



Specialty Tools

DTT Calibration Manual



DTTCALM
REV:1

DTT Digital Torque Tester

Table of Contents

Important Safety Instructions.....3-4

DTT Calibration Equipment Needed.....5

Calibrating Wheel and Arm Set-up.....6

DTT Mounting Bracket and Fixtures.....7-8

CW Three Point Calibration Procedure.....9-10

CCW Three Point Calibration Procedure.....11-12

CW Calibration Check.....13-14

CCW Calibration Check.....15-16

Three Point Calibration Check Point Tables.....17-20

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
1/4" x 1/4" male to male	2344-0051-01
3/8" x 3/8" male to male	2344-0051-02
1/2" x 1/2" male to male	2344-0051-03
3/4" x 3/4" male to male	2344-0051-04
3/8" x 1/4" male to male	2344-0051-05
3/8" x 1/2" male to male	2344-0051-06
1/2" x 1/2" male to male	2344-0051-07
3/4" x 3/4" male to male	2344-0051-05

- 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)

Calibration Wheel and Arm Set-up



Fig. 1



Fig. 2



Fig. 3

Fig. 1

Always use the supplied S-hook when using the 2.5" or 5.0" Cal Radius Wheels. The weight of the S-hook induces a weight bias in the direction of test or calibration, which creates a steady zero point.

Fig. 2

Always use a slotted 2 lbs weight when using the 20.0" Cal Arm. The weight of the 2 lbs weight induces a weight bias in the direction of test or calibration, which creates a steady zero point.

Fig. 3

Always use a slotted 8 oz. weight when using the 10.0" Cal Radius Wheel. The weight of the 8 oz. weight induces a weight bias in the direction of test or calibration, which creates a steady zero point.

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 Mounting Bracket



Fig. 4



Fig. 5

Place the DTT on the Calibration Bracket Assembly and torque the four hex screws to 24 ft-lbs, as pictured in Fig. 4 & 5.

Note: The DTT Calibration bracket should be mounted securely to the Snap-on / CDI Calibration Stand Kit, or a very sturdy stable that is well anchored to the floor.



Fig. 6



Fig. 7

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

- 1) Place the male to male square drive fixture into the socket as pictured in Fig. 6, then power up the DTT
- 2) Place the correct Calibration Wheel or arm on to the male to male square-drive fixture. Be sure to place the S-hook on the cable loop.

Note: If the Calibration Wheel has attachment hex screws, snug them to the male to male square-drive.



