AR Series

Hydraulic Impact Breaker

Model
AR110B
AR130
AR160B,C
AR170C
AR180C

ALLIED

Safety, Operation and Maintenance

Thoroughly read and understand the content of this manual before using the Allied Breaker. The safe and efficient use of the Allied equipment depends upon proper installation, operation, maintenance and training.

Keep this manual in a convenient location so that it is easily accessible for future reference. Contact your Allied Dealer or the Allied Customer Service Department for replacement manuals. Inquiries regarding the content of this manual must include effective date shown on inside cover.

TM102706

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Revision History of Document No. SOM102706

Specifications are based on published information at the time of publication. Allied Construction Products, LLC, reserves the right to change, edit, delete or modify the content of this document, including descriptions, illustrations and specifications without prior notification. For product or document updates go to www.alliedcp.com .

Effective Date	Page	Summary of Change
2003, Jun		Original issue replaced
2005, Jul	Throughout	Revised to introduce new models AR130B & 140B
2005, Aug	1-1	Removed Fig 2-2 reference in Section 1.0; revised text in Section 7.2
2005, Nov	Throughout	Revised to introduce new models AR110B & AR160B
2006, Sep	4-1	Revise AR140B flow range
2006, Nov	Throughout	Revised to introduce new model AR120B
2007, Dec	Throughout	Revised to introduce new models AR160C, 170C & 180C
2008, Jun	3-1, 4-1 thru 4-3, 11-3	Revise Theory of Operation, Add Hydraulic Installation Definition 4.1, Revise Specification Table 4.1 & 4.2, Add Wear Limits for Thrust Ring
2009, Jul	4-6	Corrections made to Fig. 4-5 mounting bolt hole location
2013, Jun	Throughout	Safety information restructured. Information pertaining to models AR110C, AR120B, AR130B, AR140B transferred to SOM576701.

Safety Information

Safety Statements and Hazard Alerts

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 any attempt to install, operate, service or transport the Allied equipment.

Keep all safety labels clean. Words and illustrations must be legible. 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 provide the following information:

1. **Alert** personnel to potential hazards
2. **Identify** the nature of the hazard
3. **Describe** the severity of the hazard, if encountered
4. **Instruct** how to avoid the hazard

Safety Alert Symbol

ATTENTION, BECOME ALERT, YOUR SAFETY IS INVOLVED.

Fig. S1

Fig. S1. The exclamation point within an equilateral triangle is the safety alert symbol. This symbol, either used alone or with a signal word, 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.

CAUTION

Burn injury from contact with hot surface. Some components of the Breaker become hot during operation. Allow parts and fluids to cool before handling.

Fig. S2 Safety Message – Typical Presentation

Signal Words Used for Non-Hazard Messages

This manual contains other message types that use the signal words IMPORTANT and NOTE. These are information messages that provide instructions and are not considered hazardous to workers.

IMPORTANT – Identify instructions that if not followed, may damage the equipment or diminish the service life of components

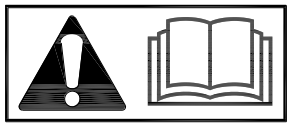
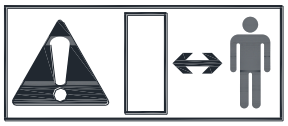
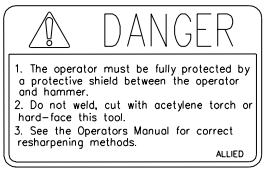
NOTE – Highlight suggestions, which will enhance installation, reliability, or operation.

Safety Information – [cont'd]

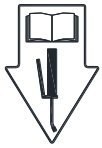
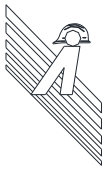
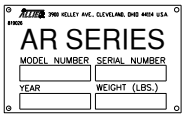
Safety, Information and Identification Labels

Information labels affixed to the Allied equipment include safety warnings, identification and instructions important to operation and service. Refer to Figure "L-15" for their location on the equipment.

Keep all safety labels clean. Words and illustrations must be legible. Before operating this equipment, replace damaged or missing labels. For replacement, refer to the appropriate Parts Manual for identification.

Fig.	Label	Description
L1		**READ INSTRUCTIONS** - Decal directs personnel to the manual for further information / instructions.
L2		**STAY CLEAR** – Decal alerts personnel and by-standers to maintain a safe distance from the Breaker while in operation.
L3		**FLYING DEBRIES** – Decal alerts of the risk of injury from impact by rock fragments. Protective guards must be placed between the breaker and operator to shield against material fragments becoming projectiles. It directs personnel to the safety instructions in the Operator's Manual. **NOTE: Place the smaller size decal in a conspicuous location inside the operator's cab.**
L4		**TOOL SHARPENING** – Decal warns against welding, cutting, or hard-facing the tool. It directs personnel to the Operator's Manual for approved sharpening methods.
L5		**PRESSURIZED NITROGEN ACCUMULATOR** – Decal warns of pressurized gas and directs personnel to the Repair Manual for service instructions.
L6		**MAXIMUM PRESSURE** – Decal indicates the maximum operating pressure.
L7		**LIFT POINT** – Decal identifies approved lift points.

Safety Information – [cont'd]

Fig.	Label	Description
L8		**LUBRICATION** – Decal emphasizes key re-lubrication instructions, including; frequency and precautions that must be observed to ensure breaker is not damaged through unapproved methods.
L9		**LUBRICATION POINT** – Decal identifies lubrication points. Refer to the manual(s) for grease type, re-lubrication schedules and procedures. Risk of equipment damage if instructions are not followed.
L10		**ALLIED LOGO** – This decal is the Allied brand identifier and is a registered trademark of Allied Construction Products, LLC.
L11	ALLIED	**ALLIED LOGO** – This decal is the Allied brand identifier and is a registered trademark of Allied Construction Products, LLC.
L12	**AR130**	**MODEL** – Decal identifies the specific model.
L13		**PRESSURE I.D. TAG** - The hydraulic supply hose is tagged for ease of identification.
L14		**ID PLATE** - Contains identifying information about the equipment, including: Manufacturer's name, address, product name, model number, serial number, year of manufacture, and weight.

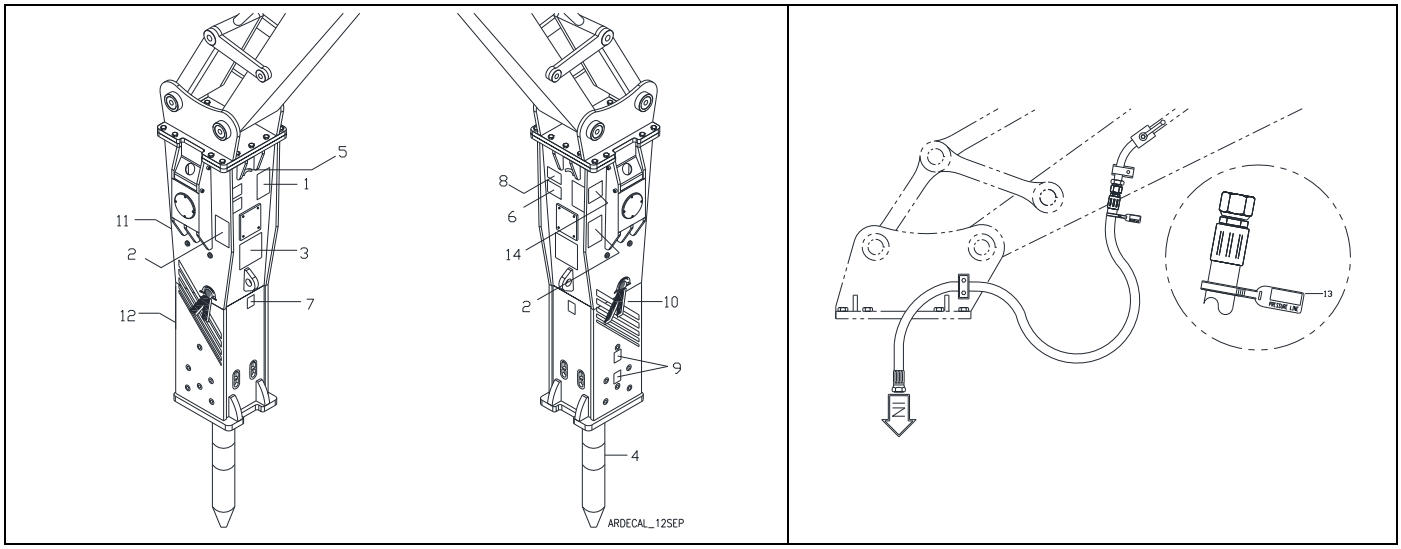
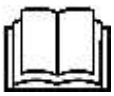


Fig. L15 Label Positions

Safety Information – [cont'd]

Meaning of Pictograms

Pictograms are used to rapidly communicate information. For the purposes of this manual and labels affixed to the Allied equipment, pictograms are defined as follows:



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

Read the Service Manual For Additional Information

- Crush point

- Pinch point

Moving part (in direction indicated by arrow)

- Falling object
- Unsupported loads

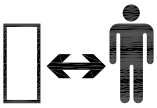
Personal Protection Equipment

- Hearing protection

- Safety eyewear

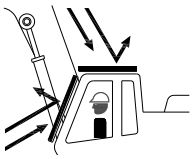
- Gloves

- Safety shoes
- Falling part



Personnel maintain a safe distance from breaker

Fragments / debris becoming airborne projectiles

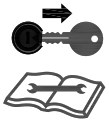


Protective guards required on cab when operating this work tool

Leaking fluid under pressure

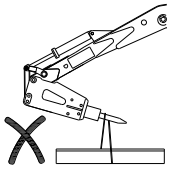
Hot surfaces

Gas / Oil under pressure

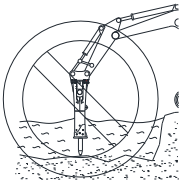


Shut off carrier & remove key before servicing

Identifies lift point



Any figure displaying an X-out or a circle with a diagonal slash is a prohibited action.



Prohibited actions must be avoided to prevent injury and/or equipment damage

The check mark is used to indicate correct actions or approved methods that are recommended

Safety Information – [cont'd]

Attention Read the Manual

Improper installation, operation or maintenance of the Allied equipment could result in serious injury or death. Only qualified operators may operate the Allied equipment. Personnel responsible for the maintenance of the Allied equipment or its systems, including inspection, installation or adjustments must also be qualified. Operators and personnel responsible for maintenance of this equipment should read this manual. Other manuals, such as those published by the machinery used in support of the Allied equipment, should also be read.

Qualified Person

For the purposes of this manual, a qualified person is an individual that has successfully demonstrated or completed the following:

- Has read, fully understands and adheres to all safety statements in this manual.
- Is competent to recognize predictable hazardous conditions and possess the authorization, skills and knowledge necessary to take prompt corrective measures to safeguard against personal injury and/or property damage.
- Has completed adequate training in safe and proper installation, maintenance and operation of this Allied equipment.
- Is authorized to operate, service and transport the Allied equipment identified in Table 1.1.

Safety Information Overview

It's important for all personnel working with the Allied equipment to read this manual in its entirety. It contains important safety information that must be followed so that unsafe situations may be avoided. Safety information described at the beginning of this manual is generic in nature. As you continue reading through later sections of this manual, instructions and safety information become tool-specific and operation-specific.

Allied has made every effort to provide information as complete and accurate as possible for this document. 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.

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
- Using personnel protection equipment appropriate to working conditions, 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.

Owner's Responsibilities

Ensure that only qualified personnel operate and service the Allied equipment.

Ensure personnel protection equipment is available to personnel and enforce the use of PPE

Ensure equipment is kept in safe operating condition

Ensure safety-related materials such as instructions and including this manual are kept in a convenient location so that they are easily accessible to operators and maintenance personnel.

Safety Information – [cont'd]

Operational Safety Program

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

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.

Personal Protective Equipment (PPE)

Personnel operating or nearby the equipment and exposed to the hazard of falling, flying and splashing objects, or exposed to harmful dusts, fumes, mists, vapors, or gases shall use the particular personal protection equipment (PPE) necessary to protect them from the hazard. Such PPE may include safety eyewear, face shield, hearing protection, safety footwear, gloves, and dust mask. Supervisors shall review proper PPE selection and ensure PPE is made available to personnel. Personnel are responsible for wearing PPE as directed by the supervisor.

Protective Equipment - Guarding

Allied equipment designed with guards shall have guards in place when equipment is in use. Guards are fitted to the equipment to protect against unsafe situations that could not be eliminated through design measures. Where it was not possible to prevent an unsafe situation by means of a guard, safety messages appear on the equipment, warning personnel of a hazardous condition.

Guards shall not be removed unless for the purpose of inspection and service of components. All guards must be reinstalled after service or adjustments are completed. Do not operate the Allied equipment without guards installed.

Additional guarding, not included with the Allied equipment, is necessary at the operator's station to protect the operator and other nearby personnel against flying debris from material being cut or demolished. Do not handle, demolish or cut material overhead without proper guards installed.

To prevent accidental start up, the control switch shall be located in a protected area that is guarded and makes it difficult to accidently operate the equipment.

Unapproved Modifications

In order to provide and maintain efficient production and reliable service, while ensuring operator safety, the Allied equipment may not be modified or used for any other purpose other than, for which it was intended. Use of the Allied equipment, other than those specified in this manual, may place personnel at risk of injury and/or may subject the equipment to damage. The Allied equipment shall not be modified or used in unapproved applications unless written consent is received from the Allied Engineering Department.

Table of Contents

Table of Contents - [cont'd]

List of Figures

1.0 Introduction and Scope

1.1 Purpose of this Manual

This Manual has been prepared to assist the operator and maintenance personnel with the information necessary for the safe and proper use of the Allied Breaker. This manual is an integral part of this product. Keep it in a convenient location so that it is easily accessible for future reference.

1.2 Content Includes

- Safety Section
- Equipment Identification
- Pre-Operation Inspection
- How to Operate the Breaker
- Maintenance Schedule
- Lubrication
- Changing the Breaker Tool
- Charging the Gas Accumulator
- Troubleshooting
- Lifting, Transporting & Storage
- Technical Data

Prior to use, confirm that the information recorded on the equipment's identification label corresponds with Table 1.1.

Table 1.1 About This Manual

Document ID No.	SOM102706
Type	Safety, Operation and Maintenance
Current Status	See Inside Cover
Product Name:	Hydraulic Impact Breaker
Series	AR
Applicable Model[s]:	AR110B,130,160B,C,170C, 180C
Years of Manufacture:	2003 & above

This document is published solely for information purposes and should not be considered all-inclusive. If further information is required, contact your local Allied dealer or the Allied Customer Service Department.

Material presented in this manual, including illustrations and descriptions, is intended solely for use with the equipment identified in Table 1.1 and may not be suitable for other models.

The content of this publication has been reviewed for accuracy. Allied Construction Products, LLC has endeavored to deliver the highest degree of accuracy possible. However, continuous improvement of our products is an Allied policy. The material in this publication, including descriptions, illustrations and specifications, describes the product at the time of its publication, and may not reflect the product in the future. Changes made to the content of this publication are recorded on the inside cover.

1.3 How to Order Replacement Publications

Replacement manuals can be ordered by contacting your Allied dealer service center.

1.4 Related Publications

Allied Construction Products, LLC offers the following publications for the product identified in Table 1.1.

1.4.1 Parts Manual

The Parts Manual identifies each component of the Allied work tool. Safety and information labels are also included in the Parts Manuals.

Material presented in each Parts Manual, including part names, illustrations and descriptions, may not be suitable for other models. Prior to using any Parts Manual, confirm that the information recorded on the Equipment's Identification Tag corresponds with the model information located on the front cover of the manual.

Illustrations shown in the Parts Manual are not intended for use in the repair or service of the breaker.

1.4.2 Repair Manual

The Repair Manual has been prepared to assist the Service Technician with the information necessary for the disassembly & reassembly of the Breaker. Content includes:

- Safety Information
- Disassembly & Reassembly
- Bolt Torque Specifications
- Wear Limits of Parts
- N2 Gas Charging Instructions
- Bushing Replacement

1.0 Introduction and Scope – [cont'd]

1.4.3 AEM Safety Manual for Hydraulic Mounted Breakers

The Association of Equipment Manufacturers offers a safety manual designed for operators and maintenance personnel of hydraulic mounted breakers.

The manual is available in Spanish, French and English. It is published in an illustrated format of sensible do's and don'ts, featuring typical daily situations on the job site.

Content includes safety tips concerning the workplace and equipment, start up and shut down guidelines and special operating and maintenance precautions.This publication is 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 CMHB-1004, Hydraulic Mounted Breakers.

This publication is also available through Allied under part number 953076 (English). To order a copy, contact the Allied Customer Service Department.

2.0 Equipment Identification

2.1 Serial Number Location

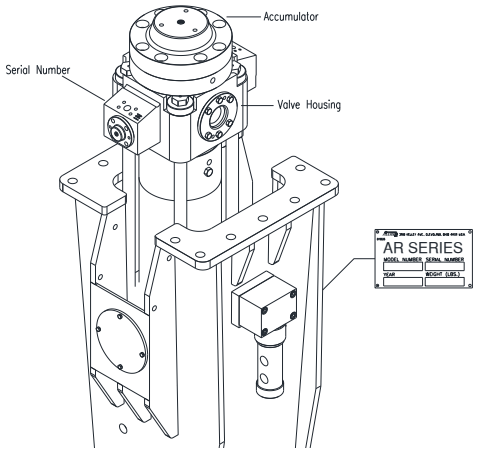


Fig 2-1 Equipment Identification

Refer to Figure 2-1. The Serial Number assigned to this equipment can be found in the following locations:

1. Stamped on the Equipment Identification Tag
2. Stamped on valve housing near the IN port.

2.2 Equipment Identification Tag

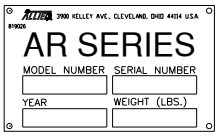


Fig 2-2 Equipment Identification Tag

The Equipment Identification Tag is affixed to the housing. It provides the following information:

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

Confirm that the information contained on the Tag corresponds with the information provided in Section 1, Table 1.1.

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.

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 filled out. The form provides a section for information about the host machine that the breaker will be installed on. Complete all sections of the form and return to Allied.

