

Hydraulic pipeline tester High-pressure version Model 80



WIKA data sheet CT 31.21

Applications

- Leak and yield strength testing
- Detection of frictional pressure losses along pipelines
- Monitoring of gas pressure associated with flow measurement
- Measurement of well head gas pressure and hydraulic test pressure of riser pipe
- Measurement of steam pressure for efficiency testing

Special features

- Ranges from 30 ... 600 bar [500 ... 8,000 lb/in²]
- Accuracy: 0.03 % + 0.05 bar [0.03 % + 0.7 lb/in²]
- Ergonomic layout ideal for field use
- All instruments supplied with certification traceable to national standards
- The UKAS calibration certificate is available in our pressure standards laboratory as an optional extra



Hydraulic pipeline tester, model 80

Description

Precise measurement of pressures

The hydraulic pipeline tester is a portable unit suitable for the accurate measurement of arbitrary and fluctuating pressures, which occur in power plants, pipelines and many other applications.

Basic principle

To measure a pressure, masses are added to the piston unit corresponding to a pressure just below that to be measured. The total downward force of the masses is in excess of the pressure to be measured and is balanced by the pressure produced by the spindle pump. The pressure of the spindle pump is applied to the stepped area of the piston which pushes it upwards.

This low pressure is indicated on the dial of the test gauge specially graduated so that the reading of the gauge only is added to the pressure equivalent of the masses used. The weight of the mass carrier corresponds to the scale range of the dial and is ignored.

Traceable to national standards

The piston unit and masses supplied with this pipeline tester have been calibrated against standards which are traceable to national standards.

Functionality

The pressure to be measured 'P' is applied to a stepped piston and an area 'a' loaded with masses 'M'. The mass 'M' is greater than the force on the piston 'Pa'. A lower pressure 'p' is then applied to the annulus (area 'b') until the masses rise.

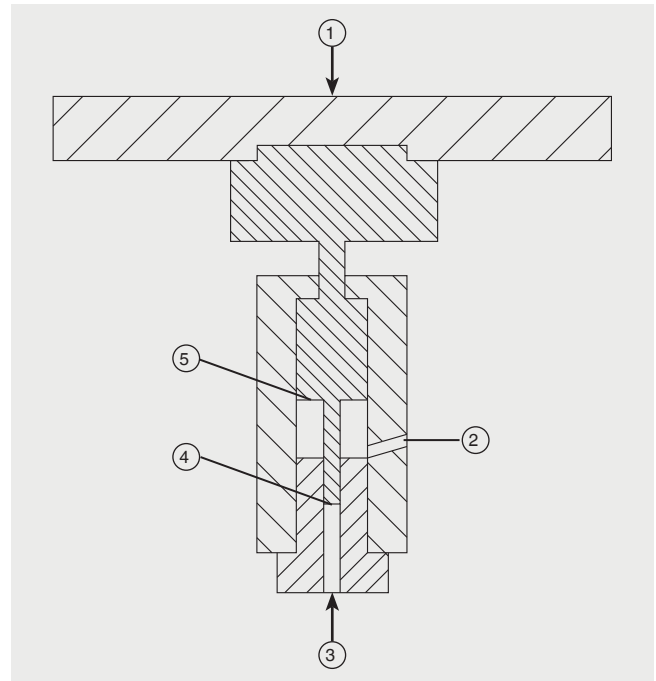
The piston is then in equilibrium and $M = Pa + pb$ applies.

The term 'pb' is in this instrument 'small' and so the pressure 'P' can be determined accurately by knowledge of the mass 'M' and the area 'a'.

The pressure is applied to a pressure gauge calibrated to suit the instrument thus giving 'pb'. Therefore having known areas 'a' and 'b' (see table below), the pressure is $P = (M - pb) / a$.

Nominal areas		
Area 'a'	1/80 in ²	8.0645 mm ²
Area 'b'	9/80 in ²	72.805 mm ²

- ① Masses ('M')
- ② Pressure at the annulus ('p')
- ③ Pressure to be measured ('P')



- ④ Effective area ('a')
- ⑤ Area at the annulus ('b')

Table of masses

The table below shows, for the respective measuring ranges, the number of masses within a mass set with their resulting nominal pressures.

The mass sets are manufactured, as standard, to the standard gravity of 9.80665 m/s², although they can also be adjusted to suit their specific place of use.

Should the instrument not be operated under reference conditions (ambient temperature 20 °C [68 °F], atmospheric pressure 1,013 mbar [14.69 lb/in²], relative humidity 40 %), the measured values must be corrected arithmetically.

