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Product Warranty

This instrument is warranted against defects in workmanship, material and design for two (2) years from date of delivery to the extent that AMETEK will, at its sole option, repair or replace the instrument or any part thereof which is defective, provided, however, that this warranty shall not apply to instruments subjected to tampering or abuse, or exposed to highly corrosive conditions.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESSED OR IMPLIED AND AMETEK HEREBY DISCLAIMS ALL OTHER WARRANTIES, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY. AMETEK SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING, BUT NOT LIMITED TO, ANY ANTICIPATED OR LOST PROFITS.

This warranty is voidable if the purchaser fails to follow any and all instructions, warnings, and cautions in the instrument’s operating manual.

If a manufacturing defect is found, AMETEK will replace or repair the instrument or replace any defective part thereof without charge; however, AMETEK’s obligation hereunder does not include the cost of transportation which must be borne by the customer. AMETEK assumes no responsibility for damage in transit, and any claim for such damage should be presented to the carrier by the purchaser.
**Precautions**

- **Read the instruction manual completely before attempting to use the LTCM-100 Series.** By following the instructions contained in this manual, the optimum accuracy and performance can be attained.

- **Never operate the LTCM-100 with the cover off.**

- **Verify Input Power Source BEFORE operation.** The LTCM-100 has a switchable power supply. The tester may operate with 115V or 230V provided the Power Input Module is in the proper setting corresponding to the source power. Always make sure that the supply power matches the setting on the Power Input Module before turning power ON. Failure to do so will cause serious damage to the tester.

- **The LTCM-100 has a moving crosshead!** Exercise extreme caution during testing or whenever the crosshead is moving. Never place fingers inside the column.

- **Use Chatillon force gauges.** The LTCM-100 is designed to be used safely with the Chatillon force gauges listed in this manual.

**Declaration of Conformity**

A sample of this product has been accessed against the essential health and safety requirements of the Low Voltage and the EMC Directives listed. Based on conformity with the listed directives, this product is deemed in compliance with the following:

- BS EN 61010-1:2001 Safety Requirements for Electrical Equipment
- BS EN 50081-1:1992 EMC Generic Emissions Standard
- BS EN 50082-1:1992 EMC Generic Immunity Standard
Getting Started

Introduction
The CHATILLON® LTCM-100 Series motorized test stand is a 110 lbf (500N) capacity tester that is to be used with a Chatillon DF Series digital force gauge. This tester operates in a vertical orientation and may be used for tensile, compression, peel, flexural or break tests.

The LTCM-100 has a compact design, making it ideal for the laboratory or production environment. The machine is lightweight (less than 40 lbs (18 kgs) and portable.

Chatillon Force Gauges
The following Chatillon force gauges are recommended for use with the LTCM-100 Series:
- DFE Series (No Outputs)
- E-DFE Series (With Outputs)
- DFS Series (Integral Loadcell)
- DFS-R Series (Dedicated Remote Loadcell)
- LG Series (Mechanical)
Getting Started

Please read this operating manual thoroughly before attempting to operate your LTCM-100 force tester.

The table below identifies the standard accessories that were supplied with your LTCM-100 Series tester.

### Standard Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Screw, #10-32 x 3/4&quot;</td>
<td>3157</td>
</tr>
<tr>
<td>Hook, Stationary, 110 lb (500N)</td>
<td>SPK-FMG-012B</td>
</tr>
<tr>
<td>Compression Platen</td>
<td>17109</td>
</tr>
<tr>
<td>Power Cable, 115V, USA Plug</td>
<td>SPK-FM200-034</td>
</tr>
<tr>
<td>Power Cable, 230V, EU Plug</td>
<td>SPK-FM200-022</td>
</tr>
<tr>
<td>Power Cable, 230V, UK Plug</td>
<td>SPK-LTCM-UK230</td>
</tr>
</tbody>
</table>

### Console Overview

The LTCM-100 Series provides these functions on the tester’s console:

- On/Off Switch
- Emergency Stop Switch
- Speed Units of Measure Selector Switch
- Speed Selector Knob
- Return Speed Switch
- Crosshead Direction of Travel Switch
Column and Crosshead

The LTCM-100 Series features a single column, designed to be used in a vertical position. Horizontal testing is not recommended.

The column height is 26-1/4-inches (667 mm).

Maximum crosshead travel is 15-inches (381 mm).

The column features two mechanical limit switches mounted on the front. These switches may be manually adjusted to provide a High and Low Deflection stop, e.g. the crosshead will stop moving if the crosshead comes in contact with a limit.

The column also features two rulers for measuring deflection distance. The rulers have both inches and metric measurements.

