

LION
PRECISION

TARGA II

Dynamic Runout System



Lion Precision 563 Shoreview Park Road St. Paul, Minnesota 55126-7014
Telephone: 651-484-6544 Fax: 651-484-6824 www.lionprecision.com
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Welcome

Congratulations on your purchase of a Lion Precision TARGA II Dynamic Runout measurement system. This manual will provide you with all the information you require to get the greatest benefit from your system.

Engineers and maintenance personnel will find the TARGA II invaluable for high precision measurement of dynamic runout at speeds up to 300,000RPM. Scrap can be reduced to zero when poor spindles are rebuilt *before* tools break. The QuikChek Probe Holder makes measurements fast and easy, once each machine has been fitted for the system.

Calibration

Your system was calibrated with the Lion Precision Ultimate Calibrator. This calibrator was designed by Lion Precision and includes a state-of-the-art air slide and motion control system. This has enabled us to calibrate with micro-inch precision. Of course all of our calibrations are traceable to NIST.

Lion Precision recommends that you have your system recalibrated at the factory once a year to ensure maximum accuracy.

Using this manual

In this manual you will find all the information for fitting the QuikChek probe holder to a machine, instructions on taking and recording spindle measurements, and forms you can use to record and store the measurements for later comparison.

Help

In the back of this manual you will find all the ways to contact us for help. If there's anything we can do to help you solve your measurement problems, please contact us.

800-229-6544 or 651-484-6544

www.lionprecision.com or www.targa2.com

Overview

The TARGA II system is designed to measure and display the runout (TIR) and RPM of high-speed spindles. While it is designed specifically for the PCB drilling industry, it can measure any spindle that can rotate a 0.125" gage pin.



Understanding the relationship between runout and RPM provides information on the best drilling speeds and can indicate out of spec spindles before they cut in to profits.

Once a machine has been fitted for the QuikChek probe holder, it takes only minutes to measure a spindle;

1. place the QuikChek on the bed,
2. load the gage pin in the collet and set the depth,
3. drop the pin in the QuikChek measurement area,
4. take the readings
5. repeat on other spindles.

When a spindle has been measured, the results can be viewed on screen, printed to the included thermal printer, saved within the TARGA II system, or uploaded to a computer. This stored information can be used to determine the history and trend of a particular spindle over time.

TARGA II Electronics

The TARGA II contains all the electronics for the measurement and features a color LCD touchscreen interface and a handle that locks into various positions for different viewing angles. The handle is moved by pressing and holding the round buttons where the handle mounts to the case, rotating the handle to the desired position, then releasing the buttons.

The Front Panel

The front panel of the TARGA II includes the color LCD touchscreen display, the RPM sensor connector and the dynamic runout sensor connector. The connectors lock in place when inserted. To disconnect, the barrel of the connector must be pulled away from the panel connector.

Do not attempt to disconnect probes by pulling on the cable.

The Rear Panel

Power Input

The power input connector is a standard IEC type connector. Input voltage range is 100-240VAC @ 40 watts. The fuse, housed in the connector, is 240VAC 2.5A.

Signal Outputs

Three different output signals are available on the rear panel. These signals are provided for external processing or measuring.

Dynamic Runout

This signal ranges from 0-10VDC and is an indication of runout value currently being measured (TIR of the runout probe). It is scaled to 2V/0.001" (2V/0.025mm).

Displacement

This is the instantaneous output voltage from the runout sensor. It ranges ± 10 VDC and is scaled to 2V/0.001" (2V/0.025mm).

RPM

This signal is the raw output from the RPM optical sensor. It is a rectangular wave between ground and 5VDC. The output is 0VDC when the black mark is being sensed by the sensor.

Ground

This connector provides connection to system ground. Chassis ground is connected to the power supply and electronics ground.

Aux

This connector is not used on the TARGA II.

Ethernet

This connector is not used on the TARGA II.

PCMCIA

This connector is not used on the TARGA II.

Printer

The included DPU-414 printer connects to this modular phone style connector.

