

Dead Weight Testers

Dead weight testers for pressurised air or neutral gas

Model **PD 1**

Pressure ranges 30 mbar to 1 bar

Dead weight testers are used for examination and calibration of pressure gauges and other pressure measuring instruments without using an external instrument. The main components are the measuring system, the valve units, the built-in screw pump for accurate pressure adjustment and the set of weights.

The measuring system itself consists of a precise lapped-in pair of piston and cylinder. During the measuring process the piston is forced up by the pressure produced with the built-in screw pump respectively with external pressure supply, while the regular weights and maybe further extra weights, if required for the designated test pressure, press it down. With the built-in screw pump the test pressure can be adjusted to an equilibrium of the forces. When the forces on both sides of the piston are in balance, the piston will be floating, and the designated test pressure is reached exactly.

For simplifying the handling, the weights are already referred to each relevant determined piston area and stamped with the pressure unit (bar/kPa).

The friction between piston and cylinder is minimised by keeping piston and weights rotating while floating.

The models described in this data sheet are available for pressure ranges 30 mbar to 1 bar.

Technical Data

- Pressure range: 30 mbar to 1 bar
- Set of weights in bar / kPa
- External pressurised air supply for max. 1 bar recommended
- Installed hand pump
- Accuracy of the adjusted examination pressure: better 0.05 % resp. 0.03 % (with official verification or DKD-approval) referred to the effective pressure. Up to 0.1 bar the maximum error is constantly ± 0.05 mbar (at 0.05%) resp. ± 0.03 mbar (at 0.03%).
- Reference conditions for the granted accuracy:
 - ambient temperature + 20 °C ± 2 °C
 - acceleration of fall = 9.8102 m/s²
- Dimension of the cross section of the measuring unit:
2.0 cm² ± 2 %
- Rotation of the weights: by manual initiating
- Connection for external pressurised air and test item:
2 x plug connection (Prestolock) for PA-tube N 4 x 1
- Medium: pressurised air or neutral gas, e.g. nitrogen
- Case: wood with imitation leather, 3 machine mounts for the exact horizontal positioning according to installed circular level, lockable wooden cover plate
- Case dimensions: 305 x 260 x 130 mm (L x W x H)
(12" x 10.24" x 5.12")
- Weight: including set of weights (approx.) 9.5 kg (20.94 lb)

Scope of delivery

Beside the dead weight tester and the set of weights, the scope of delivery comprises the following:

- 1 operating instruction
- 2 expansion plugs for N 6 x 1 (admission pressure connection and test item)
- 2 x 1 m PA-hose N 4 x 1

Special versions and accessory

- Set of weights in kp/cm², other set of weights upon request
- Test certificate B according to EN 10 204
- Official verification or DKD-approval (the installation location has to be specified for this)
- Fitting of the hose N 4 x 1 on 1/4" NPT male
- Holder for test item



Operating Instructions

ATTENTION

Please touch the dead weight tester only at the hanholds for transporting and repositioning, but never at the measuring system. Otherwise this could lead to serious damage.

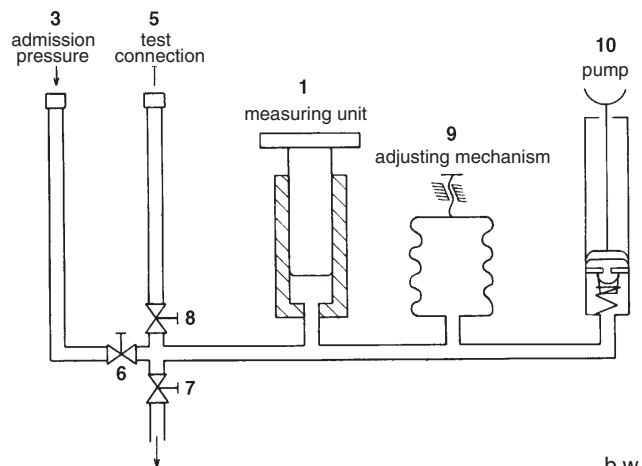
Putting into operation

Place the instrument at the position and adjust it via the circular level by screwing in the machine mounts.

Admission Pressure Generation

The instrument is constructed that the pressure optionally can be produced via the hand pump (10) or with external nitrogen-, resp. pressurised air supply via the valve (6) "Vordruck" (= admission pressure). The connection of the admission pressure to the fitting (3) happens via a hose connection, nominal diameter 4 mm (0.16")

Drawing 1 Schematic diagram



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Connection of the admission pressure

To protect the dead weight tester against impurities, an air control unit consisting of pressure regulator and filter (pores 10-20 µm with oil and water separator) has to be placed into the connecting tube between admission pressure and the dead weight tester. The pressure regulator has to be limited to max. 1 bar.

