Pre-Charging Instructions

Bladder Accumulators

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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

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.

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General Information

This guide discusses how to properly pre-charge Parker Hannifin’s BA Series Accumulators with nitrogen. 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.**
Pre-Charging Instructions
Bladder Accumulators

Accumulator Parts Description (Gas Side)

Bill of Material for Figures A-E

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shell</td>
</tr>
<tr>
<td>2</td>
<td>Bladder and Stem Assembly</td>
</tr>
<tr>
<td>3</td>
<td>O-Ring / Sealing Washer</td>
</tr>
<tr>
<td>4</td>
<td>Gas Valve Core</td>
</tr>
<tr>
<td>5</td>
<td>Hex Jam Nut</td>
</tr>
<tr>
<td>6</td>
<td>Protective Cap</td>
</tr>
<tr>
<td>7</td>
<td>Hydraulic Port Assembly</td>
</tr>
<tr>
<td>8</td>
<td>Hex Jam Nut /Locking Ring</td>
</tr>
<tr>
<td>9</td>
<td>Hydraulic Port Spacer</td>
</tr>
<tr>
<td>10</td>
<td>Anti-Extrusion Ring</td>
</tr>
<tr>
<td>12</td>
<td>O-Ring</td>
</tr>
<tr>
<td>14</td>
<td>Backup Ring</td>
</tr>
<tr>
<td>16</td>
<td>Backup Washer (Metal)</td>
</tr>
<tr>
<td>25</td>
<td>Backup Ring (2” Stem Only)</td>
</tr>
<tr>
<td>26</td>
<td>Gas Valve</td>
</tr>
<tr>
<td>27</td>
<td>O-Ring (2” Stem Only)</td>
</tr>
<tr>
<td>29</td>
<td>Gas Valve Cap</td>
</tr>
</tbody>
</table>

Suggested Approximate Torque Values

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Torque (English)</th>
<th>Torque (Metric)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Gas Valve Core</td>
<td>3-5 In-Lb</td>
<td>0.34-0.56 N-M</td>
</tr>
<tr>
<td>5</td>
<td>Hex Jam Nut (10-150 Cu. In.)</td>
<td>10-15 Ft-Lb</td>
<td>14-20 N-M</td>
</tr>
<tr>
<td>5</td>
<td>Hex Jam Nut (1-15 Gallon)</td>
<td>100-120 Ft-Lb</td>
<td>136-163 N-M</td>
</tr>
<tr>
<td>6</td>
<td>Protective Cap</td>
<td>10-15 Ft-Lb</td>
<td>14-20 N-M</td>
</tr>
<tr>
<td>8</td>
<td>Locking Ring (1 Gallon)</td>
<td>100 Ft-Lb (Min)</td>
<td>136 N-M (Min)</td>
</tr>
<tr>
<td>8</td>
<td>Locking Ring (2.5-15 Gallon)</td>
<td>500 Ft-Lb (Min)</td>
<td>678 N-M (Min)</td>
</tr>
<tr>
<td>26</td>
<td>Gas Valve (All Styles)</td>
<td>22-28 Ft-Lb</td>
<td>30-38 N-M</td>
</tr>
<tr>
<td>29</td>
<td>Gas Valve Cap</td>
<td>12-24 In-Lb</td>
<td>1-3 N-M</td>
</tr>
</tbody>
</table>
## Pre-Charging Instructions

### Bladder Accumulators

### Charging & Gauging Assemblies (Based on Pre-Charge, Accumulator Size & Style):

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Charging &amp; Gauging Assemblies for Pre-Charge &lt; 3000 PSI (207 Bar)</th>
<th>Figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG-3000A</td>
<td>Charging and Gauging Assembly consists of 10’ charging hose with a CGA 580 right-hand thread fitting, an adapter incorporating gas valve, bleed valve, gas chuck &amp; gauge.</td>
<td>3</td>
</tr>
</tbody>
</table>

![Figure 3](image3.png)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Charging &amp; Gauging Assemblies for 25-40 Gallon Units With &lt; 3000 PSI Pre-Charge &amp; all Units &lt; 6000 PSI (414 Bar)</th>
<th>Figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG-6000</td>
<td>Charging and Gauging Assembly consists of 10’ charging hose with a CGA 677 left-hand female thread fitting, an adapter incorporating gas valve, bleed valve, gas chuck &amp; gauge.</td>
<td>4</td>
</tr>
</tbody>
</table>

![Figure 4](image4.png)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Charging &amp; Gauging Assemblies for Pre-Charge &lt; 10,000 PSI (690 Bar)</th>
<th>Figure</th>
</tr>
</thead>
</table>
| CG-10K      | Charging and Gauging Assembly consists of 10’ charging hose with a CGA 677 left-hand female thread fitting, an adaptor incorporating gas valve connection, gas valve, bleed valve & gauge.  

