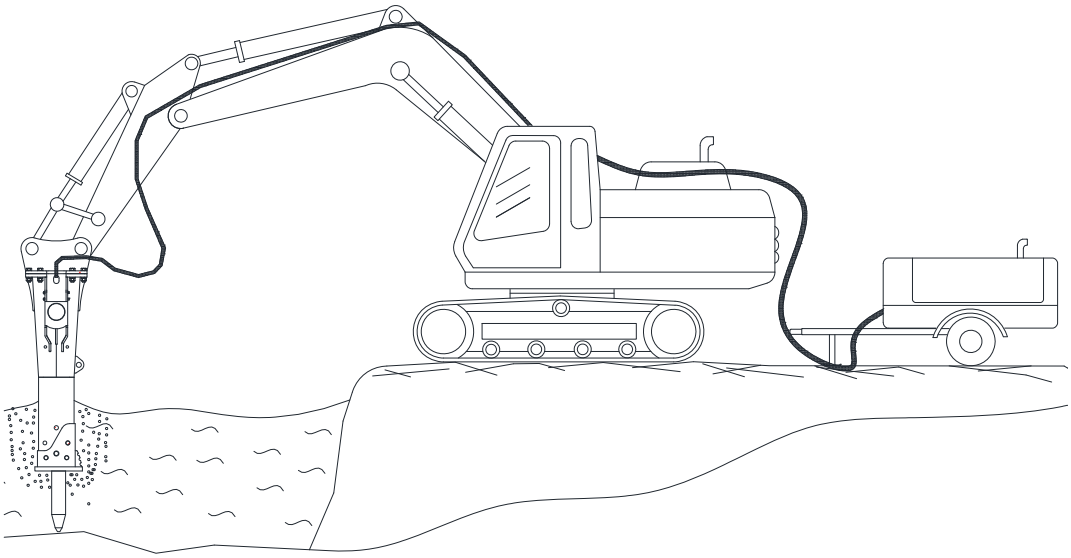
Conversion Instructions for Preparing Standard Breakers for Underwater Application



ALLIED®
Construction Products, LLC

571608

The instructions in this publication were prepared to assist service personnel with the conversion of a standard breaker for underwater service. It is intended as a supplement to the general Operation & Maintenance Manual. It is important to read and fully understand all instructions in both manuals prior using the breaker underwater.

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Revision History of Document 571608

Effective	**Page**	**Summary of Change**
Sept 12, 2005		Origin date of 571608
June 14, 2007	4, 5, 10 and 11	Add 2 air lines to breaker.
June 21, 2011	Throughout	Revise drawings
Dec, 2012	Throughout	Add new UW kit part number 576422, parts lists. Revise BOM 571458. Add breaker models HR270, HR290, HR330, HR390, HR470, HR560, HR600, HR710, AR180D, AR205. Add new figures.

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 attempting to install, operate, service or transport the Allied equipment.

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

Purpose of Safety Messages

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

Safety messages 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 safety 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 surfaces. Some machine components become hot during operation. Allow parts and fluids to cool before handling.

Fig. S2 Safety Message – Typical Presentation

Signal Words for Non-Hazard Conditions

Other signal words found in this manual are IMPORTANT and NOTE. Information provided in these messages is not hazard-related.

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

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

Safety Information – [cont'd]

Meaning of Pictograms

Pictograms are used to rapidly communicate information. For the purposes of this manual and labels, 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

- Pinch / Crush 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 the work tool

Fragments / debris becoming airborne projectiles

Fragments / debris that become flying projectiles. Protective guards required on cab when operating this work tool

Fluid injection

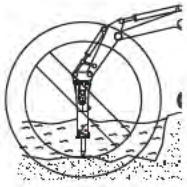
Hot surfaces

Gas / Oil under pressure

Shut off carrier & remove key before servicing

Identifies lift point

Prohibited actions bare a cross "X" or a circle with a diagonal slash.



Prohibited actions must be avoided to prevent injury or equipment damage.

The check mark symbol indicates actions that are correct, approved and 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-related 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 the Allied equipment.
- Has authorization 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 attachment.

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 that is designed with guards shall be equipped with such guards when 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 labels on the machine warn of the dangers that are present.

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 is necessary at the operator's station to protect the operator and other nearby personnel against flying debris that may be generated while work tools, such as breakers, are in use. Whenever possible, the operator and nearby personnel should distance themselves safely away from the work tool and the material being cut or demolished. Do not handle, demolish or cut material overhead.

Additional protection devices not included with the Allied equipment may be required. To prevent accidental start up, the control switch shall be guarded or positioned in a location that 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.

Equipment Selection and Compatibility

Hydraulic breakers are not self-powered. They are dependent on the machine's hydraulic power supply.

All hydraulic breakers are designed to provide optimum performance with reliable service life at a specific pressure. Before the Allied breaker is used, it is important to review all equipment specifications to confirm compatibility between the Allied equipment and carrier. The selection process must also consider the type of work to be done and along with any special needs such as when working underwater.

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.

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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 conversion and proper use of the Allied work tool in the event it is used in underwater applications.

Content in this Manual includes:

- Safety Information
- Technical Data (Connection port size, Air Compressor requirements & hose specifications)
- Air System Installation and Set-up Instructions
- Pre-Operation Adjustments and Inspection
- How to Operate the Allied Breaker underwater
- Maintenance Schedule
- Tool & Bushing – Lubrication and Inspection
- Troubleshooting
- Job Completion – Service Requirements

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.	571608
Category	Underwater Application
Current Status	See Inside Cover
Product Name:	Hydraulic Impact Breaker
Applicable Model[s]:	Ref Table 5.1
Years of Manufacture:	2011 & 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.

1.2 How to Order Replacement Publications

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

1.3 Related Publications

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

Parts Manual -Document ID No. Varies by model

1.3.1 Content Includes

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.

Safety, Operation & Maintenance Manual (Document ID No. Varies with series and model)

The Safety, Operation and Maintenance Manual has been prepared to assist the operator and maintenance personnel with the information necessary for the safe and proper use of the Allied work tool.

Content in the Safety, Operation & Maintenance Manual includes:

- Safety Information
- Equipment Model and Serial Number Identification
- Technical Data (Weight & dimensions)
- Basic Guidelines for Installation and Set-up
- Pre-Operation Inspection

1.0 Introduction and Scope – [cont'd]

- How to Operate the Allied work tool
- Maintenance Schedule
- N2 Gas Charging Instructions
- Tool and Guide Bushing – Lubrication, Inspection, Wear Limits and Replacement
- Troubleshooting
- Changing the Tool
- Removal From Carrier, Transporting, Lifting & Storage

Repair Manual (Document ID No. Varies with series and model)

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

AEM Safety Manual for Hydraulic 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 Warranty Protection Summary

2.1 Overview

Use of non-Allied parts, unapproved service methods, modifications to the attachment, or installation, operation and maintenance, not in accordance with the instructions outlined in this guide may cause equipment failure or personal injury. For details regarding warranty terms and conditions, refer to document A100668.

2.2 Owner's Responsibilities

Keep the Allied equipment operating within its performance limits by familiarizing yourself with the technical specifications provided in the Operation & Maintenance Manual. Follow the specifications when calibrating the carrier. Improper installation, including failure to calibrate the carrier correctly may result in loss of performance or subject the equipment to conditions beyond their design.

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

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

- Read and thoroughly understand the information and procedures detailed in this guide.
- Understand and follow proper operating techniques.
- Use the Allied attachment only if it is in sound operating condition. Immediately rectify any faults that, if left uncorrected, could lead to personal injury or further damage.
- Use the Allied attachment only for the purpose for which it is intended. Special applications, such as underwater use, require modifications to protect the equipment from damage. Consult other publications for specific details.
- Adhere to the technical specifications listed in the Operation & Maintenance Manual. Do not operate the Allied equipment beyond its performance limits.
- 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 the Troubleshooting Section of this guide.
- Conduct regular checks and inspections as scheduled in the Care and Maintenance Section of this guide.
- 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 the equipment's maintenance, service and repair. These records are helpful if warranty coverage is ever in question.

