Piston Accumulators

Threaded Piston Accumulators, ACP Crimped Piston Accumulators, Gas Bottles

SERVICE AND MAINTENANCE

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 herein, please contact:

Accumulator & Cooler Division
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.

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 web site at: **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

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS 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 and/or system options for further investigation by users having expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its related companies at any time without notice.

Piston Accumulators

General Information

This guide discusses how to safely transport, install, commission, maintain, and disassemble Parker Hannifin's A Series Threaded Piston Accumulators and ACP Series Crimped Piston Accumulators. This guide is to be read thoroughly, particularly the Safety Instructions below before maintaining or servicing the Piston Accumulators. Keep this guide accessible for anyone who may attempt to service or maintain the accumulators described within.

Intended use

Parker Piston accumulators are intended to be used in hydraulic systems for the purposes of:

- **Energy storage & auxiliary power**
- **Shock & vibration dampening & absorption**
- **Volume compensation due to thermal changes or loss in positive pressure**
- **Maintaining fail safe power to complete a safety cycle in the event of loss of pump or electric power**
- **Dispensing lubricants in a slow, constant rate**

Piston accumulators are pressure vessels and are held to design codes, industrial regulations, and local provisions for the countries in which they are used. Since piston accumulators are intended to be installed in a machine or system, they must conform to the Pressure Equipment Directive 2014/68/EU and UKCA when for use in the European Union. Additional design codes, like ASME's Boiler and Pressure Vessel Code Section VIII, Division 1, may also be required in the United States, as well as other design codes, industry regulations, and local provisions. It is important to know your country's, industry's, or locality's pressure vessel requirements.

General Safety

Piston 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.

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

⚠ **Only use an inert gas like nitrogen for pre-charging.** Nitrogen that is 99.99% by volume is strongly recommended. **Do not use oxygen or shop air**, as this may lead to a fire or explosion.

⚠ **Modifying a piston 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 piston-type accumulator must not be operated with group 1 hydraulic fluids** (explosive, inflammable, toxic) **or with corrosive fluids** without expressed written design approval from Parker.

⚠ **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.**

Warranty

Parker Hannifin warrants the A Series and ACP Series Piston Accumulator shall be free from defects in material or workmanship for a period of 18 months (or 3000 hours of use, whichever comes first) from the date of shipment from our facility provided the instructions for installation, operation, and maintenance in this guide are followed and the operational limits set forth on the product label or nameplate are not exceeded. The warranty doesn't cover normal wear during the operation of the accumulator. If the piston accumulator is modified in any way (i.e., welding, brazing, machining, or the use of non-original replacement parts & seals), the warranty will be considered null and void and any certifications applied to the accumulator will be revoked. For complete terms of condition, warranty information and indemnification, refer to Parker's Offer of Sale.

Operator Obligations

For Parker's Piston Accumulators that come with a black primer: it is the operator's responsibility to assure sufficient corrosion protection for the environment it is placed in. It is the responsibility of the buyer to make sure any individuals that install, operate, and maintain the accumulator are properly trained at regular intervals on those subjects. It is also the responsibility of the buyer to make sure users of the accumulator follow local and country safety and environmental rules and regulations.

Product Description

Piston accumulators are suitable for storing energy under pressure, absorbing hydraulic shocks, and dampening pump pulsation and flow fluctuations. Piston accumulators provide excellent gas and fluid separation ensuring dependable performance, maximum efficiency, and long service life.

Why Use Piston Accumulators?

- Improves system efficiency
- Supplements pump flow
- Supplies power in emergency
- Compensates for leakage
- Absorbs hydraulic shocks
- Wide range of sizes
- Lower gas permeation rate
- Extremely high-flow rates
- High/Low temperature tolerance
- High compression ratios
- Can be used with remote gas bottles
- Can be mounted in any position
- Failure mode is gradual, predictable
- Sensors can be fitted for performance monitoring
- Less maintenance

Best in Class Capabilities

- Accumulators up to 25" ID and 250 gallons and larger
- Pressure ratings in excess of 20,000 PSI
- Over 40 types of seal options provide compatibility with any fluid and application
- Wide variety of stainless steel and alternative material options
- Extreme temperatures, certified product to -50°F
- Integrated solutions including imbedded valving and controls in accumulator
- Struts and suspension products designed for rugged mobile applications
- Many surface coatings, including epoxies, CARC paints, electroless nickel plating
- Accumulators, custom designed for the most demanding markets and global locations
- Unique lockout and tag-out integrated functions
- DOT shipping exemptions for pre-charged vessels

Series 3000 Piston Accumulators

- Heavy Duty Service with 3000 PSI Operating Pressure
- 3" thru 12" Bores with More than 50 Standard Capacities
- V-O-ring Piston Seals
- Serviceable Threaded End Construction
- Five Standard Seal Options to Handle a Variety of Fluids and Temperatures
- Certifications Available: ASME/DNV/ABS/NR13/AS1210/CRN/PED/UKCA
- Temperature Ranges: -45˚ to 320˚F

Nominal Bore Size	Actual Bore Size		Max Recommended Flow*	
(in)	(in)	(mm)	GPM	LPM
3	3.00	76.20	220	834
4	4.03	102.40	397	1504
6	5.78	146.90	818	3096
7	7.00	177.80	1199	4538
9	9.00	228.60	1982	7502
12	11.88	301.60	3450	13061

ACP Series Piston Accumulators

With Working Pressures of 3770, 4000 and 5000 PSI

- Higher working-pressure ratings (3770/4000/5000 PSI) meet more applications with fewer sizes needed
- Use of standard components promotes faster delivery of proven designs and lower product cost.
- Piston design prevents sudden accumulator failure and is customized to fit the application.
- Four bore sizes available for more capacity and price options.
- Patented crimped end cap connections provide superior fatigue life compared with welded designs.
- “Schrader” style gas valve (industry standard) fits existing charging equipment.
- Multiple hydraulic port sizes accommodate a wider range of fittings and mounting options.
- Optional CRN/CSA to -40˚C/F.

Nominal Bore Size	Actual Bore Size		Max Recommend-ed Flow*	
(in)	(in)	(mm)	GPM	LPM
40	1.50	38.20	55	209
50	2.02	51.44	100	380
80	3.00	76.20	220	834
100	4.03	102.40	397	1504

Series 4000 & 5000 Piston Accumulators

- Heavy Duty Service with 4000 to 5000 PSI Operating Pressure
- 3" thru 9" Bores with More than 20 Standard Capacities
- V-O-ring Piston Seals
- Serviceable Threaded End Construction
- Five Standard Seal Options to Handle a Variety of Fluids and Temperatures
- Certifications Available: ASME/DNV/ABS/NR13/AS1210/CRN/CE/UKCA
- Temperature Ranges -45˚ to 320˚F

Nominal Bore Size	Actual Bore Size		Max Recommend-ed Flow*	
(in)	(in)	(mm)	GPM	LPM
3	3.00	76.20	220	834
4	4.03	102.40	397	1504
6	5.78	146.90	818	3096
7	7.00	178.00	1199	4538
9	9.00	228.60	1982	7502

Available Options

If your application requires a piston accumulator, gas bottle, or special option that falls outside of Parker's broad offering, consult your local distributor, Parker representative, or the factory with your specific requirements. Parker has the manufacturing and engineering expertise to design and build piston accumulators to your exacting requirements, from simple modifications of standard units to complete designs. Some example of Parker's past special designs include:

- **High Pressures**
- **Special and Stainless Steel Materials**
- **Piston Position and Velocity Sensors and Switches**
- **Water Service**
- **Non-Standard Capacities**
- **Extreme Temperatures**

Pressure Ratings

Parker Series 3000, 4000, and 5000 piston accumulators are rated to a minimum 4 to 1 design factor. For pressures over 5000 PSI consult factory.

