Thank you!

Thank you for purchasing a Mark-10 Series STA Digital Torque Tool Tester. We are confident that you will get many years of service from this product.

The STA can be used to test a number of different torque tools, including screwdrivers, wrenches, and others. To maintain normal functioning of the tester, avoid repetitive overloads and shock loads.

Note that impact and air tools cannot be used with the STA.

We hope that this User’s Guide will provide a comprehensive explanation of the STA’s operation and sufficient detail on its specifications. However, if you have any other questions or concerns, our technical support and engineering teams will be eager to help you.

Thank you again for your purchase and happy testing!

TABLE OF CONTENTS

UNPACKING AND SETTING UP .................................................. 3
LIST OF INCLUDED ITEMS ...................................................... 3
OPTIONAL ITEMS ................................................................... 3
CONTROLS ............................................................................. 4
DISPLAY ................................................................................. 4
POWER ................................................................................... 5
OPERATION ............................................................................. 5
CONFIGURATION ................................................................... 6
CALIBRATION ......................................................................... 7
OUTPUTS ................................................................................ 8
SPECIFICATIONS ................................................................. 9
DIMENSIONS ....................................................................... 10
WARRANTY ........................................................................... 10
OTHER MARK-10 PRODUCTS ............................................. 11
UNPACKING AND SETTING UP

1. Carefully unpack the torque tester and check for any damage. Inspect the contents to ensure that you have received a tester complete with all accessories – see “List of included items” below.

2. Place the tester on a firm, flat and level working surface free from vibration. If preferred, the STA can be secured to a work bench with the optional bench mounting bracket (see below). There are four tapped holes in the underside of the base to facilitate bench mounting.

LIST OF INCLUDED ITEMS

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Series STA Torque Tester</td>
</tr>
<tr>
<td>1</td>
<td>Bench mounting bracket (optional)</td>
</tr>
<tr>
<td>1</td>
<td>AC adapter</td>
</tr>
<tr>
<td>1</td>
<td>Certificate of calibration</td>
</tr>
</tbody>
</table>

OPTIONAL ITEMS

STA001 bench mounting bracket
This bracket allows the STA to be mounted at any angle. It includes mounting hardware.
CONTROLS

Series STA Torque Testers have four keys for controlling all functions:

**POWER**
Turns power on and off. Also used to select configuration menu items.

**PEAK**
Used to select Clockwise Peak, Counterclockwise Peak or Normal (real time) display mode. The actual peak readings are always captured and can be recalled at any time. Also used to step through configuration menu items.

**ZERO**
Zeros any tare value (up to the full capacity of the gauge) and clears the peak readings stored in memory.

**DATA**
Used to manually output the torque data point currently displayed.

DISPLAY

The display consists of a 4 1/2-digit section and several indicators. Their functions are listed below.

**LO BAT**
Low battery voltage indicator

**CW**
Clockwise torque indicator

**CCW**
Counterclockwise torque indicator

**CW PEAK**
Peak clockwise indicator

**CCW PEAK**
Peak counterclockwise indicator

**LBIN, NCM, KGMM**
Units of measurement (model dependent)

**- - - -** (dashes)
Overload (>110% of range)
POWER

The tester can be operated by the included 9V non-rechargeable battery or by the included AC adapter. Battery life is approximately 30 hours. *Do not use adapters other than supplied or instrument damage may occur.*

There are three levels of low battery voltage indication. At the first level the display shows a steady "LO BAT" indicating approximately one hour of charge remaining. The second level is indicated by a flashing "LO BAT" indicator. At the third level the whole display except the "LO BAT" indicator will flash for three seconds after which time the instrument will turn itself off. This prevents the instrument from working at voltages too low for reliable operation.

To access the battery, remove the cover on the underside of the base by loosening the four screws.

OPERATION

Place the tool into the receptacle, as shown in Fig. 1 below, and *gradually* exert torque by hand until the desired status is achieved (ex. click, slip, etc.). Sudden torque application may produce incorrect readings.

After the peak reading is registered, it can be transmitted to a printer, PC, or data collector for further processing or storage. For details, see the *Outputs* section.