Maintenance, service and repair records shall include at least:

- Date of the service, maintenance or repair.
- Description of the service, maintenance or repair performed. Include part numbers if applicable.
- Copies of purchase order and invoices for repair parts and service.
- The name and signature of the person performing the service, maintenance or repair.

2.0 Warranty Protection Summary – [cont'd]

2.3 Allied Product Policies

In this publication, Allied recommends Breaker applications, maintenance and service consistent with industry practices.

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

- Improper Training
- Improper Installation (Failure to properly calibrate the Host Machine)
- 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.

3.0 Standard Breaker - Underwater Conversion

3.1 Importance of Breaker Conversion for Underwater Application

CAUTION

All breakers shipped from the factory are designed for "Standard" breaking applications. Non-standard applications, such as operating underwater, will require conversion to protect against damage. Never attempt to operate the breaker underwater without the air system conversion kit installed and working. Damage incurred as a result of water intrusion is excluded under the terms of the Allied breaker warranty.

CAUTION

The carrier's hydraulics is at risk of damage if water enters the impact chamber. The pumping action of the breaker's piston will generate an intense pressure wave, destroying the seals and resulting in water intrusion.

Note: Some breaker models cannot be converted for underwater use.

3.2 Overview of the Air System Conversion Kit

The functional operation of the underwater air system is the same regardless of the breaker model. Refer to Figure 3-1. A continuous supply of air is delivered from the compressor to generate a positive pressure at the impact chamber (the area where the piston impacts the tool). Note: A second air line is required by some breaker models to pressurize the area above the piston. A list identifying these models can be found in Table 4.5 and shown in Figure 4.3.

The pressure switch is the component most critical to the protection of the breaker. It constantly monitors air pressure at the breaker and will immobilize the breaker's operating valve in the event air pressure fails to reach minimum or exceeds the maximum set point of the dual circuit switch.

NOTE: Hydraulic circuits differ between machines. Figure 3-1 exemplifies the design of the underwater kits listed in Table 4.5. Kits are intended for use with hydraulic circuits that utilize an electrically actuated valve. If, however, the circuit utilizes a non-electric valve, additional components (not included in the underwater kit) are necessary to create an interlock within the pilot oil circuit to immobilize the breaker.

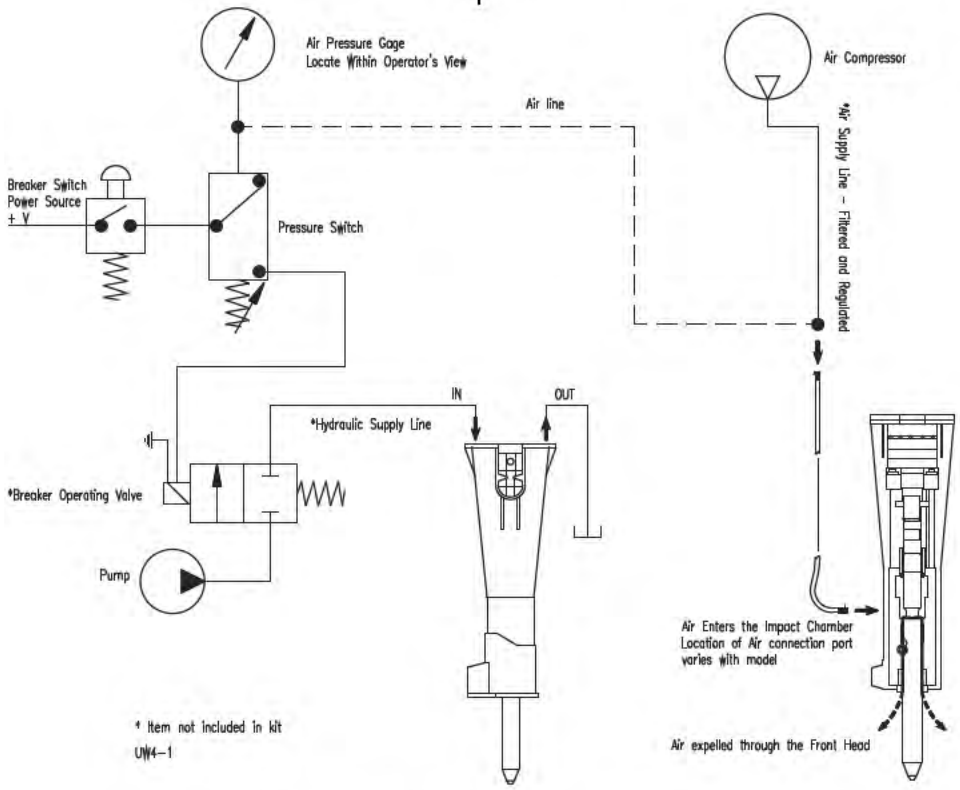


Fig. 3-1 Air System Circuit Diagram – Typical

3.0 Underwater Conversion – [cont'd]

3.3 Items Not Furnished in Air System Kit

The underwater conversion kit is available as an option from Allied. A listing of part numbers for underwater kits can be found in Table 5.1.

The functional operation of the underwater air system is the same regardless of the breaker model. Water ingress is prevented at the front head by pumping pressurized air into the breaker's impact chamber. In general, all underwater kits will contain the same components. Exceptions include any component attached directly to the breaker.

The following items are not furnished in the air system kit. Source these items locally:

- Air compressor*
- Air supply lines*
- Quick connect couplers for air supply lines
- Clamps, hangers for air supply hoses
- Electrical – Wire connectors
- Silicone compound
- Underwater tool and bushing grease

* Refer to Section 5.0 for specifications regarding compressor and hose. Items not included in kit.

NOTE: The underwater kits listed in Table 4.5 are intended for use with hydraulic circuits that employ an electrically actuated breaker operating valve. This type of valve is depicted in Figure 3-1.

If, however, the circuit utilizes a non-electric valve, additional components (not included in the underwater kit) are necessary to create an interlock within the pilot oil circuit to immobilize the breaker.

3.4 Additional Preparations Made to the Breaker

When the breaker is used underwater, the use of a premium, underwater-grade silicone compound is recommended to seal off joined assemblies of the breaker where sediment deposits can accumulate. Sealing these areas will make the task of disassembling the breaker less difficult and time consuming. Instructions can be found in Section 6.

3.5 Bushing and Tool Lubrication

Use eco-friendly lubricants when working in or around water. Allied offers biodegradable tool and bushing lubricant when breakers are used in underwater applications.

Table 3.1 Underwater Grease Order Information

Part No.	Packaging – Container Type
103011	14 oz. / standard cartridge, box of 12
102880	35 lb. / Pail
A101925	120 lb. / Drum

Refer to the Operation and Maintenance Manual for instructions on how to lubricate the tool and bushings.

Automatic lubricators provide a continuous supply of lubricant to the tool and bushings while the breaker is in use. Automatic lubricators and installation kits are available as an option from Allied. There are several types and options available. Lubricators and install kits are configured to match the size of the breaker and carrier.