Fig. 8



Fig. 9

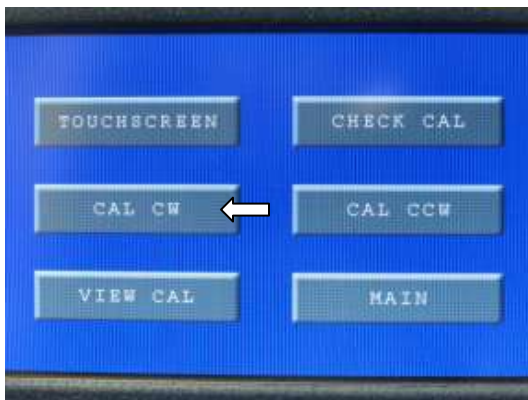


Fig. 10

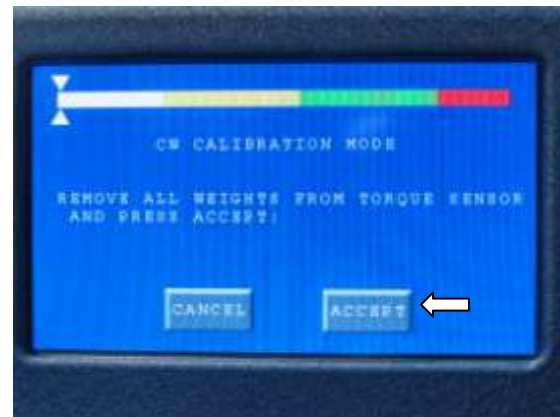


Fig. 11

CW Three Point Calibration Procedure

- 1) Press the **CALIBRATE DTT** button as pictured in Fig. 8.
- 2) Enter the password **91748** using the key-pad, then press the **NEXT** button as pictured in fig. 9
- 3) Select **CAL CW** button as pictured in Fig. 10
- 4) Load the transducer to maximum range. In the case of the 5 – 50 in-lbs DTT, the total mass in conjunction with a 5.0" Radius Cal wheel is 10 lbs of mass. (See Cal Tables on pages 17 through 20)
- 5) Let the 10 lbs of mass load for approximately ten seconds. Remove all the mass, and let the DTT steady for 30 seconds, then press the **ACCEPT** button.

Note: You can start in either the CW or CCW direction. Since the 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 one direction may be out of tolerance, thus only the need to calibrate on side of the DTT.

Calibration default units of measurement are preset in the firmware and cannot be changed. See Cal Tables on pages 17 through 20 for calibration default units of measurement.