Use of non-Allied parts, unapproved service methods, modifications to the Allied equipment, 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 equipment will remain productive with a minimum of service.

Keep the Allied equipment operating within its performance limits by familiarizing yourself with the specifications provided in the technical data and specifications tables. Improper installation, including failure to calibrate the carrier correctly may result in loss of performance or subject the equipment to conditions beyond their design.

The following outlines general maintenance policies required for all breaker models. The owner is strongly encouraged to adopt these general guidelines and further develop 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. Take prompt action to 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.
- Understand that particular applications, such as working underwater, will require modifications to the standard breaker and additional training for operation and service.
- 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 13.
- Conduct regular checks and inspections as scheduled in the Care and Maintenance Section 7.
- 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.

3.0 Warranty Protection Summary - [cont'd]

3.3 Allied Product Policies

In this manual, Allied recommends breaker 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.

4.0 Product Information

4.1 Description and Typical Applications

The Allied Breaker 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 breaker 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. (Requires conversion from standard type before underwater use!)
- Recycling: Breakup of "skulls" from the steel industry.

4.2 Familiarization of Components

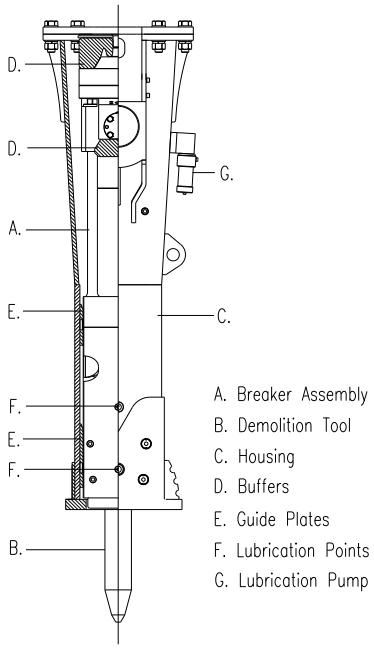


Fig 4-1 Main Components of Hydraulic Breaker

4.3 Principle of Operation

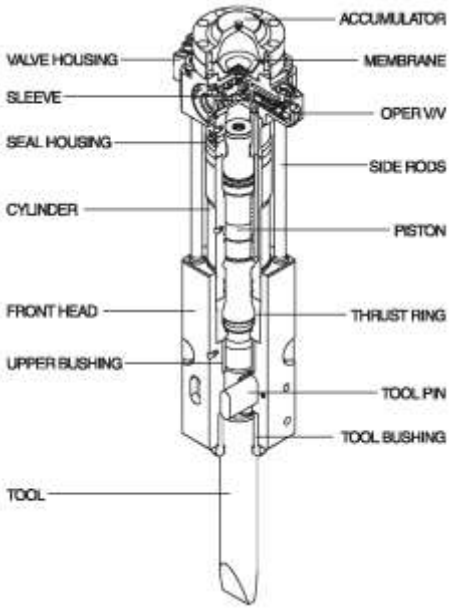


Fig 4-2 Cutaway of Breaker Assembly

- The Breaker is not self-powered. Performance relies on a host machine, equipped with a suitable hydraulic circuit that is capable of achieving all requirements specified in the technical data section of this manual.
- Within the machine's hydraulic circuit, an ON/OFF valve is necessary to provide flow in one direction to the Breaker. The valve will be managed with a momentary switch located in the operator's cab within easy reach of the operator.
- Opening the ON/OFF valve permits oil to flow from the machine's pump to the port marked [IN] on the valve housing.
- The operating valve on the breaker controls the incoming oil by porting it to the lower side of the cylinder.
- Pressurized oil will raise the piston. As the piston is cycled upward, the position of the operating valve allows oil to exit the upper cylinder and return to the machine's hydraulic tank.

4.0 Product Information –[cont'd]

- The breaker is equipped with an accumulator. The accumulator is a self-contained pressure vessel with an expansible chamber divided by a flexible membrane. The gas-side chamber is pre-charged with nitrogen gas (N2), while the oil-side chamber is for receiving, storing and discharging pressurized oil.

- As the piston nears the top of its stroke, porting inside the cylinder becomes pressurized and forces the operating valve to shift. In this position, the valve now diverts oil to the upper cylinder and blocks oil from exiting.

- The oil supplied by the pump and the discharged oil from the accumulator are combined to drive the piston downward until it impacts the tool.

- The cycle is continuous until the machine operator releases the momentary switch that operates the ON/OFF valve.

5.0 Sizing the Breaker

The process of selecting the right breaker must consider the type of work to be done, along with any special needs such as required modifications when working in underwater applications.

When sizing the breaker, there are generally three key points to consider –

- Production rate (Type of material to be broken)
- Lift capacity of machine
- Hydraulic capacity of machine

Obtaining optimal production rates requires efficiency between the breaker and machine. Other factors include pairing the right size breaker to match the material's hardness and the required degree of material size reduction.

Materials are fractured by two methods – Penetrative and Impact. In penetrative breaking, blows from the piston drive the tool into the material and wedge it apart. With impact breaking, the blows from the piston generate compressive stress waves that travel through the tool and then transferred into the material, causing it to fracture.

Be careful not to undersize the breaker in hard material. It is important that the entire impact force (the stress wave) is transferred into the material. If not, it will be reflected through the tool and back into the breaker.

Ideally, it should take 3- 5 seconds to fracture the material. Anything less than 2 seconds puts the breaker at risk of idle blows. Running the breaker continuously beyond 15 seconds will generate unwanted heat at the tip of the tool.

Using an undersized breaker in very hard material will negatively impact production as well as component longevity and reliability. In hard rock applications, undersized breakers are subjected to longer running cycles. This generates inefficiencies in both the machine and breaker. Monitoring the condition of wear parts, such as bushings and tools, will need to be more frequent. The machine's service intervals will also require extra attention.

Production is negatively impacted if the host machine is too light for the breaker. If the machine is undersized, the operator will need to work slower to keep the machine stable. An undersized machine also limits the amount and size of the material that can be moved by the machine when raking or repositioning materials.

Provided the carrier can safely lift the weight of the breaker, hydraulic comparisons are another key element for successfully matching the right size breaker with the carrier. The combination of a suitably matched hydraulic circuit that is in good service condition will help to ensure heat generation and power loss in the hydraulic system is minimal.

It's important to complete several tests and evaluate the performance of the hydraulic circuit before the breaker is used. All hydraulic breakers are designed to provide optimum performance with reliable service life at a specific oil pressure and flow range. Before use, it's important to review and compare operating specifications of the breaker with those of the carrier.

The breaker must not be used until testing is completed and the results confirm the hydraulic circuit is properly calibrated and set in accordance to the specifications including oil flow, operating pressure and back pressure.

Flow requirements and other specifications of the breaker, including weight, are located in the Technical Data section of this manual. Tools required for testing the hydraulic circuit include a flow meter and pressure gages. An overview of the testing procedure, along with a form to record the results of the flow test, can be found in the Technical Data section in this manual.

Other important considerations include knowing how your machine is equipped and if any modifications have been made. Factors such as boom and stick length, undercarriage and tracks, counterweights, etc., all affect the lifting capacity of the carrier. Also, remember to take into account any add-ons such as a quick attach coupler. Consult the manual provided by the carrier manufacturer for specifications.

5.2 Auxiliary Circuit and Conversion Kits

Hydraulic work tools, such as Breakers, are not self-powered. Its performance relies heavily upon the host machine's ability to provide a suitable hydraulic circuit that will achieve all requirements specified in the technical data section of this manual.

Most machines will require some level of conversion to make use of their hydraulic power. A hydraulic circuit, capable of producing flow and pressure in one direction is needed to operate a breaker.

5.0 Sizing the Breaker – [cont'd]

Conversions to machines equipped with a factory or dealer installed auxiliary circuit may require little more than minor adjustments to flow and pressure settings. Follow the machine manufacturer's instructions for adjustment procedures.

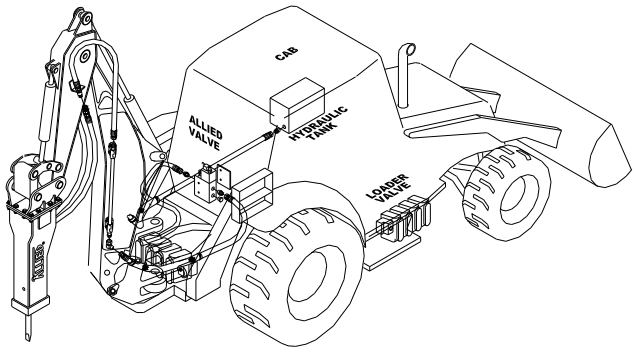


Fig 5-1 Allied Conversion Kit With AC-Series Valve

If the machine is not equipped with a hydraulic circuit, a conversion kit, from Allied, can be installed. When necessary, Allied conversion kits include the Allied "AC" series valves. These are solenoid-operated valves that control flow and pressure.

Requests for further information or assistance with breaker selection should be directed to your Allied dealer or by contacting the Allied Sales or Product / Technical Support Departments.

CAUTION
Hydraulic circuits differ between machines. Improper oil flow or pressure can damage the breaker or carrier. Only qualified personnel, having knowledge of the machine's systems, proper test equipment and tools should perform conversion set-up and adjustments.

6.0 Operation

6.1 Before the Breaker is Used

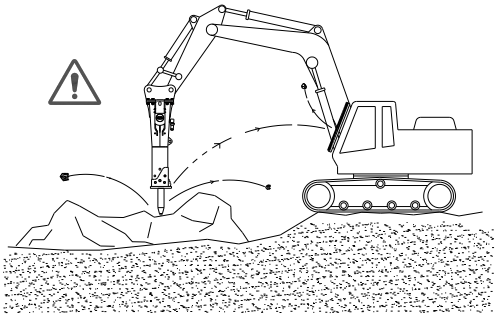
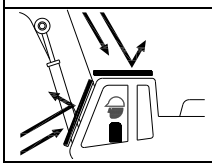


Fig. 6-1 Install Protective Guards

CAUTION



Rock fragments may cause injury or property damage. The operator's cab must be fitted with a protective guard of wire mesh or other adequate materials.

6.1.1 Pre-Operation Inspection

Prior to using the Breaker, check that it has been properly serviced with all scheduled maintenance and repairs completed. A qualified individual should conduct a visual inspection of the following:

- ❑ Ensure Breaker is securely attached to the carrier.
- ❑ Ensure Breaker tool is locked securely in the front head
- ❑ Ensure Breaker tool is well lubricated
- ❑ Check grease level and test operation automatic lube system, if equipped
- ❑ Ensure hoses are not rubbing and tubes are secured tightly in clamps
- ❑ Ensure fasteners are not loose, missing or damaged

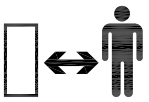
Do not operate breaker until all faults are corrected.

An inspection record, which can be copied, is located in Section 7 of this manual.

6.2 Operating the Breaker

CAUTION

Only qualified personnel shall operate the breaker. Never activate the breaker unless the operator is seated in the operator's seat and is in full control of the machine.



CAUTION

Clear out all personnel before maneuvering the carrier into the work area.

CAUTION

Hazard from flying debris or fragments. Safety eyewear must be worn when operating the breaker.

CAUTION

Prolonged exposure to high noise levels may cause hearing impairment or loss. Hearing protection must be worn when breaker is in operation.

CAUTION

Rock fragments become flying projectiles that may cause injury. Do not operate breaker with personnel in vicinity of work zone.

- Before work is started, identify all site hazards, including electrical and gas utilities
- Use the boom and arm controls to extend the breaker away from the carrier.

IMPORTANT

Service life of parts is diminished if attention to correct working methods is not applied.

- Position the breaker tool against the material to be broken. Do not drop breaker on to material.

IMPORTANT

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

6.0 Operation – [cont'd]

NOTE: Always place the breaker tool at right angles to the work surface. See Fig. 6-2. This will prevent the tool from binding against the bushings.

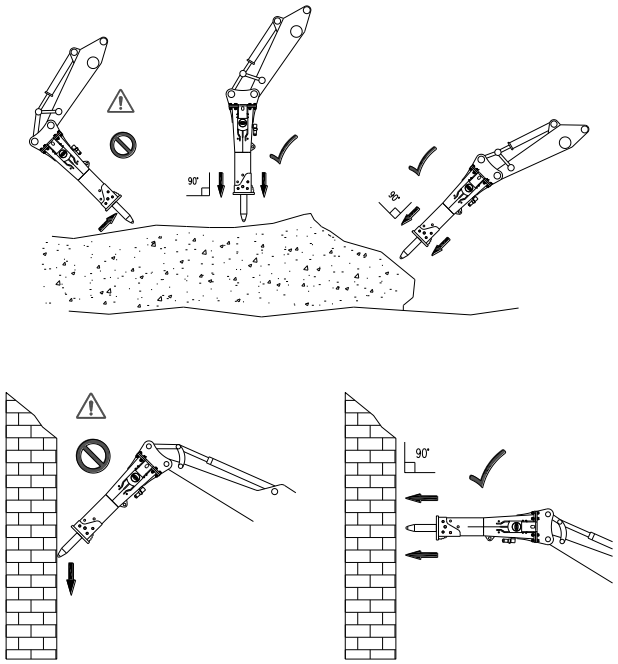


Fig. 6-2 Always Work 90° to Work Surface

- With a "firm preload" applied on the breaker tool, the breaker is ready to operate.
- 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: Start breaking near the outer edge and advance inward. See figure 6-3.

NOTE: Impact force can be absorbed by the accumulation of rock dust. Expel dust by carefully tilting the breaker with the bucket control. Use caution to avoid bending strain on tool and front head. Limit the tilt angle to no more than 5º. Impact force is also absorbed if the ground underneath the material is not solid.

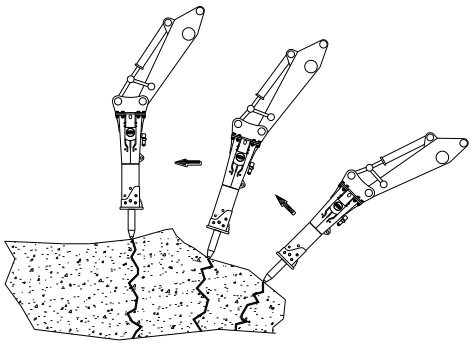


Fig 6-3 Begin At Outer Edge and Work Inward

6.3 Incorrect Operating Methods

IMPORTANT
Equipment damage may result if proper procedures are not followed. Carefully read through this section as it describes actions to be avoided when using the breaker.

6.3.1 Listen for Change in Pitch or Frequency

The operator must remain attentive to the sound emitted by the breaker.

- The breaker will emit a metallic pinging sound when the tool strikes against the retainer pins. Never operate the breaker when the tool suspended in the air (Blank Fire), or is not pressed firmly against the material (Idle Strokes). Both conditions are damaging to the breaker. The tool must always remain in firm contact with the material. Use the carrier to follow the progress of the breaker as the tool penetrates into the material. If the material is weak and easily fractured, the operator must react quickly and stop the breaker to prevent idle strokes.
- The breaker will emit a hollow (thin) sound when the tool is binding in the bushing. This is usually accompanied by a drop in blow frequency and reduced impact energy. Binding can be the result of misalignment or insufficient lubrication. Review operator technique. Always work at a 90° angle to the material. See Fig. 6-2. This will prevent the tool from binding against the bushings. Keep the tool and bushings well lubricated. Re-lubricate the tool every two hours or if it appears dry.

6.0 Operation – [cont'd]

IMPORTANT
Service life of tool and bushings is diminished if attention to correct working methods is not applied. Failure to align the breaker at right angles to the work surface will accelerate wear of tool and bushing.

NOTE: The breaker tool becomes hot during use. Breaking in extremely hard materials requires care to prevent overheating the tool. Avoid prolong hammering in one spot. If the material is not broken within 15 seconds of hammering, stop and reposition the tool nearer the edge. Refer to Figure 6-3.

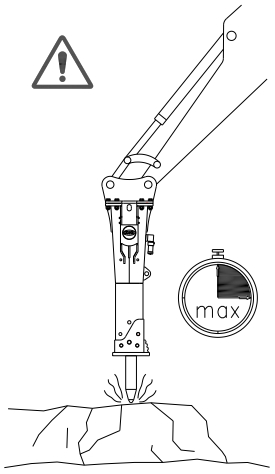


Fig. 6-4 Do Not Overheat Tool

6.3.2 Do Not Lift or Transport Loads with Breaker

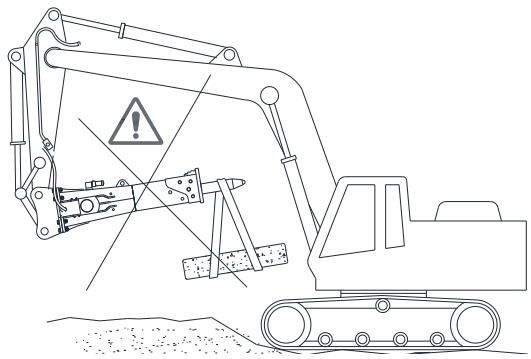


Figure 6-5 Do Not Lift or Transport Loads With Breaker

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

6.3.3 Do Not Drop or Hack at Material

Avoid reckless movements that can damage the breaker or cause the carrier to become unstable. Do not drop the breaker against the material. Do not use the breaker to hack at the material.

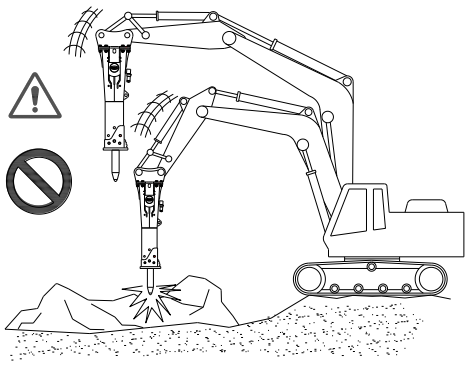


Fig 6-6 Do Not Drop Breaker on to Material. Avoid Hacking at the Material

6.3.4 Do Not Pry With the Breaker

Bending results from prying or misalignment and is the leading cause of tool breakage. Prying exerts an enormous strain over the entire Breaker, including the breaker tool, bushings and housing. In the occurrence of tool failures from bending, the length of the tool, skill of the operator and lubrication management, all play a decisive role.