4.0 UW Kit Parts Information

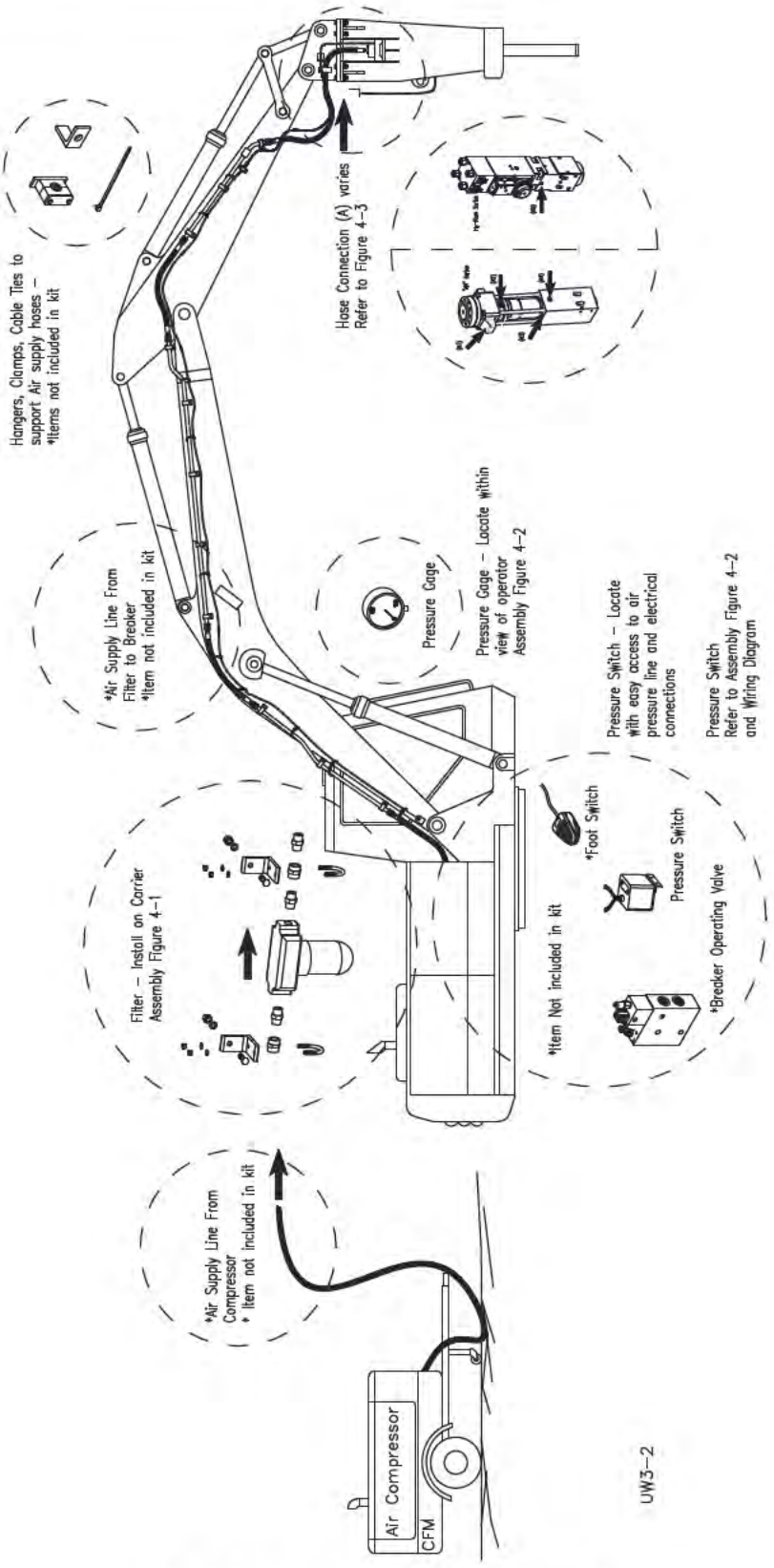


Fig. 3-2 Air System Kit – Typical Layout

4.0 Underwater Kit Parts Information

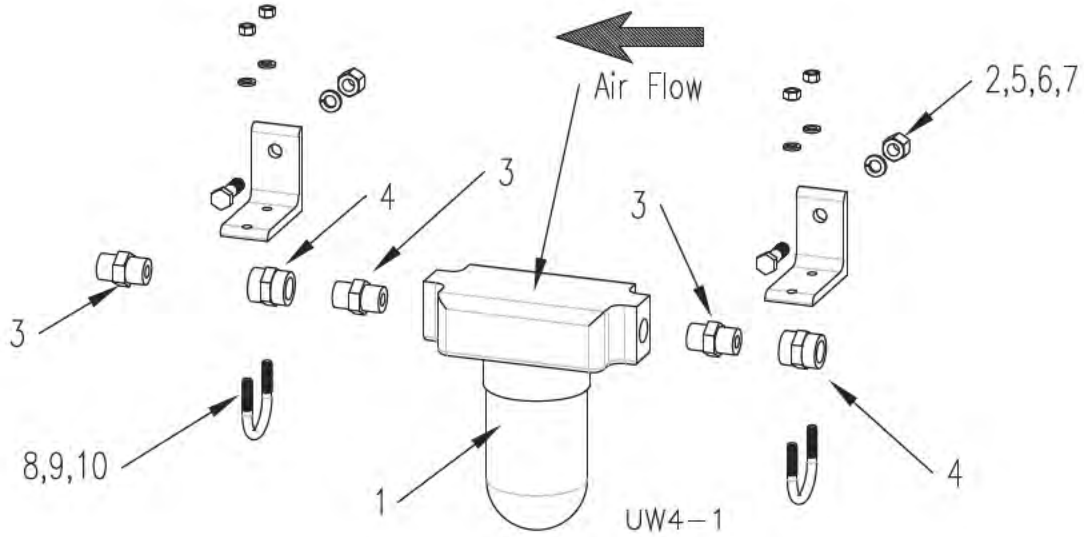


Fig 4-1 Filter Assembly

Table 4.1 Filter Assembly Parts Information

Item	Part No.	Qty	Description	UW Kit - Key K50298 ϴ 571458 ▲<> 576422 ■	Remarks/Specifications
1	054242	1	Filter	ϴ ▲ ■ <>	
2	719730	2	Hex Bolt	ϴ ▲ ■ <>	0.50 x 1.75
3	798057	3	Adapter	ϴ ▲ ■ <>	12MNPT
4	798056	2	Adapter	ϴ ▲ ■ <>	12FNPT
5	719238	2	Lock washer	ϴ ▲ ■ <>	0.50
6	719239	2	Hex Nut	ϴ ▲ ■ <>	0.50-13
7	054244	2	Bracket	ϴ ▲ ■ <>	
8	798189	4	Nut	ϴ ▲ ■ <>	3/8
9	798190	4	Lock washer	ϴ ▲ ■ <>	3/8
10	056254	2	U-Bolt	ϴ ▲ ■ <>	3/8 X 1-3/4