The crosshead features a 5-1/8-inch (130 mm) throat. Combined with the large working area, it provides you with the ability to test large samples.

The crosshead moves in either direction. Crosshead speed is selected using the speed control knob located on the front of the console. Return speed may be independently set allowing the crosshead to return at the maximum speed setting.

The crosshead contain two mounting holes. These holes should be used for mounting a Chatillon force gauge.

Sample Heights

The LTCM-100 Series maximum crosshead travel is 15-inches (381 mm). The table shows the “minimum” and “maximum” sample heights that may be used with the respective Chatillon gauge model.

<table>
<thead>
<tr>
<th>Gauge Model</th>
<th>A¹</th>
<th>B²</th>
</tr>
</thead>
<tbody>
<tr>
<td>LG Series</td>
<td>2.0” (50 mm)</td>
<td>17.0” (430 mm)</td>
</tr>
<tr>
<td>DFL Series</td>
<td>2.0” (50 mm)</td>
<td>17.0” (430 mm)</td>
</tr>
<tr>
<td>DFS Series</td>
<td>2.0” (50 mm)</td>
<td>17.0” (430 mm)</td>
</tr>
<tr>
<td>DFT Series</td>
<td>1.5” (38 mm)</td>
<td>16.5” (420 mm)</td>
</tr>
<tr>
<td>DFM Series</td>
<td>3.0” (76 mm)</td>
<td>16.0” (400 mm)</td>
</tr>
<tr>
<td>DFGS Series</td>
<td>3.0” (76 mm)</td>
<td>16.0” (400 mm)</td>
</tr>
<tr>
<td>DFM Series</td>
<td>3.0” (76 mm)</td>
<td>16.0” (400 mm)</td>
</tr>
<tr>
<td>DFT Series</td>
<td>1.5” (38 mm)</td>
<td>16.5” (420 mm)</td>
</tr>
<tr>
<td>DFA Series</td>
<td>1.5” (38 mm)</td>
<td>16.5” (420 mm)</td>
</tr>
</tbody>
</table>

Notes:

1. “A” is the minimal distance between the bottom of the gauge housing (assumes 1-inch/25mm shaft) and the tester base with the crosshead positioned at its “lowest” position. This represents the MINIMAL clearance between the gauge and the worksurface without loadcell shaft or fixtures.

2. “B” is the maximum distance between the bottom of the gauge housing (assumes 1-inch/25mm shaft) and the tester base with the crosshead positioned at its “highest” position. This represents the MAXIMUM clearance between the gauge and the worksurface without loadcell shaft or fixtures.
**Working Area**

The LTCM-100 Series features a large working area ideal for testing large samples up to 10-1/8-inches (257 mm) wide.

The working platform is 10-1/8 x 11-inches (257 x 279 mm). The platform contains 13 pre-drilled holes for fixtures. The holes have a #10-32F thread.
Fixtures and Grip Adapters

The LTCM-100 Series working platform is predrilled with 13 mounting holes. These holes have a #10-32F thread. A variety of grips and fixtures may be used with this working platform. Listed below are the common adapters used to mount varying size fixtures and grips to the tester.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Mates With</th>
</tr>
</thead>
<tbody>
<tr>
<td>3157</td>
<td>#10-32 x 3/4&quot; Set Screw</td>
<td>#10-32F</td>
</tr>
<tr>
<td>3127</td>
<td>#10-32 x 3/16&quot; Set Screw</td>
<td>#10-32F</td>
</tr>
<tr>
<td>T036</td>
<td>#10-32 to 1/4-28</td>
<td>1/4-28F</td>
</tr>
<tr>
<td>NC0006H4</td>
<td>#10-32 to 5/16-18</td>
<td>5/16-18F</td>
</tr>
<tr>
<td>ADTIO1200</td>
<td>#10-32M with 5/8&quot; Eye End</td>
<td>1&quot; for grips</td>
</tr>
</tbody>
</table>

Use a #10-32 Set Screw to connect to grips having a #10-32F thread. You may also use a socket head #10-32, and screw from the underside of the work surface.

Use a thread adapter to connect to grips having a 1/4-28F thread.

Use an eye-end adapter for connecting grips that require a 5/8" eye end with grip pin.
**Powering Your Tester**

The CHATILLON® LTCM-100 Series motorized test stand requires a stable 120V or 220V power source. The internal power transformer is switchable and operates at either 120V or 220V.

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**Switch from 120V to 220V**

The LTCM-100 Power Entry Module contains an internal drum. This drum has four settings:

- 110Vac
- 120Vac
- 220Vac
- 240Vac

Use a flathead screwdriver to open the Power Entry Module. A small slot located at the top of the Power Entry Module locks the module closed. To unlock, position the screwdriver into the slot and carefully apply pressure.