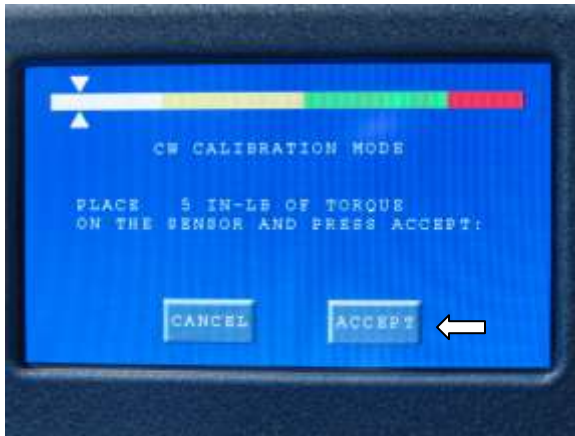


Fig. 12

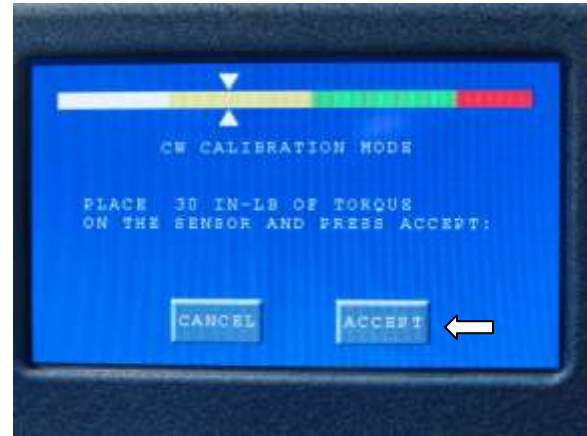


Fig. 13

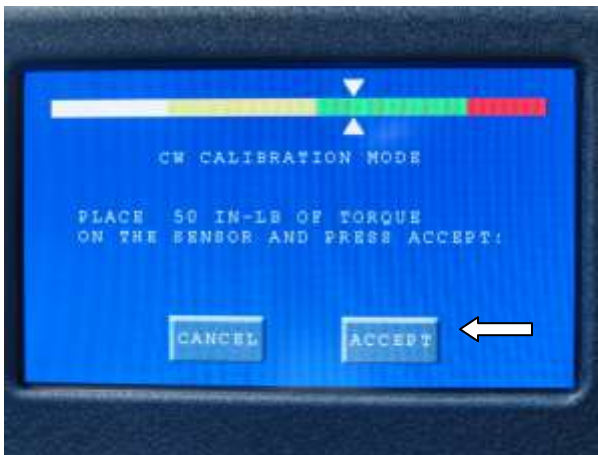


Fig. 14

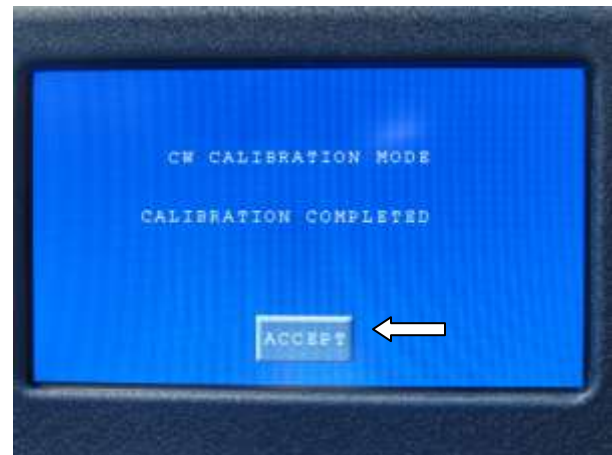


Fig. 15

CW Three Point Calibration Procedure

- 1) Carefully place 1 lb. of mass on to the Calibration Wheel. (1 lb. of mass in conjunction with a 5.0" Cal wheel = 5 in-lbs of Force). Let the mass steady for a minimum of 10 seconds then press the **ACCEPT** button, as pictured in Fig. 12
- 2) Carefully place 6 lbs. of mass on to the Calibration Wheel. (6 lbs. of mass in conjunction with a 5.0" Cal wheel = 30 in-lbs of Force). Let the mass steady for a minimum of 10 seconds then press the **ACCEPT** button, as pictured in Fig. 13
- 3) Carefully place 10 lbs. of mass on to the Calibration Wheel. (10 lbs. of mass in conjunction with a 5.0" Cal wheel = 50 in-lbs of Force). Let the mass steady for a minimum of 10 seconds then press the **ACCEPT** button, as pictured in Fig. 14
- 4) With the 10 lbs of mass still hanging from the 5.0 Cal wheel, press the **ACCEPT** button as pictured in Fig. 15
- 5) Now the 10 lbs of mass can be removed from the 5.0 Cal wheel.



Fig. 16



Fig. 17



Fig. 18

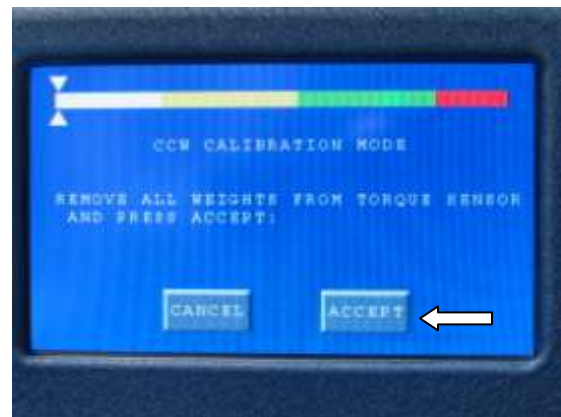


Fig. 19

CCW Three Point Calibration Procedure

- 1) Press the **CALIBRATE DTT** button as pictured in Fig. 16.
- 2) Enter the password **91748** using the key-pad, then press the **NEXT** button as pictured in fig. 17
- 3) Select **CAL CCW** button as pictured in Fig. 18
- 4) Load the transducer to maximum range. In the case of the 5 – 50 in-lbs DTT, the total mass in conjunction with a 5.0" Radius Cal wheel is 10 lbs of mass. (See Cal Tables on pages 17 through 20)
- 5) Let the 10 lbs of mass load for approximately ten seconds. Remove all the mass, and let the DTT steady for 30 seconds, then press the **ACCEPT** button.

Note: After finishing Calibrations in the CW direction, the DTT will default back to the Cal Screen as pictured in Fig. 18. Thus not having to re-enter the Calibration Password.



