulic tank and hydraulic lines.

3. Assistant: Check that the Breaker is stable and all loads are supported. Close the ball valves on the stick that control the oil to the Breaker.

4. Clean dirt from connection areas. Disconnect the hoses from the ball valves. Seal all open connections with the appropriate plugs and caps.

5. Remove the pin retainers from the stick and link pins. Use a steel rod and a sledgehammer to drive them out. Be careful to collect any spacers that may have been used.

6. Store the Breaker as instructed in Section 7.0.

SECTION 9.0
TOOL SELECTION

9.1 Choose the Right Tool for Your Application

Hydraulic breakers are used in a variety of applications including concrete demolition and rock breaking. Efficient operation, production rates and service life of the Breaker is affected by many factors, including:

- Variations in operator technique
- Maintenance
- Type of breaker tool used

Material is broken by one of two methods;

- Penetrative breaking
- Impact breaking

In penetrative breaking, the material is wedged apart as the tool penetrates and divides the material.

In impact breaking, the breaker tool fractures the material by transferring very strong mechanical stresses [compressive force] to the material.

The three most commonly used tools for breaking concrete and rock are the Conical, Chisel, and Blunt. Pointed [conical] and chisel [wedge] type tools work best in penetrative applications. Flat [blunt] type tools work best in impact breaking applications.

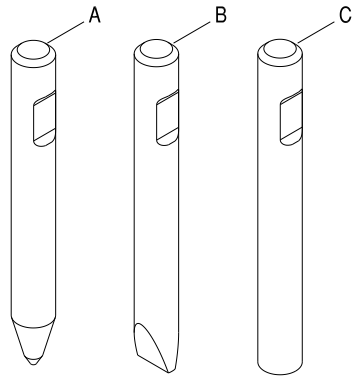


Fig. 9-1
Typical Demolition Tools
A) Conical, B) Chisel, C) Blunt

A. Conical – Designed for penetrative breaking, the conical is suitable for most applications, including trenching and benching in sedimentary rock [e.g. sandstone], weak metamorphic rock and general breaking of concrete. The conical is desirable when working in reinforced concrete because its round shape resists twisting that can cause burring in the tool's retainer slot.

B. Chisel [Wedge parallel & transverse] – Same applications as the conical. Useful when cutting action is required.

C. Blunt – Designed for impact breaking, the blunt tool is effective in breaking concrete slabs, boulder reduction and secondary breaking of oversize rock. Blunt tools are best for igneous rock [e.g. granite] and tough metamorphic rock.

9.2 Breaker Tool Precautions

Allied breaker tools are designed to provide exceptional quality and durability. Tools are made of high-strength alloy steel and given specialized heat treatment. It is important that the breaker tools be used correctly, especially longer breaker tools that are more susceptible to damage from prying. Pay attention to the correct angle of operation as described in Section 9.0.

IMPORTANT
Non-approved parts may cause loss of performance or damage. Use only genuine Allied replacement parts to protect total warranty coverage.

9.3 Sharpening

Breaker tools shall only be re-machined on suitable equipment. Conical and blunt breaker tools can be re-machined on a lathe with carbide tooling. Chisels can be sharpened on a shaping or milling machine.

IMPORTANT

Never attempt to torch cut, hard face or weld breaker tools. High temperatures will alter the original heat treatment of the tool material and change the strength of the breaker tool.

IMPORTANT

When sharpening the breaker tool, use a liquid coolant to prevent temperatures from exceeding 390º F.

9.4 Installing and Removing the Breaker Tool

9.4.1 Overview

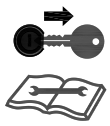
The procedure for removing and installing the breaker tool is essentially the same for all models. The breaker tool can be removed and installed while the breaker is on or off the carrier.

The breaker tool is locked securely into the front head by the retainer system. The system consists of a larger pin, which passes through the slot on the side of the breaker tool. A smaller pin is used to hold the larger pin captive.

On the smaller Hy-Ram models, the breaker tool is retained in the front head by a single round pin. For the larger Breaker models, the breaker tool is retained by two elliptically shaped pins.

9.4.2 Safety Precautions

⚠ WARNING



Follow all safety precautions and operating instructions in the manual provided by the carrier manufacturer. Engage interlock and shut off carrier.

⚠ WARNING

Avoid serious injury or death. If attached to a carrier, lower the breaker to a flat stable surface. Ensure all loads are stabilized.

⚠ CAUTION

Hot parts may cause burns. Do not touch until cool. It is normal for the breaker tool to become hot during operation. Before handling, allow sufficient time for parts and fluids to cool.

⚠ CAUTION

To avoid injury keep hands and fingers clear of bores for retainer pins.

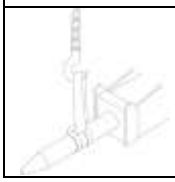
⚠ CAUTION

Avoid risk of injury. When installing or removing the breaker tool, wear protective equipment including appropriate clothing, gloves, safety eyewear and shoes.

⚠ CAUTION

Risk of injury from flying projectiles. Metal chips may fly off when driving the locking pins in or out. Clear immediate area of bystanders.

⚠ CAUTION



Breaker tools are heavy. Prevent risk of injury. Get assistance from other qualified personnel or use suitable lifting equipment.

⚠ CAUTION

Prevent injury. Keep feet and hands out of the path of falling parts.

9.4.3 Hand Tools Required

- Screw Driver
- Hand sledge
- 1/8” dowel rod
- Sling and lifting device

9.4.4 Removing the Breaker Tool

The procedure for removing and installing the breaker tool is essentially the same for all models. For all models, follow steps 1 thru 3. Then, follow the instructions described for your specific model.

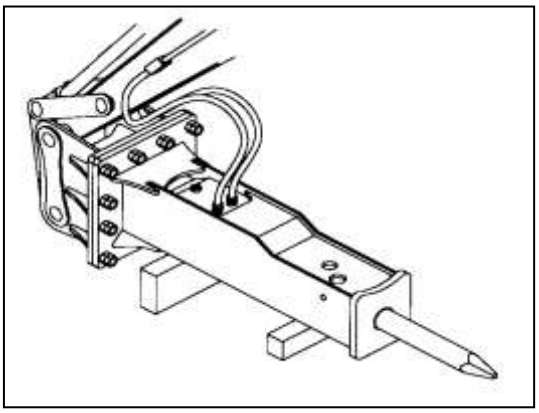


Fig. 9-2
Support Breaker on blocks

1. Place the breaker horizontally on a stable and level surface, with the hoses facing up. Elevate the Breaker with blocks so the retainer(s) on the bottom are accessible.

2. If the breaker is attached to the carrier, lower the Breaker to a horizontal position. Engage the interlock, stop the engine and engage the parking brake.

3. Remove the Rubber Covers from the housing.

For Models HR25 thru HR150

4. With a screw driver, push the captive pin until it clears the larger pin –hold in that position

5. From underneath, push the larger pin until it clears tool slot. Remove breaker tool.

For Models HR200 & HR300

6. Follow steps 1-3.

7. Remove rubber plugs

8. Drive out the small pin located in the upper position. Leave lower pin installed

9. From underneath, push larger pins up. Pull out pins and set aside. Remove breaker tool.

For Models HR400 thru HR1200

10. Follow steps 1-3.

11. Remove rubber plugs

12. Drive out the small pin located on the bottom position. Leave upper pin installed

13. Thread the extraction tool into first large pin

14. Grip extraction tool and drive out upper position pin until it clears first large pin

15. Lift and remove one (1) large pin. Set pin aside. Remove extraction tool

16. Follow the same procedure for removing the second pin. Set pin aside. Remove breaker tool.

9.5 Pre-Installation of the Breaker Tool

IMPORTANT
Read and follow all safety precautions described in section 9.4.2 of this manual.

1. Clean and inspect the front head bushings, breaker tool and retainers. Check for excessive wear, cracks and other damage.

2. Measure bushing and breaker tool. Replace breaker tool and bushings if worn beyond wear limit.

3. Inspect impact face of piston and thrust ring. Check for excessive wear, cracks and other damage.

4. Burrs and sharp edges on the shank of the breaker tool must be removed.

IMPORTANT

Use caution when using a grinder to remove burrs. Gradually remove burrs to prevent over-heating the steel.

⚠ CAUTION

The breaker tool shall only be installed in the way described. Failing to do so could allow the breaker tool to be driven out of the front head with force, possibly causing bodily injury or property damage.

IMPORTANT

Serious equipment damage may result if these procedures are not followed.

- For new breaker tools, apply a liberal amount of lubricate to the shank of the breaker tool before inserting into front head.
- The above procedure also applies to breaker tools that have been wiped clean for inspection
- By design, the volume of grease that is pumped simi-continuously from automatic lubricators is sufficient to replenish the grease that is lost during breaker operation. However, as a reminder, automatic lubricators are incapable of generating enough volume if the tool is inserted dry or if the bushings were wiped clean for inspection. In these occurrences, all surfaces, including the tool shank, tool retainer and bushings must be manually pre-lubricated. Also, if any lubrication lines were replaced they must be pre-filled using a hand lever grease gun.

9.6 Installing the Breaker Tool

Read and follow all safety precautions described in section 9.4.2 of this manual.

