

# Pre-Charging Instructions

Bladder Accumulators

Electronic Catalog: HY10-1632-M2.2/US



ENGINEERING YOUR SUCCESS.



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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)**

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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

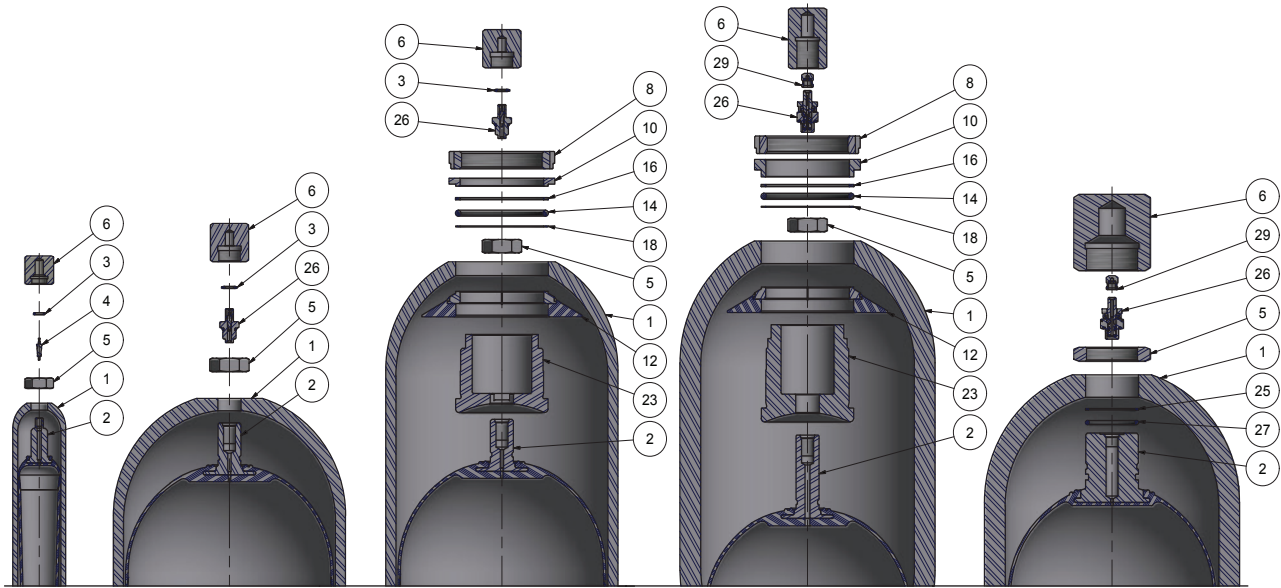
It is the responsibility of the buyer to make sure any individuals who install, operate and maintain the accumulators are properly trained at regular intervals on those subjects. It is also the responsibility of the buyer to maintain and service the accumulator at regular intervals.

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.**



**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

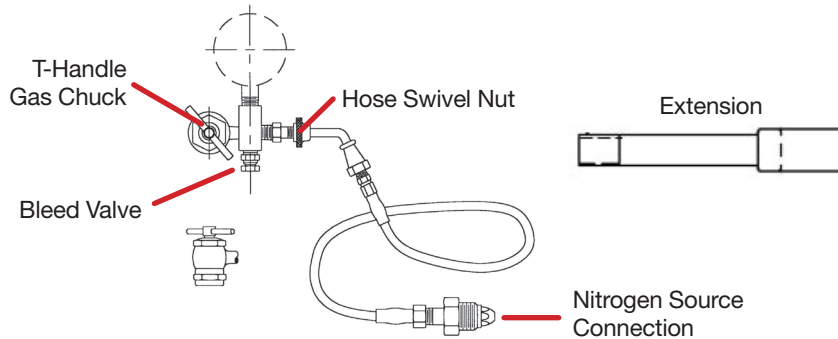
**FIGURE E**  
 5-6.6 KPSI, 690 Bar  
 1-15 Gallon  
 Bottom Repairable  
 (Items #25 & 27 Do Not Apply)

