TECHWRENCH
TECHNICAL PAGE

November 30, 2005

The **TECHWRENCH®** is an electronic torque wrench. It was designed to provide basic

electronic features, such as UNITS CONVERSION, (Nm, ft-lb and in-lb) TRACK, PEAK HOLD, PRESET, TOLERANCE and DATA STORAGE functions on a robust, yet ergonomically comfortable, wrench platform. It is priced to compete with mechanical bending beam, dial, preset and adjustable click-type torque wrenches.

WARNING ***Risk of flying particles.***
Over torquing can cause breakage. Force against flex stops on flex head can cause head breakage. An out of calibration torque wrench can cause part or tool breakage. Broken hand tools, sockets or accessories can cause injury. Excess force can cause crowfoot or flare nut wrench slippage.

- **Read this manual completely** before using the TECHWRENCH.
- For personal safety and to avoid wrench damage, follow good professional tool practices.
- Periodic recalibration is necessary to maintain accuracy.
- **Wear safety goggles, user and bystanders.**
- Be sure all components, including all adaptors, extensions, drivers and sockets are rated to match or exceed the torque being applied.
- Observe all equipment, system and manufacturer's warnings, cautions and procedures when using this wrench.
- Use the correct size socket for the fastener. .
- Do not use sockets showing wear or cracks.
- Replace fasteners with rounded corners.
- **To avoid damaging the wrench:** Never use the wrench with the power off. Always turn ON the wrench so the applied torque is being measured.
  - Do not press ON/ZERO while torque is applied.
  - Never use this wrench to break fasteners loose.
  - Do not use extensions, such as a pipe, on the handle of the wrench.
  - Check that the wrench capacity matches or exceeds each application before proceeding.
- Make sure the ratchet direction lever is fully engaged in the correct position.
- Verify the calibration of the wrench if you know or suspect its capacity has been exceeded.
- Do not force the head of flex head drives against stops.
- Always pull - do not push - on the wrench handle and adjust your stance to prevent a possible fall should something give.

WARNING ***Electrical Shock Hazard.***
Electrical shock can cause injury. Plastic handle is not insulated.

- Do not use on live electrical circuits.

TECHWRENCH® SPECIFICATIONS
NON-MEMORY MODELS

Display Capacity and Resolution

Model	Drive	Range ft-lb	in-lb	Nm
TECH1	1/4 in	2.00 - 20.00	24.0 - 240.0	2.71 - 27.12
TECH2	3/8 in	5.0 - 100.0	60 - 1200	6.8 - 135.6
TECH3	1/2 in	25.0 - 250.0	300 - 3000	33.9 - 339.0
TECH4	3/4 in	60.0 - 600.0	720 - 7200	81.3 - 813.6

Note: "SJ" versions display Nm units of measure only

Accuracy (72°F)	**CW**	**CCW**
Flex Ratchet	+/-2%	+/-3% of reading, 20% to 100% of full scale
Head	+/-4%	+/-6% of reading, 10% to 19% of full scale
(non-flexed)	+/-8%	+/-10% of reading, 5% to 9% of F.S. (TECH2 only)
	CW	**CCW**
J, Y, X, and Z	+/-4%	+/-6% of reading, 20% to 100% of full scale
Interchangeable	+/-8%	+/-12% of reading, 10% to 19% of full scale
Tool Heads	+/-16%	+/-20% of reading, 5% to 9% of F.S. (TECHY only)

Torque Setting Resolution
TECH1 0.1 ft-lb, 0.1 Nm, 1.0 in-lb
TECH2 1.0 ft-lb, 1.0 Nm, 1 in-lb.
TECH3 1.0 ft-lb, 1.0 Nm, 1 in-lb.
TECH4 1.0 ft-lb, 1.0 Nm, 1 in-lb.

