STAUFF Accumulators
Product Catalogue
Accumulators

Product Description
STAUFF’s range of hydraulic accumulators are designed to store energy, regulate the performance and enhance the operational efficiency of hydraulic systems. Available in a comprehensive range of sizes, materials, port configurations and pressure ratings, STAUFF accumulators are suitable for pressure storage, backup energy for emergency and safety functions, absorbing hydraulic shock, noise reduction, and dampening pump pulsations and fluctuations. STAUFF accumulators also provide excellent gas and fluid separation, ensuring dependable performance, maximum efficiency and an increased service life of machinery.
STAUFF Accumulator Advantages

STAUFF’s range of accumulators have been designed to include additional benefits and features for modern mobile and stationary hydraulic systems. These include:

**Bladder Accumulators**

- **Gas valves** STAUFF offer a range of gas valves to suit different applications and customer requirements
- **Dual design approval** STAUFF accumulators have both Australian (AS1210) and International (ASME) approvals
- **Bleed valve** STAUFF offer a fluid port with a STAUFF test coupling at the bleed valve > 4 Litres
- **Flat face seal connection** STAUFF offer a fluid port with a standard flat face seal connection

**STAUFF Test Coupling Gas Valve**

STAUFF test coupling gas valves are exclusive only to STAUFF accumulators for checking gas pressure pre-charge.

- **Easy connection** Allows easy connection of other equipment using a STAUFF test coupling without having to use special manifolds; therefore reducing the risk of potential leakage points
- **Easy removal** Accessory equipment connected to the gas valve can be easily removed without needing to drain the pre-charge from the accumulator
- **Checking pre-charge (without the need for a charging kit)** Exclusive accumulator gas valve test coupling, allows for pre-charge checking using a STAUFF safety pattern pressure gauge and direct gauge adaptor; therefore a charging kit is not required
- **Permanent gauge mounting** Mounted on the accumulator gas valve a gauge and gauge adapter can be easily attached

**STAUFF PT-RF Wireless Pressure Tester**

STAUFF PT-RF wireless pressure tester has been developed to measure and record temperature and pressure data without the use of a gauge or charge kit.

- **Test multiple accumulators** Each PT-RF sensor has a unique identifiable serial number therefore each accumulator can be logged separately using the one PT-RF reader
- **Data storage** The PT-RF Reader can store over 15,000 measurement recordings, recording pressure and temperature data
- **No power required** The measurement recordings are delivered from the PT-RF transmitter to the PT-RF reader using RFID technology therefore the pressure transmitter requires no internal or external power supply
- **Quick & easy to use** The PT-RF transmitter is activated by the press of a button and the measured value is determined within only 0.5 seconds. A maximum distance of only 1.5 cm is required from the antenna to the tip of the PT-RF transmitter for the duration of the measurement
- **Checking pre-charge (manually with a gauge)** The PT-RF transmitter is easily removed without draining the accumulator pre-charge (as required to check the pre-charge pressure with a gauge)
Hydraulic Accumulators

Bladder Accumulators
Bladder accumulators operate as a hydraulic spring by using the system hydraulic fluid to compress nitrogen gas stored in the accumulator. The gas and system fluid are separated by a rubber bladder containing nitrogen gas. When the system hydraulic pressure becomes greater than the nitrogen gas pre-charge pressure, the system fluid enters the accumulator. The fluid is then stored as potential energy inside the accumulator, due to the compressibility of the gas. When the system fluid pressure drops, the nitrogen gas pressure expands and delivers the fluid stored in the accumulator back to the system.

Bladder accumulators consist of:
- Forged steel shell (pressure vessel)
- Bladder (pressurised with nitrogen gas)
- Gas valve - used to charge the accumulator with nitrogen gas
- Fluid port - incorporating a poppet valve to enable connection of the accumulator to the hydraulic system
- Poppet valve - to prevent the bladder from being extruded during nitrogen gas pre-charging

Diaphragm Accumulators
Diaphragm accumulators operate in a similar way to bladder accumulators, however they are supplied assembled as a welded vessel with a pre-installed rubber diaphragm. In comparison to bladder accumulators, diaphragm accumulators are normally manufactured to a lower design pressure.

The benefits of STAUFF’s diaphragm accumulators are based on the considerable difference in compressibility between a gas and a liquid, enabling a large quantity of energy to be stored in an extremely compact form. Operating pressures of up to 350 bar enables a liquid under pressure to be accumulated, stored and recovered at any time.

Diaphragm accumulators consist of:
- Full seam welded construction
- Diaphragm
- Fluid port
- Gas valve connection incorporating a standard hexagon key valve with optional adaptors

Operating Principles

Stage A
The unit contains no nitrogen gas pre-charge pressure and no hydraulic pressure.

Stage B
The unit is pre-charged with nitrogen gas to the correct pressure (P0). At this stage the gas volume is the same as the effective volume of the accumulator (V0).

Stage C
Upon the hydraulic system pressure exceeding the pre-charge (P0), the bladder / diaphragm is then compressed and hydraulic oil starts to flow into the accumulator. When the hydraulic system pressure peaks or reaches the maximum desired pressure (P2), the accumulator is then filled with oil according to the design capacity. The nitrogen gas has been compressed and the gas volume is now (V2).

Stage D
Hydraulic system pressure falls and the nitrogen gas expands forcing the stored hydraulic oil back into the hydraulic circuit. The minimum operating pressure of the hydraulic circuit is reached (P1). The accumulator has discharged its stored volume down from the maximum pressure (P2) to the minimum pressure (P1).
Certifications

Accumulators are pressure vessels that can be subject to extreme operating conditions, large pressure and temperature variations, rapid cycles and aggressive environments.

Pressure vessels are regulated through their design worldwide in order to ensure that they are safe. Major accumulator designs are ASME, PED CE, AS1210 and GB/T.

Most design codes are specific to the region or country where the accumulator is manufactured. However, in some cases where machinery is exported, the design code may not be recognised in the region or country of import. In this case, it is the responsibility of the importer and end user to ensure that the accumulator meets the requirements of local law and vessel design requirements.

**Australian Design Code Standard - AS1210**

For Australia and New Zealand the pressure vessel design code is AS1210. For accumulators for service in Australia, pressure vessels with a hazard level of A, B, C and D (according to AS4343) must be design registered with a state work safe authority.

AS4343 specifies the hazard level of a pressure vessel into categories A through to D based on design pressure MPa x Volume (Litres) and design temperature.

Some work safe authorities currently recognise overseas standards such as ASME, PED and CE, however the design still needs to be verified and then registered by the local authority.

In Australia, once accumulators are design registered they then need to have regular inspections in order to ensure that the equipment remains safe. AS3788 outlines guidelines with regard to pressure vessel in service inspections.

According to Australian law each pressure vessel that is design registered should be marked or stamped with the design registration number. In the case of AS1210 design registration AS1210 must also be stamped on the vessel. It is important to understand that local laws are designed to ensure safety when operating and servicing hydraulic accumulators. If laws are followed the potential risk of failure or harm is minimised.

**ASME Design**

ASME (American Society of Mechanical Engineers) is an organisation that regulates the design and manufacture of pressure vessels. Accumulators are classified under the category ‘unfired pressure vessels’ and fall under the jurisdiction of the ASME boiler and pressure vessel code.

Accumulators specifically fall under the section of the code which refers to Section VIII Division 1. This section requires certification on vessels with an internal diameter greater than 152 mm (6 in) and with the ‘U’ stamp as evidence that the vessel has been manufactured in accordance with the ASME design code.

The basic requirement of the ASME code is one of design strength and traceability. Accumulators must be manufactured with materials that meet the requirement of the code and safety factor. Appendix 22 in the code allows for a reduction in the safety factor especially for hydraulic accumulators that have been manufactured with a forged shell.

Under the ASME code, each manufactured batch of accumulator shells are to be registered with the USA national board of inspectors using form U1a.
Applications

General
Accumulators are used in many different applications, providing energy savings through a reduction of equipment operating costs. Accumulators offer increased reliability and performance of system components.

Accumulator application examples

Reduction in Installed Power
In the case of a system that has a variable demand for oil, a hydraulic accumulator can be used to reduce installed power by supplementing pump flow and therefore allowing a smaller pump and drive motor to be used.

Emergency Operation
Used in systems when something needs to be operated without the use of power or electricity:
- Braking system
- Power steering
- Lubrication system
- Closing or opening a gate system
- Rapid closure of oil and gas valves

Leakage Compensator
Compensates for losses in a hydraulic system due to internal or external leakage that might occur over an extended period, and reduces the operational frequency of the pump.

Hydraulic Spring
Used in suspension systems and transport vehicles to enhance operator comfort level. Fitted to crusher and roller press systems in order to maintain a required force whilst allowing for a variation in material density and thickness.

Accumulator Selection and Sizing

The following factors should be considered when selecting an accumulator, to optimise operating efficiency and equipment service life:

- Required volume
  The volume required to be stored in the accumulator
- Minimum working pressure (P1)
  The minimum system pressure (or minimum load pressure) to operate the actuator
- Maximum working pressure (P2)
  Maximum system pressure is normally controlled by a pressure switch (or in some cases a relief valve) to shut off the hydraulic pump
- Pre-charge pressure
  Normally 80% - 90% of minimum operating pressure (P1) or load pressure
- Charge time
  Time in seconds to charge the accumulator with hydraulic fluid from the system (normally controlled by pump flow). In shock applications this can be the valve closure or load actuation time
- Discharge time
  Time to operate the actuator or valve based on the output flow rate required from the accumulator. In shock applications this can be the valve closure or load actuation time
- Minimum temperature
  Minimum ambient temperature
- Maximum temperature
  Maximum ambient temperature
- Effective gas volume
  Actual gas volume of the accumulator required in Ltrs (example: 20 Ltr accumulator has an effective gas volume of 18.4 Ltrs). Accumulator volume selected must have an effective gas volume above that as requested by the calculation program
- Pre-charge pressure
  The specified pre-charge pressure at 20°C which allows for a rise in operating temperature

The following factors should also be considered when selecting an accumulator:

- Cycle time
- Fluid type
- Flow rate
- Maximum design pressure
- Operating frequency
- Shock suppression
- Certification requirements

Accumulator Sizing Calculator:
Visit http://accumulators.stauff.com.au for STAUFF’s accumulator sizing calculator or contact your local STAUFF office for more information.
Accumulator Pre-charge

Accumulators must first be pre-charged with nitrogen gas to the correct pressure before the accumulator can be operated in a hydraulic system. This is imperative in order to achieve a long service life and optimum operational performance of the system.

Pre-charge pressure determines the amount of fluid still retained in the accumulator at minimum operating pressure. This is important so that the bladder / diaphragm does not cycle on the bottom of the accumulator at minimum operating pressure. In a typical storage application where the minimum and maximum pressures are always defined, the pre-charge gas pressure should be set to 80 - 90% of the minimum operating pressure at operating temperature. If the pre-charge pressure is set too low then this will result in a reduction of usable gas volume and reduced stored capacity. This could also lead to a reduction in bladder life.

Accumulators lose some pre-charge after a period of time. The loss of the nitrogen gas through the bladder or diaphragm is called gas permeation. The effects of gas permeation can be varied depending on the particular application. In some applications, the loss of pre-charge can be quite dramatic over several months, whilst in others, there is little or no effect over the same period of time.

The gas permeation rate is affected by several factors, primarily:

- Cycle time
- Temperature
- Stored volume
- System oil capacity / tank volume

When an accumulator is first installed in a hydraulic system it is important that the pre-charge pressure be monitored initially. STAUFF recommend that the pre-charge gas pressure be inspected after 1 month, 3 months and 6 months (depending on the results of the pressures recorded, a scheduled program of checking the pre-charge gas pressure can then be introduced). Refer to pages 50 & 54 for pre-charge instructions.

Mounting

The optimum mounting position for an accumulator is the vertical position with the oil port mounted at the bottom. Bladder accumulators can be mounted in the horizontal position, however it is not recommended as it may result in a slight reduction in stored capacity, and in cases of high cycle or rapid discharge applications a reduction in bladder life may be experienced. In cases where it is not possible to mount the accumulator vertically, contact your local STAUFF office to verify suitability.

Note: Diaphragm accumulators are less affected by horizontal mounting due to the nature of their design and smaller size.

Refer to pages 28 - 29 for mounting accessories.
Bladder Accumulators • STBA Series

Product Description
STAUFF bladder accumulator assemblies consist of three key components: shell, bladder, oil port assembly, and are available in sizes 1 - 55 Ltrs with pressures up to 400 bar. STAUFF bladder accumulators can be used in applications such as pulsation dampening, surge alleviation, thermal expansion and energy storage. STAUFF bladder accumulators comply with AS1210 standards and are suitable in all states of Australia, New Zealand and accepted throughout Asia.

Features
• Meets AS1210 and ASME VII Div 1 specifications
• Full flow fluid port
• STAUFF Test coupling and integrated gas valve options
• Standard Nitrile rubber high strength bladder
• High flow bladder / port design
• Bottom repairable accumulators
• High strength chrome molybdenum / alloy steel shell
• Corrosion resistant black acrylic polyurethane coating
• 4:1 design factor at normal operating pressures
• Interchangeable with most competitors’ units
• Fluid port assembly high grade steel, zinc plated
• Fluid bleed port connection supplied standard with STAUFF Test coupling
• Available with foreign certificates (upon request)
• Assembled and tested in Australia

Technical Data
• Range of connections from G3/4” to 2” BSPP and 1.1/2” SAE flange
• NBR diaphragm material (standard)
• Maximum compression ratio of 4:1
• Operating temperature shell -40°C …+93°C
• Operating temperature bladder - according to material used
• Operating pressure to 360 Bar AS1210 (standard) 4,000 PSI ASME APP 22 (standard)
• Capacity up to 55 Ltrs
• Bladder compatibility to most common fluids page 11
• Fluid bleed port connection G1/4”

Options
• Housing materials
• Fluid port options
• Gas valve options
• Bladder materials
• Private branding options
• Brackets, charging kits and accessories

Applications
• Mobile and stationary hydraulic systems
• Test benches
• Light & heavy industrial plants
• Transport equipment

Components & Material

<table>
<thead>
<tr>
<th>Main Components</th>
<th>Standard Material</th>
<th>Material Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shell</td>
<td>Chrome-Molybdenum Alloy Steel SA 372 - 34 CrMo4 Black RAL 3017 Acrylic Polyurethane</td>
<td>Electroless nickel plating 25 microns Internal epoxy lining</td>
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</table>

<table>
<thead>
<tr>
<th>Bladder</th>
<th>Nitrile (NBR)</th>
<th>Temperature</th>
<th>Material Options</th>
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<tr>
<td></td>
<td>-15°C...+100°C</td>
<td>FPM (Viton) -20°C...+140°C</td>
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<tr>
<td></td>
<td></td>
<td>Butyl       -15°C...+120°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPDM        -40°C...+120°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hydren (ECo) -32°C...+115°C</td>
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</table>

| Fluid Port Assembly | Steel SCD 440 material specification with Zinc Plating | Stainless Steel 630 Grade |
**Bladders**

STAUFF bladder accumulators offer excellent system performance and operational life, the key component being the bladder (available in various types of elastomer). STAUFF’s standard NBR range offers resistance to permeation and a wide temperature range (it is essential that the bladder selected is compatible with the fluid media and operating temperature range).