Key (ϴ ▲<> ■) indicates inclusion of part in kit

4.0 UW Kit Parts Information – [cont'd]

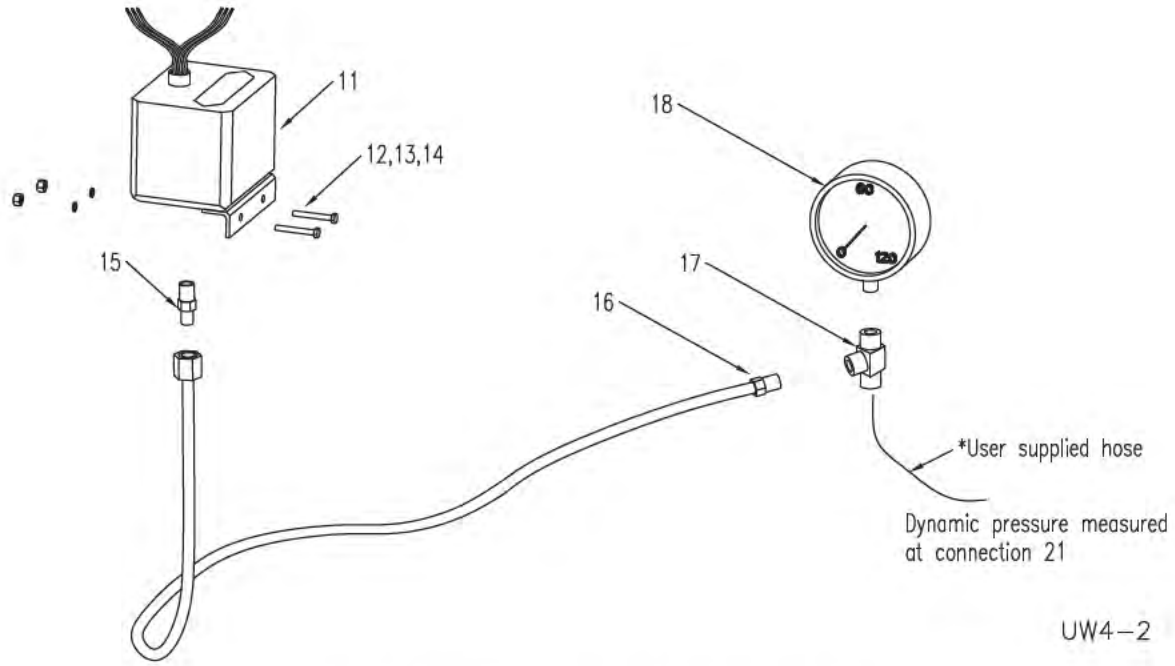


Fig 4-2 Pressure Switch and Gauge Assembly

Table 4.2 Pressure Switch and Gauge Parts Information

Item	Part No.	Qty	Description	UW Kit - Key K50298 ϴ 571458 ▲<> 576422 ■	Remarks/Specifications
11	054241	1	Pressure Switch	ϴ ▲ ■ <>	
12	056118	2	Hex Bolt	ϴ ▲ ■ <>	#10-24
13	798220	2	Lock washer	ϴ ▲ ■ <>	#10
14	656743	2	Hex Nut	ϴ ▲ ■ <>	#10-24
15	659682	1	Adapter	ϴ ▲ ■ <>	NPTxJIC
16	659837	1	Hose	ϴ ▲ ■ <>	L=48"
17	566741	1	Tee	ϴ ▲ ■ <>	1/4NPT
18	054539	1	Pressure Gauge	ϴ ▲ ■ <>	
19	056012	1	Wire	ϴ ▲ ■ <>	L=36"

Key (ϴ ▲<> ■) indicates inclusion of part in kit

4.0 UW Kit Parts Information – [cont'd]

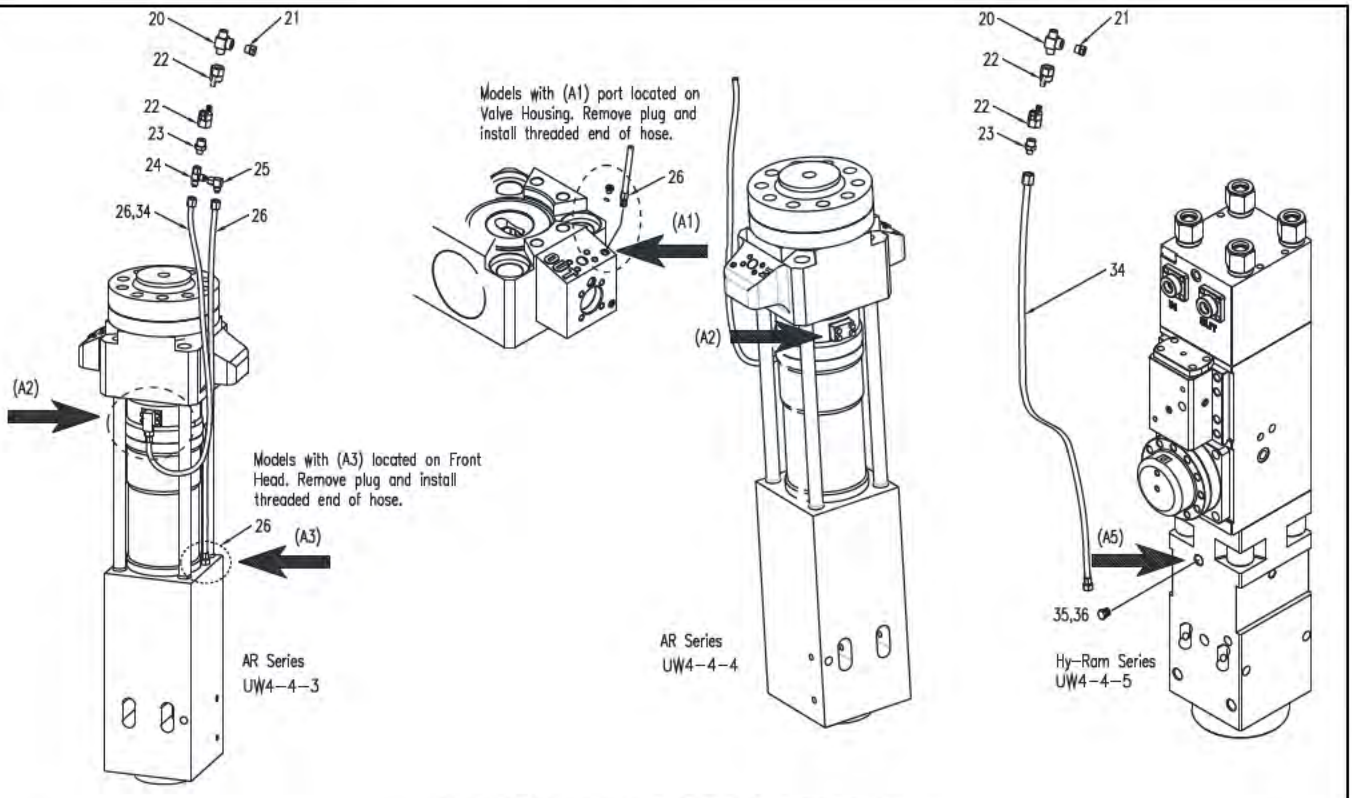


Fig 4-3 Connection Hose(s) at Breaker

Table 4.3 Underwater Kit Parts Information

Item	Part No.	Qty	Description	UW Kit - Key K50298 ϴ 571458 ▲<> 576422 ■	Remarks/Specifications
20	053317	1	Tee	▲ ■ <>	12NPT
21	708569	1	Adapter	▲ ■ <>	04FNPT x 12MNPT
22	053314	2	Quick Connect Coupler	ϴ ▲ ■ <>	Socket
23	653349	1	Adapter	▲ ■ <>	JIC x NPT
24	053032	1	Tee	▲ ■ <>	
25	814146	1	Elbow	▲ ■ <>	90*
26	573042	1 (2■)	Hose	▲ ■	08FJSW X 06MBSP
34	576431	1	Hose	▲ <>	08FJSW X 08FJSW
35	576432	1	Elbow 90	<>	06MBSPP
36	677318	1	Elbow 90	<>	08MBSPP

Key (ϴ ▲<> ■) indicates inclusion of part in kit

NOTE: *For clarity, some figures may show parts disassembled. To install the connection hose, remove the breaker from the housing. No further disassembly of the breaker is necessary.*

4.0 UW Kit Parts Information – [cont'd]

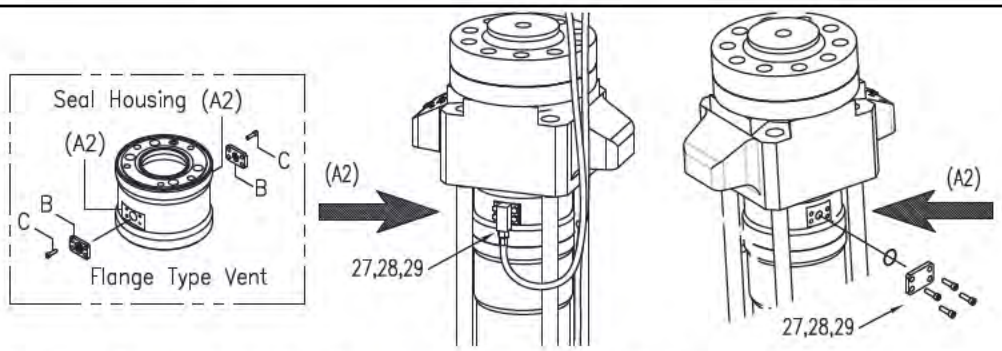


Fig 4-4 Remove Flange Vents at (A2). Install 4-Bolt Flange UW Adapter & 4-Bolt Blind Flange Plate