Fluids

Parker's piston accumulators are compatible with a wide variety of fluids. Standard accumulators (with nitrile seals) may be used with petroleum-based industrial oils or water-based flame-resistant fluids. Optional seals compatible with most industrial fluids are available with temperature ranges from -45°F to 320°F (-43°C to 160°C).

Pre-charge

Units are shipped with a nominal nitrogen pre-charge as standard. For specific pre-charge pressures, specify at the time of order.

Auxiliary Gas Bottles

When space does not permit the installation of the required piston accumulator, a smaller accumulator may be used by connecting it to an auxiliary gas bottle(s) that can be located in a nearby spot where space is available. In some cases, a piston accumulator and gas bottle combination may be more economical, especially large capacity sizes. Piston travel, confined to the accumulator, must be calculated with ample margins to store the required fluid.

Water Service Option (W)

Piston accumulators are available for use with water as the fluid media. Modifications include electroless nickel plating all surfaces and metal parts. Consult factory for details

Safety Fuse Options (F)

Safety Fuses are used as a safety device on accumulators and gas bottles to prevent over-pressurization of gas due to external heat or hydraulic pressure (set at 140% of maximum system pressure to avoid rupture disk fatigue and premature failure). The rupture disks are calibrated to rupture at a predetermined pressure. Safety fuses can be installed on all piston accumulators by using the "Fuse Adapter." 4" bore units and above can be equipped with a fuse port machined in the gas cap by specifying the "Safety Fuse Option" (F) at the time of order in the model code, see "How to Order." The safety fuse assembly and/or fuse adapter must be ordered separately. Parker Accumulator Division does not offer safety fuses or rupture discs.

Mounting, Charging & Gauging Accessories

Parker offers a wide variety of mounting, charging and gauging accessories. See "Accumulator Accessories."

Special Options

If your application requires a piston accumulator, gas bottle, or special option that falls outside of Parker's broad offering, consult your local distributor, Parker representative, or the factory with your specific requirements. Parker has the manufacturing and engineering expertise to design and build piston accumulators to your exacting requirements, from simple modifications of standard units to complete designs. Some example of Parker's past special designs include:

- Large Bore
- High Pressure
- Special and Stainless Steel Materials
- Piston Position and Velocity Sensors and Switches
- Special Seals
- Non-Standard Capacities
- Tie Rod Construction
- Special Certifications
- Spring & Weight Loaded
- Extreme Temperatures

Seal Material Options

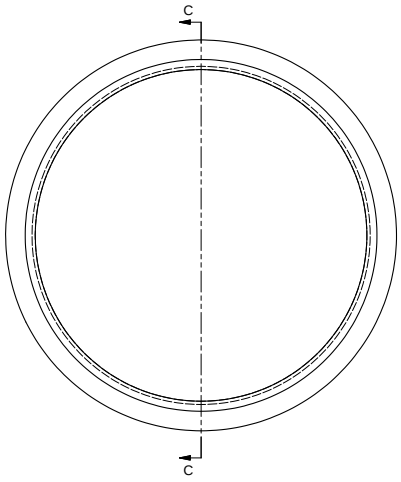
Seal Code	Polymer	Recommended Operating Temperature Range*	Maximum Temperature with Reduced Life*	General Application and Compatibility**
K	Buna Nitrile (Std)	-20°F to 165°F -29°C to 74°C	200°F 93°C	Parker's Standard Compound –Compatible with most mineral oil-based fluids
E	Fluorocarbon Elastomer	-10°F to 250°F -23°C to 121°C	400°F 204°C	Compatible with most mineral oil-based fluids at higher temperatures and some exotic fluids
D	Ethylene Propylene	-40°F to 250°F -40°C to 121°C	300°F 149°C	Compatible with most phosphate ester fluids and some synthetic fluids
H	Hydrogenated Nitrile	-25°F to 320°F -32°C to 160°C	350°F 177°C	Compatible with most oil-based and biodegradable fluids, maintains sealing effectiveness at a wide range of temperatures
Q	Low Temp. Nitrile	-45°F to 200°F -43°C to 93°C	225°F 107°C	Compatible with most mineral oil-based fluids and maintains sealing effectiveness at low temperatures

* The temperature listed indicates the operating temperature range of the seals, not the accumulator. For the Minimum Design Metal Temperature (MDMT) of ASME certified accumulators, refer to ASME Boiler and Pressure Vessel Code.
**Consult local distributor or factory for fluid compatibility information. Temperature ranges may vary depending upon fluid used in hydraulic system.

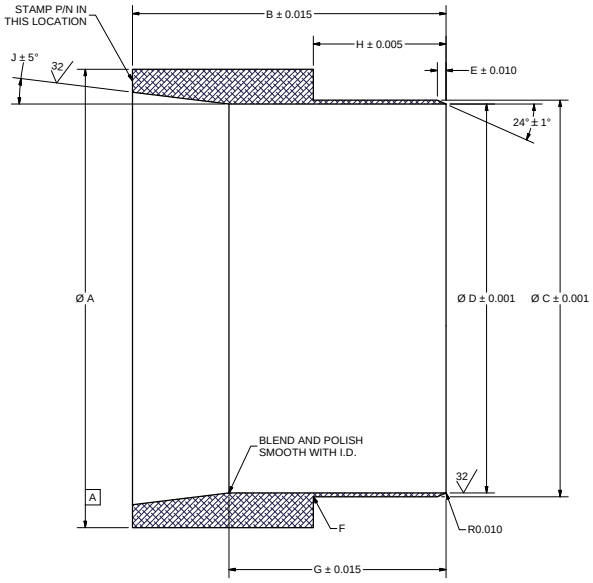
Assembly Tools

1. **Piston Sleeve**
2. **Torque Wrench**
3. **Lint-free towels**
4. **Non-abrasive compatible cleaner/degreaser***
5. **Hydraulic Oil* (for lubrication of parts during reassembly)**

*Be sure the non-abrasive compatible cleaner/degreaser and lubricating oil used are compatible with the hydraulic system and the seal package on the accumulator; if unsure about either, consult the factory.



