

# TruLoad CNC Spring Load Testers

built and serviced by  
Moyer Process and Control Co., Inc.

PO Box 935  
105 North Wayne St.  
Fremont IN 46737

Phone: 260/495-2405  
Fax: 260/495-1290

## Table of Contents

V1805

Chapter	1	Description of Tester .....	1
	2	Theory of Operation .....	2
	3	Calibration and Adjustments .....	4
	4	Simple Testing .....	6
	5	Basic Extension Kit Set Up .....	9
	6	Program Wizard .....	10
	6	Configure Menu .....	13
	7	Statistics and Data Collection ..	14
	8	Hardware Test Menu .....	15
	9	Installing/Replacing Loadcell ...	16
	10	Safety Considerations .....	18
	11	Specifications .....	19
	12	Machine Set Up .....	20
	10	Maintenance .....	21

## 1. Description of TruLoad

The TruLoad 150 System consists of a gage box with power cord, the tester mechanics with a loadcell and puck, and cables to connect to the gage box .

The front panel of the gage box has the screen and keypad. The back panel of the gage box has the sockets for the power cord, printer, serial device, loadcell and tester.

The 15 pin female connector from the tester plugs into the Loadcell socket on the back of the gage box. The 15 pin male connector from the tester plugs into the **MOTOR/ENCODER** socket on the back of the gage box.



Number and letters are entered from the keypad on the front of the gage box. The four main screens are easily accessed by pressing the corresponding key, **RUN, SETUP, CONFIG, and STAT**. The up **^** and down **v** arrows allow for movement through out menu options. The ENT key chooses the option. If an option is chosen that requires an entry, the CLR key clears the entry out

and allows you to enter new.

## **2. Theory of Operation**

The user calibrates the unit's Ram position and loadcell deflection using a known job-block, and calibrates the loadcell using a known load. The user must also check and adjust the top platen (on the moving ram) to make it parallel with the bottom (loadcell) platen. The user can then select a job with pre-saved testing parameters or can enter a new set of values into the computer gage.

At this point, the tester is ready for testing of the job that was set up. The user places a spring onto the bottom platen (near the center), closes the guard(s) and presses the **ENT** button. The tester will then move the ram downwards and compress the spring to one or more test heights to gather the measurements needed. Then the ram moves upward to some position higher than the spring's free length. The operator lifts the guard(s), exchange the spring, replaces the guard(s) and presses **ENT** again for another test. After three or more tests, some averages are computed and displayed on the bottom-most line of the screen.

For testing extension springs, the user installs the bars and hooks of the Extension Testing Kit, if not already mounted. Where applicable, the front guard has to be removed and the spring ends are clipped onto the shoulder-bolt hooks of the extension kit. The tester's ram may have to moved to bring the hooks at the proper distance to mount the spring at its free length. The guard is replaced, the user activates the testing cycle at the console. The ram moves down, pulling the spring against the extension bars, putting the loadcell array into compression.

The tester is never operated in a mode which puts the loadcell into tension, or that puts the lower section of the ball screw(s) into compression.

It's possible to test long slender springs that easily buckle under load. This requires custom tooling from Moyer that is sized and made for the certain spring being tested. A hardened pin must be passed through the ID of the spring and close-fitting holes in the platens. The spring is then captured and can be compressed and tested in the usual manner. The pin can be lifted out to quickly exchange springs.

### **3. Calibration**

Refer to your tester's Hardware Manual for instructions on mounting the loadcell you selected for this job. Be sure all cables from the tester are plugged into the back of the gage box, then plug in its power cord.

If the tester platens are not already opened up enough to accept the jo-block, you will have to make a small detour and do these steps:

1. Press in and hold the **4** key while turning the power ON.
2. You will see the **HARDWARE TEST** screen displayed. Let go of the **4** key.
3. Press and hold in the **ENT** key and watch the Ram moving up.
4. Let go of **ENT** when opening is higher than the jo-block by an inch or so.
5. Turn the gage box OFF.

It is possible to calibrate with any jo-block or none at all, but for best results and the most precise test height, select a jo-block with a height near the test height(s). (i.e. if you're testing at 4.405", a 4" or 6" jo-block is great.) Notice that at the bottom of the screen instructions will appear telling you what to do.

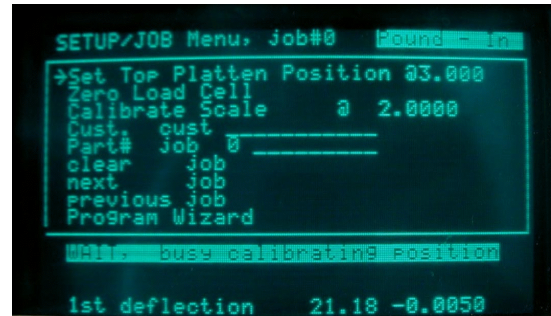
A good calibration is obtained with a dead weight around 2/3 of the full scale capacity of the loadcell. If the loadcell is very large, a deadweight of that size may not be available or practical. Use the largest weight you can manage and will fit on top the loadcell puck. Gently set the deadweight onto the center of the loadcell platen. Please do not drop it, to impact the loadcell. If the weight is irregular (has a handle or other cutout,) position the most solid portion over the platen center and do not allow the weight to rub against the other components or frame of the tester.