Fig. 20



Fig. 21

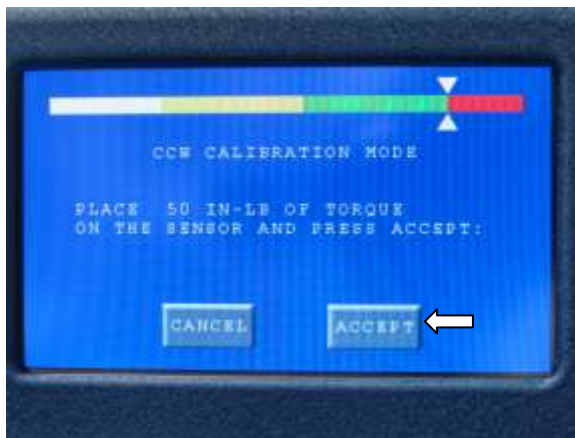


Fig. 22



Fig. 23

CCW Three Point Calibration Procedure

- 1) Carefully place 1 lb. of mass on to the Calibration Wheel. (1 lb. of mass in conjunction with a 5.0" Cal wheel = 5 in-lbs of Force). Let the mass steady for a minimum of 10 seconds then press the **ACCEPT** button, as pictured in Fig. 20
- 2) Carefully place 6 lbs. of mass on to the Calibration Wheel. (6 lbs. of mass in conjunction with a 5.0" Cal wheel = 30 in-lbs of Force). Let the mass steady for a minimum of 10 seconds then press the **ACCEPT** button, as pictured in Fig. 21
- 3) Carefully place 10 lbs. of mass on to the Calibration Wheel. (10 lbs. of mass in conjunction with a 5.0" Cal wheel = 50 in-lbs of Force). Let the mass steady for a minimum of 10 seconds then press the **ACCEPT** button, as pictured in Fig. 22
- 4) With the 10 lbs of mass still hanging from the 5.0 Cal wheel, press the **ACCEPT** button as pictured in Fig. 23
- 5) Now the 10 lbs of mass can be removed from the 5.0 Cal wheel.