9.6.1 Hand Tools Required

- Screw driver
- Hand sledge
- 1/8” dowel rod
- Sling and lifting device
- Grease gun

The procedure for removing and installing the breaker tool is essentially the same for all models. For all models, follow steps 1 thru 3. Then, follow the instructions described for your specific model.

1. Place the breaker horizontally on a stable and level surface, with the hoses facing up. Elevate the Breaker with blocks so the retainer(s) on the bottom are accessible.

2. If the breaker is attached to the carrier, lower the Breaker to a horizontal position. Engage the interlock, stop the engine and engage the parking brake.

3. Remove the Rubber Covers from the housing.

For Models HR25 thru HR150
[Refer to Fig 9-3 thru Fig. 9-5]

5. Follow steps 1 thru 3.

6. Support the Breaker Tool in a suitable hoist and sling.

7. Insert the Breaker Tool into the Front Head. Align slot in Breaker Tool with bore for retainer.

8. Using a screw driver, push the captive pin until it clears larger pin. Hold pin until large pin drops into bore. Release captive pin. Ensure captive pin is fully engaged.

For Models HR200 & HR300
[Refer to Fig 9-6 thru Fig 9-9]

9. Follow steps 1 thru 3.

10. Support the Breaker Tool in a suitable hoist and sling.

11. Insert the Breaker Tool into the Front Head. Align slot in Breaker Tool with bore for retainer.

12. Drop large pins into bore.

13. Install captive pin. Ensure captive pin is fully engaged.

14. Install rubber plugs

For Models HR400 thru HR1200
[Refer to Fig 9-10 thru Fig 9-12]

15. Follow steps 1-3.

16. Support the Breaker Tool in a suitable hoist and sling.

17. Insert the Breaker Tool into the Front Head. Align slot in Breaker Tool with bore for retainer.

18. Drop large pins into bore.

19. Install captive pin. Ensure it is fully engaged.

17. Install rubber plugs

Read and follow all safety precautions described in section 9.4.2 of this manual.

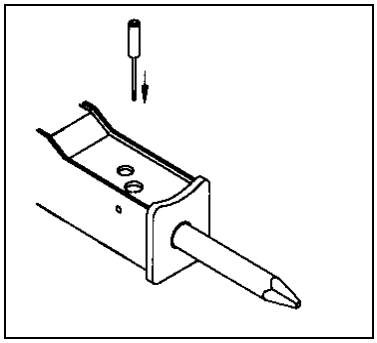


Fig 9-3

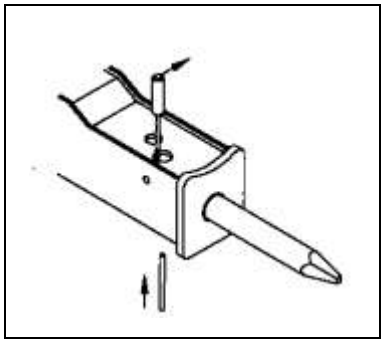


Fig 9-4

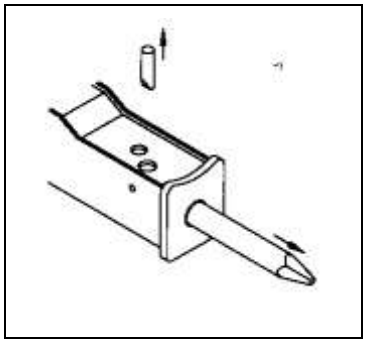


Fig 9-5

HR25 thru HR150

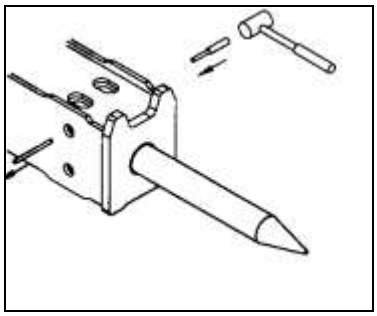


Fig 9-6

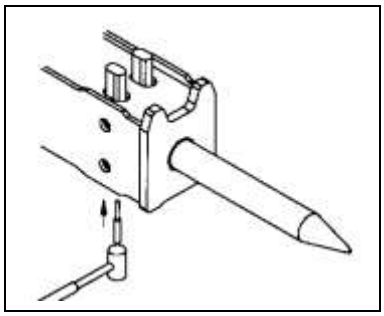


Fig 9-7

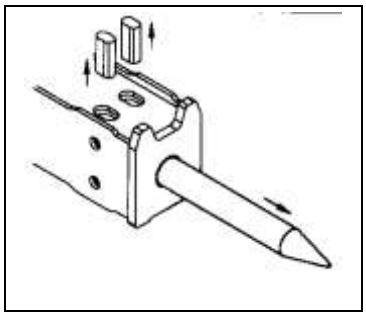


Fig 9-8

HR200 thru HR300

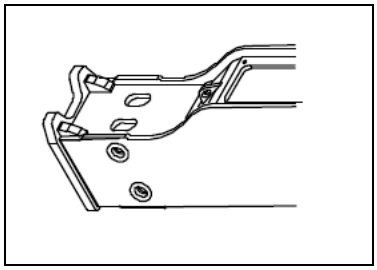


Fig 9-9

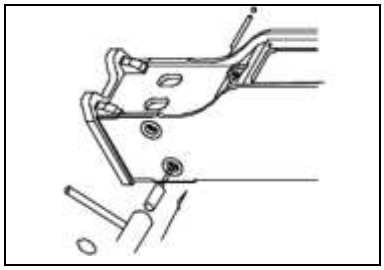


Fig 9-10

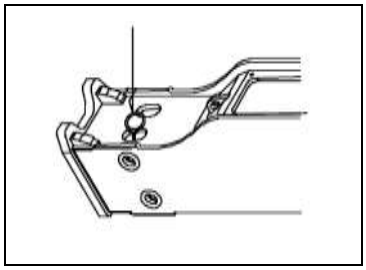


Fig 9-11

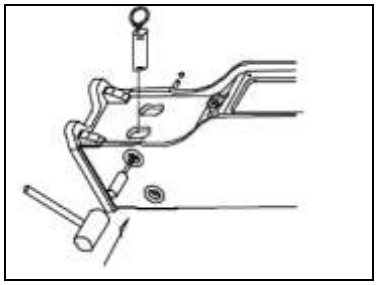


Fig 9-12

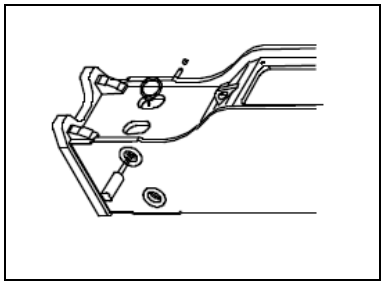


Fig 9-13

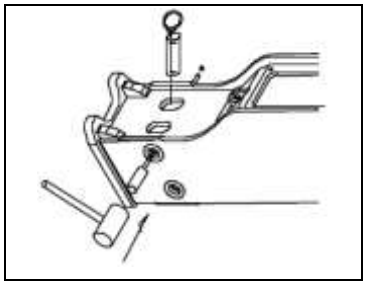


Fig 9-14

HR400 thru HR1200

Installing & Removing the Breaker Tool

Procedure varies by model. Follow instructions described in 9.4 thru 9.6

SECTION 10.0
N_2 GAS CHARGE KIT

Fig. 10-1 N_2 GAS CHARGE KIT

Parts List

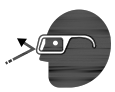
Item	Part No.	Description	Qty	Notes
1	N/A	NITROGEN GAS BOTTLE	1	NOT SUPPLIED (SOURCE LOCALLY)
---	**BGK00-N2200**	**N_2 GAS CHARGE KIT**	**1 (SET)**	**2,3,4,5,6,7**
---	BGK00-N2400	3-WAY VALVE SET	1 (SET)	2,3,4,5
2	BGK00-N2410	3-WAY VALVE	1	EXHAUST VAVLE, HANDLE, COUPLING
3	BGK00-N100P	PRESSURE GAGE	1	PSI [BAR]
4	N/A	NUT	1	CGA-580
5	N/A	STEM	1	CGA-580
6	BGK00-N2100	GAS CHARGING ADAPTOR	1	FITS ACCUMULATOR & HEAD CAP
7	BGK00-N2200	GAS HOSE	1	MICRO BORE

10.1 General Description

Read Instructions

Read, understand and follow all safety instructions when using the gas charge service kit.

CAUTION



Protective eyewear must be worn when using this tool.

Use the Gas Charge Tool to fill and pressure-check the Head Cap and Accumulator on Hy-Ram Breakers. This kit includes hoses and connections that are adaptable to commercially available nitrogen bottles.

Additional equipment is required. Source these items locally:

- Nitrogen Bottle
- Combination wrench
- Hex wrench
- The use of a pressure regulator is recommended

WARNING

The Accumulator and Head Cap contain gas under pressure. The gas must be released before removing the Head Cap or opening accumulator.

- If breaker is attached to carrier, relieve all hydraulic pressure inside breaker and attachment circuit before accumulator is serviced.
- Never use combustible gas to fill the Head Cap and Accumulator. Use only nitrogen gas. Do not use air - damage to internal parts may result.

10.2 Measuring the Gas Charge

Observe the following when servicing the gas charge:

- The gas charge is sensitive to changes in temperature. The table on the following page provides charge pressures for the Head Cap at temperatures of 70° F and 150° F.

