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**GTV – 600  
GALISO TORQUE VERIFIER  
14-51-0600  
INSTRUCTION MANUAL**

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**Manual part number 21-11-0600- ISSUED 10/28/09**

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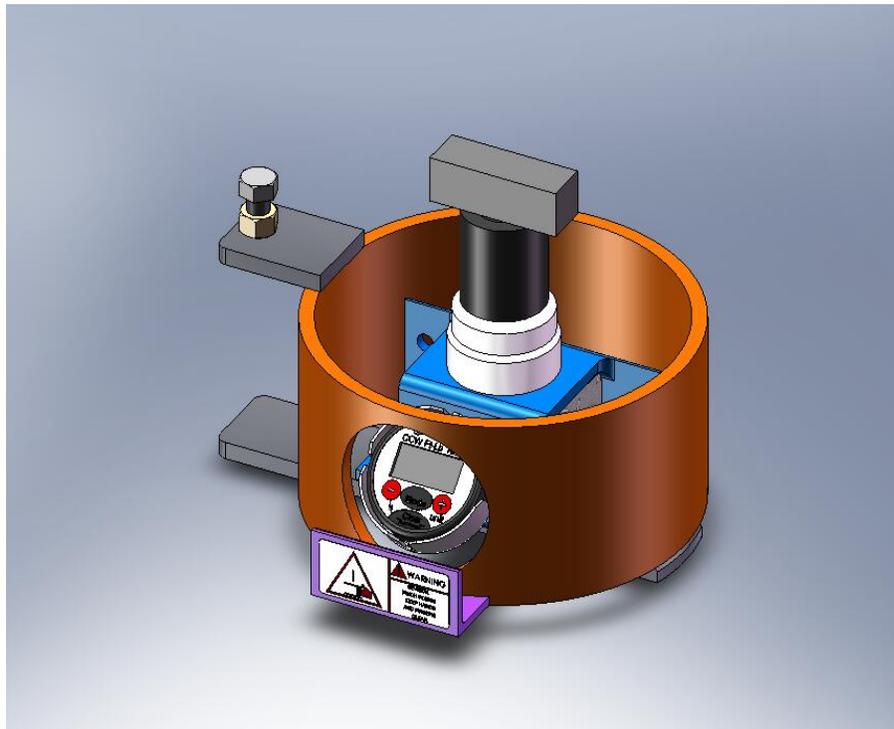
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# Operation Manual

## Galiso® Incorporated

### GTV – 600 Torque Tester/Verifier



# Galiso® Incorporated

## GTV-600

### Torque Tester/Verifier

#### Product Description:

The GTV-600 is used as a daily verification device to confirm the insertion torque value on a valving machine. The GTV-600 is designed to fit into the clamp and jaw tong mechanism of the GVM and CIV valving machines. The GTV-600 mimics a cylinder with a valve; this is to provide true and repeatable verification of the valving machine's torque output.

The GTV-600 is also used to confirm, on a daily basis, the accuracy of the GTR-600 Real Time Insertion Torque Reader system and to calibrate the GTR-600 if it needs adjustment.

#### Features:

Readings in Ft-lbs or N-m  
Range: 60-600 Ft-lbs or 81-813 N-m  
Accuracy  $\pm 1\%$  of indicated value  
Digital LCD Readout  
RS-232 connection to send data to a computer or printer

#### Daily Operating Procedure:

- Make sure the inlet air pressure and volume is sufficient to remain above the needs of your valving machine.
- Make sure you have your companies log sheet ready to record your data.
- Make sure the GTV-600 has its battery charged. If the battery is not charged it can be operated using the power supply supplied with the unit plugged into a 110V A/C outlet.
- Set the valving machine's clamp force air pressure to 100psi.
- Insert the GTV-600 onto the rear clamp arm of the valving machine and hand tighten the bolt.
- Adjust the rear clamp arm so the GTV-600 is centered (after the device is clamped) on the jaw tong.

**Note:** It is recommended to mark the rear clamp arm to make centering quicker for future installations.

- ❑ Once the GTV-600 is centered, tighten the bolt using a ¾” wrench.
- ❑ Turn on the GTV-600 and press the Mode button until the desired torque measurement unit is displayed.
- ❑ Place the jaw tongs over the drive “T” of the GTV-600, just as you would a cylinder valve.

