FLUKE®
Calibration

P5523

Liquid to Gas Separator

Users Manual

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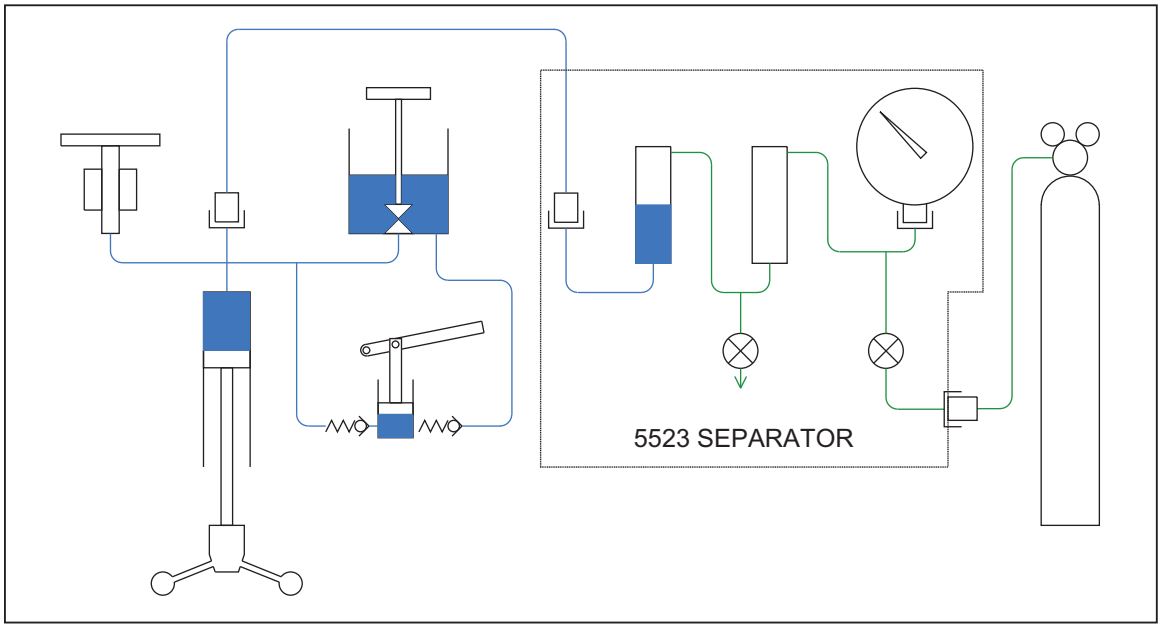
General Information

The P5523 is used for calibrating high-pressure gas measuring instruments against a hydraulic Deadweight Tester.

Note

The terms "Master Test Gauge" and "Gauge" in this document refer to any pressure-measuring instrument such as Transfer Standards, Digital Calibrators and Transducers.

An external high-pressure gas source is applied through a series of liquid traps, to the hydraulic system of the deadweight tester. Typically, dry Nitrogen from a commercially available compressed gas cylinder is used. With the deadweight tester system correctly primed, gas pressure from the external supply is adjusted to reach equilibrium with the weights on the deadweight tester.



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Figure 1. Hydraulic/Pneumatic Circuit Schematic

How to Contact Fluke

To order accessories, receive operating assistance, or get the location of the nearest Fluke distributor or Service Center, call:

- Technical Support USA: 1-800-99-FLUKE (1-800-993-5853)
- Calibration/Repair USA: 1-888-99-FLUKE (1-888-993-5853)
- Canada: 1-800-36-FLUKE (1-800-363-5853)
- Europe: +31-402-675-200
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- Anywhere in the world: +1-425-446-5500

Or, visit Fluke's website at www.fluke.com.

To register your product, visit http://register.fluke.com.

To view, print, or download the latest manual supplement, visit http://us.fluke.com/usen/support/manuals.

Safety Summary

The following are general safety precautions that are not related to any specific procedures and do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during equipment operation and maintenance to ensure safety and health and protection of property.

Compressed Liquid & Gas

Use of compressed liquids and gasses can create an environment of propelled foreign matter. Pressure system safety precautions apply to all ranges of pressure. Care must be taken during testing to ensure that all hydraulic and pneumatic connections are properly and tightly made prior to applying pressure. Personnel must wear eye protection to prevent injury.

Personal Protective Equipment

Wear eye protection approved for the materials and tools being used.

Symbols Used in this Manual

In this manual, a **Warning** identifies conditions and actions that pose a hazard to the user. A **Caution** identifies conditions and actions that may damage the Liquid to Gas Separator.

Symbols used on the Liquid to Gas Separator and this manual are explained in Table 1.