![Fig. 1](image)
Gradually exert torque to achieve accurate results
Series STA Torque Tool Testers

CONFIGURATION

Series STA torque testers have several features with programmable options allowing many user-specified choices. To enter the configuration menu, perform the following:

1. Turn off the tester
2. Press and hold PEAK
3. Turn on the tester
4. Release PEAK

The version number of the internal firmware will be displayed for a short time followed by '232'. The following secondary functions of keys are used during the configuration process:

- **POWER**: Used to select a menu choice
- **PEAK**: Used to step through menu choices

The following list shows all configuration options. *Italics* indicate factory settings.

**232 - RS-232 settings sub-menu**

- **232d** Output Disabled
- **232E** *Output Enabled*

- 300 300 baud
- 600 600 baud
- 1200 1200 baud
- 2400 2400 baud
- 4800 4800 baud
- **9600** *9600 baud*

- 7-1E 7 data bits, 1 stop bit, even parity
- 7-1o 7 data bits, 1 stop bit, odd parity
- 7-2E 7 data bits, 2 stop bits, even parity
- 7-2o 7 data bits, 2 stop bits, odd parity
- 7-2n 7 data bits, 2 stop bits, no parity
- 8-1E 8 data bits, 1 stop bit, even parity
- 8-1o 8 data bits, 1 stop bit, odd parity
- 8-2n 8 data bits, 2 stop bits, no parity

- **Ft F** *Full data (numeric + units)*
- **Ft n** Numeric data only

**bcd - Mitutoyo BCD settings sub-menu**

- **bcd d** Output disabled
- **bcd E** *Output enabled*
- **nPOL** No polarity (absolute value)
- **POL** *Data with polarity (+ for CW, - for CCW)*
AoFF - Automatic shutoff settings sub-menu

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>Disabled</td>
</tr>
<tr>
<td>1</td>
<td>1-minute automatic shutoff</td>
</tr>
<tr>
<td>5</td>
<td>5-minute automatic shutoff</td>
</tr>
<tr>
<td>10</td>
<td>10-minute automatic shutoff</td>
</tr>
<tr>
<td>20</td>
<td>20-minute automatic shutoff</td>
</tr>
<tr>
<td>30</td>
<td>30-minute automatic shutoff</td>
</tr>
</tbody>
</table>

init - Initial (default) settings sub-menu

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBIN</td>
<td>Pound-inch as default unit</td>
</tr>
<tr>
<td>KGMM</td>
<td>Kilogram-millimeter</td>
</tr>
<tr>
<td>NCM</td>
<td>Newton-centimeter</td>
</tr>
<tr>
<td>CCW</td>
<td>Real time display at turn on</td>
</tr>
<tr>
<td>PEAK CW</td>
<td>Peak clockwise display at turn on</td>
</tr>
<tr>
<td>PEAK CCW</td>
<td>Peak counterclockwise display at turn on</td>
</tr>
</tbody>
</table>

CAL - Calibration sub-menu. See CALIBRATION section.

CALIBRATION

To properly calibrate the STA, application of a precise torque value equal to the full capacity of the tester in lbin (regardless of the displayed units) will be required.

While holding PEAK, turn on power to the tester. Press PEAK repeatedly until ‘CAL’ appears on the display and press POWER three times to select the calibration mode. At the ‘null’ prompt, press ZERO. At the ‘SPAn’ prompt, apply the calibration torque and press POWER. The display will show ‘uuuu’ or ‘nnnn’ if the calibration torque is insufficient or excessive, respectively. If this happens, the only way to terminate the calibration mode is by momentarily disconnecting the battery or connecting the AC adapter to the tester without plugging the other end into a wall outlet. This will stop the calibration procedure without making any changes to the previous calibration data.

Successful calibration is indicated by ‘done’ on the display. Press POWER to save the changes and resume normal operation.
OUTPUTS

RS-232 and Mitutoyo BCD outputs are available on the 9-pin male connector. Refer to Fig. 2 below for a pin diagram.

