

## Installation & Disassembly

Bladder Accumulators

Electronic Catalog: HY10-1632-M2.1/US



ENGINEERING YOUR SUCCESS.



**Machesney Park, Illinois**  
10711 N. Second Street, Machesney Park, IL 61115



**Santa Fe Springs, California**  
14087 Borate Street, Santa Fe Springs, CA 90670

If you have questions about the information contained in this Maintenance & Installation Guide, please contact:

**Accumulator & Cooler Division - Americas**  
phone **815 636 4100**  
[parker.com/accumulator](http://parker.com/accumulator)

The information specified in this guide serves to help understand how to install & maintain the product. The information given does not release the user from their own judgment and obligation of verification. The natural process of wear and aging also impacts how easily a product can be serviced.

Extra care is taken in the preparation of this literature, but Parker is not responsible for any inadvertent typographical errors or omissions. Information in this guide is only accurate as of the date of this publication. For a more current information base, please consult the Parker Accumulator & Cooler Division website at: [www.parker.com/accumulator](http://www.parker.com/accumulator)

#### **Offer of Sale**

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions in the "Offer of Sale."

### **⚠ WARNING - USER RESPONSIBILITY**

#### **FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.**

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise. The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors. To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

© Copyright 2016 Parker Hannifin Corporation. All rights reserved.



## General Information

This guide discusses how to disassemble and install a new bladder in Parker Hannifin's BA Series Accumulators. This guide is to be read thoroughly, particularly the Safety Instructions below before maintaining or servicing the BA Series Accumulators. Keep this guide accessible for anyone who may attempt to service or maintain the accumulators described within.

## General Safety











BA Series Bladder Accumulators are designed to be inherently safe when the limiting values on the product label or name plate are followed. However, there is a risk of personal injury and equipment damage if you do not follow the safety, maintenance instructions, and the warning notices specified in this guide.

Since hydraulic accumulators are pressure vessels, the installation, commissioning, disassembly, and maintenance should be performed by professionally trained and qualified personnel.

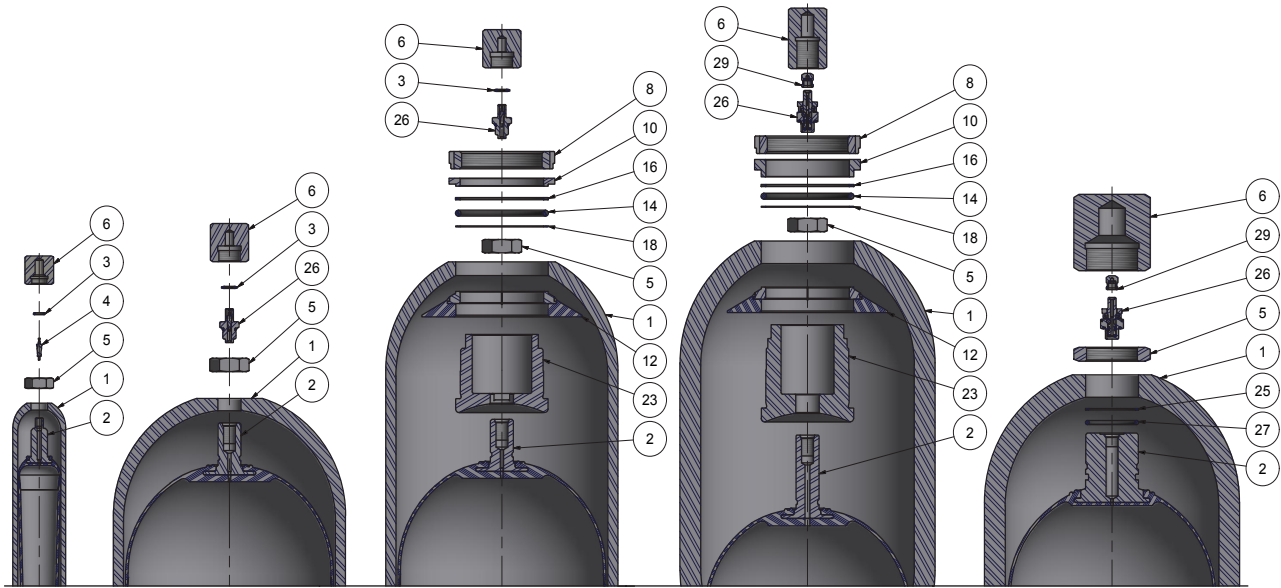
## Operator Obligations

It is the responsibility of the buyer to make sure any individuals who install, operate and maintain the accumulators are properly trained at regular intervals on those subjects. It is also the responsibility of the buyer to maintain and service the accumulator at regular intervals.

