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Model T1300

Hydraulic Comparison Test Pump

User's Manual



Terwin Instruments Ltd



**Manufacturers Of Industrial Pressure / Temperature
Sensors & Instrumentation**

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SAFETY SUMMARY

The following are general safety precautions that are not related to any specific procedures and do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during equipment operation and maintenance to ensure safety and health and protection of property.

COMPRESSED LIQUID

Use of compressed liquids can create an environment of propelled foreign matter. Pressure system safety precautions apply to all ranges of pressure. Care must be taken during testing to ensure that all hydraulic connections are properly and tightly made prior to applying pressure. Personnel must wear eye protection to prevent injury.

PERSONAL PROTECTIVE EQUIPMENT

Wear eye protection approved for the materials and tools being used.

SERVICING

If repairs are required, the instrument should be adequately packed to prevent damage and a note describing the observed problems enclosed and shipped pre-paid to the nearest Terwin representative or sent to: -

The Service Department,
Terwin Instruments Ltd.,
Winterbeck Industrial Estate, Orston Lane,
BOTTESFORD, Nottinghamshire, NG13 0AU, UK.

1.1 **Baseplate:**

The main components of the tester are fixed on a rigid aluminum baseplate. The baseplate is provided with 4 leveling screws. A sheet metal cover is provided for protecting the interconnecting piping from damage.

1.2 **Screw Pump:**

The screw pump provides the main pressure generation mechanism of the tester. It consists of 2 plungers of different areas moving along the same axis in their respective cylinders developing low and high pressures respectively.

Clockwise rotation of the screw pump handle initially engages only the low pressure plunger which increases pressure in the tester until the relief valve set pressure is reached. Continued rotation of the screw pump handle eventually engages the high pressure plunger in its cylinder and higher pressures start developing in the gauge connectors.

1.3 **Main Block:**

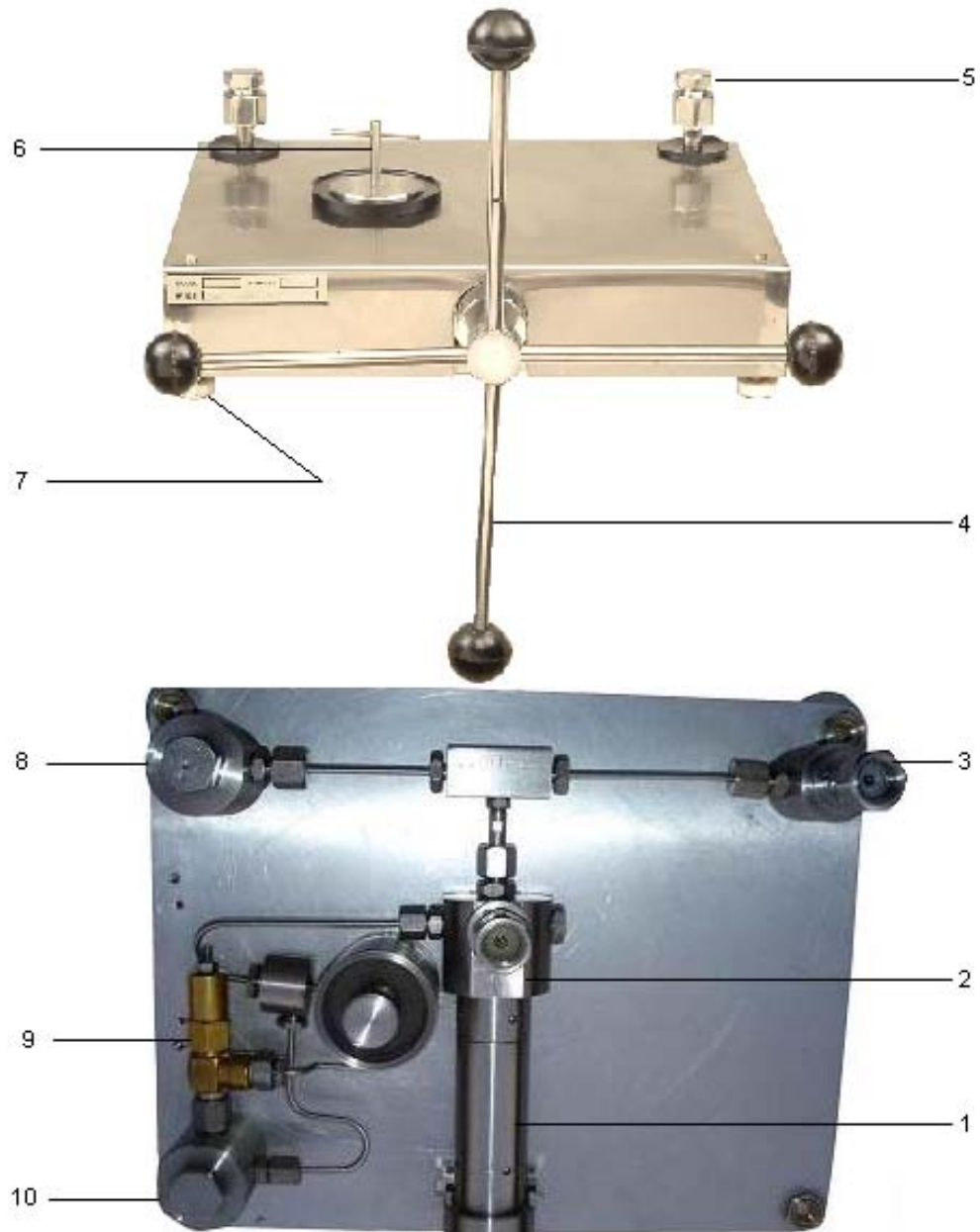
This is the manifold that connects the screw pump to the tester. It has both low pressure circuit and high pressure circuit connections. The comparison test pump utilises only the high pressure portion going towards the two gauge connectors.

