CDI TORQUE PRODUCTS

MICROMETER ADJUSTABLE “CLICK TYPE” TORQUE WRENCH

REPAIR, MAINTENANCE AND TROUBLESHOOTING MANUAL

SUGGESTED PRICE $35.00
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REVISIONS –

The CDI Micrometer Adjustable 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 revision, product bulletins may be issued to assure any changes in product or repairs are supplied to authorized repair facilities.

REV.	Date Issued	Affected Pages	Approved
	November 2001		

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CDI MICROMETER ADJUSTABLE AND PRE-SET 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 crack 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 calibration, repair, maintenance and a troubleshooting guide to identify and remedy problems that could occur with the CDI 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 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 Service Center at (626) 965-0668 or sales@cditorque.com for technical assistance on the repair or calibration of CDI Torque 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 Torque Wrenches. After assembly, a non-abrasive polishing agent applied with a dry, clean and lint free cloth may be used to polish the chrome exterior parts.

LUBRICATION

Super Lube MULTI-Purpose Synthetic Lubrication with Teflon, **CDI Part #10-1000**. **NO SUBSTITUTES ALLOWED**.

REPAIR TOOLS REQUIRED

Micrometer Adjustable Torque Wrenches

*	**Torque Tester** (range determined by the torque wrench to be tested)
1	**Flat blade mini screwdriver** (max. blade size .063 or 1.6mm)
1	**End Cutter** (modified jaws ground flat on top to allow rivet removal)
2	**CDI Calibration Crank Handle** (Pt. # 600-8-1 & 600-8-2) 7/16” & 3/8” hex
1	**0 to 1” micrometer** with tenth (.0000) increments
1	**16 oz. hammer**
1	**40 to 200 In. Lb. CDI Torque Wrench**
1	**3/8” 6 Point Deep Socket**
1	**7/16” 6 Point Deep Socket**

***We recommend that CDI torque testers are 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 Department at (626) 965-0668 or sales@cditorque.com **for the nearest distributor of CDI Torque Products.**

OTHER REQUIRED MATERIALS

Torque Seal (Part # **10-1100**)

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 torque wrenches are abused or damage beyond repair. The most common abuse is using the wrench as a breaker bar to loosen a bolt or nut. This type of misuse is evident if the tube or the drive is bent in the counterclockwise direction in relation to the tube or marks from a cheater bar are on the tube or handle. **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.

ACCURACY VERIFICATION AND MINOR CALIBRATION PROCEDURE

This procedure is to be used to check the accuracy and, if necessary, perform a minor adjustment on calibration. It must also be used after a major calibration.

There are two major international standards that establish torque wrench accuracy requirements. They are ASME B107.14 M Hand Torque Tools (American Society of Mechanical Engineers) and ISO 6789 Hand Torque Tools – Requirements and Test Methods (International Organization for Standardization). 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 revisions of the specifications listed above.

ASME B107.14M

1. Preload the wrench by setting the wrench at 50% of full scale and operating three times in the direction of the test.

2. Reset handle to 20% of full scale. Place square drive in tester. Adjust the loading point of the tester until the load is being applied in the center of the handle.

3. Test the wrench three (3) times at 20% noting the accuracy error for each reading. Set and test the wrench three (3) times at 60% and 100% of full scale noting the accuracy error for each reading. If the readings are within the accuracy requirements for the direction no calibration adjustment is required.

4. Test the torque wrench in the opposite direction, if required, by following steps 1 through 4 in that direction.

NOTE

The handle support **MUST** be at the center of the handle when the handle is adjusted to 20%, 60% of scale, and again at 100% of scale. Torque wrench readings, per industrial (ASME B107.14M-1994) standards, have to be obtained by applying the load to the center of the handle.

ISO6789

1. Preload the wrench by setting the wrench at 100% of full scale and operating five (5) times in the direction of the test.

2. Reset handle to 20% of full scale. Place square drive in tester. Adjust the loading point of the tester until the load is being applied in the center of the handle.

