

**NEXTECH**

# CTS Series User's Manual

REV 4.1



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## Introduction

Thank you for choosing Nextech CTS series instrument. With correct use and regular re-calibration, it can provide many years of accurate and reliable service.

The CTS, being simple to operate, can measure Torque accurately.

Nextech offers software and accessories to make your torque tester even more versatile. Visit our website [www.forcetorque.com](http://www.forcetorque.com) or contact your Nextech Distributor for more information.

## Before Use

Upon receiving the unit, please check that no physical damage has occurred to the packaging material, plastic case, or the instrument itself. If any damage is evident, please notify Nextech immediately.

Please read the entire manual carefully before using the Nextech Torque tester. Make certain that any person using or having access to the torque tester reads and understands the entire manual beforehand.

## Operation Overview

The most commonly used features such as displaying Torque, peak hold, zero and changing of displayed units can all be done by pressing a single dedicated key identified on the front panel (see the Basic Function section)






You can press a menu key to access the tester configuration (see the Main Menu section)

## Powering the First Time

The CTS is supplied with a set of 4 Nickel Metal Hydride AAA rechargeable batteries. For safety reasons, the batteries are discharged during transportation.

To obtain maximum battery life, we recommend that you charge them with the charger/ adaptor supplied for at least 14–16 hours when you first receive the instrument. When subsequent recharges are necessary, it is recommended that the CTS is charged for 8 hours.

### Battery Indicator

-  Battery level is at full capacity
-  Battery level is at 75% of capacity
-  Battery level is at 50% of capacity
-  Battery level is at 25% of capacity
-  Battery level is less than 5% of capacity

If battery level is 0%, the “battery empty” message will be displayed, and the gauge will power down automatically.

When plug in the charger, after few minutes the battery level will show battery capacity full. Actual remaining battery capacity can be view only when charger is not connected.

**\*Important** Only use the adaptor/charger supplied

## Using the CTS

### Before Powering Up

Insert the 4 posts into any holes that match the bottle or jar size. The post should be inserted fully and lock to the key slot. The post should not turn when you try to turn it. This will help provide better grip when holding the bottle. Make sure no weight or any force is applied on the plate at the time of powering up.

### Powering Up



**Figure 1** CTS Control Panel

As shown in Figure 1, the Control Panel has eight keys. To power up the tester, press the ON/OFF key. A short self-test runs during which the display will show the capacity in Newton.


After the self-test, provided that no load has been applied to the instrument, the display will show all zeros. This is because the tester re-zeroes itself during the self-test routine.


**Do not overload the load sensor.** This will cause irreparable damage. Torque greater than 120% of full scale will produce an audible beep and OL symbol will blink on the display until load is released and RESET key is pressed.

To power-down the tester, press the ON/OFF key.

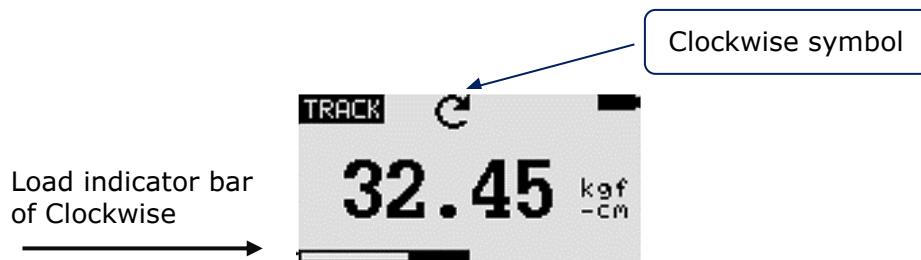
- \* *All the current settings are saved when the tester is turned off and the tester will function in the same mode when powered-up again.*