Table 1. Symbols

Symbol	Description
~	AC (Alternating Current)
⏚	Earth Ground
⚠	Important Information: refer to manual
	Do not dispose of this product as unsorted municipal waste. Go to Fluke's website for recycling information.

Preparations

This section assumes that the deadweight tester is completely primed with the correct fluid. The P5523 should be placed on a level, stable workbench or similar surface, to the right-hand side of the deadweight tester.

Level the P5523 using the four adjustable feet to prevent “rocking”, and fit the connection hose supplied with the instrument to the bulkhead coupling on the top plate.

The other end of the hose must be attached the test port of the deadweight tester in the same manner as a conventional pressure gauge or transducer. The hose is pre-assembled with a flat-faced fitting for this purpose; see notes below on making correct connections.

The external gas supply is connected to the ¼ NPT port in the rear of the P5523 case. A compressed gas cylinder fitted with a suitable pressure regulator is recommended. Factory (compressor) air lines or gas multipliers should only be used if a series of filters are fitted to ensure that the supply is clean and dry.

⚠ Caution

The external pressure supply must be regulated to either the maximum range of the P5523 (3000 psi / 210 bar), or 10% above the maximum pressure required, whichever is the lower. DO NOT OVER-PRESSURIZE THE P5523.

Fit the device under test (DUT) to the test port using the method described below:

⚠ Caution

Ensure that all devices are internally clean and free from contamination before connecting to the tester. Particle contamination can damage valve seats.

⚠ Warning

DO NOT use Teflon/PTFE tape on these connections, as this will prevent correct sealing. The Gauge Adapter sealing system is designed for hand-tight sealing up to 20,000 psi / 1,400 bar-wrenches or similar tools are not required — over tightening can cause damage to threads or sealing faces.

Before connection, ensure that there is an O-ring fitted to the test port.

Check that the sealing face of the device to be fitted is clean and undamaged, as scratches or dents can form leak-paths.

Note

The thread on the test port, and the lower part of the gauge adapters is LEFT-HANDED. The following procedure details the correct method for mounting devices using these adapters.



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Figure 2. Connecting the Gauge

Connect the Gauge

Refer to Figure 2 for steps 1-4.

1. Screw the appropriate gauge adapter fully on to the instrument to be tested.
2. Screw assembly down COUNTER-CLOCKWISE onto test port.

Note

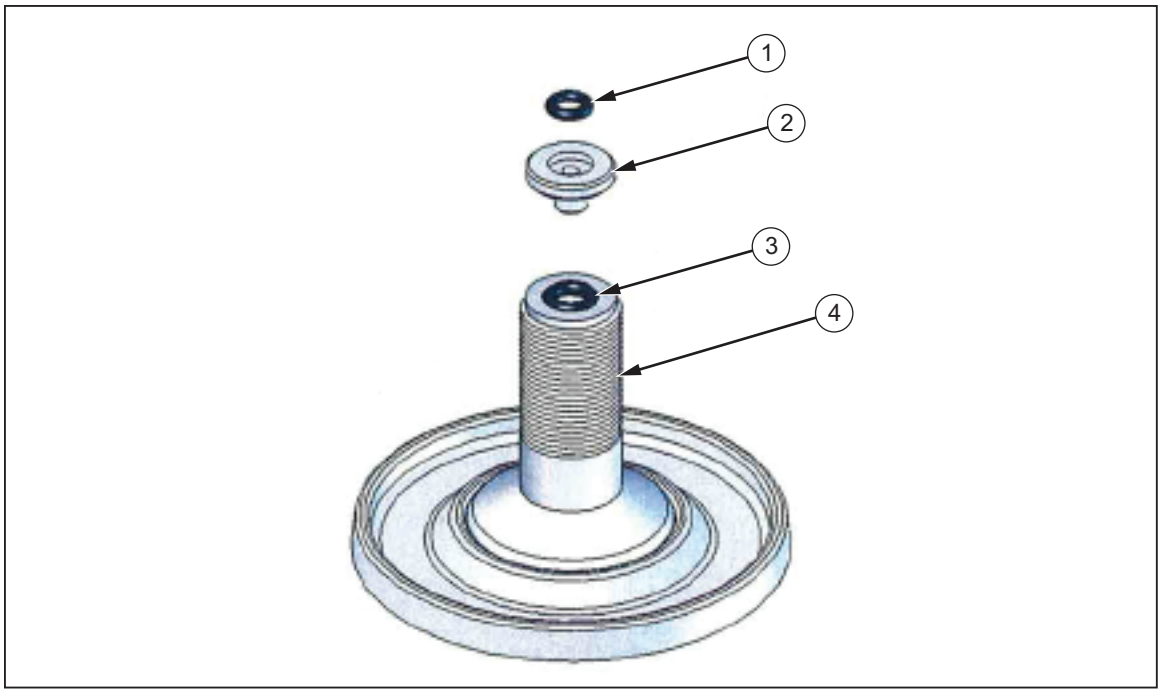
Hand-tight is sufficient; ensure that the bottom face contacts the O-ring on the test port.