### Compatibility Resistance Table

<table>
<thead>
<tr>
<th>Compatibility</th>
<th>Mineral Oil</th>
<th>Aromatic - unleash</th>
<th>Water glycol</th>
<th>Phosphates Ester (Skydrol)</th>
<th>High Temperature</th>
<th>Low Temperature</th>
<th>Mechanical characteristics</th>
<th>Permeation</th>
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<td>Exceptional resistance</td>
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<tr>
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<td>Minor resistance</td>
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</tr>
<tr>
<td>4</td>
<td>Little or no resistance</td>
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<td>Shaded Heavy</td>
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<td>2</td>
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<td>4</td>
<td>1</td>
<td>3</td>
<td>3</td>
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</table>

Other materials are available on request.

### Bladder Storage

Bladders are required to be stored away from direct sun light or in the close vicinity of machinery and electrical equipment that can generate electromechanical forces. It is recommended that bladders be slightly inflated to less than 0.4 bar air pressure and stored in the original plastic packaging shipped by STAUFF (it is not recommended that they be pre-charged or slightly inflated with gas). If bladders cannot be stored slightly inflated then it is recommended that they be stored flat and not folded. If stored correctly bladders can retain their elastomer properties for a long period of time without any deteriorating effect to the elastomer. If stored inside an accumulator, bladders can remain in good condition for up to 5 years.
Fluid Port - BSPP Female Flat Face
360 bar AS1210 - 3000/4000 PSI ASME

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Model Code</th>
<th>Size (Ltr)</th>
<th>Effective Gas Volume (Ltr)</th>
<th>Maximum Working Pressure (bar)</th>
<th>Dimensions (mm)</th>
<th>Weight (kg)</th>
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<tr>
<td>STBA-001-360-A1-B-N-T-S-7-C-B-C-C</td>
<td>3426010622</td>
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<td>114 305 50</td>
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3,000 PSI in accordance with ASME VIII Div 1
4,000 PSI in accordance with ASME VIII APP 22
360 bar in accordance with AS1210

Refer to pages 28 - 29 for accumulator clamps

Refer to pages 30 - 31 for safety blocks

Refer to page 19 for fluid port adaptors
Fluid Port • 1 1/2" SAE Code 62
360 bar AS1210 • 3000/4000 PSI ASME

Order Codes & Dimensions

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Model Code</th>
<th>Size (Ltr)</th>
<th>Effective Gas Volume (Ltr)</th>
<th>Maximum Working Pressure (bar)</th>
<th>Dimensions (mm)</th>
<th>Maximum Recommended Flow Rate L/Min</th>
<th>Weight (kg)</th>
<th>BSPP Flat Face</th>
<th>Bleed Port</th>
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</table>

3,000 PSI in accordance with ASME VIII Div 1
4,000 PSI in accordance with ASME VIII APP 22
360 bar in accordance with AS1210

Contact your local STAUFF office for SAE flange clamps and adaptors

Refer to page 19 for SAE flange clamp
## STBA Assemblies

| STBA  | 020 | 360 | A1 | B | N | T | S | 7 | C | B | C | C |
|-------|-----|-----|----|---|---|---|---|---|---|---|---|---|---|
| 1     | 2   | 3   | 4  | 5 | 6 | 7 | 8 | 9 | 10| 11| 12| 13|

### 1. Model Code
- Standard Bladder Accumulator: STBA

### 2. Size Code
- 1 Ltr (0.25 Gal): 001
- 2.5 Ltr (0.66 Gal): 002
- 4 Ltr (1 Gal): 004
- 10 Ltr (2.5 Gal): 010
- 20 Ltr (5 Gal): 020
- 35 Ltr (10 Gal): 035
- 50 Ltr (13 Gal): 050
- 55 Ltr (15 Gal): 055

### 3. Design Pressure
- Rating According to Design Standard: 360

### 4. Design Approval
- AS1210 (Only): A
- AS1210 + ASME 3,000 / 4,000 PSI: A1

### 5. Bottom or Top Repairable
- Bottom Repairable (standard): B
- Top Repairable: T

### 6. Bladder Material
- Nitrile (Buna N®) (standard): N
- HNBR: H
- EPDM: E
- BUTYL: D
- FPM (Viton®): V
- ECO: O

### 7. Gas Valve Connection
- Integrated Gas Valve 7/8” - 14” UNF (standard): T
- STAUFSKX - 20 Test Coupling: S
- US Style Gas Valve 0.305 - 32UNS 2A: Y
- 1/4” BSPP: A
- Not Fitted: O

### 8. Gas Valve Material
- Steel (standard): C
- Stainless Steel: S
- Not Fitted: O

### 9. Bladder Stem Size
- 7/8” - 14” UNF (standard): 7
- 5/8” - 18” UNF: 5
- 2” - 12” UNF: 2

### 10. Bladder Stem Material
- Steel (standard): C
- Stainless Steel: S

### 11. Fluid Port Connection
- BSPP Flat Face Seal (standard): B
- BSPP O-ring Seal: G
- 1 1/2” SAE Code 62 Flanged: F

### 12. Fluid Port Material
- Steel Zinc Coated (standard): C
- Stainless Steel 17/4 PH: P

### 13. Material or Coating of the Shell
- Steel (standard): C
- Epoxy Lined Shell: T
- Electroless Nickel Plate: E

---

Refer to page 15 for more information.
### Gas Valve Connections

#### Integrated Gas Valve (standard) - Option T
The valve seats internally inside the bladder stem. Direct coupling to the bladder stem is via the 7/8" - 14" UNF connection. The valve cannot become loose when removing the charge head, therefore if it is impossible to remove the gas valve whilst the accumulator is pre-charged.

#### STAUFF SKK20 Gas Valve - Option S
The STAUFF SKK20 gas valve (gas rated) allows easy connection to the accumulator using a standard test fitting. The advantage is that the pre-charge can be checked by simply using a STAUFF safety pattern gauge fitted with a direct gauge adaptor. The safety pattern gauge and gauge adaptor can either be installed on the accumulator permanently or used to check the pre-charge during service intervals. No charge kit is required to check pre-charge pressure.

#### Note: Gas valve options T, S, Y & A are designed to suit STAUFF bladders only

### Fluid Port Connections

#### BSPP Female Connection Flat Face seal (standard) - Option B
Designed to connect a fitting that can incorporate either a bonded washer or encapsulated seal. Also available in stainless steel.

Available for sizes:
- 1 & 2.5 Litr - G3/4" BSPP
- 4 Litr - G1 1/4" BSPP
- 10 - 55 Litr - G2" BSPP

#### BSPP Female Connection O-ring seal - Option G
This connection is fitted with an O-ring seal positioned at the root of the male thread. This is a European style adaptor and is not suitable for use with a bonded washer.

Available for sizes:
- 10 - 55 Litr - G2" BSPP only

#### 1 1/2" SAE Code 62 - Option F
This Fluid Port is manufactured with a 1 1/2" SAE code 62 connection and is ideally suited to allow connection directly onto a manifold without requiring adaptors. Also available in stainless steel.

Available for sizes:
- 10 - 55 Litr only

#### US Style Gas Valve - Option Y
The STAUFF US style gas valve provides a robust Schrader connection (0.305" x 32 TPI) as the valve seats deep inside the bladder stem (if the male connection is damaged the valve still retains its seal and prevents the loss of the nitrogen gas).

#### 1/4" BSPP Gas Valve - Option A
The 1/4" BSPP gas valve, used extensively in Australia, is being phased out and replaced by STAUFF’s integrated gas valve.

Note: Gas valve options T, S, Y & A are designed to suit STAUFF bladders only
Bladder Kits

Specifications

- Bladders are supplied in NBR rubber with a 7/8” - 14” UNF steel stem
- Other options available on request
- Supplied with integrated gas valve (standard)
- Other options available on request

1. Bladder and stem
2. Gas valve (integrated valve shown)
3. Bladder lock nut
4. Gas valve cap
5. Protection cap
6. Fluid port O-ring
7. Back-up washer

<table>
<thead>
<tr>
<th>Volume (Ltr)</th>
<th>Height (H) (mm)</th>
<th>Diameter (D) (mm)</th>
<th>Stem Thread (S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>149</td>
<td>100</td>
<td>7/8” - 14” UNF</td>
</tr>
<tr>
<td>3</td>
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<td>7/8” - 14” UNF</td>
</tr>
<tr>
<td>4</td>
<td>208</td>
<td>150</td>
<td>7/8” - 14” UNF</td>
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<td>10</td>
<td>296</td>
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<td>7/8” - 14” UNF</td>
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<td>7/8” - 14” UNF</td>
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<td>35</td>
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<td>55</td>
<td>1733</td>
<td>200</td>
<td>7/8” - 14” UNF</td>
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Dimensions

www.stauff.com
Bladder Kits • Order Codes

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Model Code</th>
<th>Size</th>
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<tbody>
<tr>
<td>3426010061</td>
<td>STB-001-N-T-S-7-C</td>
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<td>STB-002-N-T-S-7-C</td>
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<tr>
<td>3426010069</td>
<td>STB-010-N-T-S-7-C</td>
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<tr>
<td>3426010070</td>
<td>STB-020-N-T-S-7-C</td>
<td>20</td>
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<tr>
<td>3426010077</td>
<td>STB-035-N-T-S-7-C</td>
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<tr>
<td>3426010079</td>
<td>STB-050-N-T-S-7-C</td>
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<tr>
<td>3426010085</td>
<td>STB-055-N-T-S-7-C</td>
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Other materials available on request

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<td>STB-004-N-Y-S-7-C</td>
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<td>STB-010-N-Y-S-7-C</td>
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<tr>
<td>3426010094</td>
<td>STB-020-N-Y-S-7-C</td>
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<tr>
<td>3426010096</td>
<td>STB-035-N-Y-S-7-C</td>
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<tr>
<td>3426010162</td>
<td>STB-050-N-Y-S-7-C</td>
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<tr>
<td>810028396</td>
<td>STB-055-N-Y-S-7-C</td>
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Other materials available on request

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<td>3426010889</td>
<td>STB-002-N-S-C-7-C</td>
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<td>3426010890</td>
<td>STB-004-N-S-C-7-C</td>
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<td>3426010891</td>
<td>STB-010-N-S-C-7-C</td>
<td>10</td>
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<tr>
<td>3426010892</td>
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<tr>
<td>3426010893</td>
<td>STB-035-N-S-C-7-C</td>
<td>35</td>
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<tr>
<td>3426010894</td>
<td>STB-050-N-S-C-7-C</td>
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<tr>
<td>3426010895</td>
<td>STB-055-N-S-C-7-C</td>
<td>55</td>
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</tbody>
</table>

Other materials available on request

Integrated Gas Valve (NBR)

STAUFF Test SKK20 Gas Valve (NBR)

US Style Gas Valve (NBR)

1/4” BSPP Gas Valve (NBR)

Note: Gas valve options T, S, Y & A are designed to suit STAUFF Bladders only
### Gas Valves • Spares

**Integrated Gas Valve (set): 3426010228**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3426010154</td>
<td>Spring</td>
</tr>
<tr>
<td>2</td>
<td>3426010153</td>
<td>Valve Pin</td>
</tr>
<tr>
<td>3</td>
<td>3426010155</td>
<td>Seal</td>
</tr>
<tr>
<td>4</td>
<td>3426010151</td>
<td>Valve Seat</td>
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<td>5</td>
<td>3426010496</td>
<td>Cap</td>
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**US Style Gas Valve (set): 3426010598**

<table>
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<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
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<td>2</td>
<td>3426010174</td>
<td>Valve Pin</td>
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<td>3</td>
<td>3426010155</td>
<td>Seal</td>
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<td>4</td>
<td>3426010173</td>
<td>Valve Seat</td>
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<td>5</td>
<td>344004491</td>
<td>Cap Seal</td>
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<td>6</td>
<td>3426010497</td>
<td>Cap</td>
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**1/4" BSPP Gas Valve (set): 6100018949**

<table>
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<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>Spring</td>
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<tr>
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<tr>
<td>3</td>
<td>3426010155</td>
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<td>6100017783</td>
<td>Valve Seat</td>
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<td>5</td>
<td>3426010276</td>
<td>Cap</td>
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**STAUFF Test SKK20 Gas Valve**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12100022703</td>
<td>SKK20-1/2UNF-VE-GAS-C6F Steel</td>
</tr>
</tbody>
</table>

**Optional**

3000 PSI Schrader Gas Valve - (Commonly used on accumulators manufactured in the USA)

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3426010691</td>
<td>STBA-GAS-V-U-C - US STYLE GAS VALVE - 3000 PSI</td>
</tr>
</tbody>
</table>
Fluid Port Assemblies

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Model Code</th>
<th>Connection</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>STBA-FPA-001-B1-Z-NZ-0-N-0</td>
<td>3/4&quot; BSPP</td>
<td>1 &amp; 2.5 Ltr</td>
</tr>
<tr>
<td>3426010238</td>
<td>STBA-FPA-004-B2-Z-NZ-T2-N-0</td>
<td>1 1/4&quot; BSPP</td>
<td>4 Ltr</td>
</tr>
<tr>
<td>3426010239</td>
<td>STBA-FPA-010-B3-Z-NZ-T2-N-0</td>
<td>2&quot; BSPP</td>
<td>10 - 55 Ltr</td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>STBA-FPA-001-B1-P-NP-0-N-0</td>
<td>3/4&quot; BSPP</td>
<td>1 &amp; 2.5 Ltr</td>
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<tr>
<td>3426010602</td>
<td>STBA-FPA-004-B2-P-NP-T2-N-0</td>
<td>1 1/4&quot; BSPP</td>
<td>4 Ltr</td>
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<tr>
<td>3426010603</td>
<td>STBA-FPA-010-B3-P-NP-T2-N-0</td>
<td>2&quot; BSPP</td>
<td>10 - 55 Ltr</td>
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</table>

BSPP Female Connection Flat Face seal

Item No. Model Code Connection Size
Steel
3426010606 STBA-FPA-010-F-Z-NZ-T2-N-0 1 1/2" SAE 10 - 55 Ltr

Stainless Steel
3426010605 STBA-FPA-010-F-P-NP-T2-N-0 1 1/2" SAE 10 - 55 Ltr

1 1/2" SAE Code 62

**Note:** All fluid ports are supplied with an anti-extrusion ring, STAUFF Test bleed valve, fluid port O-ring, and back-up ring.