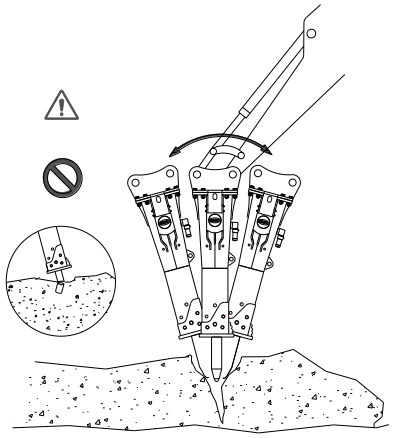


Fig 6-7 Do Not Pry With the Breaker

6.0 Operation – [cont'd]

6.3.5 Do Not Operate Breaker With Cylinders At Stroke End

Operating the breaker with the cylinders fully extended or retracted can damage cylinders.

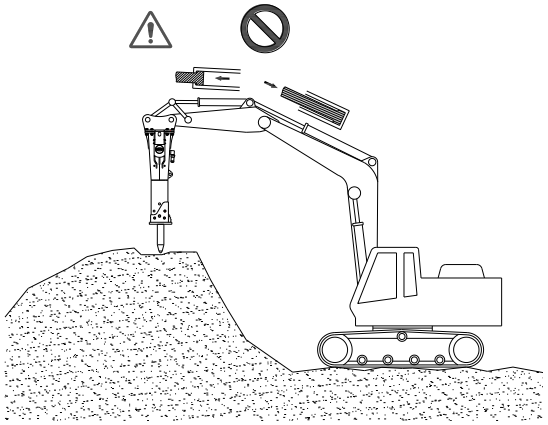


Fig 6-8 Do not Operate With Cylinders At Stroke End

6.4 Special Applications / Operating Conditions

6.4.1 Working Underwater

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

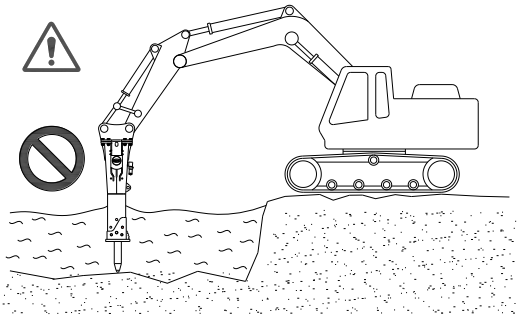


Fig 6-9 Special Applications - Working Underwater Require Modifications Before Use

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.

6.4.2 Working Underground

When using the Breaker underground [tunneling or mining applications] special safety regulations may apply. Additional considerations include:

- Use of water sprays to suppress dust.
- Use of fire-resistant hydraulic fluids. 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.

6.4.3 Working in Hot Temperatures

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

- Specify hydraulic oils with viscosity suitable for the climate conditions. In general, the hydraulic oil that was originally specified for the machine by the carrier manufacturer can be used with this equipment.
- Check the oil level in reservoir
- Inspect the cooling system. Good air circulation is essential in dissipating heat from the hydraulic oil. Make sure the cooler is clean.

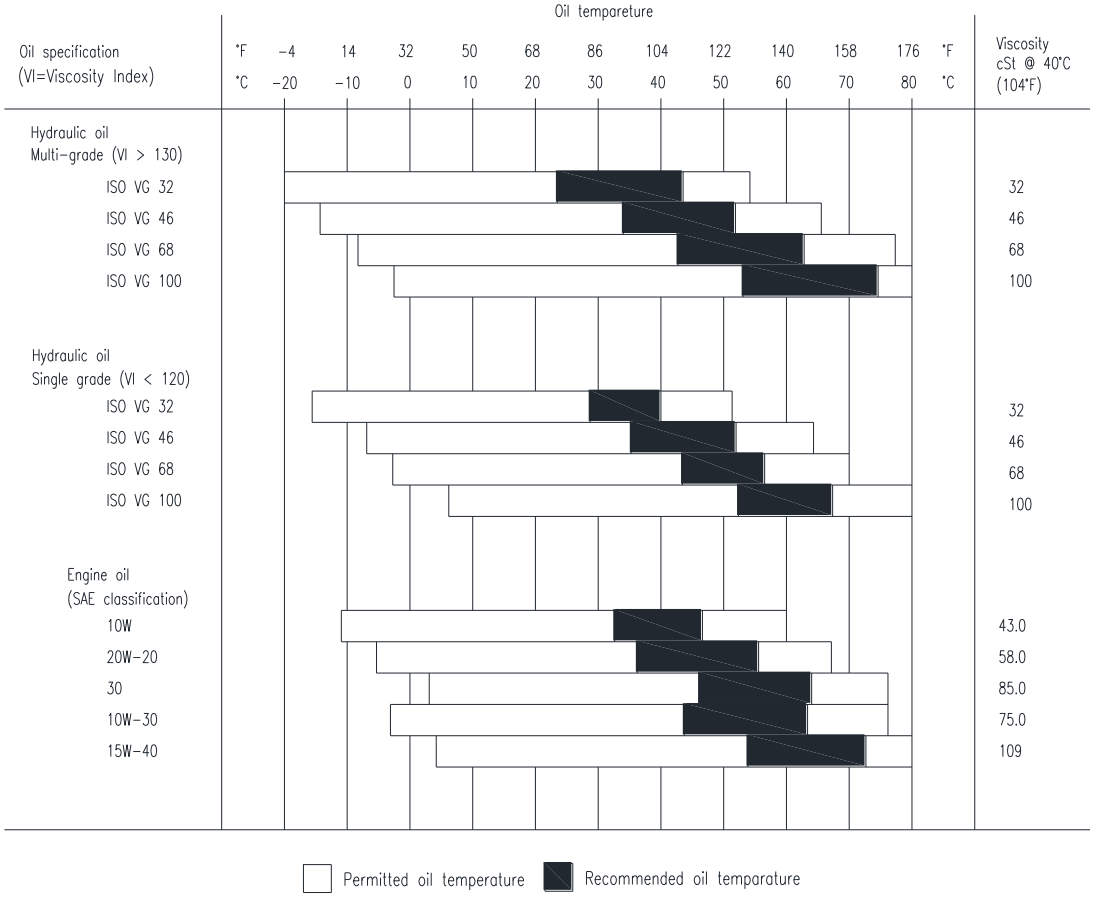
6.4.4 Working in Cold Temperatures

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. Follow instructions provided by the carrier manufacturer for on warming up the carrier.

6.0 Operation – [cont'd]

- 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.
- Specify hydraulic oils with viscosity suitable for the climate conditions. In general, the hydraulic oil that was originally specified for the machine by the carrier manufacturer can be used with the Allied equipment.
- Use oil viscosity based on the expected air temperature range during the period between oil changes.
- Optimum oil viscosity for the breaker @ operating temperature is 60 – 30cSt. Allowable oil viscosity range 1000 – 20cSt.



7.0 Care and Maintenance

7.1 Inspection & Maintenance Schedule

All hydraulic breakers require regularly scheduled inspections and service. In addition to monitoring parts for wear, scheduled inspections are useful in spotting trends and identifying potential problem areas.

The service intervals listed below apply to normal applications. Breakers working in severe operating conditions or special applications such as underwater, tunneling, scaling, foundry cleaning, etc., may require more frequent service. Diminished performance and/or accelerated wear of components may result if service intervals and/or procedures are not followed.

Daily Pre-operation Walk-around Inspection

- ❑ Lubricate breaker tool
- ❑ Check breaker tool is properly engaged in front head
- ❑ Check level and operation of automatic lube system - If equipped
- ❑ Check for loose or missing fasteners
- ❑ Check for fluid leaks at tubes, hoses, connections and seals
- ❑ Check tube and hose clamps
- ❑ Ensure breaker is properly engaged to carrier. Check mounting pins and ensure pin keepers are secure
- ❑ Check housing and mounting bracket for wear and cracks
- ❑ Look for signs of contact between breaker and housing caused by excessive movement

Every 2 Hours (While in use – Service Hours)

- ❑ Lubricate breaker tool or sooner if the tool appears dry
- ❑ Check breaker tool is properly engaged in front head

During Shift (While breaker is in use)

- ❑ Actively monitor efficiency and evenness of operation. Look and listen for any interruptions from normal operation
- ❑ Monitor hydraulic oil temperature. Keep within the required operating range
- ❑ Be alert to fluid leaks

Every 50 Hours or Weekly

- ❑ Measure gap between breaker tool and bushing

Every 100 Hours or 2 Weeks

Remove breaker tool from front head

- ❑ Check retainer slot area for burring
- ❑ Inspect impact surface for uneven wear, cracks or chips
- ❑ Inspect retainers for wear, cracks or chips
- ❑ Inspect impact surface of piston for uneven wear, cracks or chips
- ❑ Inspect thrust ring for evenness of wear, cracks or chips

Every 250 Hours or 3 Months (Or As Required)

- ❑ Measure hydraulic oil pressures and confirm all are within required range
- ❑ Should repairs or changes be made to the hydraulic system, the oil flow and pressure must be re-tested.
- ❑

At Rebuild

- ❑ Replace all seals. Replace all worn components
- ❑ Replace accumulator membrane and charge accumulator

After Rebuild – Before Use

- ❑ Test quality of hydraulic oil
- ❑ Service hydraulic oil filters
- ❑ Test hydraulic circuit with flow meter and pressure gages.

Service Notes	Date

7.0 Preventative Maintenance

7.2 Equipment Maintenance Log

The importance of regular maintenance along with frequent inspections and detailed record keeping cannot be overemphasized. Keep an updated log of equipment maintenance. Records of services performed and any repair are helpful if warranty coverage is ever in question. Records should include:

- Date of service and hour meter reading
- Details of the service, maintenance or repair performed.
- Names of persons performing the service, maintenance or repair
- Copy of the purchase order or invoice, including part numbers used in the repair

7.3.1 Housing Box Inspection – Daily Start of Shift

Inspect the housing box for cracks and wear. Frequent raking of material will lead to a higher rate of wear. Build-up worn areas and promptly repair cracks to prevent further spreading. Neglecting or delaying repairs will lead to further damage and increased repair costs.

7.3.2 Vibration Dampening Inspection

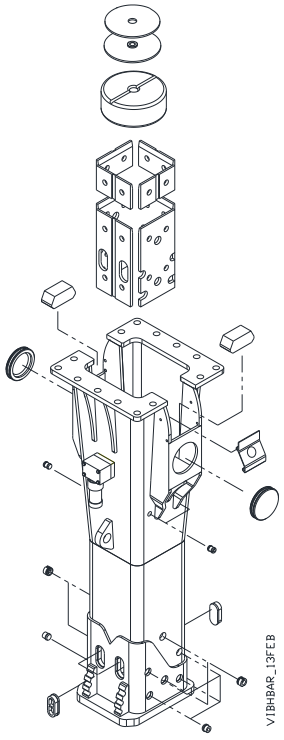


Fig. 7-1 Housing, Top Damper, Guide Plates & Plugs

A damper is located on top of the breaker and guide plates are positioned around the front head. These isolate the breaker from the housing and help minimize vibrations that contribute to unwanted noise and wear on the carrier.

Guide plates and dampers are wear items that deteriorate with use. The operator must actively monitor the movement of the breaker assembly inside the housing. Contact must be avoided to prevent damage.

Guide plates are made from a dense plastic composite. This material is abrasion resistant and wear will be further minimized by keeping dust plugs and covers in place.

With guide plates in good condition, the breaker assembly is held tight and movement inside the housing box is minimal. Excessive movement can be checked by the operator with the tip of the tool on the ground. While being careful to avoid any force that could bend the tool, gently pivot the breaker. If movement inside the housing allows contact, locate fault and take immediate actions to correct. Replace guide plates that are worn.

7.4 Front Head Inspection – Every 2 Hours

Visually inspect the exposed surfaces of the tool, bushing and other areas of the front head each time the tool is re-lubricated.

- Ensure that the tool is properly engaged in the front head by the retainers.
- Check that both the tool and bushings are receiving sufficient lubrication.
- Be alert to any oil seepage on the ground, tool or the front head, as this may indicate a serious condition that will require further investigation
- Visually inspect the gap between the lower bushing and tool. Further details in Section 7.4.1.

7.4.1 Measure Gap Between Tool and Bushing – Every 50 Hours or Weekly

Visually inspect the gap between the lower bushing and tool. If maximum gap, shown in Table 7.2, is reached, follow further details in Section 7.4.2.

7.0 Preventative Maintenance

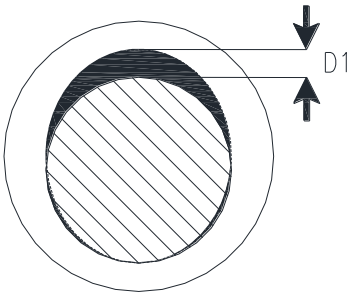


Fig 7-2 Gap D1 Between Tool and Bushing D4

7.4.2 Internal Parts of Front Head Assembly

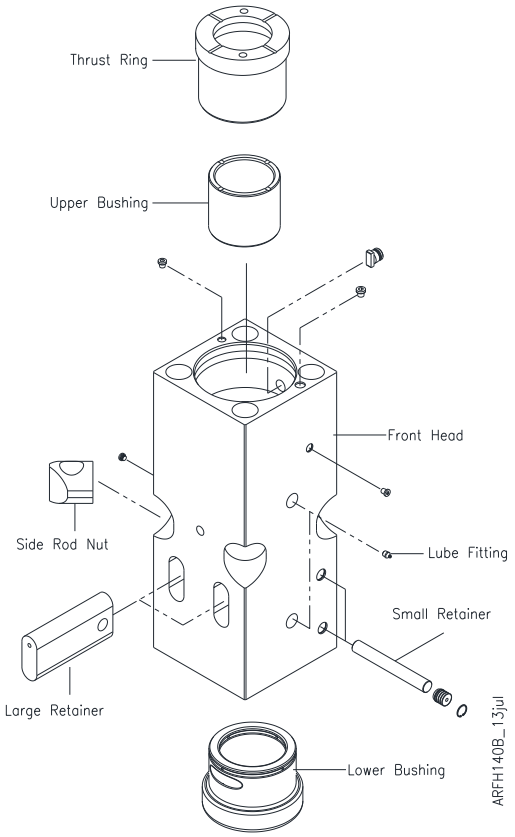


Fig 7-3 Internal Parts of Front Head Assembly

The tool is inserted into the open end of the front head and secured by the retainer system. The condition of the tool, bushings and thrust ring must be actively monitored. The bushings play a critical role in holding and guiding the tool so at the moment of impact the piston and tool are squarely aligned with each other. The thrust ring positions the height of the tool to match the stroke of the piston. Thrust ring design can vary by model. Some are machined as part of the upper bushing as in Fig. 7-7. Other models have a separate thrust ring as in Fig. 7-6.

7.4.3 Front Head Inspection – Every 100 Hours

Conduct a thorough inspection of the tool, bushings, thrust ring, retainers and piston. Regular inspection of these components will spot potential problems in their early stages, before they can worsen into serious and costly repairs. The internal components of the front head are viewable only when the breaker tool is removed.

Wipe grease from parts to be inspected. Check parts for wear and damage. Review Table 7.1 for cause and remedy.

- Tool - Burs formed in retainer slot (1)
- Retainer - Burs or uneven wear (1), heavy wear (3) or chipping (2).
- Tool, Bushings or Retainer - Galling (1,3)
- Thrust Ring – Cracked, chipped or uneven wear (1,2,4,5)
- Bushing - Cracked (4)
- Piston - Impact face concaved, cracked, chipped or sharp edges (4,5)

Table 7.1 Inspection of Parts

	Cause	Remedy
1)	Tool is twisted by the material	Use conical tool - less susceptible to twisting
2)	Idle blows	Maintain sufficient feed force. Stop breaker as soon as material breaks.
3)	Insufficient lubrication	Re-lubricate every 2 hours or if tool shank is dry
4)	Side loading	Align tool at 90° angle to work surface. Do not pry with tool.
5)	Tool misalignment	Replace worn tool and / or bushing

Continued operation with improper technique or worn parts can risk further damage that may result in costly repairs.

Several factors contribute to the rate in which front head components will wear. The most apparent include the operator's technique, lubrication and the abrasiveness of the material.

7.0 Preventative Maintenance – [cont'd]

With some items, wear-out is expected and replacement is a normal routine. For example, tools will wear at the tip and eventually become too short for use. This type of wear-out is normal and is not preventable. However, wear-out of the tool shank is not normal and preventable through proper operating techniques and regular re-lubrication.

It's important to actively monitor the tool to ensure its receiving sufficient lubrication. If regularly scheduled re-lubrication is not performed, the condition of parts will quickly deteriorate - rendering them unusable.

Damage from galling is the result of insufficient lubrication and/or side loading the tool against the bushing. Review the frequency, quantity and quality of lubricant. Shorten re-lubrication interval if the tool is dry or if chisel paste is not used.

IMPORTANT
Attention to proper selection of lubricant and punctual re-lubrication frequency will promote maximum utilization of the tool's working length. Inadequate lubrication, even for short periods, will result in rapid wear of the tool and bushings. Re-lubricate every two hours or sooner if grease is not visible. Use only lubricants formulated and labeled for use with breakers. Allied Chisel paste is recommended.

7.4.4 Measuring the Tool and Bushings for Wear

Regularly measure the tool and bushing. Worn bushings and tool will increase the risk of misalignment which if not corrected can lead to piston and seal damage.