The following safety instructions must always be followed when working with hydraulic accumulators:

-  **Only use an inert gas like nitrogen for a pre-charging.** Nitrogen that is 99.99 percent by volume is strongly recommended. **Do not use oxygen or shop air**, as this may lead to a fire or explosion.
-  **Modifying a bladder accumulator** (i.e. welding, brazing, machining, or the use of non-original replacement parts) **may compromise the integrity of the pressure vessel.**
-  **The operating pressure of the accumulator must not exceed the maximum operating pressure and the temperature ranges must be within those indicated on the label or nameplate.**
-  The bladder-type accumulator **must not be operated with group 1 hydraulic fluids** (explosive, inflammable, toxic) **or with corrosive fluids.**
-  **Never loosen the gas valve while the accumulator is under pressure.**
-  **Never attempt to disassemble the accumulator while it is under pressure.**
-  **Always assume the accumulator is under pressure until it is confirmed that it isn't.**
-  **Never add unnecessary weight or load on top of the accumulator, never use the accumulator as a structural support and never step on them.**
-  **The accumulator may become very hot during normal operation.** Allow the accumulator to cool before any servicing or touching it.
-  **Always wear personal protective equipment (PPE) like safety glasses and protective gloves when servicing the accumulator.**

**Accumulator Parts Description (Gas Side)**



**FIGURE A**  
 3-4 KPSI, 330 Bar  
 10-150 Cu. In.  
 Bottom Repairable

**FIGURE B**  
 3-3.6 KPSI, 330 Bar  
 1-15 Gallon  
 Bottom Repairable

**FIGURE C**  
 3-3.6 KPSI, 330 Bar  
 2.5-15 Gallon  
 Top Repairable

**FIGURE D**  
 5-6.6 KPSI, 690 Bar  
 2.5-15 Gallon  
 Top Repairable

**FIGURE E**  
 5-6.6 KPSI, 690 Bar  
 1-15 Gallon  
 Bottom Repairable  
 (Items #25 & 27 Do Not Apply)

| Bill of Material for Figures A-E |                            |
|----------------------------------|----------------------------|
| Item No.                         | Description                |
| 1                                | Shell                      |
| 2                                | Bladder and Stem Assembly  |
| 3                                | O-Ring / Sealing Washer    |
| 4                                | Gas Valve Core             |
| 5                                | Hex Jam Nut                |
| 6                                | Protective Cap             |
| 7                                | Hydraulic Port Assembly    |
| 8                                | Hex Jam Nut /Locking Ring  |
| 10                               | Hydraulic Port Spacer      |
| 12                               | Anti-Extrusion Ring        |
| 14                               | O-Ring                     |
| 16                               | Backup Ring                |
| 18                               | Backup Washer (Metal)      |
| 25                               | Backup Ring (2" Stem Only) |
| 26                               | Gas Valve                  |
| 27                               | O-Ring (2" Stem Only)      |
| 29                               | Gas Valve Cap              |

| Suggested Approximate Torque Values |                              |                  |                 |
|-------------------------------------|------------------------------|------------------|-----------------|
| Item No.                            | Description                  | Torque (English) | Torque (Metric) |
| 4                                   | Gas Valve Core               | 3-5 In-Lb        | 0.34-0.56 N-M   |
| 5                                   | Hex Jam Nut (10-150 Cu. In.) | 10-15 Ft-Lb      | 14-20 N-M       |
| 5                                   | Hex Jam Nut (1-15 Gallon)    | 100-120 Ft-Lb    | 136-163 N-M     |
| 6                                   | Protective Cap               | 10-15 Ft-Lb      | 14-20 N-M       |
| 8                                   | Locking Ring (1 Gallon)      | 100 Ft-Lb (Min)  | 136 N-M (Min)   |
| 8                                   | Locking Ring (2.5-15 Gallon) | 500 Ft-Lb (Min)  | 678 N-M (Min)   |
| 26                                  | Gas Valve (All Styles)       | 22-28 Ft-Lb      | 30-38 N-M       |
| 29                                  | Gas Valve Cap                | 12-24 In-Lb      | 1-3 N-M         |