Measuring range	30 ... 600 bar		500 ... 8,000 lb/in ²	
	Quantity	Nominal pressure per piece [bar]	Quantity	Nominal pressure per piece [lb/in ²]
Piston and make-up weight	1	10	1	1,000
Masses (stackable on piston)	4	100	7	1,000
	1	90	1	500
	1	50	2	200
	2	20	1	100
	1	10	1	50
	1	5	-	-

Specifications

Piston-cylinder system		
Measuring range	30 ... 600 bar	500 ... 8,000 lb/in ²
Accuracies	0.03 % + 0.05 bar	0.03 % + 0.7 lb/in ²
Resolution	0.02 bar	0.2 lb/in ²
Material		
Piston	Steel	
Cylinder	Carbide	
Masses	Austenitic stainless steel	
Weight		
Mass set	52 kg [114.66 lbs]	57 kg [125.69 lbs]

Instrument base	
Connections	
Connection for piston-cylinder system	G ¾ B male thread
Plant (input)	G ¼ female
Drain (output)	G ¼ female
Pressure transmission medium	<ul style="list-style-type: none"> ■ Hydraulic mineral oil, viscosity 20 ... 37 cSt at 40 °C [104 °F] (for more information, please see the safe operating instructions) ■ Water ■ Air
Reservoir	Approx. 60 cm ³
Case	
Material	Steel
Weight	30 kg [66.15 lbs]
Operating conditions	
Operating temperature	18 ... 28 °C [64 ... 82 °F]
Dimensions (W x D x H)	
Base	500 x 440 x 450 mm [16.685 x 17.323 x 17.717 in] → For details, see technical drawings

Certificates

Certificates	
Calibration	<ul style="list-style-type: none"> ■ Factory calibration certificate ■ UKAS calibration certificate
Recommended calibration interval	2 to 5 years (dependent on conditions of use)

→ For approvals and certificates, see website

Transport dimensions for the complete instrument

The complete instrument, incl. the scope of delivery, is shipped in three boxes.
The dimensions are 320 x 320 x 280 mm and 790 x 790 x 580 mm [12.6 x 12.6 x 11.1 in and 31.1 x 31.1 x 22.8 in].
The overall weight is dependent on the measuring range.

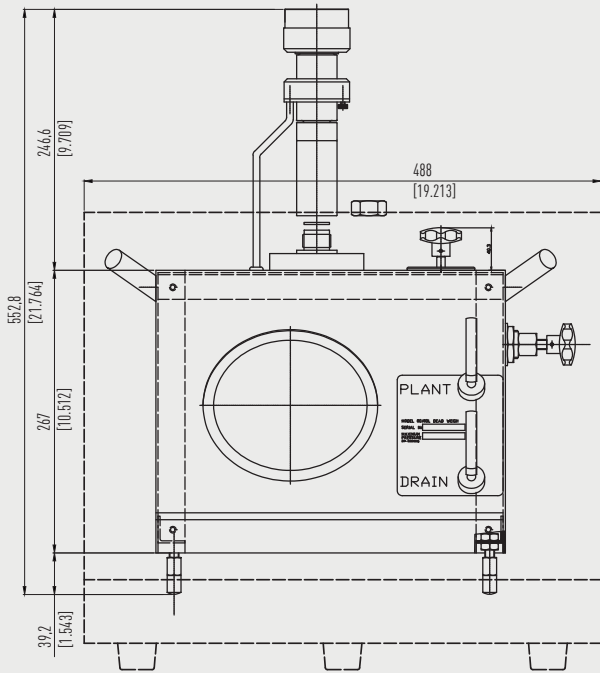
Version	Weight	
	net	gross
30 ... 600 bar	82 kg [180.81 lbs]	90 kg [198.45 lbs]

Version	Weight	
	net	gross
500 ... 8,000 lb/in ²	87 kg [191.84 lbs]	95 kg [209.48 lbs]

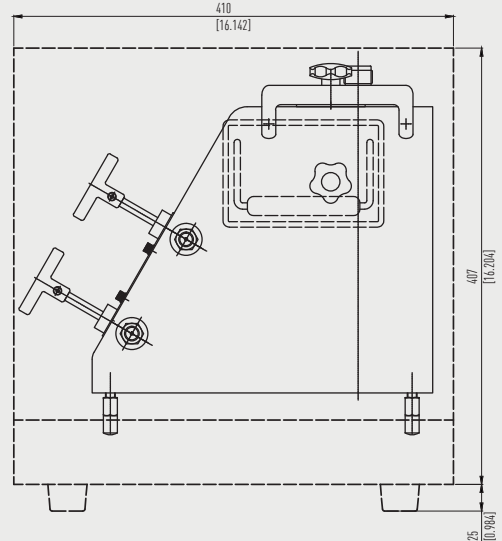
Dimensions in mm [in]

(without masses)