Table 7.2 Wear Limit – Tool, Bushing, Thrust Ring

Units in inches [mm]	Gap Max "D1"	Tool OD Min "D2"	Bushing ID Max "D3"	Thrust Ring Max
AR110B	.312 [8]	4.25 [108]	4.41 [112]	0.78 [20]
AR130	.312 [8]	5.04 [128]	5.20 [132]	0.57 [14.5]
AR160B,C	.312 [8]	6.18 [157]	6.42 [163]	0.83 [21]
AR170C	.312 [8]	6.57 [167]	6.81 [173]	0.78 [20]
AR180C	.312 [8]	6.89 [175]	7.28 [185]	2.16 [55]

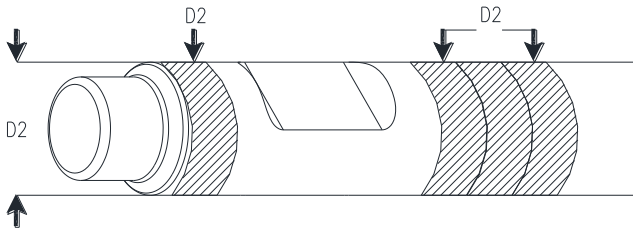


Fig 7-4 Measure OD of Tool D2 for Wear

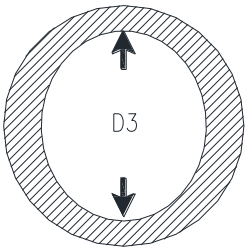


Fig 7-5 Measure ID of Bushing (D3) for Wear

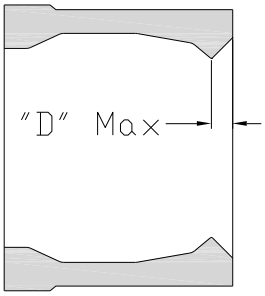


Fig 7-6 Thrust Ring Wear Limit

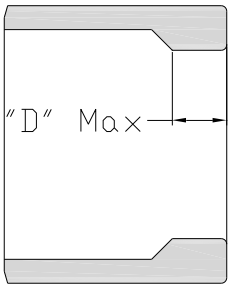


Fig 7-7 Thrust Ring Wear Limit – AR180C

The tapered shoulder of the tool seats against the matching taper of the thrust ring. The operator's technique will have the greatest bearing on the wear rate of the thrust ring. Weak down force, persistent blank firing and extensive raking must be avoided if it is to deliver a long and reliable service life.

Wear is measured at the tapered surface "D". Thrust ring replacement is required when Maximum is reached in the Table 7.2. In the event the thrust ring is chipped or cracked, it must be replaced regardless of the wear measurement.

7.0 Care and Maintenance – [cont'd]

7.4.5 Tool Retainer Inspection

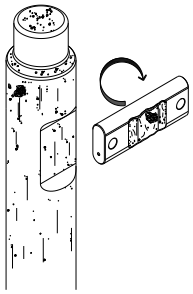


Fig 7-8 Rotate Worn Tool Retainer

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

2. Rotate retainer when surface is uneven or damaged from galling. Replace when both sides are worn.

7.4.6 Piston Inspection – With Tool Removed

The lower end of the piston can be viewed by removing the tool. Inspect the piston's impact surface for damage. The surface should be flat and smooth.

Discontinue use of the breaker if the piston surface is cupped, chipped, cracked or has sharp edges. These conditions are often the result of worn bushings, tool misalignment, and metal fatigue. Piston replacement requires complete disassembly of the breaker. Contact your authorized Allied service center.

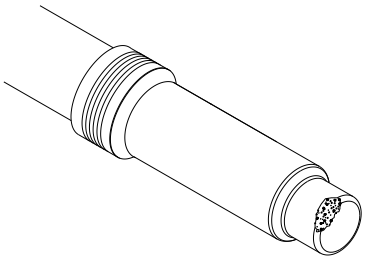


Fig 7-9 Piston Shown With Damage to Impact Face

7.5 Inspection of the High-Pressure Accumulator

The accumulator is a self-contained pressure vessel with a flexible membrane dividing the inner chamber. The lower chamber is used to receive, store and discharge pressurized oil. The upper chamber is filled with nitrogen gas.

During normal operation, no service is required to the accumulator between rebuilds. Visually inspect the accumulator daily for oil leaks and broken or loose bolts.

CAUTION

In the event of an accumulator failure, immediately discontinue operation. Ignoring this notice can damage the breaker and the carrier.

Only qualified technicians with special tools and training should service the accumulator.

WARNING

Prevent unexpected release of high pressure gaseous energy. The accumulator is pressurized with nitrogen gas and remains pressurized even at times when there is no hydraulic pressure to the breaker.

Only qualified technicians with special tools and training should service the accumulator. Never attempt to dismantle accumulator until it is completely discharged of all pressure. If the breaker is attached to a carrier do not service the accumulator until oil pressure inside breaker and hydraulic circuit is relieved.

Generally, membrane failures are often sudden and result in immediate and complete discharge of gas. The breaker will continue to operate, but without assistance from the accumulator, a noticeable change in performance will be observed. Symptoms include one or more of the following:

- Loss of blow energy
- Decrease in blow frequency
- Strong pulsations in hoses
- Oil leaking from around the accumulator

After membrane replacement, the breaker cannot be used until the upper chamber is charged. Several factors, including the pre-charge pressure, will affect the function and reliability of the accumulator. Accurate charging to the proper pressure is important if it is to deliver a long and reliable service life.

7.6 Mounting Pin Inspection

Inspect the mounting pins for wear and damage when the breaker is removed from the carrier. Replace pins if damaged or worn.

7.0 Care and Maintenance – [cont'd]

7.7 Threaded Fasteners

IMPORTANT
Keep threaded fasteners tight. Replacement 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 fasteners to the specified torque.

7.8 Hose Inspection

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

7.9 Check Carrier's Oil Level and Quality

CAUTION

Follow the service intervals recommended by the carrier manufacturer.

Check oil level in reservoir. Check records for last oil and filter service. Test oil quality. Review the manufacturer's maintenance schedule. It may specify operating conditions that require special attention to maintenance and adjusted service intervals.

7.10 Measure Oil Pressure Whenever the Following Conditions Occur

All hydraulic breakers are designed to provide optimum performance with reliable service life at a specific oil pressure. The correct pressure must be maintained for proper functioning, optimal efficiency and reliable service.

It is Required to Measure Oil Pressure When –

- The breaker is first installed on a carrier
- Anytime the machine's hydraulic circuit is repaired or modified.
- Anytime the machine operates other hydraulic work tools.
- Anytime the breaker is removed from one machine and attached to a different machine.
- It's recommended checking the pressure after every 250 hours of operation.

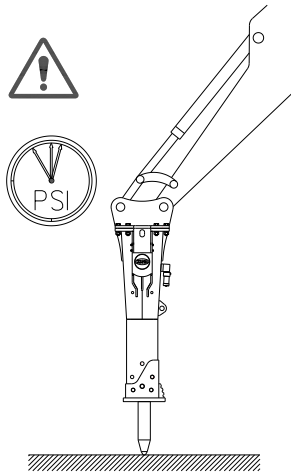


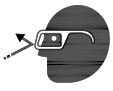
Fig. 7-10 Measuring Oil Pressure

7.10.1 Safety Precautions When Measuring Oil Pressure

- Certain tests, such as measuring the oil pressure, can only be done while the breaker is operating.
- Clear out all personnel before maneuvering the carrier into the test area.

CAUTION

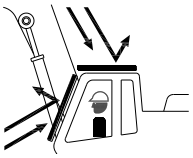
Hazard from flying debris. Do not operate breaker with personnel in vicinity of work zone.



CAUTION

Injury from flying debris. Personal protection equipment is required when operating breaker. PPE should include appropriate clothing, gloves, safety eyewear and shoes.

7.0 Care and Maintenance – [cont'd]



CAUTION

Hazard from flying debris. Protective guards must be fitted to the operator's cab when using this work tool.

WARNING

Fluid penetration injury. Fluid leaks under pressure can penetrate skin. If any fluid appears to penetrate the skin, seek immediate medical attention.

Always relieve pressure before disconnecting hydraulic lines or other pressurized lines. Only qualified technicians with special tools and knowledge of the hydraulic system should perform testing.

CAUTION

Prolonged exposure to high noise levels increases risk of hearing impairment or loss. Hearing protection is required when equipment is in operation.

CAUTION

Only qualified personnel shall operate the breaker. Never activate the breaker unless the operator is seated in the operator's seat and is in full control of the machine.

IMPORTANT

Serious equipment damage may result if proper procedures are not followed. Diminished service life will result if attention to correct machine set up is ignored.

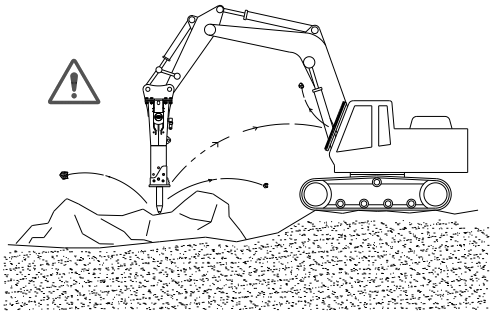
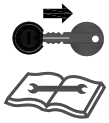


Fig. 7-11 Install Protective Guards

7.10.2 How to Measure the Oil Pressure

Certain tests, such as measuring the oil pressure, can only be done while the breaker is operating.

- Lower the Breaker to the ground and stop the carrier engine.



WARNING

Follow all safety and operating instructions provided by the carrier manufacturer. Engage interlock, shut off engine and apply parking brake.

- Relieve hydraulic pressure inside breaker and attachment circuit.
- Connect a pressure gauge [0-5000 PSI] to the measuring port located at the [IN] side of the breaker.
- Use the form provided in Section 14.2 to record your results.
- Start the carrier. Use the boom and arm controls to extend the breaker away from the carrier. Position the breaker tool against the steel plate. Do not drop breaker on to the plate.
- Adjust the engine's rpm to the normal operating speed and set operating mode to "breaker".
- The test can begin when the normal operating temperature is reached.
- Start the breaker and record the pressure reading. It's normal for the needle of the gauge to pulsate so use the average pressure. Compare your results with the values listed in the Technical Data Section of this manual.
- When the pressure-measuring test is complete, lower the breaker into a safe position and stop the engine. Remove test gauge and install plug.

8.0 Lifting, Handling, Transporting & Storage

WARNING

Crush injury from falling or shifting loads. Material handling equipment 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 suspended overhead.

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

8.1 Transport Breaker Independently of Carrier:

1. For removal instructions refer to Section 9.6.
2. Remove any hand tools and loose debris from Breaker. Secure hoses to avoid accidental damage.
3. Lift the Breaker only at approved lift points and with appropriate handling equipment.
4. Stabilize and secure the Breaker for transport.

8.2 Transport Breaker Installed on Carrier:

1. Remove all loose debris from breaker and secure hoses to avoid accidental damage.
2. Ensure mounting pins are secured.
3. Transport carrier in accordance with the carrier manufacturer's recommendations

8.3 Breaker Storage – Short Term [< 14 Days]

IMPORTANT
Water can cause destructive rust and pitting. During periods of non-use, position the breaker horizontally with the top end slightly elevated to prevent water from entering the front head.

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.

8.4 Breaker Storage – Long Term [> 14 Days]

1. Follow removal instructions in Section 9.6.
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 opening lines.

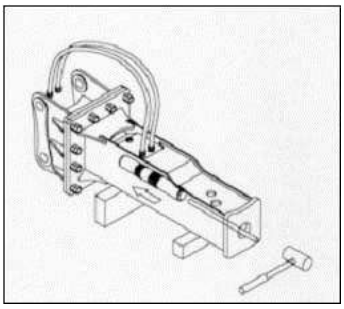


Fig 8-1 Push Piston to Highest Position

3. Protect the lower end of the piston with grease

IMPORTANT
Water can cause destructive rust and pitting. Protect the exposed surface of the piston with grease.

4. Store the breaker in the vertical position.

CAUTION

Crush injury or equipment damage from unsupported loads. Use sufficient blocking and restraints to stabilize loads.

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

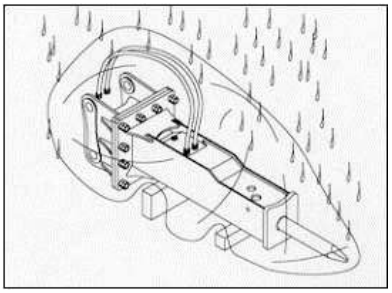


Fig 8-2 Cover Breaker with Waterproof Tarp

9.0 Attach / Remove Breaker From Carrier

9.1 Carrier Requirements

CAUTION

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

- Attach Breaker 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 carrier's lift capacity.
- 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

IMPORTANT

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

9.2 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.

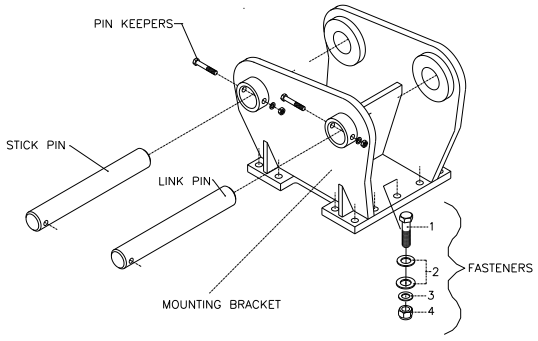


Fig 9-1 Pin-on Mounting Bracket - Typical

9.3 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

9.4 Attaching the Breaker to the Carrier

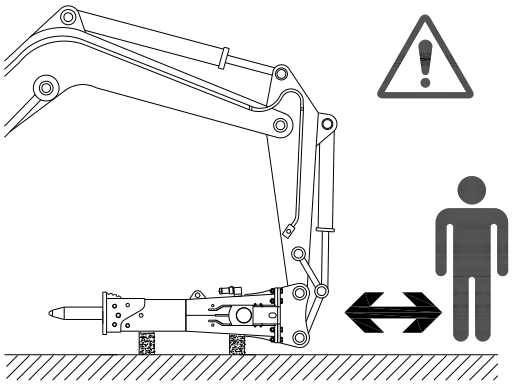


Fig. 9-2 Attach Breaker to Carrier – Typical

CAUTION

Personal protection equipment required when handling. Protective equipment should include appropriate clothing, gloves, safety eyewear and shoes.

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

Crush injury. Keep hands, feet and other body parts clear of crush points. Use sufficient blocking and restraints to avoid accidental or sudden movement of loads.

9.0 Attach / Remove Breaker From Carrier – [cont'd]

The breaker is attached to the carrier in the same manner as mounting a bucket. Use standard mechanic's techniques and tools to attach the breaker to the carrier.

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

Installation procedures can vary. The following describes basic mounting procedures for a typical pin on type as shown in Figure 9-1. You should follow the instructions provided by the carrier manufacturer.

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

1. Operator: Move carrier and breaker to a firm level surface. Refer to Figure 9-2. Position the breaker horizontally with the hose side up and with the breaker's tool pointing toward the carrier.

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

3. Operator: Maneuver the stick in between lugging of the mounting bracket. Align the stick pin holes to the mounting bracket holes.

4. Assistant: Clean pins of rust and debris before they are installed. Insert the stick pin and secure with keepers.

5. Repeat procedure for installing link pin.

6. Lubricate pins.

9.5 Connect Pressure and Return Lines

IMPORTANT
The pressure hose [IN] on the breaker is tagged "pressure line" as shown in Fig. 9-3.

CAUTION

Hydraulic circuits differ between machines. Improper set up can damage the breaker or carrier. Only qualified personnel, having knowledge of the machine's systems should install the breaker.

Identify whether the carrier's pressure line is located on the right-hand or left-hand side. Do not guess. The Breaker will not operate if these hoses are crossed.

IMPORTANT
Contamination can diminish service life. Prevent contaminating the oil. Always clean the area around connections prior to opening the hydraulic system.

IMPORTANT
Exercise extreme care to ensure fluids are collected in a suitable container when opening the hydraulic system. Clean up spilled fluids and obey all local regulations for the disposal of these fluids.

1. Remove plugs / caps from the ends of the hydraulic hoses. Set these aside and store them for later use when the Breaker is removed.

NOTE: Figure 9-3. For ease of identification, the supply hose is tagged with a red colored cable tie and marked "PRESSURE LINE".

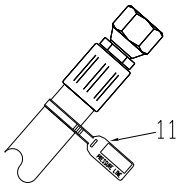


Fig. 9-3 Pressure Hose [IN] is tagged with a Red Colored Cable Tie and marked "PRESSURE LINE"

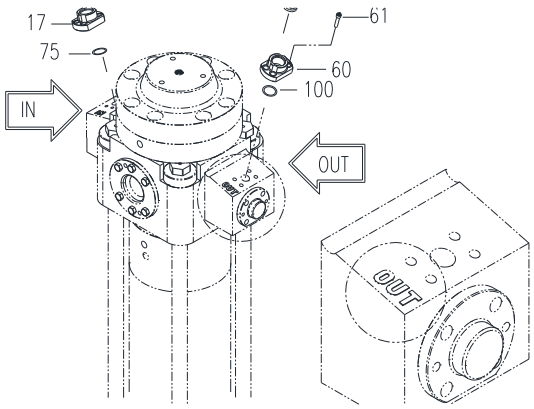


Fig. 9-4 Port [IN] and [OUT] Marked On Valve Housing

2. Connect the hydraulic lines to the Breaker. On the Valve Housing, look for markings [**IN**] and [**OUT**].

3. Connect the other end of hose to the carrier.

9.0 Attach / Remove Breaker From Carrier – [cont'd]

4. Raise the breaker off the ground. Slowly cycle the bucket cylinder thru its full range to assure hoses will not be pinched or restricted.

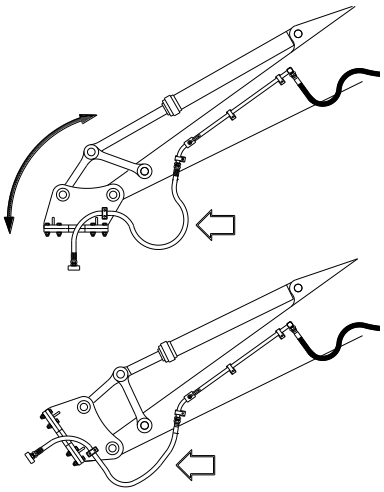


Fig. 9-5 Check hose routing for interference and length restrictions

9.6 Remove 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

Crush injury. Keep hands, feet and other body parts clear of crush points. Use sufficient blocking and restraints to avoid accidental or sudden movement of loads.

CAUTION

Burn injury from contact with hot surface. Some components of the Breaker become hot during operation. Allow parts and fluids to cool before handling.

CAUTION

Personal protection equipment should be worn when handling the breaker. Equipment should include appropriate clothing, gloves, safety eyewear and shoes.

IMPORTANT

Exercise extreme care to ensure fluids are collected in a suitable container when opening the hydraulic system. Clean up spilled fluids and obey all local regulations for the disposal of these fluids.