I/O connector pin diagram

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RS-232 receive</td>
<td>6</td>
<td>No Connection</td>
</tr>
<tr>
<td>2</td>
<td>RS-232 transmit</td>
<td>7</td>
<td>No Connection</td>
</tr>
<tr>
<td>3</td>
<td>Mitutoyo request</td>
<td>8</td>
<td>Mitutoyo Ready</td>
</tr>
<tr>
<td>4</td>
<td>Mitutoyo clock</td>
<td>9</td>
<td>Mitutoyo data</td>
</tr>
<tr>
<td>5</td>
<td>Signal ground</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

RS-232
The data transmission can be initiated by pressing the DATA button (see Fig. 2) or by an external device by sending ASCII "?" to the gauge. The gauge will respond by sending the current reading in either full or numeric format, depending on the configuration setting (see Section 3). Polarity sign indicates CW (+) or CCW (-) torque. The transmitted string has the following format:

[POLARITY (SPACE OR -)][DATA][SPACE][UNITS (IF ENABLED)][CRLF]

Mitutoyo BCD
This output is useful for connection to data collectors, printers, multiplexers or any other device capable of accepting Mitutoyo BCD data. The transmission is initiated by the DATA button (see Fig. 3) or by the receiving device.
## SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy:</td>
<td>±0.5% of full scale ±1 digit</td>
</tr>
<tr>
<td>Sampling rate:</td>
<td>65/s</td>
</tr>
<tr>
<td>Display update rate:</td>
<td>2.5/s in normal mode, 65/s in peak mode</td>
</tr>
<tr>
<td>Safe overload:</td>
<td>150% of gauge capacity. Display shows ---- (dashes) above 110%.</td>
</tr>
<tr>
<td>Outputs:</td>
<td></td>
</tr>
<tr>
<td>RS-232:</td>
<td>Baud rates between 300 and 9600</td>
</tr>
<tr>
<td>Mitutoyo:</td>
<td>Standard Mitutoyo BCD output</td>
</tr>
<tr>
<td>Connector:</td>
<td>9-pin D-type male</td>
</tr>
<tr>
<td>Power:</td>
<td>9V battery or AC adapter</td>
</tr>
<tr>
<td>Battery life:</td>
<td>30 hours of continuous operation</td>
</tr>
<tr>
<td>Weight:</td>
<td>10 lb [4.5 kg]</td>
</tr>
<tr>
<td>Capacity x resolution:</td>
<td></td>
</tr>
<tr>
<td>STA12</td>
<td>12 x 0.01 lbFin, 140 x 0.1 kgFmm, 135 x 0.1 Ncm</td>
</tr>
<tr>
<td>STA50</td>
<td>50 x 0.05 lbFin, 580 x 0.5 kgFmm, 570 x 0.5 Ncm</td>
</tr>
<tr>
<td>STA100</td>
<td>100 x 0.1 lbFin, 1150 x 1 kgFmm, 1150 x 1 Ncm</td>
</tr>
</tbody>
</table>
WARRANTY

Mark-10 Corporation expressly warrants to its buyer for three (3) years from the date of delivery that the goods sold are free from defects in workmanship and materials. Mark-10 Corporation will, at its option, repair or replace or refund the purchase price of goods found to be defective. This remedy shall be the buyer's sole and exclusive remedy. Any modification, abuse, exposure to corrosive environment or use other than intended will void this warranty. This warranty is in lieu of all other warranties, including implied warranties of merchantability and fitness for an intended purpose. In no event shall Mark-10 Corporation be liable for any incidental and consequential damages in connection with goods sold or any part thereof.
OTHER MARK-10 PRODUCTS

A full line of force and torque measurement products and related items, including force gauges, torque gauges, force and torque test stands, sensors, grips, software, and more.
Mark-10 Corporation has been an innovator in the Force and Torque measurement fields since 1979. We strive to achieve 100% customer satisfaction through excellence in product design, manufacturing and customer support. In addition to our standard line of products we can provide modifications and custom designs for OEM applications. Our engineering team is eager to satisfy any special requirements. Please contact us for further information or suggestions for improvement.