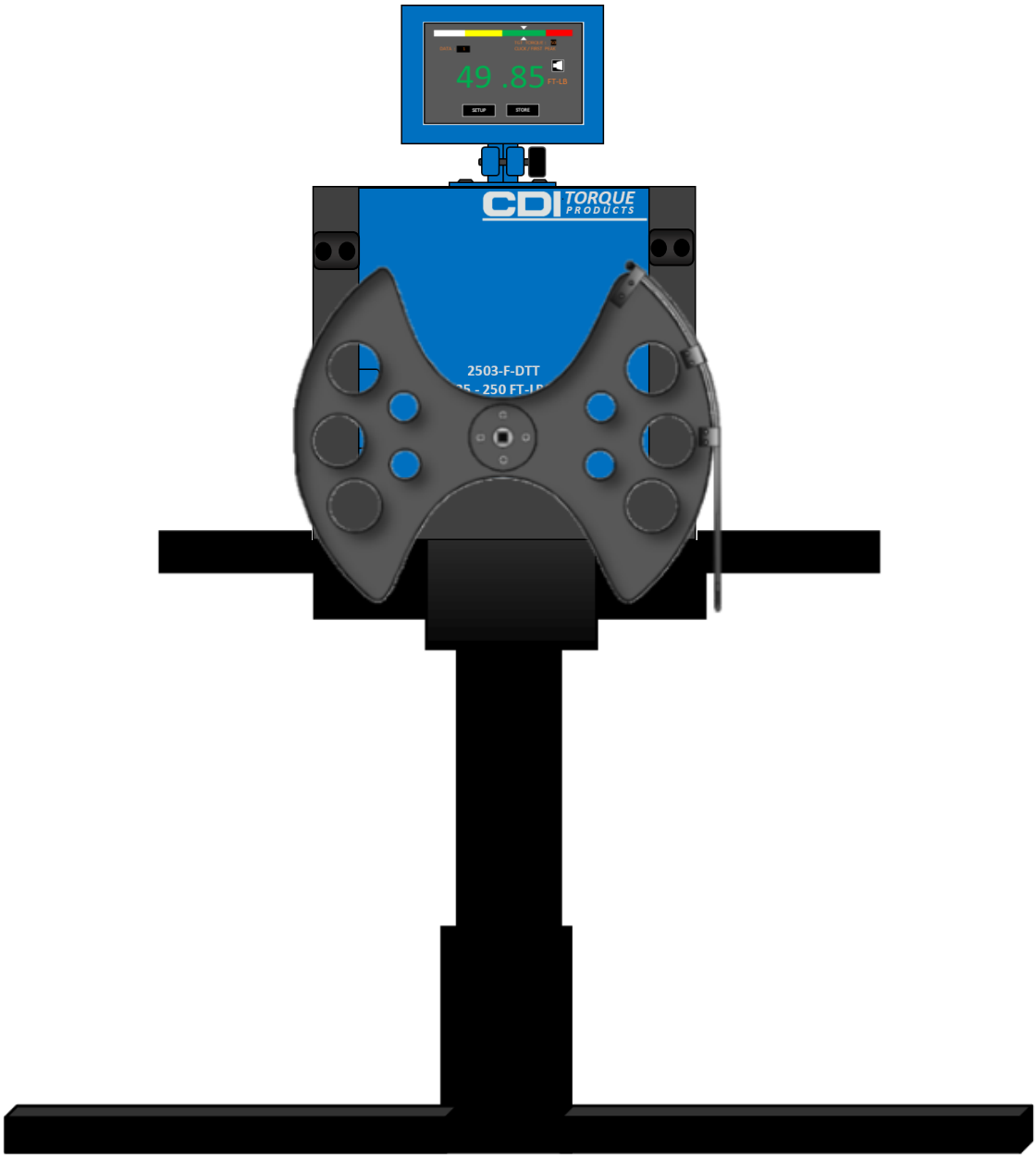
DTT Calibration Manual
Software: 1.5.0



DTTCALM
REV: (04-2017)

DTT Digital Torque Tester

Table of Contents

DTT Digital Torque Tester

IMPORTANT SAFETY INSTRUCTIONS

This manual contains important safety and operating Instructions for the Digital Torque Tester (DTT).

Read All Instructions

Read, understand and follow all safety messages and Instructions in this manual and on the test equipment. Safety messages in this section of the manual contain a Signal word, a three-part message, and, in some Instances, an icon. An icon, when present, gives a Graphical description of the potential hazard.

General Cautions

Snap-on Specialty Tools cannot anticipate or provide safety warnings and Cautions to cover every situation that may be encountered When operating, servicing or repairing this tester. It is the Responsibility of operators and servicing technicians to be Knowledgeable about the procedures, tools and materials used, and to satisfy themselves that the procedures, tools And materials will not compromise their safety.
Do not attempt to operate this Digital Torque Tester until you have thoroughly read and completely understand all instructions and safety information in this manual. Failure to comply can result in accidents involving fire, electric shock or serious personal injury. Save this manual and review it frequently for continued safe operation, and use it to instruct others who may use this tester.