**First time use:**

- ❑ Set the torque air pressure on the valving machine to 20 psi. Zero the GTV-600 by pressing the Clear button. Operate the clamp valve lever on the valving machine in the insertion direction on the GTV-600 and watch the display. When the valving machine stalls, release the clamp valve lever and record the highest reading onto your log sheet. Repeat this process 3 times for 20 psi, 30psi, 40psi, 50psi, and 60psi. This will give you the baseline torque readings for your particular valving machine.

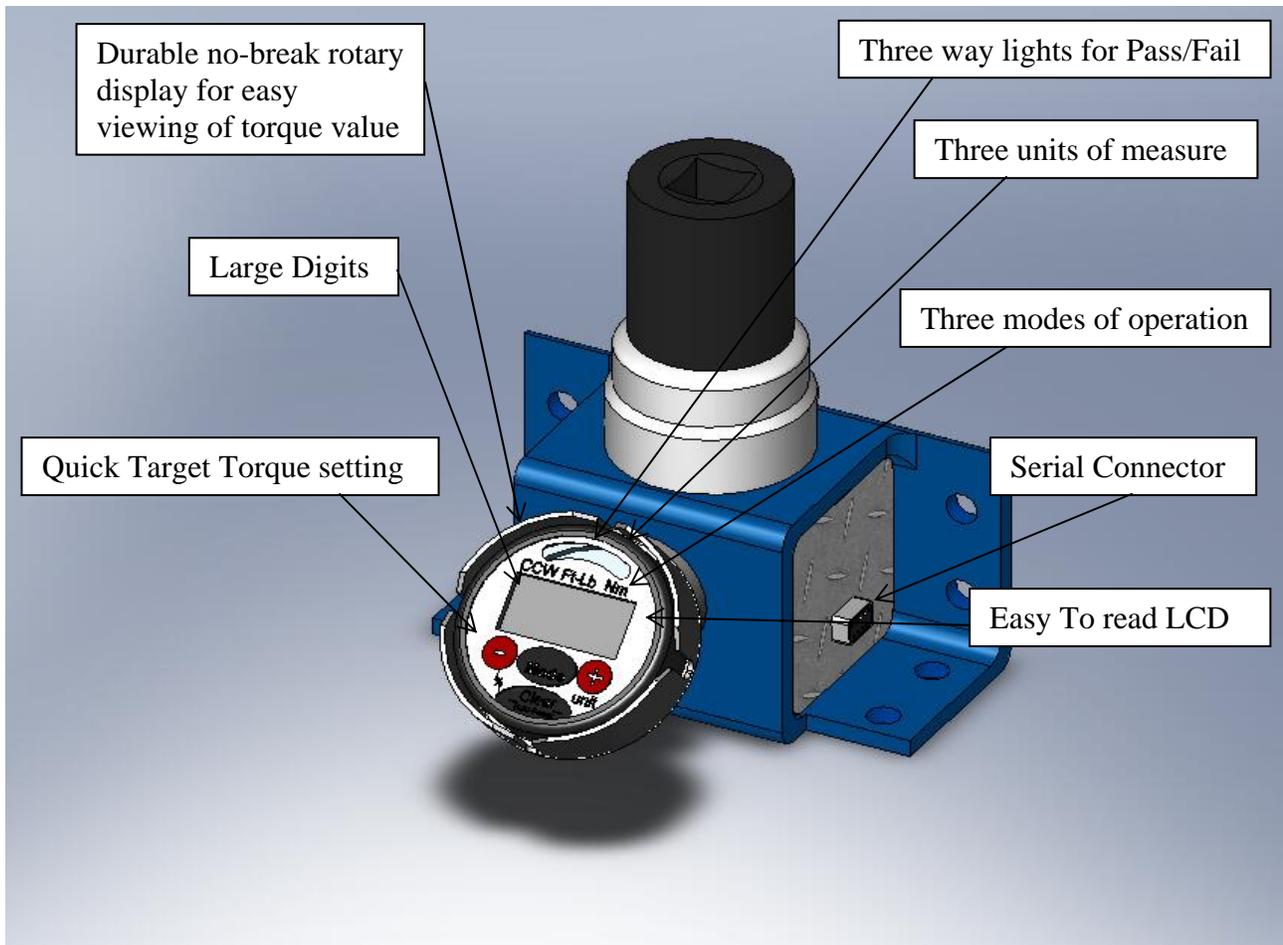
**Daily use:**

- ❑ Using the data you just acquired, adjust the torque air pressure to the estimated value to set your machine to the required torque for the valves you will be installing. Zero the GTV-600 and operate the valving machine and watch the GTV-600 display. Make adjustments to the torque air pressure and follow the above procedure until the desired Insertion torque value is reached. Record the air pressure corresponding to the desired Insertion torque value. Repeat this procedure for any and all Insertion torque values needed for the day.
- ❑ Remove the GTV-600 from the valving machine and you are ready to process cylinders.
- ❑ Please follow your company’s guides for valving and de-valving cylinders.