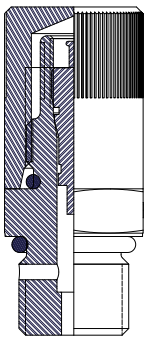
Recommended material: steel



Parts List											Bore
Part Number	A	B	C	D	E	F	G	H	J	Service	Size
PSD0000002	2.375	2.375	2.110	2.025	.100	.030	1.375	1.032	7°	3K,4K,5K	2
PSD0000003	3.560	2.750	3.110	3.000	.131	.030	1.750	1.312	7°	3K,4K,5K	3
PSD0000004	4.750	3.250	4.110	4.030	.089	.030	2.250	1.375	7°	3K	4
PSD0000005	6.000	3.500	5.112	5.002	.124	.030	2.500	1.620	7°	3K	5
PSD0000006	6.875	4.375	5.864	5.782	.104	.030	3.375	1.562	7°	3K	6
PSD0000007	8.250	5.000	7.150	7.001	.173	.030	4.000	2.312	7°	3K	7
PSD0000009	11.000	5.500	9.150	9.001	.174	.030	4.000	2.562	7°	3K	9
PSD0000012	14.375	6.375	12.105	11.876	.268	.030	4.875	3.634	7°	3K	12

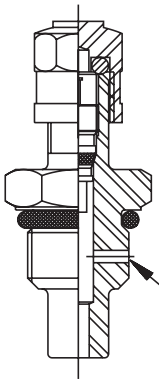
Gas Valve Options

870636H0QQ



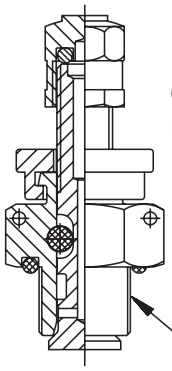
ACP
Standard
Gas Valve

L07688000Q



Gas Valve with
High Pressure Core
(2" - 6" Bores)
Threaded Only

L07689000Q



High Pressure
Poppet Type
Gas Valve
(7" - 9" Bores)

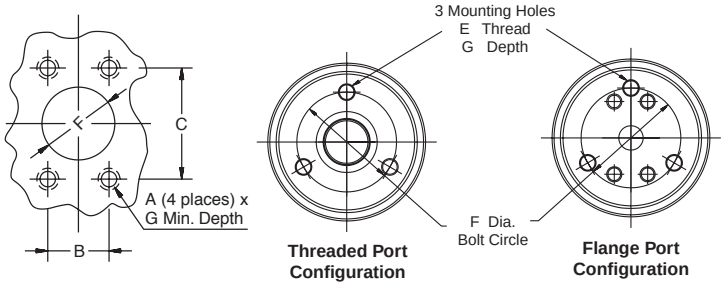
Optional Ports

The following ports are available as options on all piston accumulators.

SAE Straight Thd.			Code 61 Flange				Code 62 Flange				NPT			BSPP		
Port Size	Port Code	Min. Bore	Port Size	Port Code Inch	Port Code Metric	Min. Bore	Port Size	Port Code Inch	Port Code Metric	Min. Bore	Port Size	Port Code	Min. Bore	Port Size	Port Code	Min. Bore
#5	TA	3"	½"	PT	MT	3"	1"	PG	MG	4"	3/8"	UT	3"	3/8"	RA	3"
#6	TB	3"	¾"	PU	MU	3"	1¼"	PH	MH	4"	1/2"	UU	3"	1/2"	RB	3"
#8	TC	3"	1"	PV	MV	3"	1½"	PP	MP	6"	3/4"	UV	3"	3/4"	RC	3"
#10	TI	3"	1 ¼"	PW	MW	3"	2"	PQ	MQ	6"	1"	UW	3"	1"	RD	3"
#12	TD	3"	1½"	PJ	MJ	4"	2½"	PR	–	7"	1¼"	UX	3"	1¼"	RE	3"
#16	TE	3"	2"	PL	ML	6"	3"	PS	–	9"	1½"	UY	4"	1½"	RF	4"
–	–	–	2½"	PM	MM	6"	–	–	–	–	2"	UZ	4"	2"	RG	4"
#20	TF	3"	3"	PN	MN	7"	–	–	–	–	–	–	–	–	–	–
#24	TG	4"	–	–	–	–	–	–	–	–	–	–	–	–	–	–
#32	TH	7"	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Note: 1" through 2" flanges are to standard SAE Code 62 dimensions, 2-1/2" to "Socket Weld Flange Adapter Pattern", dimensions are shown below.

Note: BSPT and Metric ports available, consult factory.



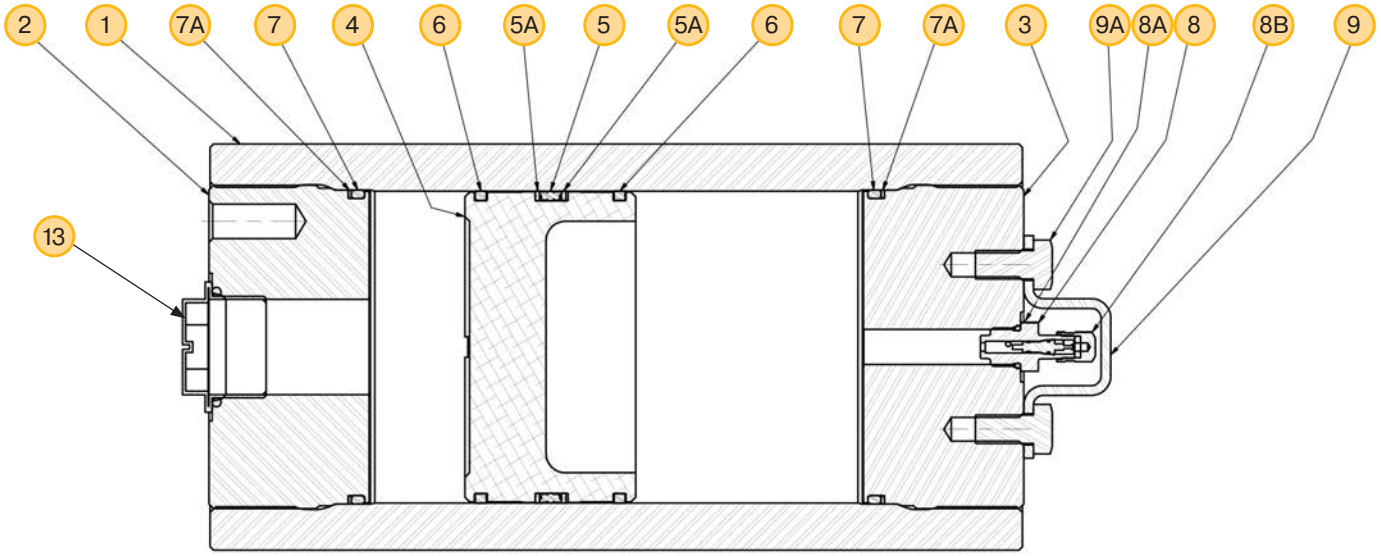
ISO 6149-1		
Port Size	Port Code	Min. Bore
M14	YA	3"
M18	YB	3"
M22	YC	3"
M27	YD	3"
M33	YE	3"
M42	YF	3"

SAE 4-Bolt Flange Dimensions

Code 62 (ISO 6162) (thru 2" diameter) – 6000 PSI (410 Bar)

Flange Size		SAE Flange Dimensions (in)					Metric SAE Flange Dimensions (mm)				
in	mm	A	B	C	F	G	A	B	C	F	G
1½"	38	5/8 - 11	1.438	3.125	1½	1.375	M16	36.5	79.4	38	34.9
2"	50	3/4 - 10	1.750	3.812	2	1.500	M20	44.5	96.8	50	38.1
2½"	–	7/8 - 9	2.312	4.875	2½	1.625	–	–	–	–	–

Accumulator Parts Description



Parts List

Item	Qty	Description
1	1	Shell
2	1	Hydraulic Cap
3	1	Gas Cap
4	1	Piston
5	1	V-O-ring
5A	2	Backup Ring
6	2	Wear Ring
7	2	End Seal O-ring
7A	2	Backup Ring
8	1	Gas Valve Assembly
8A	1	Gas Valve O-ring
8B	1	Gas Valve Cap
9	1	Gas Valve Protector
9A	2	Protective Screw
10	1	Nameplate (Not Shown)
13	1	Port Protector