Serial

Connecting the TARGA II to a PC is accomplished with this connector. When connected to a PC, all communication settings are done on the PC. Nothing needs to be done on the TARGA II to enable communication.

Reset

If the system should ever have an unexplained failure or a “crash,” use a small screwdriver or pen to press the button recessed in this hole. The system will restart.

Program Switches

These switches are used for troubleshooting, calibrating and updating your Targa II system. They should only be changed as instructed by Lion Precision service personnel or other TARGA II instruction sheets.

QuikChek Test Fixture

The QuikChek Test Fixture contains an integral fiber-optic laser tachometer, a 0.250" locating pin, and a sensor mount that precisely positions the runout sensor for measurement and prevents sensor damage from the rotating gage pin.

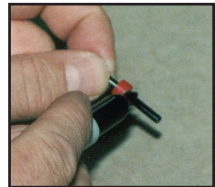


Preparing a Machine to use the QuikChek

The QuikChek Test Fixture has 0.25" locating pin protruding from the bottom of the device. To prepare the machine to use the QuikChek, a 0.25" hole must be drilled in the bed, or in a delrin plug. A 0.25" drill is provided with the system. The location of the mounting hole should be recorded to easily position the spindle during the measurement.

Using the QuikChek

For the integral tachometer to work, a single vertical mark must be placed along the length of the gage pin for the tachometer to sense. An indelible marker such as a Sharpie™ works well for this (one is included with the system). There must be only one mark on the pin but the width of the mark is not critical. The tachometer will sense this mark but it will be invisible to the runout sensor.



*A single vertical mark must be placed along the length of the gage pin.
One mark only!*

Adjusting the Tachometer

The tachometer is an optical sensor that is visible on the side of the QuikChek as a blue device with two lights and an adjustment screw.

The tachometer is adjusted at the factory and should not require further adjustment. If the system does not correctly measure RPM, additional adjustment may be necessary. Turn the adjustment screw until RPM readings are stable. When properly



QuikChek's integral tachometer.

adjusted, the green and red lights on the tachometer will turn on and off once per revolution.

Setting the Depth

Proper drill depth is set using the reference label on the side of the QuikChek. Lower the installed gage pin in front of the label. Set the depth so the end of the pin is in the gray area marked Drill Depth Zone. Use this depth during measurement. If the pin does not extend deep enough, measurements will not be accurate; too deep may crash the pin into the machine bed.



Use the Drill Depth Zone label to quickly set proper drill depth before test.

The Menu System

The TARGA II interface is a touchscreen menu driven system. The menu bar at the top of display provides access to all system functions. Access a menu by tapping (with finger or stylus) a menu item. A drop down list displays the options available under that heading. To remove a drop down list without making a selection, tap the “^” symbol at the top of the list or tap the screen anywhere outside of the drop down menu.

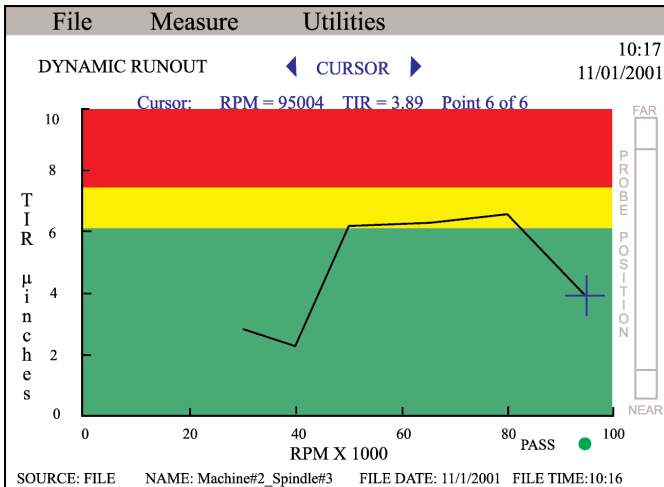
To remove a drop down list without making a selection, tap the “^” symbol at the top of the list.

