

# FORNEY TEST MACHINES

LT-120-VFD UNIVERSAL

## UNIVERSAL TESTING MACHINE

### LOAD CAPACITY

120,000lb

### FRAME

Universal

### CONTROL SYSTEM

VFD

### TEST TYPES

Compression, Tension,  
Flexural, Modulus of  
Elasticity/Poisson's Ratio  
(MP), Proppant Crush  
Resistance, Tensile Splitting

### TESTING MATERIALS

Cylinders, Cubes, Grout  
Prism, Beams, Proppant  
Sand, Rock Core, Rebar,  
Screws, Bolts, Wire, Bars,  
Coupons

### DESIGNED & BUILT BY FORNEY

Exceeds ACI  
Recommendations

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## GET A CONNECTED MACHINE AND SAVE \$1,500

### NATIVE TWO-WAY INTEGRATION WITH CMT SOFTWARE

Connected Testing Machines allow technicians to get more done faster with minimal human error through a two-way integration with ForneyVault. Resulting in 99.9%+ fewer manual errors, 66%+ increase in productivity, and 100% unalterable, unquestionable data.

- ▲ "One-touch" test starts and automatic controls
- ▲ Pre-test "Smart Checks" to validate test parameters
- ▲ Automatic preload calculations, notifications for individual and average low breaks and excessive variance, automatic data transfer, and more

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## HARDWARE

### FRAME



The heavy-duty tensile/compression unit is designed with two cross heads and one compression platen. The moveable crosshead is mounted on motorized threaded strain rods while the stationary crosshead is mounted to the load table by stationary strain rods. The load table is directly connected to the power piston. The hydraulic power piston assembly is located in the bottom of the load frame and force is applied in an upward direction. A manually actuated rack and pinion system controls the position of the gripping jaws while loading specimens.

Designed and built by Forney. The LT-120 Series Universal Testing Machines are specifically designed for testing a variety of materials in tension, compression and flexure – including cementitious and metallic materials like briquettes, cubes, cylinders, rebar, rebar with joints or T-Caps, and bolts, as well as other non-cementitious and non-metallic materials. Universal Testing Machines measure Force, Displacement, Velocity and Strain.

## HYDRAULIC PUMPING SYSTEM

The console houses the pumping system, consisting of two (2) submerged, vertically-mounted radial piston pumps, in-line coupled with supercharge/rapid advance pumps. Appropriate valves for safety relief and pressure discharge are mounted on top of the reservoir, which is mounted inside the bottom of the console.

The system utilizes two (2) variable frequency drives to adjust motor speed and therefore pump output to coincide with programmed demand set by the test set up. This provides the most efficient hydraulic power arrangement as only the amount of flow needed is developed. Excess oil is not generated, and does not therefore require discharge over a relief valve. This minimizes heat, and greatly extends hydraulic system longevity.

In addition, an optional precision proportional control valve provides fine control of the testing process and facilitates test protocols such as Modulus of Elasticity and Cyclic Testing which require controlled release of hydraulic pressure.

## ELECTRICAL

A PC-based system utilizes a variable frequency drive to control the hydraulic pump motor. This maximizes efficiency – only running the pump at speeds necessary to achieve the desired pressure. This energy efficient approach dramatically reduces heat build-up in the hydraulic system and greatly extends hydraulic component life.

Here are the main components of the system:

- ▲ Variable frequency drive (VFD)
- ▲ Windows-based touchscreen human machine interface (HMI)
- ▲ Pressure transducer that provides pressure feedback
- ▲ E-stop PB
- ▲ Limit switch
- ▲ Solenoid-operated dump valve

## SOFTWARE

### SAFETY FEATURES

Several safety features are incorporated to protect both operator and testing machine:

- ▲ Maximum Capacity Protection: A high-pressure safety relief valve protects the hydraulic circuit and load frame from exceeding maximum capacity.
- ▲ Overextension Protection: A piston over-extension limit switch system protects against piston extension beyond maximum travel.

### POWER PISTON ASSEMBLY

Testing pressure is applied by an 8.00" diameter power piston. Working stroke is 10.00" before safety disconnect.

### LOWER TENSILE CROSSHEAD

The lower crosshead is positioned by a motorized drive system. The drive system is powered by a 1/4 HP electric motor.