3. Test the wrench five (5) times at 20% noting the accuracy error for each reading. Set and test the wrench five (5) times at 60% and 100% of full scale noting the accuracy error for each reading. If the readings are within the accuracy requirements for the test direction no calibration adjustment is required.

4. Test the torque wrench in the opposite direction, if required, by following steps 1 through 4 in that direction.

Minor Calibration Accuracy Adjustment

NOTE

A minor (handle) adjustment is used to adjust 20% of the scale reading. If the reading at 20% and 100% of scale are both either high or low to the required accuracy, a minor adjustment may be used to bring the accuracy within torque specification. If the torque wrench requires minor adjustment follow steps 5 through 8.

5. Set the handle at [1]20% of full scale. Remove the [2]plug from the end of the handle.

OR

Plug Removal

6. Check the torque seal on the load screw. If removed or cracked, the wrench calibration has been tampered with or the handle has been forced below its preset stop point.

Handle End View

[1] All torque wrenches with ¼" head drives must be calibrated at 100% of scale, not minimum (20%)

[2] See section on handle/lock ring for particulars on button plug or FOD plug removal.

HANDLE/TUBE VIEW

7. Pull the lock ring down and turn the handle until you reach the desired reading on the tester as follows:

<u>**A.**</u> If the reading on the tester was **below** the **accuracy limit** for the value tested turn the handle **clockwise** to **increase** the value. Release the lock ring. Repeat this test and adjustment procedure until the torque reading is within the accuracy limits.

<u>**B.**</u> If the reading on the tester was **above** the **accuracy limit** for the value tested turn the handle **counterclockwise** to **decrease** the value. Release the lock ring. Repeat this test and adjustment procedure until the torque reading is within the accuracy limits.

Release the lock ring and check the value on the tester.

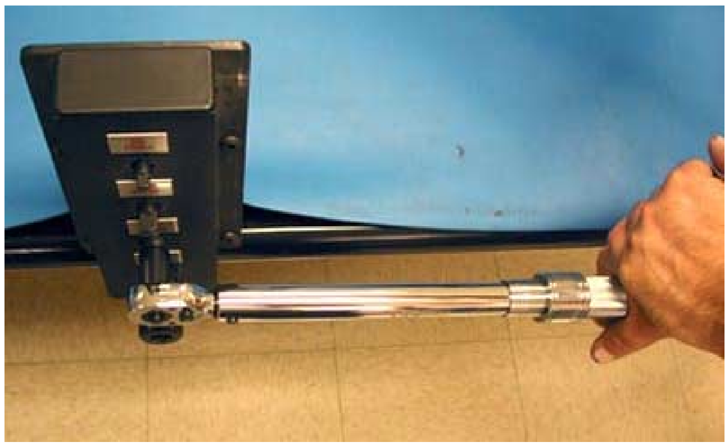
8. With the lock ring in the locked position and holding the wrench handle firmly to prevent rotation of the handle, loosen the hex flange nut with the calibration crank handle (approximately 2 full turns). Sometimes this will disengage the hex flange nut from the screw and on other wrenches the hex flange nut will remain on the load screw. The Torque seal will show a crack between the nut and screw. Remove the loose torque seal from the nut and screw.

Loosening Nut

9. Pull the lock ring down, while applying a light force towards the wrench (to prevent handle disengagement) and turn handle until handle "0" mark is aligned to the centerline of the scale.

10. Tighten the hex flange nut (B) with a 200 in. lb. torque wrench as follows:

Handle Locking		
Torque Wrench Ranges	**Hex Flange Nut Size**	**Torque Ranges**
50 in. lb. to 250 in. lb.	3/8"	35 to 40 in. lb.
75 ft. lb. to 1000 ft. lb.	7/16"	90 to100 in. lb.



11. Retest the wrench for accuracy (steps 1 through 4). If the wrench is not within specified accuracy requirements repeat steps 5 through 10 or the wrench may require a major calibration.