## Basic Functions

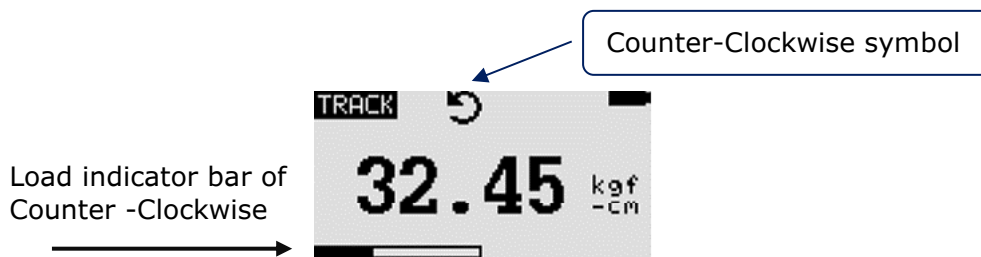
Clockwise (CW) Torque is displayed on the CTS and recognized by the symbol 

Counter-clockwise (CCW) Torque is displayed on the CTS and recognized by the symbol 

### Display of Clockwise/Counter-Clockwise



**Figure 2a** Clockwise display



**Figure 2b** Counter-Clockwise display

The “Load Indicator Bar” alerts the operator of how much load has been applied to the load sensor.

- CW Torque, the indicator bar moves from right to left.
- CCW Torque, the indicator bar moves from left to right.

**Zeroing the tester:** During the operation of the tester, it is often necessary to zero the display, so it does not become part of the measured reading. Press and release the ZERO key.

**Changing the unit of measure:** You can choose from the following units of measure depending on the capacity of your tester: N-mm, N-cm, N-m, kgf-m, in-lbf, ft-lbf, oz-in

To change the display units, press the UNITS key. Each successive key press will select the next available units until the tester returns to its original setting. The CTS automatically converts readings as new unit of measure is selected.

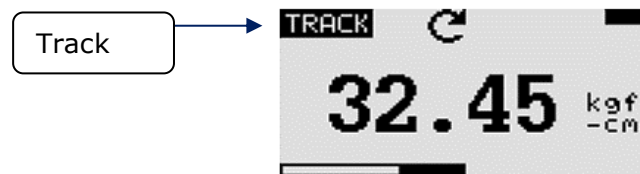
*Note\*:* All units may not be displayed, depending on tester capacity.

**Changing the mode of measure:** You can choose from the following modes of measure: Track, First Peak-Torque and Peak-Torque.

To change the display mode, press MODE key. Each successive key press will select the next available modes until the tester returns to its original setting.

### Track mode

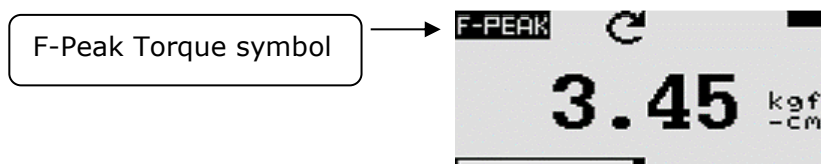
Press the MODE key until the **TRACK** appears on the display. The display will now indicate Torque applied in both directions as they are applied to the load sensor and maintain the live display. See Figure 3a.



**Figure 3a** Track

### First Peak mode

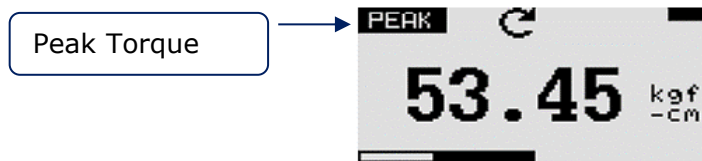
Press the MODE key until the **F-PEAK** appears on the display. The display will show the maximum tensile Torque. See Figure 3b



**Figure 3b** F-Peak Torque

### Peak mode

Press the MODE key until the **PEAK** appears on the display. The display will show the maximum compressive Torque. See Figure 3c



**Figure 3c** Peak Torque

**Resetting the tester** Press the RESET key to clear both maximum registers and prepare for detecting the next maximum readings.