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**CAUTION**

Always verify the Power Input Setting BEFORE applying power to the LTCM-100 Tester.

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**CAUTION**

Do NOT Rotate the Power Selection Drum while it is engaged in the Power Entry Module. Remove the Drum and re-insert with the desired power showing thru the window.

---

To set the power input, remove the Power Drum by pulling the drum from its socket. DO NOT ROTATE THE DRUM FROM WITHIN THE SOCKET.

Reinsert the drum back into the socket so that respective power label matches your supply power. Close the Power Entry Module and make sure the correct label is displayed through the window.

---

**Powering Your Tester**
Changing Fuses
Two 1-Amp fuses are located inside the Power Input Module. Each fuse has its own compartment. To access these fuses, use a flat head screwdriver to open the module. Using the screwdriver, carefully slide the fuse access button in the direction of the arrow. The fuse will disengage and extend out for easy replacement.

Remove the fuse and replace with another 1-Amp fuse. Reinsert the fuse and re-insert the fuse holder back into the entry module position. Depress the arrow button to lock the fuse holder in place.

CAUTION
Use only 1-Amp fuses. Do NOT use higher or lower ampere fuses.

Insert screwdriver into Power Entry Module slot. Carefully apply pressure to open the module.

Replace the 1-Amp fuse with another 1-Amp fuse. Reinsert the Fuse Module and depress the arrow button until it locks securely.

Place the side of the screwdriver next the fuse release button and apply slight pressure in the direction of the arrow.

Powering Your Tester
Using On/Off Switch
The LTCM-100 Series has the On/Off switch located at the top of the console.

Depress the switch to turn the machine ON or OFF. When the machine is OFF, the speed indicator display is not illuminated.

When turning the machine OFF, you may note that it takes a few seconds for the speed indicator display to extinguish. This is due to the capacitor used to drive the display module.

Using Emergency Stop Button
The LTCM-100 Series features an emergency stop button located at the top of the console. When this button is depressed, power is removed from the tester.

Activate Emergency Stop
To activate the emergency stop button, press firmly in a downward direction. The stop button will latch and lock into position.

Release the Emergency Stop
Power is returned to the tester when the emergency stop button is released to the UP position.

To release the emergency stop button, press firmly down on the stop button and turn in a clockwise direction. This will disengage the lock and return the stop button to its normal position.
Connecting Your Gauge

The LTCM-100 Series has been designed for use with the Chatillon DF Series digital force gauges. These gauges mount directly to the LTCM-100 crosshead. Two mounting screws are provided with the tester. These screws mount to the DF Series gauge's two center mounting holes. They will safely support test capacities up to 110 lbf (500 N) capacity.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFE Series</td>
<td>Direct Mount</td>
</tr>
<tr>
<td>DFS Series</td>
<td>Direct Mount</td>
</tr>
<tr>
<td>DFM Series</td>
<td>Direct Mount</td>
</tr>
<tr>
<td>DFIS Series</td>
<td>Direct Mount</td>
</tr>
<tr>
<td>DFT Series</td>
<td>Direct Mount</td>
</tr>
<tr>
<td>DFGS Series</td>
<td>Direct Mount</td>
</tr>
<tr>
<td>DFA Series</td>
<td>Direct Mount</td>
</tr>
<tr>
<td>REMOTE Series Loadcells</td>
<td>NC000000</td>
</tr>
<tr>
<td>CG series (Mechanical gauge)</td>
<td>Direct Mount</td>
</tr>
</tbody>
</table>

DF Series Mounting

All DF Series gauges mount directly to the LTCM-100 Series tester using the two mounting holes located on the center of the force gauge. Use two (2) #10-32 socket head screws. Position the gauge in alignment with the through holes on the LTCM-100 crosshead. Screw through the crosshead into the gauge housing being careful not to cross-thread or screw too far into the gauge housing. The screw should extend into the gauge housing no more than 0.4-inches (10mm).

CAUTION

Screws should NOT penetrate into the DF Series housing more than 0.4 inch (10 mm). Inserting to greater depth may damage internal components.

DFGS Series Mounting

The DFGS and DFIS Series gauges mount directly to the LTCM-100 Series tester using the two mounting holes located on the center of the force gauge. Use two (2) #10-32 socket head screws. Position the gauge in alignment with the through holes on the LTCM-100 crosshead. Screw through the crosshead into the gauge housing being careful not to cross-thread or screw too far into the gauge housing. The screw should extend into the gauge housing no more than 0.4-inches.
DFIS and DFM Series Mounting
The DFIS or DFM Series gauges mount to the LTCM-100 Series using a special adapter kit (p/n SPK-LTCM-DFIS). The kit includes a spacer plate and two (2) #10-32 socket head screws. Mount the DFIS or DFM to the tester using the two mounting holes located on the center of the force gauge. Use two (2) #10-32 socket head screws. Insert the two mounting screws through the crosshead. Then insert the space plate over the mounting screws. Position the gauge in alignment with the mounting screws. Screw through the crosshead and spacer plate into the gauge housing being careful not to cross-thread or screw too far into the gauge housing. The mounting screws are included with the spacer plate mounting kit.