MAJOR CALIBRATION AND REPAIR

These instructions are to be used for the major calibration. Major calibration requires the wrench to be partially disassembled from the front removing the ratchet or drive mechanism, to inspect the internal component parts for contaminates, damage and/or wear. Replacement parts are normally required. 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 purchasing CDI Torque Wrench component parts.

Contact CDI Sales Department at (626) 965-0668 or sales@cditorque.com **for Exploded Illustrations for a particular torque wrench model and/or to purchase component parts needed for repairs.**

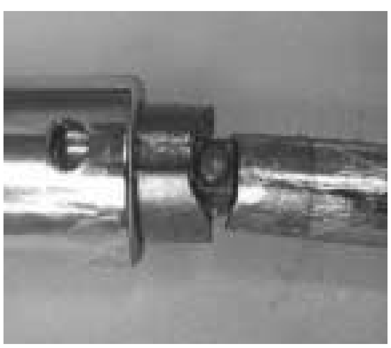
To disassemble the tube

1. Pull down the lock ring and unwind the handle of the wrench below 20% of scale until it stops. This must be done to remove the pressure on the drive or ratchet head. Prior to removal of the rivet and pivot pin required for a major calibration.

2. Remove the pivot pin rivet from the tube by using the modified end cutters. Push the pivot pin out of the tube to release the head drive.

To recalibrate the wrench

1. Pull the head drive, secondary arm (if required), pawl and cam slowly out of the wrench to prevent the pawl from [3]loosing its orientation in the cam.

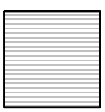
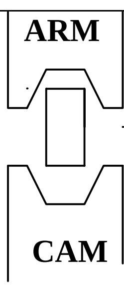
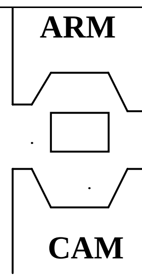


OR

[3] If the pawl orientation in the slot of the cam is unknown rebuild the wrench without inserting the rivet into the pivot pin and retest.

2. The orientation, size and style of the pawl in the wrench must be determined, measured and noted so it can be found on the pawl selection chart. Use a micrometer to measure the pawl and determine its [4]size and style.

3 A major recalibration requires the selection of a new pawl. To find the correct pawl, locate the pawl removed from the wrench on the pawl selection chart. This is the starting point for selecting a new pawl

<table>
<tr><th colspan="2">Pawl Orientation Chart</th></tr>
<tr><td colspan="2">
O = Square Pawl
All sides are the same no orientation to pawl slot required.</td></tr>
<tr><td>
T = Tall
Taller side of the pawl is perpendicular to the cam slot</td><td>
S = Short
Shorter side of The pawl is perpendicular to the cam slot</td></tr>
</table>

[4] Due to the machining tolerances, pawl sizes sometimes do not corresponding exactly to the number in the pawl selection chart. If this occurs choose the pawl on the chart closest to the pawl removed from the wrench.

Pawl Size

There are six different pawl sizes available for calibration starting with pawl number “0” with square cross sections. Metric sizes (mm) are in parentheses ().

SIZE \ STYLE	A	B	C
0	-	**.250 x .250 (6.35) x (6.35)**	**.187 x .187 (4.75 x 4.75)**
1	-	**.250 x .244 (6.35 x 6.20)**	**.187 x .183 (4.75 x 4.65)**
2	**.260 x .250 (6.60 x 6.35)**	**.250 x 240 (6.35 x 6.10)**	**.187 x .180 (4.75 x 4.57)**
3	**.260 x .245 (6.60 x 6.20)**	**.250 x .235 (6.35 x 6.00)**	**.187 x .176 (4.75 x 4.47)**
4	**.260 x .240 (6.60 x 6.10)**	**.250 x .230 (6.35 x 5.85)**	**.187 x .173 (4.75 x 4.40)**
5	**.260 x .235 (6.60 x 6.00)**	-	**.187 x .168 (4.75 x 4.27)**

Style Chart

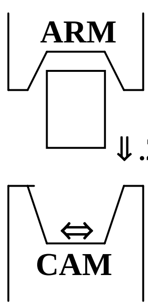
A = Pawl with longer side .260 (6.60)

B = Pawl with longer side .250 (6.35) or both sides .250 (6.35)

C = Pawl with longer side .187 (4.75) or both sides .187 (4.75)

NOTE: Style **“C”** is used on wrenches up to a maximum scale of .250 in. lb.