### GRIPPING SYSTEM

The rack and pinion gripping system will accept multiple styles of gripper jaws. Gripper jaws are easily interchanged and the following grips are available:

- ▲ “V” grips for round specimens ¼” to ¾” in diameter
- ▲ “V” grips for round specimens ½” to 1-1/4” in diameter
- ▲ Flat grips for specimens 0.06” to 1.00” thick by 0.12” to 3” wide

## COMPRESSION TABLE

The compression table is manufactured from 5.00” thick solid steel. The horizontal daylight opening between the strain rods is 21.25”. Depth of table is 21”. A locating hole is provided for centering of testing accessories.

## CONTROL CONSOLE

The control console is a separate unit from the load frame and is positioned to the right of the load frame. The console houses the pumps, hydraulic control, Operator Interface (HMI), and electrical systems.

## CONSOLE DESIGN

The console consists of a welded frame with removable side and end covers to allow access to two areas: an electronic control chamber, housing two variable frequency drives, power supplies, and additional electrical equipment to control the load frame; and a hydraulic power chamber housing pumps, valves and other necessary equipment.

## DIGITAL CONTROL SYSTEM

Setup of testing protocol, real-time display of test data, and post-test data transfer is accomplished through the ForneyLink touchscreen HMI. The operator can navigate options for:

- ▲ Test Run
- ▲ Test Setup
- ▲ Machine Setup
- ▲ Calibration
- ▲ Reporting and Data Transfer
- ▲ Diagnostics

Provides simultaneous display of force, stress, and rate of load and displays a real-time graph of Load vs. Time, or Stress vs. Strain. Standard functionality includes data collection by the ForneyLink HMI for printing and transfer. Data from optional extensometer and compressometer displacement transducers are also collected by the HMI. This data is captured with the same timestamp as the load data.

## CMT SOFTWARE INTEGRATION

Connected testing machines natively integrate with ForneyVault CMT software, improving important processes before and after an automatic test.

Before the test, Connected machines will:

- ▲ Enable positive specimen identification via barcode scan
- ▲ Provide pre-test “Smart Checks” based on preloaded sample and specimen data to validate sample date, ample size and type, and expected strength.
- ▲ Validate specimen geometry.
- ▲ Calculate preload settings based on actual and/or expected strength.

After the test, Connected machines will:

- ▲ Provide a detailed XY plot data for every test performed.
- ▲ Transfer data automatically to LIMS packages, QC systems, or other software.

- ▲ Alert to warn calibration expiration.
- ▲ Notify correction factor use, individual low breaks, and excessive variance.
- ▲ Enable intelligent workflows for detailed reporting and approvals.

## REMOTE SUPPORT

With a user-provided Internet connection (either Wi-Fi or Ethernet), all Forney VFD systems are capable of real-time, online support from the Forney Support Team for basic settings and test setup to advanced troubleshooting, fault finding, and software updates.

We offer unlimited Remote Technical Support for all Forney Testing Machines during the two-year warranty period.

For ForneyVault® subscribers, post-warranty remote technical support fees are waived for the life of your subscription.

Please refer any special requirements to a Forney sales representative.

**\* Specifications are subject to change without notice.**

ACCESSORIES	
Cylinder Compression (6" Dia x 12" L with Pad Caps) (150mm x 300mm)	TA-0101 Cylinder Top Platen Assembly  TM-0095 Bottom Platen (included w/ machine)  TM-2035 Centering Stud (included w/ machine)
Cylinder Compression (6" Dia x 12" L with Capping Compound or Ground Ends) (150mm x 300mm)	TA-0101 Cylinder Top Platen Assembly  TM-0095 Bottom Platen (included w/ machine)  TM-2035 Centering Stud (included w/ machine)
Cylinder Compression (4" Dia x 8" L with Pad Caps) (100mm x 200mm)	TA-0101 Cylinder Top Platen Assembly  TM-0095 Bottom Platen (included w/ machine)  TM-2035 Centering Stud (included w/ machine)
Cylinder Compression (4" Dia x 8" L with Capping Compound or Ground Ends) (100mm x 200mm)	TA-0101 Cylinder Top Platen Assembly  TM-0095 Bottom Platen (included w/ machine)  TM-2035 Centering Stud (included w/ machine)
Cylinder Tensile Splitting (6" Dia x 12" L) (150mm x 300mm)	TAG-0023 Cylinder Splitting Kit
Cylinder Tensile Splitting (4" Dia x 8" L) (100mm x 200mm)	TAG-0023 Cylinder Splitting Kit
Cube (2") (50mm)	TAG-0002 Cube (2") Accessory Kit
Cube (6") (150mm)	TAG-0025 Cube (6") Accessory Kit
Flexural Beam (6" x 6" x 18") (150mm x 150mm x 450mm)	TA-0166 Flexural Testing Accessory
Grout Prism (3" x 3" x 6") (75mm x 75mm x 150mm)	TA-0101 Cylinder Top Platen Assembly  TM-0095 Bottom Platen (included w/ machine)  TM-2035 Centering Stud (included w/ machine)
MOE (6" diameter) (150mm)	LA-0488-E6-SG Compressometer  *Must have compression accessories  *Must have -M or -MP machine
MOE (4" diameter) (100mm)	LA-0488-E4-SG Compressometer  *Must have compression accessories  *Must have -M or -MP machine