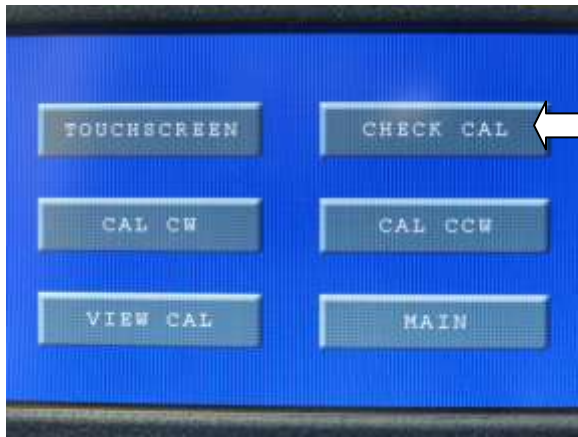


Fig. 24

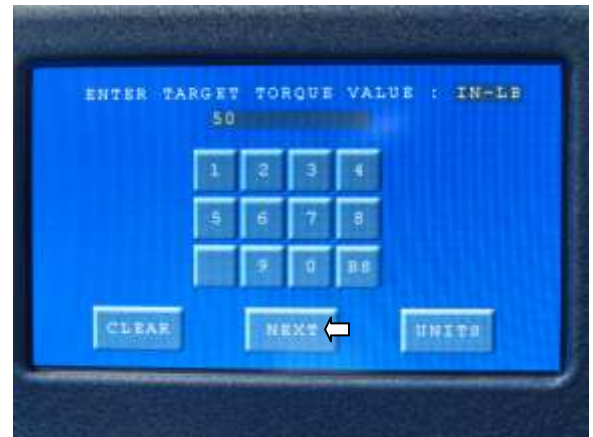


Fig. 25



Fig. 26



Fig. 27

CW Calibration Check

- 1) Maneuver back to the calibration screen and press the **CHECK CAL** button, as pictured in Fig.24.
 - 2) Enter the torque maximum capacity, which in this case is 50 in-lbs, and press the **NEXT** button, as pictured in Fig.25
 - 3) Place 10 lbs of mass on to the Cal wheel cable hook biased in the CW direction, and let the mass hang for a minimum of ten seconds, as pictured in Fig. 26
 - 4) Remove the 10 lbs. of mass while leaving the S-hook attached to the cable. Wait a minimum of 10 seconds and press the **ZERO TARE** button, then press the **EXIT** button to enter the “ENTER TARGET TORQUE” screen as pictured in Fig.27
- *Calibration Checks can only be performed in the TRACK mode*
 - *User has the option of using any units of measurement while in the Calibration Check Mode*
 - *User can choose any numerical torque value to verify, as long as the tested value is within the working range of the DTT Tester.*



Fig. 28



Fig. 29



Fig. 30



Fig. 31



Fig. 32



Fig. 33

CW Calibration Check

- 1) In the “**ENTER TARGET TORQUE**” screen, enter the target value that is to be tested using the numerical keypad. In this case 5 in-lbs has been entered, and press the **NEXT** button, as pictured in Fig. 28.
- 2) Hang the appropriate mass from the Cal Wheel that corresponds with the target torque value that is to be tested. In this case 1 lb. of mass in conjunction with a 5.0” Cal Wheel = 5 in-lbs of torque as seen in Fig 29
- 3) The operator has the choice to note the torque value, or storing the torque value by pressing the **STORE** button. Once this is completed, press the **EXIT** button to return to the “**ENTER TARGET TORQUE**” screen.
- 4) Repeat steps 1 through 3 to verify selected torque test values.

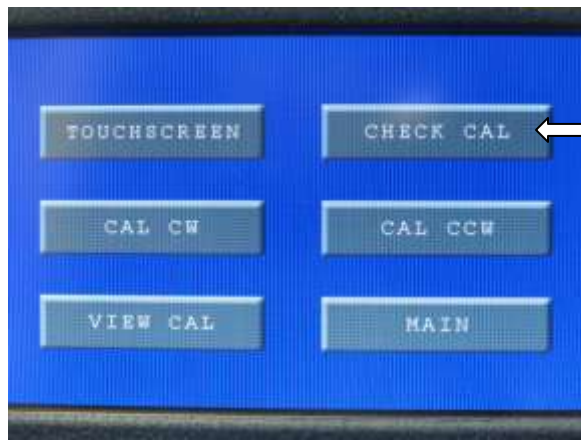


Fig. 34



Fig. 35



Fig. 36



Fig. 37

CCW Calibration Check

- 1) Maneuver back to the calibration screen and press the **CHECK CAL** button, as pictured in Fig.34.
- 2) Enter the torque maximum capacity, which in this case is 50 in-lbs, and press the **NEXT** button, as pictured in Fig.35
- 3) Place 10 lbs of mass on to the Cal wheel cable hook biased in the CCW direction, and let the mass hang for a minimum of ten seconds, as pictured in Fig. 26
- 4) Remove the 10 lbs. of mass while leaving the S-hook attached to the cable. Wait a minimum of 10 seconds and press the **ZERO TARE** button, then press the **EXIT** button to enter the “ENTER TARGET TORQUE” screen as pictured in Fig.27



Fig. 38



Fig. 39



Fig. 40



Fig. 41



Fig. 42

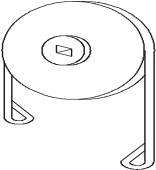


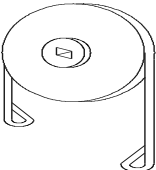
Fig. 43

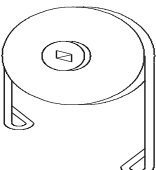
CCW Calibration Check

- 1) In the “**ENTER TARGET TORQUE**” screen, enter the target value that is to be tested using the numerical keypad. In this case 5 in-lbs has been entered, and press the **NEXT** button, as pictured in Fig. 38.
- 2) Hang the appropriate mass from the Cal Wheel that corresponds with the target torque value that is to be tested. In this case 1 lb. of mass in conjunction with a 5.0” Cal Wheel = 5 in-lbs of torque as seen in Fig 39
- 3) The operator has the choice to note the torque value, or storing the torque value by pressing the **STORE** button. Once this is completed, press the **EXIT** button to return to the “**ENTER TARGET TORQUE**” screen.
- 4) Repeat steps 1 through 3 to verify selected torque test values.