DFT and DFA Series Mounting
All DFT and DFA Series gauges mount directly to the LTCM-100 Series tester using the two mounting holes located on the center of the force gauge. Use two (2) #10-32 socket head screws. Position the gauge in alignment with the through holes on the LTCM-100 crosshead. Screw through the crosshead into the gauge housing being careful not to cross-thread or screw too far into the gauge housing. The screw should extend into the gauge housing no more than 0.4-inches (10mm).
Connecting Your Fixtures

SLC and REMOTE Series Mounting
All SLC Series (used with DFS-R gauges) or older-type REMOTE Series S-type loadcell sensors mount to the LTCM-100 with a special mounting adapter (p/n NC000300).

First affix the loadcell sensor to the mounting adapter. A socket head screw is used to position the sensor tightly to the bracket.

Next, use two (2) #10-32 socket head screws to mount the bracket to the LTCM-100 crosshead.

LG Series Mounting
All LG Series gauges mount directly to the LTCM-100 Series tester using the two mounting holes located on the center of the force gauge. Use two (2) #10-32 socket head screws. Position the gauge in alignment with the through holes on the LTCM-100 crosshead.

Screw through the crosshead into the gauge housing being careful not to cross-thread or screw too far into the gauge housing. The screw should extend into the gauge housing no more than 0.4-inches (10mm).
Using the Console Controls
The LTCM-100 Series has been designed for simple operation. Controls are intuitive and easy to use. This section will describe how to use the various Console Controls.

Speed Selection Knob
The LTCM-100 has a speed selection knob which corresponds to speed display. Rotating the knob will adjust the crosshead speed and the corresponding speed will be indicated on the LED display.

Increase the speed by rotating the knob clockwise.
Decrease the speed by rotating the knob counter-clockwise.

During a test, when the crosshead is moving, the Speed Selection Knob is disengaged. Rotating the knob during a test will not change the speed of the crosshead.

Speed Units of Measurement Selection
The LTCM-100 can display speed in inches per minute (in/min) or in millimetres/min (mm/min).

To specify the Units of Measure required, turn the tester power OFF.

Insert a small diameter probe into the Units Selector Switch and depress the internal switch and HOLD. Turn the power ON. The LTCM-100 will indicate the Units of Measure by the LED indicator. Disengage probe when the correct units of speed is indicated.

Speed Display
The LTCM-100 display is a 7-segment LED indicator. The speed shown is associated with the Units of Measure that is also indicated by an LED status light.

The displayed speed corresponds to the Speed Selector Knob.

The Speed Display indicates the speed setting.

CAUTION
Do NOT attempt to change the crosshead speed during a test. When the crosshead is moving, the Speed Selection Knob is disengaged.

CAUTION
The Speed Display requires about 10 seconds to completely discharge when the power is turned OFF.

Do NOT power the tester OFF and immediately turn the tester ON.

Allow at least 5 seconds from when you turn the tester OFF before you turn the tester ON.
Console Operation

Crosshead Travel Switch
The LTCM-100 crosshead travel is controlled by the Travel Switch. This is a momentary switch that is depressed to engage the crosshead and motor mechanism to drive the internal lead screw.

To move the crosshead in an UPWARD direction, depress and hold the Travel Switch in an UPWARD direction (top).

Return Speed Selection Switch
The LTCM-100 features an independent return switch. The switch has three settings:

- Normal
- Maximum Speed Upward
- Maximum Speed Downward

Maximum Speed Upward
When the Return Speed Switch is set to the “Maximum Speed Upward” setting (top), the Speed Travel Switch will cause the UPWARD direction to travel at maximum speed. Depressing the switch down will cause the crosshead to travel at the displayed speed shown in the Speed Display window.

Normal Setting
When the Return Speed Switch is set to the center, the return speed is the same as the Speed Selection display. Depressing the Travel Switch will cause the crosshead to move at the selected speed indicated on the display in both the UP and DOWN directions.

Maximum Speed Downward
When the Return Speed Switch is set to the “Maximum Speed Downward” setting (bottom), the Speed Travel Switch will cause the DOWNWARD direction to travel at maximum speed. Depressing the switch up will cause the crosshead to travel at the displayed speed shown in the Speed Display window.

