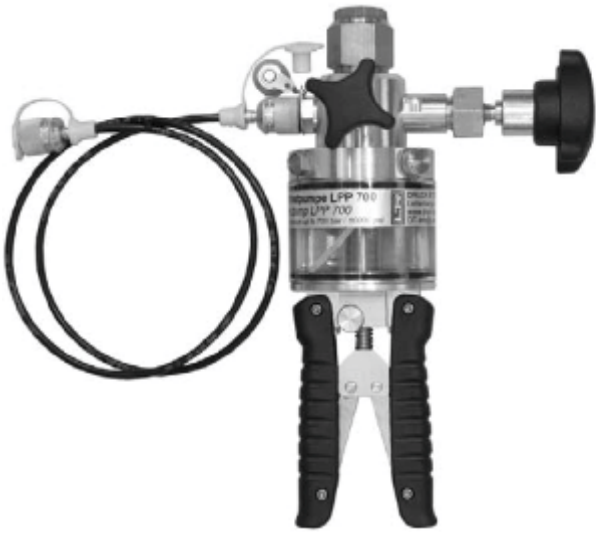
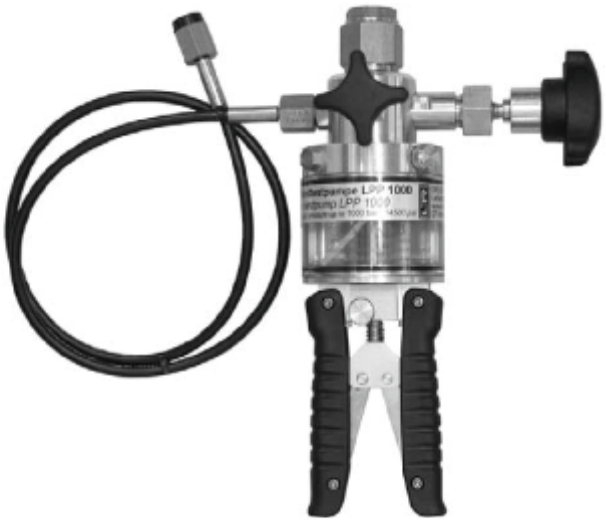
Operating Manual



PGS 700



PGS 1000

Hydraulic pressure test pump
for generating calibration pressure
up to 10,150 psi or up to 14,500 psi

1. General information

The hydraulic pressure test pumps **PGS 700** and **PGS 1000** described in this operating instructions has been designed and manufactured using state-of-the-art technology.
All components are subject to stringent quality and environmental criteria during production. Our management systems are certified to ISO 9001.

These operating instructions contain important information on handling the instrument. Working safely requires that all safety instructions and work instructions are observed.

Observe the relevant local accident prevention regulations and general safety regulations for the instrument‘s range of use.

This operating instructions are part of the product and must be kept in the immediate vicinity of the instrument and readily accessible to skilled personnel at any time.

Skilled personnel must have carefully read and understood this operating instructions prior to beginning of work.

The manufacturer‘s liability is void in the case of any damage caused by using the product contrary to its intended use, non-compliance with these operating instructions, assignment of insufficiently qualified personnel or unauthorised modifications to the instrument.

The general terms and conditions contained in the sales documentation shall apply.

Subject to technical modifications.

Explanation of symbols

WARNING!
Indicates a potentially dangerous situation that can result in serious injury or death, if not avoided.

CAUTION!
Indicates a potentially dangerous situation that can result in light injuries or damage to the equipment or environment, if not avoided.

Information
Points out useful tips, recommendations and information for efficient and trouble-free operation.

2. Safety

WARNING!
Before installation, commissioning and operation, ensure that the approbriate hydraulic pressure test pump has been selected in terms of pressure range, design and specific measuring conditions.
Non-observance can result in serious injury and/or damage to the equipment.

Further important safety instructions can be found in the individual chapters of these operating instructions.

2.1 Intended use

Pressure test pumps serve as pressure generators for the testing, adjustment and calibration of mechanical and electronic pressure measuring instruments through comparative measurements. These pressure tests can take place in the laboratory or workshop, or on site at the measuring point.