**Accumulator Parts Description (Oil Side)**

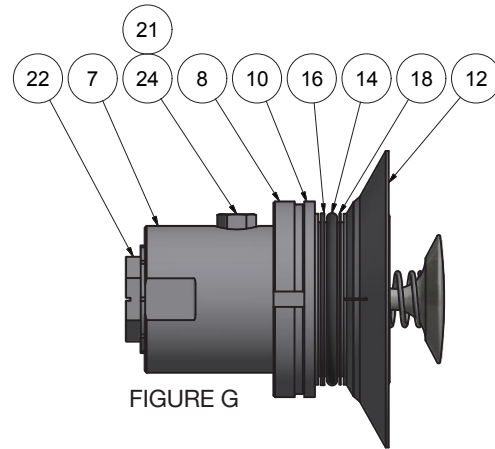
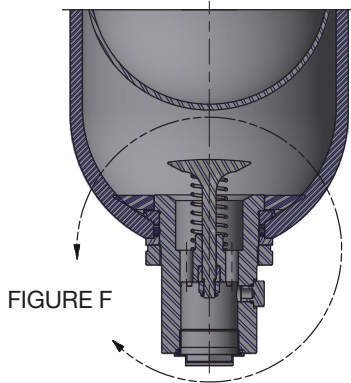
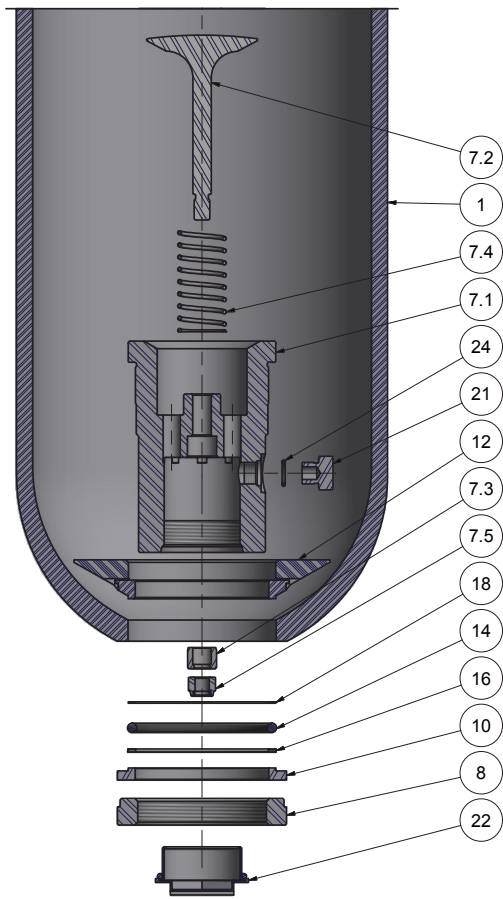


FIGURE G

| Hydraulic Port Kit |                           |
|--------------------|---------------------------|
| Item No.           | Description               |
| 7                  | Hydraulic Port Assembly   |
| 8                  | Hex Jam Nut /Locking Ring |
| 10                 | Hydraulic Port Spacer     |
| 12                 | Anti-Extrusion Ring       |
| 14                 | O-Ring                    |
| 16                 | Backup Ring               |
| 18                 | Backup Washer (Metal)     |
| 21                 | Bleed Plug                |
| 22                 | Port Protector Plug       |
| 24                 | O-Ring                    |

| Suggested Approximate Torque Values |                              |                  |                 |
|-------------------------------------|------------------------------|------------------|-----------------|
| Item No.                            | Description                  | Torque (English) | Torque (Metric) |
| 7.5                                 | Nylon Insert Locknut         | 6-7 Ft-Lb        | 8-9 N-M         |
| 8                                   | Locking Ring (1 Gallon)      | 100 Ft-Lb (Min)  | 136 N-M (Min)   |
| 8                                   | Locking Ring (2.5-15 Gallon) | 500 Ft-Lb (Min)  | 678 N-M (Min)   |
| 21                                  | Bleeder Plug                 | 10 Ft-Lb (Min)   | 14 N-M          |
| 22                                  | Port Protector Plug          | 12-24 In-Lb      | 1-3 N-M         |

| Hydraulic Port Assembly |                      |
|-------------------------|----------------------|
| Item No.                | Description          |
| 7.1                     | Hydraulic Port Body  |
| 7.2                     | Poppet               |
| 7.3                     | Bushing              |
| 7.4                     | Compression Spring   |
| 7.5                     | Nylon Insert Locknut |