Snap-on Specialty Tools is not responsible for customer modification of test equipment for applications on which Snap-on Specialty Tools was not consulted.

General Safety

WARNING

- **Improper use can cause breakage.**
- **Read instructions before operating.**
- **Follow manufacturer's instructions, safety precautions, and specifications when operating tools.**

Broken Equipment Can Cause Injury.

- **Flying particles can be discharged when applying torque.**
- **Users and bystanders must wear safety goggles.**
- **Flying particles can cause injury.**

Risk of Entanglement.

- **Keep body parts away from rotating parts.**
- **Wear a protective hair covering to contain long hair and prevent contact with moving parts.**
- **Do not overreach. Keep proper footing and balance at all times.**
- **Entanglement can cause injury.**

Torque Tester Safety

- **Be sure ratings for all components, including, adaptors, extensions, drivers and sockets, match or exceed the torque being applied.**
- **Do not use this instrument with power switch OFF. Always turn power switch ON so torque values are displayed.**
- **Be sure the capacity of the DTT matches or exceeds each application before performing a procedure.**
- **Pull on a wrench handle—do not push—when tester is mounted horizontally. Adjust stance to prevent a possible fall.**
- **Do not use extensions, such as a pipe, on a wrench handle.**
- **Do not turn the power switch ON with a calibration arm or wheel engaged to tester transducer**
- **Mount the DTT securely to a heavy bench, wall or other support structure before applying torque.**
- **Do not use the DTT if it makes unusual noises, has loose parts, or shows any other sign of damage. Have repairs performed at an Authorized Service Center before use.**
- **Do not use chipped, cracked, or damaged sockets and accessories.**
- **Do not remove any labels. Replace any damaged label.**

AC Adapter Safety

- **Risk of electric shock and fire**.
- **Do not allow conductive objects to come in contact with terminals, 120 or 220 volts present at adapter terminals.**
- **For indoor use only. Do not expose adapter to rain or snow. Do not use in damp locations.**
- **Replace defective cord immediately. Return to qualified service center for replacement.**
- **Do not use any other type of adapter. Using an adapter not specifically designed for this unit may damage tester.**
- **Do not use an extension cord with adapter.**
- **Do not use a damaged adapter.**
- **Do not disassemble adapter.**
- **Do not attempt to connect two adapters together.**
- **Do not operate adapter with damaged cord or plug. Replace immediately.**
- **Do not operate adapter after it is dropped, receives a sharp blow or damaged. Take the adapter to an Authorized Service Center.**
- **Unplug adapter from outlet before maintenance or cleaning. Turning off tester is not adequate to avoid hazard.**
- **Read all instructions and safety messages on battery and adapter before use.**
- **Electric shock or fire can cause injury.**
- **SAVE THESE INSTRUCTIONS.**

DTT Calibration Equipment Needed

Arm / wheel Length	Snap-on P/N	CDI P/N
2.5” Radius Wheel	TTC500	2500-50-0
5.0” Radius Wheel	TTC1510	2000-151-0
10.0” Butterfly Wheel	TTC1520	2000-152-0
40.0” Arm	TTC1540	2000-154-0

Size	CDI P/N
¼” x ¼” male to male	2344-0051-11
½” x ½” male to male	2344-0051-13
⅜” x ½” male to male	2344-0051-16
¾” x 1 ½” male to male	2344-0051-19

- DTT Calibration Bracket Assembly: (2344-0050-03)
- Calibration Weight Set: (TTC3210) or CDI P/N (2000-321-0)
- Calibration Stand Kit: TTC25002 or CDI P/N (2000-250-02)

*NOTE**
Calibration verification results can differ from the initial performed calibration from the factory if the supplied male calibration square drive socket adapter is not used.