**Note:** For a visual instruction of the GTV-600 operation please go to our website, [www.galiso.com](http://www.galiso.com), and from the home page select Products, then Test System Support Equipment, then GTV-600, then click on the demo video.

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**IMPORTANT READ THIS BEFORE USING THE TESTER!**

The number one cause of torque tester damage is due to over-torque conditions. Over-torque occurs when the torque tester is used above its usable range (more than 150%) and the transducer element becomes damaged. This is particularly easy to do with low range torque testers. Over-torque is considered misuse and is not covered by warranty. Signs of a tester that has been overtorqued are erratic peak reading or the tester will not zero properly.

**Please be careful not to over-torque the tester.**

## Battery and Power

The tester has an internal 9 volt Ni-MH battery. Battery life depends on battery quality and the amount the lights and buzzer are used. Always have a **rechargeable** battery installed in the tester when the 110 volt transformer is attached. Installing a non-rechargeable battery when the 110 volt power supply is attached may result in damage to the tester and the battery and will void the warranty.

When the battery power is low a “BATT” icon will light up on the LCD. When batteries are critically low, the tester will:

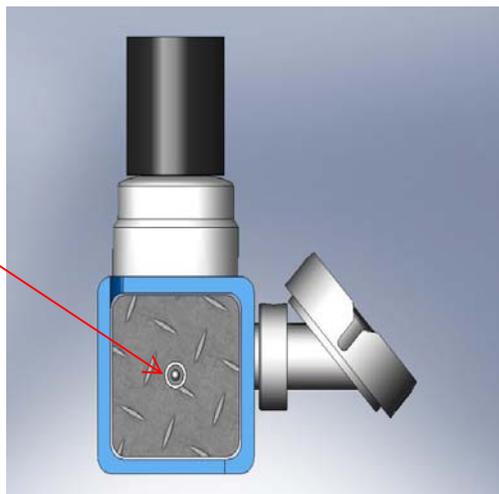
- a) not turn on or
- b) will turn on and then immediately turn off

**Note:** rechargeable batteries loose charge.

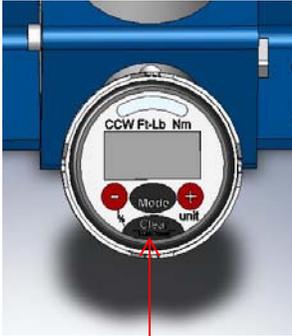
## Quick Start — General Operation

1. Once the torque tester is mounted properly and the power supply is attached, press the Clear/Power key for about 2 seconds.
2. When the tester turns on it will flash the full scale range of the tester and will flash all LCD segments including the lights and the buzzer. **Do not apply torque when the tester power is turned on as it takes a zero reading at this time (make sure a wrench is not attached and/or hanging on the drive when turned on).**
3. If you are testing click type wrenches press the Mode key until the display shows “FP0.0”. FP stands for “First Peak”. First Peak mode isolates the click point of the wrench (first peak of torque) from the actual applied torque. This allows you to determine where the wrench clicked (see the section on how to test click wrenches in this manual).
4. When you are finished testing the tool, manually turn the tester off by pressing and holding the Clear/Power button for 2 seconds (the tester will also automatically turn off after 3 minutes without use).

9 Volt Ni-MH and 110 Volt  
power



## 1. Turn Power On



Press and hold the Clear/Power key to power up the tester.

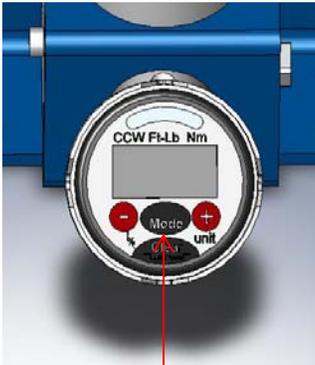
**Note:** If you do not use the tester for 3 minutes, it will automatically shut off.