1.4 **Union Connectors:**

The Union connectors provide a 1/2" BSP thread for mounting gauges and adaptors. Soft PU/Nylon/rubber or dowty seals should be used for sealing, teflon tape should be avoided.

1.5 **Release Valve:**

This is the only user operated valve. Leave it open after use.



KEY TO PARTS			
1	Screw Pump Cylinder	6	Release Valve
2	Main Block	7	Leveling Screw
3	Gauge Block	8	Gauge Block
4	Handle Shaft	9	Relief Valve
5	Gauge Connector	10	Auxillary Block (not used)

Set Up:

- 2.1 Place the tester on a level surface, preferably wooden table or mount on the tripod incase of portable model.
- 2.2 Install the handle rods after taking them out from the tool bag.

Operating Procedure:

- 3.1 Poor the oil provided to you in the oil cup of the tester but do not fill it to the brim.
- 3.2
 - a) Open the release valve
 - b) Turn the screw pump handle rod clockwise completely.
 - c) Slowly turn the screw pump handle anticlockwise towards the operator and filling it up with oil. Repeat (b) and (c) once more in the first set up.
 - d) Close the release valve
- 3.3
 - a) Remove the stopper from the gauge connector
 - b) Turn the screw pump handle clockwise until oil shows in the gauge connector
 - c) Install the pressure gauge on the connector using an appropriate adaptor. Avoid the use of teflon tape except between NPT threads and adaptors. Dirty and contaminated gauges should be cleaned before installation
- 3.4 Install the master gauge in a similar fashion, and turn screw pump handle clockwise to generate pressure.

After Use:

- 4.1 The tester should be left in the following condition after use.
 - a) Release Valve: Open
 - b) Screw Pump handle: Fully withdrawn by turning it anti-clockwise
 - c) Union connectors: Plugged

Re-adjustment Of Pressure Gauge:

5.1 Study the test results of pressure gauges and resolve the error at each point to find the zero error and ratio error in the gauge. Install the pressure gauge on the tester and proceed as follows.

5.2 Zero Error (Constant Error at each reading)

Raise the pressure upto the value of the first main division of the pressure gauge Remove the pointer by means of the pointer puller, refix at the correct position and repeat test.

This correction may be carried out at the critical pressure at which the gauge has to operate. Gauges that have adjustable pointers may be adjusted using a screw driver without any need for removing the pointer in such gauges.

5.3 Ratio Error (Error continuously increases or decreases)

There is a link that connects the arm of the segment gear to the free end of the bourdon tube. Moving the link away from the bearing pin will make the pointer move lesser with increasing pressure. This adjustment is by trial and error and may be learnt with practice. Some high quality gauges have another link between the bourdon and segment gear that can be used for adjusting linearity/angularity. This may be used for adjusting the gauge at mid scale

MAINTENANCE

6.1 Cleanliness and Lubrication:

The instrument should be kept clean. The screw pump screw should be oiled using good mineral oil or grease every 3-6 months

6.2 Seal Wear:

PU washers and dowty seals might wear with time. They should be checked for wear and replaced when needed.

6.3 Hydraulic Fluid:

Hydraulic fluid should be changed if it starts appearing dirty or discolored. Turn the screw pump handle fully clockwise to push most of the oil into the reservoir. Remove oil using an ordinary syringe.

6.4 Tips and Troubleshooting:

- a) Unexplained pressure drop may be due to air trappage. Try priming the machine 2-3 times to remove air.
- b) Large pressure drops will show up as leak. Check seal nearest to the point of leakage.
- c) Large pressure drops over 20-50 bar without any associated leaks may be due to failure of the 'O' ring seal between the high pressure screw pump cylinder and the main block. Check and replace that seal. Make sure to grease the 'O' ring before installation. The protects it from installation damage and acts like mild temporary adhesive.