**Backlit Display** When you press any key or apply Torque to the load sensor greater than 0.5% of full scale, the backlight will active for 60 seconds.

**Saving readings to memory** Any reading can be saved any time by pressing the MEM/ENTER key. A total of 500 readings can be stored in the database include the reading unit.

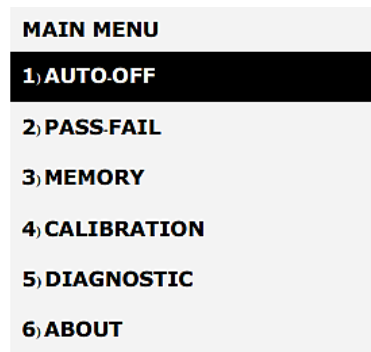
**Computer Control of Torque Tester** A computer can control the gauge by sending commands through either USB or RS232 port

**Output signals** The displayed reading may be transmitted to a PC by pressing the PRINT key or sending a request command from PC to the tester. The command can be through USB or R232 Port.

Command	Action
<b>Pressing PRINT key</b>	<p>Send live reading value from unit if current mode is track mode.</p> <p>Send peak Torque value from unit if current mode is peak Torque mode.</p> <p>Send F-peak Torque value from unit if current mode is F-peak Torque mode.</p>
<b>UPLOAD ALL</b>	Send all memory

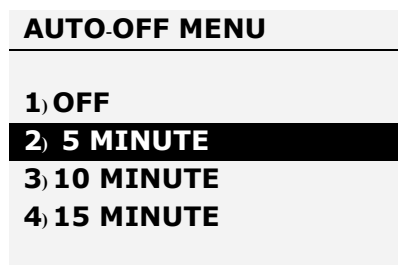
## Main Menu

Press MENU/ESC key to access the main menu. To move between the options listed on the main menu page, press UP and DOWN arrow keys to move the cursor. Press ENTER to select the sub-menus, activate features, and enter values. Within sub-menus UP, DOWN, LEFT and RIGHT arrow keys will also change numerical values. Press ESC to return to the main menu page.



- 1. AUTO-OFF** Press the MENU key, the display will show main menu page and use UP and DOWN to move the cursor point to AUTO-OFF. Press the ENTER key, the display will show the Auto-off menu page. Press ESC key to return to the Main menu page.

An Auto-off feature can be enabled to conserve battery power where the tester powers down after 5, 10 and 15 minutes (depend on Auto-off time) since the last key press. The AO will appear in the main display if you activate this feature.

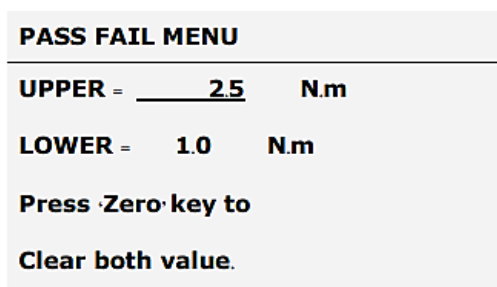


**Figure 5** AUTO-OFF Menu

Use UP and DOWN key to move the cursor. Press the ENTER key to select auto-off option and return to Main menu page.

**2. PASS-FAIL** The Pass-Fail feature used to set a defined acceptable maximum and minimum Torque gap for measuring. It activates by setting the lower level and per level Torque limit. If the Torque value is within the gap level, the display will show message PASS. Any reading values outside this gap (higher or lower), the display will show message FAIL. If you activate this feature the PF symbol will display on main display.