Bore Size	U.S. Units Min (ft.-lbs.)	Metric Units Min. (N-m)
2"	50	68
2.5"	80	108
2.75"	90	122
3"	90	122
4"	175	237
5"	220	298
5.5"	220	298
6"	220	298
7"	390	529
8"	390	529
9"	390	529
12"	390	529

Seal Kit Numbers (includes items 5, 5A, 6, 7, 7A, 8A)

Material	Bore Size						
	2"	3"	4"	6"	7"	9"	12"***
Buna-N (Std)	RK0200K000	RK0300K000	RK0400K000	RK0600K000	RK0700K000	RK0900K000	RK1200K000
Flurocarbon	RK0200E000	RK0300E000	RK0400E000	RK0600E000	RK0700E000	RK0900E000	RK1200E000
EPR	RK0200D000	RK0300D000	RK0400D000	RK0600D000	RK0700D000	RK0900D000	C.F.*
Hydrogenated Nitrile	RK0200H000	RK0300H000	RK0400H000	RK0600H000	RK0700H000	C.F.*	C.F.*
Low Temp Nitrile	RK0200Q000	RK0300Q000	RK0400Q000	RK0600Q000	RK0700Q000	RK0900Q000	C.F.*

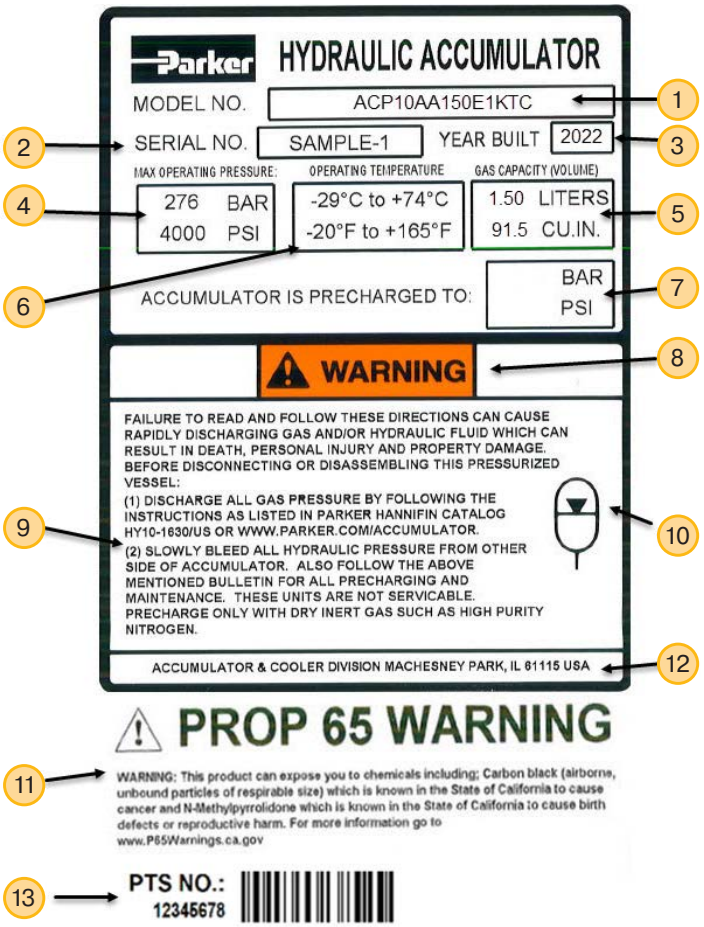
***C.F.** = Consult factory **12" bore is only available in 3,000 PSI pressure rating

⚠ WARNING
The products described in this catalog can expose you to chemicals, including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.p65warnings.ca.gov.

Label Detail

ACP Series Accumulator Product Label Detail

All Crimped Piston Series Accumulators (ACP) that don't require European Pressure Equipment Directive Certification have the following label:

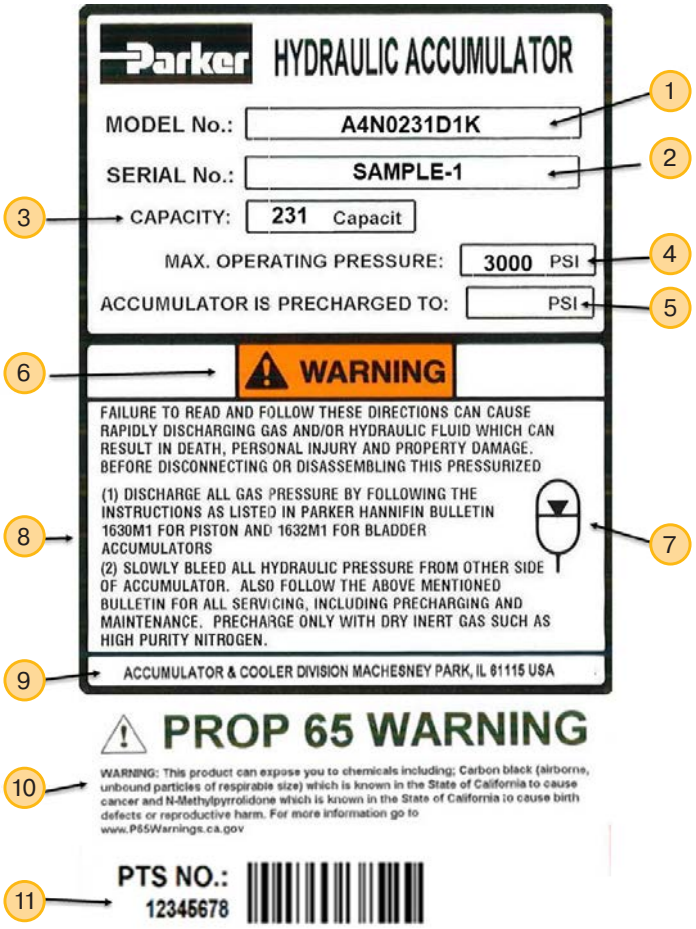


Item	Description
1	Parker's ACP Series Model Number
2	Parker's sales order number for the manufacturing lot. This helps customer service to rapidly answer any questions pertaining to the specific accumulator.
3	The year the accumulator was manufactured.
4	The maximum operating pressure the accumulator will meet in PSI and BAR.
5	Gas Capacity of the Accumulator in Liters and Cu. In.
6	Recommended operating temperature range of the accumulator in °C and °F. This is a combination of the metal temperature and seal temperature combined.
7	The customer specified nitrogen pre-charge pressure. If no pre-charge is specified by the customer, this will be left blank. There will still be a holding charge of 29 psig (2 bar) max inside the accumulator.
8	Warning Notice per ISO 3864-2
9	Dry Nitrogen only warning.
10	Accumulator / Gas Bottle Symbol.
11	Warning for the Safe Drinking Water and Toxic Enforcement Act in the State of California (Proposition 65). It provides for restrictions on exposure to and use of certain chemicals which have been determined by the State of California to cause cancer or reproductive toxicity. See oehha.ca.gov/proposition-65 for more details.
12	Parker's manufacturing address.
13	Parker Tracking System (PTS) is a component-tagging and tracking solution offered through Parker and our business partners worldwide. Via the PTS barcode you are in reach of complete product details, asset management, service information, product registration, and where to find a spare part. Visit our website at parker.com/PTS.