**The CGA 677 connection is rated for 6000 psi nitrogen tanks. For higher pre-charge pressures, this fitting must be removed when connecting to a nitrogen gas booster.** | 5      |

![Figure 5](image5.png)
Pre-Charging an Accumulator

⚠️ 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. It is strongly recommended that the nitrogen bottle used have the appropriate high pressure regulator (not included).

Pre-Charge Instructions

Select the proper Charging & Gauging Assembly on the previous page based on the nitrogen tank’s thread direction, the accumulator’s volume, and the accumulator’s design pressure. If other equipment is used, make sure it is compatible with the gas valve assembly and nitrogen source.

⚠️ All components must be rated for a pressure at least as high as the nitrogen source.

Make sure nitrogen supply is shut off. Attach the hose’s nitrogen tank connector to the nitrogen bottle. If accumulator has a Core Style Gas Valve as shown in Figure 6A or 6B, follow steps A through L and skip steps F and J. If accumulator has a Poppet Style or Military Style per MS28889-2 Gas Valve (Item 26) as shown in Figure 7, follow steps A through L and skip steps E and I. If an accumulator requires a pre-charge >6000 PSI (414 bar) and has a High Pressure Gas Valve as shown in Figure 7, follow instructions for pre-charging up to 10,000 PSI (690 bar).
Accumulators With Gas Valve Per Figure 6A Or 6B And <3000 PSI (407 Bar) Pre-Charge

**A** If present, remove protective cap (Item 6) and gas valve cap (Item 29).

**B** Back gas chuck “T” (as shown in Figures 3-4) handle all the way out (counterclockwise) before attaching charging assembly to accumulator gas valve (Item 26).

**C** Close bleed valve (as shown in Figures 3-4).

**D** If hose isn't attached to charging and gauging assembly, attach the hose to the hose gas valve on the charging and gauging assembly by tightening the hose swivel nut (as shown in Figures 3-4) to (10-15 in. lb.) (1.1-1.7 N-m). Make sure not to loop or twist the hose.

**E** Attach swivel nut on gas chuck (as shown in Figures 3-4) to the accumulator’s gas valve (Item 26). Tighten swivel nut to (10-15 in. lb.) (1.1-1.7 N-m).

**F** Turn gas chuck “T” handle until the gauge starts showing the pressure in the accumulator. Do not turn the “T” handle all the way down, as it will damage the valve core.

**G** For accumulators with gas valves as shown in Figure 7 and <6000 PSI (414 bar) pre-charge, hold gas valve at point “C” with one (1) wrench while unscrewing hex nut at point “D” with a second wrench. This will open the poppet inside the gas valve. Note: Three (3) turns will fully open the valve.

**H** Crack open nitrogen bottle or regulator valve and slowly fill accumulator. Shut off when gauge indicates 100 PSI above desired pre-charge. For shock suppression applications, pre-charge is usually set at about 65% of system pressure. When the accumulator is used to supplement pump flow, auxiliary power supply or leakage compensation, pre-charge is usually set at approximately 90% of minimum system pressure.

- If the pre-charge is not done slowly, the bladder may suffer permanent damage.
- It is recommended that pre-charge pressure be at least 25% of maximum system pressure. Damage to bladder may occur if this ratio is not maintained or is exceeded.

**I** Let the pre-charge set for 10 to 15 minutes. This will allow the gas temperature to stabilize. If the desired pre-charge is exceeded, close nitrogen bottle valve, then slowly open bleed valve.

- Do not reduce pre-charge by depressing valve core (Item 4) with a foreign object. High pressure may rupture rubber valve seat.

**J** When finished pre-charging the accumulator, turn “T” handle all the way out (counterclockwise) on the gas chuck. Then open the bleed valve. (As shown in Figures 3-4)

**K** For gas valves as shown in Figure 7, with a wrench, tighten hex nut at point “D” to close internal poppet (5-8 ft. lbs.) (6.8-10.8 N-m).