## Calibrating and Adjusting Parallelism

1. Turn the gage on. With the cursor at **Set Top Platten Position @ X.XXX**, press **ENT**. This must be set before continuing.

2. Confirm or change the height of the jo-block to be used. Press **ENT**.



3. Place the jo-block or combination of on the center of the loadcell platen. Press **ENT**. The top ram slowly moves down to touch the jo-block. The screen will show **1<sup>st</sup> deflection**. The ram spends about a minute compressing against the jo-block to measure how much the loadcell platen deflects under load. The ram will move up slightly and down again to check **2<sup>nd</sup> deflection**.

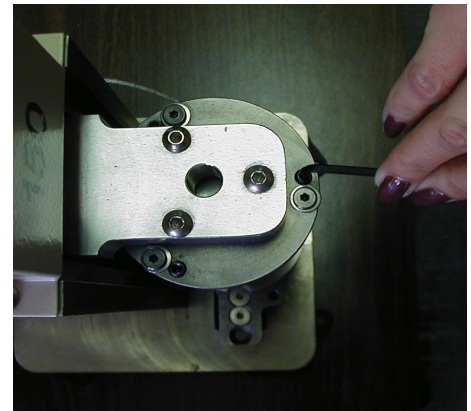
4. **adjust ram height & check parallel** only needs to be done after changing a loadcell.

**Otherwise, skip down to step 5.** The ram platen has three pairs of jack screws around the outside area of the platen for adjusting. To **adjust ram height & check parallel**, slide the jo-block under each screw and feel how tightly or loosely the jo-block is pressed under the platen. All three areas should feel the same if the top platen is parallel to the bottom. Watch the deflection value on the screen.



If the jo-block feels tight, loosen the cap screw 1/8 of a turn, adjust set screw, tighten cap screw.

If the jo-block feels loose, tighten the platen by turning the cap screw CCW and the set screw CW. Then tighten the cap screw. When it feels the same in all three areas, the platens are parallel.



The arrow keys will move the top ram up or down in very tiny amounts (0.0002") to loosen or tighten pressure against the jo-block to fine-tune the Rams position. You should feel some light pressure clamping the jo-block but not enough to prevent it from sliding around between the platens.

5. Move the cursor to **Calibrate Scale**. This will calibrate the loadcell. Again, this must be done before continuing. Press **ENT**.

6. The gage ask you to **confirm pucks are clean** then **press any key to continue**. Make sure nothing is on the loadcell and press **ENT**.



7. Next, the gage asks you to **confirm dead weight = XXX.XX**. Press **CLR** to clear out the current setting if different from the one you want. Enter the size of the weight you will be using to calibrate then press **ENT**.



8. If not already listed, enter the **MAX LOAD** this loadcell can accept. This value is based on the loadcell size and can be any value up to but not over the rating for the loadcell. Press **ENT**.
9. The gage will do some internal calculating based on the information you entered, then ask you to place the weight on the center of the loadcell and press **ENT**.
10. Again, the gage will do some internal calculations. Watch the **weight =** at the bottom of the screen. **when steady press ENT**.
11. Remove the weight from the puck when you see **confirm pucks are clean**. Watch the puck **weight=** value and **when steady, press ENT**. This is measuring the weight of the loadcell puck.
12. If you have changed or rescaled the loadcell it is necessary to reset the top platen position.

The tester is now adjusted and calibrated properly for ALL jobs. You need not calibrate again when choosing a different job setup.

You can easily confirm the calibration by placing the deadweight back onto the platen and look at the number displayed in the lower left of the screen. It should match the size of the deadweight. If not, calibrate again.

## Quick Set up Guide

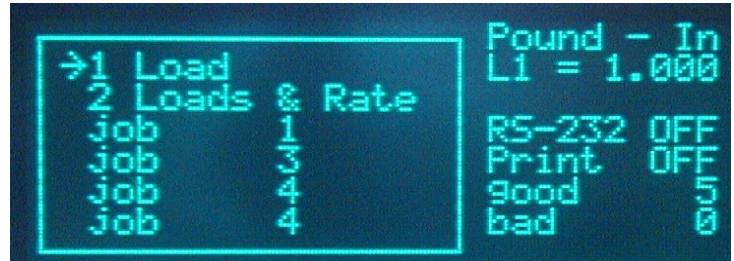
- Turn gage on.
- Press **ENT** at 1<sup>st</sup> option.
- Key in jo block size.
- Press **ENT**.
- Insert jo block.
- Press **ENT**.
- Press **ENT** again to skip **adjust ram height & check parallel**
- Press **ENT** at **Calibrate Scale**.
- Press **ENT** at **confirm pucks are clean**.
- Key in weight.
- Press **ENT**. Key in max load.
- Press **ENT**.
- Place weight on loadcell.
- Press **ENT**.
- Press **ENT**. **when steady press ENT**.
- Remove weight.
- Press **ENT**. **when steady press ENT**.