Fluid Port Adaptors

**Fluid Port Reducing Bushes**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Model Code</th>
<th>Pressure Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>6020000333</td>
<td>FI-RED-R3/4-WD-R1/4-B-W3</td>
<td>400 bar</td>
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<tr>
<td>6020000329</td>
<td>FI-RED-R3/4-WD-R1/2-B-W3</td>
<td>400 bar</td>
</tr>
<tr>
<td>6020000326</td>
<td>FI-RED-R3/4-WD-R1-1/4-B-W3</td>
<td>400 bar</td>
</tr>
<tr>
<td>6020000349</td>
<td>FI-RED-R1-1/4-WD-R1/2-B-W3</td>
<td>400 bar</td>
</tr>
<tr>
<td>6020000347</td>
<td>FI-RED-R1-1/4-WD-R3/4-B-W3</td>
<td>400 bar</td>
</tr>
<tr>
<td>6020000345</td>
<td>FI-RED-R1-1/4-WD-R1-B-W3</td>
<td>400 bar</td>
</tr>
<tr>
<td>3426010708</td>
<td>FI-RED-R2-WD-R3/4-B-W3</td>
<td>360 bar</td>
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<tr>
<td>3426010707</td>
<td>FI-RED-R2-WD-R1-B-W3</td>
<td>360 bar</td>
</tr>
<tr>
<td>3426010706</td>
<td>FI-RED-R2-WD-R1-1/4-B-W3</td>
<td>360 bar</td>
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<tr>
<td>3426010705</td>
<td>FI-RED-R2-WD-R1-1/2-B-W3</td>
<td>360 bar</td>
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**SAE Flange Clamps**

To suit Accumulators with 1 1/2" SAE Code 62 Fluid Ports

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1730000036</td>
<td>DB605 - 1.1/2&quot; SAE 62 SPLIT FLANGE - PMR - Steel</td>
</tr>
<tr>
<td>1730000153</td>
<td>DB605 - 1.1/2&quot; SAE 62 SPLIT FLANGE - PMR - Stainless Steel</td>
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</table>

**SAE O-ring Seal**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1730000053</td>
<td>FOR32 - O-ring to suit 2&quot; SAE - BUNA</td>
</tr>
</tbody>
</table>

www.stauff.com 19
Diaphragm Accumulators • Type STDA

Product Description
STAUFF diaphragm accumulators (non-repairable compact type) are used to store low volumes for oil service for 0.07 & 2.8 Ltr models, with pressure up to 350 bar. The compact design and construction includes a 1/2" or 3/4" BSPP fluid port connection (depending on accumulator size) as standard, fitted with a resilient diaphragm and the housing made of high tensile steel construction.

Features
- Full flow fluid port
- Standard Nitrile rubber high strength bladder
- High flow button style bladder / port design
- Non-repairable diaphragm accumulator
- Electron beam welded steel shell
- Corrosion resistant black enamel coating

Technical Data
- M28 x 1.5 connection with socket head cap screw (standard)
- NBR diaphragm material (standard)
- Maximum compression ratio of 8:1 - up to 1.4 Ltrs
  - 6:1 - 2 & 2.8 Ltrs
- Operating temperature -10°C... +80°C
- Operating pressure to 250 - 350 bar
- Capacity up to 2.8 Ltrs

Options
Gas Port
- 1/4" gas valve with US style gas core

Oil Port
- BSP, metric, male / female metric combination

Diaphragm Material
- NBR Nitrile (Buna N®)
- FKM Fluoroelastomer (Viton®)
- Other materials available on request

Applications
- Mobile and stationary hydraulics
- Light industrial
- Transport

Components & Material

<table>
<thead>
<tr>
<th>Main Components</th>
<th>Standard Material</th>
<th>Material Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shell</td>
<td>High strength alloy steel black enamel coating (non-repairable electron-beam welded construction)</td>
<td>Other materials available on request</td>
</tr>
<tr>
<td>Diaphragm</td>
<td>NBR (Buna N®)</td>
<td>Temperature Rating</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-10°C... +80°C</td>
</tr>
<tr>
<td></td>
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<td>-20°C... +140°C</td>
</tr>
<tr>
<td>Gas Valve</td>
<td>Connection M28 with M6 socket head cap screw</td>
<td>G1/4&quot; with US style gas core</td>
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<td>Fluid Port Shut-Off Valve</td>
<td>Delrin</td>
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Maximum Flow Rates

<table>
<thead>
<tr>
<th>Size (Ltr)</th>
<th>Normal Operation</th>
<th>Fully Discharging</th>
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<tr>
<td></td>
<td>GPM</td>
<td>LPM</td>
</tr>
<tr>
<td>0.075 &amp; 0.16</td>
<td>11</td>
<td>40</td>
</tr>
<tr>
<td>0.32 &amp; 1.40</td>
<td>26</td>
<td>100</td>
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<tr>
<td>2.00 &amp; 3.50</td>
<td>42</td>
<td>160</td>
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</tbody>
</table>

Refer to page 23 for dimensions
Refer to pages 28 - 29 for accumulator clamps
## Order Codes and Dimensions

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Nominal Capacity (Ltr)</th>
<th>Maximum Working Pressure (bar)</th>
<th>Gas Valve Connection</th>
<th>Fluid Port Connection</th>
<th>Dimensions (mm)</th>
<th>Weight (kg)</th>
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<td>3426001010</td>
<td>STDA-007-NBR-P4-B-M-N/1</td>
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<td>250</td>
<td>M28 x 1.5</td>
<td>G1/2&quot;</td>
<td>64</td>
<td>111</td>
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<td>STDA-016-NBR-P4-B-M-N/1</td>
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<td>M28 x 1.5</td>
<td>G1/2&quot;</td>
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<td>STDA-032-NBR-P3-B-M-N/1</td>
<td>0.32</td>
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<td>M28 x 1.5</td>
<td>G1/2&quot;</td>
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<td>3426001013</td>
<td>STDA-050-NBR-P3-B-M-N/1</td>
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<td>210</td>
<td>M28 x 1.5</td>
<td>G1/2&quot;</td>
<td>107</td>
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<td>3426001014</td>
<td>STDA-075-NBR-P3-B-M-N/1</td>
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<td>STDA-075-NBR-P5-D-M-N/1</td>
<td>0.75</td>
<td>350</td>
<td>M28 x 1.5</td>
<td>M33 Male G1/2&quot;</td>
<td>128.5</td>
<td>184</td>
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<td>STDA-100-NBR-P3-B-M-N/1</td>
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<td>M28 x 1.5</td>
<td>G1/2&quot;</td>
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<td>G3/4&quot;</td>
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<td>STDA-016-NBR-P4-B-G-N/1</td>
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<td>STDA-032-NBR-P3-B-G-N/1</td>
<td>0.32</td>
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<td>G1/4&quot;</td>
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<td>3426001003</td>
<td>STDA-050-NBR-P3-B-G-N/1</td>
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<td>G1/2&quot;</td>
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<td>STDA-075-NBR-P5-D-G-N/1</td>
<td>0.75</td>
<td>350</td>
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<td>M33 Male G1/2&quot;</td>
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<td>STDA-100-NBR-P3-B-G-N/1</td>
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<td>210</td>
<td>G1/4&quot;</td>
<td>G1/2&quot;</td>
<td>136</td>
<td>203</td>
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<td>STDA-140-NBR-P3-B-G-N/1</td>
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<td>210</td>
<td>G1/4&quot;</td>
<td>G1/2&quot;</td>
<td>147</td>
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<td>G3/4&quot;</td>
<td>174</td>
<td>290</td>
</tr>
</tbody>
</table>

### Model Code
- **Model Code**
  - STAUFF Non Repairable Accumulator STDA
  
### Accumulator Volume
- **Accumulator Volume**
  
- **0.075 Ltr**: 250 bar
  - **0.16 Ltr**: 250 bar
  - **0.32 Ltr**: 210 bar
  - **0.5 Ltr**: 210 bar
  - **0.75 Ltr**: 210 or 350 bar
  - **1 Ltr**: 210 bar
  - **1.4 Ltr**: 210 bar
  - **2 Ltr**: 250 bar
  - **2.8 Ltr**: 250 bar
  
### Diaphragm Material
- **Diaphragm Material**
  - Nitrile NBR
  - Hydrin for Low Temp ECO
  - Fluoroelastomer FKM

### Maximum Working Pressure
- **Maximum Working Pressure**
  - 210 bar
  - 250 bar
  - 350 bar

### Oil Port Connection
- **Oil Port Connection**
  
### Gas Port Connection
- **Gas Port Connection**
  - M28 x 1.5 (standard)
  - 1/4" BSPP (adapter)
  - US Style Gas Valve (adapter)

### Oil Port Connection

<table>
<thead>
<tr>
<th>Code</th>
<th>Connection Type</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>B**</td>
<td>BSPP</td>
<td>G1/2&quot;</td>
</tr>
<tr>
<td>D**</td>
<td>Metric Male</td>
<td>M33</td>
</tr>
<tr>
<td></td>
<td>BSPP Female</td>
<td>G1/2&quot;</td>
</tr>
</tbody>
</table>

* Standard for Australia, Brazil, China and Europe
** Standard for North America

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**www.stauff.com 23**
The gas valve conversion adaptor easily converts the standard M28 x 1.5 gas valve on diaphragm accumulators to G 1/4" male connection.

Gas valve conversion adaptor includes:
- Adaptor body with installed gas valve core
- Adaptor seal
- Gas valve cap

Note: Before the gas valve adaptor can be used the existing socket head cap screw and seal washer should be removed from the accumulator.

⚠️ Important
Before fitting the gas valve conversion adaptor to the accumulator:
- Ensure the accumulator is isolated from the hydraulic system and the system pressure has been released from the accumulator (assuming accumulator is already fitted to the hydraulic circuit)
- Ensure the gas pressure is released from the accumulator using the recommended charging kit
- Remove the existing socket head cap screw and sealing washer from the accumulator
- Ensure the gas valve adaptor is held firmly in a vice with the male connection pointed downwards
- Ensure the gas valve seal is well lubricated and then inserted into the adaptor (refer to image)
- Apply a small amount of thread sealant to the M28 male thread on the accumulator
- Screw the accumulator onto the gas valve adaptor using the M28 connection. Ensure the O-ring seal in the adaptor remains in the correct sealing position.
- Tighten the adaptor until there is a positive seal
- After pre-charging the accumulator, make sure there is no leakage from the gas valve adaptor by applying leak detection fluid to the connection.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3426010682</td>
<td>STDA-ADPT-M28-1/4 - GAS VALVE</td>
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</tr>
</tbody>
</table>
Special Products

- Stainless Steel Accumulators 26
- Stainless Steel Bladder Accumulators 26
- Surge Alleviators - Low Pressure 26
Special Products

STAUFF offer a range of special options for bladder and diaphragm accumulators and alleviators for controlling surge and pipeline shock in systems both in onshore / offshore applications and where the application environment is aggressive.

Stainless Steel Accumulators

**Characteristics**

**Standard Construction**
- Material of body: Stainless Steel AISI 316L
- Diaphragm: According to fluid
- Gas connection valve: 5/8” - 18” UNF

**Technical Data**
- Operating pressure: Max. 30 bar
- Gas filling (nitrogen only): Max. 90% of min. operating pressure
- Admissible pressure ratio: Max. ≤ 2/1
- Sizes: 1.5, 3, 5, 8.5, 10 Ltr

Stainless Steel Accumulators

**Characteristics**

**Standard Construction**
- Material of body: Stainless Steel AISI 316L Duplex Steel F51
- Diaphragm: According to fluid
- Gas connection valve: 5/8” - 18” UNF

**Technical Data**
- Operating pressure: Max. 150/210/250 bar depending on design code
- Gas filling (nitrogen only): Max. 90% of min. operating pressure
- Admissible pressure ratio: Max. ≤ 6/1
- Sizes: 0.5, 0.75, 1.5, 2.5 Ltr

Bladder Accumulators

**Construction Shell & External components**

Stainless Steel

**Characteristics**

**Standard Construction**
- Material of body: Duplex Steel F51
- Bladder: According to fluid
- Gas connection valve: 5/8” - 18” UNF

**Technical Data**
- Operating pressure: Max. 250 bar depending on design code
- Gas filling (nitrogen only): Max. 90% of min. operating pressure
- Admissible pressure ratio: Max. ≤ 4/1
- Sizes: 10 - 55 Ltr

Surge Alleviators - Low Pressure

**Characteristics**

**Standard Construction**
- Material of body: Stainless Steel AISI 316L
- Bladder: According to fluid
- Gas connection valve: 5/8” - 18” UNF

**Technical Data**
- Operating pressure: Max. 25÷40 / 30÷70 bar depending on design code
- Gas filling (nitrogen only): Max. 90% of min. operating pressure
- Admissible pressure ratio: Max. ≤ 4/1
- Sizes: 10 - 55 Ltr

Note: Special products available on request only. Contact your local STAUFF office for more information

www.stauff.com
# Accessories

<table>
<thead>
<tr>
<th>Item</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamps &amp; Supports</td>
<td>28</td>
</tr>
<tr>
<td>Safety Blocks</td>
<td>30</td>
</tr>
<tr>
<td>Burst Discs</td>
<td>34</td>
</tr>
<tr>
<td>Fuse Discs</td>
<td>35</td>
</tr>
<tr>
<td>Replacement Back-up Bottles</td>
<td>36</td>
</tr>
</tbody>
</table>
Accumulator Clamps

Type A

Type B

Order Codes & Dimensions

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Model Code</th>
<th>Nominal Clamp Diameter (mm)</th>
<th>To suit Diaphragm Accumulator STDA (Ltr)</th>
<th>To suit Bladder Accumulator STBA (Ltr)</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>3426010280</td>
<td>AMP-108</td>
<td>108</td>
<td>0.5</td>
<td>0.5</td>
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<td>3426010230</td>
<td>AMP-114</td>
<td>114</td>
<td>-</td>
<td>1 &amp; 2.5</td>
<td>134</td>
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<td>3426010285</td>
<td>AMP-126</td>
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<td>136</td>
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<td>-</td>
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<td>3426010290</td>
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<td>-</td>
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<td>8100904125</td>
<td>AMP-156</td>
<td>156</td>
<td>2</td>
<td>-</td>
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<td>3426010240</td>
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<tr>
<td>3426010247</td>
<td>AMP-228</td>
<td>232</td>
<td>-</td>
<td>10 - 50</td>
<td>254</td>
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</tbody>
</table>

Rubber moldings fitted to supports are made from Nitrile rubber

Accumulator Supports

Order Codes & Dimensions

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Model Code</th>
<th>To suit Bladder Accumulator STBA (Ltr)</th>
<th>Dimensions (mm)</th>
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<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>3426010725</td>
<td>BB-120-R</td>
<td>4</td>
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<td>3426010726</td>
<td>BB-170-R</td>
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Supplied with Nitrile rubber cushion ring
Accumulator Clamps • Stainless Steel

<table>
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<tr>
<th>Item No.</th>
<th>Model Code</th>
<th>Nominal Clamp Diameter (mm)</th>
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<th>Dimensions (mm)</th>
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<tr>
<td>610007695</td>
<td>AMP-228-SS</td>
<td>209-230</td>
<td>10 - 50</td>
<td>255 216 230-251 126 300 10 x 20 30</td>
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Rubber moldings fitted to supports are made from Nitrile rubber.