Label Detail

PA Series Product Label Detail

All Threaded Piston Series Accumulators (PA) under 6" Diameter Bore Size that don't require European Pressure Equipment Directive or ASME Certification have the following label:

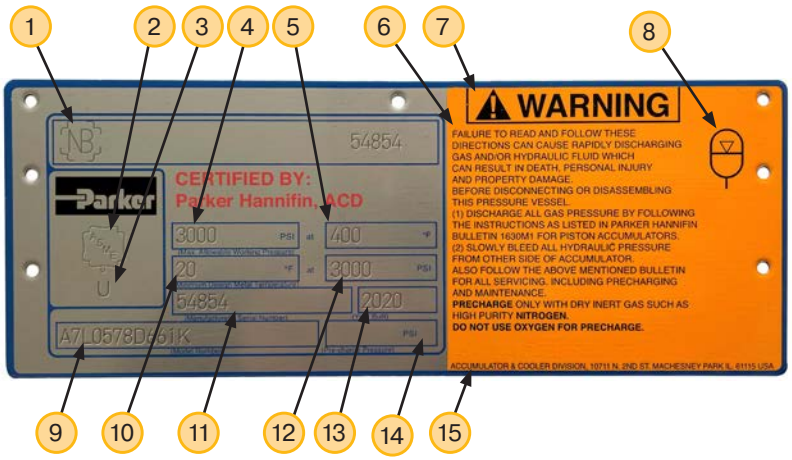


Item	Description
1	Parker's PA Series Model Number
2	Parker's sales order number for the manufacturing lot. This helps customer service to rapidly answer any questions pertaining to the specific accumulator.
3	Hydraulic Capacity of the Accumulator in Cu. In.
4	The maximum operating pressure the accumulator will meet in PSI.
5	The customer specified nitrogen pre-charge pressure. If no pre-charge is specified by the customer, this will be left blank. There will still be a holding charge of 29 psig (2 bar) max inside the accumulator.
6	Warning Notice per ISO 3864-2.
7	Accumulator / Gas Bottle Symbol.
8	Dry Nitrogen only warning.
9	Parker's manufacturing address.
10	Warning for the Safe Drinking Water and Toxic Enforcement Act in the State of California (Proposition 65). It provides for restrictions on exposure to and use of certain chemicals which have been determined by the State of California to cause cancer or reproductive toxicity. See oehha.ca.gov/proposition-65 for more details.
11	Parker Tracking System (PTS) is a component-tagging and tracking solution offered through Parker and our business partners worldwide. Via the PTS barcode you are in reach of complete product details, asset management, service information, product registration, and where to find a spare part. Visit our website at parker.com/PTS.

Label Detail

ASME Certified Product Label Detail

All Threaded Piston Series Accumulators (PA) that require ASME Boiler and Pressure Vessel Code Section VIII, Division 1 certification have a metal name plate that is riveted onto the exterior of the shell:

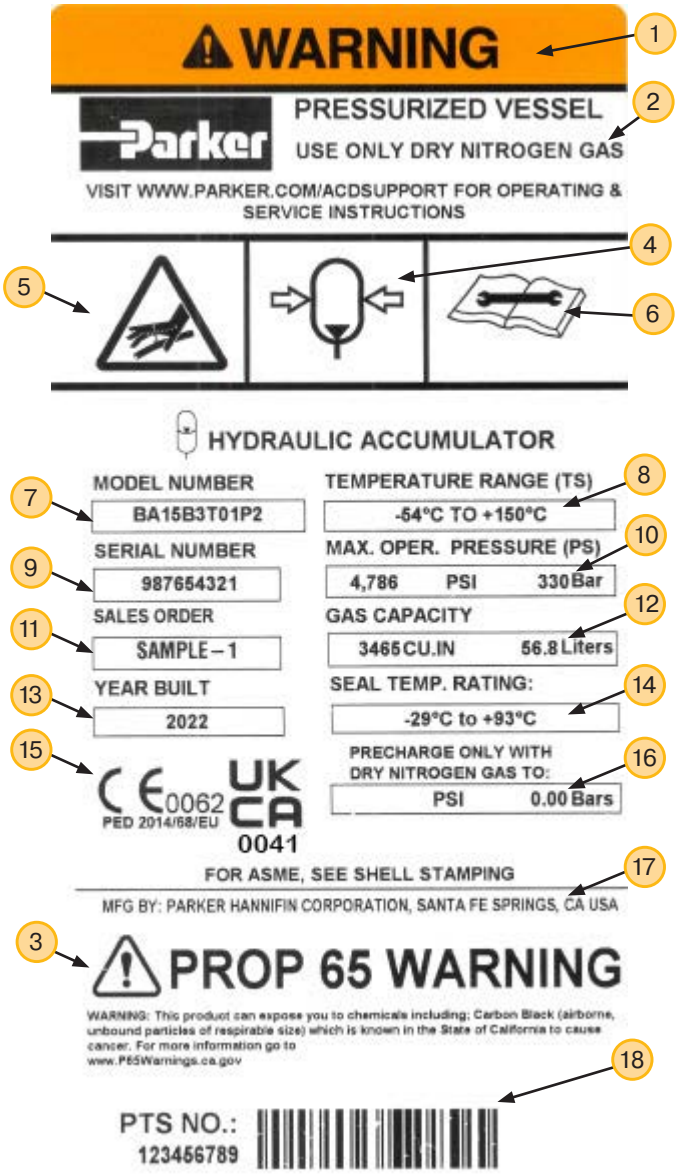


Item	Description
1	National Board Number. Required for ASME Certified Accumulators.
2	ASME Clover hard stamp. Only required on ASME units.
3	“U” stamp required for ASME Certified Accumulators only.
4	The maximum operating pressure the accumulator will meet in PSI.
5	Max allowable temperature range °F
6	Dry Nitrogen only warning.
7	Warning Notice per ISO 3864-2.
8	Accumulator / Gas Bottle Symbol.
9	Parker’s PA Series Model Number
10	Minimum Design Metal Temperature Range (MDMT) °F
11	Parker’s sales order number for the manufacturing lot. This helps customer service to rapidly answer any questions pertaining to the specific accumulator.
12	Maximum Metal Temperature Range °F
13	Year the accumulator was manufactured
14	The customer specified nitrogen pre-charge pressure. If no pre-charge is specified by the customer, this will be left blank. There will still be a holding charge of 29 psig (2 bar) max inside the accumulator.
15	Parker’s manufacturing address.

Label Detail

CE Certified Product Label

All Threaded (PA) and Crimped (ACP) Series Accumulators that conform to the European Pressure Equipment Directive 2014/68/EU have the label below:



Item	Description
1	Warning Notice per ISO 3864-2
2	Dry Nitrogen only warning
3	Warning for the Safe Drinking Water and Toxic Enforcement Act in the State of California (Proposition 65). It provides for restrictions on exposure to and use of certain chemicals which have been determined by the State of California to cause cancer or reproductive toxicity. See oehha.ca.gov/proposition-65 for more details.
4	Warning of Accumulator under pressure per ISO 7000 symbol #3317.
5	Warning noting of danger of pressurized fluid injection per ISO 9244.
6	Warning to read technical manual per ISO 7000 symbol #1659.
7	Parker's PA Series Model Number
8	Temperature range external load bearing metal components will meet per PED 2014/68/EU and PESR 2016.
9	Parker's Serial Number
10	The maximum operating pressure the accumulator will meet per PED 2014/68/EU and PESR 2016.
11	Parker's sales order number for the manufacturing lot. This helps customer service to rapidly answer any questions pertaining to the specific accumulator.
12	The internal gas capacity of the accumulator.
13	The year the accumulator was manufactured.
14	Temperature Range the internal seal components will continuously meet without rapid degradation.
15	Parker's CE registration number per PED 2014/68/EU and PESR 2016. If the vessel pressure x volume (PS x V) ratio is less than 50, then the accumulator will be marked SEP for Sound Engineering Practice per Article 4.3.
16	The customer specified nitrogen pre-charge pressure. If no pre-charge is specified by the customer, this will be left blank. There will still be a holding charge of 29 psig (2 bar) max inside the accumulator.
17	Parker's manufacturing address.
18	Parker Tracking System (PTS) is a component-tagging and tracking solution offered through Parker and our business partners worldwide. Via the PTS barcode you are in reach of complete product details, asset management, service information, product registration, and where to find a spare part. Visit our website at parker.com/PTS.

