
12.0 WARRANTY

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1.0 INTRODUCTION

Thank you for purchasing a Check-Line CAP-T Torque Tester. We are confident that you will get many years of service from this product.

The CAP-T can be used to test a number of different closure shapes and sizes, along with other types of samples. To maintain normal functioning of the tester, avoid repetitive overloads and shock loads.

Two models are available. The CAP-T-XX basic model and the CAP-T-XXRS which includes an RS-232 and Digimatic output for connection to a PC or printer.

Before continuing, carefully unpack the CAP-T and check for any damage. Inspect the contents to ensure that you have received a tester complete with all accessories.

1.1 Included items

- CAP-T Torque Tester
- User's guide (this booklet)
- 4 Sample gripping posts
- AC Adapter



1.2 Optional Items

• Sample Gripping Jaws:

See photo page 3. These jaws are for use with square or other shaped containers, in addition to round samples. The jaws are reversible; one side has a V-groove, while the other side is flat. These jaws can be mounted to the inside or outside of the sliders. **Part # CAP-T-JAWS**

• CAP-T-XX RS Version:

This model allows torque data to be transferred to a PC, printer, or other device for data analysis. The package consists of a serial connector and data button to manually output data. For more automated data collection, common software programs such as WinWedge (available from Electromatic) can be configured to automatically request data from the CAP-T.



11.0 OUTPUTS

Outputs are available as part of the CTRS communication option. If installed, it offers RS-232 and Mitutoyo BCD outputs on the 9-pin male connector. Please refer to the pin diagram below for proper connection.

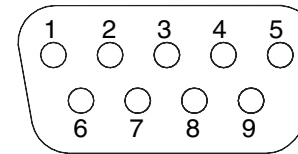
RS-232

The data transmission can be initiated by pressing the DATA button or by an external device by sending ASCII "?" to the gauge. The gauge will respond by sending the current reading in either full or numeric format, depending on the configuration setting (see Section 3). Polarity sign indicates CW (+) or CCW (-) torque. The transmitted string has the following format:

[POLARITY (SPACE OR -)][DATA][SPACE][UNITS (IF ENABLED)][CRLF]

Mitutoyo BCD

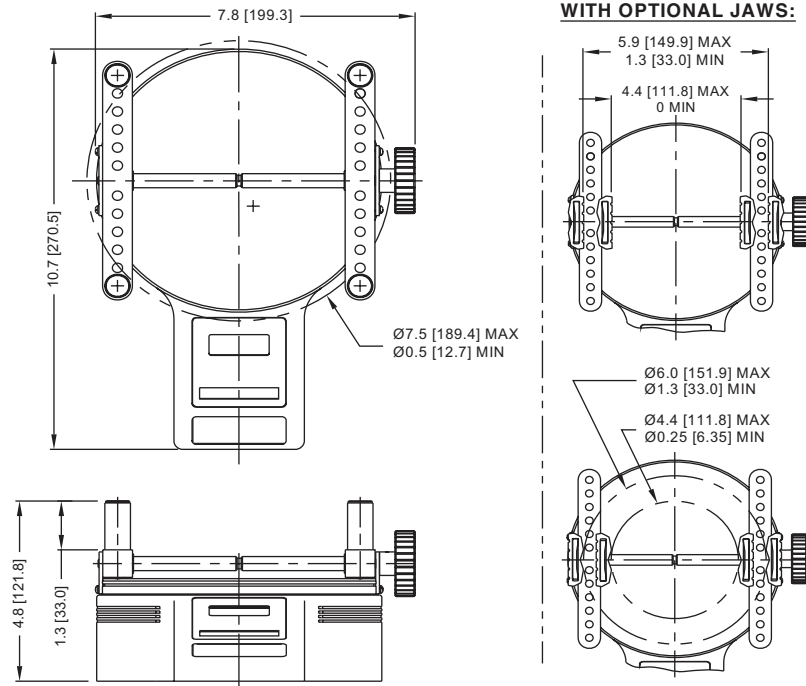
This output is useful for connection to data collectors, printers, multiplexers or any other device capable of accepting Mitutoyo BCD data. The transmission is initiated by the DATA button (see Section 3 about settings) or by the receiving device.