Basic Spindle Measurement

Once a machine is prepared for the QuikChek Test Fixture, follow this sequence to measure a spindle:

- 1 Place the QuikChek’s locating pin in the prepared hole.
- 2 Insert the 0.125" gage pin in the chuck.
- 3 Move the spindle near the QuikChek, and use the Drill Depth Zone indicator on the side of the QuikChek to set the drill depth.
- 4 Place the spindle over the QuikChek measurement area and lower the gage pin into the hole to the predetermined depth.
- 5 On the TARGA II select **Measurement > Setup** and set the TIR and RPM range (or autoscale) and pass/fail limit points if desired.
- 6 Select **Measurement > Dynamic Runout**, then select **Measurement > Clear Test**.
- 7 Set the spindle to a desired test speed.
- 8 Tap the graph area of the screen to take a measurement.
- 9 Repeat steps 7 and 8 until the desired RPM range has been measured.

The Dynamic Runout Screen



The Dynamic Runout screen is the heart of the system. Measurements are taken and displayed here.

Source

The Source indication in the lower left corner indicates whether the data being displayed is from live data, a stored file, or simulated data. The simulation mode is accessed under the Measure menu. When simulation is active, the simulation selection under the Measure menu is red and marked with an asterisk (*). Simulation mode is for demonstration and training purposes.

Chart

The measurement results are charted in the center of the screen. The blue cross-hair indicates the currently selected point. The TIR and RPM values for the currently selected point are displayed in blue at the top of the graph area.

A measurement is taken when the chart area is tapped.

A measurement is taken when the graph area is tapped.

Pass/Fail

If pass/fail limits have been set, the chart background area is green below the first limit point, yellow between the first and second limit, and red above the second limit point. A pass/fail indicator is present at the lower right when limits are activated. Any single reading above the second (red) limit will generate a fail indication.

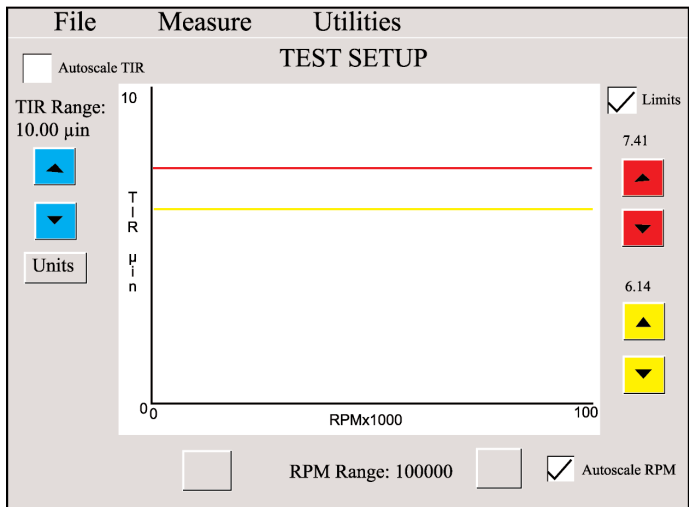
Cursor Control

Tapping the blue < or > buttons on either side of CURSOR at the top of the screen will move the cursor to another point and display that point's values. When a measurement is taken, the cursor automatically moves to the point just taken.

Probe Position

The Probe Position indicator displays the current probe position relative to its calibrated range. If the calibrated range is exceeded, the indicator will turn red. Measurements taken outside of the calibrated range are not guaranteed to be accurate. If the indicator shows the probe as too "NEAR," the probe is in danger of crashing into the target.

Test Setup



TIR Range:

When autoscaling is disabled (unchecked), TIR Range can be increased or decreased by tapping or pressing and holding the light blue up and down arrows. When held down, the rate of change will increase.

Tapping the check box by Autoscale will enable/disable autoscaling. When autoscaling is active, the TIR axis will automatically scale to fill the graph area with the resulting curve.

Autoscaling recalculates after each point is taken. As a result, the scaling will change as the test points are taken. If the range of readings are less than the minimum TIR range (0.05), the curve may not fill the graph area.

If the range of the readings taken is less than the minimum TIR Range (0.05), autoscaling will not fill the graph area.

