

# Hydraulic pipeline tester

## Model 80, high-pressure version

## Model 80L, low-pressure version



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 metering
- 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 (model 80) and from 7 ... 120 bar (model 80L)
- Accuracy: 0.03 % + 0.05 bar (model 80) and 0.04 % + 0.015 bar (model 80L)
- Ergonomic layout ideal for field use
- All instruments supplied with certification traceable to national standards
- UKAS certificate is available through our pressure standards laboratory as an optional extra



Hydraulic pipeline tester, model 80

## Description

### Accurate measurement of pressures

The hydraulic pipeline tester is a portable unit suitable for the accurate measurement of arbitrary and fluctuating pressure, 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 then in excess of the pressure to be measured and is balanced by the pressure produced by the spindle pump applied to the stepped area of the piston which pushes it upwards. This low pressure is indicated on the precision dial pressure 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 gauge and is ignored.

### Traceable to national standards

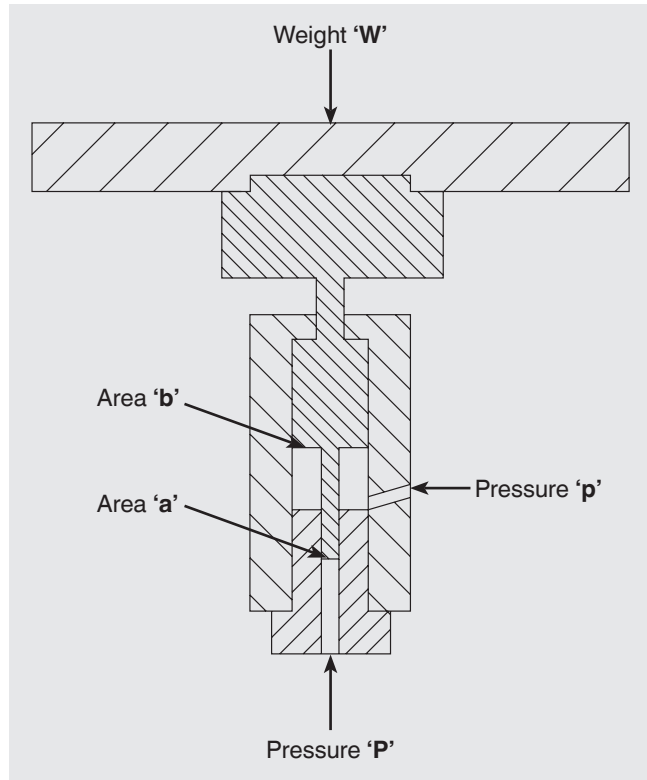
The piston unit and test masses supplied with this pipeline tester have been calibrated against standards which are traceable to National Standards.

## Principle of operation

The pressure to be measured 'P' is applied to a stepped piston and an area 'a' loaded with masses 'W'. The masses 'W' are greater than the force on the piston 'Pa'. A small pressure 'p' is then applied to the annulus (area 'b') until the masses rise, the piston is then in equilibrium and  $W = Pa + pb$ . The term 'pb' is in this instrument 'small' and so the pressure 'P' can be determined accurately by knowledge of the mass 'W' and the area 'a'.

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

Nominal areas	
Model 80	Model 80L
'a' = 1/80 in <sup>2</sup> (8.0645 mm <sup>2</sup> )	'a' = 1/8 in <sup>2</sup> (8.0645 mm <sup>2</sup> )
'b' = 9/80 in <sup>2</sup> (72.805 mm <sup>2</sup> )	'b' = 1/16 in <sup>2</sup> (40.3225 mm <sup>2</sup> )



## Table of masses

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

The mass sets can be manufactured as standard, to the standard gravity (9.80665 m/s<sup>2</sup>) although they can be adjusted for any particular location.