IMPORTANT

Contamination can diminish service life. Prevent contaminating the oil. Always clean the area around connections prior to opening the hydraulic system.

1. Operator: Move carrier and breaker to a stable and 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 lines.

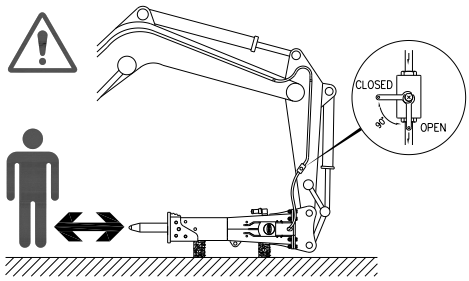


Fig. 9-6 Close Supply and Return Valves

3. Assistant: Check that the Breaker is stable and all loads are supported. Close the supply and return valves.

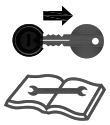
4. Clean dirt from connection areas. Disconnect the hoses from the valves. Seal all open connections with the appropriate plugs and caps.

5. Remove the pin keepers. Remove the stick and link pins. Collect any spacers that may have been used and store them for future use.

6. Refer to Section 8.0 for important storage instructions.

10.0 Changing the Breaker Tool

10.1.1 Safety Precautions – Read First



WARNING

Follow all safety and operating instructions provided by the carrier manufacturer. Engage interlock, shut off engine and apply parking brake.

CAUTION

Crush injury. Unsupported loads may cause injury or equipment damage. If attached to a carrier, lower the breaker to a flat stable surface. Ensure all loads are stabilized. Use sufficient blocking and restraints to stabilize loads.

WARNING

Crush injury. If breaker is attached to carrier, relieve all hydraulic pressure inside breaker and attachment circuit before tool is removed.

CAUTION

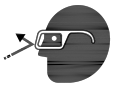
Crush injury. Keep fingers, hands and other body parts clear of falling or moving parts. Do not insert fingers into bores. Use a screwdriver or rod to push pins out of bore.

CAUTION

Crush injury. Keep hands, feet and other body parts out of path and clear of falling parts.

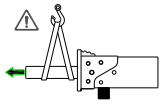
CAUTION

Burn injury from contact with hot surface. It's normal for the tool and other surfaces to become hot during operation. Allow time for parts and fluids to cool before handling.



CAUTION

Injury from flying fragments. Personal protection equipment should be worn when striking pins with hammer. PPE should include appropriate clothing, gloves, safety eyewear and shoes.



CAUTION

Tools and other components of the breaker are heavy. Use suitable lifting equipment.

10.1.2 Tools Required

- Screw Driver or round push bar
- Hammer - Hand sledge
- Snap Ring Pliers
- Sling and lifting device

10.1.3 Overview of Tool Retainer System

The arrangement of front head components and the procedure for removing and installing the tool is essentially the same for all models. The tool can be changed with the breaker on or off the carrier.

The tool is inserted into the open end of the front head and retained by a pair of larger pins, which pass through the slot located on the side of the breaker tool. The larger pins are held captive by smaller pins.

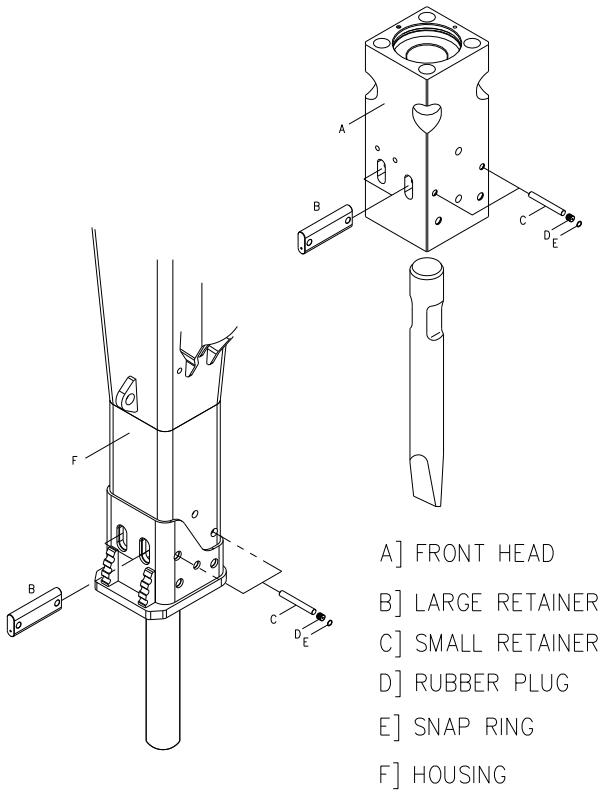


Fig. 10-1 Components of the Tool Retainer System

10.0 Changing the Breaker Tool – [cont'd]

10.1.4 Removing the Breaker Tool

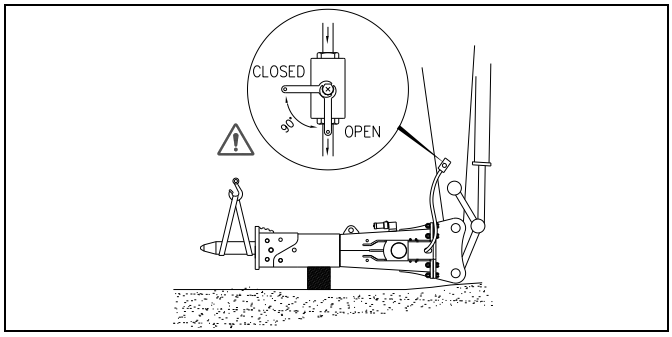


Fig. 10-2 Close Valves, Elevate, Support Tool

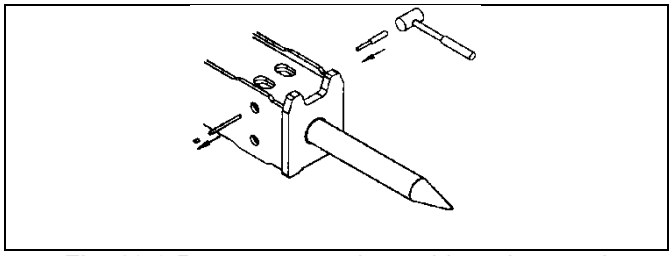


Fig. 10-3 Remove snap ring, rubber plugs and covers, push out smaller pins

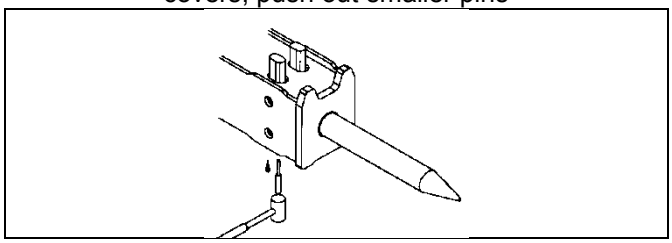


Fig. 10-4 Remove large retainer pins

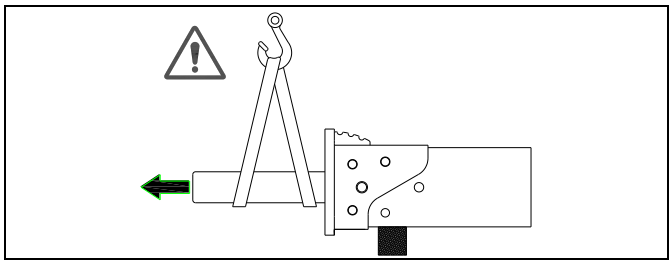


Fig. 10-5 Support Weight of Tool & Remove

1. Position the breaker horizontally on a stable and level surface. Elevate with blocks to access retainer(s) from below.

2. Engage the hydraulic interlock. Stop the engine and apply the parking brake.

3. Close shut off valves (Fig. 10-2)

4. Remove snap ring and rubber plugs.

5. Remove rubber covers from retainers.

6. Push the small retainers to the side until they clear the larger retainers. [Fig. 10-3].

7. Large retainers are free to be removed. [Fig. 10-4] Set aside.

8. Remove Tool from Front Head [Fig. 10-5].

10.1.5 Removing the Breaker Tool (Early Model AR130, AR140)

These instructions are for Model AR130 and AR140 equipped with the spring plunger retainer system.

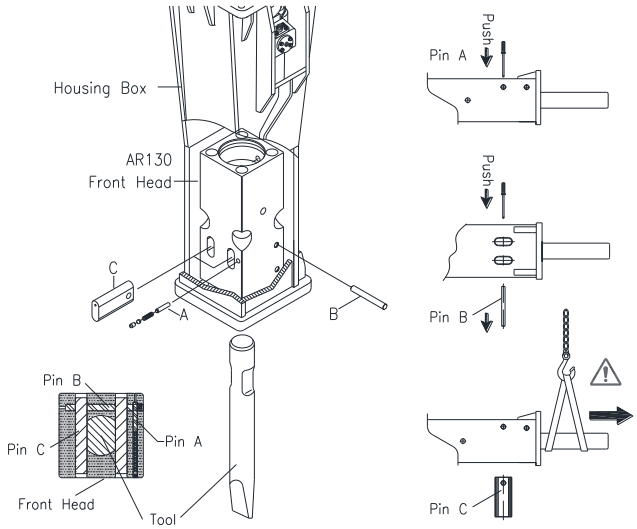


Fig. 10-6 Front Head - Plunger Pin Type

Follow steps 1, 2 and 3. from Section 10.1.4.

4. Depress plunger (Pin A) as far as it will go.

5. Remove Pin B.

6. Remove Pin C.

7. Remove Tool from Front Head.

10.2 Tool Inspection / Prepare for Installation

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

2. Measure bushing and tool. Parts must be replaced if worn beyond wear limit.

10.0 Changing the Breaker Tool – [cont'd]

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

4. Grind any burrs and sharp edges smooth if found on tool shank.

IMPORTANT
Gradually remove burrs to prevent over-heating the steel.

IMPORTANT
Rapid wear to front head components will result if the following are not observed. • Pre-lubricate the breaker tool before inserting into front head. (Fig. 10-7). This applies to new breaker tools and tools that have been wiped clean for inspection. • For field replacement, keep dirt and rocks from contaminating the grease.

10.3.1 Installing the Breaker Tool - General

The arrangement of front head components and the procedure for removing and installing the tool is essentially the same for all models. The tool can be changed with the breaker on or off the carrier.

The tool is inserted into the open end of the front head and retained by a pair of large pins, which pass through the slots located on the shank end of the breaker tool. The larger pins are held captive by smaller pins.

CAUTION
Read, understand and follow all safety precautions described in section 10.1 of this manual before installing the breaker tool. Incorrect installation may allow the breaker tool to be driven out of the front head, possibly causing bodily injury or property damage.

10.3.2 Tools Required

- Screw driver or round push bar
- Hammer - Hand sledge
- Snap Ring Pliers
- Sling and lifting device
- Grease gun

CAUTION
If tool lubrication is provided by an automatic dispenser, please read carefully. When delivery is continuous and the output is properly adjusted, the amount dispensed will be sufficient in volume to replenish the amount consumed during normal breaker operations. Any interruptions with the grease delivery will require special attention before the breaker can be returned to service. Delivery interruptions include: • Installing a replacement tool • Tool and bushings are wiped clean for inspection • A grease line is replaced or added • Operating the dispenser beyond the minimum level mark has depleted the reservoir For new tools and tools wiped clean for inspection, prior to insertion, pre-lubricate by spreading a layer of clean grease over entire surface of tool shank including the slots for the retainer. Grease further after the tool is installed. Read and follow the re-lubrication instructions in Section 10.4. Any new grease line must be pre-filled. All pockets of air must be purged until delivery is continuous.

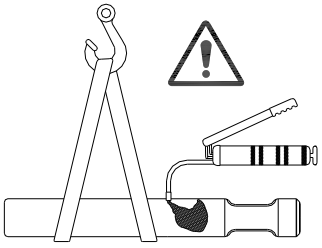


Fig. 10-7 Pre-Lube the Tool Shank

1. If attached to the carrier, lower the breaker and position horizontally on a stable and level surface.

2. Enable the hydraulic interlock. Stop the engine and apply the parking brake.

3. Close shut-off valves

4. Remove the Rubber Covers from the housing.

5. **Large Breaker Tools are Heavy!** Handle tools with a suitable hoist and sling.

6. Pre-lubricate tool shank and retainer slot with clean grease. Insert tool into front head

10.0 Changing the Breaker Tool – [cont'd]

7. Insert large retainer pins into front head
8. Push small captive pin through hole in large retainer until fully engaged.
9. Insert rubber plug into bore and install snap ring
10. Reinstall rubber covers

10.4 Tool Re-Lubrication – Conventional Method

WARNING

Crush injury from falling or shifting loads. All loads must be stable before tool re-lubrication.

Engage interlock, shut off carrier and remove key. Follow safety instructions in the manual provided by the carrier manufacturer.

Figure 10-8. The breaker must be stood upright with the tool contacting the ground. Use the carrier to push down until the tool is seated firmly against the thrust ring.

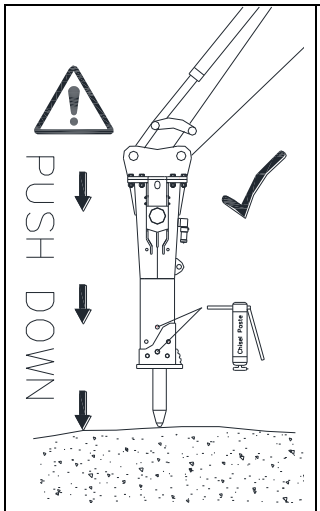


Fig 10-8

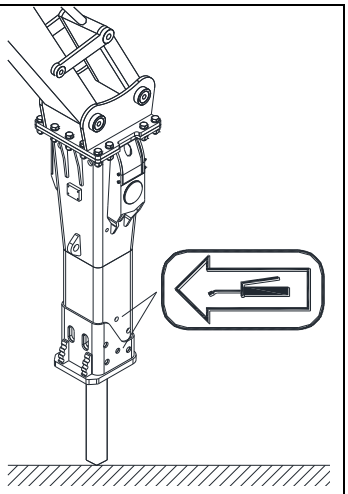


Fig 10-9

Upright Position with Tool Contacting Ground, Push Down, OK to Lubricate. Marked Location of Lubrication Points

Apply lubricant at both points shown in Fig. 10-9. The upper bushing receives grease through the top fitting and the lower bushing receives grease through the bottom fitting.

Conventional re-lubrication is accomplished with a greasing dispenser such as a standard hand-operated or power-assisted grease gun.

1. On stable and level ground, stand the breaker vertically and push the tool firmly against the ground. Engage interlock and shut off carrier.
2. Remove covers. Wipe off grease nipple. Press grease gun over top lubrication nipple. Pump lever 10-20 strokes.
3. Repeat step 2 on lower lube nipple.

Generally, tool re-lubrication is recommended every two hours. However, the operator must actively monitor the tool and adjust re-lubrication time intervals accordingly. If grease is not always visible, shorten the time between re-lubrication. If over-lubrication ends up as waste, either wait longer between re-lubrication or reduce the number of lever strokes of the grease gun.

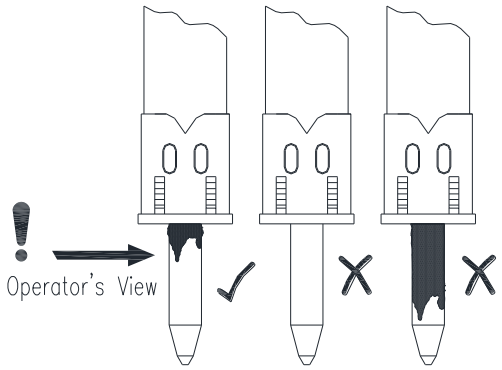


Fig 10-10 Lubricant Must Be Visible to Operator

10.4.1 Avoid Costly Lubrication Mistakes

CAUTION

Neglecting to follow re-lubrication instructions will result in equipment damage. At no time is it permissible to re-lubricate the tool with the breaker lying horizontally as shown in Figure 10-11. This can lead to seal failure. Carefully follow instructions to prevent grease from by-passing thrust ring and filling the space (impact chamber) above the tool.

10.0 Changing the Breaker Tool – [cont'd]

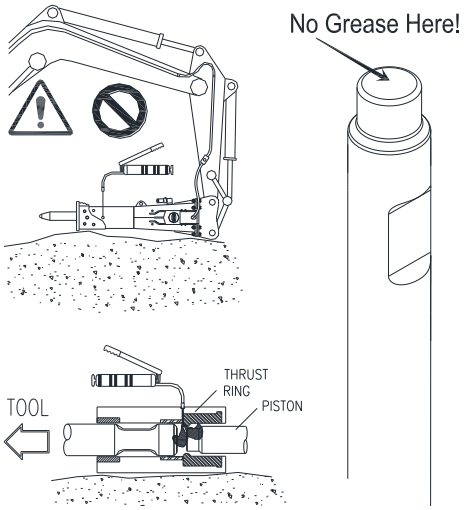


Fig 10-11 Incorrect Re-Lubrication Position

10.5 Tool Re-Lubrication – AutoLube Systems

Automatic grease dispensing systems provide continuous re-lubrication of the tool and bushings during operation. When installed correctly and properly maintained, automatic lubricators eliminate the need to stop work every two hours to re-lubricate the tool manually.

Allied offers a choice of automatic grease dispensing systems that are mounted on the carrier or breaker mounted.

10.5.1 Carrier Mounted Lubricator - CML Series

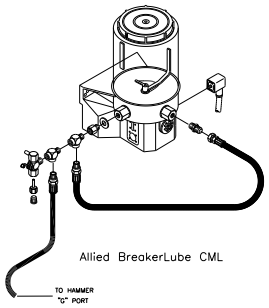


Fig 10-12 Carrier Mounted AutoLube System

The optional Autolube CML series is designed for carrier mounting. This fully automated grease dispenser is available in several configurable options that include custom installations to suit virtually any breaker. Features of the CML series include a large refillable reservoir and a low level circuit that immobilizes the breaker and signals the operator when the reservoir reaches the low level mark.

The Autolube CML series is electrically powered and the motor can drive up to three pumping elements. Allied offers installation kits that help facilitate mounting. Kits for Allied breaker models are coordinated to specific carrier and breaker combinations. Universal kits are available for non-Allied breaker models. When ordering kits, it is necessary to provide the make and model of the carrier and breaker. Components, such as pumping elements and feed line requirements, will vary with carrier and breaker size.