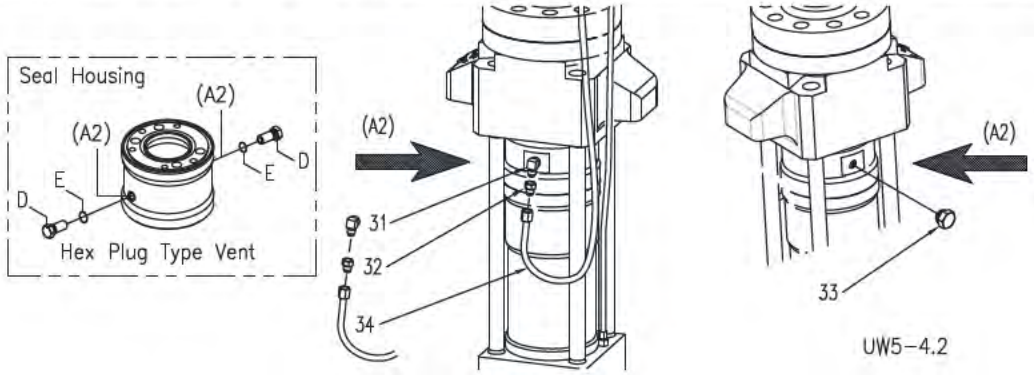


Fig 4-5 Remove Threaded Vents at (A2). Install Threaded UW Adapter & (A2) Hex Plug

Table 4.4 Underwater Kit Parts Information

Item	Part No.	Qty	Description	UW Kit - Key K50298 ⊖ 571458 ▲<> 576422 ■	Remarks/Specifications
27	571548	1	Underwater Flg Plt	■	
28	R903074	4	Socket Bolt	■	M10 x 50MM
29	815235	2	O-Ring	■	2-213
30	573041	1	Blind Flange Plate	■	
31	672557	1	Elbow 90	▲	M20 1.5 x 10MJIC
32	814026	1	Adapter	▲	10FJIC x 08MJIC
33	576427	1	Plug	▲	M20 1.5

Key (⊖ ▲<> ■) indicates inclusion of part in kit
UW 576422 ■ AR-I (A2) Kit includes adapter for vent type 4-bolt flange plate.
UW 571458 ▲AR-II (A2) Kit includes adapter for vent type 20x1.5 threaded.

NOTE: *For clarity, some figures may show parts disassembled. To install the connection hose, remove the breaker from the housing. No further disassembly of the breaker is necessary.*

4.0 UW Kit Parts Information – [cont'd]

Refer to Figures 4-1 and 4-2. The filter, pressure switch and gauge are common items included in each underwater kit listed in Table 4.5. The items that cause the kits to be different are shown in Figures 4-3, 4-4 and 4-5. They include the connection hose(s) and the underwater adapter. These components connect to the various (A) ports on the breaker and they differ by location, type and size.

Follow these steps to find your underwater kit

Step 1. Find your breaker series.

Step 2. If AR-series breaker, refer to Fig 4-4 & 4-5 to identify the type of air vent (A2).

Order **UW kit 576422** for Breaker Series "AR" and Generation I or III. (Flange-type vent).

Order **UW kit 571458** for Breaker Series "AR" and Generation II or III. (Threaded plug-type vent).

Order **UW kit 571458** for Breaker Series "Hy-Ram". Note: Hy-Ram Series Breakers are not equipped with the (A2) port.

Order **UW kit K50298** for Breaker Series "Rammer". Note: Refer to the separate Rammer Installation Guide for instructions.

Cannot adapt these models for underwater use: AR48,AR62,AR70,AR75,AR85,AR95,HR175 and HR230

Table 4.5 Underwater Kit Selection

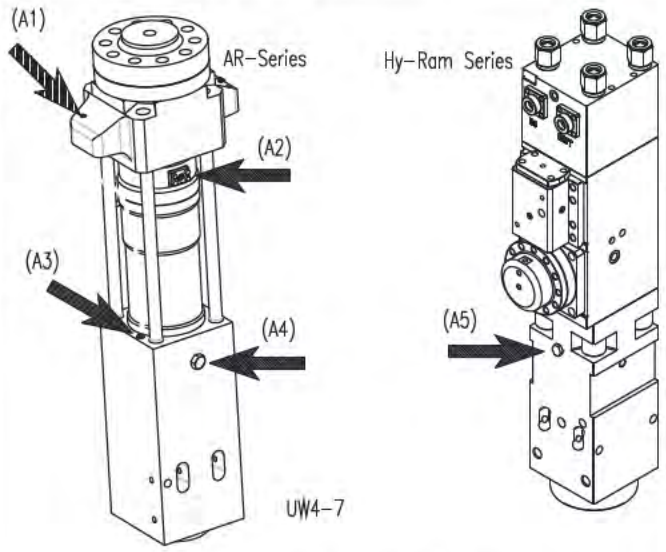


Fig. 4-6 Part Name of Each (A) Port Location

Valve Housing (A1) Seal Housing (A2)
Front Head (A3), (A4), (A5)

Breaker Series	UW Kit P/N Key	(A) Port	
		Location(s)	Type / Size
Rammer	K50298 ⊖	A1 [1]	See Rammer Installation Guide for instructions
AR-I*	576422 ■	A2 [2]	4-Bolt Flange
		A3 [1]	6BSPP
AR-II*	571458 ▲	A2 [3]	M20x1.5
		A3 [1]	6BSPP
AR-III*	576422 ■	A1 [1]	6BSPP
		A2 [2]	4-Bolt Flange
AR-III*	571458 ▲	A1 [1]	6BSPP
		A2 [3]	M20x1.5
Hy-Ram	571458 <>	A5 [1]	6BSPP [5]
			8BSPP

*How to distinguish between Generations AR I, II and III.

AR-I (Fig. 4-4) 4-bolt flange plate type vent port (A2).

AR-II (Fig. 4-5) Threaded M20x1.5 type vent port (A2)

AR-III (Fig 4-3) Port (A1) located on valve housing. Early units equipped with (A2) as depicted in Fig 4-4. Later units equipped with (A2) as depicted in Fig 4-5.

[1] Marks the entry port leading to the impact chamber.

[2] Identifies the type of (A2) adapter found in kit 576422 as 4-bolt flange-type vent.

[3] Identifies the type of (A2) adapter found in kit 571458 as 20x1.5 threaded-type vent.

[4] Port location (A4) AR180 (Early)

[5] For Hy-Ram model HR270.

5.0 Specifications

5.1 Air Compressor / Air Supply Line

Air hose ¾" Min Dia / Max length 35 ft. – Max 125 CFM. Distance of 35 ft. and longer will require 1" Min Dia Hose.

For AR205 - Air hose 1 1/4" Min Dia / Max length 50 ft. Contact the Allied Technical Service Department for instructions for distances of 50 ft. and longer.

The air hose can be routed alongside and banded to the existing steel lines on the boom and arm. Secure the air hose to ensure routing is not vulnerable to entanglement, twisting or kinking.

IMPORTANT
Minimize pressure drop in the air line by using the recommended diameter and a minimum length. Efficiency of air flow is higher when compressor is located as near to the carrier as possible.