PAWL IDENTIFICATION CODE EXAMPLE



⇓.250 (6.35) = size 3 = .250 x .235 (6.35 x 6.00)

⇔ .235 (6.00)

3 T B
↓ ↓ ↓
size ↓ style
↓
orientation

= T = tall (longer side of pawl is perpendicular to the pawl slot)

B = pawl with longer side .250 (6.35)

Metric sizes (mm) are in parentheses ().

PAWL SELECTION CHART

STYLE	SIZE & ORIENTATION										
♦	5T	4T	3T	2T	1T	0	1S	2S	3S	4S	5S
A **.260** **(6.60)**	A⇓ .235 (6.00) ⇔	A⇓ .240 (6.10) ⇔	A⇓ .245 (6.20) ⇔	A⇓ .250 (6.35) ⇔							
or											
B **.250** **(6.35)**		B⇓ .230 (5.85) ⇔	B⇓ .235 (6.00) ⇔	B⇓ .240 (6.10) ⇔	B⇓ .244 (6.20) ⇔	B⇓ B ⇔	.244⇓ (6.20) B ⇔	.240⇓ (6.10) B ⇔	.235⇓ (6.00) B ⇔	.230⇓ (5.85) B ⇔	

TO DECREASE THE READING⇐---------------⇒TO INCREASE THE READING

Style C .187 (4.75)

for wrenches with a maximum scale up to 250 in. lb. ONLY.

STYLE	5T	4T	3T	2T	1T	0	1S	2S	3S	4S	5S
♦	C⇓ .168 (4.27) ⇔	C⇓ .173 (4.40) ⇔	C⇓ .176 (4.47) ⇔	C⇓ .180 (4.57) ⇔	C⇓ .183 (4.65) ⇔	C⇓ C ⇔	.183⇓ (4.65) C ⇔	.180⇓ (4.57) C ⇔	.176⇓ (4.47) C ⇔	.173⇓ (4.40) C ⇔	.168⇓ (4.27) C ⇔

NOTES

To increase or decrease the torque reading approximately 2% requires changing the actual pawl size one location.

Always select a pawl to the left ⇐ of the actual pawl to decrease the wrench reading.

Always select a pawl to the right ⇒ of the actual pawl to increase the wrench reading.

There is an overlapping of pawl sizes. Style "A'" and "B" overlap from size 2T to 4T. Use style "A", if available.

Metric sizes (mm) are in parentheses ().

EXAMPLE #1

The wrench reads approximately 5% low from nominal. Disassemble the wrench and measure the pawl. It was .260 (6.60)⇓ X .245 (6.20)⇔, orientated with the longer side of the pawl perpendicular to the cam slot. To find the correct pawl, locate the pawl removed from the wrench on the pawl selection chart. This pawl is number 3TA on the chart. This is the starting point for selecting a new pawl.

To increase the reading of the wrench 4% choose the pawl two places to the right of 3TA (.260 (6.60)⇓ X .245 (6.20)⇔) which is 1TB (.250 (6.35)⇓ X .244 (6.20)⇔). This pawl change should increase the wrench reading to within approximately 1% of nominal.