The hydraulic pressure pressure test pump features two connections, for the test item and reference measuring instrument. If one connects the test item and a sufficiently accurate reference instrument to the pressure test pump, on actuating the pump, the same pressure will act on both instruments. By comparison of the two measured values at any given pressure value, a check of the accuracy and/or adjustment of the pressure measuring instrument under test can be carried out.

The pressure test pump enables rapid filling of the test system and pressure generation up to 700 resp. 1,000 bar. The fine adjustment valve enables fine pressure adjustment.

The term „reference measuring instrument“ in these operating instructions refers to any pressure measuring instrument, such as: pressure gauge, electrical pressure measuring instrument and pressure transmitter with electrical output. The hydraulic pressure test pump system is only as accurate as the reference measuring instrument used. The reference measuring instrument should be regularly calibrated in order to ensure that its accuracy is maintained.

The pressure test pumps **PGS 700** and **PGS 1000** have been designed and built solely for the intended use described here, and may only be used accordingly.

The technical specifications contained in these operating instructions must be observed. Improper handling or operation of the instrument outside of its technical specifications requires the instrument to be taken out of service immediately and inspected by an authorised EiUK service engineer.

Handle mechanical precision precision instruments with the required care (protect from humidity, impacts, strong magnetic fields, static electricity and extreme temperatures, do not insert any objects into the instrument or its openings).

If the instrument is transported from a cold into a warm environment, the formation of condensation may result in instrument malfunction. Before putting it back into operation, wait for the instrument temperature and the room temperature to equalise.

2.2 Personnel qualification

WARNING!
Risk of injury should qualification be insufficient! Improper handling can result in considerable injury and damage to the equipment.

- The activities described in these operating instructions may only be carried out by skilled personnel who have the qualifications described below.
- Keep unqualified personnel away from hazardous areas.

Skilled personnel
Skilled personnel are understood to be personnel who, based on their technical training, knowledge of measurement and control technology and on their experience and knowledge of country-specific regulations, current standards and directives, are capable of carrying out the work described and independently recognising potetial hazards.

Special operating conditions require further appropriate knowledge, e.g. of aggressive media.

2.3 Personal protective equipment (P.P.E.)
The personal protective equipment is designed to protect the skilled personnel from hazards that could impair their safety or health during work. When carrying out the various tasks on and with the instrument, the skilled personnel must wear personal protective equipment.

Follow the instructions, displayed in the work area, regarding personal protective equipment!

The required personal protective equipment must be provided by the operating company.

Wear safety goggles!
Protect eyes from flying particles and liquid splashes.

2.4 Special hazards

WARNING!
To ensure safe working on the instrument, the operating company must ensure
- that suitable first-aid equipment is available and aid is provided whenever required.
- that the operating personnel are regularly instructed in all topics regarding work safety, first aid and environmental protection and knows the operating instructions and, in particular, the safety instructions contained therein.

WARNING!
Residual media on the hydraulic pressure comparison test pump can result in a risk to persons, the environment and the equipment. Take sufficient precautionary measures.

2.4.1 Mineral oil health and safety information

EiUK Eurotron Instruments UK provide hydraulic mineral oil in containers up to 1 l, labelled „PGS-FLUID“, for use up to 4,000 bar in pressure test pumps. It is no more hazardous than other common lubricating oils.

It is the nature of the way in which this equipment is used, that there could be frequent and/or prolonged skin contact; in a few individuals this could give rise to skin irritation (Keratosis or Dermatitis). The use of an effective barrier cream and/or protective gloves will greatly reduce this possibility.

Description of the hydraulic fluid based on mineral oil „PGS-FLUID“:

Closed flash point: greater than 120°C
Storage: not above 30°C
Oral LD 50: 15 g per kg body weight
Threshold limit value: 5 mg/m³
Fire extinguishing media: CO2/dry chemical foam or water fog
Spillage: Soak with absorbent clay or proprietary absorbent
Waste disposal: Burn or dump in approved arrea.