2.5 & 5.0 inch Calibration Wheel Set-up

Figure 2

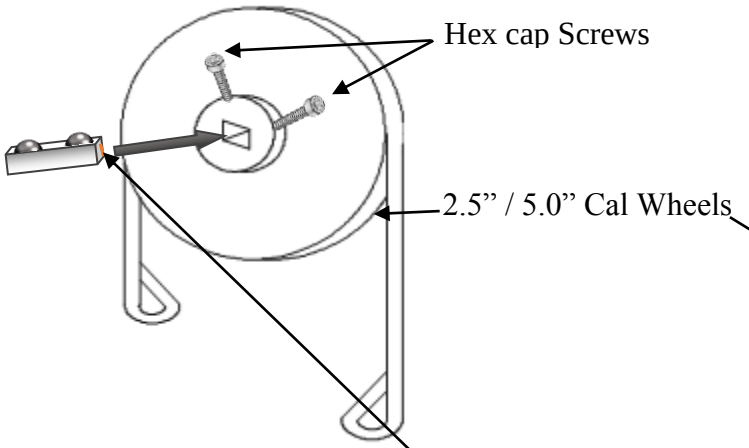
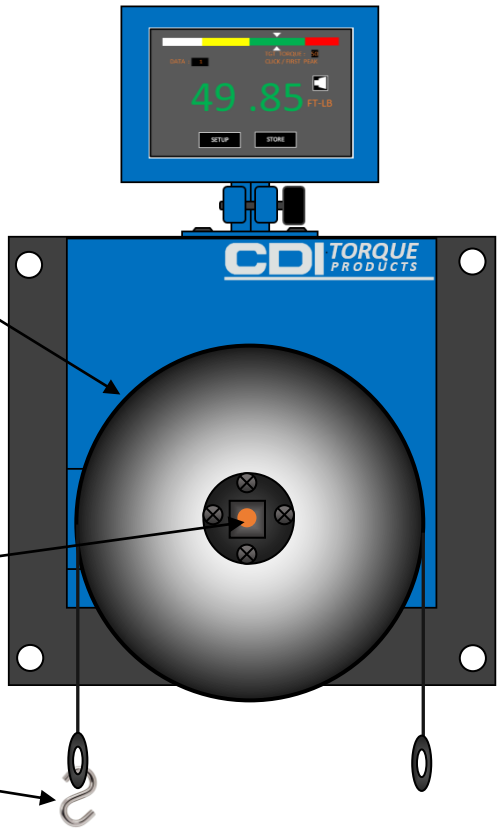


Figure 1



Use supplied S-hook is required when using the 2.5” or 5.0” Cal Radius Wheels as shown in Fig. 1.

Insert the ¼” x ¼” square male calibration drive (2344-0051-11) in to hub of the 5 inch calibration wheel until you feel the b.b. engage. Tighten the two hex cap screws to 50-60 in-lbs of torque in two sequences. (Note the position of the b.b.) As shown Figure 2.

Carefully insert the 5 inch wheel in to the DTT female socket until you feel the square drive adapter b.b engage.

Always verify the laser dot is visible from the front of the 5 inch wheel as shown in Figures 1 & 2,

10.0 – 20.0 & 40.0 inch Calibration Arm / Wheel Set-up

Figure 3

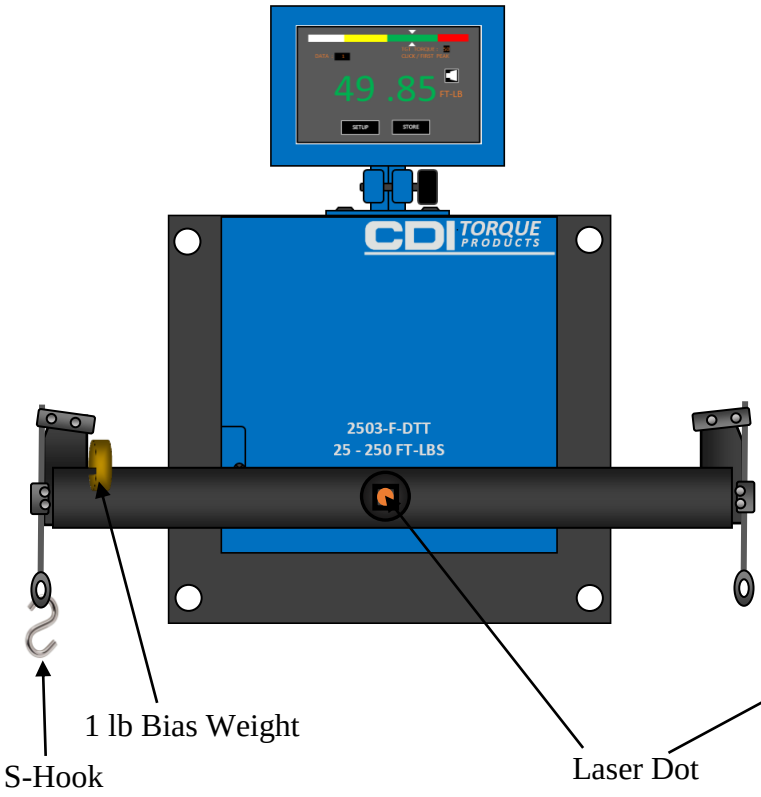


Figure 4

Always use a 1 lb. bias weight and S-hook when using the 20 inch Cal Arm. The weight of the 1 lb weight induces a weight bias in the direction of test during calibration, which creates a steady zero point. (Shown in Figure 3).