Do not apply torque to the drive when you power up.

If the tester comes on and then shuts off the batteries are probably low. If the tester turns off during use the batteries are critically low.

All previous settings (units, target value, target %) are stored even when the power is off and the batteries are out of the tester.

## 2. Set the MODE



Press the Mode key to select the proper mode of operation.

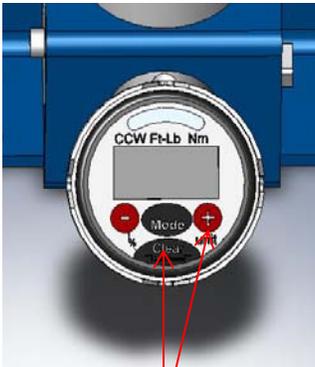
Set the mode for the tool to be tested. There are three modes of operation:

1. **Track mode:** Display tracks torque as it is applied (Ph icon off).

2. **Peak hold mode:** Holds highest torque on the display (peak torque). You are in this mode when Ph icon is shown on the display.

3. **First Peak Mode:** Use this mode to isolate the click point of a torque wrench (for verification of click wrench accuracy). FP0.0 is shown when in First Peak mode.

## 3. Set the UNITS



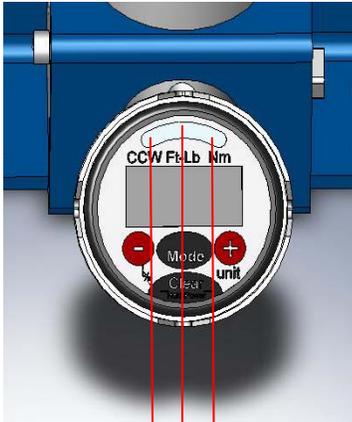
First press and HOLD the Clear button. Then press the Target + button.

To change the torque units you need to press TWO buttons (for safety): With the tester power on, press and HOLD the Clear/Power button then press the Target + button. Each time you press the Target + button you will change the current units (as shown by the units icon).

**The units selected will become the default units when the tester is turned off and on again.**

## 4. Set the Target Value

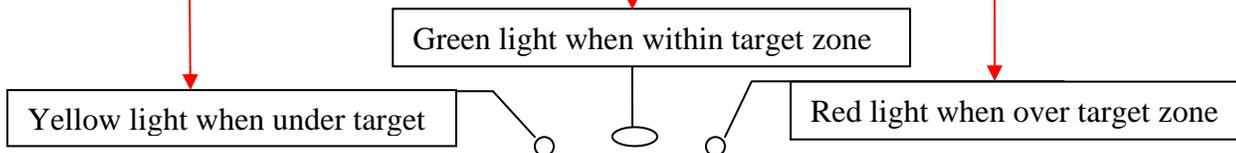
By using the target function on the tester you can be prompted if the tool you are testing is operating within its stated accuracy range. This is shown by a green “go” light on the display. In order for the tester to prompt if the tool is in or out of tolerance you need to set the target value to the same point the tool is set to. The pass/fail tolerance or the GO “zone” can also be adjusted from  $\pm 1\%$  to  $\pm 10\%$ . The default value for the target zone is  $\pm 4\%$ .



Set the target torque to the current setting on the tool to be tested (if you want the tester to give you a Pass/Fail status).

Press either target key once to see the current target value without making any changes to the value itself. The target will show for 3 seconds.

Press and **hold** the target button to make changes. The longer you press and hold the target key the faster the display will change.



### 100 ft-lb Example:

1. Set the tool to be tested to 100 ft-lb.
2. Set the target value on the tester to 100 ft-lb.
3. Test the wrench. If the wrench clicks less than 96 ft-lb (4% of 100) you will get a yellow light. If the wrench clicks between 96-104 ft-lb, you will get a green light. If the wrench clicks above 104 ft-lb, you will get a red light.