Emergency treatment of acute effects:

Ingestion: Do not induce vomiting. Administer 250 ml milk or olive oil. The main hazard following accidental ingestion is aspiration of liquid into lungs.
Aspiration: Send to hospital immediately.
Inhalation: Remove to fresh air, if nausea persists seek medical attention.
Eye contact: Wash with copious amounts of water for at least 10 minutes. If irritation results or persists, obtein medical advice.
Skin contact: Where skin rashes or other abnormalities occur as a result of prolonged or repeated contact, medical advice should be obtained as soon as possible.

2.4.2 Other liquids

The pressure test pumps **PGS 700** and **PGS 1000** may also be operated with clean destilled water. In this case, the pump must be emptyed after each usage. We recommend destilled water as used for steam iron plates (NOT perfumed!) or for car batteries.
On request, the model **PGS 1000** is also available in a version suitable for SKYDROL or break fluids. This version is marked by „-S“ in the serial number stamped on the bottom side of the pump‘s body. The SKYDROL version may NOT be used with water or mineral oil based hydraulic fluids.

2.5 Labelling, safety marks

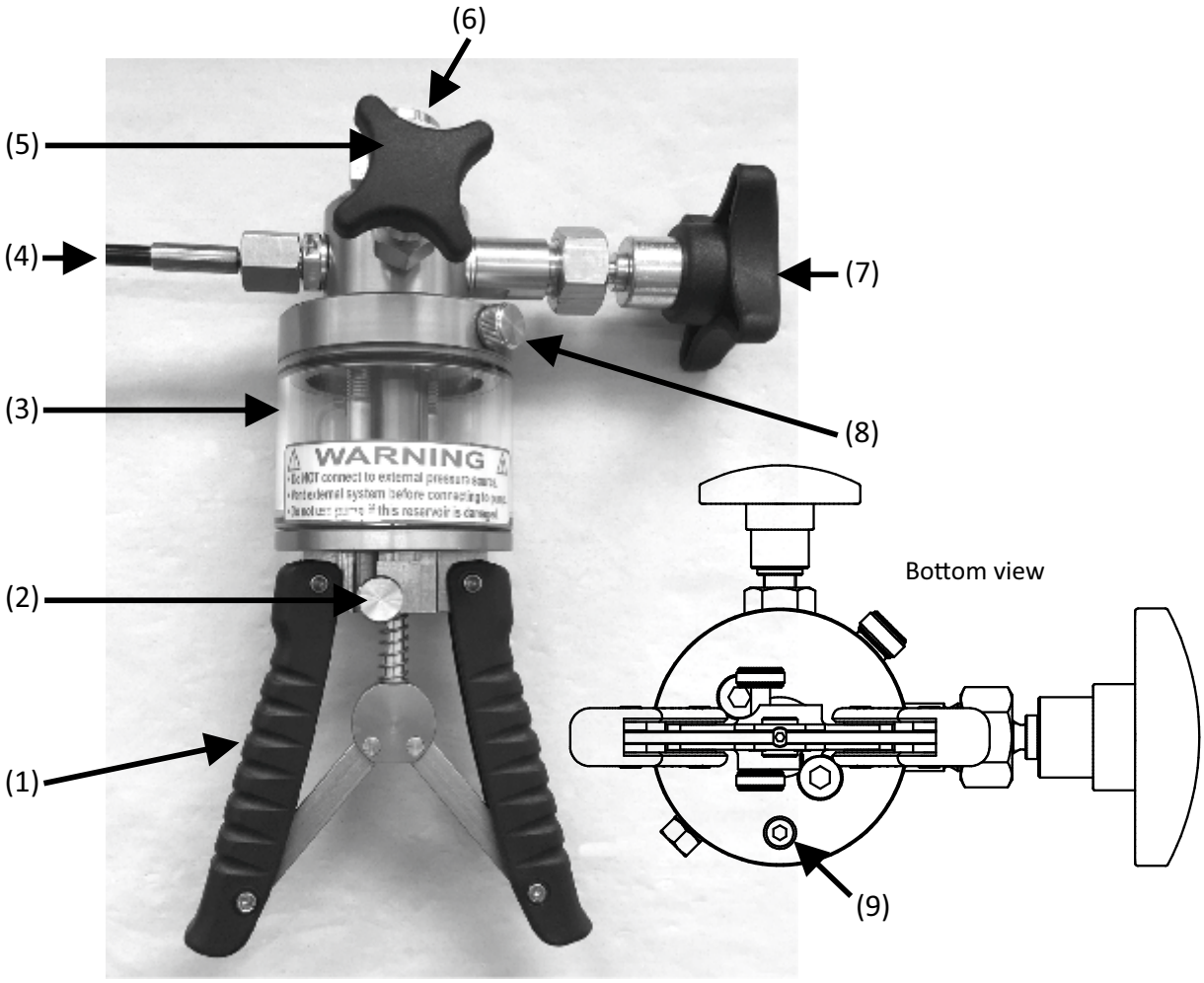
The type label shows, that these operating instructions have to be read before usage of this device. Furthermore, model name and pressure range are printed on the type label. The serial number is stamped on the bottom side of the pump‘s body..