10-150 Cubic-Inch. Don't Include 16, 21, & 24  
 All Flange Ports. Don't Include 21 & 24



**Tools & Equipment**



**Figure 1:** Pull rods, Spanner wrench, Core repair tool, and Core installation tool



**Figure 2:** Typical rounded edge flathead screwdriver or ball head hex

| Tools and Equipment                                |  |  |
|--|--|--|
| Description  | Part Number  | Use  |
| Charging & Gauging Assembly                        | Refer to Maintenance & Installation Guide HY10-1632-M2 | Various styles available based on pre-charge, accumulator size & style.  |
| Pull Rod (1 Qt - 2 ½ Gallon)                       | 085109 0250  | Pull rods are available in single or multiple lengths for different size accumulators. The pull rods attach to the gas valve of the bladder for ease of assembly into shell during assembly. |
| Pull Rod (5 Gallon)                                | 085109 0500  |  |
| Pull Rod (10-11 Gallon)                            | 085109 1000  |  |
| Pull Rod (15 Gallon)                               | 085109 1500  |  |
| Core Repair Tool                                   | 582441 0000  |  |
| Core Installation Tool                             | 300987   |  |
| Spanner Wrench                                     | 085110 0000  | Fits all standard size bladder accumulators. Used to remove hydraulic port assembly from the accumulator.  |
| Box Or Adjustable Wrenches                         |  |  |
| Blunt Flathead Screwdriver or Ball Head Hex Wrench | See pictures above                                     | Rounded edges. Used to tuck in hydraulic port O-ring.  |
| Torque Wrench                                      |  | Used to establish proper torque  |
| Soft Head Hammer                                   |  | May be required to loosen locking ring in conjunction with spanner wrench  |

**Clean & Inspect**

**Cleaning:** All metal parts should be cleaned with a cleaning agent. Seals and soft parts should be wiped clean.

**Bladder (Item 2):** Inflate bladder to normal size. Wash bladder with a soap solution. If soap solution bubbles, discard bladder. After testing, deflate bladder immediately.

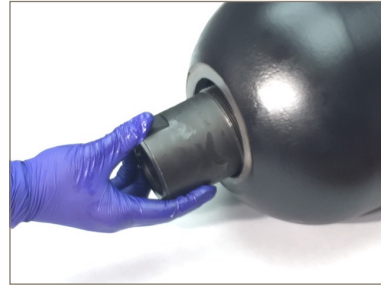
**Hydraulic Port Assembly (Item 7):** Inspect assembly for damage. Check the poppet valve (Item 7.2) and spring (Item 7.4) to see that the poppet spins freely and the spring functions properly. In cases where the accumulator is used with water, check assembly for rust and/or defective plating. If rust is detected, clean with

commercial rust remover. If parts are pitted, replace with new components. If protective plating is damaged, replace with new components.

**Seals:** Check anti-extrusion ring (Item 12) and soft seals for damage and wear. Replace all worn and damaged seals with Parker’s original equipment seals.

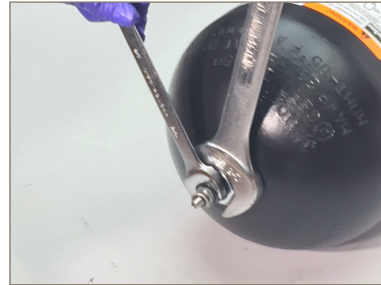
**Shell (Item1):** After shell has been cleaned with a cleansing agent, check the inside and outside of shell. Special attention should be given to the area where the bladder stem (Item 2) and hydraulic port assembly (Item 7) pass through the shell. Any nicks or damages in this area could destroy the accumulator bladder or damage new seals. If this area is pitted, consult the factory.

**Figure 5:** Remove hydraulic port assembly (Item 7) from accumulator shell (Item 1).



**Figure 5**

**Figure 6:** Remove hex jam nut (Item 5) from bladder valve stem (Item 2). Prevent valve stem from twisting with an appropriate wrench applied to the valve stem flats.



**Figure 6**

**Figure 7:** Fold bladder (Item 2) and pull out of accumulator shell (Item 1). A slight twisting motion while pulling on the bladder reduces effort required to remove bladder from shell. If bladder is slippery, hold with a cloth.