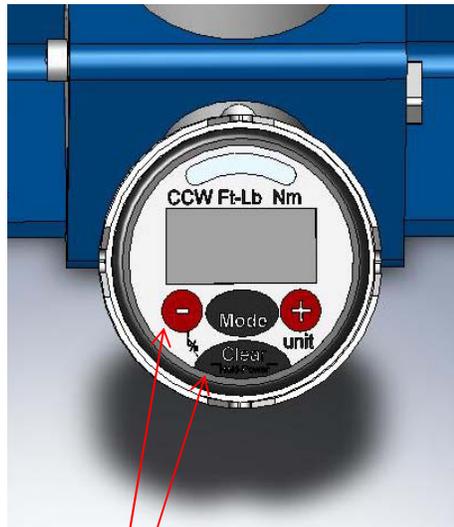
## 5. Change the Pass/Fail Zone %

The target zone is the range that you want to test the tool to (as a percent of the target torque). This basically is the size of the “bull’s eye”. For example, if you are testing click type torque wrenches and you want to test them to  $\pm 4\%$  of setting you should set the target zone to 4% with the below procedure. Set the target value (see section 4) to the same setting that the wrench is set to and then test the wrench. If the wrench passes (clicks within the target zone) it will give you a green light and a buzzer. If the wrench clicks below the target zone it is testing low and the yellow light will turn on. If the wrench clicks above the target zone you will see a red light and the buzzer will come on. Press the Clear key to clear the LED and buzzer.

### IMPORTANT!

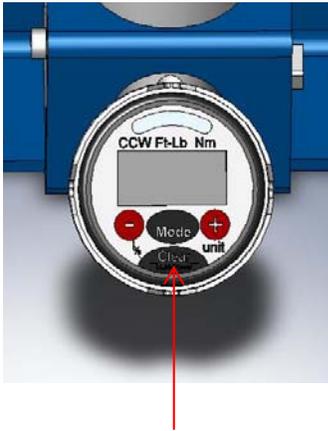
When testing in First Peak Mode (the mode used for testing click type wrenches) you must apply the torque smoothly and evenly. If you shake while applying the torque the tester may “think” that this shaking is where the wrench clicked and give a false reading. Always press on the click wrench as close as possible to the center of the grip. Do not induce a side load when pushing on the wrench. This may effect the accuracy of the tester and the accuracy of the wrench.

**To Change the Target Torque  
Pass/Fail “Zone”  
(4% default):**



First press and HOLD the Clear button  
Then press the Target - key to change the tolerance zone. Each time you press the Target - key while holding the Clear key you will change the % value. You can also select “off” if you do not want this feature turned on. Once this value is set it will remain the default value even after the system is turned off.

## 6. Clearing the display



You can clear the display by pressing the Clear key or you can use the automatic clear feature. To clear the display automatically simply lift the wrench up so there is no torque between torque cycles. As soon as you start to push on the wrench again the display will clear and start to display the applied torque.

Press the Clear key to manually clear the torque value from the display

OR

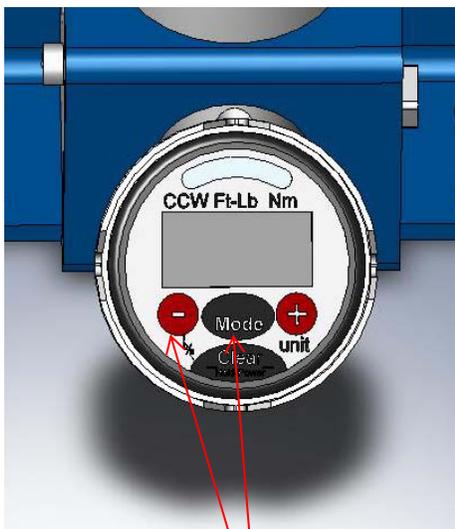


Unload the torque between cycles and the tester will automatically clear the display.

## 7. Zero the display when changing direction

All electronic torque testers have a characteristic that requires you to set the zero when going from one direction to the other (clockwise to counter-clockwise). This zero function results in more accurate readings when going from one direction to the other. To change direction you must first load the tester in the direction of test (full scale) and then turn the power off and then on again. The tester takes a new zero data point when it is turned on (zero tare). This procedure is required to compensate for hysteresis. Hysteresis is a characteristic of steel. The zero shift is usually small and cannot be seen on the display but it should be done as a matter of practice. If you do not test wrenches in counter-clockwise direction there is no need to complete this procedure.