10.5.2 Hammer Mounted Lubricator – HML Series

The optional HML-series lubricator is compact and mounts directly to the breaker. There are no electric or hydraulic connections. Grease is dispensed when the pump is pulsated by the breaker. The refillable reservoir is transparent and allows easy monitoring. Delivery is adjustable to match different size breakers and requires no special tools.

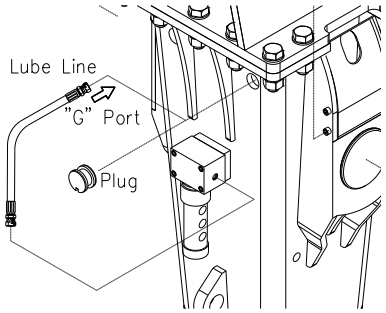


Fig 10-13 Hammer Mounted AutoLube System

Installation kits for both the CML-series and HML-series are available from Allied. These kits do not include Chisel paste. Order separately.

10.6 Chisel Paste

When applied regularly, Allied Chisel Paste is a key element in maximizing the working life of the tool and bushing by minimizing the rate of frictional wear. Chisel Paste is high-quality grease formulated with fine particles of graphite, copper and molybdenum disulfide [MoS2]. When applied regularly, this "special purpose" lubricant provides superior wear protection and out performs grease that is labeled for "General" and "Multi-Purpose" use. If Allied Chisel Paste is not used for tool re-lubrication, use a high-quality EP type grease that performs well in high-heat applications. Re-lubrication frequency must be increased if Chisel Paste is not used.

11.0 Tool Selection Guide

11.1 Match the 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

11.1.1 Methods Used to Break Material

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 strong mechanical stresses [compressive force] to the material.

The three most commonly used tools for concrete demolition, rock cutting and bolder reduction are the Conical, Chisel, and Blunt. Conical [Pointed] and chisel [wedge] type tools work best in penetrative applications. The blunt [Flat] tool is used for impact breaking. Applications include bolder (oversize) reduction, rip rap and any work with hard, brittle and abrasive materials.

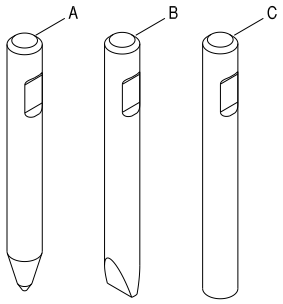


Fig. 11-1 A-Conical, B-Chisel, C-Blunt

A. Conical [Point] – 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 preforms well when working in reinforced concrete because its round shape resists twisting that can lead to retainer pin and pin slot deformation.

B. Chisel [Wedge-Cross Cut transverse or In-line parallel] – 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.

11.2 Working Length of Breaker Tool

Allied breaker tools are designed to provide exceptional quality and durability. Tools are made of high-strength alloy steel and given specialized heat treatment. Unless the application requires a longer length tool, it is best to stay with the standard tool supplied with the breaker. Shorter tools are less prone to breaking when subjected to side loading forces. Review and adopt operating methods described in Section 6.0.

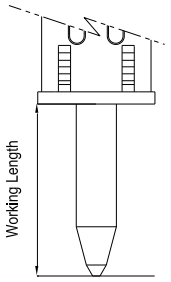


Fig. 11-2 Tool Working Length

11.3 Sharpening the Tool

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.

CAUTION

Do not cut with torch, hard face or weld breaker tools. When sharpening the breaker tool, prevent temperatures from exceeding 390º F. High temperatures will alter the original heat treatment of the tool material and change the strength.

12.0 Accumulator N_2 Gas Charge Tool

12.1 Accumulator N2 Gas Charge Equipment

The accumulator is a self-contained pressure vessel with a flexible membrane dividing the inner chamber. The lower chamber is used to receive, store and discharge pressurized oil. The upper chamber is filled with nitrogen gas. The correct pre-charge pressure must be maintained for proper functioning and optimum service life. After replacement of membrane, the accumulator must be charged. Filling the upper chamber with nitrogen (N2) gas is accomplished with the charging tool (Fig. 12-1) and a commercially available nitrogen bottle. Table 12.1 identifies components of the charge kit.

WARNING

Prevent unexpected release of high pressure gaseous energy. The accumulator is pressurized with nitrogen gas and remains pressurized even at times when there is no hydraulic pressure to the breaker.

Only qualified technicians with special tools and training should service the accumulator. Never attempt to dismantle accumulator until it is completely discharged of all pressure. If the breaker is attached to a carrier do not service the accumulator until oil pressure inside breaker and hydraulic circuit is relieved.

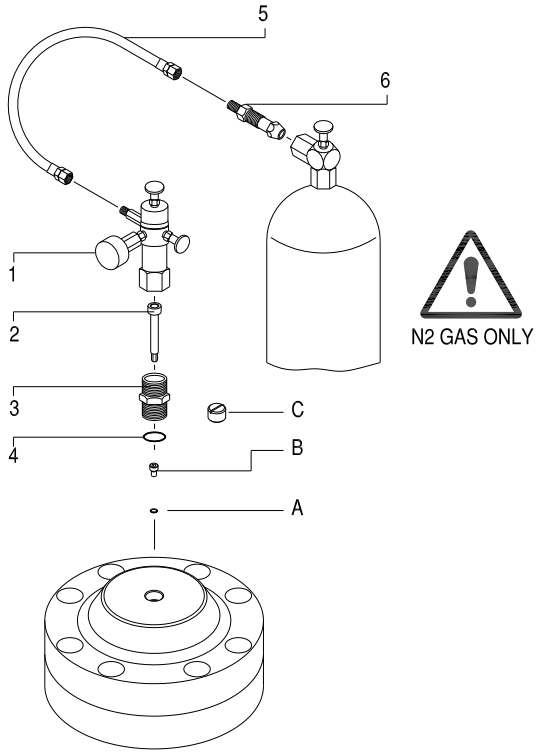


Fig. 12-1 N_2 Gas Charge Tool

Table 12.1 N2 Gas Charge Kit

Item	Description	Part No.	Qty	Remarks / Specifications
---	**N2 Gas Charge Kit**	**570071**	**1-Kit**	**Kit includes 1,2,3,4,5,6**
1	Charge Valve and Gauge	100527	1	Includes 2-6 and storage case
2	Socket Bolt	40601	1	
3	Adaptor	R101635	1	
4	O-ring	901135	1	
5	Hose	N/A	1	8 Ft. [2.5 M] Not Sold Separately
6	Gas Bottle Adapter	N/A	1	Not Sold Separately
---	Nitrogen Gas Bottle	N/A	1	Not Supplied (SOURCE LOCALLY)
A,B,C	U-sit ring, Charge Bolt, Cap	---	---	A,B,C shown for reference only. These items are not included in charge kit

12.0 Accumulator N_2 Gas Charge Tool – [cont'd]

12.2 Tools Required

1. Charge Kit 570071 (Fig. 12-1)

Source additional equipment locally:

- Nitrogen Bottle (with pressure regulator is recommended)
- Screwdriver
- Combination wrench
- Hex wrench (6mm)
- Torque Wrench
- Clean oil
- Rags

WARNING

Crush hazard. If attached to a carrier, lower the breaker to a flat stable surface. Ensure all loads are supported and stable.

WARNING

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

WARNING

Fill only with dry nitrogen gas. Never substitute with any other type of gas or air due to risk of explosion.

12.3 Connect the Charge Valve (Fig. 12-1)

1. Clean immediate area around the charge port. With a screwdriver, remove protective plug (C).
2. Use hex wrench to loosen charge bolt (B). (Do not allow gas to escape. Do not exceed 1/6 turn)
3. Check condition of O-ring (4) and thread the charging adaptor (3) into charge port
4. Insert socket bolt (2) thru adapter and engage with charge bolt.
5. Thread charge valve (1) onto adapter.
6. Attach one end of hose to the charge valve and the other to the valve at nitrogen bottle.

12.4 How to Test / Measure Gas Charge

WARNING

For the purpose of these instructions, the nitrogen bottle is equipped with a pressure regulator.

1. To preserve U-sit ring (A), the pressure must be equalized on both sides. To do this, slowly crack open valve at nitrogen bottle. Adjust regulator to pressure specified in technical data section. Close valve at bottle when desired pressure is shown on gage. If over pressure, use bleed valve to adjust.
2. Observe gage on charge valve while unseating the charge bolt. Turn T-handle 2 – 3 revolutions CCW. If the pressure in hose is equal to pressure inside accumulator, the gage will remain stationary.
3. If a change in pressure is observed, but is +/- 5% of specification, no adjustment is necessary. If so, remove charging valve from accumulator as described in Section 12.6 of this manual.
4. Pressures > +/- 5% of specification requires adjustment. If so, follow the instructions for charging the accumulator as described in Section 12.5 of this manual.
5. If the gage plummets to 0 psi, this may indicate a ruptured membrane. Try adding gas. If gas is bypassing membrane, pressure will fail to rise. If so, repair is necessary.

12.5 Charging the Accumulator

CAUTION

Rapid cooling of the gas temperature is normal when gas is transferred from the bottle. It is important not to fill the accumulator too quickly or the rubber membrane may be damaged.

1. Follow the instructions described in Section 12.3 for connecting charge tool.
2. Unseat the charge bolt by turning the T-handle 3 revolutions CCW.

12.0 N_2 GAS CHARGE KIT – [cont'd]

3. SLOWLY open valve on nitrogen bottle.

4. Adjust pressure regulator and SLOWLY fill the accumulator.

5. Adjust the regulator to + 50 psi above the value specified in the Technical Data Section.

NOTE: Gas pressure is sensitive to temperature changes. The charge pressure shown in technical data section of this manual is at 70° ambient.

6. Wait 15 to 30 minutes for temperature of gas inside accumulator to stabilize.

7. Recheck the gas pressure and make final adjustments as necessary.

12.6 Remove the Charge Valve

1. Close charge bolt hand tight.

2. Close valve at nitrogen bottle.

3. Open bleed valve.

4. Remove charge valve, adapter and socket bolt from accumulator.

5. Tighten charge bolt with torque wrench to 15 lb-ft [20 Nm].

6. Check for leaks by filling the area surrounding the charge bolt with oil.

7. Clean out oil and re-install protective plug

8. Store nitrogen tank according to regulations

9. Store charge valve in carrying case

13.0 TROUBLESHOOTING GUIDE

CAUTION

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

This guide identifies several commonly encountered conditions and the recommended course of action.

For conditions other than these, contact the Allied Technical Service Department

Condition	Possible Cause	Corrective Action
Breaker does not operate	Restriction in pressure or return line	Verify shut off valves are open. Check if hose has collapsed
	Pressure and return lines are crossed	Verify supply line is connected to port marked "IN" and return line to "OUT"
	Piston in brake	Piston must be forced out of brake. Apply contact pressure against the tool until it pushes up piston
	Incorrect breaker tool installed	Verify breaker tool is correct
	Insufficient oil pressure	Refer to section "Operating Pressure Too Low"
	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. Review operating technique Section 6.
		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. Review operating technique Section 6.
	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"

13.0 TROUBLESHOOTING [cont'd]

Condition	Possible Cause	Corrective Action
	Operating pressure too low	Refer to section "Operating Pressure Too Low"
	Improper Breaker operation Tool binding in bushing	Maintain right angle to work surface. Refer to operating technique Section 6.
		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. Review operating technique Section 6.
		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

13.0 Troubleshooting [cont'd]

Condition	Possible Cause	Corrective 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 Review operating technique Section 6.
	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	Review Section 6.4.3. Adjust oil to match ambient temperatures. Optimum oil viscosity @ operating temperature is 60 – 30 cSt. Consult carrier manufacturer for recommended oil.
	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	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

13.0 Troubleshooting- [cont'd]

Condition	Cause	Corrective 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 operating technique Section 6.
	Excessive wear on tip	Reduce advance, Limit cycle time. Refer to operating technique Section 6.
	Uneven wear on tip	Maintain right angle to work surface. Refer to operating technique Section 6.
Tool breakage	Excessive tool length	Use shorter length tool
	Tool driven into material and becomes stuck	Limit tool penetration. Refer to operating technique Section 6.
	Bending force exceeds material strength	Do not pry with tool. Refer to operating technique Section 6.
		Operator technique to adopt correct working angle. Maintain 90° angle to work surface. Refer to operating technique Section 6.
	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 operating technique Section 6. Check tool is receiving sufficient lubrication. Increase lubrication frequency. 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 indoors. Coat with grease to protect from moisture.

The Breaker is not self-powered. Its performance level is affected by a hydraulic system that is not operating to specification.

All hydraulic breakers are designed to provide optimum performance with reliable service life at a specific oil pressure. The correct pressure must be maintained for proper functioning, optimal efficiency and reliable service.

If the Breaker is working incorrectly, first check that the mode switch is positioned correctly for operating a breaker. Next, check that the shut off valves are fully open.

If there is no improvement in the breaker's performance, conduct a thorough evaluation of the carrier's hydraulic circuit. Measure oil pressures at the supply [IN] and return [OUT].

Further testing may be necessary and will require the use a flow meter. Be sure to include the breaker's supply and return hoses when conducting a flow test, as they may be faulty, e.g. collapsed hose. Use the flow meter to measure oil delivery from the pump and to verify the cracking pressure of the relief valve.

14.0 Technical Information

14.1 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 (first open) and static (all of the oil flow is bypassed). 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.

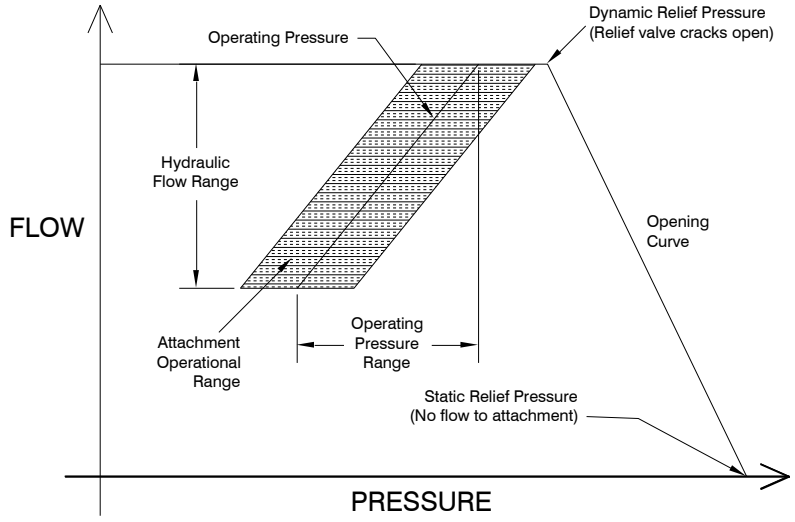


Fig. 14-1: Flow-Pressure Diagram

14.0 Technical Information –[cont'd]

14.2 Testing the Hydraulic Circuit

The hydraulic breaker is designed to perform efficiently and reliably at the prescribed flow and pressure parameters. Performance is negatively impacted if the hydraulic system is not operating correctly or set outside the prescribed specifications.

Performance evaluation of the carrier's hydraulic circuit is important before the breaker is used. Accurate assessment entails thorough testing under varied conditions, including temperature, work mode, engine speed and load.

Tools required to complete these tests include a flow meter and pressure gages. Record the test measurements in the worksheet provided below. Then compare the results with the Technical Data section of this manual.

If the Breaker is not working correctly, thoroughly check the hydraulic system of the carrier before disassembly of the Breaker. Be sure to include the hoses attached to the breaker to eliminate any possible faults, e.g. collapsed hose.

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

CAUTION

Before starting, make sure the circuit to be tested has a relief valve. Open restrictor valve on flow meter. Procedures can vary depending on specifics of your equipment. Follow the instructions provided by the manufacturer of the carrier and flow meter when testing.

Work Mode – Set to Breaker position (if equipped).

Engine RPM – Set to normal operating speed

Flow [GPM] – Record measured flow at each load pressure

Load Pressure [PSI] – Steadily increase load with restrictor valve on the flow meter

Oil Temperature – Testing must be done while the hydraulic oil temperature is at normal operating temperature. Stop test if temperature exceeds 176° F (80° C)

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

Relief Pressure [Static] – After cracking pressure is reached, steadily close the restrictor valve until flow gage indicates relief valve is fully open.

Return Pressure [PSI] – Record the pressure measured in the return line. Measuring point for gage must be located near breaker's outlet port.