	Model 80				Model 80L			
	Quantity	Nominal pressure per piece in bar	Quantity	Nominal pressure per piece in lb/in <sup>2</sup>	Quantity	Nominal pressure per piece in bar	Quantity	Nominal pressure per piece in lb/in <sup>2</sup>
Piston and make-up weight	1	10	1	1,000	1	1	-	-
Masses (stackable on piston)	4	100	7	1,000	4	20	7	200
	1	90	1	500	1	18	1	100
	1	50	2	200	1	10	1	50
	2	20	1	100	2	4	2	20
	1	10	1	50	1	2	1	10
	1	5	-	-	1	1	-	-

## Specifications

	Model 80		Model 80L	
<b>Measuring range</b>	bar	lb/in <sup>2</sup>	bar	lb/in <sup>2</sup>
Standard pressure range	30 ... 300	500 ... 4,000	7 ... 60	100 ... 800
Extended pressure range	30 ... 600	500 ... 8,000	7 ... 120	100 ... 1,600
<b>Accuracies</b>	0.03 % + 0.05 bar	0.03 % + 0.7 lb/in <sup>2</sup>	0.04 % + 0.015 bar	0.04 % + 0.2 lb/in <sup>2</sup>
<b>Resolution</b>	0.02 bar	0.2 lb/in <sup>2</sup>	0.005 bar	0.05 lb/in <sup>2</sup>
<b>Pressure transmission medium</b>	Hydraulic mineral oil viscosity 20 to 37 cSt at 40 °C (for details please see the operation instructions), water, air			
Reservoir	approx. 60 cm <sup>3</sup>			
<b>Material</b>				
Piston	Steel		Steel	
Cylinder	Carbide		Steel	
Masses	Austenitic stainless steel		Austenitic stainless steel	
<b>Weight</b>				
Standard mass set	29 kg	35 kg	29 kg	35 kg
Extended mass set	52 kg	57 kg	52 kg	57 kg
<b>Connections</b>				
Connection for piston-cylinder system	G 3/4 B male			
Plant (input)	G 1/4 female			
Drain (output)	G 1/4 female			
<b>Permissible ambient conditions</b>				
Operating temperature	18 ... 28 °C			
<b>Case</b>				
Material	Steel			
Dimensions	500 x 440 x 450 mm (W x D x H) for details, see technical drawings			
Weight	30 kg			

## Approvals and certificates

### Certificate

Calibration	Standard: Factory calibration certificate Option: UKAS calibration certificate
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Approvals and certificates, see website

## Transport dimensions for complete instrument

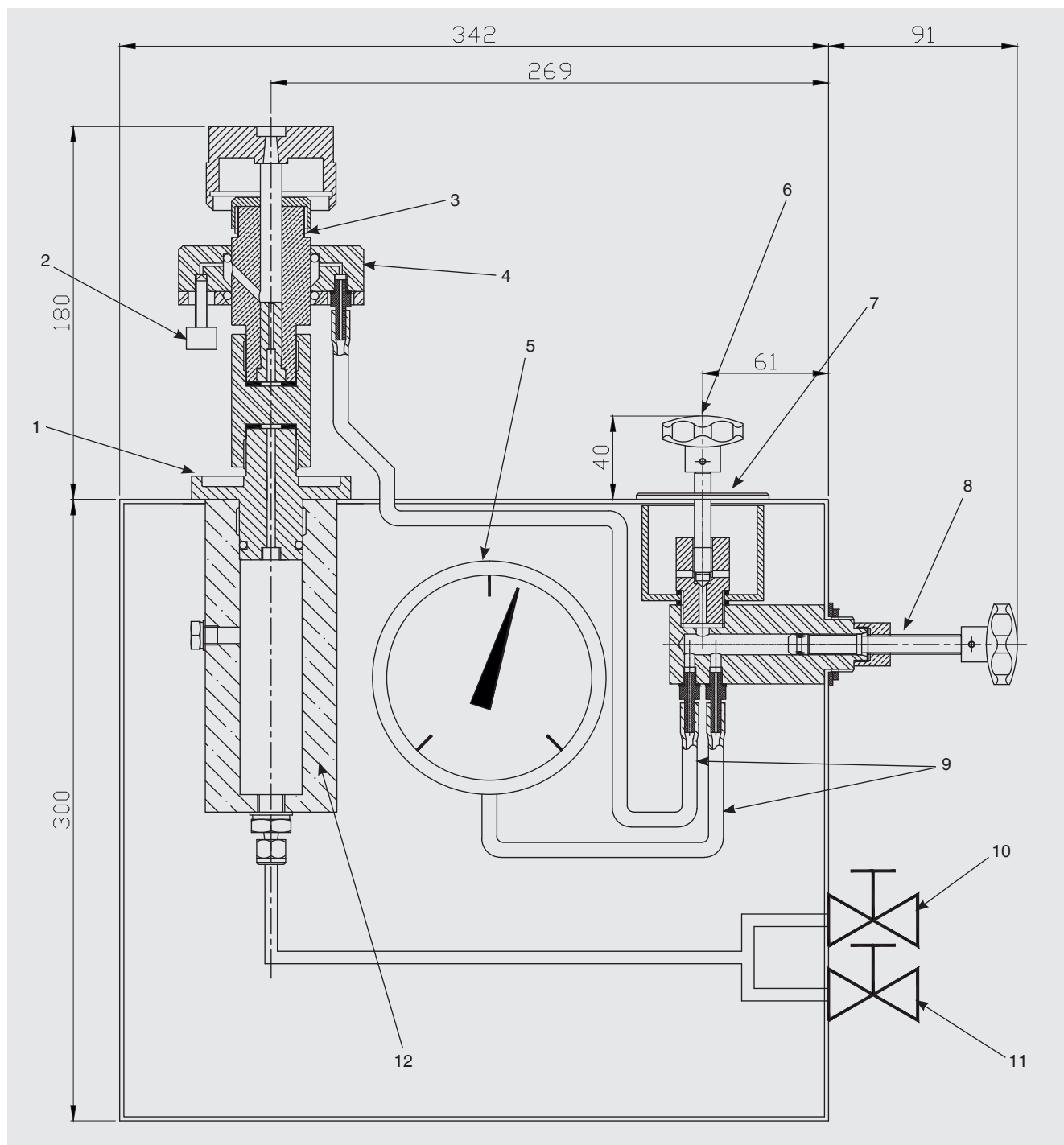
The complete instrument, in its standard version and standard scope of delivery, is shipped in three cartons. The dimensions are 320 x 320 x 280 mm and 790 x 790 x 580 mm. The overall weight is dependent on the measuring range.

