



*** Pump Pulsation Dampers * Pipeline Surge Absorbers * Thermal Expansion Compensators * Hydro-pneumatic Accumulators ***

Installation, Operating and Maintenance Instructions - DS, FG, DP, DV, HG Series Units

General

These units may be used as Pump Pulsation Dampers, Pipeline Surge Absorbers, Thermal Expansion Compensators or Accumulators and all operate by having a compressible gas on one side of a separating membrane, the other side being connected to the liquid line, used correctly they are totally safe and will give many years of reliable service.

Safety

As with all hydro-pneumatic products, caution should be exercised when handling and charging this type of equipment and should only be carried out by trained personnel - they contain energy in the form of compressed gas.

It is essential to read and understand the CA-7 Charging Instructions before any maintenance work is carried out.

UNDER NO CIRCUMSTANCES PRE-CHARGE WITH OXYGEN DUE TO THE RISK OF EXPLOSION

It is however perfectly acceptable for pressures below 7 bar to pre-charge using air pressure from an air line, foot or handpump; Nitrogen should be used at pressures above this. (Refer to CA-7 Charging Instructions)

Unless otherwise specified in your purchase order, a small amount of silicone grease will be used to lubricate the rubber components during assembly at the factory, please check that this will not effect the process or the liquid being handled.

When provided, lifting eyes or lugs should be used for lifting the unit.

Storage

Units must be stored in a certain manner to prevent mechanical damage to the shell and branch connections. If the unit is to be put into storage for more than 6 months, it is advisable to release its gas pre-charge. However where units have a pre-charge exceeding 320 bar g the gas pressure should be released when it is put into storage for a period more than 2 weeks.

Store away from extremes of temperature! The bladders are manufactured from elastomers which may suffer degradation at temperatures below minus 10°C or above 70°C.

If the unit has been in use prior to storage then the bladder should be removed and cleaned of any process fluid.

Prior To Installation

- Check the correct connection has been supplied.
- Ensure that the maximum working pressure and temperature to which the unit may be subjected does not exceed the working pressure and temperature marked on the unit. If for any reason the working pressure of the unit cannot be ascertained, then check with our works quoting the serial number on the unit.
- Check that the unit is pre-charged. Units are usually supplied already pre-charged this would normally be marked on the unit. If installation is taking place within 3-4 months of original supply then it should not need checking. If the unit has not been supplied precharged or only has a nominal 'transit' precharge (often 1 bar) then pre-charging should be carried out in accordance with relevant Flowguard pre-charging instructions. As a general guide pre-charge pressure should be as follows.
- **Pump Discharge and Suction Dampers -80% of minimum operating or minimum suction pressure at working temperature.** If the precharge of any of your units is significantly different to this or if you have any other questions regarding precharge, contact Flowguard USA by telephone or fax quoting the serial number.

- All units are tested before shipment and traces of test fluid, (water or emulsion), may still be present inside the unit. If these traces of fluid are likely to cause any problems when mixed with your process fluid then the units must first be flushed out at system pressure.

Mounting

Generally units should be mounted in a vertical position either way up. Most units below size 50 however, can be successfully mounted in a horizontal position. Single ported dampers should be fitted on a 'Tee' as close as practicable to the pump, keeping the length of the branch as short as possible, the longer the branch the less effective the damper will be.

NOTE: Unless stated otherwise on the order, we have made no allowances for supporting the damper. The installer should support the damper and pipework in such a manner as to prevent excessive loadings or stresses on the vessel and branches.

After Installation

- Ensure that the charging valve cap is hand tight. This cap contains a seal that is the main defence against loss of gas through the charging valve core. The valve core, a non-return valve, prevents gas loss in the short term, and can leak over a long period.
- Using soapy water (50% dish soap is ideal) check the charging valve, charging valve cap and the whole vessel end for any signs of gas leakage. This is best done with the unit at normal working pressure but it is usually effective if carried out at precharge pressure.
- If a pressure gauge is fitted to the pump watch the needle closely when the pump is first switched on. As pressure builds up the flickering of the needle due to pulsations should cease or be considerably reduced as the precharge is reached. In the absence of the correct precharge checking device this is a reasonably accurate way of checking the precharge.

