

# Dead Weight Tester

Pneumatic version

Pressure range 0.05 – 6 bar

PD 6

## Application

- High-precision primary standard (comparison standard)
- Reference device for calibration services, gauging offices and laboratories
- Suitable for testing, adjusting and calibrating pressure measuring instruments without using an external reference device

## Construction

The main components are measuring system, valve units, spindle unit for fine adjustment of the pressure and set of weights. The measuring system consists of a fine lapped piston / cylinder pair. The weight-loaded piston is pressed down by the local gravitation of the weights. From below the test pressure, which is generated and adjusted by the spindle pump, acts towards the piston surface area. This test pressure is increased until the pneumatic force of the medium on the piston surface area (acting from below) compensates the weight force of the piston / weight system and the equilibrium of forces is reached. During this state of equilibrium, the piston floats freely in the cylinder.

In order to simplify the handling, the weights are already standardised to the specific determined piston surface area and the local gravitation at the installation site. The set of weights is available discreetly graduated in different pressure units (bar, Pa, psi).

Piston and weights are kept rotating with a motor while floating in order to minimise the influence of static friction of piston and cylinder and therefore to guarantee a sensitive discrimination threshold.

The dead weight tester described herein operates in a range from 0.05 to 6 bar.

## Specialties

Due to the high accuracy of the dead weight tester, the influence of the gravitational acceleration is not negligible. A requirement for an official verification is the calibration of the dead weight tester with the gravitational acceleration at the installation site. Thus, this value needs to be specified when placing the order. A calibration for the installation site is recommended without official verification as well.

Without specification of the gravitational acceleration, the dead weight tester is calibrated with the value at the manufacturing site ( $g_{Hst} = 9.80968 \text{ m/s}^2$ ). Then, the measuring values need to be converted at the installation site for the compliance with the accuracy class.

## Standard Versions

### Set of Weights

In bar / kPa

### Pressure Range

Basic load	0.05 bar
Main measuring range	0.6 – 6 bar
Required admission pressure air	6 bar

### Reference Condition for the Guaranteed Accuracy

Ambient temperature +20 °C ±2 °C (+68 °F ±3.6 °F)

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### Accuracy (factory calibration)

Standard ±0.05 % of the measured value<sup>1)</sup>

### Medium

Air

### Sealing Liquid / Lubrication

Special oil

### Nominal Piston Cross-section

2 cm<sup>2</sup>

### Rotation of the Weights

By electric drive (230 – 240 V AC / 50 Hz / 3 W)

### Connection

Male G ½ LH with clamping sleeve for G ½ right and M 20x1.5 right, incl. double sealing

### Connection for External Compressed Air

Plug connection (Prestolock) for PA hose N 4x1, with adapter for N 6x1

### Case

Aluminum case, grey enamelled (self-supporting cover), 3 adjustable feet for precise horizontal alignment according to integrated circular level

### Case Dimensions incl. Star Handle (L x W x H)

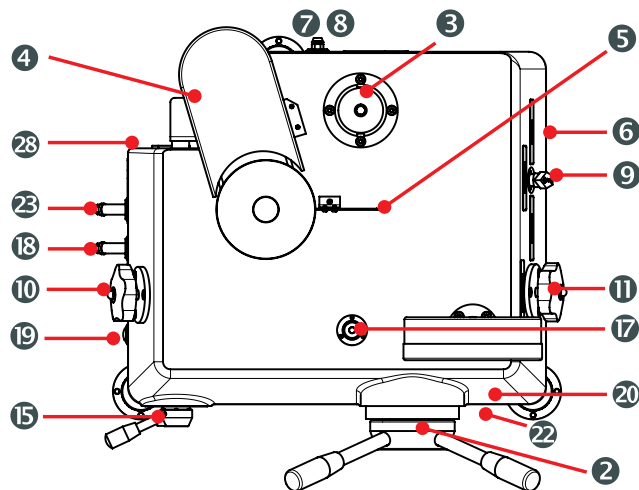
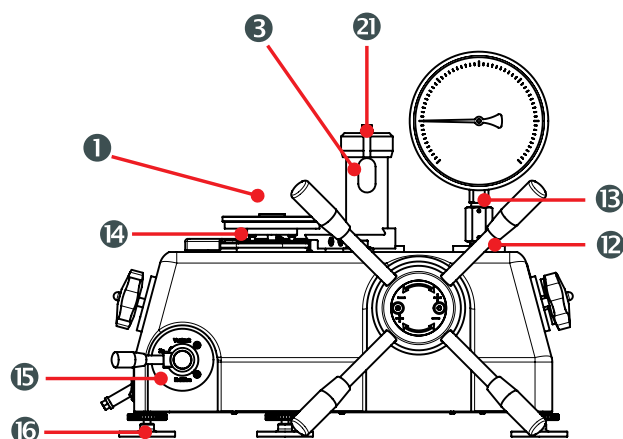
490 x 480 x 330 mm (19.29 x 18.9 x 12.99")