#### 4. Simple Testing

If you want to run a saved job, select it now by moving the cursor to **next job**. The **job#** currently selected is displayed in the upper right of the screen. Press the **ENT** key and cycle through the saved jobs to choose the job you are looking for. Press the **RUN** key. The gage can save up to 44 jobs

##### Checking One Load at Height

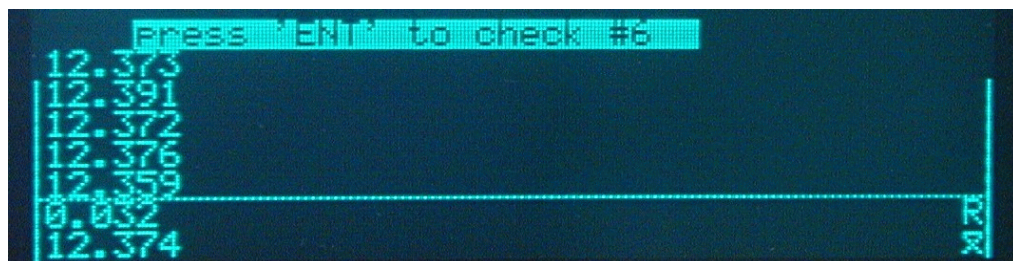
1. If this is a new job or not one previously saved, press **RUN**.
2. Move the cursor to the **1 Load** option. Press **ENT**. The **enter/check L1=** prompt appears.
3. Press the **CLR** key to clear out old data and enter the height that you want the spring compressed down to for checking the load. Press **ENT**.
4. The **SAVE, first empty job Y/N** message appears. Press **Y** or **(9)** to save this setup. The gage will automatically assign the setup a job number and display it on the screen. This is a good idea if the setup entered is one that will be used over and over. Press **ENT** or **(6)** if you do not want the setup saved.
5. If using a printer, press **Y** or **(9)** for yes at the **use printer Y/N** message. If not, press **ENT** or **(6)** for no.
6. If using a serial data collection device, press **Y** or **(9)** yes at the **use RS-232 Y/N**. If not, press **ENT** or **(6)** for no.
7. The gage will pause and tell you **press ENT to check #1**. Place your spring on the center of the loadcell platen and press **ENT** when ready.



The loadcell will first **Zero**, then the ram compresses the spring to the selected height. The load will be displayed on the screen as **P1@ X.XX**.

The tester will then stop, allowing you to change springs. When ready, press **ENT** to check next spring.

After checking three springs, two values will appear at the bottom of the screen. The top number is R or range. The bottom number is the  $\bar{x}$  or Xbar. These values always use the last five springs tested. Each time you test a spring, they will be updated.



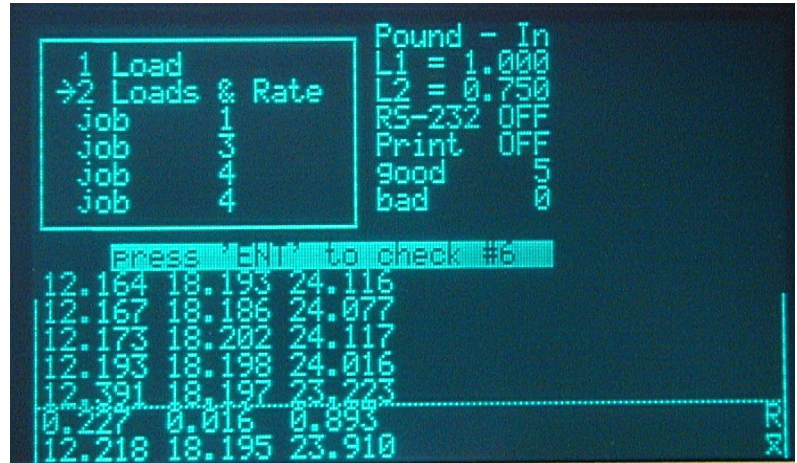


### Checking Two Loads at Height

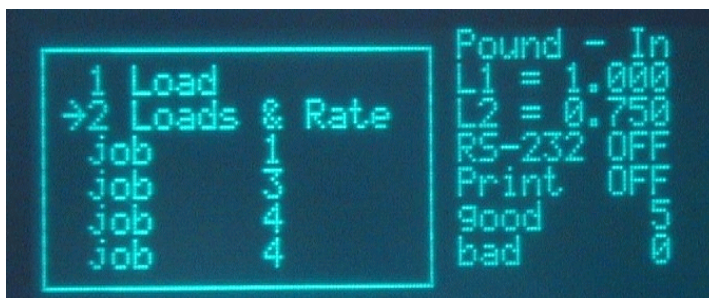
You can test at two heights and get the spring rate by selecting **2 Loads & Rate**. After checking a spring, a row of three numbers are displayed, the rightmost one being the spring rate.