Table 5.1 Specifications for Air Compressor and Air Supply Hose

Rammer	AR-I*	AR-II*	AR-III*	Hy-Ram	Air Flow CFM	Air Pressure PSI	Remarks
⊖	■	▲	■▲	<>			
Refer to the separate Rammer Installation Guide for instruction				HR270	50	See Table 5.2	
				HR290	50		
				HR330	50		
				HR390	75		
	AR110B	AR110C			100		
	AR120B	AR120B		HR470	125		
	AR130B	AR130B			125		
	AR140B	AR140B		HR560	125		
	AR160C		AR165	HR600	135		
	AR170C		AR175		140		
		AR180C	AR180D	HR710	140		
			AR205		280		

See previous page for how to distinguish between Generations AR I, II and III.

Table 5.2

Water Depth (ft.)	Air Pressure (psi)
	Low ~ High
<16	30[1)]~50[2)]
16~33	35[1)]~55[2)]
33~49	40[1)]~60[2)]
49~59	50[1)]~70[2)]

[1)] Dynamic measurement of the air pressure.
[2)] Do not set higher than necessary.

IMPORTANT
Air system performance is more efficient when tool and bushing are new. Monitor these parts for wear. Air leakage through widened gap will increase air consumption.

6.0 Installation Instructions

6.1 Before Starting

Confirm all parts listed in the kit bill of materials are present. (Use key to sort parts out that will not be used).

6.2 Filter – Assembly and Mounting

Step 1. Assemble the adapters to the filter as shown in Fig. 4-1.

Step 2. Find a suitable mounting location. Overall performance is best when located as near to the breaker as possible. Typical mounting locations include the machine's rear compartment. Filter must be installed according to the arrow indicating the direction of air flow. It must be mounted vertically. Allow sufficient room below filter to access manual drain and facilitate element change.

6.3 Air Pressure Gauge

Step 1. Assemble adapters and hose to gauge according to Fig. 4-2.

Step 2. Find a location within the operator's view to mount the gauge.

6.4 Pressure Switch

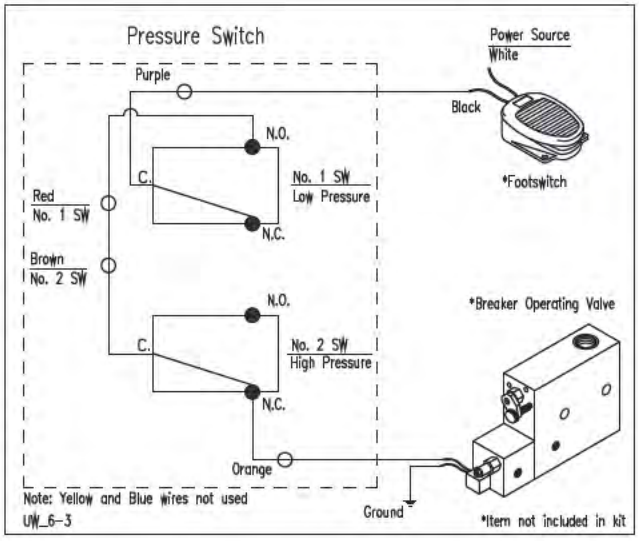


Fig. 6-1 Pressure Switch Wiring Diagram

Step 1. Find a suitable location on the carrier for mounting the air pressure switch. Mounting considerations should include a location with convenient access to both the air line and the breaker's operating valve.

Step 2. Wire pressure switch into circuit. Follow Fig. 6-1 and Table 6.1. Location of control switch (footswitch shown) must be protected against accidental operation.

Table 6.1 Pressure Switch Data

PN-054241	No. 1 SW	No. 2 SW
Low / High Limit	Table 5.2	Table 5.2
N/C	Blue*	Orange
C	Purple	Brown
N/O	Red	Yellow*
Wire Leads @18" #16AWG		
Wire Code	**Wire Connection**	
Purple	Power IN from On/Off switch	
Red & Brown	Re-wire to each other	
Orange	Power OUT to breaker valve	
*Yellow & Blue	These wires not used	

6.4.1 How to Adjust Pressure Switch

IMPORTANT

Adjust pressure at the air compressor. Then adjust pressure switch. The switch is not factory pre-set.

CAUTION

Set the low pressure limit according to water depth Table 5.2. Set the high pressure limit no higher than necessary. Excessive air pressure can damage seals may be detrimental to the breaker's performance.

Make adjustments on dry land with contact pressure on tool.

Step 1. With cover removed, find switch markings (1) and (2). Turn screw CW to raise and CCW to lower.

Step 2. Locate power wire leading to the breaker's operating valve. Use a test light when adjusting the switch. (Remove coil from operating valve to prevent breaker from firing).

Step 3. Measure and set low pressure switch while air flow is dynamic not static.

6.0 Installation Instructions – [cont'd]

6.5 Prepare the Breaker for Underwater Use

Step 1. Remove breaker from housing. Refer to the Operation and Maintenance Manual for instructions.

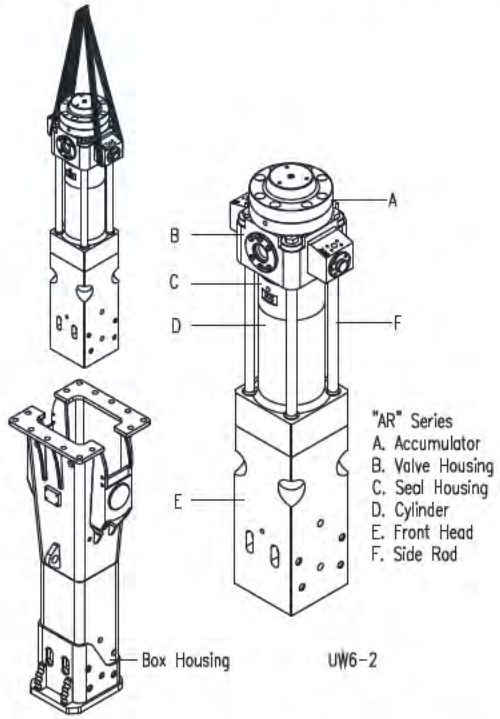


Fig. 6-2 AR-Series Remove Breaker from Housing

For Steps 2, 3, 4 & 5 Refer to Figure 4-3.

Step 2a. Remove threaded plug (A3) at Front Head

OR

Step 2b. Remove threaded plug (A1) at valve housing.

Step 3. Remove vents at ports (A2) and install underwater adapter and plug.

Step 4. Connect 1st hose (26 or 34) to underwater adapter installed at (A2)

Step 5. Connect 2nd hose (26 or 34) to port (A1) OR port (A3).

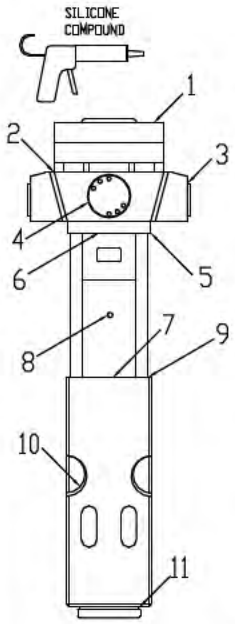
Step 6. Apply silicone compound.

IMPORTANT
Neglecting to seal areas against sediment deposits can lead to parts seizing or joined components becoming cemented. This will make disassembly of the breaker difficult and time-consuming.

Refer to Fig. 6-3. Suspended solids in the water will accumulate around joined assemblies making disassembly of the breaker difficult and time-consuming. Most deposited sediment is preventable by applying a bead of silicone around joined components.

All joined sections, covers and other mating components must be sealed with high-quality underwater-grade silicone compound.