Tolerance Setting **fixed*** at -2% of torque setting (non "D" versions)
adjustable (+ and -) 1 to 16% of torque setting ("D" versions)

***Output alert occurs 2% below setting**

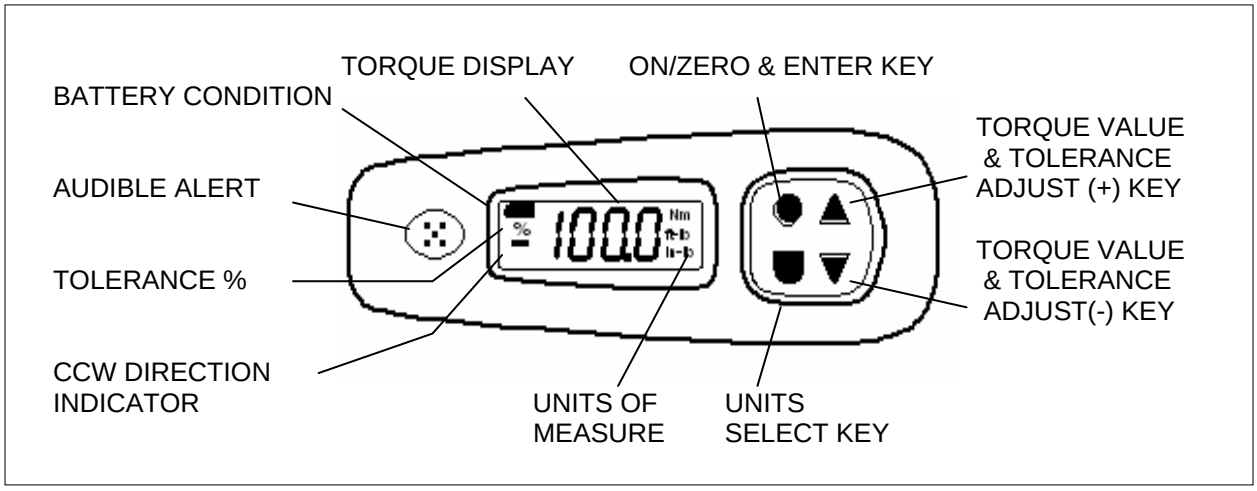
Operating Temperature 40 to 110°F (5 to 42°C)
Storage Temperature -1 to 122°F (-20 to 50°C)
Humidity - up to 90% non-condensing

Dimensions -	length	weight		length	weight (w/o tool head)
TECH1FR	15 in	1.7 lbs.	TECH1J	13.5 in	1.6 lbs.
TECH2FR	17 in	2.2 lbs.	TECH2Y	15.5 in	1.9 lbs.
TECH3FR	26 in	3.7 lbs.	TECH3X	23.5 in	2.9 lbs.
TECH4FR	48 in	10.0 lbs.	TECH4Z	45.5 in	7.0 lbs.

Battery - three "AA" Alkaline cells, over 100 hours continuous operation.
Auto Shut-off - after 2 minutes idle with no torque applied.

OPERATOR INSTRUCTIONS

Display and Keypad



Using the TECHWRENCH® (NON "D" VERSIONS)

1. **Push ON/ZERO key – the wrench will self-test and display the last fastener torque spec. setting.**

2. **Push UNITS key – to select "Nm," "ft lb," or "in lb."**

3. **Push and hold (+) or (-) keys to set the torque value.**

4. **Apply torque slowly, grasping the center of the handle*. DO NOT APPLY LOAD TO THE ENDCAP.* The display will track the applied torque. Stop and release torque when the audible alert is heard and the vibration alert is felt in the handle.**

5. **Note the peak torque applied, flashing for 10 seconds or until torque is re-applied.**

TECHWRENCH will automatically shut off after two minutes sitting idle to conserve battery power.

Using the TECHWRENCH "D" VERSIONS

1. Push ON/ZERO key – the wrench will self-test, show the torque preset value for two seconds and then show "0000."

2. Push "UNITS" key – to select "Nm," "ft lb," or "in lb."

3A. Momentarily Push ON/ZERO key while holding down the (+) key until the display flashes torque setting value. Use (+) or (-) keys to change the torque specification setting. (Display will roll-over at each end). Push ON/ZERO key to enter the new torque setting and return to measurement mode.

3B. Momentarily Push ON/ZERO key while holding down the (-) key until the display flashes tolerance percent. Use (+) and (-) keys to change the tolerance value between 1% and 16%. Push ON/ZERO key to enter new tolerance value and return to measurement mode.

4. Apply torque slowly, grasping the center of the handle. *DO NOT APPLY LOAD TO THE ENDCAP.* The display will track the applied torque. Stop and release torque when the audible alert is heard and the vibration alert is felt in the handle. A triple audible alert indicates upper tolerance has been exceeded.

