

## SECUREPAK DIGITAL TORQUE TESTER

### Overview:

The SecurePak Torque Tester is used to test and measure applied torque. The system firmware includes functions to automatically zero the unit when no torque is applied and automatically calibrate the unit using only a 25 lb weight. The unit can display torque readings in inch pounds or Newton meters. The unit can display the highest torque in either direction, the highest torque in both directions and real-time torque measurements. The unit will display torque readings from 1.2 to 100 in-pounds in the "RUN" mode and 0.1 to 100 inch pounds in the "CAL" mode. A minus (-) sign on the LCD display indicates a "REMOVE" torque. When not in use, the unit will automatically shut itself off after 30 seconds. The auto shut-off feature can be disabled. A positive tip 9 V.A.C. adapter (which should be purchased from SecurePak to insure proper voltage and connection) or 9V alkaline battery can be used to power the unit. The unit will indicate a low battery/voltage with the "LO BAT" indicator on the LCD display.

### Operation:

This operational section assumes that all dipswitches are in the default position and that the unit has been initialized, calibrated and zeroed.

The default dipswitch settings are indicated in **BOLD** type.

- |                       |  |
|-----------------------|--|
| 1. <b>RUN/CAL</b>     | Selects run or calibration mode                            |
| 2. <b>IN*LBS/N*M</b>  | Selects inch pound or Newton Meter display                 |
| 3. <b>CWPOS/CWNEG</b> | Selects apply (pos) or remove (neg) for a clockwise torque |
| 4. <b>NORM/AUTO</b>   | Selects normal or auto mode                                |
| 5. <b>SHDN/CONT</b>   | Selects auto shut-off or continuous run mode               |
| 6. <b>STD/ADV</b>     | Selects standard or advanced communications mode           |

An "APPLY" torque is in a clockwise direction.

A "REMOVE" torque is in a counter-clockwise direction.

A "PRESS" is a button press < 5 seconds.

A "HOLD" is a button hold > 5 seconds.

After power is applied, the operator should "PRESS" the "RESET" button to power up the unit. At this point, the unit will display the highest torque applied in either direction. The torque will be displayed until the "RESET" button is pressed again, at which time a new reading is initiated. (If other than "0" see Auto Zero).

### ERR Message:

The unit will need to be calibrated whenever it displays the "ERR" message. The "ERR" message is an Error message and means the memory has been erased and the unit will need to be calibrated. In order to calibrate this unit you will need a SecurePak Calibration Kit with instructions or the unit can be sent to SecurePak for calibration.

### Auto-zero:

To "ZERO" the unit, the operator should remove any torque and "HOLD" the "RESET" switch and release when the display starts counting down. The decimal point (.) will disappear to

indicate the unit is in "AUTO-ZERO" mode. During this time the chassis should not have any torque applied or be disturbed in any way. The software will attempt to adjust the unit to the zero point. When the function is completed, the decimal point (.) will return to the display and it should read "0.0".

#### RUN/CAL Switch:

To operate the Digital Torque Tester the unit must be in Run mode. The Calibration mode is for calibrating unit only. Proper weights and equipment are needed to calibrate this unit.

#### **CAUTION:**

If the unit is left in "CAL" mode the operator can take real-time readings. In this mode, the operator should not "PRESS" or "HOLD" any button. If the operator should "PRESS" the "RESET" button, the unit will go into auto-zero. If the operator should "HOLD" the "RESET" button, the unit will go into calibration. If any buttons are pushed while the unit is in Calibration Mode, and user is not calibrating the unit, the Calibration values of the unit are void.

#### Dipswitches:

##### **RUN/CAL**

This switch will change the operating mode from the normal "RUN" mode to the "CAL" mode. The "RESET" button has different functions in this mode as noted above.

##### **INLBS/NM**

This switch will change the display format from inch pounds to Newton meters.

##### **CWPOS/CWNEG**

This switch will change which side the (-) is on. CPOW: the (-) sign will be on the remove side. CWNEG: the (-) sign will be on the apply side. **BE SURE TO HAVE THIS SWITCH IN THE CWPOS POSITION WHEN CALIBRATING.**

##### **NORM/AUTO**

This switch will change the readout mode. In "NORM" mode the unit will display the highest torque applied in either direction. In "AUTO" mode the display will alternate between and show both the highest clockwise torque and the highest counter-clockwise torque.

##### **SHDN/CONT**

This switch will select whether the unit will automatically shut off after 30 seconds of inactivity or stay on continuously. When on battery power, it is recommended the operator select "SHDN" mode to increase battery life.

##### **STD/ADV**

This switch has no function and should be left in the "STD" mode.

## **Bottling Line Control**

Regular testing of packages from each bottling line makes certain correct tightness is maintained at all times. Some bottlers make a check on each line each hour of operation.

Since capping machine chucks operate as independent units, it's best to test packages from each chuck. In routine checking, this may be accomplished by simply taking the requisite number of bottles from the line.