**Figure 7**

## Bladder Assembly in Bottom Repairable Accumulators

**Figure 8:** After shell (Item 1) has been cleaned and inspected, place accumulator shell in vise or on table. Spray the inside of the accumulator shell with a liberal amount of clean system hydraulic fluid to lubricate and cushion the bladder (Item 2). Make sure the entire inside of the shell is lubricated.

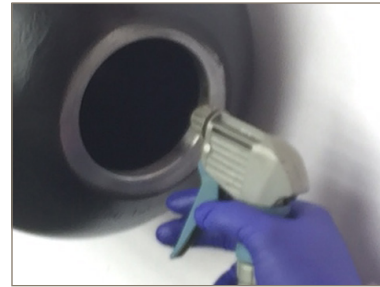


Figure 8

**Figure 9:** Insert the bladder pull rod, 085109xxxx, through both the shell's valve stem opening and fluid port opening. Attach the bladder pull rod to the bladder valve stem (Item 26).



Figure 9

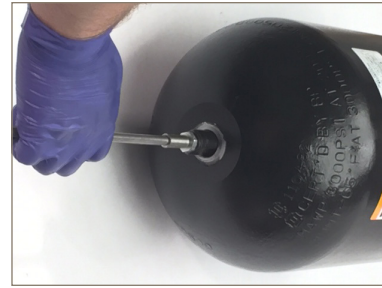
**Figure 10:** With all gas completely exhausted from bladder (Item 2), collapse bladder and fold longitudinally in a compact roll. With one hand, pull the bladder pull rod while feeding the bladder (Item 2) into the shell (Item 1) with the other hand. Slight twisting of bladder will assist in this insertion.



Figure 10

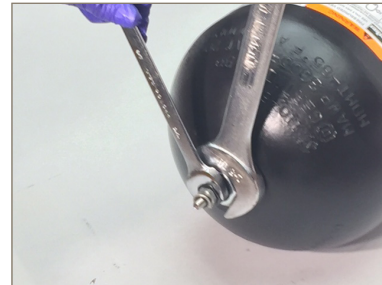


**Figure 11:** Once the bladder valve stem has been pulled through the valve stem opening in the shell, install the valve stem hex nut (Item 5) by hand. Once the valve stem hex nut is in place, remove the bladder pull rod.



**Figure 11**

**Figure 12:** Thread hex jam nut (Item 5) onto bladder valve stem (Item 2). Secure valve stem from twisting with an appropriate wrench applied to the valve stem flats. Torque jam nut to proper torque based on accumulator size per the Suggested Approximate Torque Values on page 2 of this guide.



**Figure 12**

## Disassembly of Conventional Top-Repairable Accumulators

The conventional top-repairable accumulator uses a gas-end adapter (Item 23) which is retained in the shell with an anti-extrusion ring (Item 12) exactly like those used in port assemblies. (See **Figure 10**)

- 1 Make sure the gas is relieved from the accumulator. (See Removal of Accumulator from System.)
- 2 Remove hex jam nut (Item 5) from bladder gas valve stem (Item 2) using a 1-5/16" socket wrench.
- 3 Using a spanner wrench, 085110 0000, remove outer lock ring (Item 8) on the gas end adapter (Item 23).
- 4 Push the gas end adapter (Item 23) complete with the bladder (Item 2) into the shell (Item 1).
- 5 Insert hand into accumulator, remove the o-ring back-up (Item 16), o-ring (Item 14), and metal back-up (Item 18). Separate the anti-extrusion ring (Item 12) from the gas end adapter (Item 23).
- 6 Fold the anti-extrusion ring (Item 12) and remove from shell (Item 1). (See **Figure 4**).
- 7 Remove gas end adapter (Item 23) from shell.
- 8 Remove bladder (Item 2) from shell.

**NOTE: Conventional top repairable accumulators may be repaired by removing the bladder from either the hydraulic end or the gas end of the accumulator.**

## Clean & Inspect

**Cleaning:** All metal parts should be cleaned with a cleaning agent. Seals and soft parts should be wiped clean.

**Bladder (Item 2):** Inflate bladder to normal size. Wash bladder with a soap solution. If soap solution bubbles, discard bladder. After testing, deflate bladder immediately.

**Hydraulic Port Assembly (Item 7):** Inspect assembly for damage. Check the poppet valve (Item 7.2) and spring (Item 7.4) to see that the poppet spins freely and the spring functions properly. In cases where the accumulator is used with water, check assembly for rust and/or defective plating. If rust is detected, clean with commercial rust remover. If parts are pitted, replace with new components. If protective plating is damaged, replace with new components.