5. Note the peak torque applied, flashing for 10 seconds or until torque is re-applied.

“D” Model Function Detail

The wrench will alert the user with a 1/2-second tone and handle vibration when the applied torque equals the torque setting value less the tolerance percent. A three-tone signal will indicate that the applied torque exceeds the preset value plus tolerance percent.

Example: (refer to Figure 1 on next page) A wrench is set to 80 ft-lb. If the tolerance is set to 10% then the lower alert will occur at 72 ft-lb and the over-torque alert will occur at 88 ft-lb.

A rapidly pulsing tone indicates that the wrench full-scale capacity is exceeded and the user must stop increasing torque. At 125% of wrench capacity the display will show "----" to indicate that possible damage may have occurred to the wrench. Push ON/ZERO key to initiate self-test. If the wrench has been damaged, the display will read "Err0" indicating that repair is necessary. If torque is applied while in the PRESET or TOLERANCE ADJUST modes, the wrench will output a continuous tone and handle vibration, and the display will show “**ErrP**.”

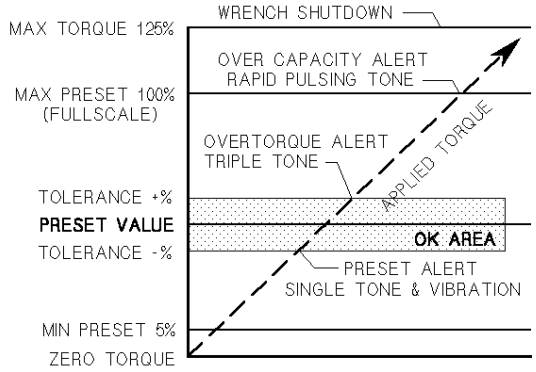


Figure 1—”D” VERSION PRESET AND TOLERANCE RANGE

INTERCHANGEABLE TOOL HEAD Models (J, Y, X and Z Shank)

NOTE: Wrench accuracy is affected by tool length. The TECHWRENCH is designed to use Snap-on A-suffix QJ, QY, QX and QZ interchangeable tools.

Tool length is measured from the center of the locking pin to the center of the fastener drive. Calibrated drive distance is from the center of the fastener drive to the calibration mark on the wrench handle.

	Tool Length	Calibrated Drive Distance
TECH1J	**2.5 in.**	**12.35 in.**
TECH2Y	**3.0 in.**	**14.82 in.**
TECH3X	**4.5 in.**	**24.30 in.**
TECH4Z	**5.75 in.**	**46.60 in.**

If the insert tool is longer (+) or shorter (-) than the calibrated tool length, refer to the formulas in “USE OF ADAPTORS, EXTENSIONS AND UNIVERSALS” TO calculate a **torque setting** adjustment.

To derive correct **torque readings**, calculate an adjustment factor as follows: Divide the sum of the drive distance and the difference in tool length by the drive distance. Example: using a tool that is short by 1/4 inch, (-0.25) on the TECH2Y wrench, fastener torque will be lower than the display value by a factor of (14.82 - 0.25) / 14.82 = 0.983. Multiply all readings by 0.983.

TECHMEMORY™ SPECIFICATIONS
MEMORY MODELS

Display Capacity and Resolution

Model	Square Drive	Range ft-lb	in-lb	Nm
TECH1M	1/4in	2.00-20.00	24.0-240.0	2.80-28.00
TECH2M	3/8in	5.0-100.0	60-1200	6.7-135.6
TECH3M	1/2in	25.0-250.0	300-3000	33.9-339.0
TECH4M	3/4in	60.0-600.0	720-7200	81.3-813.6

Note: "SJ" models display Nm units of measure only

Display Modes SETUP (PRESET), TRACK, PEAK HOLD, MEMORY RECALL

Accuracy (72°F)	**CW**	**CCW**
Fixed or Flex	+/-1%	+/-1.5% of reading, 20% to 100% of full scale
Ratchet Head	+/-2%	+/-3% of reading, 10% to 19% of full scale
(non-flexed)	+/-4%	+/-8% of reading, 5% to 9% of F.S. (TECH2 only)
	CW	**CCW**
J, Y, X, and Z	+/-4%	+/-6% of reading, 20% to 100% of full scale
Interchangeable	+/-8%	+/-12% of reading, 10% to 19% of full scale
Tool Heads	+/-16%	+/-20% of reading, 5% to 9% of F.S. (TECHY only)

Torque Setting Resolution		
	TECH1M	0.1 ft-lb, 0.1 Nm, 0.01 in-lb
	TECH2M	1.0 ft-lb, 1.0 Nm, 1 in-lb.
	TECH3M	1.0 ft-lb, 1.0 Nm, 1 in-lb.
	TECH4M	1.0 ft-lb, 1.0 Nm, 1 in-lb.

