



**TECHANGLE**

November 30, 2005

**TECHANGLE™ Wrench CALIBRATION (NON-MEMORY MODELS)**



**Calibration events are recorded in the wrench memory and provide evidence to void factory certification. Contact your *Snap-on* sales representative for authorized calibration and repair services.**

**Use this procedure to calibrate the following TECHANGLE Models:**

A TECH2FR100 (100 ft-lb full-scale)

A TECH3FR250 (250 ft-lb full-scale)

**Equipment Required:**

A torque source, accurate to 0.5% of reading or better, capable of suspending the wrench horizontally or vertically from the drive end. Refer to Snap-on Torque Calibration Equipment: TTC2000, TTC2800 and VERSATEST250/600 product lines.

Angle test fixture ATEST180, or equivalent, available from CDI/Snap-on 1-(800) 525-6319.

**NOTES:**

1. If the wrench display shows "**Err0**" at power on, the wrench is damaged and must be repaired before attempting calibration.
2. When calibrating or checking flex-ratchet models, insure that the head is straight (non-flexed).
3. When calibrating, (clockwise only) or checking wrenches for torque accuracy, (clockwise or counter-clockwise) always apply load at the appropriate "V" notch near the center of the handle.
4. Use TRACK mode if calibrating or checking with an electronic torque tester.
5. Always calibrate with new "AA" cells installed.
6. If the ON/RESET key is pushed any time before completing step 7 of the torque procedure or step 6 of the angle procedure, the wrench will escape from the calibration mode and default to the previous calibration parameters.
7. At least 5% of full-scale torque is required to check the wrench in angle measurement mode.
8. No torque is required to calibrate angle in the calibration mode.

**TORQUE Calibration Procedure (per ASME B107-28)**

1. Push the ON key to turn the wrench on.

2. Momentarily apply full-scale torque three times in the clockwise direction.
3. Select UNITS (Nm, ft-lb, or in-lb)
4. While pushing the ON key, push the UP key once momentarily and then push the DOWN key until (about 3 seconds) the display shows "**tCAL.**"
5. With no torque applied, remove the wrench from the torque source and wait at least 15 seconds. Then push the UNITS key momentarily to set zero into memory. (Initiate a zero/tare of the torque source as well).
6. Apply continuous full-scale torque in the clockwise direction at the "V" groove in the handle. On FR models, be sure the flex-head is straight (non-flexed). Use the UP and DOWN keys to adjust the wrench display to match the applied torque.
7. Push UNITS key (about 3 seconds) to accept the new calibration parameters into memory. The display momentarily reads "**CAL**" and then "**End.**"
8. Release the torque and the wrench reverts to measurement mode. On non-D models, use the UP and DOWN keys to PRESET the wrench to maximum. On "D" models, to retain the customer's settings, do not change the torque or tolerance presets. (See note 7 above).
9. Verify calibration by applying 20%, 60% and 100% of F.S. in the clockwise direction. All readings must be within 2% of the applied torque.\*
10. Momentarily apply full-scale torque three times in the counter-clockwise direction.
11. Remove the wrench from the torque source, wait at least 15 seconds. Then push the ON key. (Initiate a zero/tare of the torque source as well).
12. Verify calibration by applying 20%, 60% and 100% of F.S. in the counter-clockwise direction. All readings must be within 3% of the applied torque.\*

\*For example: If the certified torque source is within 0.5% then a properly calibrated FR model should be within 2.5% of the applied torque in the clockwise direction and within 3.5% of the applied torque in the counter-clockwise direction.

## **ANGLE Calibration Procedure**

1. Fixture set up: Loosen the fixture torque clutch. (Refer to fig.1 next page) Rotate the index wheel for 180 degree indexing. (no notches on top)
2. Push the ON key to turn wrench on.
3. While pushing and holding the ON key, push the DOWN key once momentarily and then push and hold the UP key until the display shows "**ACAL.**"
4. Install the wrench onto the ATEST180 fixture to the left as shown below, (Fig. 2). Bias the wrench up gently against the index stop. With the wrench stationary, push UNITS key once to activate angle reset (NOTE: display will show "- -" until the wrench is held still. The display shows "**turn**").
5. Keeping the flex-head straight, push the index stop back (Fig. 3) and rotate the wrench in a CW direction, 180.0°, at a rate of about 30° per

second until the index engages. Allow the wrench to hang against the stop. (Fig. 4)

NOTE: “**ErrA**” indicates that the wrench was jerked/rotated too quickly for proper calibration, or the angle sensor offset voltage is outside nominal range. Escape the calibration mode (ON key) and begin procedure again.