PAWL SELECTION CHART											
STYLE	**SIZE & ORIENTATION** ***Metric sizes (mm) are in parentheses ().***										
♦	**5T**	**4T**	**3T**	**2T**	**1T**	**0**	**1S**	**2S**	**3S**	**4S**	**5S**
A .260 (6.60) or	**A⇓ .235 (6.00) ⇔**	**A⇓ .240 (6.10) ⇔**	**A⇓ .245 (6.20) ⇔**	**A⇓ .250 (6.35) ⇔**							
B .250 (6.35)		**B⇓ .230 (5.85) ⇔**	**B⇓ .235 (6.00) ⇔**	**B⇓ .240 (6.10) ⇔**	**B⇓ .244 (6.20) ⇔**	**.B⇓ B ⇔**	**.244⇓ (6.20) B ⇔**	**.240⇓ (6.10) B ⇔**	**.235⇓ (6.00) B ⇔**	**.230⇓ (5.85) B ⇔**	

EXAMPLE #2

The wrench reads approximately 5% high from nominal. Disassemble the wrench and measure the pawl. It was .250 (6.35)⇓ X .244 (6.20)⇔, orientated with the longer side of the pawl perpendicular to the cam slot. To find the correct pawl, locate the pawl removed from the wrench on the pawl selection chart. This pawl number is 1TA on the chart. This is the starting point for selecting a new pawl.

To decrease the reading of the wrench 4% choose the pawl two places to the left of 1TB (.250 (6.35)⇓ X .244 (6.20)⇔) which is 3TA (.260 (6.60)⇓ X .245 (6.20)⇔) or 3TB (.250 (6.35)⇓ X .235 (6.00)⇔).
The recommended change would be to a Style “A”, if available. This pawl change should decrease the wrench reading to within approximately 1% of nominal.

PAWL SELECTION CHART

STYLE	**SIZE & ORIENTATION** ***Metric sizes (mm) are in parentheses ().***										
♦	**5T**	**4T**	**3T**	**2T**	**1T**	**0**	**1S**	**2S**	**3S**	**4S**	**5S**
A **.260** **(6.60)** **or**	**A⇓** **.235** **(6.00)** **⇔**	**A⇓** **.240** **(6.10)** **⇔**	**A⇓** **.245** **(6.20)** **⇔**	**A⇓** **.250** **(6.35)** **⇔**							
B **.250** **(6.35)**		**B⇓** **.230** **(5.85)** **⇔**	**B⇓** **.235** **(6.00)** **⇔**	**B⇓** **.240** **(6.10)** **⇔**	**B⇓** **.244** **(6.20)** **⇔**	**B⇓** **B** **⇔**	**.244⇓** **(6.20)** **B** **⇔**	**.240⇓** **(6.10)** **B** **⇔**	**.235⇓** **(6.00)** **B** **⇔**	**.230⇓** **(5.85)** **B** **⇔**	

4. Check the pawl and pawl slot for worn or damaged edges. Choose the appropriate pawl to increase⇒ or decrease⇐ the reading.

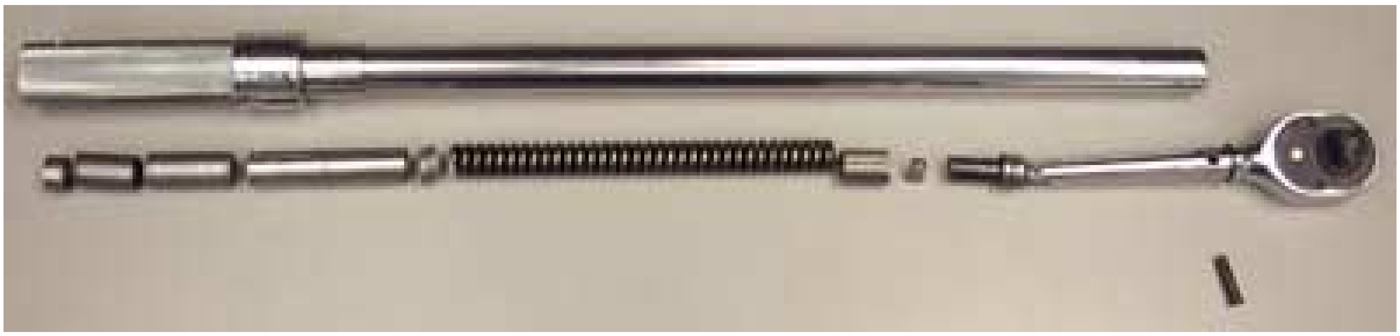
5. Go to page 15 and follow instructions 4 through 9 to calibrate.