**Seals:** Check anti-extrusion ring (Item 12) and soft seals for damage and wear. Replace all worn and damaged seals with Parker's original equipment seals.

**Shell (Item 1):** After shell has been cleaned with a cleansing agent, check the inside and outside of shell. Special attention should be given to the area where the gas valve and hydraulic assembly pass through the shell. Any nicks or damages in this area could destroy the accumulator bladder or damage new seals. If this area is pitted consult factory.

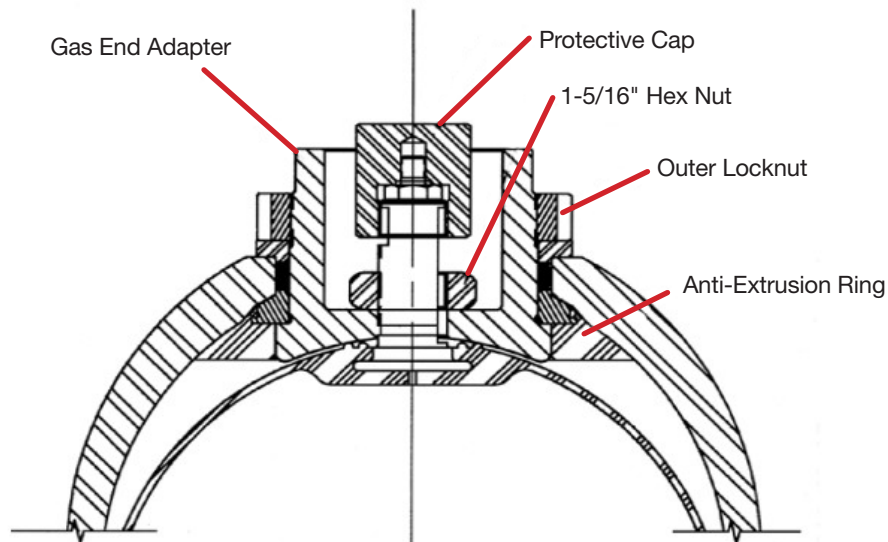


Figure 13

## Bladder Assembly in Conventional Top-Repairable Accumulators

- 1 Spray the inside of the accumulator shell (Item 1) with a liberal amount of clean system hydraulic fluid to lubricate and cushion the bladder. Make sure the entire inside of the shell is lubricated.
- 2 With all gas completely exhausted from bladder, collapse bladder (Item 2) and fold longitudinally in a compact roll.
- 3 Install the gas end adapter (Item 23) on the bladder and secure with hex jam nut (Item 5). Torque hex jam nut to 100-120 ft-lb (136-163 N-m).
- 4 Insert bladder/adapter assembly into accumulator shell.
- 5 Fold anti-extrusion ring (Item 12) and place inside accumulator.
- 6 Reaching inside the accumulator, insert the gas end adapter (Item 23) through the anti-extrusion ring (Item 12) and pull into place. The steel surface on anti-extrusion ring should face outward.
- 7 Holding the gas end adapter (Item 23) in place, fill accumulator with approximately 50 PSI nitrogen. This will hold the gas end adapter in place.
- 8 Install the metal backup (Item 18), o-ring (Item 14), and o-ring backup (Item 16).
- 9 Install the outer spacer (Item 10).
- 10 Install the outer locking ring (Item 8).

## Hydraulic Port Assembly Installation

- 1 Holding the hydraulic port assembly (Item 7) by the threaded end, insert the poppet end into the shell fluid port. Lay complete assembly inside shell (Item 1).
- 2 **Figure 14:** Fold anti-extrusion ring (Item 12) to enable insertion into the shell. Once the anti-extrusion ring has cleared the hydraulic fluid port opening, place the anti-extrusion ring on the hydraulic port assembly (Item 7) with the port assembly's steel collar end facing toward the shell fluid port.