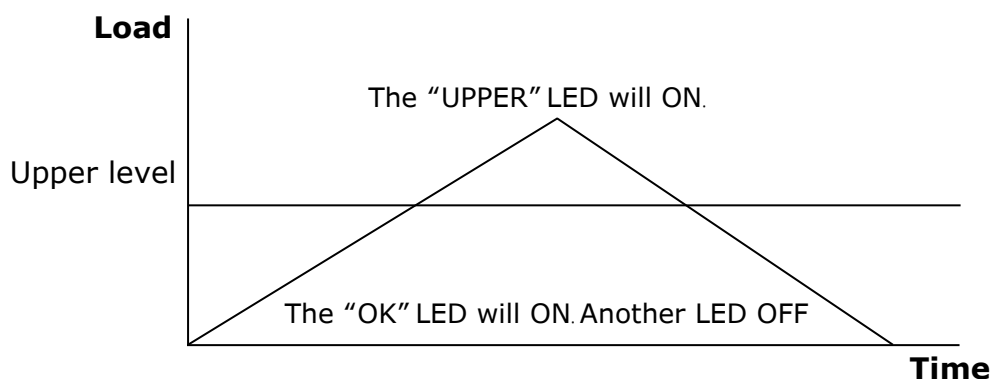
To access PASS-FAIL menu, press UP and DOWN to move the cursor point to PASS-FAIL and press the ENTER key, the display will show the PASS-FAIL menu page. Press ESC key to return the main menu page.



Use LEFT Arrow keys to move cursor point to the desired value. Use UP and DOWN keys to change the value, press and hold to scroll values. Use RIGHT Arrow key to change the unit. Press ENTER to save setting and return to main menu page.

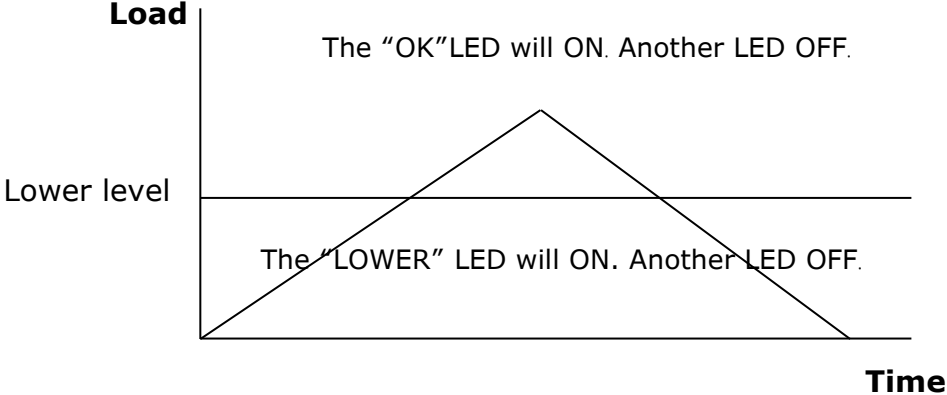
- \* Pass-Fail feature will automatically disable if you set LOWER and UPPER = 0N.m
- \* LOWER must be less than the UPPER