To move the crosshead in a DOWNWARD direction, depress and hold the Travel Switch in a DOWNWARD direction (bottom).
Adjusting Limits

Using Limits
The LTCM-100 Series has adjustable mechanical limits that are designed to help protect your force gauge from overloads. These limits are called extension or deflection limits and are designed to stop the machine’s crosshead travel when the internal microswitch is contacted by the crosshead.

The front of the LTCM-100 column features a ruler with two adjustable mechanical limits switches. One switch is for the HIGH Limit. The other switch if for the LOW Limit. The limit switches should be positioned using the ruler, so that the crosshead will stop when contact is made with the High or Low switch.

Setting HIGH Limit
Limits are supplied to protect your force gauge. The HIGH Limit protects the force gauge’s sensor by preventing the crosshead from traveling beyond your limit value.

The HIGH Limit is designed to protect the gauge when the crosshead is in the UPWARD travel direction.

To set the limit, loosen the thumbscrew by turning the screw in a counterclockwise direction. You only need to loosen the screw enough so that the switch slides along the internal guide. When the screw is loose, slide the mechanism to the desired extension position. Tighten the screw by turning clockwise.

Test your setting using a slow crosshead speed, e.g. 0.5 in/min. Move the crosshead in an UPWARD direction and watch to see where the crosshead makes contact and ensure that contact with the limit switch stopped the crosshead travel. If the crosshead stops too soon or too late, adjust the thumbscrew, reposition the limit mechanism and repeat the test.

Setting LOW Limit
The LOW Limit is designed to protect the gauge when the crosshead is in the DOWNWARD travel direction.

To set the limit, loosen the thumbscrew by turning the screw in a counterclockwise direction. You only need to loosen the screw enough so that the switch slides along the internal guide. When the screw is loose, slide the mechanism to the desired extension position. Tighten the screw by turning clockwise.

Test your setting using a slow crosshead speed, e.g. 0.5 in/min. Move the crosshead in a DOWNWARD direction and watch to see where the crosshead makes contact and ensure that contact with the limit switch stopped the crosshead travel. Adjust accordingly.
Performing a Tensile Test

The LTCM-100 Series may be used to perform tensile tests on test samples with capacities of up to 110 lbf (500 N).

Common tensile tests are:

- Pull to Break
- Pull to Force Limit
- Pull to Deflection Limit

Pull to Break

Use a Chatillon DFS Series digital force gauge to perform a Pull to Break Test. The DFS Series has a Break Detection function that allows you to define your break parameters. This function is especially useful for samples that yield prior to breaking.

Mount the appropriate testing fixture for holding your sample to your DFS Series gauge and to the center mounting hole on the LTCM-100 work surface.

With the DFS Series mounted to the LTCM-100 cross-head, first set the mechanical limits on your LTCM-100. Position the HIGH and LOW limits to ensure that your DFS is protected from accidental overloads. Allow enough distance between the the HIGH and LOW limits to ensure that the sample breaks.

Select the speed Units of Measure. The units that correspond to the Speed Display are highlighted with an LED status indicator. Use the Speed Units switch to change if necessary to inches/min or mm/min.

Select the test speed. Rotate the dial until the speed for your test is displayed in the Speed window.

Set the Return Speed Switch to the desired setting: Normal or Maximum Downward. Since the crosshead will be moving upward during a tensile test, it may be advantageous to set the Return Speed to Maximum downward. Position the switch in the down position.

Secure your sample to the fixture on the gauge first. Then use the down key to lower the crosshead so that the sample can be secured to the lower fixture (LTCM-100).

Remove excess “slack” with the sample, however, being careful not to apply a load to the DFS force gauge.

Zero the DFS force gauge.

Note the zero deflection value using the ruler on the LTCM-100 column. This will be useful if you are doing repetitive testing, since you can return the crosshead to the same location at the completion of a test.

Depress the Travel Switch in the UPWARD direction and observe that the crosshead is moving UPWARD. As the crosshead moves UPWARD tension is applied to the sample.

Continue pressing the Travel Switch upward until the sample breaks.

The DFS Series gauge will display the peak tensile force for the test and the break force for the test based on your “break criterion”.

Return the crosshead by depressing the Travel Switch DOWNWARD. Since the Return Speed Switch is set to Maximum DOWNWARD, the crosshead will return at maximum speed.
Performing a Test

Pull to Force Limit
Use a Chatillon DFE or DFS Series digital force gauge to perform a Pull to Force Limit Test. In this test, your gauge will be setup to provide Load Limits. Load Limits are designed to alert the operator when the measured force has exceeded a HIGH or LOW Load Limit. The gauges will provide you with an audible and visual annunciator.