1. Press the **RUN** key. Move the cursor to the **2 Load & Rate** option. Press **ENT**.

2. The **enter/check L1=** prompt appears. Press the **CLR** key to clear out old data and enter the height that you want the spring compressed down to for checking the first load. Press **ENT**.



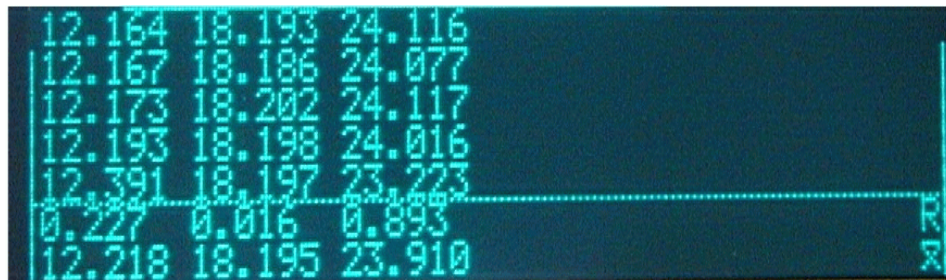
3. The **enter/check L2=** comes up. Again, press the **CLR** key to clear out old data and enter the second height that you want the spring compressed down to. Press **ENT**.
4. The **SAVE, first empty job Y/N** message appears. Press **Y** or **(9)** to save this setup. The gage will automatically assign the setup a job number and display it on the screen. This is a good idea if the setup entered is one that will be used over and over. Press **ENT** or **(6)** if you do not want the setup saved.
5. If using a printer, press **Y** or **(9)** at the **use printer Y/N** message for yes. If not, press **ENT** or **(6)** for no.



6. If using a serial data collection device, press **Y** or **(9)** at the **use RS-232 Y/N** for yes. If not, press **ENT** or **(6)** for no.
7. The gage will pause, then tell you **press ENT to check #1**. Place your spring on the center of the loadcell platen and press **ENT** when ready.
8. The loadcell will first **Zero**, then the ram will compress the spring to the first height. The load will be displayed on the screen as **P1@ X.XX**.

9. The ram will automatically move to the second height entered. This will be displayed on the screen as **P2@ X.XX**. Notice to the right of this is a third value displayed as **R** . This is the rate of the spring.
10. The tester will then stop allowing you to change springs. The **press ENT to check #2** appears. When ready, press **ENT**. Notice the first line will move down one line to make room for the second spring.

After checking three springs, two values will appear at the bottom of the screen. The top number is R or range. The bottom number is the x or Xbar. These values always use the last five springs tested. Each time you test a spring, they will be updated.



12.164	18.193	24.116	
12.167	18.186	24.077	
12.173	18.202	24.117	
12.193	18.198	24.016	
12.391	18.197	23.223	
0.227	0.016	0.893	
12.218	18.195	23.910	

## 5. Basic Extension Kit Setup

When setting up the TruLoad for testing extension springs, it is first necessary to setup the extension kit. This involves attaching the two extension kit rods to the lower platen and then attaching the upper brace to the rods. The positioning of the upper brace effects the minimum and maximum gap between the hooks for testing springs. Travel is set at a maximum of 6.0". Make sure you have allowed enough room for the top ram to travel to it's upper most position.

After turning on the tester and setting the platen height, the tester is ready to test compression springs. If you want to do adhock testing of extension springs. You need to:

- 1) set the default units in the **Config** screen to include **EXTENSION**.
- 2) go to the run menu and start to set parameters in either of the top two options. The tester will know that you need to set the extension gap and will automatically put you into a menu to do just that.
- 3) the first option selected is **Manual - Set Ram Position ENT**. Selecting this option allows you to move the ram up or down using the arrow keys. Position the ram so you have room to move up and/or down to get the various check heights you require. Remember that you will calibrate with a fixed gage ring, usually 1.000". Readjust the upper brace if needed so that the gage ring just fits over the pins. When done, press the **"ENT"** key to continue.
- 4) the **Touch & Set, Reference gap #.###** is displayed. Pressing **ENT** here will cause the TruLoad to touch the ring on both pins and memorize the Reference gap position.
- 5) remove the calibration ring and press **ENT**. This should return you to the **Run Menu**. You can now reenter testing settings for your trial spring. This part is very much like testing compression springs. When you get the part where it asks to actually test the spring, install the spring on the hooks. It should not be tight. Press **ENT** to test the spring. Repeat as needed.

Testing extension springs using the Program Wizard is similar, to testing a compression spring the same way. First, enter the required parameters, just like testing compression springs. The **Units** value can be reset to the required units, including, setting the EXTENSION flag. New functions like Initial tension are possible. Go to the **Run Menu** and select the job you just created. Again, you will need to reset extension hooks if using the first time. This will be the same as the example above. Test extension springs as needed.

One further feature is available. To allow the resetting of the reference inch cap, you can do so by using the **clear EXT GAP** function. This will require you to check or change the extension kit setup with out starting from scratch.