Accumulator Supports • Stainless Steel

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<th>To suit Bladder Accumulator STBA (Ltr)</th>
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<td>BB-170-R-SS</td>
<td>10 - 50</td>
<td>260 200 120 170 100 30 132 125 17</td>
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</table>

Supplied with Nitrile rubber cushion ring.
Safety Blocks • Type BS

Product Description
Type BS safety blocks are designed for mounting, pressure isolation, pressure relief protection, and manual or remote discharge (blowing down) of hydraulic accumulators. The main ports match common accumulator fluid ports for simple mounting. A rapid shut-off function is achieved by a 90° turn of a leak-free ball valve handle during emergencies or routine maintenance. Note: This valve is not intended for throttling flow in and out of the accumulator (doing so can damage the ball seats). An integral relief valve provides over-pressure protection for the accumulator shell (valve is set at 360 bar, other pressure settings available on request). Type BS safety blocks also have a port (M) for monitoring fluid pressure within the accumulator. Safety blocks are supplied with NBR O-rings to take BSP chamfer seal. Additional metal ring to suit BSP flat face seal available separately.

Technical Data
Max operating pressure (Ps): 420 bar
Pressure test (Pt): 1.43 X Ps
Nominal passage diameter: 10 mm, 25 mm, 32 mm
Working temperature: -40°C…+150°C
Fluid viscosity range: 10 - 400 cSt
Recommended viscosity: 36 cSt
Fluid contamination level, Max: Class 21/19/16 according to ISO 4406/99
Shut-off valve: Ball type
Safety valve: Type DBDS cartridge safety relief valve
Discharge valve: Manual or electric
Mounting position: Vertical or horizontal
Body material: Carbon steel phosphated in compliance with directive 2000/53/EC (rohs) to resist to corrosion
Valves material: Carbon steel phosphated or galvanized in compliance with directive 2000/53/EC (rohs) to resist to corrosion
Seal material: Nitrile rubber (NBR)
Accumulator connection: 3/4” BSP
1 1/4” BSP
2” BSP

Order Codes

| BS - 10 - M - P - 360 - A - 5 - G - 4 - C - P |

<table>
<thead>
<tr>
<th>BS</th>
<th>10</th>
<th>M</th>
<th>P</th>
<th>360</th>
<th>A</th>
<th>5</th>
<th>G</th>
<th>4</th>
<th>C</th>
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<tr>
<td>Internal Nominal Diameter</td>
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<td>25 mm</td>
<td>32 mm</td>
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<td>Discharge</td>
<td>Manual Only</td>
<td>M</td>
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<td></td>
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<td>Relief Valve</td>
<td>Valve Type DBDS (CE certified)</td>
<td>P</td>
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<tr>
<td>Valve Setting (bar)</td>
<td>Valve Type DBDS (adjustable)</td>
<td>360</td>
<td></td>
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<tr>
<td>Accumulator Side Connection</td>
<td>BSP ISO 228 with chamfer for OR (standard)</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Dimension of the Accumulator Side Connection
For connection A: 3/4” BSP 5
1 1/4” BSP 7
2" BSP 9
Without adaptor 0

System Side Calibration
Thread BSP ISO 228 6

Dimension of the System Side Connection
For BS10 1/2” BSP 4
For BS25 G 1” 8
For BS32 G 1/2” 8

Block Material
Steel C

Seal Material
Nitrile rubber (NBR) P
# Safety Blocks • Type BS

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3426000314</td>
<td>BS-10-M-P-360-A-5-G-4-C-P - 1 &amp; 2.5 Ltr Accumulator</td>
</tr>
<tr>
<td>2</td>
<td>6100011938</td>
<td>BS-25-M-P-360-A-7-G-6-C-P - 4 Ltr Accumulator</td>
</tr>
<tr>
<td>3</td>
<td>3426000119</td>
<td>BS-32-M-P-360-A-9-G-8-C-P - 10 – 55 Ltr Accumulator</td>
</tr>
<tr>
<td>4</td>
<td>3426001021</td>
<td>34,4/28,6 OD x 19 mm thick metal ring to suit safety block BS10 with 3/4&quot; flat face accumulator connection</td>
</tr>
<tr>
<td>5</td>
<td>3426001022</td>
<td>52,5/44.9 OD x 2.6 mm thick metal ring to suit safety block BS25 with 1 1/4&quot; flat face accumulator connection</td>
</tr>
<tr>
<td>6</td>
<td>3426001023</td>
<td>73,0/62,8 OD x 2.9 mm thick metal ring to suit safety block BS32 with 2&quot; flat face accumulator connection</td>
</tr>
</tbody>
</table>

**BS - Size 10:**
- Isolation valve, manual drain, relief valve 360 bar
- Accumulator connection 3/4" BSPP
- System connection 1/2" BSPP

**BS - Size 25:**
- Isolation valve, manual drain, relief valve 360 bar
- Accumulator connection 1 1/4" BSPP
- System connection 1" BSPP

**BS - Size 32:**
- Isolation valve, manual drain, relief valve 360 bar
- Accumulator connection 2" BSPP
- System connection 1 1/2" BSPP
Safety Blocks • Type BS

Dimensions

<table>
<thead>
<tr>
<th>Code</th>
<th>ØA</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS10MP...A5...</td>
<td>3/4” BSP</td>
<td>3.2</td>
</tr>
<tr>
<td>BS10MP...A7...</td>
<td>1 1/4” BSP</td>
<td>3.4</td>
</tr>
<tr>
<td>BS10MP...A9...</td>
<td>2” BSP</td>
<td>3.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>ØA</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS32MP...A7...</td>
<td>1 1/4” BSP</td>
<td>12.7</td>
</tr>
<tr>
<td>BS32MP...A9...</td>
<td>2” BSP</td>
<td>12.9</td>
</tr>
</tbody>
</table>
Safety Blocks • Type BS
Characteristic Curves

Flow rate from the pump to the accumulator
Flow rate from the accumulator to the tank

**BS10**

Curves measured using mineral oil with viscosity of 36 cSt at 50°C
Burst Discs • Type DR (Pressure)

Product Description
Burst discs are a pressure safety device that can be mounted to an adaptor fitted on the gas side of both bladder and piston accumulators. The function of a burst disc is to protect the accumulator from any excessive pressure that may exceed the accumulators maximum design limits. To protect the accumulator the burst disc releases the excessive gas (nitrogen) pressure securely via a calibrated concave membrane within the stainless steel AISI 316L cap, therefore safeguarding both operation personnel and equipment. STAUFF recommend the use of one burst disc per accumulator vessel. In the event pressure has been exceeded, the release of the excessive gas (nitrogen) will rupture the concave membrane and subsequently the burst disc will be unusable and will need to be replaced.

Technical Data
- Internal diameter: 8 mm
- Influx diameter: 4 mm
- Maximum operating pressure: 400 bar
- Overpressure: 0 + 10%
- Testing certificate: CE/PED (97/23/EC)
- Material: Stainless Steel AISI 316L
- Medium: Nitrogen (N2) gas
- Temperature range: -10°C…+80 °C

Selection
The nominal pressure setting has a tolerance 0 + 10% (the burst pressure varies according to the temperature). Refer to table below.

Order Codes

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>DR</th>
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<th>360</th>
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<tbody>
<tr>
<td>6100006973</td>
<td>DR-8-210</td>
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<tr>
<td>6100006987</td>
<td>DR-8-330</td>
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<td>6100006988</td>
<td>DR-8-360 (standard)</td>
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</table>
Product Description
Fuse discs are a temperature safety device that can be mounted to an adapter fitted on the gas side of both bladder and piston accumulators. The function of a fuse disc is to release the gas (nitrogen) pressure of an accumulator securely when the temperature exceeds a maximum level of 150°C. To protect the accumulator the fuse disc releases the accumulators gas (nitrogen) pressure securely via a calibrated concave membrane within the stainless steel AISI 316L cap, therefore safeguarding both operation personnel and equipment. In the event temperature has been exceeded, the release of the gas (nitrogen) pressure will rupture the concave membrane and subsequently the fuse disc will be unusable and will need to be replaced.

Technical Data
- Internal diameter: 8 mm
- Influe diameter: 4 mm
- Maximum operating pressure: ≤ 500
- Working temperature: -10°C...+80°C
- Melting point: Approx. 150°C
- Testing certificate: CE/PED (97/23/EC)
- Material: Stainless Steel AISI 316L
- Medium: Nitrogen (N2) gas

Order Codes
<table>
<thead>
<tr>
<th>Series</th>
<th>DF</th>
<th>Size</th>
<th>Maximum Working Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DF</td>
<td>8</td>
<td>150°C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6100111939</td>
<td>DF-8-150</td>
</tr>
</tbody>
</table>
Product Description
STAUFF accumulator replacement back-up bottles are available to customers that have existing installed accumulator stations (both bladder and piston) that utilize back-up bottles.

Technical Data
Maximum design pressure: 350 bar (AS1210 design approval)
Design temperature: -20°C...+80°C
Test pressure: 540 bar
Nominal volume: 50 and 75 Ltr
Body material: Steel

Order Codes & Dimensions
<table>
<thead>
<tr>
<th>Item No.</th>
<th>Model Code</th>
<th>Size / Volume (Ltr)</th>
<th>Length (L) (mm)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3426010751</td>
<td>STNB-50-350-GB-GA-A</td>
<td>50</td>
<td>1700 ±10</td>
<td>100</td>
</tr>
<tr>
<td>3426010752</td>
<td>STNB-75-350-GB-GA-A</td>
<td>75</td>
<td>2280 +0 / - 25</td>
<td>140</td>
</tr>
</tbody>
</table>
Pre-charging & Testing Equipment

Universal Accumulator Charging Kit  38
Direct Accumulator Charging Kit  40
PT-RF Pressure Transmitter & Reader  42
Permanent Charging Heads  44
Nitrogen Gas Regulators  46
Universal Accumulator Charging Kit

Description
STAUFF universal accumulator charging kit is an essential instrument for the verification, pressurisation and gas bleeding of hydraulic accumulators, suitable for most common bladder and diaphragm accumulators.

Features
The standard kit is delivered in a storage case containing the following:

1. 1 x Charging head for testing and pressurising (swivel connection M28 x 1.5)
2. 1 x Adaptor 1/4" BSPP
3. 1 x Adaptor 5/8" - 18" UNF
4. 1 x Adaptor (long) 7/8" - 14" UNF
5. 1 x Adaptor (short) Integrated 7/8" - 14" UNF
6. 1 x 0 - 100 bar safety pattern pressure gauge + adaptor SM200/1/4"
7. 1 x 0 - 250 bar safety pattern pressure gauge + adaptor SM200G1/4"
8. 1 x Adaptor + washer 5/8" - 18" UNF - 0.305"
9. 1 x High pressure gas hose (2000 mm long) for connecting to a nitrogen gas source - SKK20-1/4" BSPP female
10. 1 x Safety goggles
11. 1 x Hex key 6 mm
12. 1 x Operating instructions

Optional
1. Type 51 gas bottle adaptor
2. Type 50 gas bottle adaptor

Available on request
- 0 - 400 bar kit

Application
- For checking and pre-charging common types of accumulators

Maximum working pressure of this equipment (excluding individual pressure rating of gauges) is 400 bar.

