Automatic Tension and Compression Testing Machine

TM-3000

TM-3000 automatic 500 kN tension and 1000 kN compression testing machine has been designed to meet the need for reliable and consistent tensile testing of steel rebars up to 22 mm diameter and compression testing of concrete cube samples up to 150 mm and cylinders up to 160 x 320 mm. This lightweight low cost and high accurate machine is suitable for use both on-the-site testing and educational purposes. TM-3000 features the complete automatic test cycle with a closed loop digital readout. Once the specimen parameters have been introduced, it is sufficient to press the START button to complete the test. TM-3000 tension/compression test machines consist of three main parts: Frame, power pack and data acquisition & control system. On the measuring system pressure transducer is used for load measurements and Linear Potentiometer Displacement Transducers is used for strain measurements. Each part has been designed to manufacture machines with a high degree of mechanical stability and complies to international standards.

Frame

The load frame is a welded steel fabrication carrying the ballseated upper platen or the universal grip assembly. Positively located on the loading ram which is protected from debris by a cover, the lower platen is marked for the centering of cube and cylinder specimens. The dimensions of the frame allow the tension tests on steel rebar up to 22 mm dia., and flat specimens up to 15 mm thick and 50 mm wide, compression tests on concrete cylinders up to 320 mm long x 160 mm diameter and cubes up to 150 mm. The machine is supplied complete with 5 pcs. 90 mm x Ø165, 2 pcs. 50 mm x Ø165 and 2 pcs. 30 mm x Ø165 distance pieces. To test samples shorter than 150 mm extra distance pieces should be ordered. The frame has a double acting piston with over travel protection to stop the motor when the maximum platen or grip travel is reached.

Standards

- BS 1610
- ASTM C39
- ASTM E4
- AASHTO T22
- NF P18-411
- DIN 51220

Key Features

- High stability welded assembly
- 500 kN tensile and 1000 kN compression capacity
- 100 mm piston stroke with safety limit switch
- Upper compression platen with ball seating assembly and lower platen included
- Set of two tensile grips and jaw faces included
- Platen hardness of min 55 HRC
- Distance pieces included
Dual Stage Pump

The dual stage pump is formed by two groups:
- Low pressure gear pump
- High pressure radial piston pump

On the dual stage pump, a high delivery, low pressure gear pump is used for rapid approach, while a low delivery, high pressure radial piston pump is used for test execution. The rapid approach facility shortens the time interval from piston start until the upper platen touches to the specimen. This excellent feature helps to save a lot of time when a large number of specimens are going to be tested.

Motor

The motor which drives the dual pump is an AC motor, 380 V, 50-60 Hz, 3 phase, 1 hp and 0.75 kW and it is controlled by Omron J7 motor inverter. The variation in the oil flow is executed with the variation of the rotation speed of the motor.

Distribution Block

A distribution block is used to control the oil flow direction supplied by the dual stage pump, the following parts are fitted to the distribution block:
- Solenoid valve
- Safety valve (maximum pressure valve)
- Transducer
- Low pressure gear pump
- High pressure radial piston pump

Oil Tank

The tank includes enough oil to fill the mechanism which pushes the ram during the test. The level and oil temperature can be seen on the indicator fitted to the tank. It has 20 L capacity. Hydraulic motor oil, number 46, must be used.

Power Pack

TC-4830 Automatic Hydraulic Power Pack, dual stage, controlled by BC 100 is designed to supply the required oil to the load frames for loading. Very silent power pack can load the specimen between 50 N/sec to 2.4 kN/sec with an accuracy of ±5%. A Rapid approach pump is supplied as standard. Safety valve (maximum pressure valve) is used to avoid machine overloading.

BC 100 Unit TFT Graphic Display Data Acquisition and Control Unit

BC100 TFT Graphic Display Data Acquisition and Control Unit is designed to control the machine and processing of data from load-cells, pressure transducers or displacement transducers which are fitted to the machine. All the operations of BC100 are controlled from the front panel consisting of a 800 x 480 pixel 65535 colour resistive touch screen display and function keys 4 analogue channels are provided for load-cells, pressure transducers or displacement transducers. BC100 has easy-to-use menu options. It displays all menu option listings simultaneously, allowing the operator to access the required option in a seamless manner to activate the option or enter a numeric value to set the test parameters. The BC100 digital graphic display is able to draw real-time ‘Load vs. Time’, ‘Load vs. Displacement’ or ‘Stress vs. Time’ graphics.

Specifications

Technical specifications are subject to change without notice.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>Load Capacity in Tension (kN)</td>
<td>500</td>
</tr>
<tr>
<td>Load Capacity in Compression (kN)</td>
<td>1000</td>
</tr>
<tr>
<td>Max. Vertical Clearance with Compression Test Accessory (mm)</td>
<td>768</td>
</tr>
<tr>
<td>Max. Distance between Grips, excluding Piston Travel (mm)</td>
<td>268</td>
</tr>
<tr>
<td>Distance between Columns (mm)</td>
<td>305</td>
</tr>
<tr>
<td>Max. Ram Travel (mm)</td>
<td>100</td>
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<tr>
<td>Resolution digital Display (kN-mm)</td>
<td>0.01</td>
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<tr>
<td>Load Measurement Accuracy (Starting from the first 10% of the Load Range) (%)</td>
<td>± 1</td>
</tr>
<tr>
<td>Strain Measurement Accuracy (mm)</td>
<td>0.01</td>
</tr>
<tr>
<td>Dimension mm (W x D x H)</td>
<td>1660 x 800 x 500</td>
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<tr>
<td>Weight (approx.) Kg</td>
<td>535</td>
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