Transport of Piston Accumulators

Due to their cylindrical shape, PA Series accumulators have a tendency to roll or fall over. This may lead to property damage or personal injuries. Make sure the accumulator safely secured against unintended rolling or falling. Use appropriate lifting equipment for piston accumulators and be sure that the load capacity of the lifting gear is sufficient in order to safely carry the weight of the piston accumulator. Details on the weights of each size accumulator can be at found at our website www.parker.com/acdsupport. When piston accumulators are pressurized, external impact can damage the vessel and further lead to product rupture or property damage.

Never:

- Hit, drop, or apply force to the accumulator.
- Use the gas valve as a lifting mechanism.
- Place objects on top of the accumulator.
- Use the accumulator as a support structure.
- Use the accumulator as a step or handle.

Prior to transporting, the hydraulic port opening and gas valve should be covered with their appropriate protective caps. This prevents dirt or water from penetrating into the accumulator and protects the threads and gas valve from damage.

Installation and Commissioning of a New Accumulator

The installation must be carried out by qualified personnel with the proper hydraulic system schematic. Carefully unpack the accumulators by removing them from their shipping container or loosening the plastic strapping around the skid on a flat surface. This will prevent unintentional rolling that could lead to injuries or damage. Lift the piston-type accumulator out of the package by using appropriate equipment. Dispose of the packaging in accordance with the recommendations applicable in your city or country.

All accumulators shipped from the factory will be pre-charged to a nominal pressure in order to seat the piston on the hydraulic cap. In this case the pre-charge will not be listed on the label. However, in some cases they will be shipped with a nitrogen charge, the value of which will be marked on the label/nameplate. Keep the hydraulic port covered to keep out foreign material until ready to make the hydraulic connections. The accumulator can be mounted in any orientation. However, it should be rigidly mounted using any combination of the mounting holes provided at the hydraulic cap or proper clamps. The hydraulic circuit, which contains a connection to the accumulator should be designed so that it automatically discharges all hydraulic fluid from the accumulator when the equipment is turned off.

Maximum Allowable Working Pressure (MAWP)

The Parker model number indicates the maximum working pressure that the accumulator is allowed to be pressurized to:

K = 2000 PSI (137 bar)
D = 3000 PSI (207 bar)
L = 3625 PSI (250 bar)
E = 4000 PSI (275 bar)
C = 5000 PSI (345 bar)
H = 5076 PSI (350 bar)
T = 6000 PSI (413 bar)
X = Special Pressure Design, see engineering documentation

Pre-Charging

Use an inert gas such as nitrogen for pre-charging piston accumulators. **Do not use oxygen or shop air**.

If water pumped nitrogen is not available, oil-pumped nitrogen may be used. C.G.A. standards: Nitrogen gas bottles for water pumped nitrogen have a right-hand valve thread which requires charging and gauging assembly **CG-3000A** for units up to 3000 PSI.

For accumulators rated over 3000 PSI and the pre-charge requirement is above 2300 PSI, use **CG-6000** (See Figure 3).

If equipment other than the above listed is used, make sure it is compatible with the gas valve assembly. Nitrogen source and all components must be rated for a pressure at least as high as the nitrogen source. **It is strongly recommended that the nitrogen bottle used have the appropriate pressure high pressure regulator (not included)**.

Make sure nitrogen supply is shut off. Attach hose to nitrogen bottle. If accumulator has a gas valve as shown in Figure 5 follow steps A through L and skip steps F and J. If accumulator has a gas valve as shown in Figure 6, follow steps A through L and skip steps E and I.

Accumulator having gas valve as per Figure 5.

A. Remove gas valve guard and gas valve cap.
B. Back gas chuck "T" handle all the way out (counterclockwise) before attaching charging assembly to accumulator gas valve.
C. Close bleed valve.
D. Making sure not to loop or twist the hose, attach a swivel into a gas valve and tighten (10-15 in. lb.) (11.5-17 cm kg).
E. 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 dam age the valve core.
F. For gas valves as shown in Figure 6, 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.
G. Crack open nitrogen bottle valve and slowly fill accumulator. Shut off when gauge indicates desired pre-charge.
H. Let the pre-charge set for 10 -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 (Figure 1). Do not reduce pre-charge by depressing valve core with a foreign object. High pressure may rupture rubber valve seat.
I. When finished pre-charging accumulator, turn "T" handle all the way out on gas chuck (Figure 1), then open bleed valve.
J. For gas valves as shown in Figure 6, with a wrench, tighten hex nut at point "D" to close internal poppet (5-8 ft. lbs.) (5.7-9.2 cm kg).
K. Hold gas valve to keep from turning, loosen swivel nut, remove assembly. Check for pre-charge leak using a common leak reactant.
L. Replace gas valve cap (10-15 in. lbs.) (11.5-17 cm kg) and valve guard. (Gas valve cap serves as a secondary seal.)

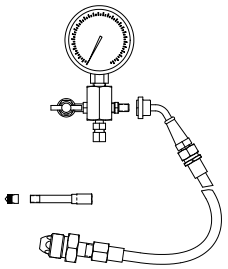


FIGURE 1 PART #CG-3000A

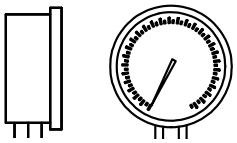


FIGURE 2 PART #085122XXXX

3000 PSI UNITS

Part Number	Charging and Gauging Assembly for Cored Accumulators
CG-3000A (Std) (Right-Hand)	Charging and Gauging Assembly consists of 10' charging hose with standard right-hand thread nitrogen fittings adapter incorporating gas valve, bleeder valve and gas chuck.

Part Number	Gauging Assembly for Cored Accumulators
0851220000	Gauging device consisting of adapter incorporating gas valve, bleeder valve and gas chuck (less gauge).

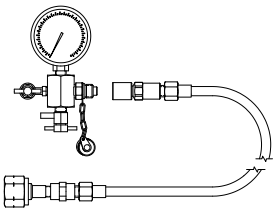


FIGURE 3 PART #CG-6000

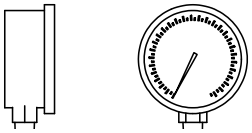


FIGURE 4 PART #871372XXXX

5000 PSI UNITS

Part Number	Charging and Gauging Assembly for 5000 PSI
CG-6000	Charging and Gauging Assembly consists of 10' charging hose with standard right-hand thread nitrogen fittings (1.035-14 NGO female)adapter incorporating gas valve, bleeder valve and gas chuck (less gauge).

Part Number	Gauging Assembly for 5000 PSI
8713720000	Gauging device consisting of adapter incorporating gas valve, bleeder valve and gas chuck.