Order Codes

<table>
<thead>
<tr>
<th>Model Code</th>
<th>STA-CK</th>
<th>250/100S</th>
<th>HA21</th>
<th>A1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAUFF Accumulator Charge Kit</td>
<td>STA-CK</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Gauges (AS1349)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Including Gauge Adaptor</td>
<td>STA-CK</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 250 bar + 0 - 100 bar (standard)</td>
<td>250/100S</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 400 bar + 0 - 250 bar</td>
<td>400/250S</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charging Hose</td>
<td>STA-CK</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SGS-C Test 20 - 1/4&quot; BSPP DN94 Gas Hose</td>
<td>HA21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2m (standard)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Charging Adaptors
1. 1/4" BSPP (STAUFF – Olaer) A1
2. 5/8" - 18" UNF (EPE) A1
3. 7/8" - 14" UNF Long (Hydac) A1
4. 7/8" - 14" UNF Hort (STAUFF – Olaer Integrated) 0.305" x 32 TPI (USA) A1

Gas Adaptors
- Without Gas Adaptors (standard) O
- Type 50 & Type 51 to AS2473 A1

Item No. | Description
---------|------------------------
6100018948 | STA-CK-250/100S-HA21-A1-O (standard)

Note: STAUFF pressure gauges are safety pattern type according to AS1349 with safety glass, solid baffle wall, and a stainless steel construction with excellent stability and shock resistance.
## Universal Accumulator Charging Kit • Component Contents

### Charging head

1. STA-CK Charging Head

### Charging adaptors

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3426010223</td>
<td>STA-CK-ADPT M28-1/4” BSPP</td>
</tr>
<tr>
<td>3</td>
<td>3426010220</td>
<td>STA-CK-ADPT M28-5/8” - 1/8” UNF</td>
</tr>
<tr>
<td>4</td>
<td>3426010852</td>
<td>STA-CK-ADPT M28-7/8” - 1/4” UNF (LONG)</td>
</tr>
<tr>
<td>5</td>
<td>3426010215</td>
<td>STA-CK-ADPT M28-7/8” - 1/4” UNF (SHORT)</td>
</tr>
</tbody>
</table>

### Gauges

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>3426010762</td>
<td>STA-CK-ADPT M28-5/8” - 0.305” (US Style)</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>3426010578</td>
<td>Gauge  1210026219 - SMD 0-100 bar Safety Pattern Pressure Gauge + Adaptor SMD20G1/4”</td>
</tr>
<tr>
<td>9</td>
<td>3426010577</td>
<td>Gauge  1210026219 - SMD 0-250 bar Safety Pattern Pressure Gauge + Adaptor SMD20G1/4”</td>
</tr>
</tbody>
</table>

### Optional

#### Type 51 & 50 Gas adaptors (sold separately)

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3426001110</td>
<td>Type 51 Gas Bottle Adaptor</td>
</tr>
<tr>
<td>3426001111</td>
<td>Type 50 Gas Bottle Adaptor</td>
</tr>
</tbody>
</table>

Note: Component slot available in charging kit for gas adaptors

#### Adaptor to suit Chinese M14 gas valve - (sold separately)

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3426010762</td>
<td>STA-CK-ADPT M28-M14x1.5</td>
</tr>
</tbody>
</table>
Direct Accumulator Charging Kit • SKK20 Series

Description
STAUFF accumulator direct charging kit - SKK20 is an essential instrument for the verification, pressurisation and nitrogen gas bleeding of STAUFF accumulators that are fitted with a SKK20 gas valve connection. Pre-charge pressure can be easily checked by coupling the safety gauge directly to the SKK20 gas valve connection on the STAUFF accumulator.

Features
The standard kit is delivered in a storage case containing the following:

1. 1 x Charging valve
2. 1 x SKK20 Test coupling 1/4” NPT (for regulator connection)
3. 1 x Safety pattern pressure gauge 0 - 250 bar (standard) according to AS1349-1986
4. 1 x 2 Metre hose
5. 1 x Safety goggles
6. 1 x Operating instructions

Available on request
- 0 - 25, 0 - 100 & 0 - 400 bar kit

Application
- For checking and pre-charging of accumulators with M16 x 2.0 (Test 20) or M12 x 1.65 (Test 12) STAUFF Test coupling connection (optional)

Maximum working pressure of this equipment (excluding individual pressure rating of gauges) is 400 bar.

Order Codes

<table>
<thead>
<tr>
<th>STA-CK</th>
<th>SKK20</th>
<th>250S</th>
<th>HA20</th>
<th>N04</th>
<th>CAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

1. Model Code
STAUFF Accumulator Charge Kit STA-CK

2. Charge Head Connection
Test 20 Coupling (standard) SKK20
Test 12 Coupling SKK12

3. Safety Gauges
Including Gauge Adaptor
- 0 - 25 bar 025
- 0 - 100 bar (AS1349) 106S
- 0 - 250 bar (AS1349) (standard) 256S
- 0 - 400 bar (AS1349) 406S

Other options available on request.
AS1349 Safety pattern pressure gauges

4. Charging Adaptors
- SGS-C Test 20 - Test 20 DN4 GAS HOSE 2M (standard) HA20
- SGS-C Test 12 - Test 12 DN4 GAS HOSE 2M HA12
- No hose supplied HA00

5. Outlet Connection to Regulator
- 1/4” NPT (standard) N04
- 1/4” BSPT R04

6. Case
Supplied with case CAS

Item No. | Description
---------|---------
6100008571 | STA-CK-SKK20-100S-HA20-N04-CAS
6100008615 | STA-CK-SKK20-250S-HA20-N04-CAS (standard)
6100008674 | STA-CK-SKK20-400S-HA20-N04-CAS
6100008730 | STA-CK-SKK12-025-HA12-N04-CAS
6100008731 | STA-CK-SKK12-100S-HA12-N04-CAS
6100008755 | STA-CK-SKK12-250S-HA12-N04-CAS
6100008757 | STA-CK-SKK12-400S-HA12-N04-CAS

Typical Installation

Note: STAUFF pressure gauges are safety pattern type according to AS1349 with safety glass, solid baffle wall, and a stainless steel construction with excellent stability and shock resistance.
Direct Accumulator Charging Kit • SKK20 Series

Component Contents

Part No. | Item No. | Description
--- | --- | ---
A | 1210026012 | SKK20 Test Coupling
B | 1210026012 | SKK20 Test Coupling
C | 1210026426 | SDA20 Test Adaptor
D | 3426000268 | Bleed Valve
E | 2011624119 | Charging Cross

Part No. | Item No. | Description
--- | --- | ---
1 | 1210026178 | SKK20 Test Coupling 1/4” NPT (for regulator connection)

Part No. | Item No. | Description
--- | --- | ---
3 | 3426010577 - Gauge | 0 - 250 bar Safety Pattern Pressure Gauge + Adaptor SMD20G1/4”
 | 1210026219 - SMD |

Part No. | Item No. | Description
--- | --- | ---
4 | 6100013268 | High Pressure Gas Hose Length: 2000 mm Test 20 - 1/4” NPT Connection
 | | 3499000031 | Safety Goggles
Description

STAUFF PT-RF pressure transmitters are integrated into fluid technology plants and systems (temporarily or permanently) using the appropriate process connection adapters to measure and record temperature and pressure data. The energy required for a measurement is transferred to the pressure transmitter via the antenna of the STAUFF PT-RF reading device using wireless RFID technology. As a result the pressure transmitter requires neither internal nor external power supply, is completely maintenance free, and the recording process is automated therefore minimising the possibilities of human error.

The pressure transmitter for the PT-RF along with the PT-RF reader is an ideal tool to check the pre-charge pressure of an accumulator fitted with a STAUFF SKK gas valve. Each PT-RF transmitter has its own identifiable serial number that can be recorded by the PT-RF reader, therefore each accumulator can be logged separately and the data can be downloaded to a computer at a later date.

Technical Data

Wetted Parts

Suitable for liquid and gaseous media

Materials

Housing: Stainless Steel 1.4305
Sealing (B04): FPM (Viton®)
Cap: Polyamide (glass fibre-reinforced)

Dimensions / Weight

Dimensions: 59 x 26 mm
Weight: 80 g

Temperature Range

Media temp.: -40°C...+85°C
Ambient temp.: -40°C...+85°C
Storage temp.: -55°C...+125°C

Electrical Data

Sampling rate: typ. 250 ms / max. 400 ms
Long-term stability: according to IEC EN 60770-1 max. ± 0.25 % F.S. /a
Load cycles (10⁶): 10
Vibration loading: acc. to IEC 60068-2-6 (20 g)
Shock loading: acc. to IEC 60068-2-27 (30 g) 11ms

Protection Rating

IP67 protection rating: Dust tight and protected against splashing water

Order Codes

<table>
<thead>
<tr>
<th>Series and Type</th>
<th>PT-RF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Transmitter</td>
<td>PT</td>
</tr>
<tr>
<td>Signal transmission via RFID technology</td>
<td>RF</td>
</tr>
<tr>
<td>Process Connection</td>
<td>G1/4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pressure Range</th>
<th>B00400</th>
<th>B00600</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-400 bar (refer to table below)</td>
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<td></td>
</tr>
<tr>
<td>0-600 bar (refer to table below)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pressure Range and Accuracies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>B00400</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>B00600</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Process Connection Adaptors for Pressure Transmitter PT-RF

Various adaptors are available in addition to the pressure transmitters from the PT-RF series allowing easy connection to the STAUFF Test 20 system as well as installation in pipes.

SDA20-G1/4-C6F

Adapter for process connection G1/4 (B04) on test coupling STAUFF Test 20 (connection thread M16 x 2)
Reader • Type PT-RF

Description

STAUFF PT-RF readers combined with STAUFF PT-RF transmitters are used to measure and record temperature and pressure data. The energy required for a measurement is transferred to the pressure transmitter via the antenna of the PT-RF reading device using wireless RFID technology. A maximum distance of only 1.5 cm is required from the antenna to the tip of the PT-RF transmitter for the duration of the measurement. The PT-RF transmitter is activated by the press of a button (the measured value is determined within only 0.5 seconds), and then the data is transmitted immediately to the PT-RF reader together with additional relevant information, displayed on the screen and recorded. Over 15,000 measurement recordings can be stored in the internal memory of the device.

The PT-RF reader along with PT-RF transmitter is an ideal tool to check the pre-charge pressure of an accumulator fitted with a STAUFF SKK gas valve. Each PT-RF transmitter has its own identifiable serial number that can be recorded by the PT-RF reader, therefore each accumulator can be logged separately and the data can be downloaded to a computer at a later date.

Technical Data

Material
Housing made of ABS

Dimensions / Weight
Dimensions: 76 x 35 x 240 mm
Weight: 220 g

Measurements / Display
Pressure: in bar and PSI
Temperature: in °C and °F
Display: graphic, LED backlit
Visible area: 55 x 48 mm
Resolution: 128 x 64 Pixels

Power Supply
Battery: Lithium ion (3.7 V DC / 900 mAh)
Operating time approx. 6 hours (approx. 1800 individual measurements)

Temperature Range
Ambient temp.: -20°C... +70°C
Storage temp.: -25°C... +60°C
CE certified

Electrical Data / Interface
Sampling rate: typ. 250 ms / max. 400 ms
Interface: Micro USB
EMV: EN 61326-1:2013 EN 300330

Protection Rating
IP65 protection rating: Dust tight and protected against water jets

Order Code

Reader-PT-RF

Series and Type
Reader (standard) Reader-PT-RF
- Reader-PT-RF
- Manual and software on CD
- Quick guide
- USB 2.0 cable (1 m / 3.28 ft)
- 5 V DC / 1 A power supply including country-specific adaptors

APPLICATIONS

Connected through SKK test coupling
Connected through fluid port

PC Software

The software included allows transmission of the stored measured values from the reading device to the PC, subsequent evaluation and export, e.g. to Microsoft Excel®.

Set Up

PC Software

The software included allows transmission of the stored measured values from the reading device to the PC, subsequent evaluation and export, e.g. to Microsoft Excel®.

Spare Parts / Accessories

Case, small
Case Reader-PT-RF

Case, large
Case-PT-RF-SET

Spare Parts / Accessories

Item No. Description
1810011067 READER-PT-RF
6100000353 CASE-READER-PT-RF
6100003635 CASE-PT-RF-SET
Permanent Charging Heads
Bladder Accumulators • STBA Series

Description
The STAUFF permanent charge head is used for monitoring the pre-charge pressure of STBA bladder accumulators, when the system fluid pressure is discharged and isolated. The permanent charge head incorporates a separate gas valve (refer below for gas valve options), which allows for pre-charging and checking of the gas pressure of the accumulator using a universal accumulator charging kit (refer to page 38). The pressure gauge is a STAUFF safety pattern gauge directly connected to the permanent charge head.

Note: Before the permanent charge head can be fitted to the accumulator bladder stem, the gas valve must be removed from the bladder stem. For each gas valve option, the protective cap must be removed prior to connection to the permanent charge head.

Order Codes

<table>
<thead>
<tr>
<th>Series</th>
<th>Permanent Charging Head</th>
<th>Gas Valve Type</th>
<th>Gauge Outlet</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>STBA</td>
<td>PERMCH</td>
<td>T</td>
<td>1/4” BSPP (Port only) B04</td>
<td>Stainless Steel S</td>
</tr>
<tr>
<td></td>
<td>PERMCH</td>
<td>Y</td>
<td>0-100 bar * 100S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PERMCH</td>
<td>A</td>
<td>0-250 bar * 250S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PERMCH</td>
<td></td>
<td>0-400 bar * 400S</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* AS1349 Safety pattern pressure gauge, including SKK20 test coupling and gauge adaptor</td>
<td></td>
</tr>
</tbody>
</table>

Material

- Stainless Steel S

Gas Valve Options

Option T

- Integrated Gas Valve and Gauge - Option T

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3426010589</td>
<td>STBA-PERMCH-T-250S-S</td>
</tr>
<tr>
<td>3426010590</td>
<td>STBA-PERMCH-T-400S-S</td>
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</tbody>
</table>

Option Y

- US Style Gas Valve and Gauge - Option Y

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>3426010592</td>
<td>STBA-PERMCH-Y-250S-S</td>
</tr>
<tr>
<td>3426010593</td>
<td>STBA-PERMCH-Y-400S-S</td>
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</tbody>
</table>

Option A

- 1/4” BSPP Gas Valve and Gauge - Option A

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3426010596</td>
<td>STBA-PERMCH-A-250S-S</td>
</tr>
<tr>
<td>3426010597</td>
<td>STBA-PERMCH-A-400S-S</td>
</tr>
</tbody>
</table>
Permanent Charging Heads
Diaphragm Accumulators • STDA Series

Description
The STAUFF permanent charge head is used for monitoring the pre-charge pressure of STDA diaphragm accumulators, when the system fluid pressure is discharged and isolated. The permanent charge head connection is M28 x 1.5, and incorporates a separate SKK20 gas valve, which allows for pre-charging and checking of the gas pressure of the accumulator using a direct accumulator charging kit (refer to page 40). The pressure gauge is a STAUFF safety pattern gauge directly connected to the permanent charge head.

Note: Before the permanent charge head can be fitted to the diaphragm accumulators M28 x 1.5 connection, the socket head cap screw in the accumulator must be removed along with the bonded washer.

