

# BL2R-BL2H Air or oil reference dead-weight tester

Calibration of pressure transducers, transmitters, pressure gauges and pressure switches.

Measuring ranges:

BL2R : -0.9 ....200 bar (air)

BL2H : 0.5 .....4000 bar (oil)

Quick connection of devices to be calibrated.

The dead-weight testers BL2R and BL2H are designed for the calibration of pressure monitoring systems. They consist of a pressure generator, a cylinder piston unit, including a given S section and a set of weights with an accurate given value m which allow the establishment of the relation  $P = (m \times g)/S$  and, thus, comply with the units of the International System (SI).

As for their design, the dead-weight testers BL2R and BL2H are sturdy, easy to operate and have an excellent long-term stability providing a high metrological property.



## Technical specifications (20°C)

<b>Calibration fluid</b>	BL2R : clean and dry nitrogen gas delete (lubricated piston for measuring ranges EM $\geq$ 30 bar) Connection to power supply under vacuum or pressure conditions : G 1/4 female BL2H : measuring ranges $\leq$ 150 bar mineral oil (H15), measuring ranges $>$ 150 bar mineral oil (H40)
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### Generator specifications

<b>Type of material</b>	Tube and fittings: measuring ranges $\leq$ 120 bar: copper/brass measuring ranges $>$ 120 bar: stainless steel 1.4404 (316) Frame: aluminium alloy Case: epoxy painted steel
<b>Volume adjuster</b>	Fixed with thrust-bearing (wearing rings and needle thrust bearings)
<b>Levelling</b>	A spirit level indicator and four adjustable integrated feet
<b>Input pressure</b> (BL2R only)	Pressure gauge
<b>Operating connection</b>	G 1/2 female with manual fastening (other options available)
<b>Options</b>	Self-propelled spinning rest point indicator

### Specifications for the piston/cylinder unit (simple piston)

<b>Type of material</b>	BL2R measuring ranges $<$ 10 bar: stainless steel BL2R measuring ranges $\geq$ 10 bar: treated steel BL2H measuring ranges $<$ 300 bar: treated steel BL2H measuring ranges $\geq$ 300 bar: tungsten carbide
<b>Repeatability</b>	$2.10^{-5} \times P$ à $4.10^{-5} \times P$ depending on measuring ranges
<b>Option</b>	Piston/cylinder unit (double piston) available for BL2H300, BLH600, BL2H1200

### Specification for intermediate set of weights

<b>Type of material</b>	Light alloy
<b>Weight value</b>	4 g to 160 g

### Specifications for basic set of weights

<b>Type of material</b>	Stainless steel or light alloy
<b>Shape</b>	Ring-shaped
<b>Weight value</b>	40 g to 8 kg
<b>Set of weights value</b>	4 kg to 80 kg
<b>Weight mark-up</b>	In pressure units
<b>Standard units</b>	bar, mbar, Kpa, mmH <sub>2</sub> O, kg/cm <sup>2</sup> , InH <sub>2</sub> O, Psi (contact us for others)

### Options

Double piston/cylinder unit  
Intermediate set of weights  
Oxygen cleanliness (BL2R only)  
Motor driven weights (power supply 110V or 220V to be specified)  
Rest point indicator  
Other measurement units (contact us)  
Other measuring ranges (contact us)  
Calibration certificate by EA authorized laboratory (COFRAC, DANAK, DKD, SAS, UKAS, etc.)

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## Operating principle

### BL2R air dead weight tester

The input gas should be clean and dry (e.g., nitrogen)

It is equipped with two valves: one for pressurized gas inlet or through a vacuum pump and one for outlet. The volume adjuster allows adjustment of the pressure bringing to balance piston and weights. The pressure generated on the instrument is proportional to the value of the applied weights.

### BL2H oil dead weight tester

The tester is equipped with an oil reservoir, a reservoir isolation valve and for the measuring ranges  $\geq 300$  bar with a piston isolation valve, low pressure of compressor. The volume adjuster activated compressor allows adjustment of pressure bringing to balance piston and weights. The pressure generated on the instrument is proportional to the value of the applied weights.

## Maximum permissible errors

Model	Measuring range		Maximum permissible error (better than)
BL2R1V	-15	to -900 mbar	$3.10^{-4} \times P$
BL2R1	15	to 1000 mbar	$3.10^{-4} \times P$
BL2R10	0.15	to 10 bar	$1.5.10^{-4} \times P$
BL2R30	0.5	to 30 bar	$1.5.10^{-4} \times P$
BL2R60	1	to 60 bar	$1.5.10^{-4} \times P$
BL2R120	1	to 120 bar	$1.5.10^{-4} \times P$
BL2R200	5	to 200 bar	$1.5.10^{-4} \times P$
BL2H30	0.2	to 30 bar	$2.10^{-4} \times P$
BL2H60	0.4	to 60 bar	$2.10^{-4} \times P$
BL2H150	0.5	to 150 bar	$1.5.10^{-4} \times P$
BL2H300	1	to 300 bar	$1.5.10^{-4} \times P$
BL2H600	2	to 600 bar	$1.5.10^{-4} \times P$
BL2H1200	2	to 1200 bar	$2.10^{-4} \times P$
BL2H2000	40	to 2000 bar	$4.10^{-4} \times P$
BL2H2500	40	to 2500 bar	$4.10^{-4} \times P$
BL2H3000	40	to 3000 bar	$4.10^{-4} \times P$
BL2H4000	40	to 4000 bar	$4.10^{-4} \times P$