- Measure and charge the Head Cap with the Breaker in the horizontal position and with no contact pressure applied to the Breaker tool.

WARNING

Avoid serious injury or death. If attached to a carrier, lower the breaker to a flat stable surface. Ensure all loads are stabilized.

1. Clean the area surrounding the charge valve. Remove protective plug / cap.

2. Install charging adaptor. (Without hose attached).
3. With 3-way valve and bleed valve closed, first attach hose to 3-way valve. Then attach other end of hose to charging adaptor.

NOTE: Some accumulators are equipped with a needle pin. Open the needle pin at this time.

4. Observe pressure gage. See pressure specifications table.

10.3 Adjusting / Filling Gas Charge

After measuring your current gas charge level, follow steps that apply –

Correct Gas Charge - No adjustment is necessary, proceed to step 11a, 14-17.

Low Gas Charge - Proceed with step 5.

High Gas Charge - Proceed with step 11, (11a). Then 14-17.

5. Attach 3-way valve to regulator / gas bottle.

6. Slowly open valve on gas bottle.

7. Slowly open 3-way valve. Allow time for gas transfer. (If empty, increase transfer time).

8. Slightly over-charge by 50 psi.

9. Close the 3-way valve.

10. Allow 3 minutes (minimum) for gas temperature to stabilize. If low, add gas.

11. If the gas pressure is too high, vent excess by cracking bleed valve.

11a. NOTE: Close the needle pin at this time, if equipped.

12. Close 3-way valve and gas bottle valve.

13. Disconnect hose from charging adaptor.

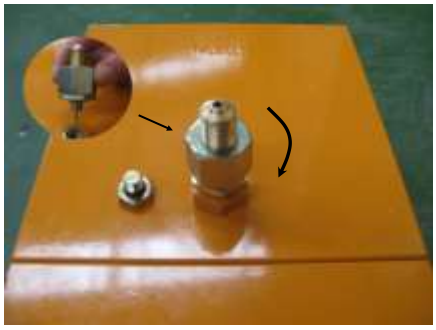
14. Unthread charging adaptor.

15. Check for leakage using soapy water solution or a few drops of oil around the plug.

16. Reinstall plug. Torque to 36lb/ft (49Nm).

Head Cap Gas Charge (Fig 10-2 thru Fig 10-9)

1. Keep dirt and debris out of valve. Clean surrounding area before removing threaded plug.



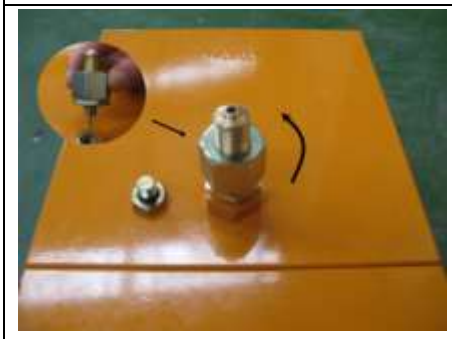
2. Thread charging adaptor to valve. NOTE: Must install without hose attached.

3. Connect 3-way valve to gas bottle. Attach hose to 3-way valve.

4. Attach other end of hose to charging adaptor.

5. Slowly open gas bottle valve. Next, open the 3-way valve. Allow time for gas transfer. Close 3-way valve.

6. Wait 3 minutes (minimum) for gas temperature to stabilize. Monitor the gage while opening bleed valve for final pressure.



7. Unthread hose from adapter. Unthread adaptor from valve.

8. Install threaded plug.

HEAD CAP GAS CHARGE	70°F		150°F		
MODEL	**PSI**	**BAR**	**PSI**	**BAR**	**A pressure tolerance of + / - 5% is acceptable**
HR25,HR50,HR75HR150,HR200,HR1000	172	11.9	200	13.8	
HR300,HR400,HR500,HR750,HR1200	215	14.8	250	17.2	
HR100	237	16.3	275	19.0	

ACCUMULATOR GAS CHARGE	70°F		
MODEL	**PSI**	**BAR**	**A pressure tolerance of + / - 5% is acceptable**
HR25,HR50,HR75,HR100,HR150,HR200	650	45	
HR300,HR400,HR500,HR750,HR1000, HR1000	870	60	

Accumulator Gas Charge (Fig 10-10 thru Fig 10-21)

 1. Keep dirt and debris out of valve. Clean surrounding area before removing threaded plug.	 2. Remove protective cap from needle pin. (Not equipped on all models)	 3. Thread charging adaptor into the inlet. NOTE: Must install without hose attached.
 4. Attach 3-way valve to gas bottle. Attach hose to 3-way valve.	 5. Attach other hose end to charging adaptor.	 6. Open needle pin. (If equipped) Turn counter-clockwise.
 7. Slowly open gas bottle valve. Slowly open the 3-way valve. Allow time for gas transfer. Close 3-way valve.	 8. Wait 3 minutes minimum for gas temperature to stabilize. Monitor gage while opening bleed valve for final pressure.	 9. Close needle pin. (If equipped)
 10. Detach hose from adapter.	 11. Unthread charging adapter from inlet.	 12. Reinstall threaded plug and cap.

SECTION 11.0
TROUBLESHOOTING GUIDE

This guide identifies several commonly encountered conditions and the recommended course of action. For conditions other than these, contact the Allied Technical Service Department.

⚠ CAUTION

Only qualified personnel, having knowledge of the machine's systems, proper test equipment and tools should attempt adjustments and repairs.

Condition	Possible Cause	Course of Action
Breaker does not operate	Restriction in pressure or return line	Verify ball valves are open, verify quick disconnects are in working condition. Check if hose has collapsed
	Pressure and return lines are reversed	Verify supply line is connected to port marked "IN" and return line to "OUT"
	Piston in brake	Piston must be pushed out of brake. Apply down pressure on the breaker tool
	Incorrect breaker tool installed	Verify breaker tool is correct
	Insufficient oil pressure	Refer to section "Operating Pressure Too Low"
	Excessive gas charge pressure in head cap	Measure gas pressure – Set to value listed in the specifications section of this manual
	Head Cap filled with oil	Replace all seals
	Return line pressure too high	Refer to section "Return Line Pressure Too High"
	Carrier hydraulic circuit leaks	Locate source of bypass – Adjust, repair or replace faulty components
	Control valve [Carrier] misadjusted or malfunction	Incorrect working mode. Troubleshoot valve for mechanical, pilot circuit, or electrical fault
	AutoLube reservoir is empty - power interrupted to valve	Fill Auto-lube reservoir
Breaker starts but operation is irregular	Breaker tool is binding	Maintain right angle to work surface. Refer to Section 11.0
		Check breaker tool is receiving sufficient lubrication. Check operation of autolube. Use Chisel Paste
		Breaker tool / bushings are worn
	Breaker tool loosing contact with material	Use boom, arm and bucket cylinder to follow breaker as tool penetrates material [Refer to Section 11.0]
	Return line pressure too high	Refer to section "Return Line Pressure Too High"
	Operating flow or pressure is too low	Refer to section "Operating Pressure Too Low"

TROUBLESHOOTING [cont'd]

Condition	Possible Cause	Course of Action
Breaker operates but at reduced power	Stroke adjuster is open	Close stroke adjuster for maximum impact
	Operating pressure too low	Refer to section "Operating Pressure Too Low"
	Low gas charge pressure in head cap	Measure gas pressure – Set to value listed in the specifications section of this manual
	Improper Breaker operation Tool binding in bushing	Maintain right angle to work surface. Refer to Section 11.0
		Check breaker tool is receiving sufficient lubrication. Check operation of Autolube. Use Chisel Paste
		Breaker tool / bushings are worn
	Return line pressure too high	Refer to section "Return Line Pressure Too High"
	Control valve [Carrier] misadjusted or malfunction	Incorrect working mode. Check for mechanical or pilot circuit failure
	Hydraulic oil overheating	Oil temperature should not exceed 176° F [80° C]
Blow frequency (BPM) slows down	Hydraulic oil is overheated	Refer to section "Operating Temperature Too High"
	Return line pressure too high	Refer to section "Return Line Pressure Too High"
	Flow too low	Measure oil Flow – Set to value listed in the specifications section of this manual
	Leakage in hydraulic circuit [Carrier]	Test hydraulic components for malfunction
	Oil viscosity too low	Consult carrier manufacturer for recommended oil type
	Breaker tool is binding	Maintain right angle to work surface. Refer to Section 11.0
		Check breaker tool is receiving sufficient lubrication. Check operation of Autolube. Use Chisel Paste
		Breaker tool / bushings are worn
Excessive pulsations in pressure hose	No gas charge in accumulator	Stop breaker operation until accumulator is repaired

TROUBLESHOOTING [cont'd]