14.0 Technical Information –[cont'd]

Table 14.1 Technical Data

	Model	AR110B	AR130	AR160B	AR160C
Impact Frequency [a]	B/min	400 - 700	350 - 470	340 - 550	
Oil Flow Range	gpm [l/min]	21 - 26 [80 - 100]	32-43 (120-160)	50-58 (190-220)	50-63 (190-238)
Operating Pressure Range [b]	psi [bar]	1740 – 2030 [120 – 140]	1,950-2,250 (135-155)	1,900-2,200 (130-152)	
Pressure Relief – Min [c] - Max [d]	psi [bar]	2610-2900 [180-200]	2,830-2,970 [195-205]	2,755-3,045 [195-205]	
Back Pressure – Min - Max	psi [bar]	60 – 145 [4 - 10]			
Oil Temperature - Max	F° [C°]	176° [80°]			
Oil Viscosity Range – Permissible (Optimum – at working temp.)	cSt	1000 – 15 (60 – 30)			
Accumulator Charge Pressure N2 Gas @ 70° F [21°C]	psi [bar]	580 [40]			
Oil Port Connection Type / Size – IN [OUT]	Flange	3/4" C62 [1" C62]	1" C62 [1-1/4" C62]	1" C62 [1-1/4" C62]	
Oil Supply Line – Min. ID.	in. [mm]	3/4 [19]	1 [25.4]	1-1/4 [32]	
Oil Return Line – Min. ID.	in. [mm]	3/4 [19]	1 [25]	1-1/4 [32]	
Grease Port Connection - G	BSP	R3/8[h]			
Air Port Connection - A	g]	g]			
Breaker Tool: Type-Std Diameter Length	in. [mm] in. [mm]	Chisel - CCW 4.33 [110] 27 [686]	Chisel - CCW 5.12 [130] 27 [686]	Chisel - CCW 6.29 [160] 30 [762]	
Working Weight [e]	lbs. [kg]	2,640 [1,200]	3,725 [1,690]	5,970 [2,705]	5,620 [2,550]
Carrier Weight Range [f]	1000 lbs. [1000 kg]	31-40 [14-18]	44-76 [22-35]	72-100 [33-45]	

a] Actual frequency depends on oil flow [Factors that affect oil flow include oil viscosity and temperature]

b] Permissible range. 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 725 psi [50 Bar]

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

e] Equipped with typical mounting bracket & standard tool

f] Values 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.

g] Underwater capable only after modifications are completed. Refer to Underwater Application Instructions

h] Early AR130 not equipped with port on valve housing

14.0 Technical Information –[cont'd]

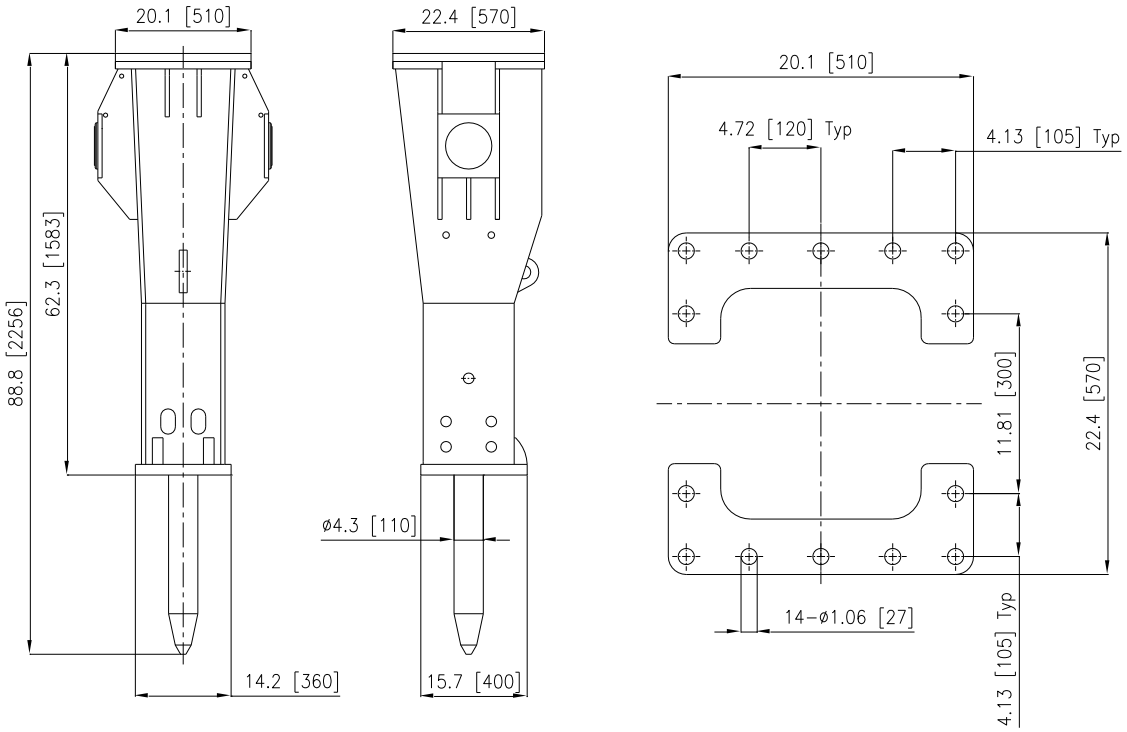


Figure 14-2: Standard Dimensions – Model AR110B

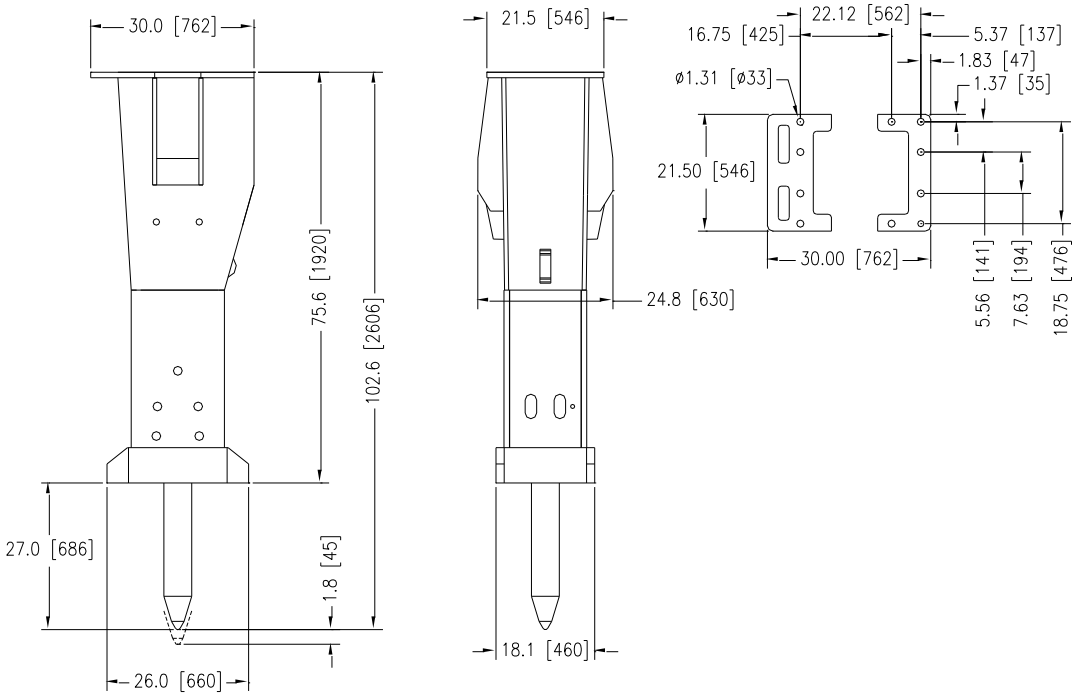


Fig. 14-3 Standard Dimensions – Model AR130

14.0 Technical Information –[cont'd]

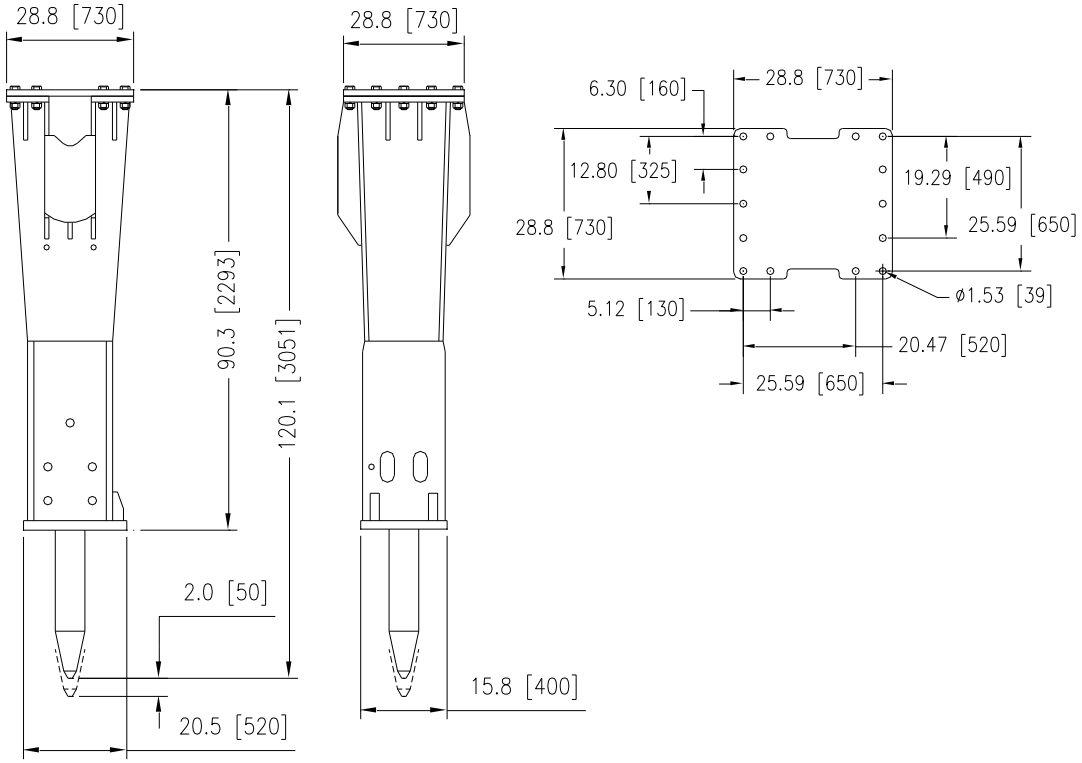


Fig. 14-4 Standard Dimensions – Model AR160B & AR160C

14.0 Technical Information –[cont'd]

Table 14.2 Technical Data

	Model	AR170C	AR180C
Impact Frequency [a]	B/min	300 - 400	300 - 450
Oil Flow Range	gpm [l/min]	55-74 [210-280]	60-80 [227-303]
Operating Pressure Range [b]	psi [bar]	1,900-2,200 [130-152]	
Pressure Relief – Min [c] - Max [d]	psi [bar]	2,755-3,045 [190-210]	
Back Pressure – Min - Max	psi [bar]	60 – 145 [4 - 10]	
Oil Temperature - Max	F° [C°]	176° [80°]	
Oil Viscosity Range – Permissible (Optimum – at working temp.)	cSt	1000 – 15 (60 – 30)	
Accumulator Charge Pressure N2 Gas @ 70° F [21°C]	psi [bar]	580 [40]	
Oil Port Connection Type / Size – IN [OUT]	Flange	1" C62 [1-1/4" C62]	
Oil Supply Line – Min. ID.	in. [mm]	1-1/4" [32]	
Oil Return Line – Min. ID.	in. [mm]	1-1/4" [32]	
Grease Port Connection - G	BSP	R3/8	
Air Port Connection - A	g]	g]	
Breaker Tool: Type-Std Diameter Length	in. [mm] in. [mm]	Chisel - CCW 6.69 [170] 31 [787]	Chisel - CCW 7.09 [180] 37 [943]
Working Weight [e]	lbs. [kg]	7,815 [3,545]	12,540 [5,700]
Carrier Weight Range [f]	1000 lbs. [1000 kg]	90-133 [40-60]	110-190 [50-85]

a] Actual frequency depends on oil flow [Factors that affect oil flow include oil viscosity and temperature]

b] Permissible range. 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 725 psi [50 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.

g] Underwater capable only after modifications are completed. Refer to Underwater Application Instructions

14.0 Technical Information –[cont'd]

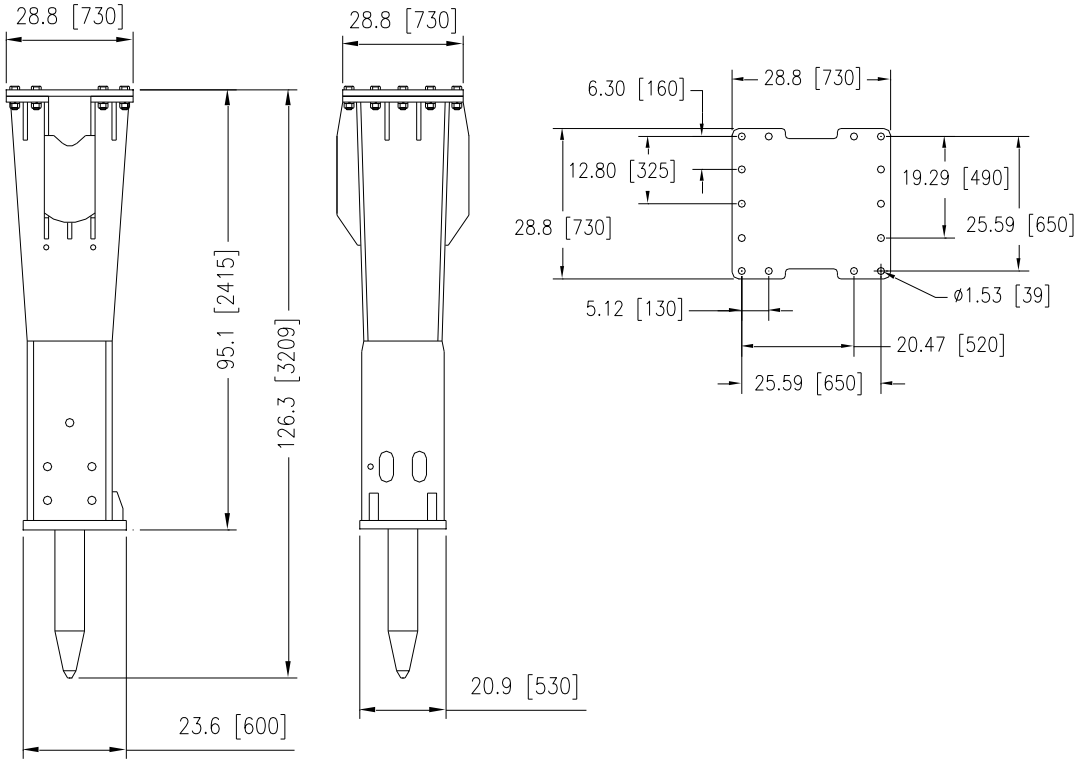


Fig. 14-5 Standard Dimensions – Model AR170C

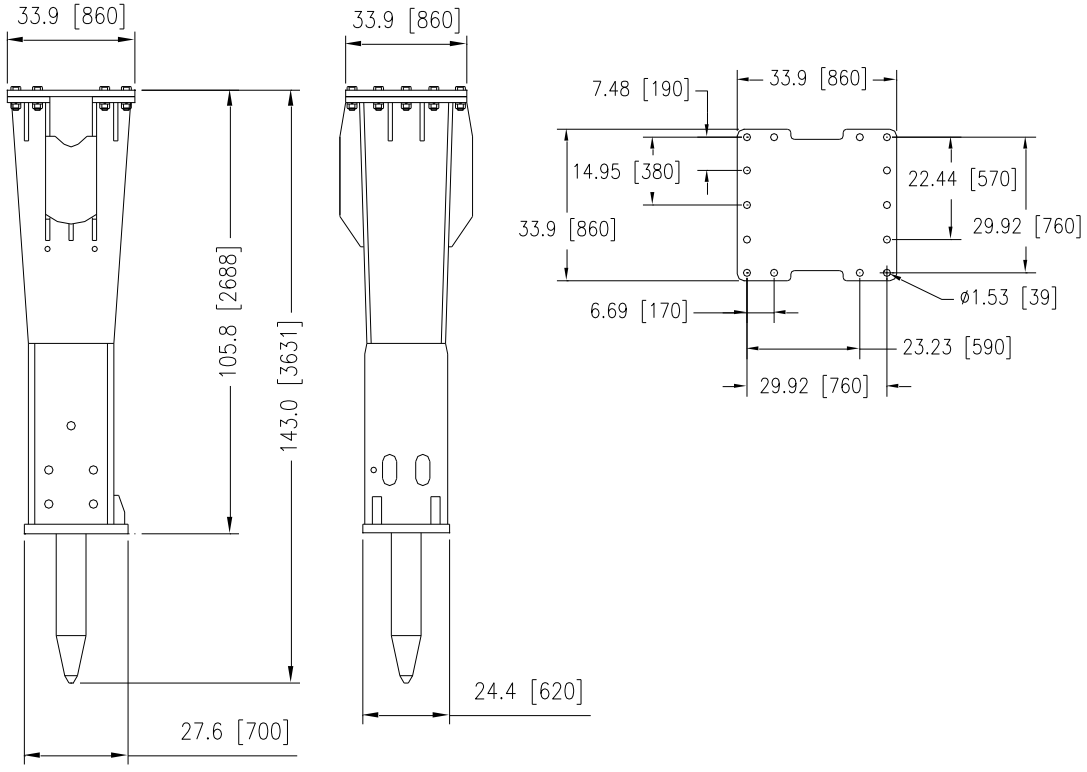


Fig. 14-6 Standard Dimensions – Model AR180C

14.0 Technical Information –[cont'd]

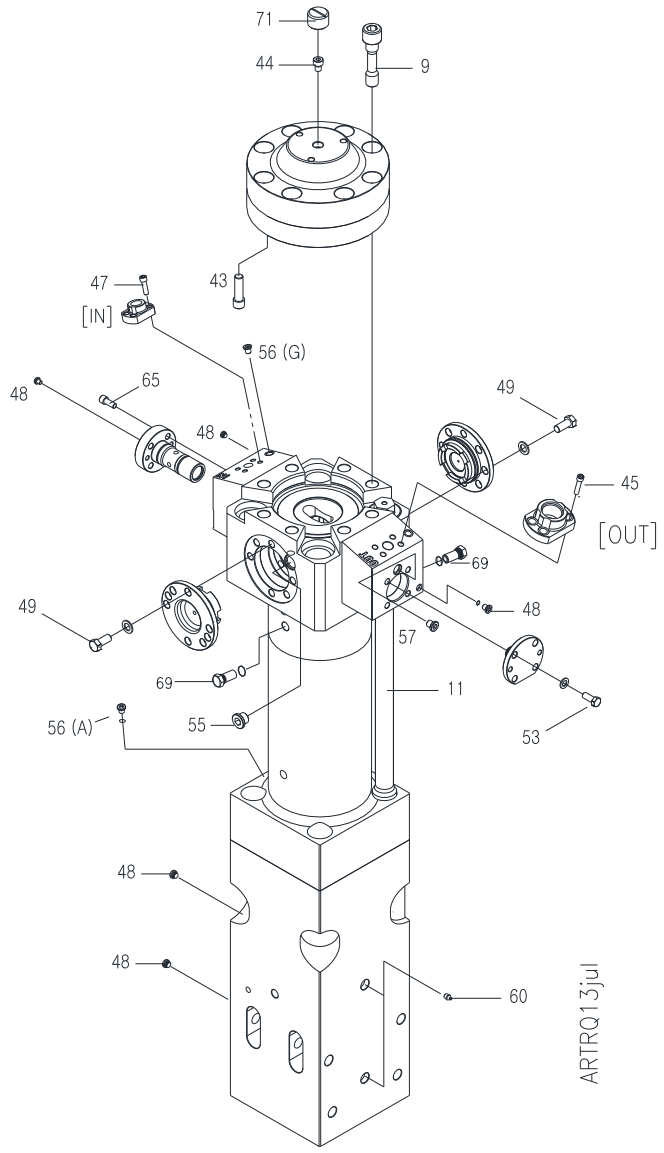


Fig 14-7 Position of Threaded Fasteners

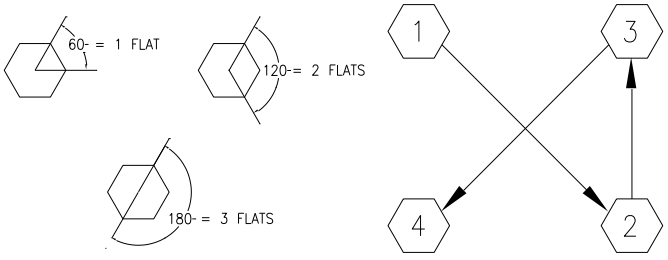


Fig. 14-8 Rotation Angle Each Flat = 60° and Tightening In a Diagonal Sequence

14.0 Technical Information –[cont'd]

Table 14.6 Fastener Torque			Model	AR110B	AR130	
Item	**Description**	**Qty**	**Size**	**Ft-Lbs. [N·m]**	**Size**	**Ft-Lbs. [N·m]**
9	Accum Top Bolt	8		370 [500]		510 [700]
11*	Side Rod (Torque + Turn)	4	---	370 [500] + 100º	---	370 [500] + 100º
43	Accum Bottom Bolt	12	M20	260 [350]	M22	365 [500]
44	Gas Charge Bolt	1	M08	15 [20]	M08	15 [20]
45	Flg Mtg Bolt [OUT]	4	M12	70 [130]	M14	110 [150]
47	Flg Mtg Bolt [IN]	4	M10	45 [60]	M12	70 [130]
48	Flg Plug	3	R1/4	24 [33]	R1/4	24 [33]
49	Main Spool Cover Bolt	12	M14	175 [240]	M16	190 [260]
53	Oper Valve Cover Bolt	4	M12	115 [160]	M12	115 [160]
55	Flg Plug	1	R1/2	65 [90]	R1/2	65 [90]
56	Flg Plug	2	R3/8	50 [70]	R3/8	50 [70]
57	Flg Plug	1	R		R	
65	Check Valve Cover Bolt	4	M12	115 [160]	M12	115 [160]
---	Top Mtg Brkt Bolts	14	M24	580 [800]	M24	580 [800]