## 8. Adjusting the LCD Contrast



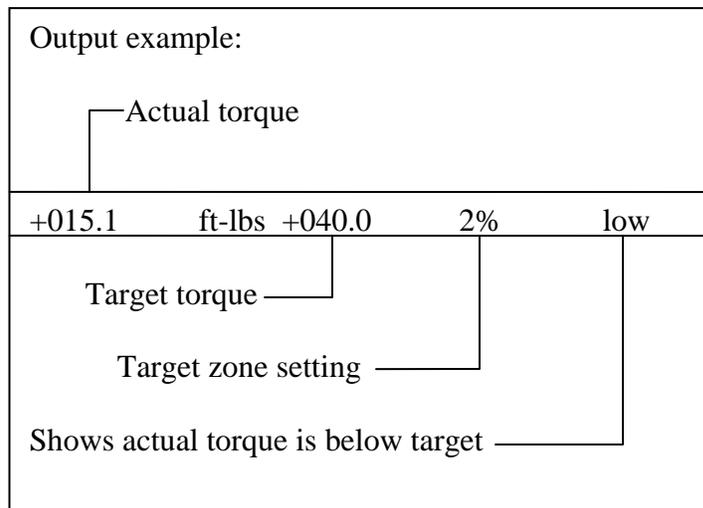
If the LCD display looks dim or hard to read you need to adjust the contrast. To adjust contrast press the Mode and Target - key at the same time. The contrast will change slowly. Continue to hold the keys until the contrast is correct.

Press the Mode and Target - key at the same time to adjust contrast

## 9. To Send Data To a Computer/Printer:

In order to take advantage of the RS232 serial output you will need a serial data cable with connectors that match your computer configuration. These cables are readily available from any computer, electronic or office supply store. The type of cable depends on your computer/printer layout. The tester has a 9 pin female DB9 connector on the side. If the computer you are sending data to has a male DB9 connector (most common for com port1), you will need a serial DB9 male/female cable. If your computer has a DB25 connector (most common for com port 2) you will need a DB9 male/DB25 female serial data cable. Refer to your computer specifications for the type of connector you have.

The data on the LCD (plus the other set variables) is sent to the computer/printer when you press the Clear key.



### NOTES:

Data is sent standard ASCII format

Protocol: 9600 Bps, 8, 1, n

Information sent: (comma separated values)

- Torque value
- Units
- Target torque setting
- Target Zone setting (%)
- Under/Pass/Over Target

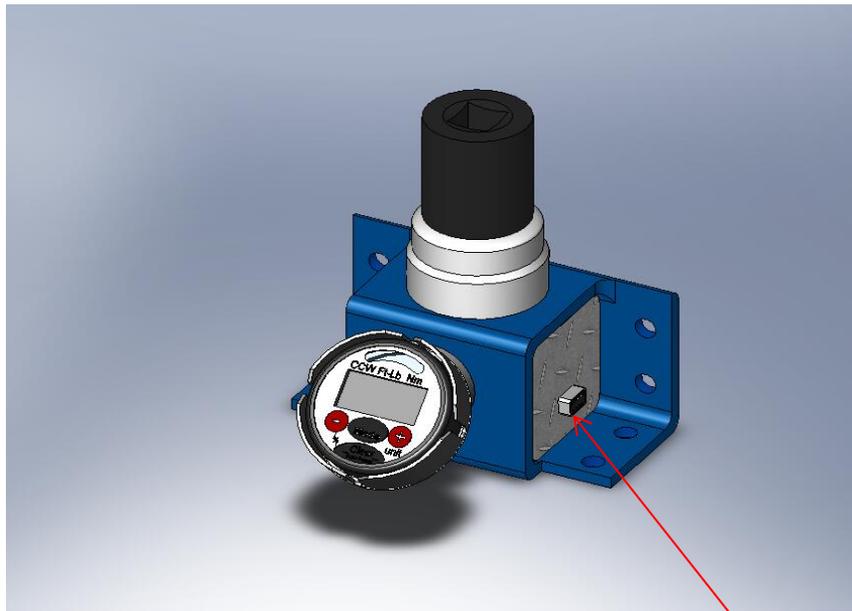
If you do not have data logging software you can use Windows "Hyperterminal" to view or save the data. To use Windows Hyperterminal see your computer Windows help file.

### **Sending data directly into a spreadsheet, database or word document:**

In order to send data directly into any Windows program such as a spreadsheet, word document or database you will need a third party “wedge” program. When the wedge program is running in the background and the tester is connected to the computer, the torque value will be placed in the Windows program just as if you typed it in (when you press the Clear button). There are several programs available. We recommend winwedge by TAL ([www.taltech.com](http://www.taltech.com)).