NOTE: “**ErrC**” indicates that angle accumulation is outside nominal range. Escape the calibration mode (ON key) and begin procedure again.

6. Push UNITS key (about 3 seconds) to accept new calibration parameters into memory. Display momentarily reads “**CAL**” and then “**End**” and then reverts to measurement mode last selected.
7. Fixture set up: Adjust the tension ring on the ATEST180 fixture to approximately 10% of full-scale torque of the wrench under test. (Fig.1)
8. Verify calibration at 45.0°, 90.0°, 135° and 180.0° in both CW and CCW directions using the opposite edge of the index wheel (notches on top) on the ATEST180 fixture. (Fig. 5, 6,7) All readings must be within +/-1% of reading +1 degree of indexed rotation.

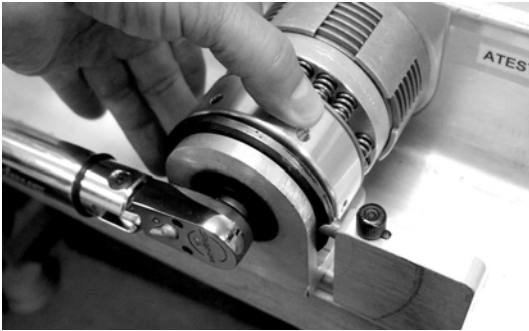


Fig. 1 Loosen to CAL, set 10% of F.S. to CHECK. Fig. 2 Bias wrench up against index

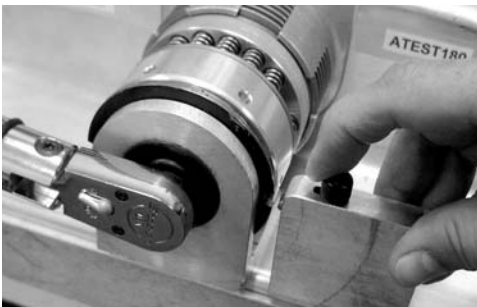


Fig. 3 Release index stop and rotate

Fig. 4 Rotate to 180 degree index and let hang

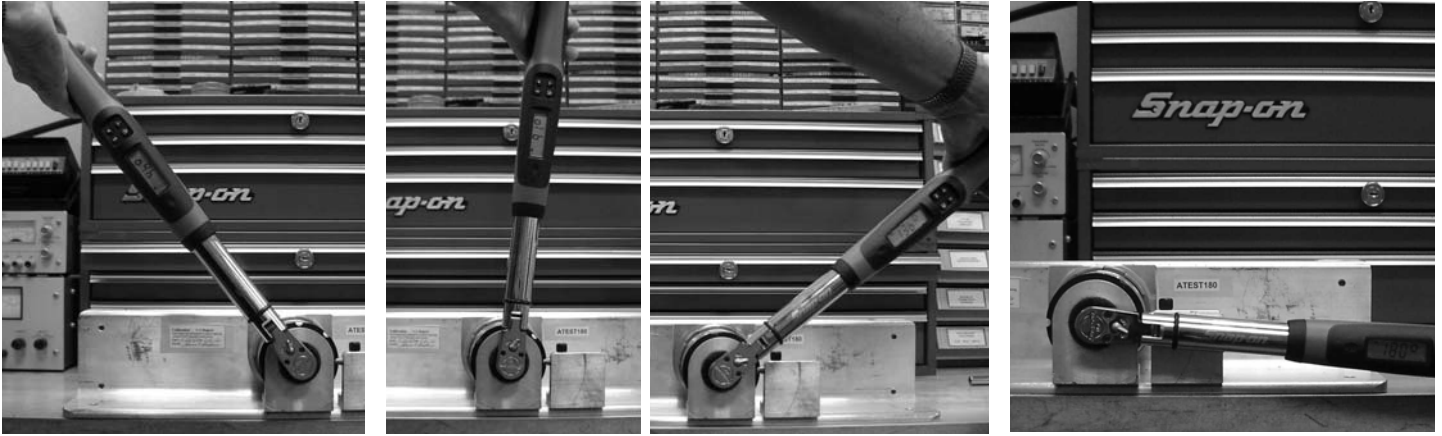


Fig 5, 6, 7, 8 from left horizontal, rotate CW and stop at 45, 90, 135 and 180 degree indexes, recording the wrench display readings. Repeat in CCW direction.