Condition	Possible Cause	Course of Action
Operating pressure too low	Relief valve set too low	Set to value listed in the specifications section of this manual
	Leakage in carrier's hydraulic circuit	Test hydraulic components for malfunction or improper adjustment
	Insufficient pump delivery [low flow results in low pressure]	Check pump flow [Measure with flow meter]
	Flow control set improperly	Set to value listed in the specifications section of this manual
Oil temperature too high	Operating pressure too high or too low	Refer to section "Operating Pressure Too High" or "Operating Pressure Too Low"
	Relief valve set too low	Set to value listed in the specifications section of this manual
	Ambient temperature is high	Auxiliary cooler may be required Check with carrier manufacturer
	Tool binding in bushing	Check breaker tool is receiving sufficient lubrication. Use Chisel Paste
	Return line pressure too high	Refer to "Return Line Pressure Too High" section
	Excessive cycle time	Limit hammering time to 30 seconds maximum [Refer to Section 11.0]
	Oil flow too high	Set to value listed in the specifications section of this manual
	Breaking cycle too long	Review operating technique and application. Reduce advance. Evaluate breaker size to material
	Oil viscosity too low	Consult carrier manufacturer for recommended oil type
	Cooling system fault	Clean cooler, repair
Return line pressure too high	Flow restricted from blocked hoses or fittings	Remove blockage, replace damaged hoses or fittings
	Flow restricted from hoses or fittings too small for installation	Replace with proper size hose and fitting
	Flow restricted from small ports in valve bank	BREAKER return line must by-pass valve bank and be routed directly to the filter.
	Flow restricted from cooler or return filters	Repair or replace cooler Change filter

TROUBLESHOOTING [cont'd]

Condition	Cause	Course of Action
Oil leakage from body, accumulator or front head	Damaged or worn seals	Stop Breaker operation immediately and replace seals
	Ruptured accumulator membrane	Stop Breaker operation immediately and service accumulator
	Broken Through Bolt	Stop Breaker operation immediately and replace
Tool Excessive / uneven wear	Excessive galling of tool shank or bushings	Check breaker tool is receiving sufficient lubrication Increase lubrication frequency. Use Allied Chisel Paste
		Maintain right angle to work surface. Refer to Section 11.0
	Excessive wear on tip	Reduce advance, Limit cycle time. Refer to Section 11.0
	Uneven wear on tip	Maintain right angle to work surface. Refer to Section 11.0
Tool breakage	Excessive tool length	Use shorter length tool
	Tool driven into material and becomes stuck	Limit tool penetration. Refer to Section 11.0
	Bending force exceeds material strength	Do not pry with tool. Refer to Section 11.0
		Operator technique to adopt correct working angle. Maintain right angle to work surface. Refer to Section 11.0
	Material strength is weakened if surface is damaged from galling, deep gouge or corrosion.	Operator technique to adopt correct working angle. Maintain right angle to work surface. Refer to Section 11.0. Check breaker tool is receiving sufficient lubrication. Increase lubrication frequency. Only use grease that is approved for this application such as a premium high temperature and extreme pressure type grease. Allied Chisel Paste is specifically formulated for this application. Store tools properly. Indoors or covered with waterproof tarp and coating of grease.

Note: The performance of the Breaker is affected by a hydraulic system that is not operating to specifications. If the Breaker is not working correctly, check the hydraulic system of the carrier thoroughly before disassembly of the Breaker.

Connect a flow meter to the hydraulic system to check the pump output and the cracking pressure of the relief valve. To eliminate possible faults with the Breaker lines, e.g. collapsed hose, be sure they are included in the flow test.

SECTION 12.0
TECHNICAL INFORMATION

12.1 Definition of Terms

For the purposes of this manual, Hydraulic Flow, Operating Pressure, Dynamic Relief Pressure and Static Relief Pressure are defined as follows:

- **Hydraulic Flow** – A measure of the volume of oil (values given in GPM / LPM) necessary for the safe and efficient operation of the Allied attachment. For attachments such as Breakers, the flow value is represented as a range. The range specifies the upper and lower limits in which the Breaker is designed to operate.

- **Operating Pressure** – A measure of the hydraulic oil pressure (values given in PSI / BAR) taken in the breaker's supply line during operation. For attachments such as Breakers, the pressure value is represented as a range. The range specifies the upper and lower limits in which the Breaker is designed to operate.

- **Relief Valve** – An adjustable, spring-loaded valve that opens when a preset pressure value is reached. A relief valve is safety device, used to protect the circuit against hydraulic overload. Relief valves vary in design. Pilot controlled pressure relief valves are designed so that the relief pressure increases very little as the flow through the valve increases. For Breaker applications, they are recommended over direct acting type relief valves.

- **Dynamic Relief Pressure –** Also referred to as "Cracking Pressure". The pressure measured at the moment the oil pressure exceeds the preset value of the relief valve and the spool "cracks" open.

- **Static Relief Pressure** – Also referred to as "Full Relief Pressure". The pressure measured at the moment the relief valve has opened fully and all oil is by-passed.

- **Opening Curve** – The opening curve is the rise of pressure between dynamic and static. The dynamic pressure is always less than the static pressure. A relief valve adjusted to a dynamic pressure of 3000 psi (200 Bar) will crack open when the preset point is reached, but fully opens at a higher pressure.

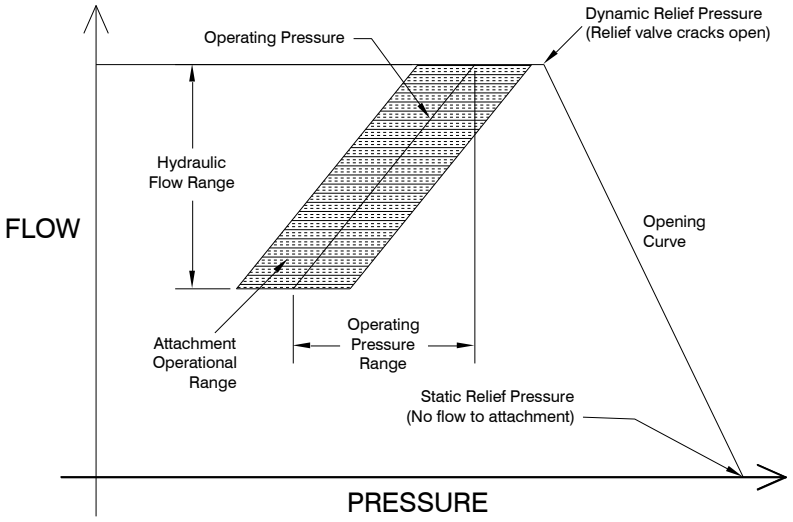


Figure 12-1: Flow-Pressure Diagram

12.2 Hydraulic Circuits for Carrier

Hydraulic attachments, such as Breakers, are not self-powered. Breakers utilize the hydraulic power of the machine on which they are mounted. As a result, the operating efficiency of the breaker is reliant on the hydraulic circuit of the machine. The same holds true for the machine. In order for the machine to remain productive, it relies on the breaker to be operating properly. Since the Breaker and machine are sharing the same hydraulic circuit, it is critical to the performance of each that they are in sound operating condition.

An Allied installation kit is recommended to properly install the Hy-Ram. These kits are designed to meet the specific requirements of the breaker and machine so that both will operate to their peak performance.

If the carrier is not equipped with an auxiliary circuit, an Allied installation kit is required. In any case, the carrier must be modified so that its hydraulic power is utilized to operate the Breaker. The complexity of the kit will vary on whether the machine's hydraulic circuit includes an auxiliary circuit. If not, the installation will use the Allied "AC" series valves. These are solenoid-operated valves that regulate flow and control pressure.

The carrier must have adequate lift and hydraulic capacities to properly and safely operate the Hy-Ram. Refer to the Specifications Section for the weight of each Hy-Ram model.

IMPORTANT
Incorrect combination of Breaker and carrier will result in poor performance or equipment damage.

12.3 Installation Kits

Always follow hydraulic kit installation instructions. Carrier hydraulic circuit designs differ, and damage to the Hy-Ram or carrier may result if the hydraulic kit is improperly installed. Contact Allied for installation recommendations.

12.4 Carrier Hydraulic Requirements

Each Breaker is designed to operate within a certain flow and pressure range. Operating outside the specified range can result in inefficient operation, damage to the Breaker, or injury to personnel.

It's important to adjust the carrier's attachment circuit in accordance with the requirements listed in the specifications section of this manual. Test the Breaker circuit using a flow meter and pressure gages.

CAUTION
 Do not attempt to set the Breaker's operating pressure or flow without first consulting the manual provided by the carrier manufacturer. Refer to Technical Specifications Tables in this section. DO NOT exceed the specified limits. Refer to the carrier manufacturer's manuals for proper carrier operation, service and maintenance procedures.

12.5 Testing the Hydraulic Circuit

The hydraulic system of the host machine is utilized to supply power to the Breaker. It's important to evaluate the hydraulic circuit with a flow meter. After the tests are completed, compare the results with the Specifications Table. Do not attempt to operate the Breaker until the results recorded below are in accordance with the specifications listed for your breaker model.

Before starting a flow test, make sure the circuit to be tested has a relief valve. In order to get an accurate assessment of the hydraulic circuit, the test is conducted over a range of conditions, including temperatures, mode, engine speed and load.

Use the space provided to record your results

Mode	Engine RPM	Flow [GPM]	Load Pressure [PSI]	Oil Temp [ºF]	Relief Pressure [Crack]	Relief Pressure [Dynamic]	Return Pressure [PSI]
			0				
			1000				
			1500				
			1800				
			2000				
			2200				
			2400				
			2600				
			2800				
			3000				
			3200				
			3400				

Mode – Set the mode selector to Breaker position (if equipped).

Engine RPM – Set to normal operating speed

Flow [GPM] – Record flow meter readings at the specified pressure increments

Load Pressure [PSI] – Increase load on hydraulic circuit by slowly closing restrictor valve on flow meter.