**L** Hold gas valve to keep from turning, loosen gas chuck swivel nut (as shown in Figures 3-4), and remove assembly. Check for pre-charge leak using a common leak reactant.

**M** Replace gas valve cap (Item 29) and torque to (12-24 in. lbs.) (1.4-2.7 N-m) and protective cap (Item 6) (Gas valve cap serves as a secondary seal.)
Pre-Charging Instructions

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Accumulators Rated for 10,000 PSI (690 Bar) or Less

With Gas Valve Per Figure 7

A If present, remove protective cap (Item 6) and gas valve cap (Item 29).

B Use charging and gauging assembly, Parker Part CG-10K, as shown in Figure 5. Close bleed valve on Figure 5. Attach nitrogen hose connection to a nitrogen source. (A Nitrogen Gas Booster may be required for pre-charge pressure greater than 6000 PSI (414 bar).

C If hose isn’t attached to charging and gauging assembly, attach the hose to the hose gas valve on the charging and gauging assembly by tightening the hose swivel nut as shown in Figure 5 to (10-15 in. lb.) (1.1-1.7 N-m). Making sure not to loop or twist the hose.

D Tighten the gas valve swivel nut shown in Figure 5 to the accumulator’s gas valve (Item 26). Torque to 10-15 in. lb. (1.1-1.7 N-m)

E Referring to Figure 7, hold gas valve at point “C” with one (1) wrench while unscrewing hex nut at point “D” with a second wrench. This will open the poppet inside the gas valve. Note: Four (4) turns will fully open the poppet.

F Crack open nitrogen bottle or regulator valve and slowly fill accumulator. Shut off when gauge indicates 100 PSI (7 Bar) above desired pre-charge.

   If the pre-charge is not done slowly, the bladder may suffer permanent damage.

   It is recommended that pre-charge pressure be at least 25% of maximum system pressure. Damage to bladder may occur if this ratio is not maintained or is exceeded.

G Let the pre-charge set for 10 to 15 minutes. This will allow the gas temperature to stabilize. If the desired pre-charge is exceeded, close nitrogen bottle valve, then slowly open bleed valve on Figure 5 until desired pressure is reached.

H Upon closing the gas valve (Item 26), a greater amount of torque is required, thereby indicating a charged system. With a wrench, tighten hex nut at point “D” on Figure 7 to close internal poppet. Torque to 220-225 inch-lb or (24.9-25.4 N-m). The gas valve assembly could become damaged beyond repair if this torque value is exceeded.

I Hold gas valve at point “C” per Figure 7 to keep from turning and then open bleed valve on Figure 7 to relieve pressure inside the charging assembly. Next, loosen the gas valve swivel nut on Figure 5 and remove charging assembly. Check for pre-charge leak using a common leak reactant.

J Replace gas valve cap (Item 29) and torque to (12-24 in. lbs.) (1.4-2.7 N-m) and protective cap (Item 6). Gas valve cap serves as a secondary seal.
Pre-Charging

Monitoring & Maintenance

Little maintenance is required for a bladder accumulator. If there is external leakage, tighten all connections. If leakage continues, remove accumulator from system and replace faulty components. After original installation, check pre-charge once during first week to see that no leak has developed. Thereafter, if not specified by the hydraulic system’s maintenance manual, check pre-charge monthly. Check pre-charge if the system is acting sluggish. If pre-charge is low, check gas valve for leakage and recharge. If there is no gas in the bladder and hydraulic fluid appears at gas valve, unit must be removed and the bladder replaced.

Pre-Charge Checking Procedure

Using the appropriate valve in the hydraulic system, discharge all oil from accumulator and allow the poppet valve to close. Then follow the appropriate instructions below based on the pressure rating of the accumulator.

For BA Series Accumulators Rated Less Than 3000 PSI (207 Bar) Units With a Gas Valve Shown in Figure 6A & 6B:

A Remove protective cap (Item 6) and gas valve cap (Item 29).

B Close bleed valve and turn “T” handle (as shown in Figures 3-4) all the way out.