**Note :** These values have been established under the following conditions: Temperature T = 20°C Relative humidity I-Ir = 50%  
Acceleration due to gravity = 9.80665 m/s<sup>2</sup> Atmospheric pressure = 1013.25 hPa

## Characteristics with standard set of weights

Model	Weight of set	mbar		bar or kg/cm <sup>2</sup>		kPa		psi		mmH <sub>2</sub> O		inH <sub>2</sub> O	
		Resolution	No. of weights	Resolution	No. of weights	Resolution	No. of weights	Resolution	No. of weights	Resolution	No. of weights	Resolution	No. of weights
BL2R1V	4kg	5	9			0.5	9			50	9	1	11
BL2R1	4kg	5	9			0.5	9			50	9	1	11
BL2R10	16kg			0.05	12	5	12	0.5	11				
BL2R30	48kg			0.25	10	25	10	2.5	12				
BL2R60	48kg			0.5	10	50	10	5	12				
BL2R120	48kg			1	10	100	10	10	12				
BL2R200	32kg			0.25	12	25	12	2.5	14				
BL2H30	24kg			0.05	11	5	11	0.5	12				
BL2H60	24kg			0.1	11	10	11	1	12				
BL2H150	24kg			0.25	11	25	11	2.5	12				
BL2H300	24kg			0.5	11	50	11	5	12				
BL2H600	24kg			1	11	100	11	10	13				
BL2H1200	48kg			2	13	200	13	20	15				
BL2H2000	40kg			10	10	1000	10	200	12				
BL2H2500	50kg			10	12	1000	12	200	15				
BL2H3000	60kg			10	13	1000	13	200	15				
BL2H4000	80kg			10	15	1000	15	200	19				

## Characteristics with intermediate set of weights

Model	Weight of set	kPa		bar or kg/cm <sup>2</sup>		psi	
		Résolution	No. of weights	Résolution	No. of weights	Résolution	No. of weights
BL2R1V	-	-	-	-	-	-	-
BL2R1	-	-	-	-	-	-	-
BL2R10	80g	0.5	4	0.005	4	0.05	4
BL2R30	480g	0.5	7	0.005	7	0.05	7
BL2R60	480g	1	7	0.01	7	0.1	7
BL2R120	480g	2	7	0.02	7	0.2	7
BL2R200	48g	1	6	0.01	6	0.1	6
BL2H30	48g	0.2	6	0.002	6	0.02	6
BL2H60	48g	0.5	5	0.005	5	0.05	5
BL2H150	48g	1	6	0.01	6	0.1	6
BL2H300	48g	2	6	0.02	6	0.2	6
BL2H600	84g	5	5	0.05	5	0.5	5
BL2H1200	244g	10	5	0.1	5	1	5
BL2H2000	244g	20	6	0.2	6	2	6
BL2H2500	244g	20	6	20	6	2	6
BL2H3000	460g	20	6	20	6	2	6
BL2H4000	460g	20	6	20	6	2	6

## Characteristics with standard set of weights and double piston unit

Model	Measuring range in bar	Maximum permissible error (better than)	Weight of set of weights	bar or kg/cm <sup>2</sup>		kPa		psi	
				Résolution	No. of weights	Résolution	No. of weights	Résolution	No. of weights
BL2H300	1 - 300	P < 60 bar 2.5 10 <sup>-4</sup> x P P ≥ 60 bar 2.10 <sup>-4</sup> x P	47.6 kg	P < 60 bar 0.5 bar P ≥ 60 bar 2.5 bar	10	P < 6 MPa 500 kPa P ≥ 6 MPa 2500 kPa	10	P < 800 psi 5 psi P ≥ 805 psi 25 psi	12
BL2H600	1 - 600	P < 60 bar 3 10 <sup>-4</sup> x P P ≥ 60 bar 2.10 <sup>-4</sup> x P	47.6 kg	P < 60 bar 50.5 bar P ≥ 60 bar 5 bar	10	P < 6 MPa 500 kPa P ≥ 6 MPa 5000 kPa	10	P < 800 psi 5 psi P ≥ 805 psi 50 psi	12
BL2H1200	1 - 1200	P < 60 bar 5 10 <sup>-4</sup> x P P ≥ 60 bar 2.10 <sup>-4</sup> x P	47.6 kg	P < 60 bar 0.5 bar P ≥ 60 bar 10 bar	10	P < 6 MPa 500 kPa P ≥ 6 MPa 10000 kPa	10	P < 800 psi 5 psi P ≥ 805 psi 100 psi	12