Oil Temperature – Testing must be done while the hydraulic oil temperature is at normal operating temperature.

Relief Pressure [Crack] – Slowly close restrictor valve until pressure gage indicates relief valve has cracked open.

Relief Pressure [Dynamic] – Adjust restrictor valve until pressure gage indicates relief valve has reached full open and all oil is bypassed through relief valve.

Return Pressure [PSI] – Record the pressure measured in the return line pressure.

Procedures described are for typical carriers and flow meters. Procedures may vary and you should always consult the manual provided by the manufacturer of the flow meter for specific installation and operating details. Follow all safety precautions.

12.6 Technical Specifications

Table 12.1 Technical Specifications					
		HR25	**HR50**	**HR75**	**HR100**
Impact Frequency [a]	blows per minute	550 - 1000	450 - 1000	550 - 1100	380 - 900
Oil Flow Range	gpm [lpm]	4-8 [15-30]	7-13 [26-50]	8-16 [30-60]	11-21 [40-80]
Operating Pressure Range [b]	psi [bar]	1300-1750 [90-120]	1450-2050 [100-140]	1600-2400 [110-165]	1750-2400 [120-165]
Pressure Relief – Min [c]	psi [bar]	2175 [150]	2465 [170]	2825 [195]	
Pressure Relief – Max [d]	psi [bar]	2465 [170]	2755 [190]	3045 [210]	
Return Line Pressure - Max	Psi [bar]	145 [10]			
Return Line Pressure - Min	Psi [bar]	60 [4]			
Operating Temperature - Max	F° [C°]	176° [80°]			
N2 Gas Charge – Head Cap [70 F°]	Psi [bar]	172 [11.9]			250 [17.2]
Gas Charge – Accumulator [70 F°]	Psi [bar]	N/A		650 [45]	
Port Connection – IN [OUT]	SAE-UNF	7/8-14 [same]			1-1/16 [same]
Oil Supply Line – Min. ID.	in. [mm]	1/2 [13]			3/4 [19]
Oil Return Line – Min. ID.	in. [mm]	1/2 [13]			3/4 [19]
Breaker Tool: Standard Diameter Work Length	Type in. [mm] in. [mm]	Conical 1.77 [45] 10 [258]	Conical 2.24 [57] 12.75 [324]	Chisel [CC] 2.76 [70] 14 [358]	Chisel [CC] 2.95 [75] 14.5 [367]
Working Weight [e]	lbs [kg]	265 [120]	386 [175]	574 [260]	728 [330]
Carrier Weight Range [f]	1000 lbs [1000 kg]	4-8 [1.8-3.6]	6-10 [2.7-4.5]	7-15 [3.2-6.8]	15-30 [6.8-13.6]

[a] Actual frequency depends on oil flow [Factors that affect oil flow include oil viscosity and temperature] With exception to HR25 and HR50, all models equipped with Stroke Adjuster.

[b] Actual operating pressure depends on oil flow, back pressure, material to be broken

[c] Permissible setting of MINIMUM pressure relief – DYNAMIC. Measured operating pressure + Minimum 435 psi [30 Bar]

[d] Permissible setting of MAXIMUM pressure relief – STATIC [Not to exceed main relief setting]

[e] Equipped with typical mounting bracket & standard tool [Weight varies upon configuration]

[f] The range is designed to be a guide only. The carrier must have adequate lift and hydraulic capacities to safely carry and properly operate the breaker. Always consult the carrier's specifications, including the lift capacity, to assure stable carrier operation.

12.6 Technical Specifications [cont'd]

Table 12.2 Technical Specifications

		HR150	HR200	HR300	HR400
Impact Frequency [a]	blows per minute	350 - 1000	350 - 900	320 - 900	320 - 800
Oil Flow Range	gpm [lpm]	13 - 26 [50 - 100]	20 - 32 [75 - 120]	26 - 40 [100 - 150]	26 - 41 [100 - 155]
Operating Pressure Range [b]	psi [bar]	2050 - 2465 [140 - 170]	2050 - 2600 [140 - 180]	2300 - 2600 [160 - 180]	
Pressure Relief – Min [c]	psi [bar]	2900 [200]	3045 [210]		
Pressure Relief – Max [d]	psi [bar]	3045 [210]			
Return Line Pressure - Max	psi [bar]	145 [10]			
Return Line Pressure - Min	Psi [bar]	60 [4]			
Operating Temperature - Max	F° [C°]	176° [80°]			
N2 Gas Charge – Head Cap [70 F°]	psi [bar]	172 [11.9]		215 [14.8]	
N2 Gas Charge – Accumulator [70 F°]	psi [bar]	650 [45]		870 [60]	
Port Connection – IN [OUT]	SAE-UNF	1-1/16 [same]		1-5/16 [same]	
Oil Supply Line – Min. ID.	in. [mm]	3/4 [19]	1 [25.5]		
Oil Return Line – Min. ID.	in. [mm]	3/4 [19]	1 [25.5]		
Breaker Tool: Standard	Type	Chisel [CC]	Chisel [CC]	Chisel [CC]	Chisel [CC]
Diameter	in. [mm]	3.54 [90]	3.74 [95]	4.53 [115]	4.92 [125]
Work Length	in. [mm]	21 [530]	21.75 [552]	22 [560]	23.5 [600]
Working Weight [e]	lbs. [kg]	1200 [545]	1765 [800]	2535 [1150]	3195 [1450]
Carrier Weight Range [f]	1000 lbs [1000 kg]	15 - 30 [6.8- 13.6]	20 - 40 [9.0 – 18.1]	31 - 40 [14.0 –18.1]	40 - 62 [18.1 – 28.1]

[a] Actual frequency depends on oil flow [Factors that affect oil flow include oil viscosity and temperature] With exception to HR25 and HR50, all models equipped with Stroke Adjuster.

[b] Actual operating pressure depends on oil flow, back pressure, material to be broken

c] Permissible setting of MINIMUM pressure relief – DYNAMIC. Measured operating pressure + Minimum 435 psi [30 Bar]

[d] Permissible setting of MAXIMUM pressure relief – STATIC [Not to exceed main relief setting]

[e] Equipped with typical mounting bracket & standard tool

[f] Figures shown are guidelines – Always consult carrier manufacturer's lift capacity to assure stable carrier operation. The carrier must have adequate lift and hydraulic capacities to properly and safely operate the BREAKER.

12.6 Technical Specifications [cont'd]

Table 12.3 Technical Specifications

		HR500	HR750	HR1000	HR1200
Impact Frequency [a]	blows per minute	340 - 800	230 - 600	230 - 600	230 - 550
Oil Flow Range	gpm [lpm]	37 - 50 [140 - 190]	53 - 69 [200 - 260]	58 - 74 [220 - 280]	63 - 85 [240 - 320]
Operating Pressure Range [b]	psi [bar]	2300 - 2600 [160 - 180]			
Pressure Relief – Min [c]	psi [bar]	3045 [210]			
Pressure Relief – Max [d]	psi [bar]	3045 [210]			
Return Line Pressure - Max	psi [bar]	145 [10]			
Return Line Pressure - Min	Psi [bar]	60 [4]			
Operating Temperature - Max	F° [C°]	176° [80°]			
N2 Gas Charge – Head Cap [70 F°]	psi [bar]	215 [14.8]			
N2 Gas Charge – Accumulator [70 F°]	psi [bar]	870 [60]			
Port Connection – IN [OUT]	SAE-UNF	1-5/16 [same]	1-1/4 Flange Code 62 [same]		
Oil Supply Line – Min. ID.	in. [mm]	1 [25.5]		1-1/4 [31.75]	
Oil Return Line – Min. ID.	in. [mm]	1 [25.5]		1-1/4 [31.75]	
Breaker Tool: Standard Diameter Work Length	Type in. [mm] in. [mm]	Chisel [CC] 5.31 [135] 26.5 [674]	Chisel [CC] 6.10 [155] 27.75 [703]	Chisel [CC] 6.50 [165] 30.75 [780]	Chisel [CC] 6.89 [175] 33 [842]
Working Weight [e]	lbs [kg]	3970 [1800]	5950 [2700]	7275 [3300]	8375 [3800]
Carrier Weight Range [f]	1000 lbs [1000 kg]	44 - 76 [19.9 – 34.5]	72 - 100 [32.6 –45.3]	90 - 133 [40.8 – 60.3]	110 - 190 [49.9 – 86.1]

[a] Actual frequency depends on oil flow [Factors that affect oil flow include oil viscosity and temperature] With exception to HR25 and HR50, all models equipped with Stroke Adjuster.

[b] Actual operating pressure depends on oil flow, back pressure, material to be broken

c] Permissible setting of MINIMUM pressure relief – DYNAMIC. Measured operating pressure + Minimum 435 psi [30 Bar]

[d] Permissible setting of MAXIMUM pressure relief – STATIC [Not to exceed main relief setting]

[e] Equipped with typical mounting bracket & standard tool

[f] Figures shown are guidelines – Always consult carrier manufacturer's lift capacity to assure stable carrier operation. The carrier must have adequate lift and hydraulic capacities to properly and safely operate the BREAKER.

