



DIAL TORQUE WRENCH



REPAIR, MAINTENANCE AND TROUBLESHOOTING MANUAL

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REVISIONS –

The CDI Dial Wrench Torque Wrench Repair Manual was originated and first issued in November 2001. The manual will be reviewed and revised as necessary to assure that it contains the latest changes in product or repair changes. In between revisions, product bulletins may be issued to assure any changes in product or repairs are supplied to authorized repair facilities.

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CDI DIAL INDICATING (RIGID HOUSING) TORQUE WRENCH REPAIR, MAINTENANCE AND TROUBLESHOOTING INSTRUCTIONS

SAFETY INSTRUCTIONS

Failure to follow **WARNING** instructions can cause personal injury to the operator.
Failure to follow **CAUTION** instructions can cause the equipment to fail or break in use.

! WARNING

Always wear Safety Glasses or goggles when using or repairing hand tools.

Read this manual completely before repairing torque wrenches.

DO NOT use or test a wrench that shows signs of damage (bent tubes, cracked or broken parts) caused by misuse. Recommend replacement.

DO NOT use cheater extensions on the handles or tube to apply torque.

DO NOT exceed rated maximum torque.

Check all sockets or other test accessories for wear, damage or cracks prior to their use with torque wrenches. Do not exceed their rated maximum torque.

Always pull (DO NOT push) to apply torque. Adjust your stance to prevent a fall if something should give suddenly.

Ratchet head torque wrenches must be checked for full (positive) engagement of the ratchet in the direction of use prior to applying a load on the wrench. Broken or slipping ratchets can cause injury.

CAUTION

Periodic recalibration is necessary to maintain accuracy.

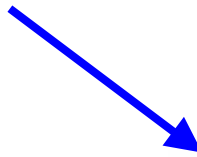
Periodic examination and cleaning is necessary to maintain the wrench.



MULTITEST
TORQUE
CALIBRATION
SYSTEM



SURETEST
TORQUE
CALIBRATION
SYSTEM



ETT
ELECTRONIC
TORQUE
TESTER



INTRODUCTION

This manual covers the repair, maintenance and troubleshooting instructions to identify and remedy problems that could occur with the CDI Dial Indicating Torque Wrenches. Each wrench model has an Exploded Illustration that lists the component parts and shows assembly particulars. The exploded illustration must be used as a guide for assembling CDI Dial Indicating Torque Wrenches.

CDI has a Service Center that performs repairs and calibration on all of our products at the factory, plus a list of factory authorized repair/calibration centers throughout the world. Contact CDI Sales or Service Center at (626) 965-0668 or sales@cditorque.com for technical assistance on the repair or calibration of CDI products.

CLEANING

Wipe all exterior parts with a dry, clean and lint free cloth. **DO NOT USE** any abrasive or corrosive materials to clean any components of the CDI Dial Indicating Torque Wrenches. A non-abrasive polishing agent applied with a dry, clean and lint free cloth may be used to polish the chrome exterior parts.

LUBRICATION

None required.

REPAIR TOOLS REQUIRED

- * **Torque Tester** (range determined by the torque wrench to be tested)
 - 1 Flat blade mini screwdriver** (max. blade size .063 or 1.6mm)
 - 1 Needle Nose Pliers**
 - 1 Dial Scale Assembly Tool**
 - 1 Pointer Tapping Tool**
 - 1 Dial Wrench Adjustment Tool (part # 600-2)**
 - 1 Screwdriver**
- **We recommend that CDI torque testers be used to test the calibration accuracy of CDI manufactured torque products.**

CDI manufactures a complete line of torque testing equipment from moderately priced testers to complete state of the art test systems used in metrology calibration laboratories all over the world. Contact CDI Sales or Service Center at (626) 965-0668 or sales@cditorque.com.

INSPECTION

Inspect all wrenches repaired to determine that they are in an operational condition by visually inspecting for worn, broken, cracked or damaged parts. Replace parts not found to be in satisfactory condition.

CAUTION

Some customer's abuse torque wrenches and damage them beyond repair. The most common abuse is the placing of an extension or cheater bar on the handle end of the wrench. This type of misuse is evident if the plate, handle or the drive is bent, or there are cheater bar marks on the handle near the plate. **DO NOT REPAIR** the wrench if it shows signs of this type of misuse. The component parts may be permanently damaged. The **SAFETY** and **INTEGRITY** of the wrench could be impaired. Recommend that the wrench be replaced.