Mount the appropriate testing fixture for holding your sample to your DF Series gauge and to the center mounting hole on the LTCM-100 work surface.

With the DF Series mounted to the LTCM-100 crosshead, first set the mechanical limits on your LTCM-100. Position the HIGH and LOW limits to ensure that your DF Series is protected from accidental overloads. Allow enough distance between the the HIGH and LOW limits to ensure that the sample can get to the desired limit.

Select the speed Units of Measure. The units that correspond to the Speed Display are highlighted with an LED status indicator. Use the Speed Units switch to change if necessary to inches/min or mm/min.

Select the test speed. Rotate the dial until the speed for your test is displayed in the Speed window.

Set the Return Speed Switch to the desired setting: Normal or Maximum Downward. Since the crosshead will be moving upward during a tensile test, it may be advantageous to set the Return Speed to Maximum downward. Position the switch in the down position.

Secure your sample to the fixture on the gauge first. Then use the down key to lower the crosshead so that the sample can be secured to the lower fixture (LTCM-100).

Remove excess “slack” with the sample, however, being careful not to apply a load to the DF Series force gauge.

Zero the DF Series force gauge.

Note the zero deflection value using the ruler on the LTCM-100 column. This will be useful if you are doing repetitive testing, since you can return the crosshead to the same location at the completion of a test.

Depress the Travel Switch in the UPWARD direction and observe that the crosshead is moving UPWARD. As the crosshead moves UPWARD tension is applied to the sample.

Continue pressing the Travel Switch upward until the DF Series indicates the desired force. The DF gauge will also provide you with an audible and visual indication that the limit has been achieved.

The DF Series gauge will display the peak tensile force for the test.

Measure your deflection distance using the ruler.

Return the crosshead by depressing the Travel Switch DOWNWARD. Since the Return Speed Switch is set to Maximum DOWNWARD, the crosshead will return at maximum speed.
Performing a Test

Pull to Deflection Limit
Use a Chatillon DFE or DFS Series digital force gauge to perform a Pull to Deflection Limit Test. In this test, your crosshead will travel from a zero point to a deflection limit. You will be using distance to drive a force. In this test, it is important to carefully measure your zero deflection point and your end point. You can use the Upper Limit Switch to define your Deflection Limit point.

Mount the appropriate testing fixture for holding your sample to your DF Series gauge and to the center mounting hole on the LTCM-100 work surface.

With the DF Series mounted to the LTCM-100 crosshead, first set the mechanical limits on your LTCM-100. Position the HIGH and LOW limits to ensure that your DF Series is protected from accidental overloads. Allow enough distance between the the HIGH and LOW limits to ensure that the sample can get to the desired limit.

Select the speed Units of Measure. The units that correspond to the Speed Display are highlighted with an LED status indicator. Use the Speed Units switch to change if necessary to inches/min or mm/min.

Select the test speed. Rotate the dial until the speed for your test is displayed in the Speed window.

Set the Return Speed Switch to the desired setting: Normal or Maximum Downward. Since the crosshead will be moving upward during a tensile test, it may be advantageous to set the Return Speed to Maximum downward. Position the switch in the down position.

Secure your sample to the fixture on the gauge first. Then use the down key to lower the crosshead so that the sample can be secured to the lower fixture (LTCM-100).

Remove excess “slack” with the sample, however, being careful not to apply a load to the DF Series force gauge.

Zero the DF Series force gauge.

Note the zero deflection value using the ruler on the LTCM-100 column. This will be useful if you are doing repetitive testing, since you can return the crosshead to the same location at the completion of a test.

Depress the Travel Switch in the UPWARD direction and observe that the crosshead is moving UPWARD. As the crosshead moves UPWARD tension is applied to the sample.

Continue pressing the Travel Switch upward until the crosshead makes contact with the Upper Limit Switch. The crosshead will stop automatically. Observe the force displayed by the gauge.

The DF Series gauge will display the peak tensile force for the test.

Return the crosshead by depressing the Travel Switch DOWNWARD. Since the Return Speed Switch is set to Maximum DOWNWARD, the crosshead will return at maximum speed.
Performing a Compression Test

The LTCM-100 Series may be used to perform compression tests on test samples with capacities of up to 110 lbf (500 N). With compression testing, it is very important to protect your gauge from accidental overloads.

Common compression tests are:

- Compress to Rupture (Break)
- Compress to Force Limit
- Compress to Deflection Limit

Compress to Rupture

Use a Chatillon DFS Series digital force gauge to perform a Compress to Rupture test. The DFS Series has a Break Detection function that allows you to define your break parameters. This function is especially useful for samples that yield prior to breaking.