Maintenance

Pulsation Dampers need very little maintenance. The gas precharge should be checked periodically to ensure that no leakage has taken place, using charging kit CA7. It should be noted that when checking the pressure, a small amount of nitrogen is released from the vessel into the charging assembly and its connecting hose. This will cause the reading to be slightly low. **IMPORTANT NOTE – ENSURE SYSTEM IS OFF AND SYSTEM PRESSURE IS DRAINED WHEN CHECKING OR ADJUSTING PRECHARGE PRESSURE!! BLADDER DAMAGE IS LIKELY TO OCCUR IF SYSTEM IS STILL RUNNING WHILE PRECHARGE IS CHECKED OR ADJUSTED!!**

Any small losses in precharge pressure may also be due to temperature variations. If small losses are detected the pressure should be topped up. If, however, losses are significant or persistent the cause of the leak should be ascertained and a repair affected.

Extreme caution should be exercised during disassembly when the vessel has been used on corrosive or toxic substances as, even after flushing small amounts of fluid may remain, particularly if the bladder is punctured.

Disassembly

- Prior to disassembly ensure that the unit is isolated from the process line or the process line is depressurised and drained down.
- Release the gas using a suitable charging assembly (see leaflet CA7).
- Remove gas bladder from gas chamber as follows:
- Remove charging valve (Fig 1)
- High pressure units (type HG) are fitted with a threaded retaining ring which may be removed with a peg spanner. Other units (types FG & DS) are fitted with a split retaining ring which should be removed by tapping gas header down bore with a soft faced mallet until retaining ring is fully exposed (Fig 2). This ring, which is in three segments (Fig 5) may now be removed from the groove by sliding rings together to form a gap (Fig 6), slide one segment out of the groove with a screwdriver (Fig7) and then lift out of groove (Fig 8). For types DP the construction is the same as FG/DS except that the retaining ring is replaced by a single piece of spring material.
- Fit extractor bolt with suitable mating thread into charging valve hole (Fig 3).

- Header plug may now be levered out using two levers to ensure that header plug remains square to the axis of the bore. On the larger sizes it may be necessary to use spacers on end of shell to give enough clearance (Fig 4).
- Bladder may now be removed from gas header plug.

Reassembly

- It is recommended that the inner and outer seals are replaced each time the damper is stripped down.
- Assemble bladder onto gas header ensuring that the inner seal is replaced in the correct position on the gas header and the outer seal is correctly positioned in its groove in the shell.
- Smear the outer seal and top of the bladder with a lubricant which is compatible with the bladder and the process liquid. Silicone grease is used at the factory unless otherwise stated on your purchase order.
- Assemble bladder and gas header into bore of shell.
- High Pressure units-Tap gas header down bore with a soft faced mallet until the retaining ring thread is fully exposed. Do not use the threaded retaining ring to force the gas header down as this can cause the threads to gall.
- Low Pressure units-Tap gas header down bore with a soft faced mallet until retaining ring groove is exposed. The ring which is in three segments may now be fitted into the groove.
- Fit extractor tool with suitable mating thread into charging valve hole (Fig 3).
- Header plug may now be levered up using two levers to ensure that the header plug remains square to the axis of the bore and the retaining ring segments are seated correctly.
- Replace charging valve and recharge damper with nitrogen to the pressure specified on the label.
- Replace weather protection cap if supplied.
- Suction Dampers which may work at pressure close to, or below, atmospheric pressure may be fitted with screws and washers to prevent the gas header from being sucked down the bore. These must be refitted after maintenance.
- Dampers which may be subjected to high compression ratios may be furnished with a cushion fluid on the gas side of the bladder. The volume of fluid to be used is normally 25% of the nominal volume. The fluid used should be compatible with the system fluid in order to avoid any problems in the event of bladder failure.

Basic Accessories and spares

Description	Part Number
Standard 1215 stainless steel charging valve – NPT thread	1215/N
Standard 1215 stainless steel charging valve – UNF thread	1215/U
Low Pressure Adaptor; converts 1215 to Schraeder Valve connection	SK-AD-15/11
Gas Headers Extractor with 1/4" NPT Thread	SK-TL-GHX/N
Gas Headers Extractor with 1/2" UNF Thread	SK-TL-GHX/U
Peg Spanner for removal of Threaded Retaining Rings	SK.TL.PSR