Version in bar	Weight in kg	
	net	gross
<b>Model</b>		
80 (30 ... 300 bar), 80L (7 ... 60 bar)	59	67
80 (30 ... 600 bar), 80L (7 ... 120 bar)	82	90

Version in lb/in <sup>2</sup>	Weight in kg	
	net	gross
<b>Model</b>		
80 (500 ... 4,000 lb/in <sup>2</sup> ), 80L (100 ... 800 lb/in <sup>2</sup> )	65	73
80 (500 ... 8,000 lb/in <sup>2</sup> ), 80L (100 ... 1,600 lb/in <sup>2</sup> )	87	95

# Instrument base

## Components

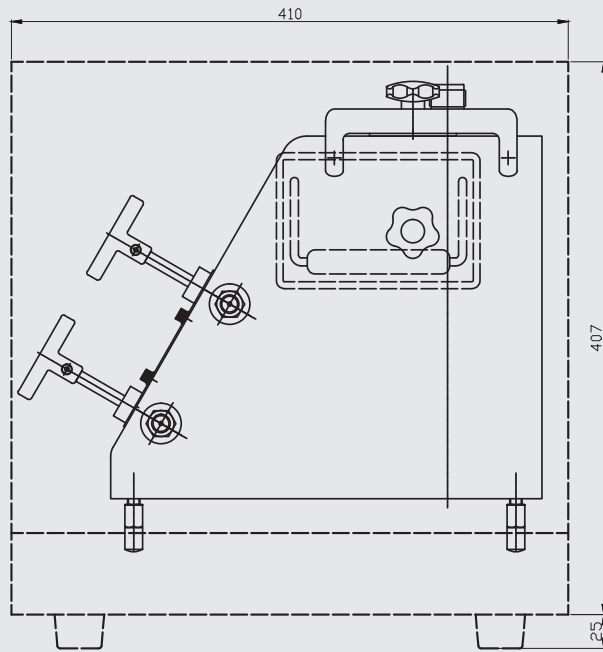


- (1) Pressure cap
- (2) Bleed screw
- (3) Piston unit
- (4) Oil seal
- (5) Dial pressure gauge
- (6) Reservoir valve