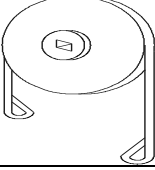
Three Point Calibration Tables

Three Calibration Points 100 in-oz DTT		
2.5" Calibration Wheel 	Mass / Weight	Calibration Point %
	Torque Reading (in-oz)	
	.25 lbs	10%
	1.5 lbs	60%
	3 lbs	100%

Three Calibration Points 200 in-oz DTT		
2.5" Calibration Wheel 	Mass / Weight	Calibration Point %
	Torque Reading (in-oz)	
	.5 lbs	10%
	3 lbs	60%
	5 lbs	100%

Three Calibration Points 400 in-oz DTT		
2.5" Calibration Wheel 	Mass / Weight	Calibration Point %
	Torque Reading (in-oz)	
	1 lbs	10%
	6 lbs	60%
	10 lbs	100%

Three Point Calibration Tables

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

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

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

Three Point Calibration Tables

Three Calibration Points 1000 in-lbs DTT														
10" Calibration Wheel 	<table> <tr> <th>Mass / Weight</th><th>Calibration Point %</th><th>Torque Reading (in-lbs)</th></tr> <tr> <td>10 lbs</td><td>10%</td><td>100</td></tr> <tr> <td>60 lbs</td><td>60%</td><td>600</td></tr> <tr> <td>100 lbs</td><td>100%</td><td>1000</td></tr> </table>	Mass / Weight	Calibration Point %	Torque Reading (in-lbs)	10 lbs	10%	100	60 lbs	60%	600	100 lbs	100%	1000	
Mass / Weight	Calibration Point %	Torque Reading (in-lbs)												
10 lbs	10%	100												
60 lbs	60%	600												
100 lbs	100%	1000												

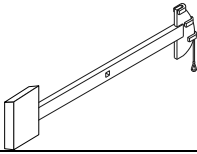
Three Calibration Points 125 ft-lbs DTT														
10" Calibration Wheel 	<table> <tr> <th>Mass / Weight</th><th>Calibration Point %</th><th>Torque Reading (ft-lbs)</th></tr> <tr> <td>15 lbs</td><td>10%</td><td>12.5</td></tr> <tr> <td>90 lbs</td><td>60%</td><td>75</td></tr> <tr> <td>150 lbs</td><td>100%</td><td>125</td></tr> </table>	Mass / Weight	Calibration Point %	Torque Reading (ft-lbs)	15 lbs	10%	12.5	90 lbs	60%	75	150 lbs	100%	125	
Mass / Weight	Calibration Point %	Torque Reading (ft-lbs)												
15 lbs	10%	12.5												
90 lbs	60%	75												
150 lbs	100%	125												

Three Calibration Points 250 ft-lbs DTT														
10" Calibration Wheel 	<table> <tr> <th>Mass / Weight</th><th>Calibration Point %</th><th>Torque Reading (ft-lbs)</th></tr> <tr> <td>30 lbs</td><td>10%</td><td>25</td></tr> <tr> <td>180 lbs</td><td>60%</td><td>150</td></tr> <tr> <td>300 lbs</td><td>100%</td><td>250</td></tr> </table>	Mass / Weight	Calibration Point %	Torque Reading (ft-lbs)	30 lbs	10%	25	180 lbs	60%	150	300 lbs	100%	250	
Mass / Weight	Calibration Point %	Torque Reading (ft-lbs)												
30 lbs	10%	25												
180 lbs	60%	150												
300 lbs	100%	250												

Three Point Calibration Tables

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