DEAD WEIGHT PRESSURE GAUGE TESTER

Operation Manual
FEATURES:

Built on first principle of hydraulics used for precision calibrator for pressure gauges and other sensing, transmitting and recording pressure instrument. Bench mounted indigenous unit, simple to operate.

INTRODUCTION:

The dead weight tester is one of the few instruments that can be used to generate pressure in terms of the fundamental units of force and area. Since only the fundamental units of force and area are involved for measurements, the dead weight tester need not be continuously referenced to another pressure instruments for its calibration accuracy. Dead weight testers are thus considered primary laboratory pressure standard.

DESCRIPTION:

Dead weight tester consists of a frictionless piston (ram) mounted on a rugged base. Its proprietary screw type operating system ensures an effortless operation. Rotation of screw produces the pressure which is balanced by precision weights designed for industrial standard accuracy. A test connection is arranged for direct mounting of pressure gauges, transmitter, pressure switches, recorders etc. It is of robust construction with a sturdy steel base having adjustable leveling screws.

SPECIFICATION:

MECHANICAL SPECIFICATION:

Dimension: 375 (W) X 425 (L) X 350 (H) mm

Weights: 20 Kg (Except weights sets and accessories) (Finish Painted with corrosion resistant paint and oven dried)
OPERATING INSTRUCTION:

1. Level the Tester on a strong table top using sprit level and adjusting the level screws.
2. Make sure there is 2/3 oil level in oil reservoir cup.
3. Keep oil reservoir valve open and unscrew the screw pump fully.
4. Close the oil reservoir valve and rotate screw pump clockwise till the air is out from the systems and oil is visible in gauge connection.
5. Connect the pressure gauge in gauge connection using proper adapter.
6. Open the oil reservoir valve and unscrew the screw pump fully.
7. Close the oil reservoir valve and pressurize the system using screw pump slowly till the weight is lifting by 4 to 5 mm or up to the red mark. Rotate the lifted weight slowly and compare the pressure gauge indication with lifted weights.

ERROR CORRECTION FOR GRAVITY:

NOTE: Dead Weight Tester weight set will manufacture for local gravity at Vadodara, India with local acceleration Of Gravity g value 9.7876 m/sec2. Pressure Correction need to make, if it is used at different location as follows.

1) The value of local gravity can differ by 0.1% all over India. As pressure is defined as ‘FORCE PER UNIT AREA’ the mass values must be converted to force values. So measured pressure can be corrected as

$$\text{Corrected pressure} = \frac{G_l}{G_c} \times P_r,$$

Where $G_c$ = Gravity value for which DWT is calibrated, $G_l$ = Local gravity, $P_r$ = Pressure measured by DWT. Acceleration due to gravity at any latitude and elevation can be calculated by Helmert’s equation. If $F$ is the latitude and $H$ the elevation in centimeter the acceleration in C.G.S units is

$$G = 980.616 - 2.5928 \cos^2 F + 0.0069 \cos 2F - 3.086 \times 10^{-6} H$$

2) Change in temperature is affecting piston area. Linear coefficient of expansion ($a$) of carbon steel is $12 \times 10^{-6}$. Thus the % change in piston area is 1.000024 per 1 °C. Error due to change in 1 °C is 0.0024 %.
STANDARD ACCESSORIES:

* Accurately calibrated weights
* Gauge connection adopters for 1/8", 1/4", 3/8", 1/2 BSPF, 1/2" NPTF, 20x1.5 mm on ½" BSPF Fitment
* Pointer puller and pointer punch
* Gauge opener
* Spirit level
* A set of spanners in a Tool Box
* 500 ml Oil (SAE 30/40) Bottle
* One set of spare seals and 'O' Rings
* A sturdy earring case for weights
* Dust cover

RANGE:

THE SELECTABLE RANGE FOR MODEL BS-01 AND BS-02 ARE AS UNDER

<table>
<thead>
<tr>
<th>From (Kg/cm²)</th>
<th>To (Kg/cm²)</th>
<th>In Step Of (Kg/cm²)</th>
<th>Model</th>
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<td>0.1</td>
<td>BS-01</td>
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<tr>
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<td>250</td>
<td>0.1</td>
<td>BS-02</td>
</tr>
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</table>

1 Dead Weight Tester range in any other engineering units like BAR, PSI, kPa etc. are optional
2 Additional fractional weights for measurement in step of 0.01 Kg/cm² are Optional.
3 BS-02 is bell type loading and BS-01 is top loading model for weights sets for Dead Weight Tester.