DB-9P

- 1 RS-232 receive Input
- 2 RS-232 transmit Output
- 3 Mitutoyo request Input
- 4 Mitutoyo clock Output
- 5 Signal ground
- 6 No connection
- 7 No connection
- 8 Mitutoyo ready Output
- 9 Mitutoyo data Output

10.2 Dimensional Drawings



all dimension in mm

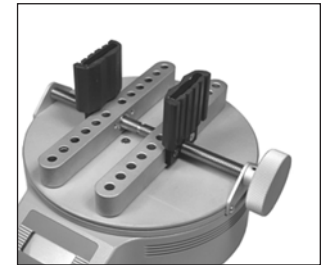
2.0 SET-UP

Carefully unpack the CAP-T and check for any damage. Inspect the contents to ensure that you have received a tester complete with all accessories – see page 2.

Place the tester on a firm, flat and level working surface free from vibration. If preferred, the CAP-T can be secured to a work bench with screws through the four tapped holes in the underside of the base. Then insert the posts or sample gripping jaws into the desired holes on the sliders.



Gripping posts (included)



Gripping jaws (optional)
Part # CAP-T-JAWS

3.0 CONTROLS

CAP-T Torque Testers have three keys for controlling all functions:

POWER: Turns power on and off. Also used in Calibration mode.

PEAK: Used to select Clockwise Peak, Counterclockwise Peak or Normal (real time) display mode. The actual peak readings are always captured and can be recalled at any time.

ZERO: Zeros any tare value (up to the full capacity of the gauge) and clears the peak readings stored in memory.

DATA: (optional) Used to manually output the torque data point currently displayed.



4.0 DISPLAY

The display consists of a 4-1/2 digit section and several indicators. Their functions are listed below.



- LO BAT** Low battery voltage indicator
- CW** Clockwise torque indicator
- CCW** Counterclockwise torque indicator
- CW PEAK** Peak clockwise indicator
- CCW PEAK** Peak counterclockwise indicator
- OZIN, LBIN**
NCM, KGMM Units of measurement (model dependent)
- - - - (dashes)** Overload (>110% of range)

5.0 POWER

The CAP-T may be powered by the internal 9V battery, or by the included AC adapter. The need for battery replacement is indicated by a 3-step sequence:

1. A steady **LO BAT** appears on the display indicating the last 10% of battery life
2. **LO BAT** begins to flash indicating the need for an immediate battery replacement
3. The entire display except **LO BAT** flashes for several seconds and then the tester shuts off.

10.0 SPECIFICATIONS

- Accuracy** $\pm 0.5\%$ of full scale ± 1 digit
- Sampling rate** 30/s
- Display update rate** 2.5/s in normal mode, 30/s in peak mode
- Safe overload** 150% of gauge capacity.
Display shows---- (dashes) above 110%.
- Power** 9V battery or AC adapter
- Battery life** 30 hours of continuous operation
- Weight** 10 lb [4.5 kg]

9.1 Force Ranges

Model	Capacity	Resolution
CAP-T-12	12 lb-in	0.01 lb-in
	140 kg-mm	0.1 kg-mm
	135 N-cm	0.1 N-cm
CAP-T-50	50 lb-in	0.05 lb-in
	580 kg-mm	0.5 kg-mm
	570 N-cm	0.5 N-cm
CAP-T-100	100 lb-in	0.1 lb-in
	1150 kg-mm	1 kg-mm
	1150 N-cm	1 N-cm

9.0 OPERATION

Place the sample between the posts or jaws of the tester, and tighten, using the knob. Posts can be placed in any of the holes on the sliders.

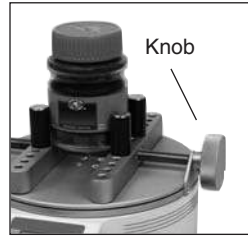
Ensure that the sample is gripped firmly, however, excessively tightening thin-walled closures may result in sample deformation, possibly affecting test results. When the sample is secured, gradually exert torque by hand.

NOTE: Sudden torque application may produce incorrect readings.

The default mode of operation is the normal (real time) mode.

If the peak readings are to be observed as they occur, then the mode of operation can be changed by pressing **PEAK** until the desired mode (CW PEAK or CCW PEAK) appears on the display.

This action affects only the display. The peak readings are captured automatically and can be recalled by pressing **PEAK**. The peak readings may be cleared from the memory by either pressing **ZERO** or shutting off power.



9.1 Changing Operating Modes and Measuring Units

The displayed units of measurement and the default mode of operation (peak or normal) can be changed by entering the setup mode as described in section 6.0, pressing **POWER** at the **init** prompt and selecting the desired settings using the **PEAK** and the **POWER** keys.