Tolerance Setting **fixed*** at -2% of torque setting (all except "D" models)
adjustable (+ and -) 1 to 16% of torque setting ("D" models)
***Output alert occurs 2% below setting for ergonomic compensation**

Output Alert Audible tone and Vibrating Handle
Memory Capacity 1000 readings - Reading number, torque value, units of measure
Digital Download RS232 (True) - selectable 1200 to 19.2K Baud

Sealed Key Pad

ON/ZERO - auto self check (not a calibration check) - zero tare
UP - increments torque setting, tolerance and scrolls memory
DOWN - decrements preset torque setting and scrolls memory
UNITS - selects **Nm, ft-lb,** or **in-lb**, display
MEMORY - store, recall and clear peak readings
PRINT - RS232 download to computer or serial printer and port setup

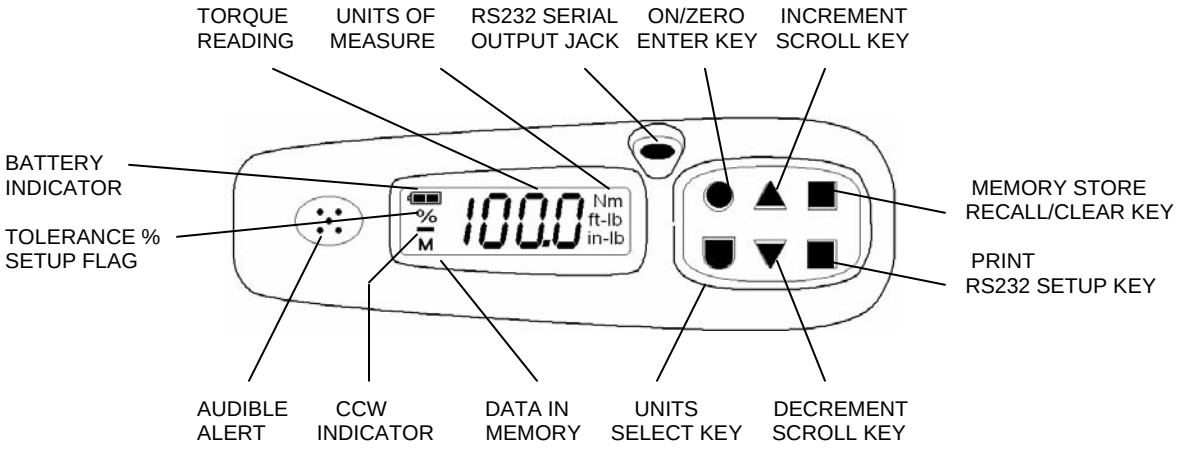
Operating Temperature - 5 to 42°C (40 to 110°F)
Storage Temperature - -20 to 50°C (-1 to 122°F)
Humidity - up to 90% non-condensing

Dimensions -	**length**	**weight**		**length**	**weight** (w/o tool head)
TECH1FRM	15 in	1.7 lbs.	TECH1JM	13.5 in	1.6 lbs.
TECH2FRM	17 in	2.2 lbs.	TECH2YM	15.5 in	1.9 lbs.
TECH3FRM	26 in	3.7 lbs.	TECH3XM	23.5 in	2.9 lbs.
TECH4FRM	48 in	10.0 lbs.	TECH4ZM	45.5 in	7.0 lbs.

Battery - three "AA" Alkaline cells, up to 80 hours continuous operation.
Auto Shut-off - after 2 minutes idle

OPERATOR INSTRUCTION
MEMORY MODELS

Display and Keypad



1. POWER ON - With no torque applied, push the "**ON/ZERO**" key – the wrench will self-test and then show the torque preset value.

*On **"D" models** the torque preset value is shown for two seconds and then the display shows "0000."*

2. UNITS SELECT - Push the **UNITS** key – to select "**Nm**," "**ft lb**," or "**in lb**."

3. PRESET ADJUST - Use the **INCREMENT** and **DECREMENT** keys to set the torque preset value. (Display will roll-over at each end).