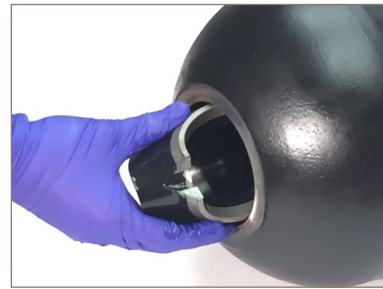


Figure 14

- 3 Pull the threaded end of the port assembly (Item 7) through the shell fluid port until it sits solidly into position on the shell's fluid port opening.
- 4 **Figure 15:** With port assembly firmly in place, install valve core (Item 3) or gas valve (Item 26) into the bladder stem (Item 2). Slowly pressurize the bladder, using dry nitrogen with sufficient pressure (approximately 40-50 PSI) to hold hydraulic port assembly (Item 7) in place so both hands are free to continue with assembly.

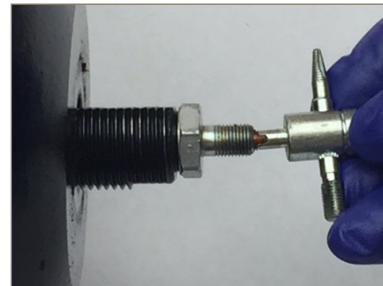


Figure 15

- 5 **Figure 16:** Install metal backup washer (Item 18) over hydraulic port assembly and push into the shell fluid port to bottom it out on the anti-extrusion ring (Item 12).



Figure 16

- 6 **Figure 17:** Install O-ring (Item 14) over hydraulic port assembly (Item 7) and push it using a blunt, rounded edge, flathead screw driver or a ball head hex into the shell's fluid port until it bottoms out against the washer.

**CAUTION: Do not twist or damage o-ring.**



Figure 17

- 7 Install O-ring backup (Item 16) over hydraulic port assembly (Item 7) and push until it bottoms against O-ring (Item 14) (1-40 gallon sizes and 5K only).

- 8 **Figure 18:** Insert spacer (Item 10) with the smaller diameter of the shoulder facing the accumulator shell.



Figure 18

**9 Figure 19:** Install the locking ring (Item 8) on the hydraulic port assembly (Item 7). Using a spanner wrench, 0851100000, tighten securely per the Suggested Approximate Torque Values on page 3 of this guide. This will squeeze the O-ring (Item 14) into position. Use appropriate wrench on flats of hydraulic port assembly (Item 7) to ensure the unit does not turn.

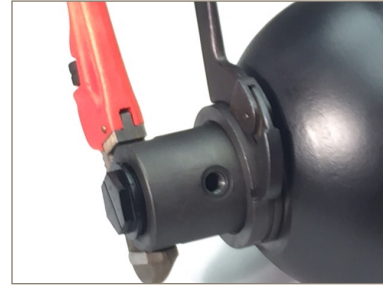


Figure 19

- 10 Figure 20:** Thread bleeder plug (Item 21) into the hydraulic port assembly (Item 7).
- 11** Position accumulator so that fluid (same fluid as used in system) can be poured into the accumulator (add approximately 10% of the accumulator capacity). This fluid will act as a cushion when the accumulator is pre-charged with gas.
- 12** Pre-charge accumulator to desired pressure. See pre-charge instructions.
- 13** Install accumulator on machine.



Figure 20

## Disassembly of Bottom Repairable Accumulators

**Figure 1:** Once the accumulator has been removed from the equipment, the accumulator body should be secured in a vise, preferably a chain vise. If a standard jaw vise is used, brass inserts should be used to protect the accumulator hydraulic port assembly (Item 7) from damage. Clamp on wrench flats only when using a jaw vise to prevent accumulator from turning.



Figure 1

**Figure 2:** Remove bleeder plug (Item 21), if the accumulator is equipped with one, on hydraulic port assembly.



Figure 2

**Figure 3:** Using a spanner wrench, 0851100000, remove lock ring (Item 8) from the hydraulic port assembly (Item 7); use an adjustable wrench on the flats located on the port assembly to prevent port assembly from rotating. Remove spacer (Item 10), then push the hydraulic port assembly (Item 7) into the shell (Item 1) prior to Step 4.



Figure 3

**Figure 4:** Insert hand into the accumulator shell (Item 1) and remove the O-ring backup (Item 16), o-ring (Item 14), and metal backup (Item 18). Separate the anti-extrusion ring (Item 12) from the hydraulic port (Item 7). Fold anti-extrusion ring to enable removal of anti-extrusion ring from shell.



Figure 4



Parker Hannifin Corporation  
**Accumulator & Cooler Division**  
10711 N Second Street  
Machesney Park, IL 61115  
phone 815 636 4100  
fax 815 636 4111  
[www.parker.com/accumulator](http://www.parker.com/accumulator)