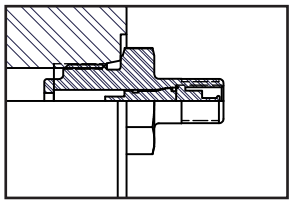


FIGURE 5
Part #L07688000* Gas Valve with core for up to 5,000 psi service on units 2"-6" bore.

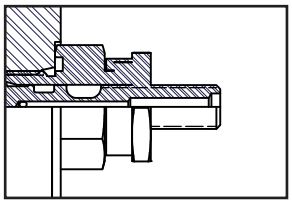


FIGURE 6
Part #L07689000* Gas Valve with poppet for ASME units 7, 9, 12 bore and some 5,000 psi units.

Repair Kits

Repair Kits (see Parts List) are available for all accumulator models. When ordering repair kits, state complete model number from nameplate. Also specify fluid and temperature at which used.

Occasional replacement of V-O-ring seal on the piston is generally the only maintenance required. Replacement of other seals on end caps and gas valve is recommended (see Kit Numbers).

Periodic checking of pre-charge pressure will detect whether V-O-ring wear is sufficient to begin reducing sealing performance. If pre-charge is low, also check for gas valve and/ or end seal leakage. Allowing for temperature difference, if any, from time of its pressure checking, pre-charge pressure will rise if oil gathers in the gas side and will fall if gas leaks into the oil side or out past gas end seals. It is suggested that a check be made a week after installation, and thereafter once a month.

Pre-charge Checking Procedure

Using appropriate valve in the hydraulic system, discharge all oil from accumulator and allow piston to bottom against hydraulic end cap.

For accumulators rated for 3000 PSI or less, with cored gas valve, use gauging assembly as shown in Figure 2 (Part #085122XX00). For accumulators rated over 3000 PSI up to 5000 PSI, use assembly as shown in Figure 4 (Part #871372XXXX).

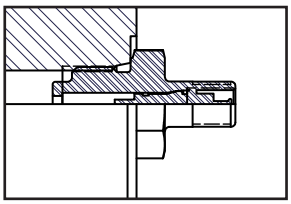


FIGURE 5
Part #L07688000* Gas Valve with core for up to 5,000 psi service on units 2”-6” bore.

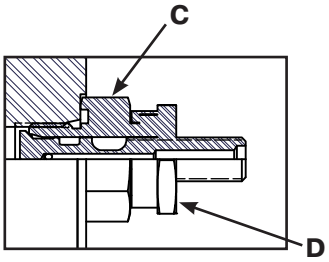


FIGURE 6
Part #L07689000* Gas Valve with poppet for ASME units 7, 9, 12 bore and some 5000 psi units.

Accumulators having gas valve as per Figure 5.

1. Remove gas valve guard and gas valve cap.
2. Back gas chuck “T” handle all the way out (counterclockwise) before attaching charging assembly to accumulator gas valve.
3. Close bleed valve.
4. Attach swivel nut to gas valve and tighten (10-15 in. lb.) (11.5-17 cm kg).
5. 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.
6. To remove gauging assembly turn “T” handle all the way out on gas chuck (Figure 1), then open bleed valve to relieve residual gas charge in the gauging assembly.
7. Hold gas valve from turning, loosen swivel nut, remove assembly.
8. Replace gas valve cap (10-15 in. lbs.) (11.5-17 cm kg) and valve guard.

Accumulators having gas valve as per Figure 6.

9. Remove gas valve guard and gas valve cap.
10. Close bleed valve.
11. Attach swivel nut to gas valve and tighten (10-15 in. lb.) (11.5-17 cm kg).
12. 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. Turn 23 times and read pre-charge. Note: Three (3) turns will fully open the valve.
13. With a wrench, tighten hex nut at point “D” to close internal poppet (5-8 ft. lbs.) (5.7-9.2 cm kg) then open bleed valve to relieve residual gas charge in the gauging assembly.
14. Hold gas valve at point “C” with wrench and remove swivel nut assembly.
15. Replace gas valve cap and tighten (10-15 in. lb.) (11.5-17cm kg) and install gas valve guard.

Maintenance Instructions

Disassembly of the end caps, Figures 1 through 5

- Lay the accumulator horizontally on a chain vise and secure it by wrapping the chain over the shell as shown in figure 1.
- Place a cloth or a piece of rubber in between the chain and the shell to protect the paint if necessary.
- Remove the screws from the gas valve protector and place these components aside.
- Remove the yellow cap from the gas valve assembly
- Choose a charging assembly from a Parker catalog with a suitable pressure rating to the accumulator that is being repaired.
- Install charging assembly to the gas valve.
- Find the pressure relief valve and slowly open it to allow the pre-charge pressure to dissipate. See Figure 3.

CAUTION: carefully read the instructions on how to operate a charging assembly prior to using.

FIGURE 1

FIGURE 2

FIGURE 3

FIGURE 4

FIGURE 5

Preferred method of removing the end caps. (Figure 4)

- Use a drive plate with high strength metal pins that match the bolt circle of the spanner holes on the gas cap.
- Turn the drive plate counterclockwise to remove the gas cap.

Alternate method of removing the end caps. (Figure 5)

- Use 3 high strength metal pins of about the same diameter as the spanner holes in the gas cap and a cross bar.
- Have a bucket ready to collect excess oil in the accumulator.

CAUTION: In some cases, the end caps of a piston accumulator are not easy to unfasten with conventional tools. Consult the factory for an alternate method to what is shown in Figures 4 and 5. In many cases it is best to send the accumulator back to the factory for service and repair.

Maintenance Instructions

Cleaning and dressing the end caps, figures 6 through 10

- Thoroughly clean the end caps with a nonabrasive compatible cleaner/ degreaser,
- Dry all surfaces with compressed air and wipe with a lint-free cloth.
- A low-scratch abrasive brush can be used to remove light to medium rust, stains, or small burrs from around the threads.

Note: The thread form should not be damaged during the cleaning process.

Inspection

- Inspect both caps for cracks, burrs, scratches around the O-ring grooves or damaged threads.
- Replace the cap with a new cap if any of the threads are damaged.

Repair and Replacement

- Prior to replacing the O-rings and their respective back-up washers, minor nicks and scratches on the seal groove can be removed by using emery cloth.

Replacing the seals Figures 9 and 10

- Install the back-up washer with its concaved section facing the O-ring.
- Push the back-up washer toward the bottom of the seal groove.
- Install the O-ring above the back-up washer facing the pressure side of the accumulator.