*On **"D" models**, momentarily push the **ON/ZERO** key while holding down the **INCREMENT** key until the display flashes the torque preset value. Use the **INCREMENT** and **DECREMENT** keys to change the torque preset value. Push the **ON/ZERO** key to enter the new torque preset value and return to measurement mode.*

4. TOLERANCE ADJUST ("D" models only)

*Momentarily push the **ON/ZERO** key while holding down the **DECREMENT** key until the display flashes tolerance percent. Use the **INCREMENT** and **DECREMENT** keys to change the tolerance value between 1% and 16%. Push the **ON/ZERO** key to enter the new tolerance value and return to measurement mode.*

5. APPLY TORQUE SLOWLY until **audible** alert is heard and **vibration** alert is felt in the handle. DO NOT APPLY LOAD TO THE ENDCAP. The display will **TRACK** applied torque until load is released.

6. On load release, the **PEAK** torque value is displayed, flashing, for 10 seconds or until torque is re-applied or any key is pushed.

7. To **STORE** the PEAK reading, momentarily push the **MEMORY** key while the **PEAK** display is flashing.

MEMORY FUNCTION DETAIL

The **TECHMEMORY™** wrench will store, recall and download data to a computer or printer via RS232 true standard. A download software disk is included with the wrench for use with an IBM PC running WINDOWS or NT operating system. Refer to the **TORQLOG™** disk for PC installation instructions. Refer to your serial printer instruction manual for installation instructions - see *Setup serial baud rate* below.

Two Excel templates are provided on the **TORQLOG™** disk for user convenience. These should copied and renamed, and are intended to be changed to suit the user's needs. NOTE: *Snap-on Tools does not provide technical support for these templates.* Use the DOWNLOAD Template to print the previously stored data list from the wrench. The PRINT function of the wrench sends out the number of the reading, the torque value and the units of measure. Use the DATE-TIME Template to automatically create a DATE and TIME stamp for each reading, while the wrench is connected to the computer. Individual readings are both stored in the wrench and are sent out the serial port simultaneously. Only the torque value and the units of measure are sent out during the store function.

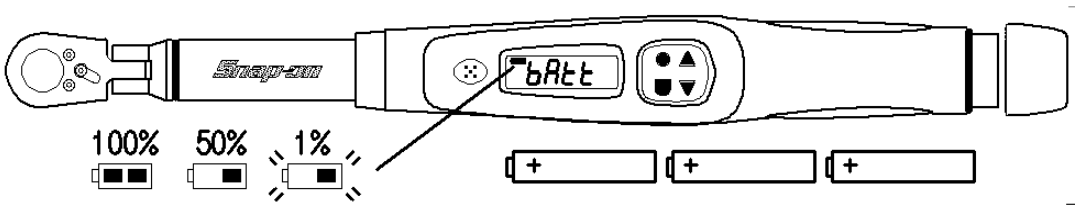
STORE - Momentarily push the **MEMORY** key to store PEAK readings captured on the flashing display. The audible alert will sound once and the reading will be stored and numbered in memory and the reading will be sent out the RS232 port simultaneously. The **"M"** indicator will turn on when at least one reading is stored in memory.
RECALL - To review the data in memory, push and hold the **MEMORY** key for three seconds. The last reading will be displayed alternating with its memory location number. Use the **INCREMENT** and **DECREMENT** keys to scroll through the data list. Push **ON/ZERO** key to return to measurement mode.
CLEAR - To clear a reading, enter the RECALL mode as above. Scroll to the memory location number that you want to clear and hold the **MEMORY** key for three seconds. The display will show **'CLr"** for one second and decrement to the next reading. If this was not the last reading stored, all subsequent readings will shift down one memory location. Push **ON/ZERO** key to return to measurement mode.
CLEAR ALL - To clear the entire data list, enter the RECALL mode as above. Hold the **MEMORY** key and the **INCREMENT** key simultaneously for three seconds. The **"M"** indicator will turn off and the wrench will revert to measurement mode.
PRINT - To send the entire data list out the RS232 port, push the **PRINT** key momentarily. The audible alert will sound twice and the display will read **"SEnd**" until the data stream is finished. The wrench will then revert to measurement mode.

Setup serial baud rate:

Note: RS232 protocol is true, 8 data bits, 1 stop bit, carriage return delay is 600 mS and character delay is 14 mS. Default is 9600 baud. Push the **ON/ZERO** key to exit the setup mode at any time without changing previous baud setup.