The limits may not be visible if set higher than the currently displayed TIR range.

TIR Units

Tapping the Units button will drop down a selection list of units of measurement in which to display the TIR. The choices are:

| | |
|------------|-------------------|
| mils | 0.001 inches, |
| μ inch | 0.000,001 inches, |
| mm | 0.001 meters, |
| μ m | 0.000,001 meters. |

Tap the desired unit to select it.

TIR Limits:

Limits can be set to indicate a spindle that is bad or questionable. Tap the check box next to **Limits** to enable them.

There are two limit levels; red for a failure level, and yellow for a cautionary level. The yellow limit must always be less than the red level. If one tries to exceed the other, the other will automatically be adjusted.

The limits are adjusted by tapping, or pressing and holding the red or yellow up and down arrows. When held down or tapped rapidly, the rate of change will increase.

RPM Range:

When autoscaling is disabled (unchecked), set the RPM Range by tapping or pressing and holding the gray up and down arrows. When held down, the rate of change will increase.

Tapping the check box by Autoscale will enable/disable autoscaling and disable/enable the manual range adjustments.

When autoscaling is active, the RPM axis will automatically scale to fill the graph area with the resulting curve.

Autoscaling recalculates after each

point is taken. As a result, the scaling

will change as the test points are taken. If the range of readings is

less than the minimum RPM range (2000RPM), the curve may not fill the graph area.

If the range of the readings taken is less than the minimum RPM Range (2000RPM), autoscaling will not fill the graph area.

Working with Files

| File | Measure | Utilities |
|--|---------|--|
| SAVE FILE | | |
| MACHINE NAME | | SPINDLE NAME |
| <input type="text" value="Machine #2"/> | | <input type="text" value="Spindle #3 SAVED"/> |
| <p>TO SAVE A FILE:</p> <ol style="list-style-type: none">1.) Touch down arrow button next to machine name window. Then touch desired machine name. Name will appear in window.2.) Repeat for Spindle name.3.) Press "SAVE FILE" button. <p>To cancel "SAVE" and exit this screen, select from menu at top of screen.</p> | | |
| <input type="button" value="Save File"/> | | <input type="button" value="Delete Selected Files"/> |

The TARGA II has the capacity to store data for up to ten machines with up to ten spindles on each machine. These files can be reviewed at a later date for comparison of spindle performance over time. The TARGA II is supplied with a Windows compatible program (TARGA II Interface) that provides transfer of files from the TARGA II to a PC where they can be archived and viewed in spreadsheet applications. This program also features a utility for creating unique filenames for files stored internally in the TARGA II. Details on the PC program are given below.

File Naming Convention

Files are named in a two step process that indicates the machine, and the spindle that the data is associated with. The default filename structure in the TARGA II uses this format:

Machine#X; where X is 1-10, and **Spindle#Y;** where Y is 1-10. For example, a filename may be **Machine#1Spindle#3.**

Saving Files

Once a spindle has been measured, the results can be saved by selecting **File > Save**. This will present the File Save screen. Using the drop down menus, select the Machine and Spindle being measured and tap the **Save File** button.

If the Spindle portion of the name has **SAVED** after it, this file already has data. If selected and saved, the existing data will be overwritten. **SAVED** will not be added to the filename, it only appears in the drop down list as an indication of existing data.

Viewing Files

Select **File > Load/View** to view previously saved spindle measurements. This will present the Load File screen. Select the desired machine and spindle portions of the filename from the drop down lists and tap **View Selected File**. Files can also be erased from this screen by selecting the desired filename and tapping **Delete Selected File**.

TARGA II Interface PC Software

Installation

Requirements:

Windows 95 or later

16M RAM

Serial Port

CD ROM

Insert the CD in a CD drive. Select the drive with Windows explorer and double click setup.exe. Follow instructions on the screen.

Using the Software

Select TARGA II Interface from the Start>Programs list to start the program.

