

# Dead Weight Tester

Pneumatic version, portable version  
Pressure range 0.03 – 1 bar

PD 1

**barotec**<sup>®</sup>  
KALIBRIERTECHNIK

## 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 of the dead weight tester are measuring system, valve units, pressure generation, adjusting mechanism for fine adjustment 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. The test pressure, which is generated and adjusted by either an electric pump, or an integrated metal bellows, or externally via the admission pressure connection, acts from below towards the piston surface area.

This test pressure is increased until the pneumatic force of the medium (usually air) 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 discretely graduated in different pressure units (bar, Pa, psi).

Piston and weights are set in rotation by manual initiation and kept 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 0.03 to 1 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	0.03 bar
Main measuring range	0.1 – 1 bar

### Reference Condition for the Guaranteed Accuracy

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



### Accuracy (factory calibration)

Standard ±0.05 % of the measured value<sup>1)</sup>  
Enhanced ±0.02 % of the measured value<sup>1)</sup>

### Medium

Air

### Nominal Piston Cross-section

2 cm<sup>2</sup>

### Rotation of the Weights

Initiated manually

### 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 (L x W x H)

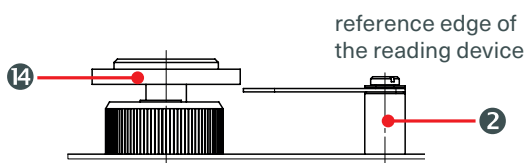
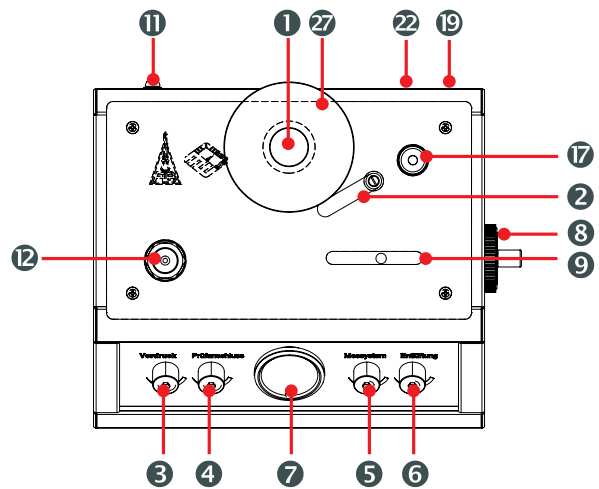
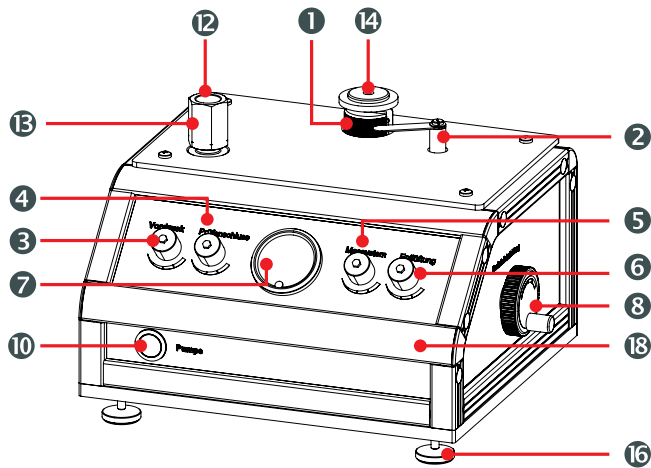
300 x 260 x 240 mm (11.81 x 10.24 x 9.45")

### Approx. Weight

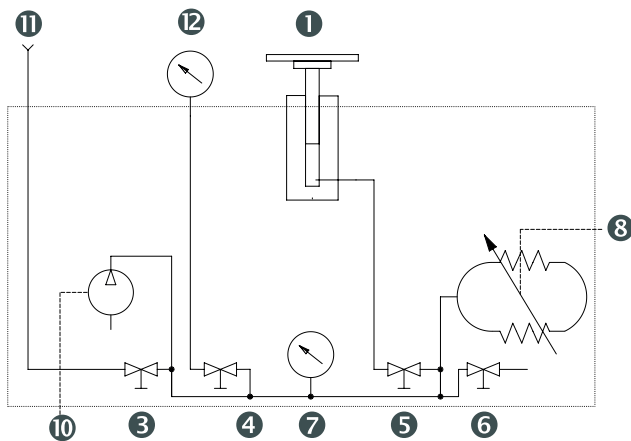
Dead weight tester	15 kg (33.07 lb)
Set of weights	3.1 kg (6.83 lb)
Transport case dead weight tester	2.2 kg (4.85 lb)
Transport case set of weights	2.1 kg (4.63 lb)

<sup>1)</sup> in the main measuring range, the accuracy refers to the measured value; in the secondary measuring range, it refers to 0.1 bar

## Technical Drawings



## Schematic Drawing



- 1 Measuring system
- 2 Reading device (stationary pointer)
- 3 Stop valve "Admission pressure / Vordruck"
- 4 Stop valve "Test connection / Prüfanschluss"
- 5 Stop valve "Measuring system / Messsystem"
- 6 Stop valve "Ventilation / Entlüftung"
- 7 Mechanical admission pressure indication (pressure gauge)
- 8 "Adjusting mechanism / Nachstelleinrichtung"
- 9 Position indication adjusting mechanism
- 10 Push button "Pump / Pumpe"
- 11 "Connection admission pressure / Anschluss Vordruck"
- 12 Test connection
- 13 Clamping sleeve (AF 27)
- 14 Base plate (basic load)
- 16 Adjustable feet
- 17 Circular level
- 18 Case
- 19 Electrical connection "6 V DC 500 mA"
- 22 Nameplate
- 27 Weights

## Options

- Inspection certificate 3.1 according to DIN EN 10204 on the accuracy
- Accredited calibration or DKD approval<sup>1)</sup>
- 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 0.01 %

## Scope of Delivery

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

- Operating instruction
- Transport case dead weight tester
- Transport case set of weights
- Special gasket for test item, with 2 encased O-rings
- Clamping sleeve G 1/2 LH / G 1/2
- Adapter for N 6x1 (admission pressure connection)
- 6 V mains adapter

## Ordering Information

Please specify in your order:

**Basic model** PD 1  
**Options** see options

**Example** PD 1  
accuracy 0.05 %  
gravity acceleration at the installation site  
DKD approval certificate

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