Mount the appropriate testing fixture to your DFS Series gauge. Generally, this is a probe, platen or grip adapter for compression testing.

With the DFS Series mounted to the LTCM-100 crosshead, first set the mechanical limits on your LTCM-100. Position the LOW limit to ensure that your DFS is protected from accidental overloads. Allow enough distance between the the HIGH and LOW limits to ensure that the sample breaks. The LOW Limit is critical and should be positioned to protect your gauge from an overload caused by the crosshead moving too far after the break.

Select the speed Units of Measure. The units that correspond to the Speed Display are highlighted with an LED status indicator. Use the Speed Units switch to change if necessary to inches/min or mm/min.

Select the test speed. Rotate the dial until the speed for your test is displayed in the Speed window.

Set the Return Speed Switch to the desired setting; Normal or Maximum Upward. Since the crosshead will be moving downward during a compression test, it may be advantageous to set the Return Speed to Maximum upward. Position the switch in the up position.

Zero the DF Series force gauge.

Note the zero deflection value using the ruler on the LTCM-100 column. This will be useful if you are doing repetitive testing, since you can return the crosshead to the same location at the completion of a test.

Depress the Travel Switch in the DOWNWARD direction and observe that the crosshead is moving DOWNWARD. As the crosshead moves DOWNWARD compression is applied to the sample.

Continue pressing the Travel Switch downward until the sample breaks.

The DFS Series gauge will display the peak compression force for the test and the break force for the test based on your “break criterion”.

Return the crosshead by depressing the Travel Switch UPWARD. Since the Return Speed Switch is set to Maximum UPWARD, the crosshead will return at maximum speed.

Performing a Test
Performing a Test

Compress to Force Limit
Use a Chatillon DFE or DFS Series digital force gauge to perform a Compress to Force Limit Test. In this test, your gauge will be setup to provide Load Limits. Load Limits are designed to alert the operator when the measured force has exceeded a HIGH or LOW Load Limit. The gauges will provide you with an audible and visual annunciator.

Mount the appropriate testing fixture for your compression test. Generally, the fixture is a probe, platen or flat adapter.

With the DF Series mounted to the LTCM-100 crosshead, first set the mechanical limits on your LTCM-100. Position the LOW Limit Switch so that it protects your gauge from accidental overloading. The LOW Limit Switch should be positioned just beyond the projected load limit deflection point.

Select the speed Units of Measure. The units that correspond to the Speed Display are highlighted with an LED status indicator. Use the Speed Units switch to change if necessary to inches/min or mm/min.

Select the test speed. Rotate the dial until the speed for your test is displayed in the Speed window.

Set the Return Speed Switch to the desired setting: Normal or Maximum Upward. Since the crosshead will be moving downward during a compression test, it may be advantageous to set the Return Speed to Maximum upward. Position the switch in the up position.

Zero the DF Series force gauge.

Note the zero deflection value using the ruler on the LTCM-100 column. This will be useful if you are doing repetitive testing, since you can return the crosshead to the same location at the completion of a test.

Depress the Travel Switch in the DOWNWARD direction and observe that the crosshead is moving DOWNWARD. As the crosshead moves DOWNWARD compression is applied to the sample.

Continue pressing the Travel Switch downward until the DF Series indicates the desired force. The DF gauge will also provide you with an audible and visual indication that the limit has been achieved.

The DF Series gauge will display the peak compression force for the test.

Measure your deflection distance using the ruler.

Return the crosshead by depressing the Travel Switch UPWARD. Since the Return Speed Switch is set to Maximum UPWARD, the crosshead will return at maximum speed.
Performing a Test

Compress to Deflection Limit
Use a Chatillon DFE or DFS Series digital force gauge to perform a Compress to Deflection Limit Test. In this test, your crosshead will travel from a zero point to a deflection limit. You will be using distance to drive a force. In this test, it is important to carefully measure your zero deflection point and your end point. You can use the Lower Limit Switch to define your Deflection Limit point.

Mount the appropriate testing fixture to your DF Series gauge. Generally, the fixture is a probe, platen or flat adapter.

With the DF Series mounted to the LTCM-100 crosshead, first set the mechanical limits on your LTCM-100. Position the LOW limit at the desired deflection point that will end the test.

Select the speed Units of Measure. The units that correspond to the Speed Display are highlighted with an LED status indicator. Use the Speed Units switch to change if necessary to inches/min or mm/min.

Select the test speed. Rotate the dial until the speed for your test is displayed in the Speed window.

Set the Return Speed Switch to the desired setting; Normal or Maximum Upward. Since the crosshead will be moving downward during a compression test, it may be advantageous to set the Return Speed to Maximum upward. Position the switch in the up position. Zero the DF Series force gauge.