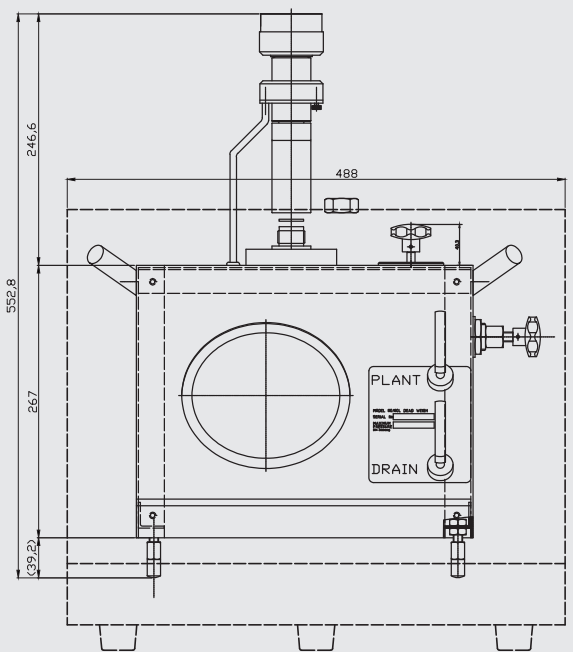
- (7) Compensator reservoir
- (8) Compensator
- (9) Transparent plastic pipes
- (10) Plant valve
- (11) Drain valve
- (12) Pressure chamber

# Dimensions in mm

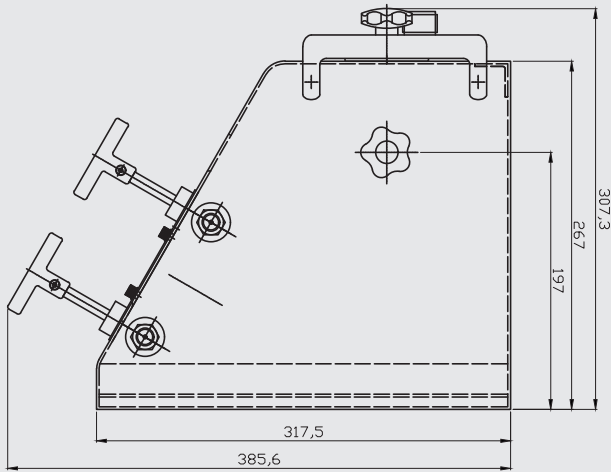
Side view (with case dimension)



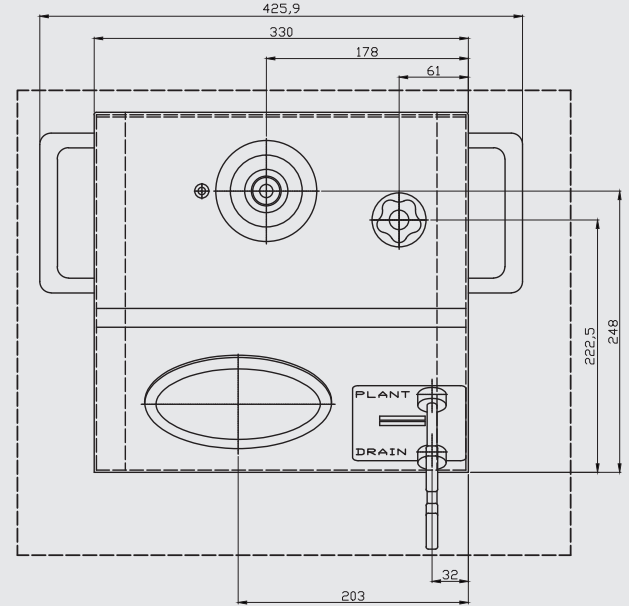
Front view



Side view



Top view



## Scope of delivery

- Model 80, hydraulic pipeline tester high-pressure version or model 80L, hydraulic pipeline tester low-pressure version (fitted with blanking plug)
- Piston-cylinder unit with oil seal (fitted with blanking 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 bonded seal
- Spirit level
- Factory calibration certificate
- Operation instructions

## Options

- UKAS calibration certificate (pressure calibration)



Hydraulic pipeline tester, model 80 with transport case