CE **CE, Communauté Européenne**
Instruments bearing this mark comply with the relevant European directives.

3. Specifications

Pressure port for reference pressure instrument:
1/2" BSP female rotating swivel nut, with O-ring, at the top of the pump. (After dismounting of this swivel nut using a Allen key, the 3/8" BSP female thread can be used.)
Pressure port for unit under test:
1/4" BSP female rotating, with O-Ring, at the open end of the supplied test hose.
(Version **PGS 700**: MINIMESS 1620 test hose with 1/4" BSP female thread at open end,
Version **PGS 1000**: high pressure hose)
Reservoir: >200 cm^3, can be refilled during pump operation,
with drain screw (for 4 mm allen key) for dumping of the operation fluid
Pressure adjustment: handles, volume fine adjustment valve and pressure release valve
Volume per stroke: priming pressure 81.6 mm^3, high pressure 21 mm^3
Dimension: approx. 270 x 160 x 120 mm (without test hose)
Weight: approx. 1.3 kg (without test hose)

3.1 Operating controls



(1) Pump handles
(2) Toggle „priming pressure“ / „high pressure“
(3) Reservoir
(4) Test hose (with connection for unit under test)
(5) Pressure release valve
(6) Pressure port for reference pressure instrument (1/2" BSP female rotating swivel nut)
(7) Fine pressure (valume) adjustment valve
(8) Filling plug for filling and emptying the reservoir with operation fluid
(9) Drain screw (for dumping the operation fluid) M5 x 6 with O-ring 4 x 2
For opening, an allen-key (4 mm) is needed. Max. torque 15 Nm.

When using thread adapters, the thread adapters has to be connected pressure tight to the test item first.
After that the test item with mounted adapters can be inserted into the test connection and can be oriented.

3.2 Operating fluids to be used

The pressure test pumps are suitable for:

- Hydraulic fluids based on mineral oil.
  (We recommend our oil order-code **PGS-FLUID**.)

- Destilled water
  (We recommend destilled water like used for steam iron plates, NOT perfumed or car batteries.)

If used with water:
- After each usage, the instrument has to be emptied and let dryed out.
(Drain screw at the bottom of the reservoir.)
- As soon as first cloudiness, particles or dirt become visible: change the fluid (water).

The special model suitable for SKYDROL (“S“ added at serial number) is suitable for Skydrol and break fluids only (NOT for water or mineral oil).


Change the operating fluid as soon as cloudiness, particles or dirt become visible in the reservoir!


War safety goggles!
Protect eyes from flying particles and liquid splashes.

4. Design and function

4.1 Description

The hydraulic pressure test pumps **PGS 700** and **PGS 1000** features optimal characteristics for use in the laboratory, as well as the ruggedness needed for industrial applications. They are suitable for pressure generation up to 700 bar resp. 1,000 bar.
Unit under test is connected to the open end of the test hose, the reference pressure instrument to the top of the pressure test pump.

4.2 Scope of delivery

- Pressure test pump
- Operating instructions in English language

Cross-check scope of delivery with delivery note.