Fill areas around / between the following areas



1-Accumulator bolt head

2-Accumulator & valve housing

3-Covers for check & pressure valve

4-Covers for main spool

5-Side rod & valve housing

6-Valve housing & cylinder

7-Cylinder & front head

8-Lift eye holes

9-Side rod & front head

10-Side rod nut and front head

11-Lower tool bushing & front head

Fig. 6-3 AR-series Seal with Silicone Compound

7.0 Operation and Maintenance

7.1 Pre-operation Inspection

CAUTION

Do not operate the Breaker underwater unless the air system is pressurized and functioning properly.

CAUTION

Prior to operating the equipment, inspect all critical parts. Replace worn, damage or missing parts. Repair all system faults. Do not operate the equipment until all faults are corrected.

IMPORTANT

Air system performance is more efficient when tool and bushings are new. Monitor these parts for wear. Air leakage through widened gap will increase air consumption.

For safe and proper operation, perform a daily inspection of the equipment before it is used.

- Ensure the mounting of the breaker is properly secured to the carrier. Inspect mounting pins, keepers and hardware for wear, damage or missing parts. Apply lubricant to pins as necessary.
- Check the breaker for excessive movement inside the housing. Do not allow the breaker to contact housing. Refer to the Operation & Maintenance Manual for further details.
- Inspect hoses and fittings. Check for signs of leaks at connections. Replace damaged hoses. Ensure hose is properly routed and secured by clamps. Do not allow the air hose to twist or kink.
- Lubricate tool and tool bushing. If equipped with automatic greaser, fill reservoir with Underwater Chisel Paste. Check for proper operation. Refer to the Operation & Maintenance Manual for further details.

NOTE: *This is only a partial pre-operation list. For a complete list of maintenance requirements and procedure, refer to the Operation & Maintenance Manual. To obtain a copy of the "Operation & Maintenance Manual", contact your local Allied dealer or the Allied Customer Service Department. You will need to provide your model and serial number.*

7.2 Operating the Equipment Underwater

CAUTION

Upon installation and commissioning of the air system kit, the breaker may be used for short periods of use underwater.

IMPORTANT

Additional training for operators and service personnel will be necessary when the breaker is used in non-standard applications such as underwater demolition. Read and thoroughly understand all instructions to become familiar with the air system.

1. Clear all personnel from the work area.
2. **The air supply must be turned on before breaker enters water.**
3. At all times, a steady flow of air bubbles must be visible in the water whenever the breaker is submerged. Frequently observe the pressure gauge to ensure it remains in the safe range.
4. Position the carrier and breaker to work surface, making sure the breaker's tool is aligned perpendicular with the work surface.
5. Press the tool firmly against the work surface. For even operation, the tool must remain firmly in contact with the work surface while the breaker is operating.
6. When in operation, follow the breaker with constant feed force as it progresses through the material. Use the controls of the carrier to maintain firm contact with the work surface.
7. Continue to operate until the material fractures. Short bursts (5-10 seconds) allow for better control. Immediately stop operation when material fractures or if the tool slips off. Stop operating if the material does not break after 15 seconds. Locate the material's seam or reposition closer to the edge. Always stop the breaker before repositioning the tool.
8. Stop the breaker if the air system is malfunctioning.

7.0 Operation and Maintenance – [cont'd]

CAUTION

Water may cause irreversible damage to the piston's surface if not promptly removed. During idle periods, stand the Breaker upright to allow water to drain away from the piston. With contact pressure on the tool, run the air supply for a few minutes to remove moisture from the front head.

7.3 Productivity in Underwater Applications

Many factors, including limited visibility, tool selection and variations in operator technique will have an effect on productivity.

Expect additional time to maneuver the breaker into position since the operator will need to feel rather than see if the breaker is aligned with the object to be demolished.

Equipment inspections will be more frequent along with shortened maintenance intervals. Follow the modified maintenance intervals found later in this section.

Production gains may be reached by changing the tool, i.e. if cutting action is needed use a wedge. Use conical for penetrating action.

NOTE: *Further information is available in the "Operation & Maintenance Manual". To obtain a copy, contact your local dealer or the Allied Customer Service Department.*

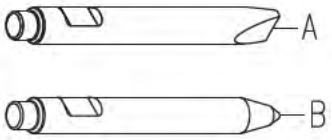


Fig. 7-1 A-Wedge, B-Conical

7.4 Maintenance – Modified for UW Application

When used underwater, maintenance intervals for items such as greasing the tool and tool bushing are shortened. Also, inspections need to be more frequent to prevent parts damage from water corrosion. Additionally, a reduction in life expectancy of breaker parts should be realized due to highly abrasive particles suspended in the water.

- Check hoses for quality and tight connections.
- Test the operation of the air pressure switch.

7.4.2 Maintenance - Every 1/2 Hour

Lubricate the tool and tool bushing. If equipped with an automatic greaser, check that the tool is receiving sufficient lubrication. Refer to Operation & Maintenance Manual for greasing instructions.

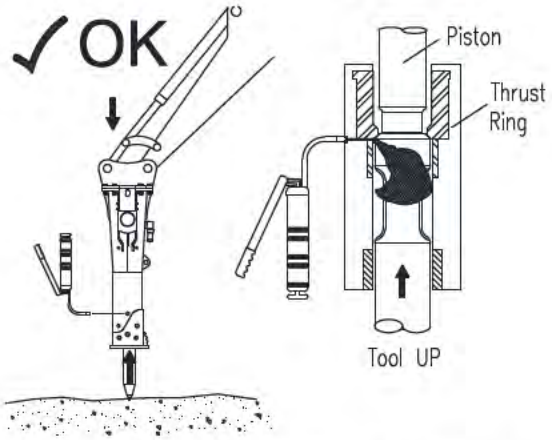


Fig. 7-1 Vertical position, press tool firmly against firm surface – OK to grease

7.4.3 Maintenance – Daily (Every 10 Hours)

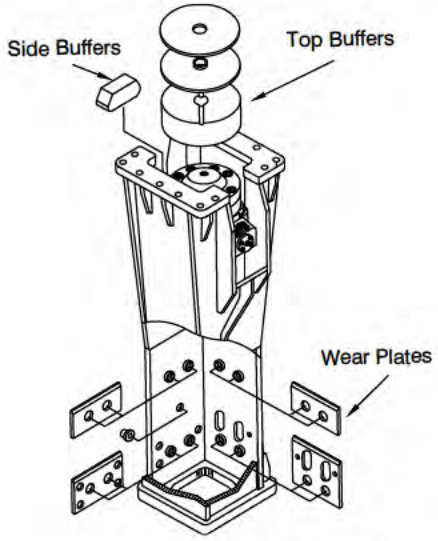


Fig. 7-2 Housing, Buffers & Wear Plates

- Check condition of buffers and wear plates. When in good condition, a slight up-down, left-right and fore-aft movement is normal inside the housing, but no part of the breaker should ever contact the housing.

7.0 Operation and Maintenance – [cont'd]

IMPORTANT

Air system performance is more efficient when tool and bushing are new. Monitor these parts for wear. Air leakage through widened gap will increase air consumption.

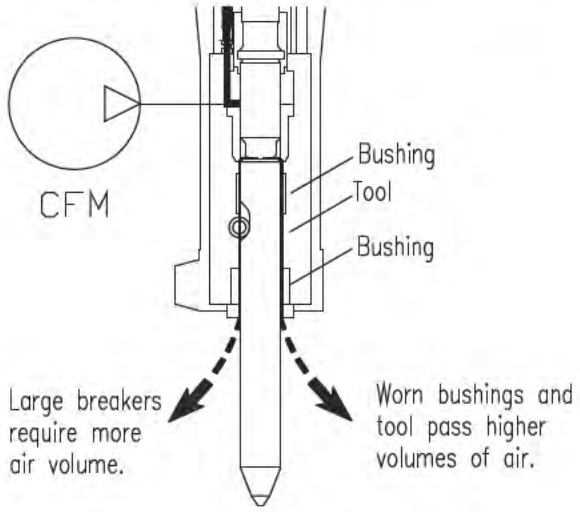


Fig. 7-3 Air Flow Through Gap at Tool & Bushing

- Check condition of tool and tool bushing for wear. Refer to the Operation & Maintenance Manual for wear limits.