OR

6. To disassemble, clean, inspect and re-lubricate go to page 14 and follow instructions 1 though 9.

To Disassemble and Check Parts

1. Remove all parts from tube. Examine them for wear and/or damage. Replace parts as required. Clean and lubricate internal parts with Super Lube.



2. Assemble the parts according to the assembly blueprint requirements (spacers, Thrust washers, flat washers & spring). Slide into the tube.

3. Place the cam on top of the spring, properly orientated to the pivot hole.

4. Select pawl as shown on pages 9 through 13. Lightly grease the pawl to hold it into position in the cam. Place the pawl in the cam slot.

.

5. Place the end of the drive head or arm carefully against the top of the pawl and slide assembly back into the tube. Place pivot pin through the tube and head.

CAUTION

The wrench must always be assembled with some positive pressure on the spring. To assure positive pressure, the pivot hole of the head must be pushed into alignment with the pivot hole on the tube. Failure to assemble the wrench with positive pressure will result in the wrench not being able to hold calibration.

To check for positive pressure on the spring

a) Place the pivot pin into the assembled wrench.

b) With the handle unwound to its lowest point (the handle stop), the wrench should be at 5% to 10% of full scale (example a 250 ft/ lb. wrench should read 12.5 to 25 ft. lb.) on a torque tester.

c) If the wrench does not click or reads below at 5% of full scale on a torque tester when the handle is at its lowest position, disassemble and add more washers to increase the pressure.

6. Pull the lock ring down and adjust the wrench up to the maximum scale value. Cycle the wrench a minimum of 25 times in both directions (clockwise & counterclockwise).

7. Pull the lock ring down and adjust the wrench down to minimum scale value.

8. Perform an accuracy verification and if required, a minor calibration adjustment.

9. After calibration, insert a new rivet into the pivot pin. Use a hammer to lock rivet into pivot pin.

HANDLE/LOCK RING REPAIR

These instructions are to be used for the repair of the handles or lock rings. Calibration does not require the handle to be disassembled.

To Disassemble the Handle/Lock Ring

1. Remove the button or rubber plug with a flat blade mini screwdriver.

NOTE

There are two distinct end plugs for the torque wrenches.
They are:

- Steel button plug with a prongs, which requires 4 drops of adhesive (locktite 495) at the top, bottom and sides.

⇐Steel Button

- Rubber plug that requires a groove inside of the handle end for installation.

A steel button plug may be placed into a handle end with a groove on the inside diameter. A rubber plug may not be used on a handle without a groove on the inside of the handle.

2. Remove the Torque Seal from the screw and nut.

3. To disassemble the handle from the tube, remove the nut from the end of the wrench using the calibration crank handle.

4. Next, remove the washer.

5. Pull the lock ring back to the unlock position (this releases the two balls from the splines on the tube) and pull the handle off the tube.

NOTE

There are two distinct metal handle styles for the CDI torque wrenches.
They are:

- A handle without a plastic bushing in the front. This model requires that the grooves in the tube (between the splines and roll marking) have a spring rings in it. These are wrenches that are from a maximum scale of 50 in. lb. to 250 in. lb

Spring Rings in tube

- A handle with a plastic bushing in the front. This handle requires the removal of the spring ring from the groove in the tube (between the splines and roll marking).

6. Remove the lock ring from the handle.

7. Remove the lock ring spring.

8. Remove the two small round balls (held with Super Lube to handle) from the inside of the handle.

To assemble the handle/lock ring

1. Place Super Lube on the ball holes on handle. Place two balls in holes (Super Lube will hold them in place).

2. Next, place lock ring spring on handle

3. Place lock ring on handle.

4. Pull the lock ring down into the unlock position while sliding the handle as far as it will go onto the tube. Turn the handle until the six point flange nut on the load screw is engaged into the handle's twelve point insert. Release the lock ring to engage the balls into the splines on the tube.