5. Transport, packaging and storage

5.1 Transport

Check the pressure test pump for any damage that may have been caused by transport.
Obvious damage must be reported immediately.

5.2 Packaging

Do not remove packaging until just before usage.
Keep the packaging as it will provide optimum protection during transport (e.g. change in usage site, sending for repair).

5.3 Storage

Permissible conditions at the place of storage:
- Storage temperature: -10...+50°C
- Humidity: 35...85% relative humidity

Avoid exposure to the following factors:
- Direct sunlight or proximity to hot objects
- Mechanical vibration, mechanical shock (putting it down hard)
- Soot, vapour, dust and corrosive gases
- Potentially explosive environments, flammable atmospheres
- Corrosive liquids

Store the hydraulic pressure test pump in its original packaging in a location that fullfills the conditions listed above. If the original packaging is not available, pack and store the instrument as described below:
1. Wrap the instrument in an antistatic plastic film.
2. Place the instrument, along with shock-absorbent material, in the packaging.
3. If shored for a prolonged period of time (more than 30 days), place a bag, containing a desiccant, inside the packaging.

6. Commissioning, operation

6.1 Unpacking the hydraulic pressure test pump

As soon as possible after delivery open the packaging of the hydraulic pressure test pump and check that you have all the items detailled in the packing list (see chapter 4.2 „Scope of delivery“).
As you are unpacking the items, examine them for signs of damage or breaking during transit.
If any items are missing get in touch immediately with EiUK Eurotron Instruments (UK) Ltd. to inform us of the shortage.

WARNING!
Never apply external pressure to the pressure test pump.
Never connect to an external pressure source.

6.2 Environmental requirement

When siting the hydraulic pressure test pump not in a temperature controlled laboratory, look for an area that satisfies the following criteria as much as possible:

- A constant temperature area free from draughts and sources of heat or cold
- An area free from noise and vibration, constantly used pathways
- A clean dry area free from corrosive liquids or vapours

6.3 Initial operation

6.3.1 Mounting of unit under test and reference pressure instrument

1. The reference pressure instrument is fitted to the upper side of the pressure test pump. The reference instrument is sealed by the integral O-ring sealing gasket. The maximum torque is 15 Nm.
2. The unit under test is mounted to the end of the flexible test hose. Tighten to the connector to prevent any leaks to a maximum torque of 15 Nm.

As an accessory, stainless stell sets of adapters are available to cover several thread dimensions of your test specimen. Tighten the optional adapters to a maximum torque of 15 Nm.

It is possible to connect an unit under test directly to the pump body. After dismounting the test hose connecter, there is a 1/4" BSP female thread at the side of the pump body.

CAUTION!
Take care that instruments to be connected to the pressure test pump are clean inside.

NOTE: The following numbers in brackets are related to the picture on page 24.

6.3.2 Filling the reservoir of the pressure test pump

1. Dismount the filling screw (8).
2. Fill the reservoir for 2/3 up to max. 3/4 with suitable operation fluid (see chapter 3.2).
3. Mount the filling screw (8) - hand tight.
4. **We strongly recommend to pre-fill the test hose: operate the handles of the pump until operating fluid becomes visible at the open end of the test hose (reference port must be closed during this operation).**

CAUTION!
If destilled water is used as operating fluid, the pressure test pump must be emptyed after each usage (by opening the drain screw (9) at the bottom of the reservoir).
The maximum allowed temperature of the operating fluid is 70°C
If first dirt or particles become visible in the reservoir, change the operating fluid immediately.

War safety goggles!
Protect eyes from flying particles and liquid splashes.

6.4 Operation (pressure generation)

a) Make sure that the pressure test pump is in priming position. If necessary, press the switching knob (toggle) (2).