Always use a slotted 4 or 8 ozs. weight and S-hook when using the 10.0 inch Cal Butterfly Wheel for weight bias which creates a steady zero point. (Shown in figure 4)

Note: The 40.0" Cal Arm (Not Pictured) will NOT need an additional weight bias, due to the natural 13 lbs. of weight bias built into the design.

DTT Calibration Mounting Bracket

Figure 5

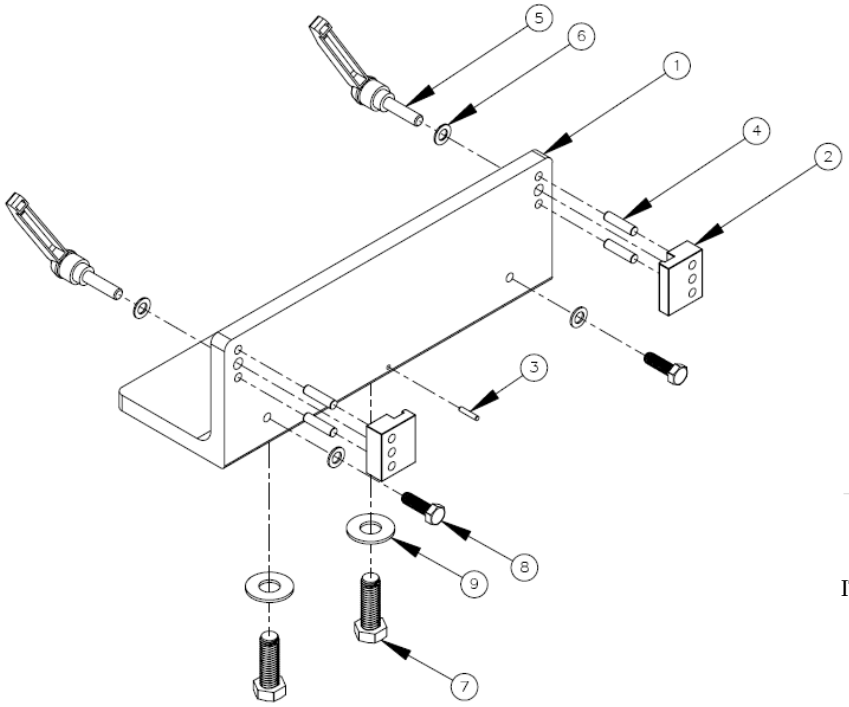
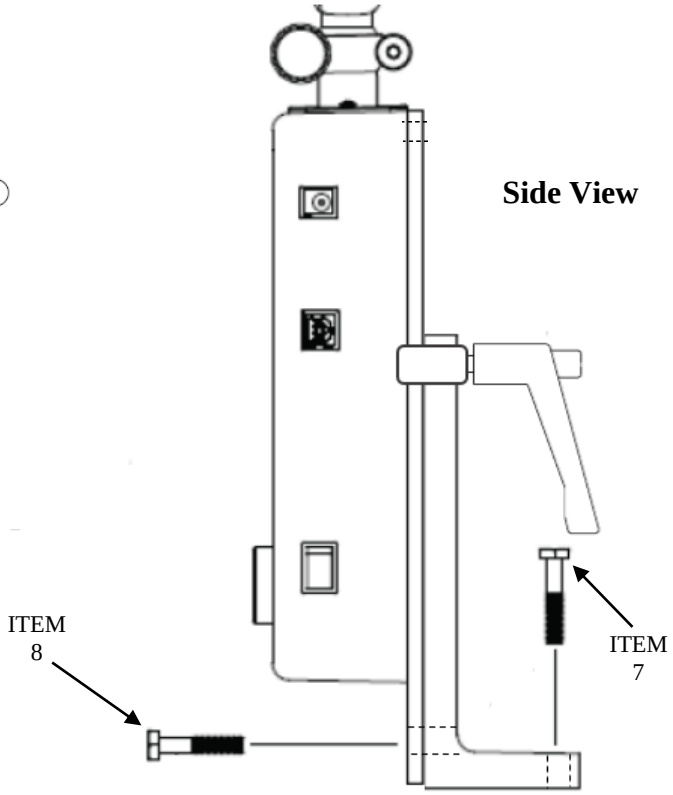


Figure 6



Mount calibration bracket (Figure 5) on 1/2 inch steel plate, with mounting table securely anchored to the floor.