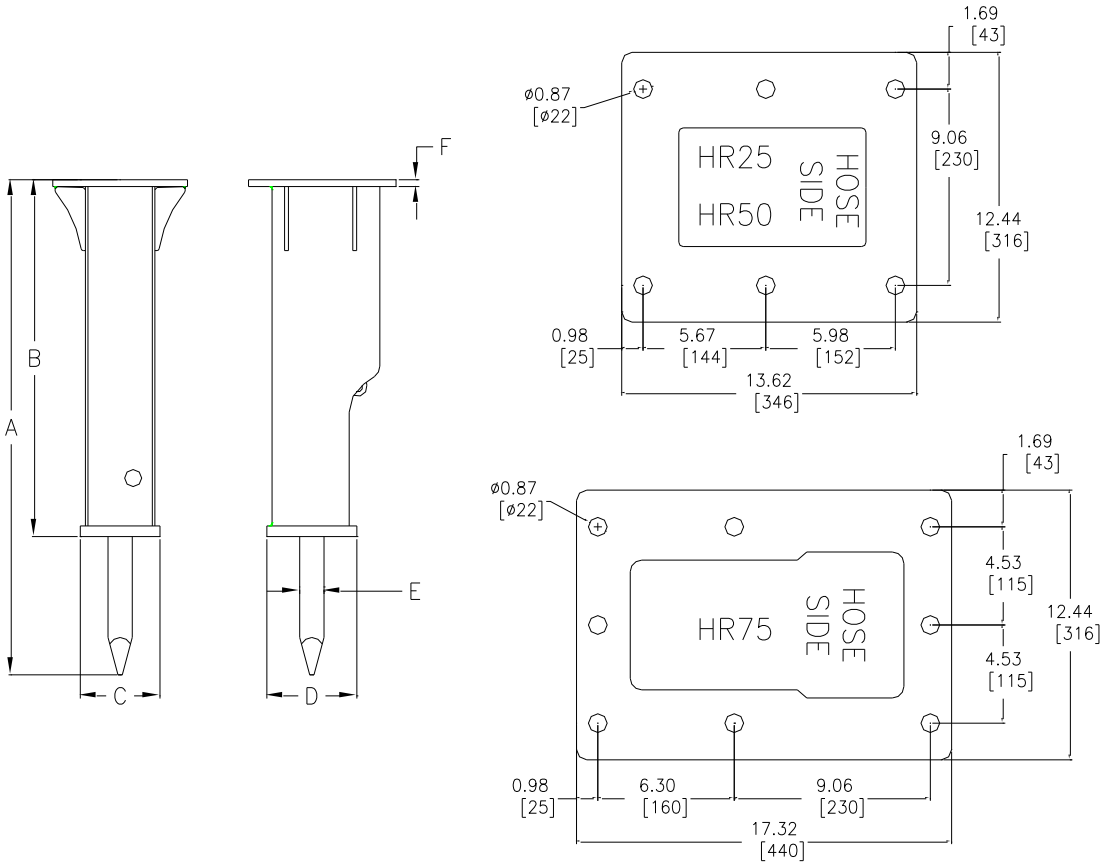


Fig. 12-2
Dimensions HR25, HR50 & HR75

		HR25	HR50	HR75	Notes
A	inch	38.98	45.67	50.83	
	[mm]	990	1160	129	
B	inch	28.82	32.91	36.73	
	[mm]	732	836	933	
C	inch	7.17	7.36	8.74	
	[mm]	182	187	222	
D	inch	7.01	8.31	10.20	
	[mm]	178	211	259	
E	inch	1.77	2.24	2.76	
	[mm]	45	57	70	
F	inch	0.63	0.63	0.87	
	[mm]	16	16	22	
G	Mounting Family	XR	XR	XR	

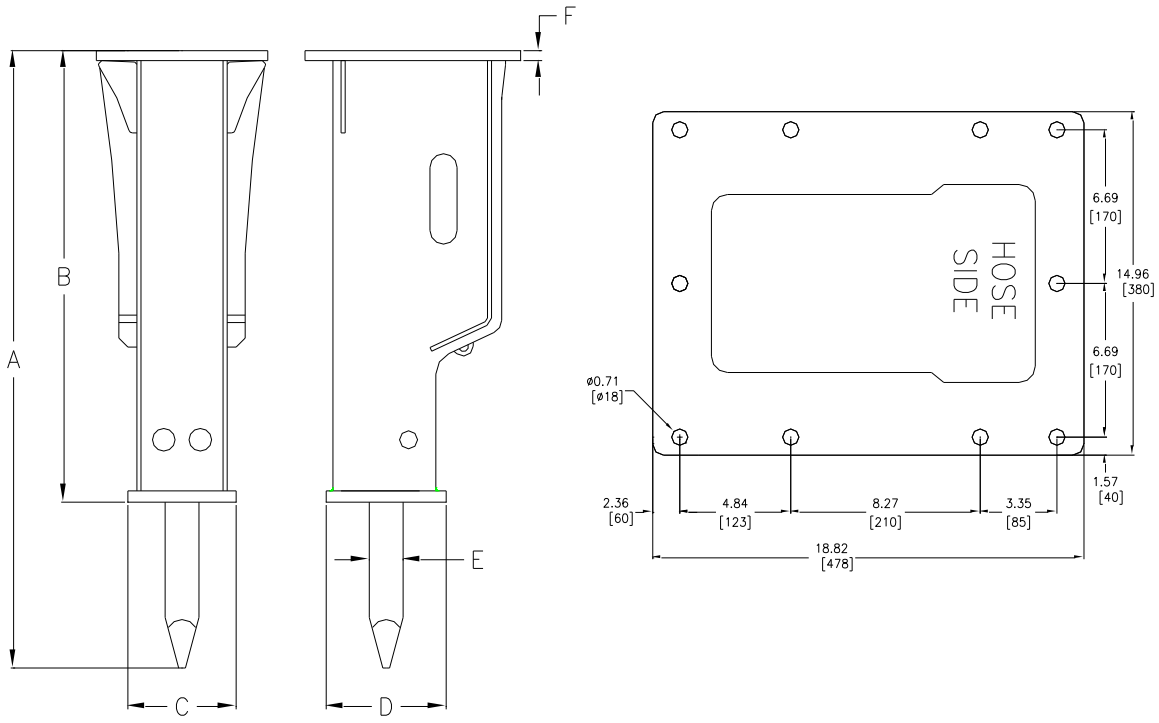


Fig. 12-3
Dimensions HR100 & HR150

		HR100	HR150	Notes
A	inch [mm]	53.78 [1366]	70.16 [1782]	
B	inch [mm]	39.33 [999]	49.29 [1252]	
C	inch [mm]	9.45 [240]	10.35 [263]	
D	inch [mm]	10.47 [266]	12.24 [311]	
E	inch [mm]	2.95 [75]	3.54 [90]	
F	inch [mm]	0.87 [22]	0.87 [22]	
G	Mounting Family	BR	BR	

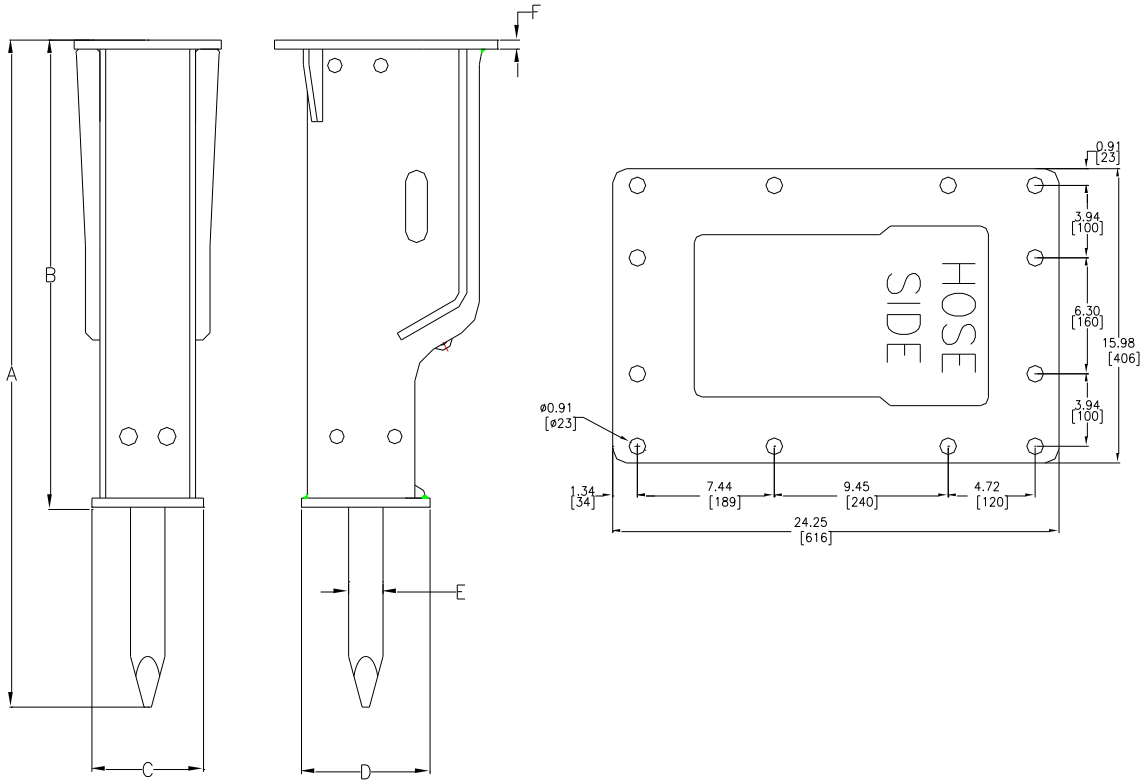


Fig. 12-4
Dimensions HR200 & HR300

		HR200	HR300	Notes
A	inch [mm]	72.48 [1841]	84.53 [2147]	
B	inch [mm]	51.0 [1295]	57.48 [1460]	
C	inch [mm]	12.13 [308]	14.66 [372]	
D	inch [mm]	13.98 [355]	15.91 [404]	
E	inch [mm]	3.74 [95]	4.53 [115]	
F	inch [mm]	0.98 [25]	0.98 [25]	
G	Mounting Family	SR	SR	