C Follow one of the following to attach charging and gauging assembly to accumulator:

a. For 10 cubic inch – 15 Gallon, 3000 PSI bottom repairable units as shown in Figures A & B: Use Parker CG-3000 as shown in Figure 3. An o-ring/sealing washer (Item 3) will need to be installed onto the accumulator’s gas valve (Item 26) prior to attaching this charging and gauging assembly to the accumulator’s bladder valve stem (Item 2). Attach charging and gauging assembly to accumulator’s gas valve (Item 26) and via the gas chuck’s swivel nut and tighten to (10-15 in. lb.) (1.1-1.7 N-m).

b. For 3000 PSI top repairable units as shown in Figure C: Use Parker CG-3000A as shown in Figure 3. An o-ring/sealing washer (Item 3) will need to be installed onto the accumulator’s gas valve (Item 26) prior to attaching this charging and gauging assembly to the accumulator’s bladder valve stem (Item 2). A Gas Valve Extension is required for all 3000 PSI Top Repairable Accumulators. The extension can be found in the CG-3000A kit. Attach the extension to the gas chuck in Figure 3. Then attach charging and gauging assembly via the extension to the accumulator’s gas valve (Item 26). Tighten to (10-15 in. lb.) (1.1-1.7 N-m).

D Turn “T” handle, as shown in Figure 3, all the way down, which will depress core (Item 4) in gas valve and check pressure.

E Read pre-charge. If pre-charge is satisfactory, continue to Step F. If pre-charge is low, follow Pre-Charging Instructions (H-I).

F To remove gauging assembly, turn “T” handle all the way out and then open bleeder valve. (As shown in Figure 3.)

G Prevent gas valve (Item 26) from turning, loosen swivel nut on the gas valve chuck and remove assembly.

H Install cap (Item 29) on gas valve (12-24 in. lb.) (1.4-2.7 N-m) and protective cap (Item 6).
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For All BA Series Accumulators Rated Less Than 5000 PSI (345 Bar) or 25-40 Gallon, 3000 PSI (207 Bar) Rated Units With a Gas Valve Shown in Figure 7:

A Remove protective cap (Item 6) and gas valve cap (Item 29).
B Close bleed valve and turn “T” handle (as shown in Figure 4) all the way out.
C Use Charging and gauging assembly, Parker CG-6000, as shown in Figure 4. Attach charging and gauging assembly to accumulator’s gas valve (Item 26) via the gas chuck’s swivel nut and tighten to (10-15 in. lb.) (1.1-1.7 N-m).
D Referring to Figure 7, hold gas valve (Item 26) at point “C” with one (1) wrench while unscrewing hex nut at point “D” with a second wrench. This will open the poppet inside the gas valve. Note, four (4) turns will fully open poppet valve.
E Check pre-charge. If pre-charge is satisfactory, continue to Step F. If pre-charge is low, follow Pre-Charging Instructions (H-I).
F With wrench, tighten hex nut at point “D” to close internal poppet (10-15 in. lb.) (1.1-1.7 N-m).
G Replace cap (Item 29) on gas valve (12-24 in. lb.) (1.4-2.7 N-m) and install protective cap (Item 6).

For BA Series Accumulators Rated Less Than 10,000 PSI (690 Bar) Units With a Gas Valve Shown In Figure 7:

A If present, remove protective cap (Item 6) and gas valve cap (Item 29).
B Use charging and gauging assembly, Parker CG-10K, as shown in Figure 5.
C Close bleed valve on Figure 5.
D Making sure not to loop or twist the hose, attach the charging and gauging assembly’s gas valve swivel nut on Figure 5 to gas valve (Item 26) in Figure 7 and tighten (10-15 in. lb.) (1.1-1.7 N-m).
E Referring to Figure 7, hold gas valve at point “C” with one (1) wrench while unscrewing hex nut at point “D” with a second wrench. This will open the poppet inside the gas valve. Note: Four (4) turns will fully open the poppet.
F Read pre-charge. If pre-charge is satisfactory, continue to Step G. If pre-charge is low, follow 10,000 PSI Pre-Charging Instructions (6-7).
G Upon closing the gas valve (Item 26), a greater amount of torque is required, thereby indicating a charged system. With a wrench, tighten hex nut at point “D” on Figure 7 to close internal poppet. Torque to 220-225 inch-lb or (24.9-25.4 N-m). The gas valve assembly could become damaged beyond repair if this torque value is exceeded.
H Hold gas valve at point “C” per Figure 7 to keep from turning and then open bleed valve on Figure 5 to relieve pressure inside the charging assembly. Next, loosen the gas valve swivel nut on Figure 5 and remove charging assembly.
I Replace gas valve cap (12-24 in. lbs.) (1.4-2.7 N-m) and protective cap. Gas valve cap serves as a secondary seal.