Downloading Filenames

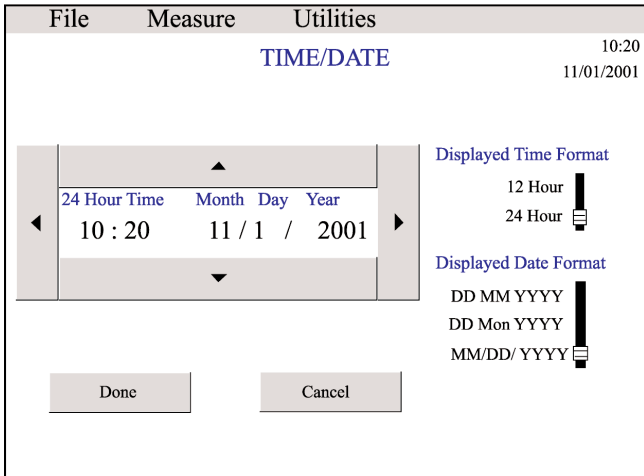
If you want more specific filenames, user created filenames can be downloaded from a PC. The ten TARGA II default Machine and Spindle entries can be changed to any character string up to 15 characters long. If the files are going to be transferred to a PC, the machine and spindle entries should be valid Windows filenames. To create unique filenames, start the TARGA II Interface program on the PC. The light blue highlight on the TARGA II screen indicates the currently selected item to be changed. Use the mouse activated buttons (Up, Down, Left, Right) or the cursor control keys on the PC keyboard to move the highlight to the desired item. Enter the new filename on the PC and click Change Filename (or press Enter). After all desired filenames have been changed, click Done. If Cancel is clicked instead of Done, all filenames will return to their original name.

Transferring Files

Files can be uploaded to a PC using the TARGA II Interface software. This allows the archiving of information for quality records and viewing/analyzing in spreadsheet programs.

Start the TARGA II Interface software and Select **File > Transfer** on the TARGA II to present the Transfer File screen. Selected files or all files can be transferred to the PC. To transfer all files, just tap the **Transfer All Files** button. To transfer a selected file, select the desired filename using the machine and spindle drop down menus and tap **Transfer Selected File**. TARGA II Interface software must be running on the PC to upload files. When files are uploaded, the uploaded data is presented in the text view window on the PC. This is for verification purposes only. Tab characters in the files may be displayed as solid vertical bars or other extended characters in the text. When this data is viewed in a spreadsheet, word processor or database program, the tabs are used to separate the data.

Setting the Time and Date



Select **Utilities > Time/Date** from the menu to view the Time Date Setup screen. Tap the desired selection for 12 hour or 24 hour clock, and the selection for date format. The time and date in the upper right corner will change to display the selected time and date format. The clock and date setting area at the left of the screen remains in a 24 hour, mm-dd-yyyy format, independent of the format selections.

The clock and date setting area at the left of the screen remains in a 24 hour, mm-dd-yyyy format, independent of the format selections.

To set the time and date, tap the right and left arrow buttons to select the item to be changed. The currently selected item is indicated in red. Once selected, tap the top (increment) and bottom (decrement) buttons to change the value of the selected item.

System Test

Select **Utilities > System Test** to display the System Test screen. Information about the internal systems of the TARGA II is presented here. This information can be used for some maintenance and troubleshooting operations. The calibration information on this screen is absolutely critical to proper function of the system and should never be changed except as instructed by Lion Precision service personnel.

Software Version and Other Information

Select **Utilities > About** from the menu. The About screen will indicate the version of software installed and other general system information.

Changing Language

Select **ABC/期せぬ** from the menu. A drop down list will extend from the menu where you can select the language for the display.

Maintenance

Calibration

Your TARGA II system must be factory calibrated on a yearly basis to ensure accuracy and maintain a NIST traceable calibration to satisfy ISO requirements. The calibration procedure requires specialized equipment and must be done at Lion Precision.

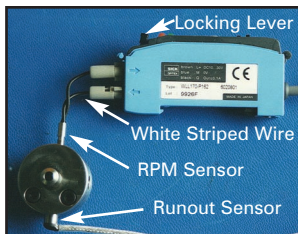
QuikChek Fixture

The QuikChek feature should not require maintenance except in rare circumstances.