P/N 2344-0050-03				
ITEM	**PART NO.**	**DESCRIPTION**	**REQ'D**	**REQ'D TORQUE**
1	**2344-0050-01**	**CALIBRATION BRACKET**	**1**	**N/A**
2	**2344-0050-02**	**CLAMP**	**2**	**N/A**
3	**10-102-44**	**DOWEL PIN (1/8 DIA. X .625 LG.)**	**1**	**N/A**
4	**10-102-40**	**DOWEL PIN (1/4 DIA. X 1.00 LG)**	**4**	**N/A**
5	**2100-0060-02**	**ADJUSTABLE HANDLE (5/16-18 X 1.18 LG. THREAD)**	**2**	**HAND TIGHT**
6	**10-104-9**	**WASHER, FLAT (.33 I.D. X .57 O.D. X .070 THK.)**	**4**	**N/A**
7	**10-125-21**	**SCREW, HEX MACHINE HEAD (1/2-13 X 1-1/2" LG.)**	**2**	**45 FT-LBS**
8	**10-125-10**	**SCREW, HEX MACHINE HEAD (5/16-18 X 1" LG.)**	**2**	**28 FT-LBS**
9	**10-104-16**	**WASHER, FLAT (.56 I.D. X 1.25 O.D. X .10 THK.)**	**2**	**N/A**

DTT Calibration Setup

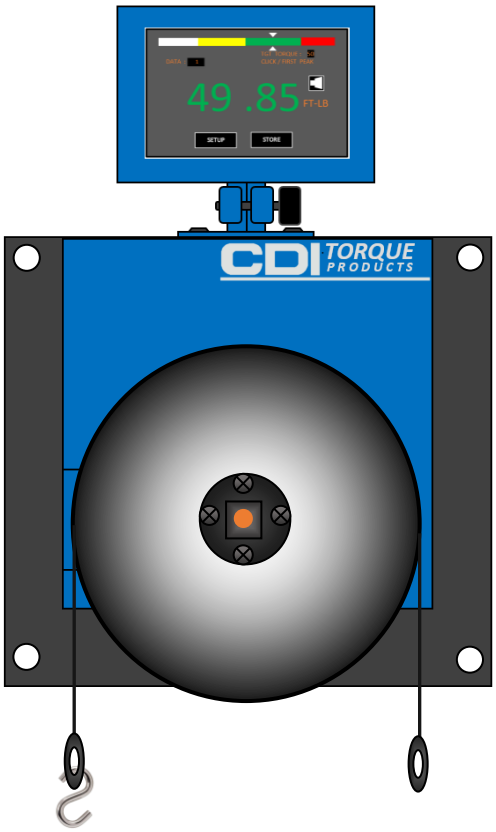


Figure 7 - Cal Setup

We will use the 5 – 50 in-lbs Range DTT as the example.

1) Set up the calibration wheel as described on pages 6, 7 and 8 (Figures 1 thru 5).
2) Place the correct Calibration Wheel (5 inch) or arm on to the male-to-male square-drive fixture.

Note: You can start in either CW or CCW directions. Since calibration direction functions are independent of each other. The Calibration Technician can decide in which direction he or she can begin. In many cases only none or one direction may be out of tolerance, thus the need to only calibrate one direction of the DTT.

Calibration default units of measurement are preset in the firmware and cannot be changed. See Cal Tables on pages 17 through 19 for calibration default units of measurement.

CW & CCW Three Point Calibration Procedure (5-50 in-lbs)