Note the zero deflection value using the ruler on the LTCM-100 column. This will be useful if you are doing repetitive testing, since you can return the crosshead to the same location at the completion of a test.

Depress the Travel Switch in the DOWNWARD direction and observe that the crosshead is moving DOWNWARD. As the crosshead moves DOWNWARD compression is applied to the sample.

Continue pressing the Travel Switch downward until the crosshead makes contact with the Lower Limit Switch. The crosshead will stop automatically. Observe the force displayed by the gauge.

The DF Series gauge will display the peak compressive force for the test.

Return the crosshead by depressing the Travel Switch UPWARD. Since the Return Speed Switch is set to Maximum UPWARD, the crosshead will return at maximum speed.
## LTCM-100 Spare Parts

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SPK-LTCM-001</td>
<td>Cover Assembly</td>
</tr>
<tr>
<td>2</td>
<td>SPK-LTCM-002</td>
<td>Overlay, LTCM-100</td>
</tr>
<tr>
<td>3</td>
<td>SPK-LTCM-003</td>
<td>Ruler, Label, 20-inch</td>
</tr>
<tr>
<td>4</td>
<td>SPK-LTCM-004</td>
<td>Printed Circuit Board Assembly</td>
</tr>
<tr>
<td>5</td>
<td>SPK-LTCM-005</td>
<td>On/Off Switch</td>
</tr>
<tr>
<td>6</td>
<td>SPK-LTCM-006</td>
<td>Switch, Emergency</td>
</tr>
<tr>
<td>7</td>
<td>SPK-LTCM-007</td>
<td>Transformer Assembly</td>
</tr>
<tr>
<td>8</td>
<td>SPK-LTCM-008</td>
<td>Power Entry Module Assembly</td>
</tr>
<tr>
<td>9</td>
<td>SPK-LTCM-009</td>
<td>Knob, Plastic</td>
</tr>
<tr>
<td>10</td>
<td>SPK-LTCM-010</td>
<td>Up/Down Switch Assembly</td>
</tr>
<tr>
<td>11</td>
<td>SPK-LTCM-011</td>
<td>Cable, Encoder</td>
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<tr>
<td>12</td>
<td>SPK-LTCM-012</td>
<td>Base Plate Assembly</td>
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<tr>
<td>13</td>
<td>SPK-LTCM-013</td>
<td>Feet and Fasteners</td>
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<tr>
<td>14</td>
<td>SPK-LTCM-014</td>
<td>Timing Belt</td>
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<tr>
<td>15</td>
<td>SPK-LTCM-015</td>
<td>Pulley, Motor</td>
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<tr>
<td>16</td>
<td>SPK-LTCM-016</td>
<td>Pulley, Ball Screw</td>
</tr>
<tr>
<td>17</td>
<td>SPK-LTCM-017</td>
<td>Plate, Motor Mounting</td>
</tr>
<tr>
<td>18</td>
<td>SPK-LTCM-018</td>
<td>Motor, with Mounting Screws</td>
</tr>
</tbody>
</table>

## Troubleshooting Guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Troubleshooting Guide</th>
<th>Possible problem with Upper Limit Switch. Limit Switch is normally Closed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;tac&quot; is displayed and crosshead does not move.</td>
<td>Possible problem with Speed Encoder. Contact your Distributor for Service.</td>
<td>Possible problem with Speed Encoder. Contact your Distributor for Service.</td>
</tr>
</tbody>
</table>

- LTCM-100 will not power ON. Check that power is ON. Check that Emergency Switch is disengaged (UP). Check Power Source. Check Fuses in Power Entry Module.
- LTCM-100 moves DOWN but not UP. Possible problem with Upper Limit Switch. Limit Switch is normally Closed.
- LTCM-100 moves UP but not DOWN. Possible problem with Lower Limit Switch. Limit Switch is normally Closed.
- Speed Display does not illuminate. Check that power is ON. Check that Emergency Switch is disengaged (UP). Contact your Chatillon Distributor for Service.
Specifications

Physical Specifications

Load Capacity: 110 lbf (500N)
Travel: 15-inches (381 mm)
Speed Range: 0.2 to 20.0 inches per minute, 5 to 500 mm/min
Speed Accuracy: ±3% Full Scale

Environment Specifications

Operating Temperature: 45°F to 110°F (8°C to 45°C)
Storage Temperature: 0°F to 130°F (-17°C to 54°C)
Power
Voltage: 115Vac ±10% or 230Vac ±10%
Frequency: 50/60 Hz
Current: 1 Amp Maximum
Relative Humidity: 20% to 85%