5. Next, set the handle on the lowest increment of the tube. Pull the lock ring down to the unlock position and turn the handle until the top of the handle scale is lined up with the lowest increment on the tube. Release the lock ring to engage balls into the splines on the tube.

NOTE

The top of the handle must touch the increment line on the tube scale. When “0” is set, the top of the handle cannot cover up the increment line on the tube scale or be below it.

6. If the center line of the tube is not lined up with the “0” on the handle, pull down on the lock ring to unlock it, pull the handle back off of the flange nut on the tube screw (approx. ¼”). Turn the handle to reset the flange nut into the handle insert so that the “0” is lined up with the centerline of the tube scale. Release the lock ring and jiggle the handle lightly left and right until the lock ring is fully engaged.

NOTE

Wrenches with maximum ranges from 50 in. lb. to 250 in. lb. require a lock washer on the handle (see exploded illustration for lock washer part number). Do not reuse the lock washer. Use a new lock washer when reassembling the handle to the tube.

7. Tighten the hex flange nut with a 200 in. lb. torque wrench as follows:

Handle Locking		
Torque Wrench Ranges	**Hex Flange Nut Size**	**Torque Ranges**
50 in. lb. to 250 in. lb.	3/8”	35 to 40 in. lb.
75 ft. lb. to 1000 ft. lb.	7/16”	90 to 100 in. lb.

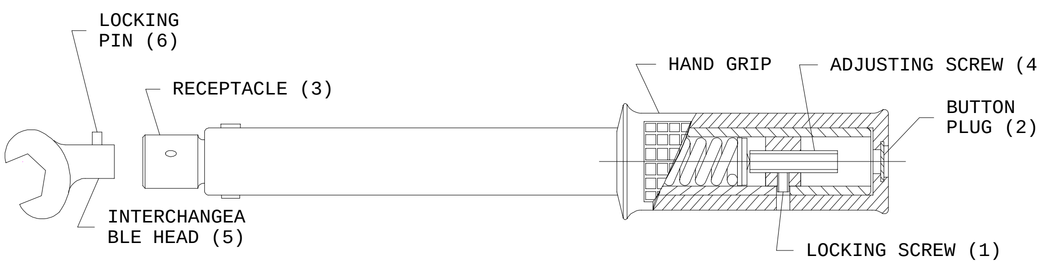
8. An accuracy and minor calibration adjustment must be performed after a handle is assembled.

CALIBRATION INSTRUCTIONS FOR PRE-SET TORQUE WRENCHES

Pre-Set Torque Wrenches

REPAIR TOOLS REQUIRED

1 3/32” “T” Handle hex
1 CDI Adjusting Tool (see chart for correct part number)



PRE-SET TORQUE WRENCH

1. Loosen locking screw (1) with the 3/32” T handled hex.

2. Remove Button Plug (2) from rubber handle end by bending a corner of the handle end until the edge of the plug appears. Then remove the plug by lifting the edge.

3. Insert the interchangeable head (5) into the wrench receptacle until the locking pin (6) is fully engaged with the corresponding receptacle hole (3).

NOTE
Some heads used in pre-set torque wrenches have lengths that vary. It is recommended that pre-set torque wrenches be calibrated with the head that is to be used to assure the greatest accuracy in calibration.

4. Place the wrench on a torque tester and turn adjustment screw (4) with a T handled hex (1/8” or 3/32”) until the desired setting is on the torque tester when a load is applied.