Figure 8 - Main Screen

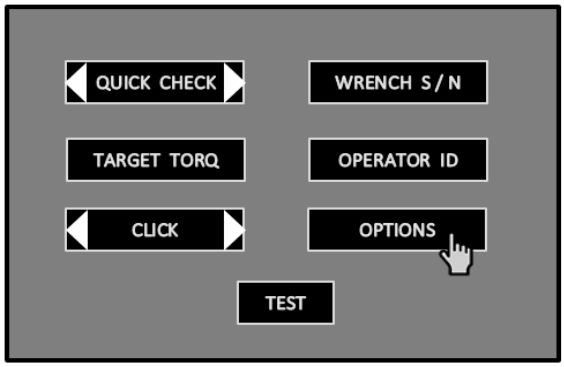


Figure 9 - Options Screen

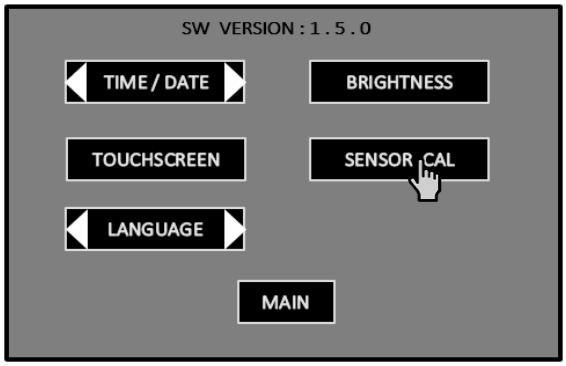


Figure 10 - Password Screen

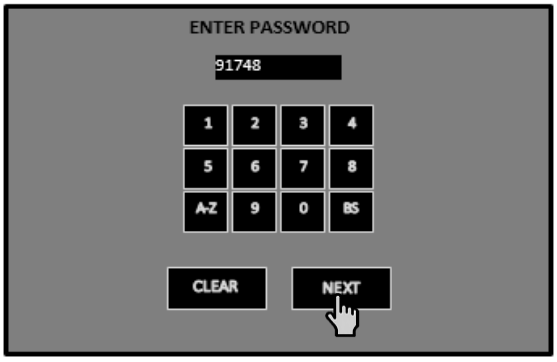


Figure 11 - Calibration Menu Screen

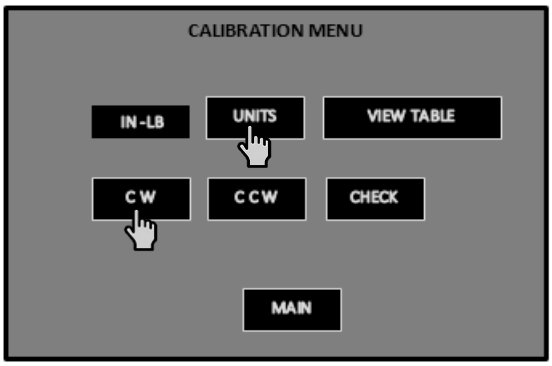
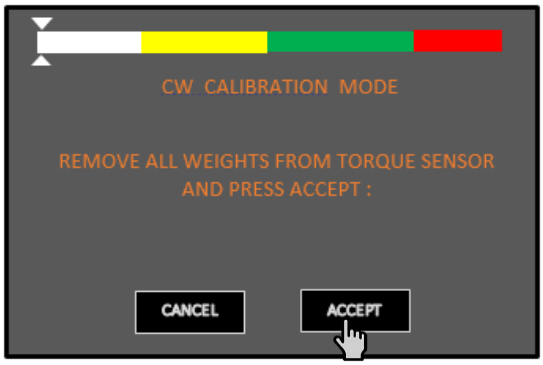


Figure 12 - CW Calibration Mode Menu



1) Press **OPTIONS** button as shown in Figure 8.
2) Press **SENSOR CAL** button as shown in Figure 9
3) Enter password “91748” using key-pad, and press **NEXT** button as pictured in Figure 10.
4) Press UNITS button to select correct units of measure as shown in Figure 11.
5) Press **CW** button as pictured in Figure 11.
6) Place correct calibration arm (5 inch) on DTT transducer. See Figures 1 & 2 on page 6.
7) Load the transducer CW 3x to maximum range using class F weights. (See Cal Tables on pages 19 through 22).
8) Remove 10 lbs. of weight, and let DTT stabilize for a minimum of 30 seconds, press **ACCEPT** button as shown in Figure 12.

CW & CCW Three Point Calibration 5-50 in-lbs (cont.)