### Approx. Weight

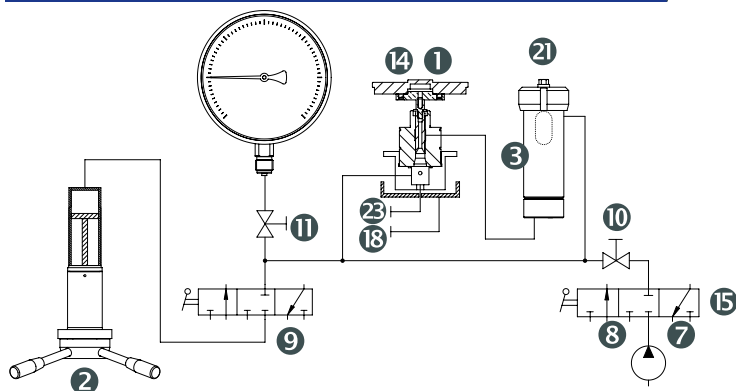
Dead weight tester	28 kg (61.73 lb)
Set of weights	7 kg (15.43 lb)
Device packaging	21 kg (46.3 lb)
Transport case set of weights	9.2 kg (20.28 lb)

<sup>1)</sup> in the main measuring range, the accuracy refers to the measured value; in the secondary measuring range, it refers to 0.6 bar

## Technical Drawings



## Schematic Drawing



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|---|---|--|
| <ul style="list-style-type: none"> <li>1 Measuring system</li> <li>2 Spindle pump with star handle</li> <li>3 Oil reservoir</li> <li>4 Electric drive</li> <li>5 Reading device (stationary pointer)</li> <li>6 Case</li> <li>7 "Connection admission pressure / Anschluss Vordruck"</li> <li>8 "Ventilation admission pressure / Entlüftung Vordruck"</li> <li>9 Change-over valve spindle pump ("Pump on / Pumpe ein", "Pump off / Pumpe aus", "Vent / Entlüften")</li> </ul> | <ul style="list-style-type: none"> <li>10 Dosing valve "Admission pressure / Vordruck"</li> <li>11 Stop valve "Test connection / Prüfanschluss"</li> <li>12 Test connection</li> <li>13 Clamping sleeve (AF 27)</li> <li>14 Base plate (basic load)</li> <li>15 Change-over valve for external admission pressure ("Admission pressure / Vordruck", "Closed / Zu", "Vent / Entlüften")</li> </ul> | <ul style="list-style-type: none"> <li>16 Adjustable feet</li> <li>17 Circular level</li> <li>18 "Oil drain system / Ölablass System" (overflow of the system)</li> <li>19 Switch electric drive</li> <li>20 Calibration plate (for accredited calibration)</li> <li>21 Screw plug oil reservoir</li> <li>22 Nameplate</li> <li>23 "Oil drain measuring cylinder / Ölablass Messzylinder"</li> <li>28 C14 inlet</li> </ul> |
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## Options

- Inspection certificate 3.1 according to DIN EN 10204 on the accuracy
- Accredited calibration or DKD approval<sup>1)</sup>
- Hose N 4x1 for Prestolock
- Adapter from hose 4x1 to 1/4" NPT male

## Special Versions Upon Request

- Set of weights in kp/cm<sup>2</sup>, psi; other weights
- Adapters for other connection threads
- Higher accuracy 0.02 %

## Scope of Delivery

The delivery includes – in addition to the dead weight tester and the set of weights in a transport case:

- 1 operating instruction
- 1 l special oil (lubricant and sealing liquid)
- 1 protective cover
- 1 special gasket for test item, with 2 encased O-rings
- 4 O-rings as spare parts
- 2 adapters for N 6x1 (admission pressure connection)
- 2 plugs for oil drains (mounted)
- 1 mains cable

## Ordering Information

Please specify in your order:

<b>Basic model</b>	PD 6
<b>Options</b>	see options
<b>Example</b>	PD 6 accuracy 0.05 % adapter 1/2" NPT gravity acceleration at the installation site DKD approval certificate

<sup>1)</sup> see section Specialties