CDI Pre-Set (Click) Torque Wrench Ranges & Adjustment Tool Part Numbers					
Part Number	**Torque Ranges**			**Adjustment Tool Part #**	**Hex Size**
	in./ft. lb.	**dNM/NM.**	**cmkg/mkg**		
5T-I	**16-60 in. lb.**	**14-67 dNM**	**14-69 cmkg**	**600-45-01**	**3/32”**
10T-I	**36-108 in. lb.**	**40-122 dNM**	**42-124 cmkg**	**600-45-02**	**1/8”**
10ST-I	**84-300 in. lb.**	**95-338 dNM**	**110-385 cmkg**	**600-45-02**	**1/8”**
10AT-I	**84-300 in. lb.**	**95-338 dNM**	**110-385 cmkg**	**600-45-03**	**1/8”**
50ST-I	**10-50 ft. lb.**	**14-67 NM.**	**1.4-7 mkg.**	**600-45-03**	**1/8”**
50T-I	**10-50 ft. lb.**	**14-67 NM.**	**1.4-7 mkg.**	**600-45-03**	**1/8”**
100ST-I	**30-150 ft. lb.**	**41-200 NM.**	**4.1-20 mkg.**	**600-45-04**	**1/8”**
100T-I	**30-150 ft. lb.**	**41-200 NM.**	**4.1-20 mkg.**	**600-45-04**	**1/8”**
200T-I	**40-200 ft. lb.**	**55-270 NM.**	**5.5-27 mkg.**	**600-45-04**	**1/8”**
300T-I	**60-300 ft. lb.**	**82-400 NM.**	**8.2-40 mkg.**	**600-45-05**	**3/16”**
600T-I	**200-600 ft. lb.**	**275-800 NM.**	**27.5-135 mkg.**	**600-45-06**	**3/16”**

5. Tighten the locking screw (1). Test wrenches setting three more times. If the readings are correct, place torque seal into the locking screw (1) hex opening to prevent tampering.

6. Place button plug (2) back into the handle end by inserting it into one side of the opening then applying pressure with your finger until it is fully engaged.

TROUBLESHOOTING

The **Pre-Set Torque Wrenches** generally do not require repair. They are sent in for calibration to the required use setting with the head or adapter chosen for use. All adjustments are to be made as shown in the section on **Pre-Set Torque Wrench Calibration**.

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

Micrometer Adjustable Torque Wrench Troubleshooting Matrix

PROBLEM	CAUSE(s)	REMEDY
Calibration accuracy at 20% of scale is out of tolerance. **OR** Calibration accuracy at 20%, 60% and 100% of scale is out of tolerance. **OR** Calibration accuracy at 60% and 100% of scale is out of tolerance	Wrench tampered with (torque seal cracked or missing) **OR** The handle is unwound below the stop point. (torque seal cracked or missing) **OR** Handle disassembled handle and reassembled wrong. (torque seal cracked or missing) **OR** Pawl and/or pawl slots worn or damaged.	**NOTE** Check handle prior to adjusting to assure it is engaged to the adjusting screw. Minor calibration Adjustment. **NOTE** If a minor calibration fails to bring the 20% of scale reading into tolerance or if adjustment causes the 60% or 100% of scale to fall out of the tolerance a major calibration is required. **OR** **NOTE** Check pawl and pawl slots prior to a major calibration. A major calibration.
When the lock ring is released the handle goes up and down the tube without turning the handle or the handle doesn't turn at all.	The tube insert is stripped **OR** No lubrication on torque load screw.	Send to authorized repair facility.
Handle and load screw disassembled.		See handle/lock ring repair section to assemble.
Lock Ring Doesn't Lock.	The handle was turned without releasing the lock ring. (the tube will show groove marks through the splines)	Send to authorized repair facility.
Lock ring is jammed or doesn't fall into lock	Handle spring problem.	Disassemble the handle/lock ring and replace

position when released.		lock ring spring.
PROBLEM	**CAUSE(s)**	**REMEDY**
The wrench does not click.	The pawl is not in the pawl slot. **OR** There is no pressure on the pawl.	Disassemble wrench and add washers to increase pressure on pawl. **NOTE** When placing the ratchet/head drive into the tube to insert the pivot pin, the drive pivot hole must be pushed into the tube to align the holes. If there is no pressures remove parts and add more washers to increase pressure on the pawl.
The wrench only clicks in one direction or can only be calibrated in one direction.	The head drive and/or secondary arm (if used) are not in centerline.	Replace the head drive and/or secondary arm (if used).
The pawl double clicks.		Check and replace as needed head and/or secondary arm (if used). Check and replace the pawl, as needed.