Figure 13 - CW Calibration Mode Screen

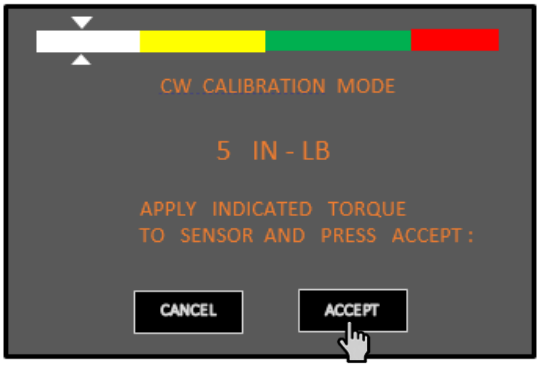


Figure 14 - CW Calibration Mode Screen

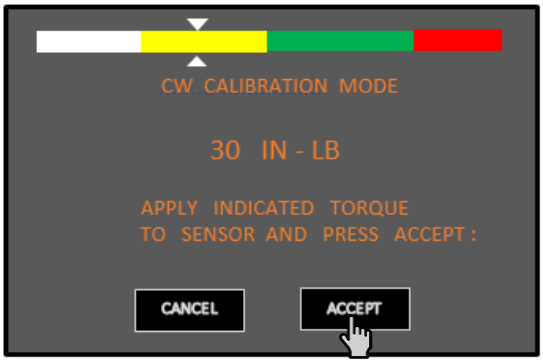


Figure 15 - CW Calibration Mode Screen

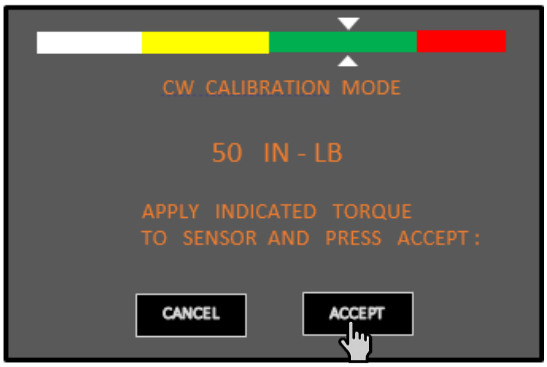


Figure 16 - CW Calibration Mode Screen

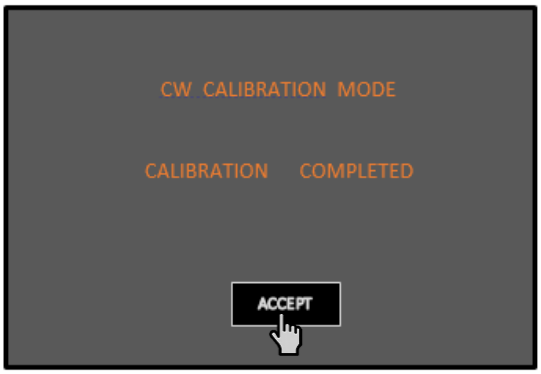
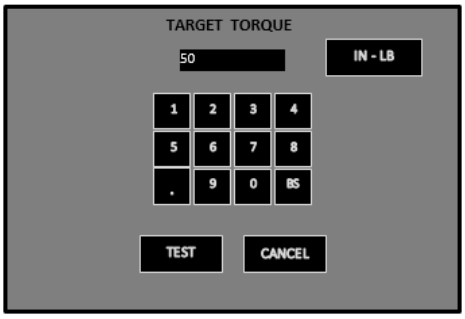


Figure 17 - Cal-Check Screen



9) Carefully place 1 lb. of mass on to Calibration Wheel (1 lb. of mass in conjunction with a 5.0" Cal wheel = 5 in-lbs of Torque). Let mass steady for a minimum of 30 seconds press the **ACCEPT** button as shown in Figure 13.
10) Carefully place 6 lbs. of mass on to Calibration Wheel (6 lbs. of mass in conjunction with a 5.0" Cal wheel = 30 in-lbs of Torque). Let mass steady for a minimum of 30 seconds press **ACCEPT** button, as shown in as shown in Figure 14.
11) Carefully place 10 lbs. of mass on Calibration Wheel (10 lbs. of mass in conjunction with a 5.0" Cal wheel = 50 in-lbs of Torque). Let mass steady for a minimum of 30 seconds press the **ACCEPT** button, as shown in as shown in Figure 15.
12) With 10 lbs of mass still hanging from 5.0 Cal wheel, press **ACCEPT** button as shown in as shown in Figure 16 and CAL-CHECK screen will appear.
13) Now remove 10 lbs of mass from 5.0 Cal wheel and transducer can be verified.
14) Repeat Steps 5 thru 14 for **CCW** direction calibration, by pressing **CCW** button in Figure 11 on page 10.

CW Calibration Check 5 - 50 in-lbs DTT

Figure 18 - Cal-Check Screen

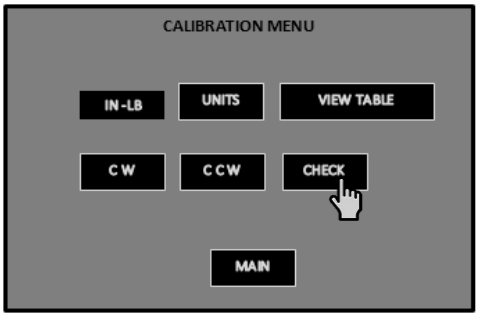


Figure 19 - Target Torque Screen

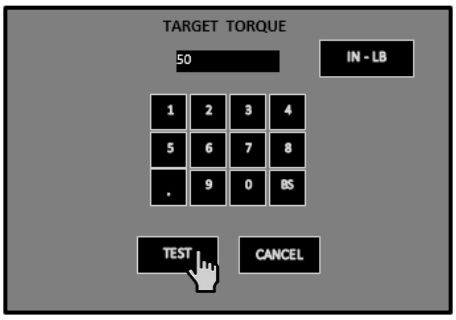


Figure 20 - Cal-Check Measurement Screen

Figure 21 - Cal-Check Measurement Screen

Figure 22 - Cal-Check Measurement Screen

Figure 23 - Cal-Check Measurement Screen

Figure 24 - Cal-Check Measurement Screen

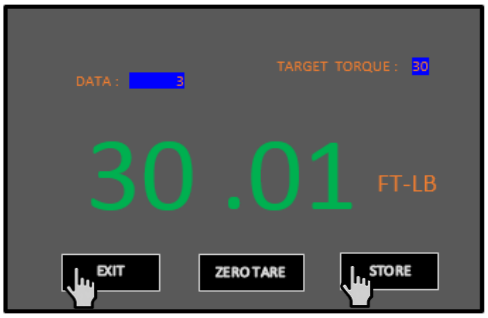


Figure 25 - Cal-Check Measurement Screen

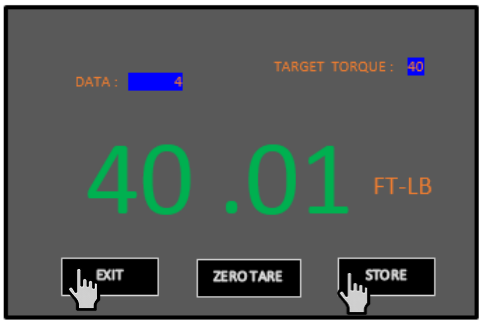


Figure 26 - Cal-Check Measurement Screen

Note: After finishing CW and or CCW calibration, the DTT will default to Cal-Check Target screen for a calibration check as pictured in *Error! Reference source not found.****18, thus step 1 below can be skipped.***