Order Codes

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6100028405</td>
<td>STAUFF-PermCh-SKK20-100S-C</td>
</tr>
<tr>
<td>6100028402</td>
<td>STAUFF-PermCh-SKK20-250S-C</td>
</tr>
</tbody>
</table>
Nitrogen Gas Regulators • STA-NR

Description
Nitrogen gas regulators are used to control the pressure and incoming gas flow from the nitrogen cylinder or bank of cylinders. The dual gauge allows visual control of both the inlet and outlet pressure.

Application
When pre-charging hydraulic accumulators it is important that initially the accumulator be charged slowly. This is due to the fact that the bladder / diaphragm has to expand and stretch uniformly to take up the volume of the vessel internally. The pressure required to do this properly is less than 1 bar. Pre-charging an accumulator too quickly and/or without the correct lubrication can damage or in some cases cause failure of the bladder / diaphragm. In order to pre-charge an accumulator properly STAUFF recommends the use of a nitrogen gas regulator.

Technical Data
Specifications
- Max inlet pressure: (see order codes for options)
- Max outlet pressure: (see order codes for options)
- Flow rate: 360 M3/hr @ 10,000 kpa outlet pressure
- Inlet connections: AS 2473
- Operating temp: -20°C...+50°C
- Gauges: AS 4706-2001
- Outlet connections: 1/4" NPT (see order codes for options)
- Inlet filter

Materials
- Body: Machined brass
- Bonnet: Machined brass
- Pressure Gauges: Mild steel with copper and brass internals. Plastic lens.
- Seat: Polyurethane
- O-rings - Oxygen: Viton
- O-rings - Other Gases: Nitrile butylene rubber (NBR)
- Safety Relief Valve: Brass housing, steel spring, viton seal
- Filter: Sintered bronze
- Stem O-ring: Viton

Order Codes

<table>
<thead>
<tr>
<th>STA-NR</th>
<th>-</th>
<th>400/300</th>
<th>-</th>
<th>T51</th>
<th>-</th>
<th>400S/400S</th>
<th>-</th>
<th>N04</th>
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<tbody>
<tr>
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<tr>
<td>STAUFF Nitrogen Gas Regulator</td>
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<table>
<thead>
<tr>
<th>Inlet Pressure</th>
<th>Outlet Pressure</th>
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<tbody>
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<table>
<thead>
<tr>
<th>Nitrogen Gas Cylinder Connection</th>
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<tbody>
<tr>
<td>(AS2473 Type 50) N2 Bottle</td>
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<tr>
<td>T50</td>
</tr>
<tr>
<td>(AS2473 Type 51) EHP N2 Bottle (standard)</td>
</tr>
<tr>
<td>T51</td>
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<tr>
<td>To suit both Type 50/51 Connections</td>
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Regulator Safety Gauges (AS4706)

<table>
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<tr>
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<td>400S</td>
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<tr>
<td>28,000 kpa</td>
<td>280S</td>
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<tr>
<td>400S</td>
<td></td>
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<td>400S</td>
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Output Connection

| 1/4" NPT (standard) |
| STKAFF Test 20 |
| SKK20 |

Item No. Description
- 6100000800 STA-NR-300/200-T51-400S/280S-N04
- 6100000782 STA-NR-400/300/T51-400S/400S-N04 (standard)

Safety Information
High pressure nitrogen gas regulators are not fitted with safety relief valves. In the event of internal failure of the regulator, the outlet connection and the accumulator could potentially see the full pressure from the nitrogen gas cylinder. In cases where the nitrogen gas bottle pressure is greater than the pressure rating of the accumulator, a safety relief device should be fitted between the nitrogen gas regulator and the accumulator.

⚠️ For use with nitrogen (N2) gas only
⚠️ Safety goggles must be worn at all times
Servicing & Maintenance

Universal Accumulator Charging Kit Instructions 48
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Bladder Replacement Assembly Procedure 58
Bladder Replacement Disassembly Procedure 60
Trouble Shooting Guide 62
Universal Charging Kit
Operating and Maintenance Instructions

Description
STAUFF’s universal accumulator charging kit is an essential instrument for the verification, pressurisation and gas bleeding of hydraulic accumulators, suitable for most common bladder and diaphragm accumulators.

Features
The standard kit is delivered in a storage case containing the following:
1. Charging head for testing and pressurisation (swivel connection M28 x 1.5)
2. Adaptor 1/4" BSPP
3. Adaptor 5/8" - 18" UNF
4. Adaptor (long) 7/8" - 14" UNF
5. Adaptor (short) integrated 7/8" - 14" UNF
6. 0 - 100 bar safety pattern pressure gauge + adaptor SMD20G1/4"
7. 0 - 250 bar safety pattern pressure gauge + adaptor SMD20G1/4"
8. Adaptor + washer 5/8" - 18" UNF - 0.305"
9. High pressure gas hose (2000 mm long) for connecting to a nitrogen gas source SKG20-1/4" BSPP female
10. Safety goggles
11. Hex key 6 mm
12. Operating instructions

Optional
1. Type 51 gas bottle adaptor
2. Type 50 gas bottle adaptor

Available on request
- 0 - 400 bar kit

Application
- For checking and pre-charging common types of accumulators

Safety Instructions and Recommendations
1. Before using the charging head carefully read the directions and safety instructions in this guide.
2. In all cases observe the pressure limits indicated on the accumulator pressure vessels. If necessary refer to the applicable operating instructions.
3. Before attempting to check the pre-charge pressure, the accumulator in the hydraulic circuit under pressure has to be isolated and discharged on the hydraulic side. If required immobilize it and define a safety zone.
4. Only use nitrogen gas with a purity ≥ 99,8% (N2) to pressurise the accumulator.
5. STAUFF always recommends the use of a nitrogen gas regulator on the nitrogen gas bottle.
6. The charging valve (1) and pressure gauge (3) are tools for checking gas pressure and pre-charging accumulators. In cases where the gauge and gauge adaptor will be left on the accumulator, make sure that the gauge fitted is rated for the maximum system pressure of the hydraulic circuit.
7. Never use an accumulator in a hydraulic system without it first being pre-charged with the correct nitrogen gas pressure. Failure to do this will result in bladder or diaphragm damage.
8. Ensure safety goggles are worn when either checking or pre-charging accumulators.
9. To ensure optimum efficiency and performance of the hydraulic circuit, the pre-charge pressure must be checked frequently. STAUFF recommends the pressure be checked initially at intervals of 1 month, 3 months and then 6 months after installation. Depending on the amount of loss of pressure (if any) over this time, a planned maintenance schedule for monitoring the pressure can then be put into operation (check annually).
Connection Flow Chart

Direct connection to M28 dia x 1.5 accumulator valve with 6 mm A/F Hexagonal socket - head screw

Use of a regulator is recommended

Type 50 Gas Bottle Adaptor (optional)

Type 51 Gas Bottle Adaptor (optional)

Direct Gauge Adaptor - SMD

Charging Head

Length: 2000 mm

Set of Adaptors

0.305" x 32 TPI Threaded or not threaded Adaptor (4) connects directly to 7/8" UNF Bladder Stem
Hydac / Bosch Rexroth / Parker

1/2" UNF Integrated Valve Adaptor (short) connects directly to 7/8" UNF Bladder Stem
Olaer / STAUFF

5/8" UNF Male Thread Adaptor (3) connects directly to 5/8" UNF Gas Valve
European - EPE

0.305" x 32 TPI Threaded US Style Valve Adaptor (3) connects via 5/8" UNF and 0.305" x 32 TPI (10)
US Style Gas Valve

1/4" BSPP Male Thread Adaptor (2) connects directly to 1/4" BSPP Gas Valve
Olaer / Fawcett Christie / STAUFF

Use of a regulator is recommended

Type 50 Gas Bottle Adaptor (optional)
**Pre-charging - Universal Charging Kit**

**Servicing & Maintenance**

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**Checking the Pre-charge Pressure**

**General**

1. **Recommendation:** Before proceeding to any operation concerning the initial pressurisation of an accumulator, consult the applicable operating instructions.

2. **Pressurisation limits:** Ensure that the Universal Accumulator Charging Kit and any associated pressure gauge fitted are rated for the intended pressure for both pre-charging and pressure checking. Refer to the manufacturers specifications.

   - The nitrogen gas pressure varies as a function of the gas temperature. After each inflation and deflation of nitrogen gas, wait for the temperature to stabilise before checking the pressure (this may take several minutes depending on the accumulator size).
   - Never exceed the maximum stated design pressure (PS or DP) of the accumulator as stamped on the vessel. If in doubt consult the manufacturer or check manufacturer’s operating instructions or specifications manual.

**Bladder Accumulators**

Refer to page 49 for connection flow chart

- Remove the protection or gas valve cap fitted to the gas side of the accumulator
- Select the adaptor according to the gas valve fitted to the accumulator (4 or 6), (3+10), (3 or 2)
- Ensure the pin in the adaptor is backed off by unscrewing the socket head cap screw (G) in an anti-clockwise direction. To do this use the 6 mm hex key supplied in the charging kit
- Attach the appropriate adaptor to the accumulator gas valve
- Take the charging head (1) from the kit and install the pressure gauge by attaching it to the test coupling (E). Make sure the pressure gauge is compatible with the gas pressure (to be verified) and make sure the bleed valve (C) is closed
- Manually tighten the knurled ring (B) on the charging head (1) to the adaptor (4 or 6), (3+10), (3 or 2), positioning the device in such a way that the pressure gauge values can be easily read
- Open the accumulator gas valve by slowly tightening (clock-wise) the lobe wheel (A) until the pre-charge pressure is indicated on the pressure gauge. DO NOT overtighten the lobe wheel (A)

**Diaphragm Accumulators**

Refer to page 49 for connection flow chart

- When checking the pre-charge pressure of a diaphragm accumulator fitted with a 6 mm socket head cap screw – carefully loosen the socket head cap screw (G) by turning anti-clockwise to relieve any tension
- Take the charging head (1) from the kit and install the pressure gauge by attaching it to the test coupling (E). Make sure the pressure gauge is compatible with the gas pressure (to be verified) and make sure the bleed valve (C) is closed
- Mount the charging head (1) directly to the accumulator’s M28 threaded connection (no adaptor required), by tightening the knurled ring (B) on the charging head
- Once the charging head (1) is connected to the accumulator, unscrew the lobe wheel (A) anti-clockwise until the inflation pressure is indicated on the pressure gauge

**Service Options**

**Option 1. The displayed nitrogen gas pressure (P0) is correct**

Refer to page 49 for connection flow chart

- For bladder accumulators manually unscrew the lobe wheel (A) anti-clockwise. The lobe wheel (A) allows re-closing of the gas valve
- For diaphragm accumulators manually screw the lobe wheel (A) clockwise. The lobe wheel (A) allows re-closing of the socket head cap screw (G)
- Loosen the bleed valve by rotating anti-clockwise (C) to purge the charging head (1) of pressure
- For bladder accumulators remove the charging head (1) from the adaptor (4 or 6), (3+10), (3 or 2)
- For diaphragm accumulators remove the charging head (1) from the M28 threaded connection and tighten the socket head cap screw (G) with supplied 6 mm hex key

**Option 2. The displayed nitrogen gas pressure (P0) is too high**

Refer to page 49 for connection flow chart

- Loosen the bleed valve (C) to reduce the nitrogen gas pressure of the accumulator until the required (P0) pressure after stabilization is reached (the nitrogen gas escapes to the atmosphere)
- Re-tighten the bleed valve (C)
- For bladder accumulators manually unscrew the lobe wheel (A) anti-clockwise. The lobe wheel (A) allows re-closing of the gas valve
- For diaphragm accumulators manually screw the lobe wheel (A) clockwise. The lobe wheel (A) allows re-closing of the socket head cap screw (G)
- Loosen the bleed valve by rotating anti-clockwise (C) to purge the charging head (1) of pressure
- For bladder accumulators remove the charging head (1) from the adaptor (4 or 6), (3+10), (3 or 2)
- For diaphragm accumulators unscrew the adaptor (4 or 6), (3+10), (3 or 2) fitted to the gas valve
- For diaphragm accumulators remove the charging head (1) from the M28 threaded connection and tighten the socket head cap screw (G) with supplied 6 mm hex key

**Option 3. The displayed nitrogen gas pressure (P0) is too low**

Refer to page 49 for connection flow chart

- Remove cap from test coupling (D)
- Connect the Test 20 end of the high pressure hose to test coupling (D)
- Connect the other end of the high pressure hose to the nitrogen gas source either to a regulator (recommended), or directly to a nitrogen gas bottle
- If the accumulator gas valve is not already open loosen or tighten the lobe wheel (A) according to the accumulator type to allow the pressure to build up and register on the gauge
- Slightly open the valve of the nitrogen gas source until the required inflation pressure (P0) is reached and stabilized, close the valve of the nitrogen gas source
- For bladder accumulators manually unscrew the lobe wheel (A) anti-clockwise. The lobe wheel (A) allows re-closing of the gas valve
- For diaphragm accumulators manually screw the lobe wheel (A) clockwise. The lobe wheel (A) allows re-closing of the socket head cap screw (G)
- Loosen the drain valve (C) to purge the gas from the charging head (1)
- Carefully unscrew and remove the high pressure hose to purge any remaining gas
- Reinstall cap to test coupling (D)
- For bladder accumulators remove the charging head (1) from the adaptor (4 or 6), (3+10), (3 or 2)
- For diaphragm accumulators unscrew the adaptor (4 or 6), (3+10), (3 or 2) fitted to the gas valve
- For diaphragm accumulators remove the charging head (1) from the M28 threaded connection and tighten the socket head cap screw (G) with supplied 6 mm hex key

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**Pressurisation limits:** Ensure that the Universal Accumulator Charging Kit and any associated pressure gauge fitted are rated for the intended pressure for both pre-charging and pressure checking. Refer to the manufacturers specifications.

**3. Taking into account the temperature influence on the pre-charge pressure:** In order to observe the working pressures of the accumulator it is advised to adjust the inflation pressure (P0) according to the operating or control temperature. Refer to page 56 for inflation pressure corrections table.

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**Important:** When using diaphragm accumulators with a socket head cap screw fitted, tighten the socket head cap screw (G) using the supplied 6 mm hex key.