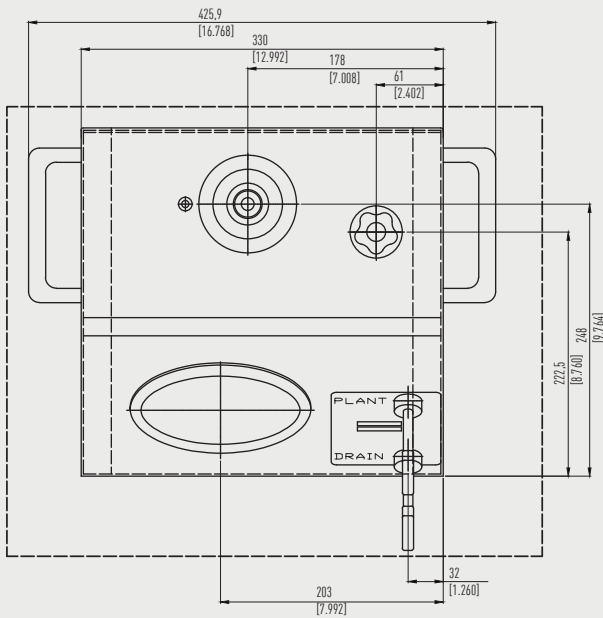
Front view



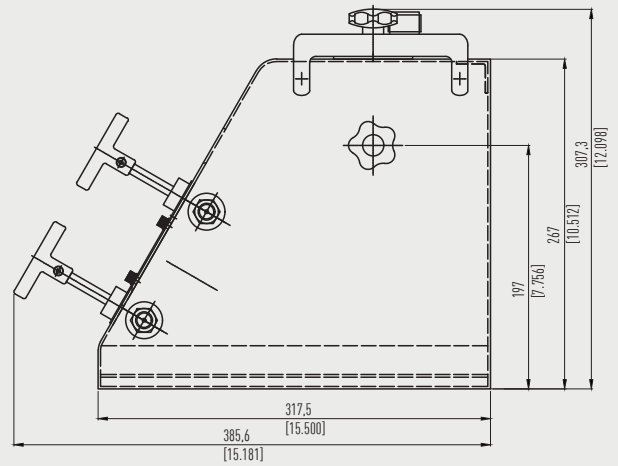
Side view (with case dimensions)



