

Types BT 300, BT 1000

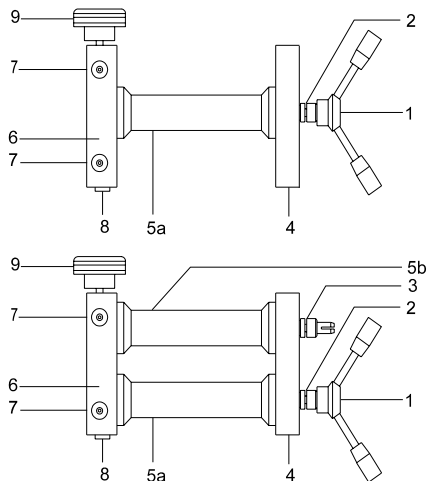
Application:

Test pumps are used for testing, adjusting, and calibrating mechanical pressure measuring devices (pressure gauges) and electronic pressure measuring devices (pressure sensors, transducers) through comparison measurements. Such pressure test can be made in a work shop, in a laboratory or at the measuring point in the field.

Connecting the instrument to be tested and a sufficiently precise reference to the test pump and turning the capstan wheel to the right creates a pressure which affects both instruments. The produced pressure display or the electronic pressure signal (0/4...20mA, 0... 10V, etc.) of both units can be compared at any set pressure point. The deviation between the displayed value of the reference instrument and set value of the instrument to be tested shows the accuracy of the tested gauge.

The new LR test pumps BT 300 and BT 1000 are the result of a consequent development of the successful forerunner types 3/PH1 and 3/PH2. Different procedures during pressure tests, higher demands on technology, ergonomics and design created the handy shape, the dimensions and the light weight of this new generation of test pumps. The most important characteristics however, are the **fine tuning** and the turning spindle which **turns only inside the cylinder**. There is **no more danger of a bending moment because of a protruding spindle** as is common at other test pumps after applying pressure. **Easy handling** - especially for working in the field - is guaranteed because the dimensions the pump remain the same during operation.

Description and function:



- | | |
|--------------------------|---------------------------|
| 1 handle | 5b high pressure cylinder |
| 2 low pressure spindle | 6 back flange |
| 3 high pressure spindle | 7 connections |
| 4 front flange | 8 side connection |
| 5a low pressure cylinder | 9 fine tuning |

Pressure pumps are equipped with one (type BT 300) or two pressure cylinders (type BT 1000) which are screw connected to a front flange and a back flange (see 4, 5, 6). Turning the handle (1) to the left cause the spindle (2) inside the low pressure cylinder to move a piston in the



HD 300



BT 1000

direction of the front flange. If one of the connections is open (7), pressure fluid can be suctioned into the pump by turning the handle (1) to the left. To use up the entire piston play, the handle must be turned from the stop at the back flange to the stop of the front flange. The pump should be filled slowly to avoid air being suctioned into the system. For type BT 1000 the second connection must now be opened. Remove the handle (1) and connect it to the second cylinder (3). Now fill the high pressure cylinder as described above. After the filling process is completed wait approximately 2 - 3 minutes so that the air in the medium can settle. One right turn of spindles (2) and (3) creates one piston stroke in the direction of the back flange. To test



readiness of the pump, move both spindles slightly and watch the fluid level inside the connection openings. If air bubbles become visible, continue turning the handle to the right until the medium in the connection opening has risen by approximately one half. Slow turning the spindles (2) and (3) counterclockwise to the stop suction more liquid into the system. After this filling process is completed, a reference instrument and one or two instruments to be tested can be connected at connection (7) and (8). The pump is now ready for a pressure test.