## Characteristics with intermediate set of weights and double piston unit

Model	Weight of set	Piston BP						Piston HP					
		kPa		bar ou kg/cm <sup>2</sup>		psi		kPa		bar or kg/cm <sup>2</sup>		psi	
		Résolution	No. of weights	Résolution	No. of weights	Résolution	No. of weights	Résolution	No. of weights	Résolution	No. of weights	Résolution	No. of weights
BL2H300	48g	1	7	0.01	7	0.1	7	5	7	0.05	7	0.5	7
BL2H600	48g	1	7	0.01	7	0.1	7	10	7	0.1	7	1	7
BL2H1200	48g	1	7	0.01	7	0.1	7	20	7	0.2	7	2	7

## Dimensions (mm) - Weight (kg)

Model	Dimensions (wxdxh) in mm of operating tester	Tester weight (without weights)	Dimensions (wxdxh) in mm/Weight in kg of the standard wood packing	optional			
				Dimensions (wxdxh) in mm/Weight in kg of the carrying case for tester	Dimensions (wxdxh) in mm/Weight in kg of the big carrying case for the set of weights	Dimensions (wxdxh) in mm/Weight in kg of the small carrying case for the set of weights	Quantity of small carrying cases
BL2 R1V	420x420x363	17 kg	800x500x430/15	630x630x370/20	370x310x300/11		1
BL2R1	420x420x225	17 kg	800x500x430/15	630x630x370/20	370x310x300/11		1
BL2R10	420x505x340	17 kg	800x500x430/15	630x630x370/20	370x310x300/11	310x190x300/4.5	1
BL2R30 BL2R60 BL2R120 BL2R200	420x505x340	18 kg	800x500x430/15	630x630x370/20	370x310x300/11	310x190x300/4.5	1
BL2H30 BL2H60 BL2H150 BL2H300 BL2H600 BL2H1200 BL2H2000	420x510x340	18 kg	800x500x430/15	630x630x370/20	370x310x300/11	310x190x300/4.5	1
BL2H2500 BL2H3000 BL2H4000	420x540x38	18 kg	1000x700x500/20	630x630x370/20	370x310x300/11	310x190x300/4.5	2 3

\*(w) width of tester (d) depth of tester, including volume adjuster (h) height of feet at the top of the cylinder piston unit excluding weights

reservoir 125 cm<sup>3</sup>

quick-mount fitting G ½

(except BL2H 2000 : ø 400)

## Standard versions

Compressor for pressurization  
Piston/cylinder unit  
Set of weights  
Certificate of accuracy  
Operating instructions  
Necessary for operation (calibration fluid 0.5 l for BL2H)

## Accessories (contact us)

0.5 litre oil bottle  
Accessory kit including 1 retaining disk with its joints, 1 horizontal outlet adapter, 1 quick-mount fittings (G ¼, G ½, ¼ NPT, ½ NPT), 1 open-end wrench 27x30, 1 Allen wrench, 1 hammer, 1 pointer punch, 1 needle remover (0.8 and 1.5)  
Pocket case with spare seals (specify tester model)  
Carrying case for set of weights  
Carrying case for tester  
Carrying case for quick-mount fittings for adaptation of devices to be calibrated (1 retaining disk with joints: 1 7x1 joint, 1x5 joint; 15 quick-mount fittings)  
Tester oil change equipment including 1 manual suction pump, 1 reservoir for used oil.  
800 bar viton membrane separator (optional butyl): G ½  
quick-mount fitting, maximum 0.2 bar induced error, weight 6.5 kg

## Codification

BL2xxxxx	
<b>Family</b>	1'...2' digit
Tester	BL
<b>Model (1)</b>	3' digit
2	2
<b>Calibration fluid</b>	4' digit
Air	R
Oil	H
<b>Pressure range</b>	5'...8' digit
See codes in table	xxxx
<b>Measuring units</b>	9' digit
bar	B
kPa	D
kg/cm <sup>2</sup>	F
psi	H
mbar	N
mm H <sub>2</sub> O	R
in H <sub>2</sub> O	X

Code	Measuring Ranges (bar)
001V	-0.9 ... -0.015
0001	0.015... 1
0010	0.15 ... 10
0030	0.5 ... 30
0060	1 ... 60
0120	0.5 ... 120
0150	0.5 ... 150
0200	1 ... 200
0300	1 ... 300
0600	1 ... 600
1200	1 ... 1200
2000	20 ... 2000
2500	40 ... 2500
3000	40 ... 3000
4000	40 ... 4000

(1) Dead weight tester with double piston unit (models BL2H300-L2H600-BL2H1200) to clearly specify after codification