## 5. Program Wizard

Since this tester is fully computerized, it can be set up to perform specialized and complex tests. At the **SETUP/JOB Menu** screen, selecting the last item displays the **Program Wizard** screen. By selecting these menu items and typing in test values for them, you build a little coded program at the bottom of the screen for the tester to execute. Of course, this program is saved with the job for future use without having to rebuild it.



**Z**  
Zero Equate current loadcell force as 0.0 force to reference future readings.  
Used to tare or zero out the weight of the spring or to do load differential.

**F#**  
Free Reports initial tension of extension spring, or approx. free length of compression spring.

**B#**  
Begin Height To speed up testing, set this value a bit taller than the spring free length, or set the correct gap between hooks to snap on an extension spring.

**P#[@#]**  
Load@Length Enter a test height to measure a load. Two fields allow entry of max and min limits for load used in CPK stats and 3-way sorting if desired. Leaving them 0.00 disables sorting or CPK.

**L#[@#]**  
Length@Load Enter a load to measure and report the spring height at that load. Two fields are given to enter sort tolerances for the height.

**R[#]**  
Rate The number 0,1,2 is how many previous load points to skip to get to the one used to calculate the rate. Entry fields are given to enter sort tolerances for the rate.

**+ # move up** Move the top Ram up from the current position.

**- # move down** Move the top Ram down from the current position.

**A#**  
move absolute Move top Ram to a certain point above the loadcell platen.

**D# Delay** Wait a brief moment (in seconds) before proceeding to the next action.

**Change Units** Change the displayed units. The gage supports inch, mm, pounds, grams, kgrams, and newton.

**S**  
Solid Move top Ram down onto the spring until it is compressed to its solid height. Be careful not to overload the loadcell! (Under development)

**Clear Program** Erases the custom program built at the bottom of the screen.

**Edit Program** Puts a cursor on the of the screen for editing the program. key inserts a space, deletes a space; -> or <- moves the cursor; ENT ends it and



other keys overwrite the highlighted character.

## Using the Program Wizard

If you have a spring that needs tested often, it is a good idea to save the setup to a job number so it can be easily recalled instead of reset every time it is needed.

As an example, you have a spring **1.500"** long that needs to be load tested at **1.000"** and at **0.625"**. It also has tolerances of **11.995#** max and **11.550#** min at **1.0"**.

1. The TruLoad can store up to 44 jobs. Pick a job number that is empty by using the **ENT** and the **next job** and **previous job** options in the **SETUP/JOB Menu** screen. Then move the cursor to **Program Wizard** and press **ENT**.

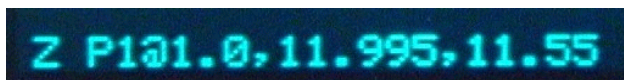


2. The first thing you want to happen is zero the loadcell, so move the cursor the **Z** and press **ENT**. Notice that a **Z** appears in the bottom left hand corner of the screen.

3. Move the cursor to **P#[@#]** and press **ENT**. This is where you enter the length the spring needs to be compressed, in our example, **1.000**. Press **CLR** to clear the number to all zeros, then enter that length and press **ENT**.



4. Notice after pressing **ENT**, two new options appear. One is **max 0000.0000** and the other is **min 0000.0000**. If you have weight tolerances, enter them here. As in our example, enter **11.995** as **max**, press **ENT**, then enter **11.550** as **min**.



5. Press **ENT** to close to this option. At the bottom of the screen, you now have added to the command line **P1@1.0,11.995,11.55**.

6. Up to this point, you have told the tester to zero then compress to 1.00" and signal if the reading is over 11.995# or under 11.550#.
7. Press **ENT** again at **P#[@#]**. This allows you to set a second height for testing a load. Press **CLR** to clear the old number and enter **.625**. Press **ENT**. Again the **max** and **min** option comes up. Since we have no tolerance at **.625"**, press **CLR** then **ENT** at both the **max** and **min**. They will remain all zeros as if this option is turned off.
8. After pressing **ENT** a new addition appears at the bottom of the screen, **P2@0.625**.
9. Press and hold **RUN** until the TruLoad information screen appears. Release the key and the run screen will appear.
10. Move the cursor to the first **job 00**. Press **CLR** to clear the old previous job number, then enter your job number. Press **9** to use the printer, otherwise press **ENT**. Press **9** to use the RS232 port, otherwise press **ENT**. The tester is now ready to use.



## **Selecting Different Jobs**

When you enter the test heights or loads, these parameters become associated with **job 0**. The four **job #** options on the menu let you quickly select between jobs previously set up. This is a convenience, allowing different users to test different springs quickly. Notice that when selecting these job items, the **job#** is changeable, allowing you to specify which four of the 44 saved jobs can be quickly selected from this screen. When a job is replaced on this "hot list", it is still saved in memory and can be retrieved again later.