3. To adjust the position to face forward, hold the gauge adapter and turn the instrument COUNTER-CLOCKWISE, so that it faces forward.
4. Hold the instrument steady, while turning the gauge adapter COUNTER-CLOCKWISE until it pulls down onto the O-ring.

Connect the Test Port Insert

For devices with 1/8 BSP or NPT mounting threads, the diameter of the thread is very close to the effective sealing diameter of the O-ring fitted to the test port.

This can make it difficult to achieve a good seal. When mounting these devices, use the test port insert (stored in the spare seals container) as shown in Figure 3.



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Figure 3. Test Port Insert

Table 2. Test Port Insert - Parts List

Item	Description	Part Number
1	O Ring	3865142
2	Test Port Insert	3919892
3	O Ring	3883397
4	Test Port	—

To calibrate panel-mounted gauges with pressure connections in the rear, use an Angle Adapter. (Refer to section, Ancillary Equipment.)

Priming

1. Unscrew and remove reservoir cap from left-hand reservoir. Note the position of the groove inside the reservoir body — this is the Fluid Datum Level.
2. Using the priming pump on the deadweight tester, slowly drive fluid from the deadweight tester through the connection pipe, into the left-hand reservoir, until it is just below the Fluid Datum Level.
3. Allow a few moments for the system to stabilize, and then bring the fluid up to the Datum Level by slowly turning the screw press in (clockwise).

Note

The fluid height must not be above this level during operation — turn the screw press out (counter-clockwise) to reduce the fluid level.

4. Replace the reservoir cap.

Operation

⚠ Warning

ALWAYS reduce the system pressure with the Exhaust Valve — NEVER use the deadweight tester reservoir valve.

1. Ensure both Inlet and Exhaust valves are closed.
2. Place the weights necessary to achieve the desired calibration point on the deadweight tester.
3. Slowly open and close the inlet valve until the piston floats. To avoid over-pressurization due to “fluid-stick”, the weights can be gently rotated close to the calibration point. The monitor gauge fitted to the separator can be used as a guide to the system pressure.
4. Use the screw press for fine adjustment of the PCU float height — do not turn screw press more than 2 turns in or out from its priming position.
5. Ensure that the weights are rotating freely, and allow a few moments for the system to stabilize before taking any readings, especially after large changes in system pressure.

Note

Large, sudden changes in pressure will cause the system temperature to rise or fall, which can cause instrument readings to change as the fluid in the system expands or contracts, thus increasing or decreasing the pressure.

6. Compare the reading of the gauge under test with that of the master gauge.
7. For the next, higher calibration point, repeat from step 2 above.
8. To measure reducing pressures, remove the necessary weights from the deadweight tester, and slowly open and close exhaust valve, reducing the system pressure until the piston is floating at its mid-operating position.
9. Ensure that the weights are rotating freely, and allow a few moments for the system to stabilize before taking any readings.
10. During long periods of use, the fluid level in the left-hand reservoir should be checked, and adjusted if necessary, to maintain the correct datum level. Ensure that the system is FULLY DEPRESSURIZED before removing the reservoir cap.
11. To depressurize the system fully, slowly open and close the exhaust valve — NEVER depressurize the system quickly.

Disconnecting the Unit from the Deadweight Tester

1. With the system fully depressurized, remove the reservoir cap from the left-hand reservoir.
2. Ensure reservoir valve is closed on the deadweight tester, and turn the screw press out to draw fluid back into the deadweight tester reservoir. (Observe fluid level in P5523 reservoir.)

3. When the fluid has been withdrawn from the separator, the connection hose can be disconnected from the deadweight tester.

Periodically, the right-hand reservoir body should be inspected and cleaned, to remove any fluid that may be present.

Ancillary Equipment

Angle Adapter, P5543

To calibrate gauges with the pressure connection on the rear (e.g. panel-mount gauges) in their correct position, an angle adapter should be used. The angle adapter fits directly onto the test station, converting it through 90 degrees, allowing the standard adapters to be used.



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Figure 4. Angle Adapter

Pointer Remover/Punch, P5551

To remove and refit the pointer of a pressure gauge, use the Pointer Remover/Punch. This tool has a spring-loaded plunger to quickly and consistently refit the pointer.



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Figure 5. Pointer Remover/Punch