Toggle / Switching knob (2) →

Handles in position... „priming pressure“ „high pressure“

The toggle / switching knob (2) can be operated only, if both handles (1) are pressed together. Otherwise a too high priming pressure is generated.

b) Make sure that the release valve (5) is open.

c) Turn the adjustment valve (7) counter-clockwise fully out (smooth „stop“ can be felt).

d) Turn the release valve (2) clockwise until the vent is closed.

e) Operate the handles (1) for priming, until **max. 50 bar** priming pressure are generated.

f) Keep the handles (1) pressed together and operate the switch knob / toggle (2). The handles (1) are now in „hig pressure“ position.

NOTE:
If the generated priming pressure is too high and - as a result - it is no longer possible to press the handles (1) fully together, please open the release valve (5) (turn counter-clockwise) and try it again.

g) Operate the handles (1) until the required pressure is nealy achieved, but max. to approx. 600 bar / 9000 psi. Higher pressure is made by turning the adjustment valve (7) clockwise.

NOTE:
After increasing the pressure, the reading may slightly drop again for about 1-3 minutes, which is caused by thermodynamic effects, the tube connection and the sealing gaskets.
If the pressure drop does not come to a standstill, check the measuring circuit for tightness.

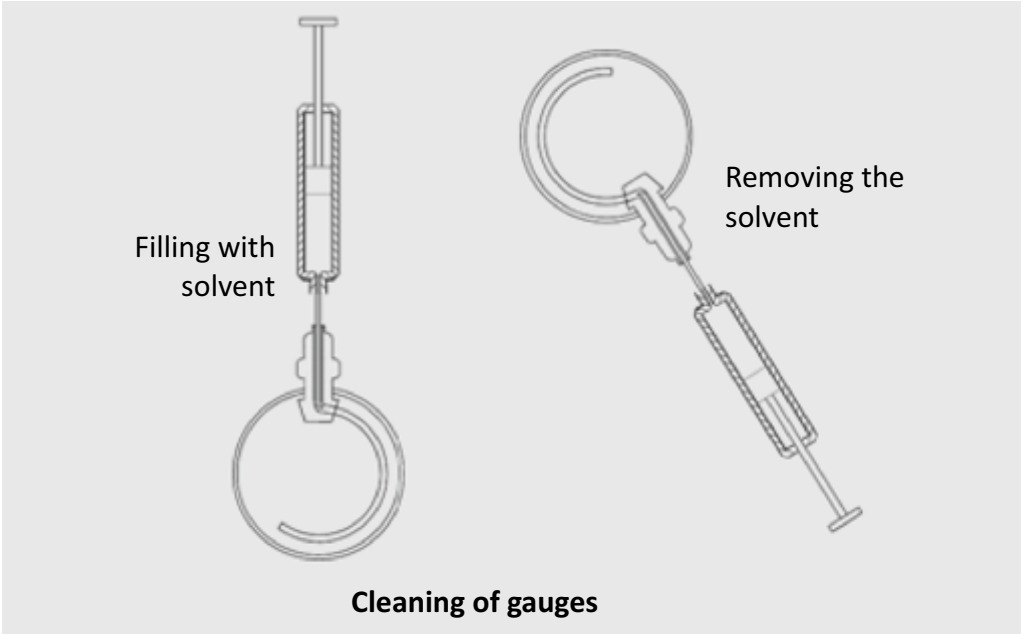
h) A pressure reduction is achieved by turning the fine adjustment valve (7) counter-clockwise first and then by carefully opening the pressure release valve (5).

WARNING!
Remove the reference pressure instrument or the unit under test only when the release valve (5) is open and no pressure is in the pressure test pump anymore.

i) If operated with destilled water, the reservoir must be emptyed after each usage:
- **Unscrew filling screw (8).**
- **Unscrew drain screw (9) using a 4 mm allen key (hex-wrench).**
- **Never dismount other components of the pump for dumping the operation fluid.**
- **Keep filling- and drain screws dismounting if pump is storaged. This allows drying-out of the reservoir.**
- **Before re-filling the reservoir, mount the drain screw (9), using a 4 mm allen key. Check correct position of the 4 x 2 O-ring. Torque 15 Nm. A spare screw and O-ring are available with the maintenance kit, order-code PGS-H-WARTUNG.**

6.5 Cleaning gauges (if device under test is an analogue burdon tube pressure gauge)
This cleaning/degreasing process is only suitable for use with pressure gauges with either phosphor bronze, beryllium copper, Monel or stainless steel bourdon tubes in the form of a „C“ (mainly pressure ranges ≤ 40 bar).
It is not advisable to degrease pressure gauges with steel bourdon tubes since a very small amount of corrosion on the bore of a bourdon tube can cause inaccuracies of reading and early failure of the tube.