Examination of pressure gauges

The test item has to be connected to the dead weight tester via the hose connection and test connection (5). Afterwards the valve (8) has to be opened, the adjusting mechanism (9) has to be brought into centre position (between upper and lower arrester) and the valve (7) has to be closed. Put the set of weights (see "Set of weights") according to the designated pressure on the base plate (12).

According to the mode of operation the pressure has to be raised as long as the piston lifts off the lower arrester, either by opening the valve (6) or by using the hand pump (10). The measuring piston has to be rotated (manual operation).

Via the adjusting mechanism (9) [right hand rotation= increase in pressure] the measuring piston has to be brought into the measuring position, that means until the lower edge of the base plate is approximately at a height of the marking of the reading device (see drawing 3).

Please regard that the valve (6) is closed again when using external admission pressure after inlet and producing of the designated admission pressure.

For a reduction of the pressure please rotate the hand wheel of the adjusting mechanism to the left. If this is not enough, open the valve (7) slowly.

Maintenance

If the measuring piston can not be moved easily anymore (e. g. high air humidity), it has to be removed from the measuring cylinder (unscrew the union nut) and cleaned with a soft, lintfree cloth. The measuring cylinder can be cleaned with the same cloth by winding it around a wood block. Denatured ethyl alcohol is recommended as cleaning compound. Traces of grease can be removed with ethanol or distilled petrol.

For the installation and removal of the piston the valve (7) has to be kept open.

ATTENTION !

Please avoid touching the lapped surfaces in every case.

- 1 Measuring system
- 2 Reading device
- 3 Inlet for admission pressure ("Vordruck")
- 4 Circular level
- 5 Test connection
- 6 Pressure gauge valve for admission pressure ("Vordruck")
- 7 Ventilation
- 8 Pressure gauge valve for test connection ("Prüfanschluss")
- 9 Adjusting mechanism
- 10 Hand pump
- 11 Machine mount
- 12 Basic load
- 13 Weights
- 14 Nameplate

Set of weights

ATTENTION !

Treat the set of weights carefully and avoid all kinds of damage!

The weights and the base plate (12) (basic load) are marked with bar and kPa for the pressure, which is produced on the dead weight tester, as well as the instrument identification number and the final value. The base plate (12) (basic load) without weights produces a pressure of 0.03 bar.

An additional weight is the weight 0.47 bar as addition to the basic load 0.03 bar, to produce a pressure of 0.5 bar.

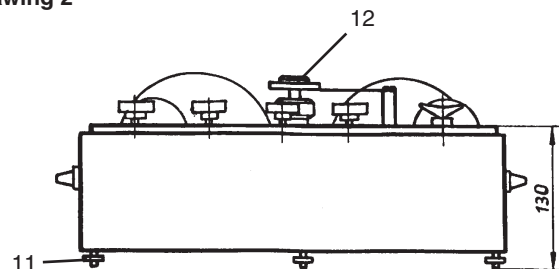
The set of weights is composed as follows:

1 weight plate	0.5	bar
1 weight plate	0.47	bar (additional weight)
1 weight plate	0.25	bar
2 weight plates	0.1	bar
1 weight plate	0.05	bar
3 weight plates	0.02	bar
1 weight plate	0.01	bar

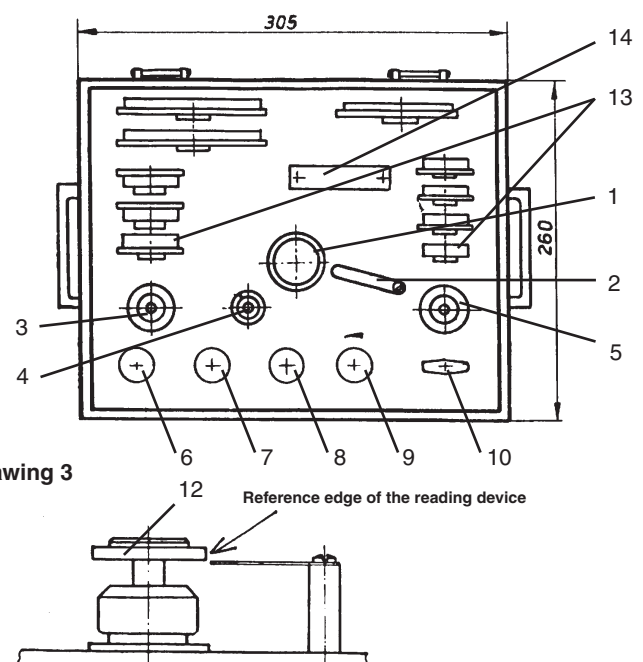
The smallest graduation of the supplied set of weights is 0.01 bar.

Special weights for smaller pressure graduations are available upon request. They may be required for example to compensate operation conditions deviating from our standard reference conditions.

Drawing 2



Drawing 3



Technical changes, replacement of materials and errors excepted.