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50 www.stauff.com
Pre-charging Accumulators Instructions

General
Prior to pre-charging an accumulator it is important that the inside of the accumulator shell be lubricated. New STAUFF accumulators are already lubricated internally during the manufacture / assembly process. For older units or accumulators that have been repaired and a new bladder installed, STAUFF recommend that the accumulator be lubricated with enough system fluid to evenly coat the inside of the shell. To ensure good lubrication lay the accumulator horizontally and rotate on its axis.

The pre-charge setting is recommended to be set to 80% - 90% of the minimum system working pressure if no specific pressure has been calculated.

Bladder Accumulators
Remove any plastic plugs that are fitted to the accumulator fluid port. Remove the accumulator gas valve protection cap and gas valve screw cap fitted to the gas side of the accumulator. Prepare a container to catch any fluid which may drain from the fluid port during charging.

Refer to page 49 for connection flow chart
- Select the adaptor according to the gas valve fitted to the accumulator (4 or 6), (3+10), (3 or 2)
- Ensure the pin in the adaptor is backed off by unscrewing the socket head cap screw (G) in an anti-clockwise direction. To do this use a 6 mm hex key from the charging kit
- Attach the appropriate adaptor to the accumulator gas valve
- Take the charging head (1) from the kit and install the pressure gauge compatible with the pressure (to be verified) and make sure the bleed valve (C) is open
- Manually tighten the knurled ring (B) of the charging head (1) to the adaptor, positioning the device in such a way that the pressure gauge values can be easily read
- Open the accumulator gas valve by tightening the lobe wheel (A) anti-clockwise no more than two complete turns
- Refer below for applying the pre-charge pressure

Applying the Pre-Charge Pressure
(accumulator has no gas)

Refer to page 49 for connection flow chart
- Remove cap from test coupling (D)
- Connect the Test 20 end of the high pressure hose to test coupling (D)
- Connect the other end of the high pressure hose to the nitrogen gas source either to a regulator (recommended), or directly to a nitrogen gas bottle
- Slightly open the valve of the nitrogen gas source until a small amount of resistance is felt. DO NOT over tighten the lobe wheel as it may cause damage to the gas valve core
- Refer below for applying the pre-charge pressure

Diaphragm Accumulators
Refer to page 49 for connection flow chart
- Ensure the socket head cap screw (G) is loose by untightening it using the 6 mm hex key supplied before the charging head (1) is fitted
- Take the charging head (1) from the kit and install the pressure gauge by attaching it to test coupling (E). Make sure the pressure gauge is compatible with the pressure (to be verified) and the bleed valve (C) is safely open
- Mount the charging head (1) directly to the accumulator M28 threaded connection (no adaptor required)
- Open the gas valve (socket head cap screw G) on the accumulator by unscrewing the lobe wheel (A) anti-clockwise no more than two complete turns
- Refer below for applying the pre-charge pressure

Maintenance of the STA-CK Charging Head (1)
It is recommended to check the various connections and adaptors at regular intervals for cleanliness, detection of possible defects, thread wear and sealing parts.

Please contact your local STAUFF office for further information.

Note: The following information applies to pre-charging new accumulators or after a bladder change when no gas pressure is present inside the accumulator.

Only use “gas approved” test hose
For use with nitrogen (N2) gas only
Safety goggles must be worn at all times
STAUFF pressure gauges are safety pattern type according to AS1349

www.stauff.com
Direct Accumulator Charging Kit • SKK20

Description
STAUFF’s accumulator direct charging kit - SKK20 is an essential instrument for the verification, pressurisation and nitrogen gas bleeding of STAUFF accumulators fitted with a SKK20 gas valve connection. Pre-charge pressure can be easily checked by coupling the safety gauge directly to the SKK20 gas valve connection on the STAUFF accumulator.

Features
The standard kit is delivered in a storage case containing the following:
1. 1 x Charging valve
2. 1 x SKK20 Test coupling 1/4” NPT (for regulator connection)
3. 1 x Safety pattern pressure gauge 0 - 250 bar (standard) according to AS1349-1986
4. 1 x 2 Metre hose
5. 1 x Safety goggles
6. 1 x Operating instructions

Available on request
- 0 - 25, 0 - 100 & 0 - 400 bar kit

Application
- For checking and pre-charging of accumulators with M16 x 2.0 (Test 20) or M12 x 1.65 (Test 12) STAUFF Test coupling connection (optional)

Safety Instructions and Recommendations
1. Before using the charging head carefully read the directions and safety instructions in this guide.
2. In all cases observe the pressure limits indicated on the accumulator pressure vessels. If necessary refer to the applicable operating instructions.
3. Before attempting to check the pre-charge pressure, the accumulator in the hydraulic circuit under pressure has to be isolated and discharged on the hydraulic side. If required immobilize it and define a safety zone.
4. Only use nitrogen gas with a purity ≥ 99.8% (N₂) to pressurise the accumulator.
5. STAUFF always recommends the use of a nitrogen gas regulator on the nitrogen gas bottle.
6. The charging valve (1) and pressure gauge (3) are tools for checking gas pressure and pre-charging accumulators. In cases where the gauge and gauge adaptor will be left on the accumulator, make sure that the gauge fitted is rated for the maximum system pressure of the hydraulic circuit.
7. Never use an accumulator in a hydraulic system without it first being pre-charged with the correct nitrogen gas pressure. Failure to do this will result in bladder or diaphragm damage.
8. Ensure safety goggles are worn when either checking or pre-charging accumulators.
9. To ensure optimum efficiency and performance of the hydraulic circuit, the pre-charge pressure must be checked frequently. STAUFF recommends the pressure be checked initially at intervals of 1 month, 3 months and then 6 months after installation. Depending on the amount of loss of pressure (if any) over this time, a planned maintenance schedule for monitoring the pressure can then be put into operation (check annually).

Only use “gas approved” test hose
For use with nitrogen (N₂) gas only
Safety goggles must be worn at all times
STAUFF pressure gauges are safety pattern type according to AS1349
Connection Flow Chart

1. Charging Valve

2. SKK20 Test Coupling 1/4” NPT (for regulator connection)
   - Optional
   - STAUFF Recommend the use of a Nitrogen Gas Regulator (refer to page 46)

3. Safety Pattern Pressure Gauge + Adaptor SMD20G1/4“

4. High Pressure Gas Hose DN4
   - Length: 2000 mm
   - Test 20 Connection
   - STAUFF SKK Gas Valve Coupling

* Ensure appropriate thread sealing compound is applied prior to connection

Pre-Charging - Optional Installation

Checking - Typical Installation
Checking the Pre-charge Pressure

**General**

1. Recommendation: Before proceeding to any operation concerning the initial pressurisation of an accumulator, consult the applicable operating instructions.

2. Pressurisation limits: Ensure that the SKK20 Charging Kit and any associated pressure gauge fitted are rated for the intended pressure for both pre-charging and pressure checking. Refer to the manufacturers specifications.
   - The nitrogen gas pressure varies as a function of the gas temperature. After each inflation and deflation of nitrogen gas, wait for the temperature to stabilise before checking the pressure (this may take several minutes depending on the accumulator size).
   - Never exceed the maximum stated design pressure (PS or DP) of the accumulator as stamped on the vessel. If in doubt consult the manufacturer or check manufacturer’s operating instructions or specification manual.

3. Taking into account the temperature influence on the pre-charge pressure: In order to observe the working pressures of the accumulator it is advised to adjust the inflation pressure (P0) according to the operating or control temperature. Refer to page 56 for inflation pressure corrections table.

**Bladder Accumulators**

*Refer to page 53 for connection flow chart*
- Remove the protection cap on the SKK gas valve coupling (F) fitted to the gas side of the accumulator
- Select the safety pattern pressure gauge and adaptor (3) and couple directly to the SKK gas valve coupling (F) on the STAUFF accumulator – pressure should now be indicated on the gauge
- To remove, uncouple the gauge from the STAUFF accumulator

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Pre-charging Accumulators Instruction

**General**

- **Note:** The following information applies to pre-charging new accumulators or after a bladder change when no gas pressure is present inside the accumulator.

Prior to pre-charging an accumulator it is important that the inside of the accumulator shell be lubricated. New STAUFF accumulators are already lubricated internally during the manufacture / assembly process. For older units or accumulators that have been repaired and a new bladder installed, STAUFF recommend that the accumulator be lubricated with enough system fluid to evenly coat the inside of the shell. To ensure good lubrication lay the accumulator horizontally and rotate on its axis.

The pre-charge setting is recommended to be set to 80% - 90% of the minimum system working pressure if no specific pressure has been calculated.

- Only use “gas approved” test hose
- For use with nitrogen (N2) gas only
- Safety goggles must be worn at all times
- STAUFF pressure gauges are safety pattern type according to AS1349
Applying the Pre-charge Pressure (Accumulator has no gas)

Charging Valve Connected Directly to Regulator

Typical Installation

Remove any plastic plugs that are fitted to the accumulator fluid port. Remove the accumulator gas valve protection cap and gas valve screw cap fitted to the gas side of the accumulator. Prepare a container to catch any fluid which may drain from the fluid port during charging.

Refer to page 53 for connection flow chart

- Ensure regulator used is fitted with STAUFF SKK20 or SKK12 test coupling (2)
- Make sure main valve on nitrogen gas bottle is closed
- Connect SDA20 adaptor end (C) of charging valve to SKK20 test coupling (2) fitted on regulator
- Connect gauge + adaptor (3) to charging valve (A)
- Connect one end of the gas hose to the SKK gas valve coupling (F) on the accumulator
- Connect remaining gas hose end to the charging valve (B)
- Slightly open the valve on the nitrogen gas source until a small amount of gas can be heard coming from the bleed valve (D) which should be open
- After 5 seconds (0.7 Ltr - 4 Ltr) and 10 to 20 seconds (10 Ltr - 55 Ltr) slowly close the bleed valve (D), allow pressure to increase
- Slowly increase the pressure from the nitrogen gas source by opening its valve until the indicated pressure increases to the desired setting. Wait until temperature and pressure are stable, and if needed increase the pressure again to the required setting. When the pre-charge pressure (P0) is reached and stabilised, close the valve of the nitrogen gas source
- Disconnect the hose end connected to the SKK gas valve coupling (F) and then disconnect from the charging valve (B)
- Remove charging valve (1) from regulator by unscrewing from SDA side (C)
- Connect the SDA20 adaptor end (C) of charging valve directly to the accumulator (ensuring pressure gauge (3) is still connected) and re-check pre-charge pressure. If pressure is above desired pressure, bleed off any excessive pressure using the bleed valve (D) until required pressure is reached
- Ensuring bleed valve (D) is closed, remove charging valve (1) from the SKK gas valve coupling (F)

Important: Whilst the gas hose (4) is connected to the SKK gas valve coupling (F), the SKK gas valve coupling is always open. Before attempting to remove any of the charge equipment, the gas hose (4) connected to the SKK gas valve coupling (F) must first be removed. Failure to do so will drain the nitrogen gas pressure from the accumulator.

Optional Installation

Remove any plastic plugs that are fitted to the accumulator fluid port. Remove the accumulator gas valve protection cap and gas valve screw cap fitted to the gas side of the accumulator. Prepare a container to catch any fluid which may drain from the fluid port during charging.

Refer to page 53 for connection flow chart

- Ensure regulator used is fitted with STAUFF SKK20 or SKK12 test coupling (2)
- Make sure main valve on nitrogen gas bottle is closed
- Connect SDA20 adaptor end (C) of charging valve to SKK gas valve coupling (F) fitted on STAUFF accumulator
- Connect gauge + adaptor (3) to charging valve (A)
- Connect one end of the gas hose to the SKK gas valve coupling (F) fitted on STAUFF regulator
- Connect remaining gas hose end to the charging valve (B)
- Slightly open the valve on the nitrogen gas source until a small amount of gas can be heard coming from the bleed valve (D) which should be open
- After 5 seconds (0.7 Ltr - 4 Ltr) and 10 to 20 seconds (10 Ltr - 55 Ltr) slowly close the bleed valve (D), allow pressure to increase
- Slowly increase the pressure from the nitrogen gas source by opening its valve until the indicated pressure increases to the desired setting. Wait until temperature and pressure are stable, and if needed increase the pressure again to the required setting. When the pre-charge pressure (P0) is reached and stabilised, close the valve of the nitrogen gas source
- Disconnect the hose from charging valve (B) and then from the nitrogen gas regulator (2)
- With charging valve (1) still coupled directly to the accumulator (ensuring pressure gauge is still connected) re-check pre-charge pressure. If pressure is above desired, bleed off any excessive pressure using the bleed valve (D) until required pressure is reached
- Ensuring bleed valve (D) is closed, remove charging valve (1) from the SKK gas valve coupling (F)

Maintenance of the STA-CK Charging Valve (1)

It is recommended to check the various connections and adaptors at regular intervals for cleanliness, detection of possible defects, thread wear and sealing parts.

Please contact your local STAUFF office for further information.