This method of cleaning is not suitable for use with pressure gauges which are fitted with coiled bourdon tubes (mainly ranges above 40 bar), nor any gauges which are to be used with oxygen, as complete removal of oil is not assured. Please contact EiUK Eurotron Instruments (UK) Ltd.
Equipment (not inluded in scope of supply of EiUK Eurotron Instruments (UK) Ltd.)
This consists of a syringe and a special needle with the point bent through 90°.



Cleaning of gauges

Instructions:

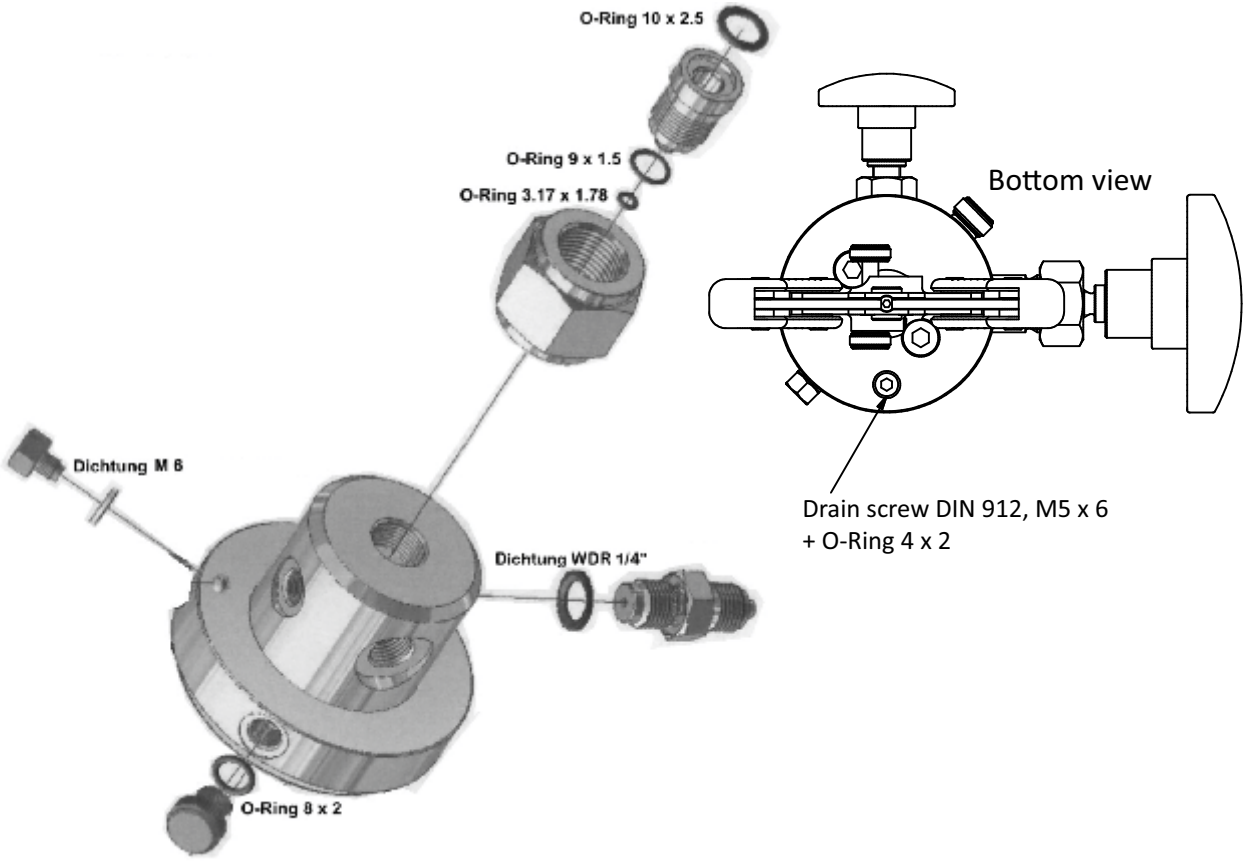
a) Fill syringe with solvent (suitable cold degreasing liquid).
b) With gauge connection pointing upwards put needle into connection and insert by feel the point into the hole leading to the tube.
c) Inject the solvent. Ideally the tube should be half full.
d) Shake gauge in various attitudes to agitate solvent.
e) Suck solvent back into syringe, holding gauge at an angle.
f) Check that solvent removed is clean. To be sure that all oil has been removed, repeat cleaning process until solvent removed from gauge is as clean as that put in.