**Example 1** LOWER LEVEL = 0 N.m, UPPER LEVEL = 20 N.m



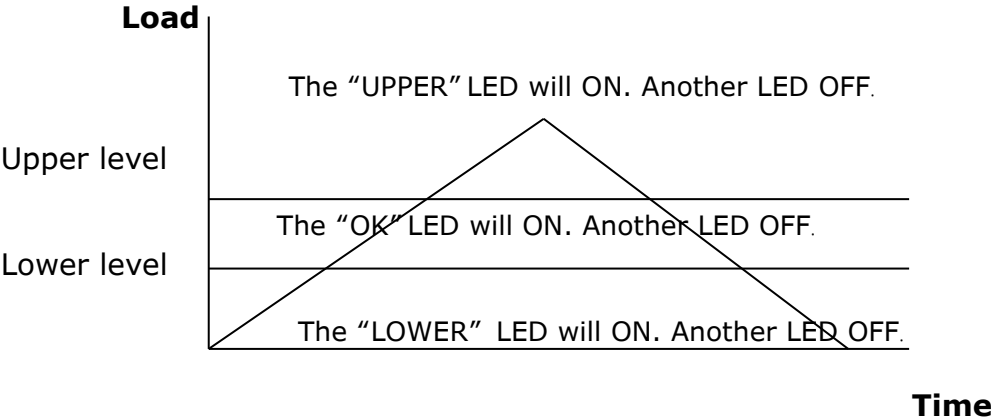
**Figure 6a**

**Example 2** LOWER LEVEL = 20 N.m, UPPER LEVEL = 0 N.m



**Figure 6b**

**Example 3** LOWER LEVEL = 10 N.m, UPPER LEVEL = 20 N.m



**Figure 6c**

**3. MEMORY** This function is used to view the saved record, delete current record, delete all record and print data of the saved record.

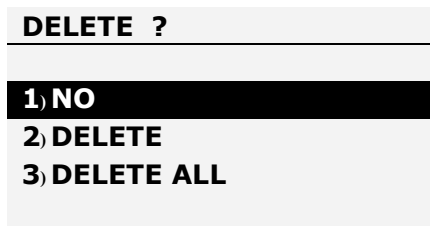
To access the MEMORY menu, go to the main menu page, press UP and DOWN to move the cursor point to the MEMORY and press ENTER key. The display will show the memory page. Press ESC key to return to main menu page.



Notice the number of records saved at the top right corner. (This is record 3 of the total 3 records saved)

**Figure 7a** Memory Page

Press UP and DOWN to change memory page, press and hold to scroll change memory page. Press PRINT key to print the memory to the serial port. Press ZERO key to access the DELETE menu.



**Figure 7b** Memory Delete Menu

Press UP and DOWN to select the delete option,

If you select NO and press ENTER key, the tester will return to memory page.

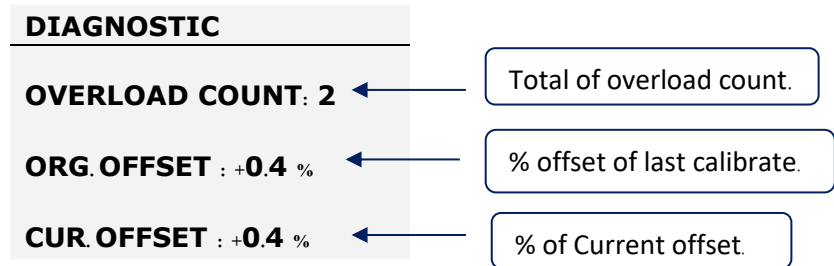
If you select DELETE and press ENTER key, the tester will delete current saved record and return to memory page.

If you select DELETE ALL and press ENTER key, the tester will delete all saved record and return to memory page.

**4. CALIBRATION** This is used by service technicians when calibrating the tester. Contact your Nextech distributor for details.

**5. DIAGNOSTIC** This is used to check the status of the load cell. If you suspect that the load cell transducer has sustained an overload, it is possible to check the status of the load cell immediately.

Place the tester horizontally on the flat level surface and go to the main menu page. Use UP and DOWN key to move the cursor point to DIAGNOSTIC and press ENTER key, the display will show Diagnostic menu page. Press ESC to return to main menu page.

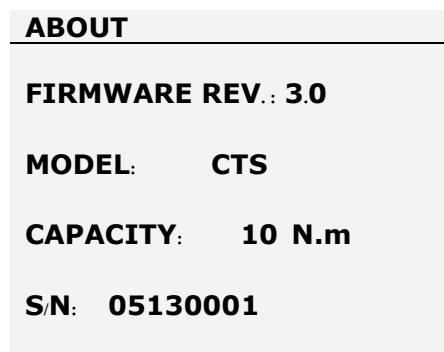


**Figure 8** Diagnostic Menu

- If the % offset is between 5% - 10%, please contact your supplier to arrange a recalibration of your gauge.
- If the % offset is greater than 10%, please contact your supplier to arrange for load cell replacement.

These values are given as an indicator only. The need for calibration/repair may vary according to the individual characteristics of the load cell.