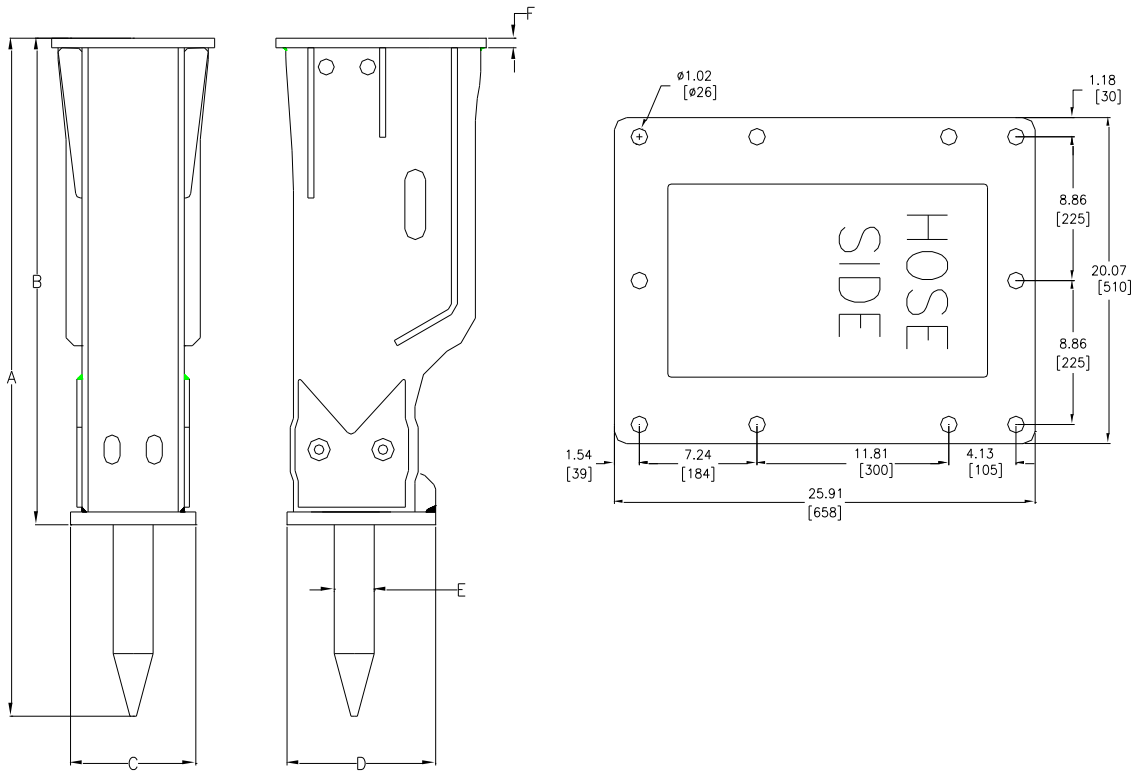


Fig. 12-5
Dimensions HR400 & HR500

		HR400	HR500	Notes
A	inch	83.50	94.76	
	[mm]	[2121]	[2407]	
B	inch	59.92	68.23	
	[mm]	[1522]	[1733]	
C	inch	15.43	16.61	
	[mm]	[392]	[422]	
D	inch	18.31	20.08	
	[mm]	[465]	[510]	
E	inch	4.92	5.31	
	[mm]	[125]	[135]	
F	inch	1.18	1.18	
	[mm]	[30]	[30]	
G	Mounting Family	MR	MR	

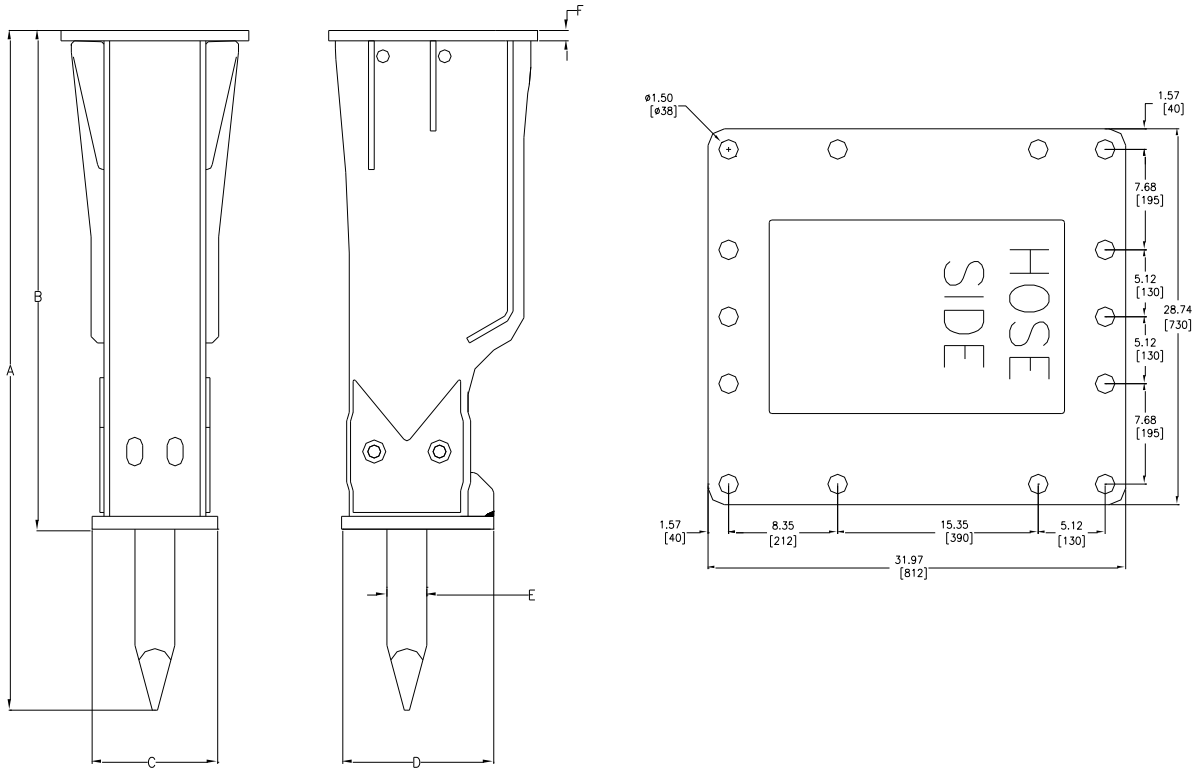


Fig. 12-6
Dimensions HR750 & HR1000

		HR750	HR1000	Notes
A	inch [mm]	103.94 [2640]	110.20 [2799]	
B	inch [mm]	76.51 [1943]	79.53 [2020]	
C	inch [mm]	19.21 [488]	20.09 [510]	
D	inch [mm]	23.11 [587]	23.82 [605]	
E	inch [mm]	6.10 [155]	6.50 [165]	
F	inch [mm]	1.57 [40]	1.57 [40]	
G	Mounting Family	LR9	LR9	

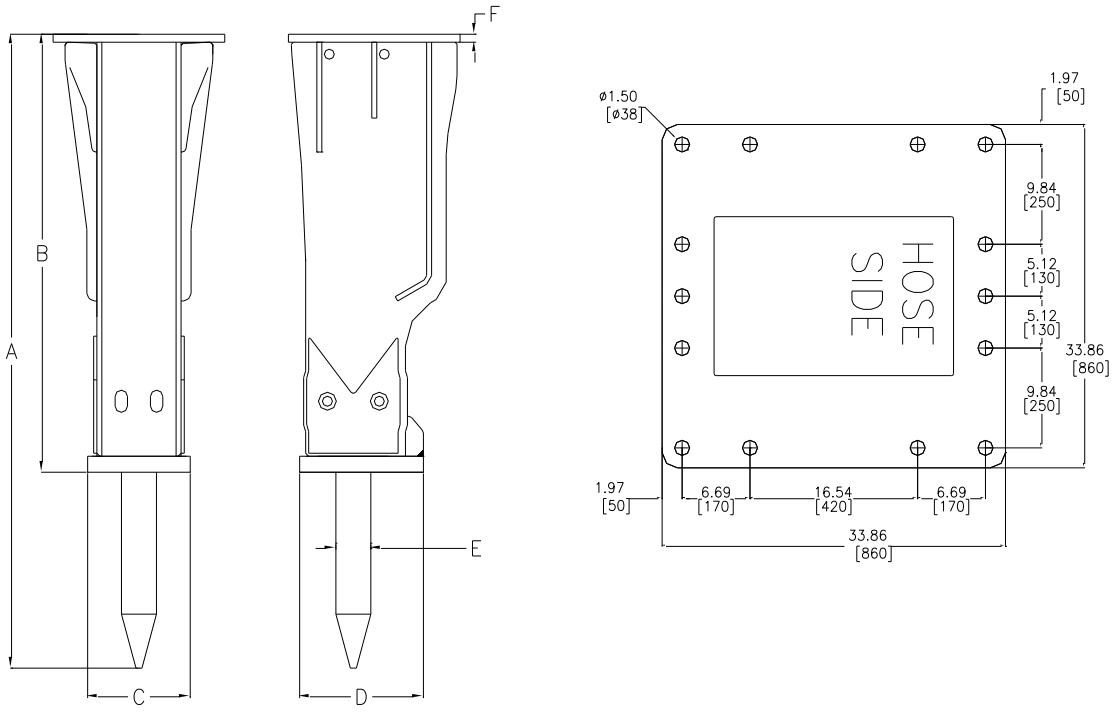


Fig. 12-7
Dimensions HR1200

		HR1200	Notes
A	inch [mm]	125.02 [3175]	
B	inch [mm]	86.38 [2194]	
C	inch [mm]	20.24 [514]	
D	inch [mm]	24.41 [620]	
E	inch [mm]	6.89 [175]	
F	inch [mm]	1.57 [40]	
G	Mounting Family	LR10	