7. Maintenance and cleaning

7.1 Periodic maintenance

Repairs must only be carried out by the manufacturer.
Cleaning the units and checking the liquid levels and quality is the only periodic maintenance required. With normal use, no further maintenance should be necessary. If required, the system can be returned to the manufacturer for re-conditioning.
If used with destilled water, after each work the pump including reservoir must be emptied and made dry. **Do NEVER use chemicals for cleaning the reservoir, just a wet and free of lint close.**

7.2 Maintenance (using the maintenance kit order-code **PGS-H-WARTUNG**)
Working with the maintenance kit is only allowed for skilled personnel.



- The O-rings must be coated with a very little bit of silicone oil.
- Screwed connections must be fixed with a torque of 25 Nm. (Drain screw max. 15 Nm, check correct placement of the o-ring 4 x 2.)

7.3 Cleaning

Cleaning the unit.

Keep the system clean and free from spilt oil or water. Wipe out the surfaces as necessary. Do not use any cleansing solvents or chemicals as they damage transparent reservoir.

Ensure that the reservoir contains sufficient liquid to carry out any calibrations required. If necessary top up the reservoir with the same liquid that is already being used. Do not mix various types or brands of liquid in the reservoir.

If the operating liquid in the test pump becomes dirty, attach a drain to the test connection and use the test pump to flush through clean operating liquid.

Wear safety goggles!
Protect eyes from flying particles and liquid splashes.

8. Faults

If the pressure cannot be generated correctly or if the set pressure does not stay stable, this is likely to be caused by the incorrectly positioned or selected sealing gaskets. Please also check wether any adapters used on the unit under test have been tightened sufficiently to eliminate leaks.

Before assuming there is a leak in the pressure test pump: First of all, check if the pressure release valve (5) is closed. It is recommended to pre-fill the test hose. See chapter 6.3.2 point 4.

If the pressure test pump has not been used for a longer period of time, the first lift may be somewhat sluggish. This effect will disappear again during further operation.

By no means apply any force to the operating elements of the pressure test pump.

WARNING!
Never connect an external pressure supply system to the pressure test pump.

CAUTION!
Never fully screw out (counter-clockwise) the pressure release valve (5).
The sealing ball, placed inside the pump, may war off.

9. Return and disposal

WARNING!
Residual media on the hydraulic pressure testtest pump can result in a risk to persons, the environment and the equipment. Take sufficient precautionary measures.

9.1 Return

WARNING!
Strictly observe the following when shipping the instrument:
All instruments deliverd to EiUK Eurotron Instruments (UK) Ltd. must be free from any kind of hazardous substances (acids, bases, solutions etc.).

When returning the instrument, use the original packaging or a suitable transport package.

To avaoid damage:

1. Extract all fluid from reservoir.
2. Wrap the instrument in an antistatic plastic-film.
3. Place the instrument, along with the shock-absorbent material, in the packaging.
   Place shock-absorbent material evenly on all sides of the transport packaging.
4. If possible, place a bag, containing a desiccant, inside the packaging.
5. Label the shipment as transport of a highly sensitive measuring instrument.

9.2 Disposal

Incorrect disposal can put the environment at risk. Dispose of instrument components and packaging materials in an environmentally compatible way and in accordance with the country-specific waste disposal regulations.