**6. ABOUT** This shows the information of your tester (Firmware revision, Model, Capacity, Serial number). To access ABOUT menu, go to main menu page and press UP and DOWN to move the cursor point to ABOUT and press ENTER key, the display will show About menu page. Press ESC key to return to main menu page.



**Figure 9** About Menu

## Measurement Practice

For best measurement accuracy keep the center of rotation of both cap and tester in the same axis. Avoid bending loads while applying torque for consistent peak reading. Monitor analog load bar to make sure the unit stay within the maximum torque capacity.

If tester is used above this capacity in either CW/CCW, even for a short time, permanent load cell damage can result. Overload damage is not covered by the warranty.

## CTS Specifications

### Capacity and Divisions

Model	N-mm	N-cm	N-m	Kgf-cm	Kgf-m	In-lbf	Ft-lbf	oz-in
<b>CTS 1</b>	1000 x 0.2	100 x 0.2	1 x 0.0002	10.196 x 0.002	0.1019 x 0.0001	8.852 x 0.002	0.7374 x 0.0002	141.6 x 0.2
<b>CTS 5</b>	5000 x 1	500 x 0.1	5 x 0.001	50.98 x 0.01	0.5098 x 0.0001	44.25 x 0.01	3.688 x 0.001	708 x 0.2
<b>CTS 10</b>	10000 x 2	1000 x 0.2	10 x 0.002	101.96 x 0.02	1.0196 x 0.0002	88.52 x 0.02	7.374 x 0.002	1416 x 0.2
<b>CTS 20</b>	20000 x 5	2000 x 0.5	20 x 0.005	203.9 x 0.05	2039 x 0.0005	177.0 x 0.05	14.75 x 0.005	2832 x 0.5

### Environment

Operating condition: For indoor use only  
 Operating temperature: 60 °F - 95 °F (15 °C - 35 °C)  
 Storage temperature: -15 °C to 65 °C  
 Humidity: Maximum 70% Relative

### Accuracy

Accuracy (Combined error): ± 0.5 % of full scale  
 Creep: ± 0.02 % of full scale  
 Non-Linearity: ± 0.02 % of full scale  
 Temperature shift at zero load: ± 0.02% of full scale °C

### Dimension & Weight

Size: 160 x 250 x 100 cm.  
 Weight: 2.6 kg.

### Mechanical Rating

Maximum torque: 120% of rated capacity stated  
 Maximum mounting torque: 150 % of rated capacity

### Electrical

Charger rating: 500mA 9 Volts DC  
 Charging time: 12-14 hours for full charge  
 ADC Sampling Rate: 1,000 Hz  
 Screen Refresh Rate: 0.10 S  
 Output: USB 8 data bits, 1 Start bit, 1 Stop bit, no parity, Baud rate: 38400  
 Communication Port: Both R232 & USB are ready. No selection on the menu required.  
 Display: 128 x 64 pixel dot matrix display  
 Unit of measurement: N-mm, N-cm, N-m, kgf-cm, kgf-m, in-lbf, ft-lbf, oz-in  
 Mode of measurement: Track, Peak, First-Peak  
 Minimum torque: Readable at min 5% of F.S  
 Auto Reset range: Adjustable 2 to 100% of F. S  
 Pass-Fail range: Adjustable 2 to 100% of F.S

### Conversion Factor

Unit	N-m	kgf-cm	Kgf-m	in-lbf	ft-lbf	oz-f
<b>N-m</b>	1	10.197	0.10197	8.8507	0.73756	141.61193
<b>kgf-cm</b>	0.098066	1	0.01	0.86796	0.07233	13.88738
<b>Kgf-m</b>	9.80665	100	1	86.796	7.233	1388.7386
<b>in-lbf</b>	0.11298	1.152	0.01152	1	0.08333	3072
<b>ft-lbf</b>	1.3558	13.8255	0.138255	12	1	36864
<b>oz-in</b>	0.007061	0.072007	0.0007201	0.0625	0.005208	1



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