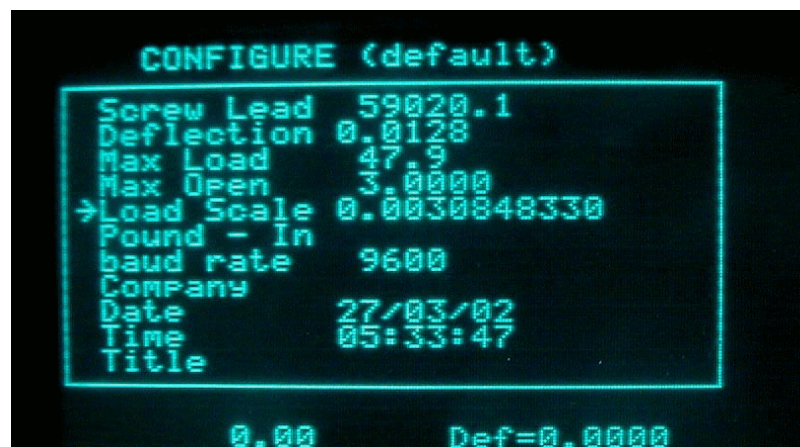
1. Move the cursor to one of the job numbers on the run screen and press **ENT**. The current job number will highlight.
2. Enter the job number you wish to select. Ex: To choose job #6, press **0** then **6**.

## 6. Configure Menu

Press the **CONFIG** key on the bottom row of the gage box keypad. Most items on this menu are purely informational and not user options. Others are set by the operator.

<b>Screw Lead</b>	the number of encoder step per inch of travel. The exact number is based on the lead screw certification. Contact Moyer.
<b>Deflection</b>	the amount the loadcell compresses when a specific force is applied. This is calculated by the TruLoad <b>set top platten height</b> .
<b>Max Load</b>	the maximum force before an "overload" condition is met.
<b>Max Open</b>	the gap between platens when the tester is at rest. Adjusting this to be a bit taller than the spring's free length speeds up testing, since the Ram moves less before contacting the spring. Adjusting it to a large value allows placing tall dead weights for calibration.
<b>Load Scale</b>	the constant used to convert raw values to our units.
<b>Pound - In</b>	allows you to select readings given in English or metric values.
<b>baud rate</b>	allows you to set the speed of the serial output port to match your data collection equipment.
<b>Company</b>	lets you type in YOUR company's name to appear on all of your stats printouts.
<b>Date / Time</b>	will appear on your printed reports, but does not affect operation.
<b>Title</b>	an extra title for the printed reports.

When the items are set, the gage saves them and will not change until reset by the operator.



## 7. Statistics and Data Collection

### Stats Menu

Press the **STATS** key in the lower right corner of the keypad to enter the statistics menu.

**Statistical Study** instructs the gage to print all the information on on all the springs tested since the data was last cleared.

**send data RS232** directs the gage to send data to the serial data collection device.

#### **Limit type**

**Clear Data** clears out all the data associated with the last springs checked in a particular job number.

**Cust** allows a customers name to be entered in association with a particular job number.

**Part** enter the number of the part being tested.

**sample size**

**number of boxes**

**total population**

A 9-pin female serial connector labeled "SER I/O" is provided on the back of the gage. The protocol is RS-232 with 8 data bits, 1 stop bit, and No parity. The speed is 300 to 19200 baud, selectable through the computer's **CONFIG** menu. These screens also allow you to select which of the measured attributes are transmitted.

The measurements are output in standard DataByte format, of numeric digits with decimal point, each measurement separated by whitespace. For example: **123.45 125.87 120.55 119.00** represent four values around 120 units. This format can be read and analyzed by any DataByte compatible data collection module or software package.

A detailed statistical analysis of recent testing can be printed by an attached printer by selecting the first menu item. The second item performs a data dump to the RS232 DataByte compatible device. The remaining items fine-tune the math used in the statistical studies.

## 8. Hardware Test menu

A special screen can be brought up by pressing and holding in the **4** key while turning on the gage.

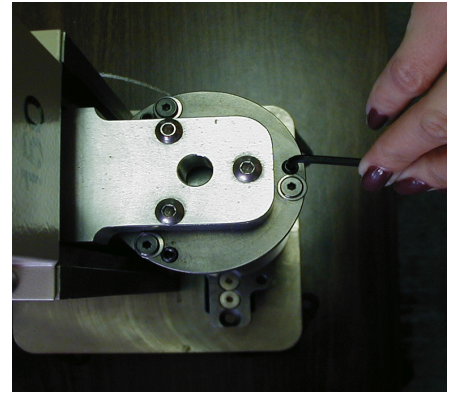
This menu has items allowing you to move the top Ram up or down. This assists you in placing the Ram where it's convenient to clip on an extension spring, or at a height a little above the compression spring, to save time in the testing cycle.


You can also test an attached printer if you use one. You can also zero the loadcell and give it different scaling factors for troubleshooting only; never a substitute for real calibration with a deadweight.