Types of Dial Wrenches

There are three types of Dial Wrenches. They are:

- ◆ Plain Dial- A single pointer shows applied torque on the scale.
- ◆ Dial with Signal - Allows a pre-set torque value to be set on the wrench. When the set torque value is applied a signal indicates that the set torque value has been reached. CDI produces dial wrenches that have an electric light or an electric light and audible buzzer that is illuminated when the set torque value is reached.
- ◆ Dial with Memory Indicator – An auxiliary pointer is used to indicate the maximum torque value applied to the wrench. The memory pointer remains at the highest applied torque value until it is reset to zero.

Precision Movement

A precision movement controls dial wrench accuracy. Damage to the movement caused by misuse or abuse of the wrench can not be repaired and must be replaced. Care must be taken in the use and storage of dial wrenches, as they are precision measuring instruments.



Scale Pointer

To repair loose scale pointer if removed from the post.

- 1.) Take the scale pointer (orange) and align it to the center of the square drive of the wrench.
- 2.) Place it in the center post in the center of the scale.
- 3.) Align the scale pointer end point to the center of the drive end of the wrench.
- 4.) Press into place.



- 5.) Tap it lightly to lock it into place with the handle end of a plastic screwdriver or other instrument. This will lock it into post.

The scale pointer (orange) end is slightly bent upwards to allow the memory pointer (blue) to be pushed by the scale pointer. If the scale pointer (orange) end is not bent upwards or the scale pointer (orange) end is touching the scale plate it must be bent or replaced.

Scale with Electric Signal

To repair a wrench if the signal is not working on the wrench:

- 1.) Check/replace the battery first.
- 2.) Next, check the light bulb to assure it is screwed in and making contact.
- 3.) Remove the lens and remove the scale pointer (orange) from the wrench. Take a knife and scrape the sides of the pointer (to assure better contact).
- 4.) Clean the contact on the scale.
- 5.) Check the wiring for broken wires or damaged wires.
- 6.) If the buzzer doesn't work check the wiring connection to the battery.

If none of these remedies correct the problem, contact CDI Service Department, to return the wrench to CDI for repair.

Memory Pointer

The memory pointer (blue) is designed to be pushed by the scale pointer (orange) and indicate the point on the scale where the largest amount of torque was applied. It must move freely with the scale pointer (orange). Check the memory pointer (blue) by turning the knob until it meets the scale pointer (orange) in the clockwise position. Load the wrench to the maximum scale. The memory pointer (blue) must be pushed by the scale pointer (orange) all the way to full scale. Repeat this test in the opposite direction.

If the memory pointer (blue) slips over the scale pointer (orange), bend the blue pointer downward so that the tip of the memory pointer will be moved by the scale pointer. Make sure the memory pointer (blue) does not drag on the surface of the scale.

The Scale Pointers (orange) and the Memory Pointer Assembly (crystal, knob & blue pointer) are available as repair parts.

ACCURACY VERIFICATION

This procedure is to be used to check the accuracy of a dial wrench.

There are two major international standards that establish torque wrench accuracy requirements. They are ASME B107.14M Hand Torque Tools (American Society of Mechanical Engineers) and ISO 6789 Hand Torque Tools – Requirements and Test Methods (International Organization for Standards). Both standards are recognized as established accuracy test methods and referenced in this section. ASME and ISO standards are subject to review and changes. The repair manual will be reviewed and revised periodically but may not reflect the latest revision of the specifications listed above.

ASME B107.14M

1. Preload the wrench by loading the wrench three times in the direction of the test (either clockwise or counterclockwise).
2. Set the pointer on the zero increment of the scale. The pointer **MUST** be set in the same plane as the testing will be performed (horizontal or vertical).
3. Load the wrench until the scale reads at 20% of full scale (example a 100 in. lb. wrench would be tested at 20 in. lb., which is 20% of full scale). Repeat the test 2 more times. Record all three readings.
4. Load the wrench until the scale reads at 60% of full scale (example a 100 in. lb. wrench would be tested at 60 in. lb., which is 60% of full scale). Repeat the test 2 more times. Record all three readings.
5. Load the wrench until the scale reads at 100% of full scale (example a 100 in. lb. wrench would be tested at 100 in. lb., which is 100% of full scale). Repeat the test 2 more times. Record all three readings.
6. Preload the wrench by loading the wrench three times in the opposite direction of the test already performed (either clockwise or counterclockwise).
7. Set the pointer on the zero increment of the scale. The pointer **MUST** be set in the same plane as the testing will be performed (horizontal or vertical).
8. Test the wrench in this direction by following steps 3 through 5. If all of the readings are within the accuracy requirement no calibration adjustment is required. If they are not see the section on calibration adjustment.

NOTE

Torque wrench readings **MUST** be obtained by applying force to the center of the handle (per ANSI & ISO specifications).