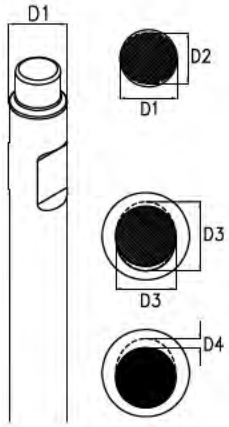


Fig. 7-4 Areas to Measure Tool & Bushing

- Remove the tool. Refer to the Operation & Maintenance Manual for instructions.
- Check tool for sufficient lubrication. If dry, shorten greasing interval.
- Inspect bushing and tool for wear.
- With tool out, grease areas of tool as shown in Fig. 7-5. Re-Install tool.

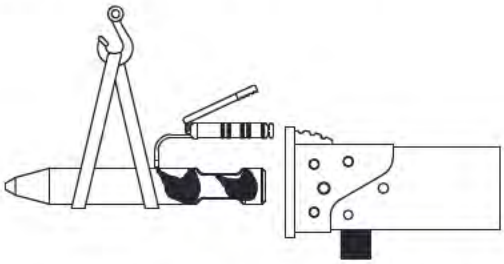


Fig. 7-5 Apply Grease Directly On Tool

7.4.4 Completion of Underwater Work

Immediately after completion of underwater work, the Breaker must be completely dismantled and serviced. This must be done promptly, otherwise within a few days, if moisture is not removed from unprotected surfaces, parts like the piston may become damaged beyond repair.

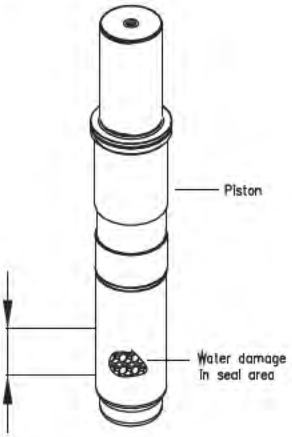


Fig. 7-6 Piston Unusable – Water Stain & Pitting In Critical Seal Area

- All unprotected surfaces need to be cleaned to prevent damage from moisture.
- Inspect parts for damage and wear. Replace if worn beyond limits, damaged or missing.
- Assemble breaker with new seals. Refer to the instructions found in the Repair Manual.

NOTE: *To obtain a copy of the "Repair Manual" contact your local dealer or the Allied Customer Service Department. Your model and serial is required.*

8.0 Troubleshooting

When troubleshooting the air pressure system, use the guide below to assist with several commonly encountered faults. If suggested remedies do not correct the fault of if conditions other than these are encountered, contact the Allied Technical Service Department for assistance.

NOTE: *Further information is available in the "Operation & Maintenance Manual". To obtain a copy, contact your local dealer or the Allied Customer Service Department.*

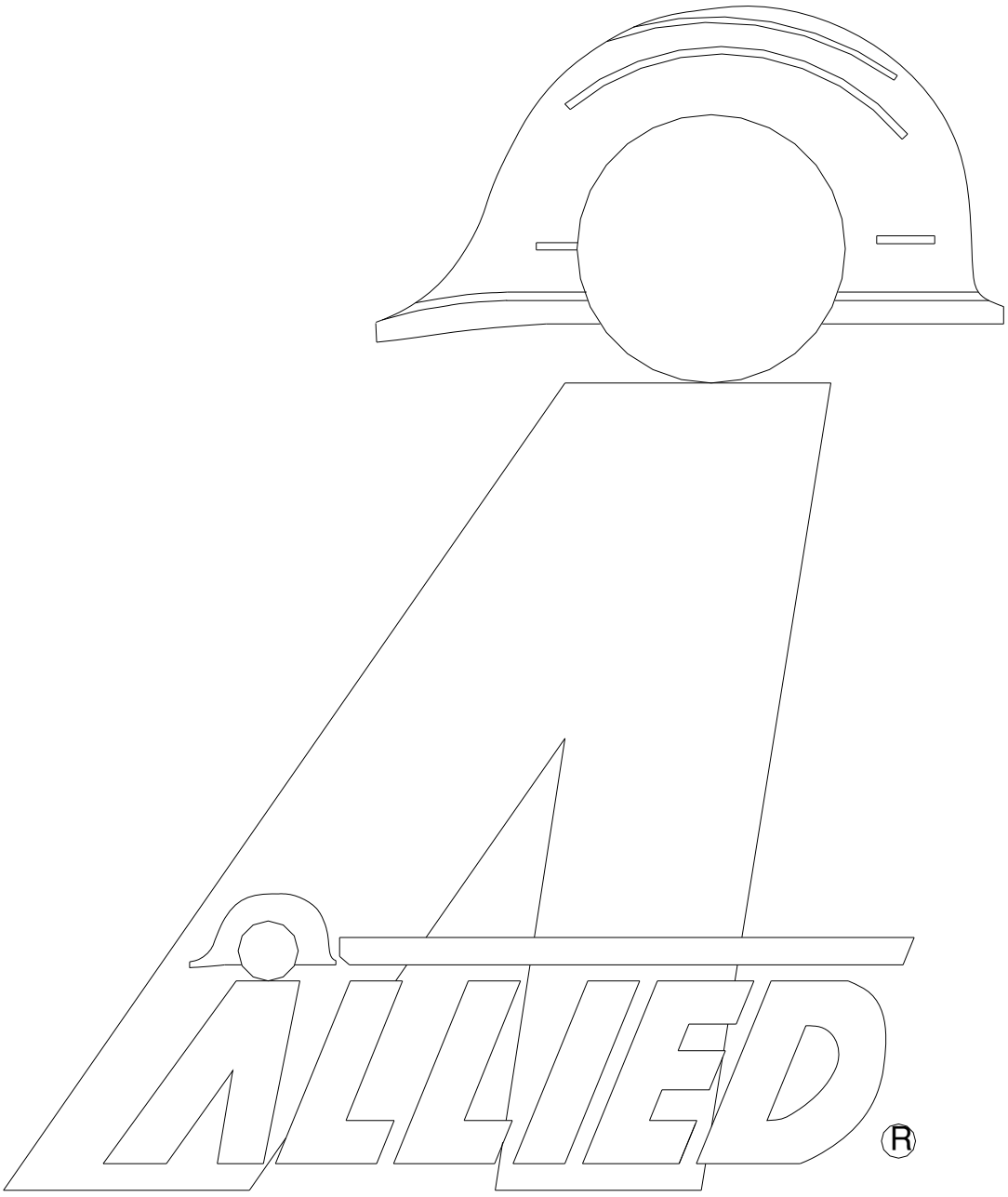
NOTE: *The performance of the Allied attachment is affected by a hydraulic system that is not operating to specifications. If the attachment is not working correctly, make a thorough check the carrier's hydraulic system.*

Using a flow meter, measure the oil flow and determine the cracking pressure of the relief valve. Inclusion of the hoses from the work tool is an important part of the test. This will eliminate the possibility of a collapsed hose. Compare the results of your test with the specifications data listed in the Operation & Maintenance Manual.

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

Fault	Possible Cause	Remedy
Breaker does not start	Low or high air pressure	Check air supply system; Correct as required.
	Pressure switch mis-adjusted. Faulty connections at switch	Test for power at switch. Adjust set points as required. Repair fault.
Breaker runs erratically	Air flow interrupted	Check air supply components for function and fit. Make adjustments if air flow is insufficient.
	Tool contact & misalignment	Operator must apply and maintain feed force. Improve tool alignment
Oil discharge from front head	Damaged seals	Stop breaker. Discontinue use until new seals are installed.

Notes:



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