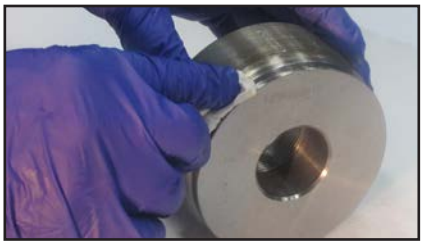


FIGURE 6

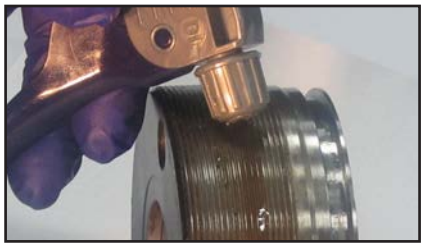


FIGURE 7

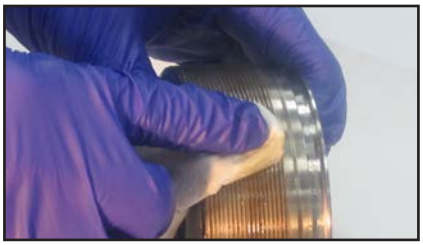


FIGURE 8

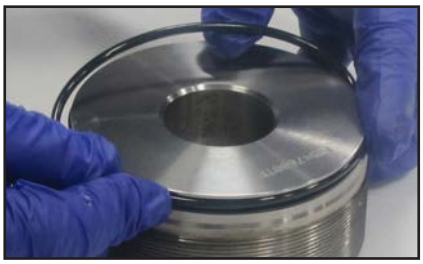


FIGURE 9

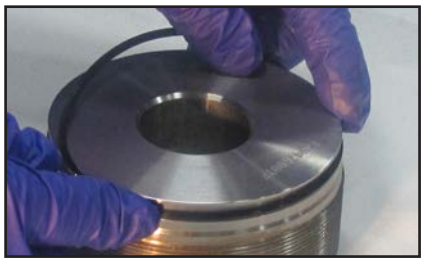


FIGURE 10

Maintenance Instructions

Removing and dressing the piston, Figures 11 through 15

- Remove the piston by lightly tapping it from the hydraulic end with a bar. Make sure not to scratch the inside of the shell.
- NEVER TRY TO REMOVE THE PISTON BY APPLYING COMPRESSED AIR FROM THE OPPOSITE END.
- To remove the V-O-ring from the piston, lift the seal with an O-ring pick or similar tool being careful not to scratch the O-ring groove surface.

CAUTION: NEVER TRY TO REMOVE THE PISTON BY APPLYING COMPRESSED AIR FROM THE OPPOSITE END.

Cleaning

- Inspect the piston for any cracks or burrs around the O-ring grooves.
- Thoroughly clean the piston with a nonabrasive compatible cleaner/ degreaser,
- Dry the piston with compressed air and wipe each grove with a lint-free cloth.

Replacing the seals

- Place the V-O-ring over the center groove of the piston and hold it in place while inserting the rest of the seal around the groove, see Figure 14
- Install a back-up washer at each side of the piston seal, see Figure 15
- Install a wear ring in each outer grove of the piston.

FIGURE 11

FIGURE 12

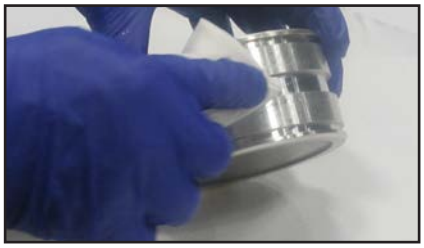


FIGURE 13

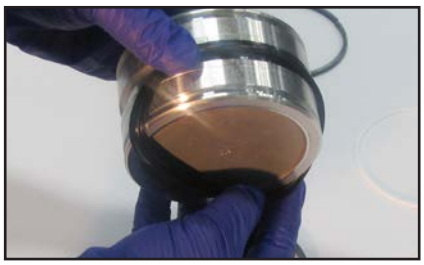


FIGURE 14

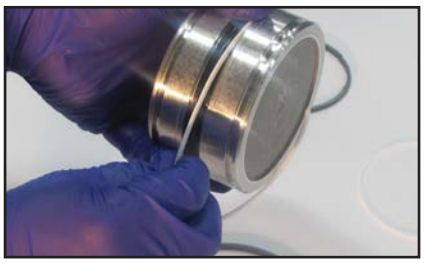
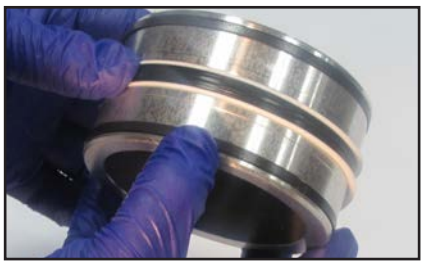


FIGURE 15



Completed piston seal assembly for a standard V-O-ring

Maintenance Instructions

Replacing the piston into the shell figures 16 through 20.

- Wipe the inside of the shell with a nonabrasive compatible cleaner/ degreaser.
- Inspect the inside of the shell for any damage
- Coat the inside of the shell with clean hydraulic fluid that is compatible with the seal compound. See note below.
- It is highly recommended to use a piston starting sleeve for the installation of a piston into the accumulator shell. See page 7 for sleeve details.
- Insert the starting sleeve into the accumulator shell until it rests square on the tube as shown in Figure 17.
- Lubricate the outside of the piston and inside of the starting sleeve as shown in Figure 17.
- Insert the piston in the starting sleeve with the dished side of the piston facing the gas cap. See Figure 18.
- Use a hammer and a brass rod to tap the piston into the shell and until all the piston is at least 2 inches below the beginning of the honed bore as shown in Figure 20.
- Care should be exercised not to drag the V-O-ring piston seal over the threads.

Note: Failure to use non compatible cleaning and lubricating fluids with any of the seals can cause an immediate adverse effect (chemical reaction) resulting in early degradation of the seal compound thus shortening seal life.

FIGURE 16

FIGURE 17

FIGURE 18

FIGURE 19

FIGURE 20

Maintenance Instructions

Re-installing the end caps into the shell. Figures 21 through 28

- Lightly lubricate the threads in the shell. Also lubricate the seals backup washer.
- Align the threads of the end cap with the threads in the shell and begin to rotate.
- The end cap will stop rotating once it is against the internal chamfer leading into the honed bore.
- Use recommended drive plate as shown in Figure 24 and tighten the end cap to the recommended torque.
- The cap should be above the end of the accumulator body within 1/32” to 3/32”
- Replace the gas valve into the gas cap and replace the valve protector as shown in Figures 25, 26, 27, 28.

FIGURE 21

FIGURE 22

FIGURE 23

FIGURE 24

FIGURE 25

FIGURE 26

FIGURE 27

FIGURE 28

Accumulator Storage

In order to prepare a piston accumulator for a proper long-term storage for future use, the piston must be moved off the hydraulic cap by as much as 2 inches. Proceed by pouring 10 to 150 cubic inches (depending on the size of accumulator) of the system fluid through the hydraulic port in the accumulator end and plug the port using a stainless steel fitting, then pre-charge the unit with nitrogen to 100±10 psig to allow equal pressure on both sides of the seal.

The pre-charge should be bled off and the system fluid in the accumulator must be drained prior to installation of the piston accumulator on the system.

It is also recommended that the units be stored in a vertical position to prevent the seals from developing a set (flat spot) on the side that the piston weight is exerted.

The piston accumulator should be stored in a cool, dry place away from sun, ultraviolet and fluorescent lights as well as electrical equipment. Direct sunlight or fluorescent light can cause the seals to weather check and dry rot, which appear on the seal and O-ring surface as cracks. The ideal temperature for storage is 70˚F.

Recycling & Disposal

Prior to recycling, the accumulator must be discharged with gas valves removed and made inoperable by drilling through its cylindrical shell. Once inoperable, the accumulator can be recycled by separating the steel parts from the rubber seals. Recycle rubber and steel parts separately.

Rubber components can contain residual hydraulic fluid within. The hydraulic fluid can be hazardous to the environment. Dispose of the rubber-type accumulator in accordance with the provisions applicable in your country. Dispose of any hydraulic fluid residues according to the respective safety data sheets valid for these hydraulic fluids.

Notes

MSG10-1900-M1/US 07/2022

Parker Hannifin Corporation
Accumulator & Cooler Division
10711 N Second Street
Rockford, IL 61115
phone 815 636 4100
fax 815 636 4111
www.parker.com/accumulator