FACTORY INSTALLED OPTIONS	
Voltage	110/220VAC Single Phase
Displacement	Factory Installed Upgrade Included
Optional Test Protocol Capabilities	ASTM C469 MOE (M)  ASTM C469 MOE & Poisson's Ratio (MP)  ISO 13503-2 Proppant (SW-0010)  *Additional accessories required  *Inquire about other test types
Capacity Options	Contact Us for Special Requests
Frame Options	Contact Us for Special Requests
Travel Limit Switch	Standard Equipment

SPECIFICATIONS	
Load Capacity Range	1,200lbf - 120,000lbf
Vertical Opening	28"
Horizontal Opening	18.5"
Ram Diameter	8"
Piston Stroke	8"
Platen Hardness	60HRC
Lower Platen Dimension	6.5" Diameter
Upper Platen Dimension	*See Available Accessories
Oil Reservoir Capacity	10 Gallons
Overall Width	35"
Overall Depth	26"
Overall Height	84" (+8" stroke)
Unit Weight	3,600lbs Frame  595lbs Console

MOE & Poisson's Ratio (6" Diameter) (150mm)	<p>LA-0488-P6-SG</p> <p>Compressometer/Extensometer</p> <p>*Must have compression accessories</p> <p>*Must have -MP machine</p>
MOE & Poisson's Ratio (4" Diameter) (100mm)	<p>LA-0488-P4-SG</p> <p>Compressometer/Extensometer</p> <p>*Must have compression accessories</p> <p>*Must have -MP machine</p>
MOE & Poisson's Ratio (2" Diameter) (50mm)	<p>TA-3542-03 Axial Extensometer 2"</p> <p>TA-3975-01 Diametral 0.030"</p> <p>*Must have compression accessories</p> <p>*Must have -MP machine</p>
Proppant (2" diameter) (50mm)	<p>TA-0119-11 Top Platen Assembly</p> <p>TA-0151 Bottom Platen</p> <p>TA-0174 Spacer, 6" H</p> <p>TM-2035 Centering Stud</p> <p>TA-0002 Proppant Crush Piston &amp; Cell</p>
Rebar/Round Tensile	<p>(4) TA-0189 Grips</p> <p>(4) TA-0190 Grips</p> <p>*Can test #2 - #10 rebar</p>
Flat Tensile Specimens	<p>(4) TA-0192 Grips</p> <p>* Can fit up to 1" thickness x 3" width</p> <p>*Note some test protocols and materials may exceed machine capacity</p>
Threaded Fasteners	<p>TA-0212-10 Bolt Test Set</p> <p>(.25" to 1" diameter flat and wedge)</p> <p>*Check max force, some test protocols may exceed machine capacity</p>
7 Strand Cable/Wire	<p>TA-0190-01 Cable/Wire Grips, 7-Strand</p> <p>*Must specify cable/wire size</p>

Test Standard Ready	<p>(1) set of grips</p> <p>ASTM E4</p>
Test Standard Capable	<p>ASTM C39, C78, C293, C109, C469, C496, C1019, D7012</p> <p>A370, A1061, F606, E290</p> <p>AASHTO T 22, T 97, T 106</p> <p>BS 1610, BS 1881, EN ISO7500-1, EN 12390-3, EN 12390-4</p>