9.2 Auto Shut-off

The CAP-T is equipped with an automatic shutdown feature and it will shut off after approximately 30 minutes of inactivity (readings do not change by more than ± 10 counts and no keys are pressed). The entire display will flash for 5-7 seconds as a warning of the imminent shutdown.

To change the default setting of 30 minutes, hold **PEAK** while turning on the gauge. Press **PEAK** repeatedly until 'AOFF' appears. Press **POWER** to select this function. The current setting will flash on the display. Use **PEAK** to scroll through the displayed choices and **POWER** to select.

6.0 CHANGING UNITS OF MEASURE

1. Press and Hold the **PEAK** key and at the same time. Press the **POWER** key. (The Display will show "Aoff"). Then release all keys.
2. Press the **PEAK** key one (1) or more times until the display shows "init"
3. Press the **POWER** key one time. (The currently selected unit of measure will flash on/off on the right side of the display)
4. Press the **PEAK** key to cycle thru the choices of units. Each time the **PEAK** key is pressed the new units selection will be shown on the right side of the display. (The desired unit of measure should be flashing before you continue to step #5.)
5. Press the **POWER** key two (2) times to store the new units selections. Display will show "donE".
6. Press **POWER** again to return to the measurement mode with the new unit selection.

7.0 CONFIGURATION

CAP-T torque testers have several features with programmable options allowing many user-specified choices. To enter the configuration menu, perform the following:

1. Turn off the tester
2. Press and hold **PEAK**
3. Turn on the tester
4. Release **PEAK**

The version number of the internal software will be displayed for a short time followed by either 'Aoff' for a standard CT or '232' if equipped with CTRS communication option. The following secondary functions of keys are used during the configuration process:

POWER Used to select a menu choice
PEAK Used to step through menu choices

7.1 232 - RS-232 settings sub-menu

232d	Output Disabled
232E	Output Enabled
300	300 baud
600	600 baud
1200	1200 baud
2400	2400 baud
4800	4800 baud
9600	9600 baud

7-1E	7 data bits, 1 stop bit, even parity
7-1o	7 data bits, 1 stop bit, odd parity
7-2E	7 data bits, 2 stop bits, even parity
7-2o	7 data bits, 2 stop bits, odd parity
7-2n	7 data bits, 2 stop bits, no parity
8-1E	8 data bits, 1 stop bit, even parity
8-1o	8 data bits, 1 stop bit, odd parity
8-1n	8 data bits, 1 stop bit, no parity
8-2n	8 data bits, 2 stop bits, no parity
Ft F	Full data (numeric + units)
Ft n	Numeric data only

7.2 bcd - Mitutoyo BCD settings sub-menu

bcdd	Output disabled
<i>bcdE</i>	<i>Output enabled</i>
nPOL	No polarity (absolute value)
<i>POL</i>	<i>Data with polarity (+ for CW, - for CCW)</i>

7.3 AoFF - Automatic shutoff settings sub-menu

no	Disabled
1	1-minute automatic shutoff
5	5-minute automatic shutoff
10	10-minute automatic shutoff
20	20-minute automatic shutoff
30	30-minute automatic shutoff

7.4 init - Initial (default) settings sub-menu

LBIN	Pound-inch as default unit
KGMM	Kilogram-millimeter as default unit
NCM	Newton-centimeter as default unit
CCW	Real time display at turn on
PEAK CW	Peak clockwise display at turn on
PEAK CCW	Peak counterclockwise display at turn on
CAL	Calibration sub-menu. See CALIBRATION section.

8.0 CALIBRATION

To properly calibrate the CAP-T, application of a precise torque value equal to the full capacity of the tester in lbin (regardless of the displayed units) will be required. The procedure follows:

1. Press and hold the **PEAK** control while turning on power to the CAP-T tester.
2. When **CAL** appears on the display, press **POWER** three times to select the calibration mode.
3. At the **null** prompt, press **ZERO**.
4. At the **SPAn** prompt, apply the calibration torque and press **POWER**. The display will show **uuuu** or **nnnn** if the calibration torque is insufficient or excessive, respectively.

If this happens, the only way to terminate the calibration mode is by momentarily disconnecting the battery or connecting the AC adapter to the tester without plugging the other end into a wall outlet. This will stop the calibration procedure without making any changes to the previous calibration data.

5. Successful calibration is indicated by **donE** on the display. Press **POWER** to save the changes and resume normal operation.

CAP-T

TORQUE TESTER



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