<b>ram up</b>	moves the ram up
<b>ram down</b>	moves the ram down
<b>terminal emulation</b>	allows communication directly with the motion controller
<b>set gain pot</b>	for testing
<b>set zero pot</b>	for testing
<b>offset</b>	for special compensation
<b>MechMax Open</b>	sets maximum travel allowed by hardware
<b>Screw Lead</b>	the number of encoder step per inch of travel
<b>Velocity ips</b>	speed at which the ram moves per second
<b>Acceleration</b>	how quickly it changes speed
<b>Back Lash</b>	how much to compensate for back lash .001" to .003" are normal

## 9. Installing/Replacing Loadcell

The base of the TruLoad has several mounting holes for using a variety of loadcells. Be sure the screws are the correct thread for the loadcell you will be using. Moyer uses the SPI series loadcell.



1. Remove the loadcell from the TruLoad by removing the screws on the bottom of the base plate.
2. Attach the new loadcell on the bottom of the base plate by using the mounting screws. Make sure they are tight, but careful not to strip.
3. The loadcell puck has a combination set screw and nut to guard against overloading the loadcell. To insure proper protection, the gap between the set screw and loadcell should be .020". If this is not set correctly, adjust the screw and tighten the nut.
4. Move the cursor to **Calibrate Scale**. This will calibrate the loadcell. Press **ENT**. The gage ask you to **confirm pucks are clean** then **press any key to continue**. Make sure nothing is on the loadcell and press **ENT**.
5. Next, the gage asks you to **confirm dead weight = XXX.XX**. Press **CLR** to clear out the current setting if different from the one you want. Enter the size of the weight you will be using to calibrate then press **ENT**.
6. If not already listed, enter the **MAX LOAD** this loadcell can accept. This value is based on the loadcell size and can be any value up to but not over the rating for the loadcell. Press **ENT**.
7. The gage will do some internal calculating based on the information you entered then ask you to place the weight on the center of the loadcell and press **ENT**.
8. Again, the gage will do some internal calculations. Watch the **weight =** at the bottom of the screen. **when steady press ENT**.
9. Remove the weight from the puck when you see the **confirm pucks are clean**. Watch the puck **weight=** value and **when stead, press ENT**. This is measuring the weight of the loadcell puck.
10. Plug the new loadcell into the gage and turn it on. With the cursor at **Set Top Platten Position @ X.XXX**, press **ENT**. Confirm or change the height of the jo-block to be used. Press **ENT**.
11. Place the jo-block or combination of on the center of the loadcell platen. Press **ENT**. The top ram slowly moves down to touch the jo-block. The screen will show **1<sup>st</sup> deflection**. The ram spends about a minute compressing against the jo-block

to measure how much the loadcell platen deflects under load. The ram will move up slightly and down again to check **2<sup>nd</sup> deflection**.

12. The ram platen has three pairs of jack screws around the outside area of the platen for adjusting. To **adjust ram height & check parallel**, slide the jo-block under each screw and feel how tightly or loosely the jo-block is pressed under the platen. All three areas should feel the same if the top platen is parallel to the bottom. Watch the deflection value on the screen. If the jo-block feels tight, loosen the cap screw 1/8 of a turn, adjust set screw, tighten set screw. If the jo-block feels loose, tighten the platen by turning the cap screw CCW and the set screw CW. Then tighten the cap screw. When it feels the same in all three areas, the platens are parallel.
13. The arrow keys will move the top ram up or down in very tiny amounts (0.002") to loosen or tighten pressure against the jo-block to fine-tune the rams position. You should feel some light pressure clamping the jo-block but not enough to prevent it from sliding around between the platens.
14. When finished, press **ENT**. You are now ready to set up new jobs.

## 1. **\*\* SAFETY CONSIDERATIONS \*\***

1. This unit, as any press type machine, exerts a great force when the ram cycles. IT IS IMPERATIVE THAT NO HANDS ARE PLACED AROUND THE LOADCELL, LEAD SCREW, OR RAM HEAD DURING THE OPERATION OF THIS MACHINE.
2. Never work on the machine in terms of changing loadcells or the ram platens with the unit turned on or plugged into its power source.
3. Never run the machine under power without all safety guards in position!
4. Due to the dangerous nature of press type equipment, it is imperative that the work area is not congested and that no horseplay occur around the machine or the operator.
5. It is important that the operator does not wear loose clothing or have untied long hair that might get entangled in the moving parts of this machine.
6. As with any machine, the operator must wear safety glasses while working around it.
7. Training for operators and set-up personnel was conducted at buyer's plant by a representative of Moyer Process and Control Co. on \_\_\_\_\_. The training was conducted by \_\_\_\_\_, and was observed as being adequate by a representative of the buyer on \_\_\_\_\_.
8. If the Moyer TruLoad 150 Load Tester is sold to another company or if the subject machine is transferred to another division of \_\_\_\_\_, a representative of same will make available all safety and maintenance materials to the new users of this machine, and will conduct a safety and maintenance instruction presentation to the new users prior to the operation of this machine in the plant of the new users. \_\_\_\_\_, as a representative of \_\_\_\_\_, will establish a system in regard to such a transfer or sale to ensure that the safety and maintenance instruction is made available to the new users. In addition, a system will be established to ensure that all operators who operate this machine in our facility will receive adequate training prior to working on the Moyer TruLoad 150 Load Tester if they were not trained on \_\_\_\_\_ by a representative of Moyer Process and Control Company, Inc.
9. Any additional guarding and/or safety devices that may be required to comply with OSHA or local laws must be provided by the user in accordance with local codes in effect.