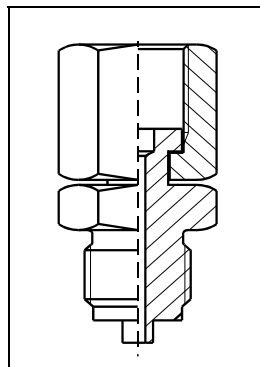
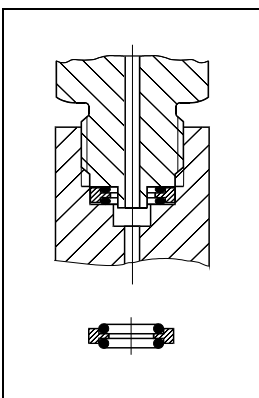
Connect handle (1) to spindle (2). Turning it clockwise causes the piston inside the cylinder to move in the direction of the back flange. This compresses the filling medium, creating a pressure display or an electric signal at the reference instrument and the instrument to be tested. Type BT 300 is designed for pressures up to 250 bar ($P_{max} = 300$ bar). Type BT 1000 is designed for pre-pressures up to 250 bar in the low pressure cylinder and for high pressures up to 1000 bar ($P_{max} = 1300$ bar) in the high pressure cylinder. Fine tuning in the low pressure range up to 250 bar can be achieved by turning the precision spindle with the knob (9). Test pressures higher than 250 can be sufficiently set with the handle (1). Since small particles of air or gas are always compressed with the medium, the generated test pressure in the high pressure ranges will usually decrease slightly and must be re-adjusted accordingly. Always reduce pressure in the high-pressure cylinder (5b) first. Turning the spindle (3) to the stop at the front flange assures a pressure release to the level of the low-pressure range. Now the pressure in the low-pressure cylinder (5a) can be released from 250 bar to "zero". After both spindles (2) and (3) have been turned to the stop of the front flange, and reference instrument and instrument to be tested show "zero", the instruments can be dismantled.

Connections:

The standard design of test pumps BT 300 and BT 1000 are equipped with three connections with inner thread 1/2"A according to DIN 16288. They can be used in any succession for the connection of reference gauges or gauges to be tested. Adapters can be supplied for different connection threads as well as an angle connection piece for instruments with back entry.

For sealing we suggest to use an **quick-seal**:

The spacer disk which can be used for G1/2 threads and M 20x1,5 has a groove on both sides. An O-ring of Perbunan (brass design) or Viton (stainless steel design) is fitted in each groove. When the pressure increases, the O-ring can expand only to the top end to the bottom (the sides are restricted by the groove). The sealing effect to the connection flange of the pump (bottom) and to the socket of the reference or the instrument to be tested (top) increases with the increasing pressure. The quick-seal permits mounting of the reference and/or test gauges without a screw driver. It is sufficient to tighten the connection piece by hand for leakproof connection up to 1000 bar (P_{max} 1300 bar).



Our **positioning adapter** is especially useful for testing mechanical and electronic pressure gauges. It enables to position the reference or the test gauge in any desired angle.

Designs:

Test pumps BT 300 and BT 1000 are designed for the connection of a reference instrument with nominal size 100 (top or side of back flange) and two pressure transducers. For testing mechanical gauges

(nominal sizes 160 and 250) a reference with side entry is necessary. We purposely chose this design in order to keep the pump small and light for working in the field. If however, weight and dimensions are not important to a customer who tests gauges nominal size 160 and 250, we can deliver these pumps with an enlarged back flange: types BT 300 BM and BT 1000 BM. The standard design of test pumps BT 300 and BT 1000 is laid out for operation with a pure - possibly acid free-oil as medium. We suggest hydraulic oil UNIVIS J 13. **Pumps for oxygen service, break fluid, Skydrol etc. are available upon request.**

Maintenance:

Our test pumps are wear resistant so that no special maintenance is necessary, provided however, that a pure acid free medium is used. It is also important that during pressure tests the pressure limits are not surpassed. A constant operating pressure of 250 bar should not be surpassed with the BT 300 pump, to avoid overburdening seals and bearings within the pump.

The operating pressure of the BT 1000 pump should not exceed 250 bar in the low pressure range and 1000 bar in the high pressure range.

Type of pump	BT 300	BT 1000
Test pressure 1st cylinder:	0...250 bar	
Test pressure 2nd cylinder:	---	1000 bar
P_{max} :	300 bar	1300 bar
Special designs:	oxygen, break fluid, Skydrol, etc. upon request	
Fill medium:	Univis J 13	
Pressure generation:	with turning handle, removeable	with turning handle, changeable
Fine Tuning:	through spindle on the right	
Connections:	3 x G 1/2 A inner thread	
Dimensions: length x width x height	290 x 190 x 110 mm special design with enlarged back flange available	
Weight	7,8 kg	11 kg

In similar design high pressure test pumps BT 3000 are available, test pressure 2500 bar (36000 psi), P_{max} 3000 bar (43000 psi). For dimensions see OF4.1470.