### **Sending torque data directly to a printer:**

In order to directly print the data output you will need a printer with a SERIAL input connector. Set the protocol on the printer to the protocol listed on the previous page. Every time you press the Clear key the data will be printed.



DB9 female serial connector

## 10. How to Test Click Type Torque Wrenches:

1. Turn the meter on and put it in first peak mode (shown by FP0.0 on the display).
2. Make sure the units on the meter match the units on the torque wrench.
3. Set the wrench to the desired test point (usually 20%, 40%, 60%, or 100% of full scale). For example, if you are testing a 250 ft-lb. wrench you would test at 50, 100, 150 and 250 ft-lbs.
4. Set the tester to the same test point as the wrench (using the target keys).
5. Attach the wrench to the tester making sure the wrench is parallel to the ground.
6. Push down on the wrench smoothly and evenly until it clicks.  
Apply torque as best as you can to the center of the wrench grip. Click wrench accuracy varies depending on where you place the force on the handle. Most click wrenches have a groove or mark on the center of the handle. This is where you should apply the force if possible.
7. After it clicks the tester will capture the click point (first peak of torque).
8. If you have the target zone set the tester will inform you if the wrench clicked within 4% of the target setting with a yellow (under target), green (Pass within target tolerance), and red (over target tolerance) light. If you want to check to a tighter tolerance, change the target zone to a lower percentage.

### What NOT to do when testing click wrenches:

**DO NOT** pull outward or push inward when applying the force on the handle. This will effect the accuracy of the wrench and the tester.

**DO NOT** apply the load in a jerky motion. The meter may mistake this for the click of a wrench and give you false readings.

**DO NOT** over-torque the wrench or the tester beyond its stated range.

## 11. Tester Calibration

The time interval for calibration of the tester is highly dependent on the amount of use the tester gets. There is no one answer to the question “how often should you have the tester checked for calibration”. The tester is guaranteed to retain accuracy for a minimum of 5,000 cycles. If you use the tester 5,000 times per month then the time requirement should be monthly. As a general guideline you should have the tester calibrated at least yearly. If the application is critical then you may want to reduce this interval to quarterly or even monthly. Common sense should be applied to the calibration requirement. If you find that you are suddenly failing every wrench you have then you may want to check the tester for damage. Damage most likely will be caused by over-torque of the torque transducer inside the tester. Usually you can see this by the fact that the tester will not show zero properly. Proper training of personnel is important to minimize the chances for damage to the tester.

You must have the proper equipment to calibrate the torque tester.

Equipment required:

1. Certified NIST traceable dead weights
2. Certified NIST traceable Calibration arm

The tester is calibrated by loading the tester to eight predetermined points (three clockwise and three counterclockwise plus zero in each direction). The calibration must be done in the equivalent primary units of the meter (in-lb or ft-lb). For example, to calibrate a 25-250 ft-lb tester you must have the ability to apply 25.00 ft-lb (10% of full scale), 125.0 ft-lb (50%) and 250.0 (100%) in both the clockwise and counter-clockwise direction. The tester uses 4 calibration points in each direction (including zero), however you should test accuracy to 5 points (or as many as your specification requires).

### **Test Accuracy Procedure:**

1. Mount the tester firmly as described in the operation manual.
2. Put the torque tester in Track mode.
3. Attach a certified torque arm. Make sure the arm is balanced and is applying either no torque or a small amount of torque in the direction to be tested.
4. Apply proper torque with certified dead weights at the following points: 10%, 40%, 60%, 80% and 100% of full scale.
5. When going from clockwise to counter-clockwise always load the tester to full scale three times prior to calibration. This “shifts” the zero to the opposite direction as a result of hysteresis (hysteresis is a natural phenomenon which occurs in material). Turn the tester on then off again when changing directions.
6. The tester is specified to an accuracy of  $\pm 1\%$  IV from 10-100% of full scale. Note the reading and determine the accuracy. If the tester is out of tolerance re-calibrate per the procedure below. Be sure to take into account the accuracy of your weights and arms when checking for accuracy.

### **Calibration Procedure:**

1. When the tester is OFF, press the Clear/On key and the Mode key at the same time HOLD BOTH KEYS UNTIL the tester shows: "C..." for a moment. The tester will then display "0". Load the tester to full scale (clockwise) three times. Then, with NO torque applied, press the Mode button to accept zero.