## **Specifications**

### **Sizes**

Tester: 8"wide x 9"deep x 23"tall weight 56 lbs.  
Console: 12"wide x 12"deep x 10"tall weight 10 lbs  
Extension Kit: 4"wide x 1"deep x 30"tall weight 4 lbs  
Assembled: 20"wide x 12"deep x 36"tall weight 70 lbs  
Ram Stroke: 6.25"  
Platen size: 3.25" diameter

Largest Spring: 6"long x 3"diameter x 150 lb load

Extension Spring: 1"min free length, 25"max length under load, 3"max diameter.

With custom tooling, can test slender springs over a pin of 0.45"max diameter.

### **Major Components**

Compression is accomplished with a hi-accuracy ballscrew.

Screw driven by a DC servo gearmotor with a high resolution optical encoder.

Motor is powered by an amplifier with 24vdc buss, 3 amp continuous (6 amp peak) output. Ram vertical motion guided on a 1"diameter polished shaft by linear bushings.

### **Measurement**

- Measurement accomplished with one SPI, or SMT model load cell, available in several load capacities.
- Can measure spring force up to 150 lbs with a typical accuracy of approximately +/- 0.012% of loadcell capacity (so +/- 0.02 lbs for a 150 lb rated loadcell).
- Measurement and control accomplished with a Moyer TruLoad console with an embedded computer, loadcell signal conditioner, and intelligent servo controller.



## **4. Machine Setup**

**\*\* PRIOR TO THE OPERATION OF THIS MACHINE, PLEASE COMPLETELY READ AND STUDY THIS SAFETY AND MAINTENANCE MANUAL THOROUGHLY \*\***

### **Location**

It's always best to locate precision measuring equipment away from strong vibrations like grinder motors, punch presses, etc. This unit has some vibration isolation to reject most of this, but if given a choice, a quieter environment is preferable. Cleanliness is also important. The unit has shields to protect it, but close proximity to grit and dust is never good for the long term.

### **Tester Mounting**

This unit is designed to be set onto any flat level table and used. The four rubber feet have mounting holes to allow permanent attachment to the testing table if desired. The "give" in the rubber feet also eliminate the need for leveling the tester body itself.

### **Initial Lubrication**

The enclosed screw and gearhead was greased and all moving joints were "run in" prior to shipping. However, they should be inspected and regreased regularly in accordance with Section 5, which gives detailed preventative maintenance lubrication instructions.

### **Power**

Normal grounded 110 vac is required. No compressed air is required.

### **Loadcell Mounting/Replacement**

Several mounting holes are provided to accommodate different models of loadcells you may need to use. Mounting screws must be tight, but not so tight to strip or damage the threads in the aluminum body of the loadcell. Be very careful when bolting light-capacity loadcells to not put them under a torsional force which could damage them internally with no obvious visible effects.

Please note: any time loadcells are replaced or even tightened, the machine needs to be calibrated again for height and load before production use. Also note that for best results and safety, it's recommended to place the spring near the center of the testing puck. A spring placed on the outside of the puck might buckle and fly out when put under load.

## **10. Lubrication and Preventative Maintenance**

After the first week or two of operation of the new machine, all of these parts should be checked for looseness or leaks. After that, all these checks and lubes should be performed at least every six months, by default.

### **DC Servo Gearmotor**

Is prelubricated for the life of the gears. Armature brushes should be removed and checked/ replaced every 12 months. New sets of replacement gears are available if ever needed.

### **Rockford Ballscrew and Ballnut**

The best lubricant to use is "Rheolube 733F" LEAD SCREW grease from Nye Lubricants Inc in New Bedford MA, phone# 508-996-6721.

Acceptable is "Mobilith SHC 100" p/n RG-100 from Rockford Ball Screw Co in Rockford IL, phone 800-475-9532. Also acceptable is a light lithium grease.

Remove one side plate to expose the screw. Wipe the exposed screw clean of existing grease and dirt. Apply a ball of grease to the screw and wipe it down into the threads. Repeat as needed, along the length of the screw. Replace the side plate then use the "Hardware Test" menu to move the top Ram completely up and down to distribute the grease inside the nut. This should be checked every 12 months.

### **Journal End Bearings**

Same lubricant type and frequency for the ball screws and nuts. There are bearings on the top and bottom of each screw. The bottom bearings bear all the load.

### **Guide Shaft**

Should be wiped clean of residue and receive a coating of light petroleum-based oil such as 3-in-1 oil, **DO NOT USE WD40 or SILICONE or TEFLON-BASED LUBRICANTS.**