Top view

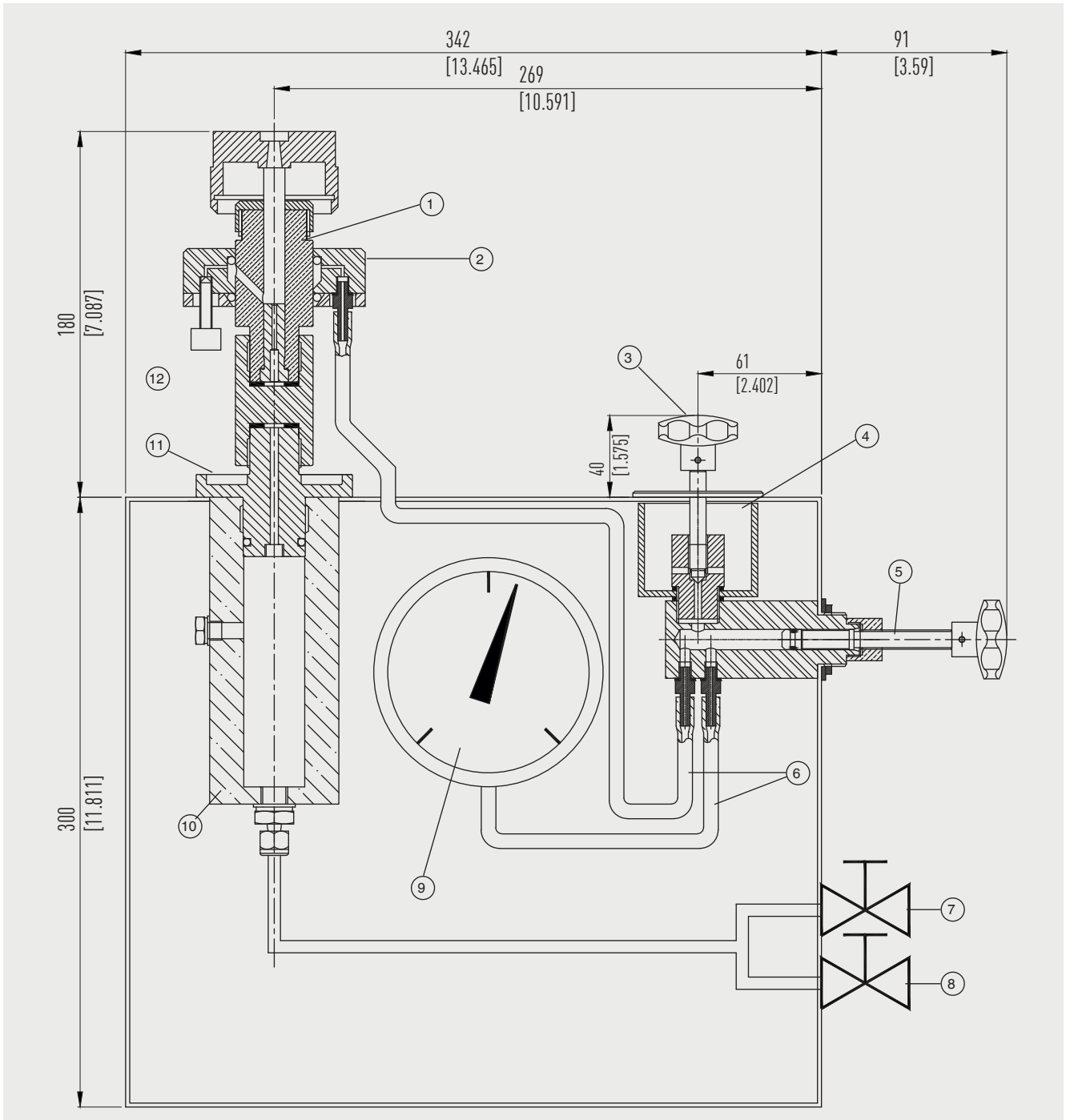


Side view (right)



Instrument base

Components



- | | |
|-----------------------------|-----------------------|
| ① Piston unit | ⑧ Drain valve |
| ② Oil seal | ⑨ Dial pressure gauge |
| ③ Reservoir valve | ⑩ Pressure chamber |
| ④ Compensator reservoir | ⑪ Pressure cap |
| ⑤ Compensator | ⑫ Drain plug |
| ⑥ Transparent plastic pipes | |
| ⑦ Plant valve | |

WIKA-Cal calibration software

Easy and fast creation of a high-quality calibration certificate

The WIKA-Cal calibration software is used for generating calibration certificates or logger protocols for pressure measuring instruments and is available as a demo version for a cost-free download.

To switch from the demo version to a licenced version, a USB dongle with a valid licence must be purchased.

The preinstalled demo version changes automatically to the selected version when plugging in the USB dongle and remains available as long as the USB dongle is connected to the PC.



- The user is guided through the calibration or logger process
- Management of calibration data and instrument data
- Intelligent preselection via SQL database
- Menu languages: German, English, Italian, French, Dutch, Polish, Portuguese, Romanian, Spanish, Swedish, Russian, Greek, Japanese, Chinese
More languages are due with software updates
- Customer-specific complete solutions possible

WIKA-Cal is a calibration software for making calibrations with a pressure balance (dead-weight tester) easier. With the calibration certificate, an XML file can be requested, which can be imported and contains the relevant information:

- Piston parameters (or pressure range)
- Mass set parameters with the individual masses and identifier for different mass sets. Additionally, there is the option to enter user-defined values for the mass sets.

To make the calibration process more reliable and accurate, WIKA-Cal also offers a wide range of additional input parameters, with options such as:

- Input of the local gravity for the test item to compensate with the gravity at the calibration location during calibration
- Conversion of units and determination of the required masses
- Compensation of the pressure difference by entering the height difference between reference and test item

The supported instruments are continuously expanded and even customer-specific adaptations are possible.

For further information, see data sheet CT 95.10

Two WIKA-Cal licences are available together with one CPB series pressure balance (dead-weight tester)

The WIKA-Cal calibration software is available for online calibrations together with a PC. The scope of software functions depends on the selected licence.

Cal-Template (demo version)	Cal-Template (light version)	Cal-Template (full version)
Fully automatic calibration	Semi-automatic calibration	Fully automatic calibration
Limitation to two measuring points	No limitation of the measuring points approached	
<ul style="list-style-type: none"> ■ Creation of 3.1 inspection certificates per DIN EN 10204 ■ Calibration data can be exported to Excel® template or XML file ■ Calibration of pressure measuring instruments 		
Ordering information for your enquiry for a single licence:		
Is available for a cost-free download	WIKA-CAL-LZ-Z-Z	WIKA-CAL-CZ-Z-Z

Scope of delivery

- Hydraulic pipeline tester, model 80, high-pressure version (fitted with blind plugs)
- Piston-cylinder unit with oil seal (fitted with blind plug)
- Mass set supplied in separate carrying case
- 500 ml bottle of hydraulic mineral oil
- Set of pipes for air, gas or water operation, comprising two pipes and one seal
- Spirit level
- Factory calibration certificate
- Operating instructions

Options

- UKAS calibration certificate (pressure calibration)



Hydraulic pipeline tester, model 80 with transport case

Ordering information

CPB80 / Instrument version / Additional ordering information

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We reserve the right to make modifications to the specifications and materials.