**NOTE:** Each level requires you to apply the correct torque and press the Mode key to go on to the next level. If you make a mistake you must start over at step 1.

***IMPORTANT: you must always calibrate in the clockwise direction FIRST, then the counterclockwise direction.***

2. The tester will now show "10". This means apply 10% of full scale to the tester in the clockwise direction. If the tester range is 250 ft-lb apply exactly 25.00 ft-lb (10% of full scale) press the Mode key to accept the 10% torque value.

***IMPORTANT: After loading the desired torque and pressing the Mode key the tester will wait approximately 3 seconds to take a reading to allow the torque to stabilize. Do not touch the tester or go on to the next step until the tester prompts you to do so. Make sure the weights are not swinging when you press the Mode key.***

3. Repeat above procedure for 50% and 100% clockwise torque values.
4. After completing the clockwise direction the tester will display "0" **and the direction icon will point to counter-clockwise.** Load the tester to full scale (counter-clockwise) three times. Then, with no torque applied, press the Mode button to accept the counter-clockwise zero.
5. The tester will now show "10". This means apply 10% of full scale to the tester (this time in the counter-clockwise direction). If the tester is a 250 ft-lb tester apply exactly 25 ft-lb (10% of full scale). With a stable 10% load press the Mode key.

***IMPORTANT! After loading the torque and pressing the Mode key the tester will wait approximately 3 seconds to take a reading to allow the torque to stabilize. Do not touch the tester, or go on to the next step until the tester prompts you to do so.***

6. Repeat for 50% and 100% in the counter-clockwise direction. After pressing the final Mode key, at 100% of full scale in the counter-clockwise direction, the tester will start reading torque in the track mode.

### **Important Calibration Issues:**

The calibration will only be as accurate as the accuracy of the torque applied at the calibration points. When testing the tester for accuracy, make sure you are in the Track Mode. Do not use torque arms with torque offsets when no torque is applied. In other words the torque arms should be balanced (no induced torque from the arm). If you find you have consistently low or high readings after calibration you probably have a torque offset from your arms.

## NOTES

## 12. Troubleshooting

<p><b>The tester will not power up.</b></p>	<ol style="list-style-type: none"> <li>1. The battery level is critically low. Plug in the transformer.</li> <li>2. The battery needs to be replaced with a new 9 volt Ni-MH.</li> </ol>
<p><b>The tester turns off in the middle of use.</b></p>	<p>The battery level is critically low. Recharge the battery.</p>
<p><b>The tester will not show zero.</b></p>	<p>Possible over-torque damage.</p>
<p><b>The lights work but not the buzzer mode.</b></p>	<p>The buzzer only works in peak mode or first peak.</p>
<p><b>The tester does not send data.</b></p>	<ol style="list-style-type: none"> <li>1. Make sure the computer com port is set to the proper protocol.</li> <li>2. Make sure you are using a serial cable, not a modem cable.</li> <li>3. Make sure you are using the proper com port on your computer.</li> </ol>
<p><b>You get “false” first peak readings.</b></p>	<ol style="list-style-type: none"> <li>1. Press smoothly on the wrench handle.</li> <li>2. If the wrench has a “mushy” or “soft” click put the tester in the peak mode and re-test.</li> </ol>
<p><b>The Lights and Buzzer do not work.</b></p>	<p>Turn Target Zone to 1-10%</p>
<p><b>The LCD is too light or dark.</b></p>	<p>Adjust contrast</p>

## 13. Specifications

**Accuracy:**

± 1% indicated value from 10-100% of range.

**Display:**

Large 4 digit LCD display with BATT, % Target, Units icons. Durable articulating rotary neck for easy viewing.

**Keypad:**

4 button sealed membrane keypad.

**Power:**

Internal 9 volt Ni-MH rechargeable battery with 110 volt transformer. Transformer: 2.1 mm Center Positive. 300Mah.

**Modes:**

Track Mode, Peak Hold Mode, First Peak Mode

**Sampling Rate:**

2500 samples per second for accurate dynamic peak detection.

**Clear Modes:**

Manual and automatic peak hold clear function.

**Units:**

Ft-lb, In-lb, Nm.

**Direction:**

Clockwise and counter-clockwise.

**Drive:**

Male Square Drive with female-female adapter

**Mounting:**

Integral mounting bracket

**Size:**

6.5" wide x 5.5" deep x 6" high - Weight: 6 lbs.