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

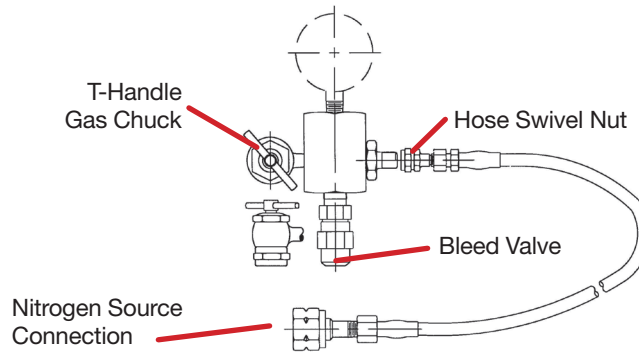
**Charging & Gauging Assemblies (Based on Pre-Charge, Accumulator Size & Style):**

Part Number	Charging & Gauging Assemblies for Pre-Charge < 3000 PSI (207 Bar)	Figure
CG-3000A	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 & gauge.	3



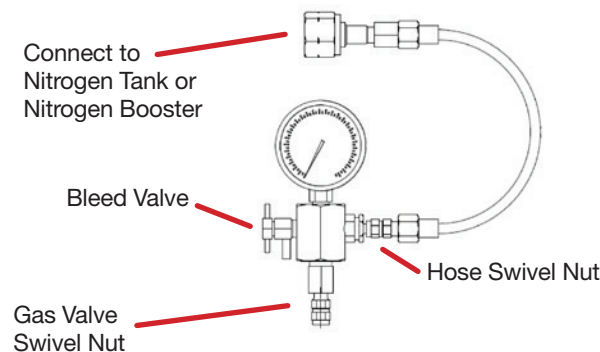
**Figure 3**

Part Number	Charging & Gauging Assemblies for 25-40 Gallon Units With < 3000 PSI Pre-Charge & all Units < 6000 PSI (414 Bar)	Figure
CG-6000	Charging and Gauging Assembly consists of 10' charging hose with a CGA 677 left-hand female thread fitting, an adaptor incorporating gas valve, bleed valve, gas chuck & gauge.	4



**Figure 4**

Part Number	Charging & Gauging Assemblies for Pre-Charge < 10,000 PSI (690 Bar)	Figure
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. <b>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.</b>	5



**Figure 5**

**Pre-Charging an Accumulator**

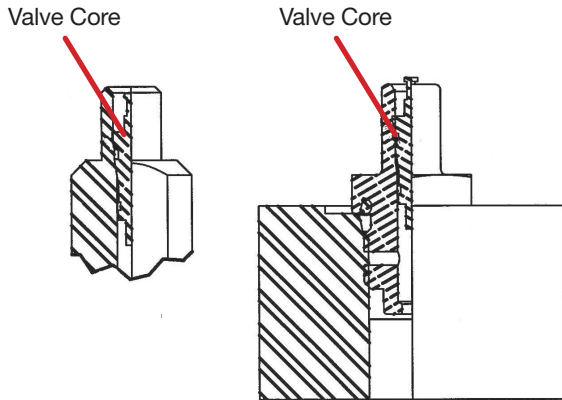
**⚠ Only use an inert gas like nitrogen for a pre-charging.** Nitrogen that is 99.99 percent by volume is strongly recommended. **Do not use oxygen or shop air**, as this may lead to a fire or explosion. **It is strongly recommended that the nitrogen bottle used have the appropriate high pressure regulator (not included).**

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

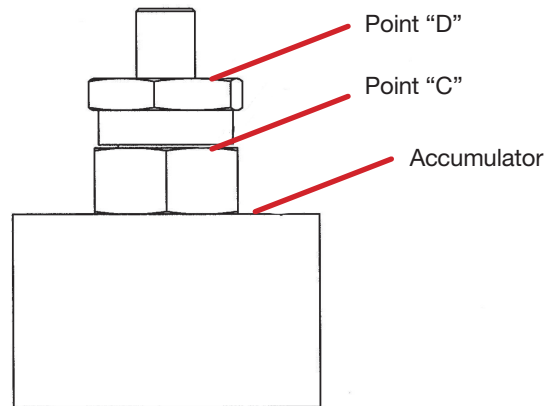
**Pre-Charge Instructions**

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.

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).



**Figure 6A Figure 6B**  
**Core Style Gas Values**





**Figure 7**  
**Poppet/Military/High Pressure**  
**Style Gas Valves**

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

**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.



## 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).

**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).
- I** Hold gas valve at point “C” with a wrench and loosen swivel nut on the gas valve chuck and remove charging and gauging assembly.
- 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.



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