Table 14.7 Side Rod Tightening Item 11*

IMPORTANT! Apply Moly-Paste 676927 to threads before assembly.		
Step 1	**Pre-torque Ft-Lbs. [N·m]**	Step 1: Use progressive tightening technique to draw side rods up evenly. Start with side rod 1 and apply 1/3 of final pre-torque. Do the same with side rods 2,3 & 4 following the order shown in Figure 14-8. Next apply 2/3 of final pre-torque to each side rod, again following sequence order. Next tighten all to full pre-torque.
Step 2	**Apply heat evenly to side rods**	**IMPORTANT! Do not over-heat the side rods. Excessive heat will damage side rod beyond use. Do not exceed 390° F [200° C].** Heat until side ride can be turned with hand wrench* and minimal effort applied. (*3/4" drive and breaker bar)
Step 3	**Final Turn + º**	Turn each side rod according to +º (or flats) shown above. Follow tightening sequence Fig 14-8. **Use hand wrench only - Impact tools prohibited!**

14.0 Technical Information

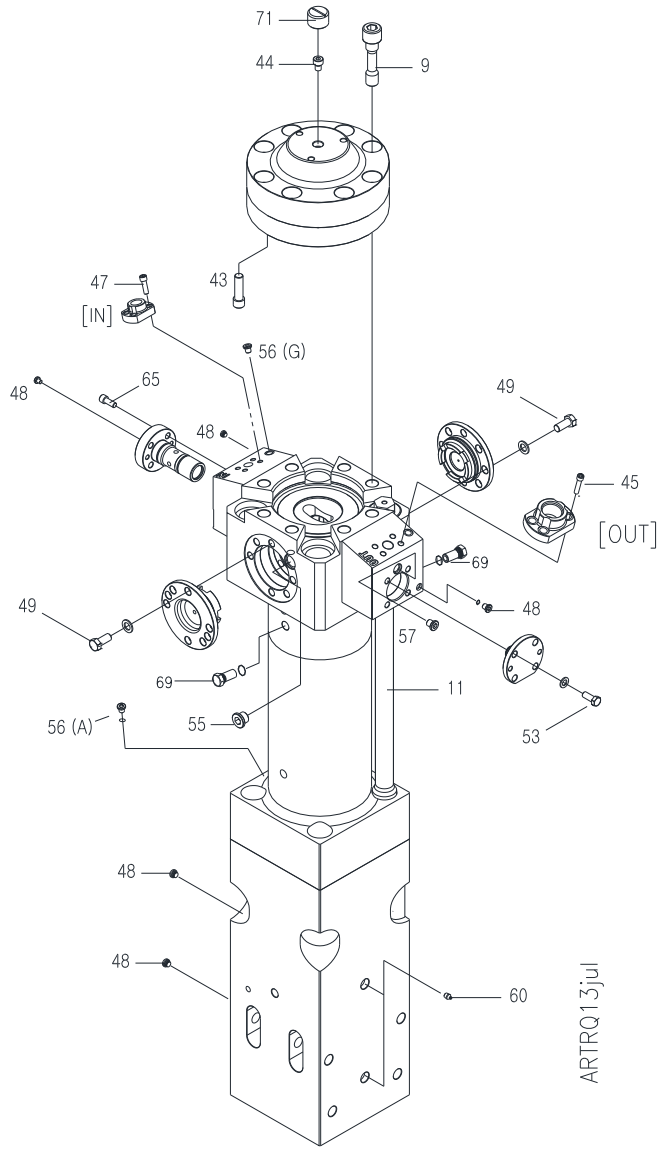


Fig 14-9 Position of Threaded Fasteners

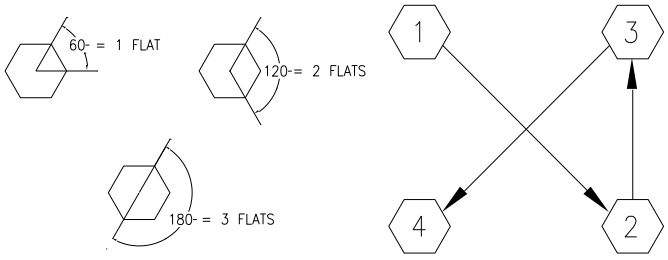


Fig. 14-10 Rotation Angle Each Flat = 60° and Tightening In a Diagonal Sequence

14.0 Technical Information

Table 14.6 Fastener Torque			Model	AR160B,C	AR170C	
Item	**Description**	**Qty**	**Size**	**Ft-Lbs. [N·m]**	**Size**	**Ft-Lbs. [N·m]**
9	Accum Top Bolt	8		1100 [1500]	M33	1100 [1500]
11*	Side Rod (Torque + Turn)	4	---	515 [700] + 120º	---	515 [700] + 120º
43	Accum Bottom Bolt	12		390 [530]	M24	480 [650]
44	Gas Charge Bolt	1	M08	15 [20]	M08	15 [20]
45	Flg Mtg Bolt [OUT]	4	M14	110 [150]	M14	110 [150]
47	Flg Mtg Bolt [IN]	4	M12	70 [130]	M12	70 [130]
48	Flg Plug	3	R1/4	24 [33]	R1/4	24 [33]
49	Main Spool Cover Bolt	12	M20	290 [390]	M20	290 [390]
53	Oper Valve Cover Bolt	4	M16	185 [250]		185 [250]
55	Flg Plug	1	R1/2	65 [90]	R1/2	65 [90]
56	Flg Plug	2	R3/8	50 [70]	R3/8	50 [70]
57	Flg Plug	1	R		R	
65	Check Valve Cover Bolt	4	M16	190 [260]		190 [260]
---	Top Mtg Brkt Bolts	14	M36	1550 [2100]	M36	1550 [2100]

Table 14.7 Side Rod Tightening Item 11

IMPORTANT! Apply Moly-Paste 676927 to threads before assembly.		
Step 1	**Pre-torque Ft-Lbs. [N·m]**	Step 1: Use progressive tightening technique to draw side rods up evenly. Start with side rod 1 and apply 1/3 of final pre-torque. Do the same with side rods 2,3 & 4 following the order shown in Figure 14-10. Next apply 2/3 of final pre-torque to each side rod, again following sequence order. Next tighten all to full pre-torque.
Step 2	**Apply heat evenly to side rods**	**IMPORTANT! Do not over-heat the side rods. Excessive heat will damage side rod beyond use. Do not exceed 390° F [200° C].** Heat until side ride can be turned with hand wrench* and minimal effort applied. (*3/4" drive and breaker bar)
Step 3	**Final Turn + º**	Turn each side rod according to +º (or flats) shown above. Follow tightening sequence Fig 14-10. **Use hand wrench only - Impact tools prohibited!**

14.0 Technical Information

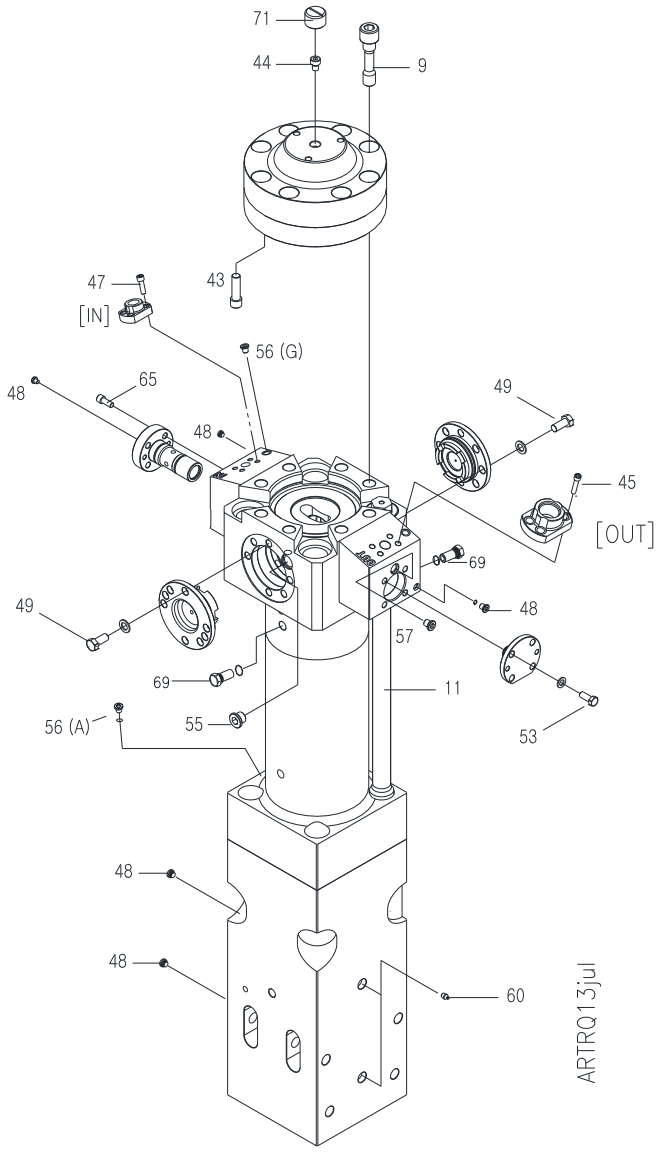


Fig 14-11 Position of Threaded Fasteners

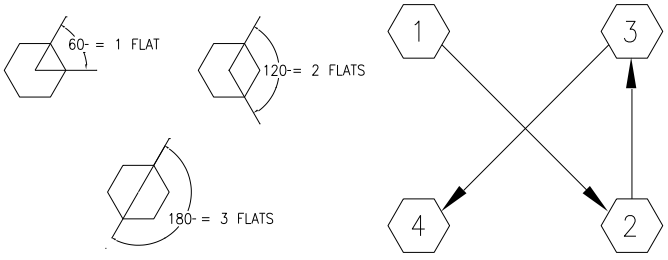


Fig. 14-12 Rotation Angle Each Flat = 60° and Tightening In a Diagonal Sequence

14.0 Technical Information

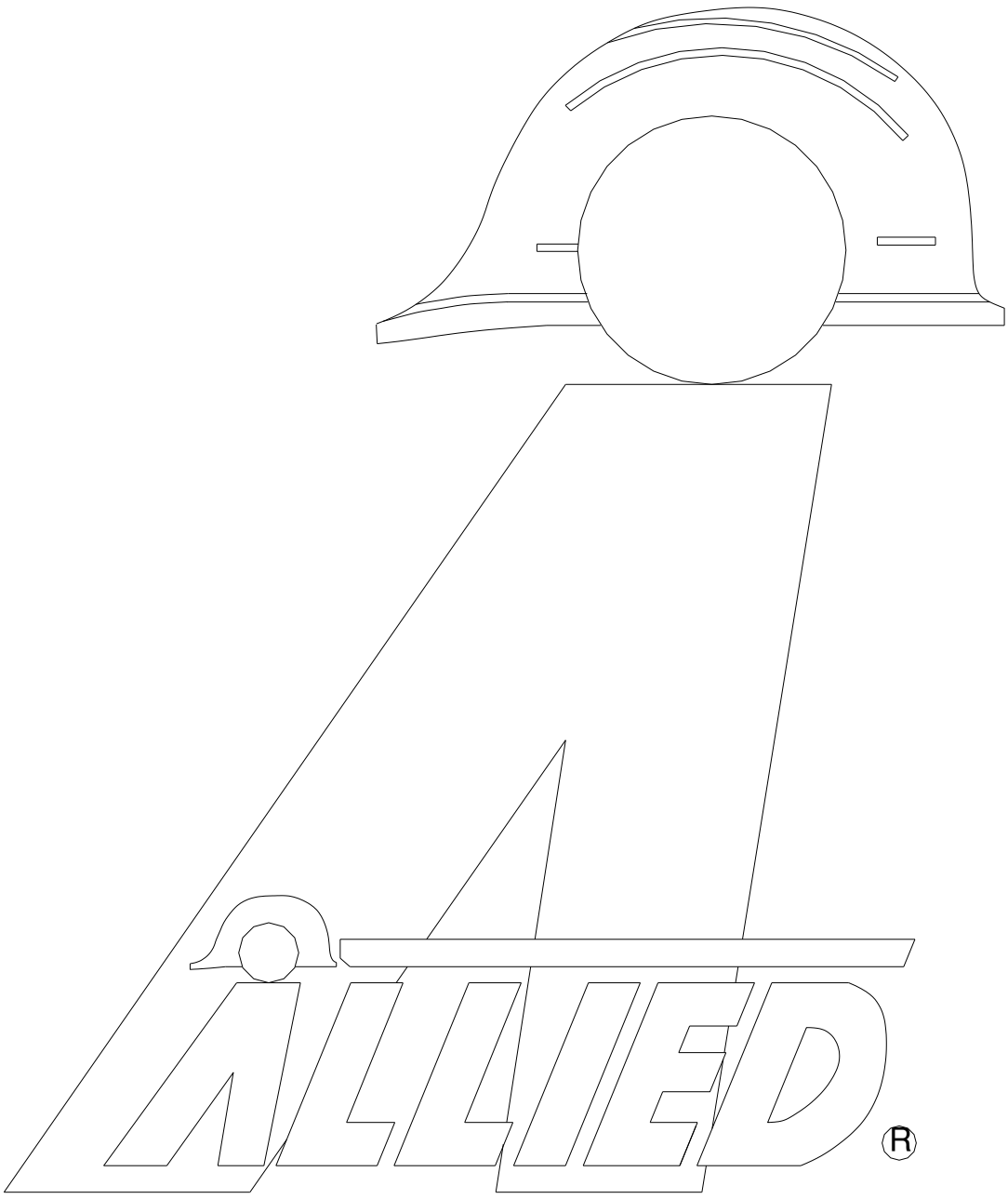
Table 14.8 Fastener Torque			Model	AR180C		
Item	**Description**	**Qty**	**Size**	**Ft-Lbs. [N·m]**		
9	Accum Top Bolt	8	M33	655 [900]		
11*	Side Rod (Torque + Turn)	4	---	515 [700] + 120º		
43	Accum Bottom Bolt	12	M24	590 [800]		
44	Gas Charge Bolt	1	M08	15 [20]		
45	Flg Mtg Bolt [OUT]	4	M14	110 [150]		
47	Flg Mtg Bolt [IN]	4	M12	70 [130]		
48	Flg Plug	3	R1/4	24 [33]		
49	Main Spool Cover Bolt	12	M20	370 [500]		
53	Oper Valve Cover Bolt	4	M16	190 [260]		
55	Flg Plug	1	R1/2	65 [90]		
56	Flg Plug	2	R3/8	50 [70]		
57	Flg Plug	1	R			
65	Check Valve Cover Bolt	4	M16	190 [260]		
---	Top Mtg Brkt Bolts	14	M36	1550 [2100]		

Table 14.7 Side Rod Tightening Item 11

IMPORTANT! Apply Moly-Paste 676927 to threads before assembly.		
Step 1	**Pre-torque Ft-Lbs. [N·m]**	Step 1: Use progressive tightening technique to draw side rods up evenly. Start with side rod 1 and apply 1/3 of final pre-torque. Do the same with side rods 2,3 & 4 following the order shown in Figure 14-12. Next apply 2/3 of final pre-torque to each side rod, again following sequence order. Next tighten all to full pre-torque.
Step 2	**Apply heat evenly to side rods**	**IMPORTANT! Do not over-heat the side rods. Excessive heat will damage side rod beyond use. Do not exceed 390° F [200° C].** Heat until side ride can be turned with hand wrench* and minimal effort applied. (*3/4" drive and breaker bar)
Step 3	**Final Turn + º**	Turn each side rod according to +º (or flats) shown above. Follow tightening sequence Fig 14-12. **Use hand wrench only - Impact tools prohibited!**

15.0 Service Record

Service Performed	By	Date



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