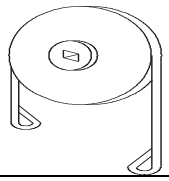
1) Maneuver back to Calibration Menu screen and press **CHECK** button, as shown in Figure 18.
2) Enter the torque maximum capacity, in this case 50 in-lbs, and press **TEST** button, as pictured in Figure 19.
3) Place 10 lbs of mass on to 5" Cal-Wheel cable s-hook in the CW direction, and exercise 3x in CW direction of test as pictured in Figure 20.
4) Remove 10 lbs. of mass from 5" Cal-Wheel cable loop. Wait a minimum of 30 seconds and press **ZERO TARE** button as pictured in Figure 21, then press the **EXIT** button to enter Cal-Check Target screen.
5) Place 1 lb. of mass on to 5" Cal-Wheel cable s-hook in the CW direction. Wait a minimum of 30 seconds and press STORE button to increment data count as shown in Figure 22. Repeats step 5 for Figures 22 thru 26. For CCW Cal Check repeat steps 3 thru 5

- ***Calibration Checks can only be performed in the TRACK mode.***
- ***User has option of selecting unit measurement in Check-Target Screen by pressing UNIT button.***
- ***User can choose any numerical torque value to verify, as long as the tested value is within the working range of the DTT Tester. Fractional inputs are also accepted.***

Three Point Calibration Tables

Three Calibration Points
100 in-oz DTT

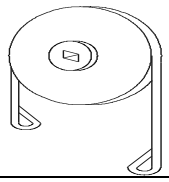
2.5" Calibration Wheel



Mass / Weight	Calibration Point %	Torque Reading (in-oz)
.25 lbs	10%	10
1.5 lbs	60%	60
3 lbs	100%	100

Three Calibration Points
800 in-oz DTT

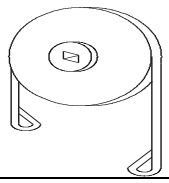
5" Calibration Wheel



Mass / Weight	Calibration Point %	Torque Reading (in-oz)
1 lbs	10%	80
6 lbs	60%	480
10 lbs	100%	800

Three Calibration Points
50 in-lbs DTT

5" Calibration Wheel

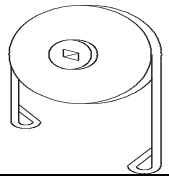


Mass / Weight	Calibration Point %	Torque Reading (in-lbs)
1 lbs	10%	5
6 lbs	60%	30
10 lbs	100%	50

Three Point Calibration Tables

Three Calibration Points
100 in-lbs DTT

5” Calibration Wheel



Mass / Weight	Calibration Point %	Torque Reading (in-lbs)
2 lbs	10%	10
12 lbs	60%	60
20 lbs	100%	100

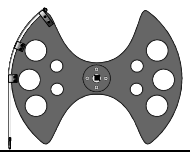
Three Calibration Points
250 in-lbs DTT

10” Calibration Wheel

Mass / Weight	Calibration Point %	Torque Reading (in-lbs)
2.5 lbs	10%	25
15 lbs	60%	150
25 lbs	100%	250

Three Calibration Points
400 in-lbs DTT

10” Calibration Wheel



Mass / Weight	Calibration Point %	Torque Reading (in-lbs)
4 lbs	10%	40
24 lbs	60%	240
40 lbs	100%	400

Three Point Calibration Tables

Three Calibration Points
1000 in-lbs DTT

10” Calibration Wheel

Mass / Weight	Calibration Point %	Torque Reading (in-lbs)
10 lbs	10%	100
60 lbs	60%	600
100 lbs	100%	1000

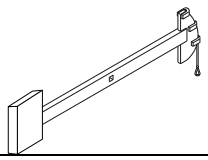
Three Calibration Points
250 ft-lbs DTT

10” Calibration Wheel

Mass / Weight	Calibration Point %	Torque Reading (ft-lbs)
30 lbs	10%	25
180 lbs	60%	150
300 lbs	100%	250

Three Calibration Points
600 ft-lbs DTT

40” Calibration Arm



Mass / Weight	Calibration Point %	Torque Reading (ft-lbs)
18 lbs	10%	60
108 lbs	60%	360
180 lbs	100%	600