To change output baud rate, push and hold the **PRINT** key for three seconds to enter setup mode. Display shows previously programmed baud rate flashing and UNITS display is off. Use the **INCREMENT** and **DECREMENT** keys to select the required baud rate, "0012"=1200, "0024"=2400, "0048"=4800, "0096"=9600 or "0192"=19.2K. Push the **PRINT** key momentarily to accept the new baud rate. Audible alert will sound once and display will revert to measurement mode.

REPLACING THE BATTERY



Unscrew the endcap from the handle and install three "AA" alkaline cells, positive end into the handle first.

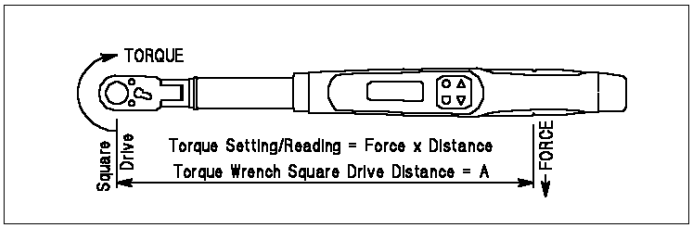
MAINTENANCE / SERVICE

Clean torque wrench by wiping with a damp cloth. Do NOT use solvents, thinners or carburetor cleaners. Do NOT immerse in anything. If the display shows "**Err0**" at power on, the wrench is damaged and must be returned for repair. Service, repair and calibration are to be done by *Snap-on* Service Centers only.

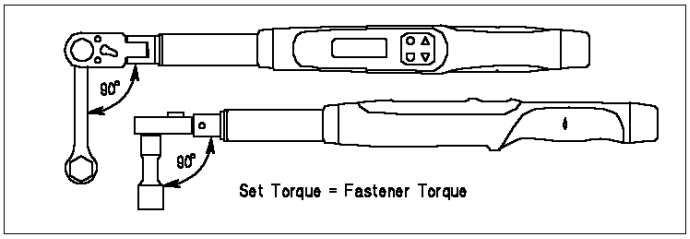
USE OF ADAPTORS, EXTENSIONS AND UNIVERSALS

Anytime an adaptor, extension or universal is used with a torque wrench in such a way that the fastener distance is different than the torque wrench square drive distance, an adjustment to the set torque is required to get proper fastener torque.

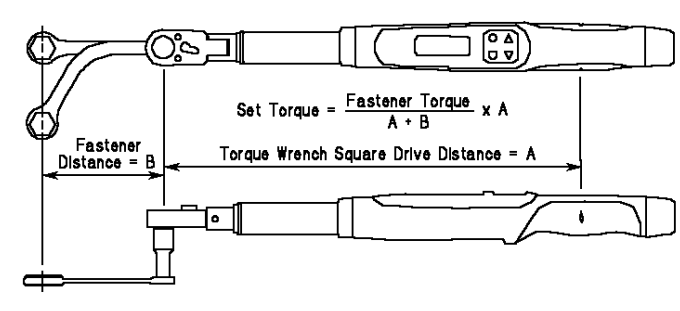
Fastener torque equals torque wrench square drive torque. Wrench setting is equal to desired fastener torque.



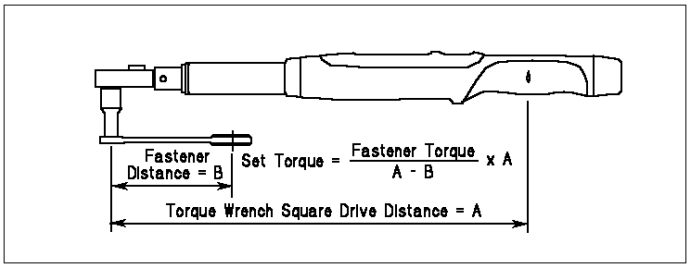
Fastener torque equals torque wrench square drive torque. Wrench setting is equal to desired fastener torque.



Fastener torque is greater than torque wrench square drive torque. Calculated setting will be lower than desired fastener torque.



Fastener torque is less than torque wrench square drive torque. Calculated setting will be higher than desired fastener torque.



When using wobble extension or a universal, do not exceed more than 15 degrees of offset from perpendicular drive. Do not use a long extension with the flex-drive at full flex.