If the RPM Sensor Does Not Work

It is possible for material such as dust or oil to block the RPM sensor from reading the gage pin. Try to clean this with a blast of air or an electronics spray cleaner. If this is not successful, the RPM sensor will have to be removed and the threaded mounting hole cleaned. Remove the RPM sensor with the following procedure. (The Runout sensor is precisely located. **DO NOT REMOVE IT** from the mounting piece).

1. Remove the two screws on top of the QuikChek and the metal strain relief on the bottom allowing the steel mounting piece and the sensors to be removed from the black housing.
2. Remove the fiber optic cables from the blue RPM sensor by releasing the locking lever and gently pulling the cables from the sensor.
3. Turn the threaded RPM sensor counter-clockwise to remove it from its mount.
4. Clean the RPM sensor mounting hole of any debris or objects.
5. Remount the RPM sensor by threading it into the mounting hole until it stops and finger tighten.
6. Reconnect the cable with the white strip on the wire to the Output hole on the sensor as indicated by the outward facing arrow, and the other cable in the other hole.
7. Relock the locking lever.
8. Re-install the mounting piece in the housing.
9. Reinstall the metal strain relief.

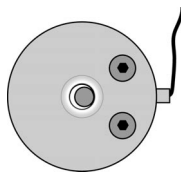


QuikChek sensor and mounting piece assembly with Locking Lever in the locked position.

Remounting the Runout Sensor

The runout sensor is precisely placed in the QuikChek mounting piece and should not be removed. If it is dislodged or moved it will have to be relocated. To relocate the runout sensor in the proper position follow this procedure:

1. Remove the two screws on top of the QuikChek and the metal strain relief on the bottom allowing the steel mounting piece and the sensors to be removed from the black housing.
2. Loosen the two runout sensor clamping screws until the runout sensor can be moved in the mounting hole.
3. Place a 0.125" gage pin in the measurement area of the mounting piece and place it against the runout sensor access hole.
4. Display the System Test screen on the TARGA II by selecting **Utilities > System Test**
5. On this screen, the Displacement Output is labeled as **Chan. 0 Raw Voltage**.
6. Adjust the position of the sensor until the Displacement Output is between +6 and +8 VDC.
5. Without moving the sensor, tighten the runout sensor clamping screws.
6. Verify that the Displacement Output is still +6 to +8VDC.
7. Move the gage pin around in the measurement area and verify the voltage remains between ± 10 VDC.
8. Reinstall the mounting piece in the housing.
9. Reinstall the metal strain relief.



Gage pin placement for adjusting runout sensor position.

Specifications

Output Voltages

| | |
|--------------------------|------------------------------|
| Dynamic Runout: | 0-10VDC |
| Displacement: | ± 10 VDC |
| RPM: | 0-5VDC Rectangular Waveform |
| RPM Resolution: | 1RPM |
| RPM Range: | 100-300,000 RPM |
| Runout Resolution: | 20 μ inch (0.5 μ m) |
| Runout Range: | 0.000-0.005" (0-125 μ m) |
| Input Voltage: | 100-240VAC 50/60Hz 40 Watts |
| Height: | 6.5" (165mm) |
| Width: | 10.6" (269mm) |
| Depth: | 9.2" (234mm) |
| Weight: | 9lbs. (4kg) |

Getting Help

Lion Precision wants to help you get the most from your system. If there is anything we can do, call or fax us at these numbers:

Telephone: 651-484-6544

Fax: 651-484-6824

Or, you can email us:

General information: info@lionprecision.com

Service or calibration: support@lionprecision.com

Sales: sales@lionprecision.com

Or you can visit our website: www.lionprecision.com or www.targa2.com.

There you'll find application notes, product manuals, theory of operation of capacitance sensors, a complete listing of our product line etc. There's also a form you can fill out to request information or help.

Lion Precision
563 Shoreview Park Road
St. Paul, MN 55126
phone: 651-484-6544
fax: 651-484-6824
info@lionprecision.com
www.lionprecision.com