ISO6789

1. Preload the wrench by loading the wrench five times in the direction of the test (either clockwise or counterclockwise).
2. Set the pointer on the zero increment of the scale. The pointer **MUST** be set in the same plane as the testing will be performed (horizontal or vertical).
3. Load the wrench until the scale reads at 20% of full scale (example a 100 in. lb. wrench would be tested at 20 in. lb., which is 20% of full scale). Repeat the test 4 more times. Record all five readings.
4. Load the wrench until the scale reads at 60% of full scale (example a 100 in. lb. wrench would be tested at 60 in. lb., which is 60% of full scale). Repeat the test 4 more times. Record all five readings.
5. Load the wrench until the scale reads at 100% of full scale (example a 100 in. lb. wrench would be tested at 100 in. lb., which is 100% of full scale). Repeat the test 4 more times. Record all five readings.
6. Preload the wrench by loading the wrench five times in the opposite direction of the test already performed (either clockwise or counterclockwise).
7. Set the pointer on the zero increment of the scale. The pointer **MUST** be set in the same plane as the testing will be performed (horizontal or vertical).
8. Test the wrench in this direction by following steps 3 through 5. If all of the readings are within the accuracy requirement no calibration adjustment is required. If they are not see the section on calibration adjustment.

Major Calibration

Turn the wrench over, with the dial facing down. On the bottom of the case you will find a button plug. Remove it.

Through the button plug hole you will see the movement and push rod (The push rod is the black part that is bent through the loop in the brass movement). Check the push rod to assure it is centered to the wrench and level (not pushed down touching the plate or out of the movements loop).



The push rod needs to be reset in the movement:

- ◆ If the push rod is pushed off center and to one side of the wrench or the other.



- ◆ If the push rod is bent up so far as to be coming out of the loop of the movement.

- ◆ If the push rod is bent down so far as to be touching the plate.



Use the Dial Wrench Adjusting Tool (Part #600-2) and gently move the push rod until it is centered to the channel and in the movement loop and not touching the plate. Next, perform an accuracy check.



NOTE



The Dial Wrench Adjusting Tool (Part # 600-2) allows adjustments to be made in small, slight movements. The adjustments to the push rod must be made in very small increments, generally not to exceed .010 (.26mm). Test the wrench on a torque tester after each incremental adjustment.

CENTERING (Left or Right Adjustment)

Centering adjustment is required, if the wrench failed the accuracy check because it was out in opposing directions (Example; +plus 4.5% in one direction and -4% in the opposite direction) or near perfect in one direction and out in the opposite direction. To center the push rod take the Dial Wrench Adjusting Tool (Part #602-2) and gently move the push rod until it is moved slightly into the direction that the correction needs to be made. An example of this would be a +plus 4.5% in one direction and -4% in the opposite direction could be moved in the direction of the + plus reading. This would split the tolerance between the two directions and center the wrench. Test the wrench to see if the correction was enough to center the wrench readings so that both sides (CW & CCW) are within specification requirements.

DECREASING/INCREASING READING VALUE (Forward or Backwards Adjustment)

The second adjustment that can be made to a dial wrench is to decrease or increase the reading values. To adjust the reading take the Dial Wrench Adjusting Tool (Part #600-2) and gently move the push rod:

- ◆ Away from the movement (backward) to increase the reading values, if the wrench values are reading low.
- ◆ Toward the movement forward) to decrease the reading values, if the wrench values are reading high.

If a slight movement of the push rod doesn't bring the wrench into calibration, the wrench must be re-gaged. Do not bend the push rod so that it is touching the plate or almost all the way out of the movement loop. To re-gage the case must be removed from the plate assembly.



After removing the case measure the distance between the push rod bent end and the end of the movement loop, with the inside diameter end (blades) of a caliper.



Then loosen the screws on the channel. Every 0.010 increase or decrease of the distance will change the reading value approximately 3 to 6 %. After moving the push rod, tighten the channel screws, re-assemble with the case and test the readings.

TROUBLESHOOTING

CDI Dial Indicating Torque Wrenches generally do not require repair. They are sent in, by users, for calibration. All adjustments are to be made as shown in the section on **Calibration**.

The **Troubleshooting Matrix** is for **CDI Dial Indicating Torque Wrench** models **only**. Refer to the **Troubleshooting Matrix** for problems that could occur to **CDI Dial Indicating Torque Wrenches** and their remedy.

PROBLEM	Remedy
Loose Pointer or disconnected pointer	See Section III on Pointer Repair
Pointer or Memory Pointer rubs on scale.	See Section III or V on Pointer and Memory Pointer Repair
The memory pointer is not working.	See Section III or V on Pointer and Memory Pointer Repair
Signal on wrench does not work	See Section IV Dial wrenches with a signal.
Accuracy	See Section VI on Calibration check
Re-Calibration	See Section VII