Only use “gas approved” test hose

For use with nitrogen (N2) gas only

Safety goggles must be worn at all times

STAUFF pressure gauges are safety pattern type according to AS1349
### Basis of Calculation

\[
P_0 t_2 = P_0 t_1 \times \frac{t_2 + 273}{t_1 + 273}
\]

Value of the nitrogen gas inflation pressure \((P_0)\) according to the operating temperature \((t_2)\)

**Example:** Inflation pressure \((P_0)\) at operating temperature \(t_2\) in bar (absolute value) = 88 bar

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<td>6</td>
<td>6.2</td>
<td>6.4</td>
<td>6.5</td>
</tr>
</tbody>
</table>

---

**Example:**

Nitrogen gas inflation pressure \((P_0)\) at 20°C / 68°F (absolute value) = 80 bar

Operating temperature \(t_1\) = 50°C / 122°F
## Conversion Factors

### Length

<table>
<thead>
<tr>
<th>Multiply</th>
<th>By</th>
<th>To Obtain</th>
</tr>
</thead>
<tbody>
<tr>
<td>inch</td>
<td>25.4</td>
<td>millimetres (mm)</td>
</tr>
<tr>
<td>inch</td>
<td>0.0254</td>
<td>metres (m)</td>
</tr>
<tr>
<td>foot</td>
<td>0.3048</td>
<td>metres (m)</td>
</tr>
<tr>
<td>yards</td>
<td>0.9144</td>
<td>metres (m)</td>
</tr>
<tr>
<td>mile</td>
<td>1.6109</td>
<td>kilometres (km)</td>
</tr>
</tbody>
</table>

### Pressure

<table>
<thead>
<tr>
<th>Multiply</th>
<th>By</th>
<th>To Obtain</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs/sq.in. (psi)</td>
<td>0.069</td>
<td>bar</td>
</tr>
<tr>
<td>lbs/sq.in. (psi)</td>
<td>6.89</td>
<td>kilopascals (kPa)</td>
</tr>
<tr>
<td>atmosphere (atm)</td>
<td>1.013</td>
<td>bar</td>
</tr>
<tr>
<td>kg/cm²</td>
<td>0.981</td>
<td>bar</td>
</tr>
<tr>
<td>bar</td>
<td>100</td>
<td>kilopascals (kPa)</td>
</tr>
<tr>
<td>megapascal (MPa)</td>
<td>10</td>
<td>bar</td>
</tr>
<tr>
<td>inch mercury (Hg)</td>
<td>3.377</td>
<td>kilopascals (kPa)</td>
</tr>
<tr>
<td>foot water (H₂O)</td>
<td>2.99</td>
<td>kilopascals (kPa)</td>
</tr>
<tr>
<td>metre (H₂O)</td>
<td>9.81</td>
<td>kilopascals (kPa)</td>
</tr>
</tbody>
</table>

### Mass (Weight)

<table>
<thead>
<tr>
<th>Multiply</th>
<th>By</th>
<th>To Obtain</th>
</tr>
</thead>
<tbody>
<tr>
<td>ounce</td>
<td>28.35</td>
<td>grams (gms)</td>
</tr>
<tr>
<td>pound</td>
<td>0.4536</td>
<td>kilograms (kg)</td>
</tr>
<tr>
<td>ton (long)</td>
<td>2240 lbs</td>
<td>tonne</td>
</tr>
<tr>
<td>ton (short)</td>
<td>2000 lbs</td>
<td>tonne</td>
</tr>
<tr>
<td>tonne</td>
<td>1,000</td>
<td>kilograms (kg)</td>
</tr>
</tbody>
</table>

### Power & Torque

<table>
<thead>
<tr>
<th>Multiply</th>
<th>By</th>
<th>To Obtain</th>
</tr>
</thead>
<tbody>
<tr>
<td>horsepower (hp)</td>
<td>.7457</td>
<td>kilowatts (kW)</td>
</tr>
<tr>
<td>foot lbs (lb/ft)</td>
<td>1.356</td>
<td>Newton metres (Nm)</td>
</tr>
<tr>
<td>inch lbs (in/lb)</td>
<td>0.113</td>
<td>Newton metres (Nm)</td>
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</table>

### Volume

<table>
<thead>
<tr>
<th>Multiply</th>
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<th>To Obtain</th>
</tr>
</thead>
<tbody>
<tr>
<td>gallon (imp.)</td>
<td>4.546</td>
<td>litres (l)</td>
</tr>
<tr>
<td>gallon (US)</td>
<td>3.785</td>
<td>litres (l)</td>
</tr>
<tr>
<td>cubic inch</td>
<td>16.39</td>
<td>cubic centimetres (cm³)</td>
</tr>
<tr>
<td>cubic inch</td>
<td>16.39</td>
<td>millilitres (mm³)</td>
</tr>
<tr>
<td>cubic foot</td>
<td>0.0283</td>
<td>cubic metres (m³)</td>
</tr>
<tr>
<td>cubic foot</td>
<td>28.2</td>
<td>litres (l)</td>
</tr>
</tbody>
</table>

### Flow

<table>
<thead>
<tr>
<th>Multiply</th>
<th>By</th>
<th>To Obtain</th>
</tr>
</thead>
<tbody>
<tr>
<td>gal/min (imp)</td>
<td>4.546</td>
<td>litres/min (lpm)</td>
</tr>
<tr>
<td>gal/min (US)</td>
<td>3.785</td>
<td>litres/min (lpm)</td>
</tr>
<tr>
<td>std. cu.ft./min (air)</td>
<td>0.472</td>
<td>litres/sec (l/sec)</td>
</tr>
</tbody>
</table>
Bladder Replacement
Assembly Procedure

Note: Prior to assembly of the accumulator please ensure the following are checked first
A. Always ensure that the assembly is carried out in a clean area
B. Make sure that the replacement bladder is designed and sized for the accumulator being repaired
C. Where possible, ensure that any potential system fluid still in the accumulator is not harmful or can cause harm if it comes into contact with human skin, especially in the case of phosphate ester fluids. If necessary wear protective clothing
D. Make sure there is no internal or external corrosion on the accumulator or any evidence of damage to the shell prior to assembling the accumulator
E. It is the responsibility of the person doing the repair to ensure that the accumulator complies with any relevant government requirements such as design verification and registration including regular inspections
If a problem is discovered regarding D. and E. (above) then the accumulator should not be reassembled and preferably discarded

Assembly Instructions

1. Ensure that the inside of the shell is well lubricated with system fluid.
Note: In some cases standard hydraulic fluid may not be compatible with the system fluid therefore an alternative fluid may need to be used.

2. Remove all air from the bladder and fold neatly. Position bladder inside accumulator so that the bladder stem protrudes through the small opening at the other end of the shell.

3. Fit name plate and locknut to bladder stem.

4. Place fluid port inside the shell poppet valve facing inwards.

5. Place anti-extrusion ring inside the shell by folding ring. Once inside make sure the metal ring is facing outwards.

6. Slide the anti-extrusion ring over the fluid port inside the accumulator shell.

7. Grip the fluid port body from inside the shell and pull out as far as possible.

8. Holding the fluid port body firmly install the O-ring by hand.

9. Using existing flanged washer and locknut, tighten until O-ring is inserted evenly into position.
Bladder Replacement
Assembly Procedure continued...

10. Remove flanged washer and locknut to enable installation of nylon back-up washer.

11. Ensuring the fluid port body does not get dislodged - insert the nylon back-up washer so that the concave face on the washer faces the O-ring.

12. Attach first the flanged washer and then the locknut. Ensure the locknut is tightened using an appropriate spanner.

13. Fit the bleed plug or STAUFF test coupling (if fitted) and tighten.

14. Tighten locknut to the bladder stem. Ensure that when tightened the bladder stem does not rotate.

15. Fit the gas valve assembly.

16. Fit the gas valve assembly cap.

17. Fit the gas valve protection cap.

Disposal Information
Dispose of used hydraulic fluid and damaged parts responsibly and according to local disposal regulations.
Bladder Replacement
Disassembly Procedure

As accumulators store fluid under pressure they are considered a pressure vessel, and therefore must comply with the relevant design standards for the country in which they are used. All work on accumulators must be completed by a qualified person.

⚠️ Note: Prior to disassembly of the accumulator please ensure the following are checked first:

A. The pre-charge pressure is released from the accumulator and there is no gas pressure left in the accumulator. Use an appropriate pre-charging head connected to the gas valve and check to see that the gauge reads zero pressure. Open the bleed valve on the charging head and make sure no gas can be heard coming from the accumulator. Refer to pages 50 & 54 for STAUFF pre-charging instructions.

B. Check to make sure that the poppet valve located in the fluid port is fully in the open position. Refer to figure 4a.

⚠️ Note: If the poppet valve is still in the closed position and the stem is extended (out position), DO NOT attempt to service the vessel and contact the manufacturer.

C. Where possible, ensure that any potential system fluid still in the accumulator is not harmful or can cause harm if it comes into contact with human skin, especially in the case of phosphate ester fluids. If necessary wear protective clothing.

Disassembly Instructions

1. Remove the protection cap.
2. Ensure that the poppet valve is fully open. The poppet valve stem should be fully retracted as per above.
3. Remove the gas valve assembly cap.
4. Remove the gas valve assembly or gas valve core.
5. Attach STAUFF pre-charging head and release any pre-charge from the accumulator.
6. Remove the bladder locknut and name plate.
7. Remove the bleed valve on the fluid port.
8. Remove the fluid port locknut with an appropriate “C” spanner along with the flanged washer.
9. Remove the nylon back-up washer along with the O-ring.
Bladder Replacement
Disassembly Procedure continued...

10a. Remove the fluid port assembly by first pushing the fluid port back into the inside of the shell.

10b. From inside the shell slide the anti-extrusion ring off the fluid port body. Fold ring and remove from the shell.

10c. The fluid port can then be removed from the shell.

11. Remove as much air as possible from the bladder, then remove the bladder from the shell. DO NOT use any sharp objects that could damage the bladder.

12. Inspect the bladder. In cases where there are signs of damage, wear or swelling then the bladder should be replaced. Refer to page 62 & 63 outlining potential damages, causes and response.

Disposal Information
Dispose of used hydraulic fluid and damaged parts responsibly and according to local disposal regulations.
<table>
<thead>
<tr>
<th>Type of Damage</th>
<th>Cause</th>
<th>Response</th>
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<tbody>
<tr>
<td><strong>External Leakage from Gas Valve</strong></td>
<td>Any leakage from the gas valve if not detected will eventually lead to bladder failure.</td>
<td>Any loss of nitrogen from the gas valve will cause the compression ratio on the bladder to exceed and cause early bladder failure. Always ensure that after pre-charging or during service intervals where the pre-charge is checked, that the gas valve is checked for leaks.</td>
</tr>
<tr>
<td>Severe leakage from the gas valve.</td>
<td>Gas valve assembly or valve core damaged.</td>
<td>Replace gas valve.</td>
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<tr>
<td></td>
<td>Incorrect charge valve used.</td>
<td>Ensure the correct charging equipment is used.</td>
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<tr>
<td></td>
<td>Gas valve has been tampered with.</td>
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<tr>
<td><strong>External Leakage from Fluid Port</strong></td>
<td>Leaking oil between fluid port body and accumulator shell.</td>
<td>Replace fluid port O-ring.</td>
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<tr>
<td></td>
<td>Damaged O-ring caused during assembly or O-ring has become hard due to high oil temperatures.</td>
<td>Check assembly methods.</td>
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<tr>
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<td>Check oil system temperature.</td>
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<tr>
<td><strong>Internal Leakage from Bladder</strong></td>
<td>Upon pre-charge and less than 29 PSI (2 bar) the bladder fails leaving a star shaped burst pattern at the bottom of the bladder.</td>
<td>The accumulator was not lubricated properly and/or pre-charged too quickly. Excessive stretching of the bladder or the lower region has been caught in the poppet valve. Replace bladder. Ensure that the shell and bladder are well lubricated with system fluid. Pre-charge very slowly until the poppet valve is closed.</td>
</tr>
<tr>
<td>Bladder has abrasion lines on 1, 2 or 3 sides. There is a failure along one of the marked lines.</td>
<td>The compression ratio between max. and min. pressure is too high. The pre-charge pressure is too low or has not been checked for a long time. Gas permeation is an issue.</td>
<td>Replace bladder. Ensure that the compression ratio is below 4:1 Check pre-charge pressure more frequently. Replace with bladder that has a higher acrylonitrile percentage.</td>
</tr>
<tr>
<td>Bladder has failed at the bonded seam Vulcanizing failure.</td>
<td>Bladder has rubbed on the inside of the shell due to the compression ratio too high. Manufacturing or material fault.</td>
<td>Replace bladder. Ensure that the compression ratio is below 4:1 Check pre-charge pressure more frequently. Replace with bladder that has a higher acrylonitrile percentage.</td>
</tr>
<tr>
<td>Bladder has a circular cut mark on the base.</td>
<td>Pre-charge pressure is too high.</td>
<td>Lower pre-charge pressure.</td>
</tr>
<tr>
<td>Bladder has a pin hole.</td>
<td>Loss of pre-charge pressure, leaking gas valve, the pre-charge pressure has not been checked.</td>
<td>Replace bladder. Check pre-charge more frequently.</td>
</tr>
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</table>
## Trouble Shooting Guide

<table>
<thead>
<tr>
<th>Type of Damage</th>
<th>Cause</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Leakage from Bladder</td>
<td><strong>Bladder has hardened and is carbonized.</strong></td>
<td>Replace bladder.</td>
</tr>
<tr>
<td></td>
<td>Accumulator cycle time is very quick along with a very high compression ratio, causing high gas temperature.</td>
<td>Check accumulator cycle time and reduce or increase size of accumulator.</td>
</tr>
<tr>
<td></td>
<td>Oil temperature is too high.</td>
<td>Ensure oil temperature is lowered to the correct level.</td>
</tr>
<tr>
<td></td>
<td><strong>Bladder is swollen.</strong></td>
<td>Check compatibility of the bladder material with the fluid used.</td>
</tr>
<tr>
<td></td>
<td>Incorrect bladder material.</td>
<td>Consult accumulator manufacturer.</td>
</tr>
<tr>
<td></td>
<td>System fluid is not compatible with the bladder material.</td>
<td></td>
</tr>
<tr>
<td>Anti- Extrusion Ring</td>
<td><strong>Anti-extrusion ring has split into two halves after disassembly.</strong></td>
<td>Replace anti-extrusion ring.</td>
</tr>
<tr>
<td></td>
<td>Normal wear and tear.</td>
<td></td>
</tr>
<tr>
<td>Fluid Port Assembly</td>
<td><strong>Worn poppet valve.</strong></td>
<td>Replace fluid port assembly.</td>
</tr>
<tr>
<td></td>
<td>Excessive side movement in the poppet valve or poppet valve is sticking when pushed down.</td>
<td>Ensure pre-charge pressure is lowered to &lt;90% of minimum working pressure.</td>
</tr>
<tr>
<td></td>
<td>Normal wear.</td>
<td>Decrease flow rate or use a larger accumulator with bigger port.</td>
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<td></td>
<td>Poppet valve is operated during each cycle.</td>
<td>Increase the number of accumulators used to reduce the output flow.</td>
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<td></td>
<td>The pre-charge is too close or higher than the minimum working pressure.</td>
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<td></td>
<td>The flow rate from the accumulator is above the recommend flow rate for that model.</td>
<td></td>
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<tr>
<td></td>
<td><strong>Poppet valve is broken.</strong></td>
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<tr>
<td></td>
<td>Very high cycling application.</td>
<td></td>
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<tr>
<td></td>
<td>Poppet valve is operated during each cycle.</td>
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<tr>
<td></td>
<td>The flow rate from the accumulator is above the recommend flow rate for that model.</td>
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<tr>
<td>Contact your local STAUFF office for more information</td>
<td><a href="http://www.stauff.com">www.stauff.com</a></td>
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</tr>
</tbody>
</table>
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