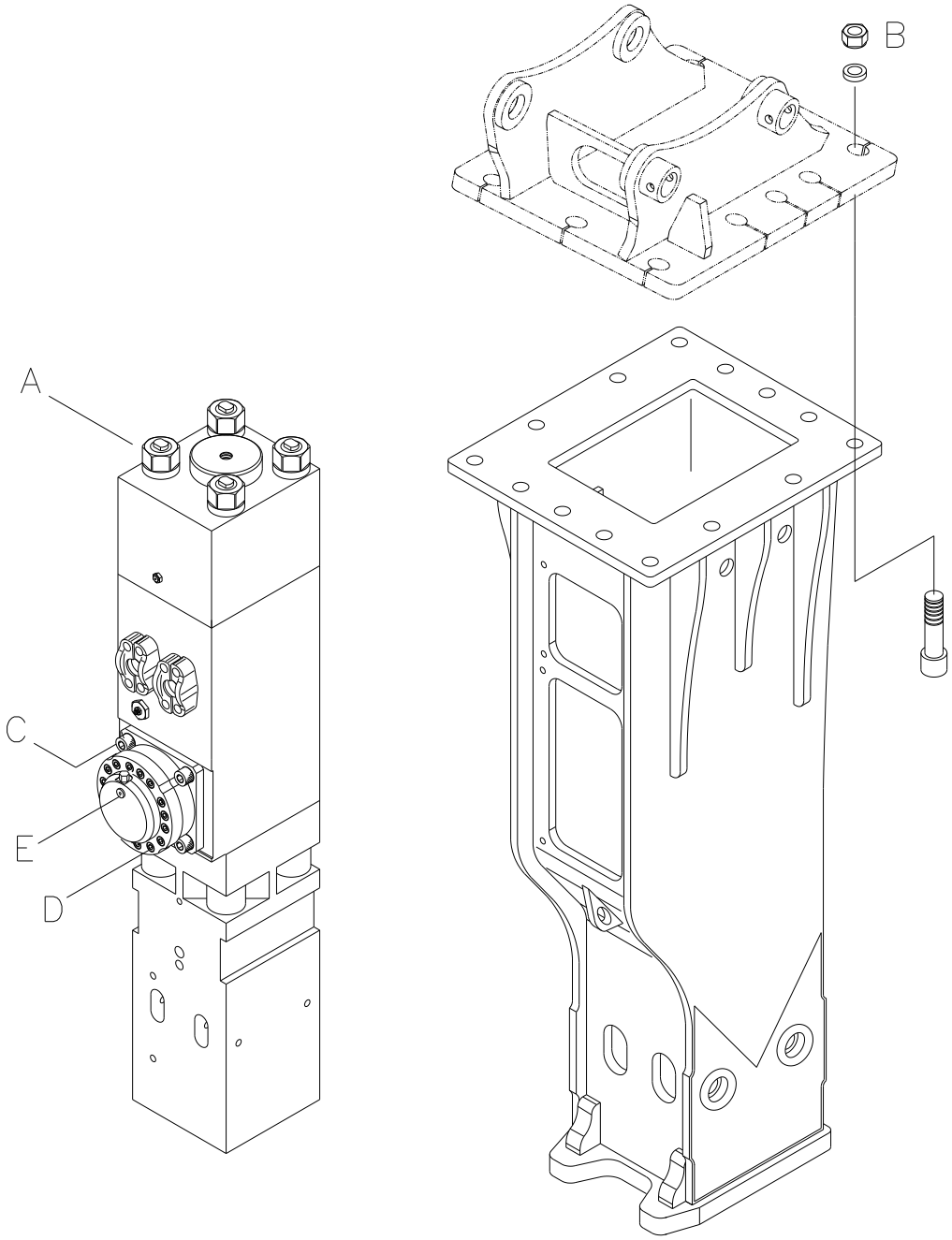


Fig. 12-8
Tightening Torques

	Table 12.4 Tightening Torque				
	B- Mounting Bracket Bolts	**C- Accumulator Body Bolts**	**D- Accumulator Cover Bolts**	**E- Accumulator Filling Valve Cap**	
	Ft-Lbs	Ft-Lbs	Ft-Lbs	Ft-Lbs	**Note:** Follow progressive tightening and sequence rule
HR 25	250	Not equipped			
HR 50	250				
HR 75	250	325	100	36	
HR 100	220	325	100	36	
HR 150	220	325	180	36	
HR 200	250	435	250	36	
HR 300	250	620	250	36	
HR 400	580	800	250	36	
HR 500	580	800	360	36	
HR 750	655	1,300	470	36	
HR1000	655	1,300	360	36	
HR1200	655	1,300	470	36	

IMPORTANT Clean the thread surfaces and make sure they are free from nicks and burrs. Apply Moly-Paste 676927 to threads before assembly. The load on each tie rod must be evenly distributed. Progressive tightening and diagonal sequence are key rules that must be followed. Progressive tightening means the nut will be turned in small increments until final torque is achieved. Never exceed 1 full turn without turning the other 3 nuts.

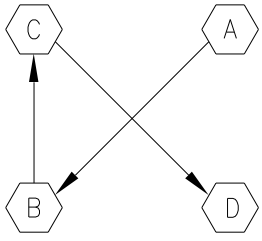
Step	Instructions	Sequence	Progressive Tightening
1	With torque wrench follow sequence A, B, C, D. Follow progressive tightening rule.		Ft-Lbs 65, 130, 200 Ft-Lbs 90, 180, 270 Ft-Lbs 120, 240, 350 Ft-Lbs 120, 240, 360
2	Turn each nut as specified in Table Step 2		Steps 1 and 2 completed
3	Turn each nut as specified in Table Step 3		Steps 1, 2 & 3 completed
4	Turn each nut as specified in Table Step 4.		Steps 1, 2, 3 & 4 completed

	Table 12.5 Tightening Torque				
	A - Tie Rod Bolts (Final Torque)	**Alternate Torque Turn Method for Tie Rod Bolts (Through Bolts)**			
	Ft-Lbs	Step 1	Step 2	Step 3	Step 4
HR 25	200	200 Ft-Lbs	na	na	na
HR 50	270	270 Ft-Lbs			
HR 75	350	350 Ft-Lbs			
HR 100	350	350 Ft-Lbs			
HR 150	670	360 Ft-Lbs	150° (2.5)		
HR 200	900	360 Ft-Lbs	60° (1)	180° (3)	
HR 300	1,400	360 Ft-Lbs	30° (.5)	120° (2)	165° (2.75)
HR 400	1,900	360 Ft-Lbs	30° (.5)	120° (2)	180° (3)
HR 500	2,350	360 Ft-Lbs	90° (1.5)	180° (3)	210° (3.5)
HR 750	2,800	360 Ft-Lbs	60° (1)	150° (2.5)	225° (3.75)
HR1000	3,950	360 Ft-Lbs	60° (1)	180° (3)	240° (4)
HR1200	3,950	360 Ft-Lbs	60° (1)	180° (3)	240° (4)

na = No additional turning
The number is parentheses ( ) indicates the number of flats that correspond to the number of degrees to be tightened.

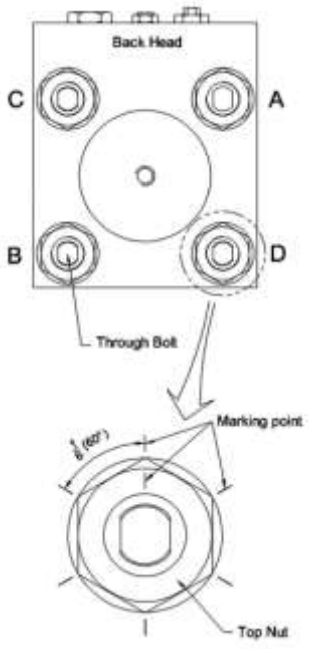


Fig. 12-9 Follow tightening sequence. 60° (1 Hex Flat)

SECTION 13.0
SERVICE RECORD

Service Performed	By	Date

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