To determine the amount of torque required to loosen the cap, follow the recommendations of your closure manufacturer. Apply the torque gradually so as to read the maximum force used in loosening the cap.

While at least five duplicate tests are necessary in order to establish a reliable average for any set of conditions, adequate control of the line may be possible with fewer tests. For example, if testing of each line is done once an hour, 1 to 3 tests from each chuck may be adequate to determine if adjustments are needed. Experience with a specific operation can identify the amount and frequency of testing needed.

## **Correct Cap Tightness**

Removal torque is affected by many factors other than how tightly the cap is applied. Such factors include the style of caps and bottles used, type of liner, product being packed, and time after tightening and conditions of storage. In other words, removal *torque alone* becomes a measure of how tightly the cap was applied only when other factors are known or controlled.

## **Incremental Torque Gauges**

Incremental Torque Gauges are available for the beverage industry in a 28MM and 38MM size. These are normally in stock at SecurePak.

## **The following procedure is recommended:**

Select 10 bottles at random and apply a cap to each by hand, using an amount of torque estimated to be correct for the case at hand or as indicated by the table on the following page. (In applying caps, bring the torque up smoothly to the predetermined value and hold for approximately one second.) Then determine and record removal torque for each of the 10 bottles. By comparing figures obtained in this method with removal torque of packages from the line, it's possible to determine whether the capping machine is applying caps at the required tightness.

Example: 10 duplicate bottles with 20-400 finish capped by hand using plastic closures and 10 inch pounds torque gave removal torque values varying between 4 and 5 inch pounds. The same bottles closed with duplicate caps using 15 inch pounds torque gave removal torques varying from 5 to 7 inch pounds. If you need tightness equivalent to 10 to 15 inch pounds hand application, the capping machine should be adjusted to give removal torques of 4 to 7 pounds. This procedure can also be measured in Newton meters since these torque testers are calibrated in both inch pounds and Newton meters.

Since tightness obtained is a function not only of torque applied, but also of other factors such as head pressure and the time cycle, figures obtained by the above process may not correspond to the exact amount of torque actually applied by the capping machine.

In some instances (e.g. when packaging substances such as cough syrup), empty bottles should be tested since some substances on the bottle finish will result in erratic figures which do not accurately record performance of the capping machine.

*CAUTION: Where removal torque is used as a measure of tightness of application, the figure should be obtained within a few minutes of the time the cap is applied. If packages are allowed to stand for any considerable time, removal torque may change markedly. Since removal torque is affected by time and other factors, suggested tightness is not expressed directly in units of removal torque.*

The following tabulation shows suggested tightness for pulp lined metal and thermosetting closures in terms of torque as applied by hand. Lug caps, linerless polypropylene caps and polystyrene caps require special considerations. Contact your closure supplier for guidance.

Closure size in millimeters	Suggested tightness of application in units of inch pounds torque as applied by hand.
15	6-9
18	7-11
20	8-12
22	9-13
24	10-15
28	11-17
33	13-20
38	15-23
43	17-26
48	19-29
53	21-32
58	23-35
63	25-38
70	28-42
83	34-49
86	35-51
89	36-53
100	40-60
110	45-65
120	48-72
132	53-79

The preceding figures are entirely empirical and constitute a general guide rather than definite recommendations to fit specific circumstances. In a few cases, it may not be found practical to work within the limits given and experience may show in these cases that it is unnecessary.

The closure on your container must be placed over the center of the table on your unit for proper testing.

If centering of closure on the table cannot be obtained by adjusting the bumpers and pins, special brackets or fixtures are available from SecurePak.

### Care of the Instrument

The Digital and Computer Interface Torque Testers are ruggedly built and should give long service without maintenance or repair. None of the enclosed parts require oiling. An occasional drop of oil on the screw thread of the chuck will keep it operating smoothly.

The Digital and Computer Interface Torque Testers should not be in areas where contamination of unit might occur. These units are not waterproof; care should be used when cleaning.

## Digital Torque Tester – Parts List

Item	Part No.	Description	Qty.
1	MR-1044	Bumper	4
2	MR-1043	Chuck Jaw Pin	4
3	MR-157	Chuck Screw	1
4	MR-1052	Chuck Jaw – R.H.	1
5	-----	¼-20x1/4" Cup Point Set Screw	2
6	-----	Round "U" #2x1/4" Drive Screw	4
7	D-1045	Direction Plate	1
8	D-1116	Plug	2
9	-----	6-32x1/4" Round Head Machine Screw	8
10	MR-168	Sight Glass Gasket	1
11	D-167	Sight Glass (Lexan)	1
12	D-1114	Spring clip (Flush)	3
13	MR-1090	Handle	1
14	-----	8-32x3/8" Round Head Machine Screw	3
15	D-1115	Dial Spacer	2
16	D-0253	Electronic Board	1
17	-----	10-24x3/4" Socket Head Cap Screw	2
18	-----	10-32x1/4" Cup Point Set Screw	1
19	MR-187	Instrument Knob	1
20	MR-160	Chuck Screw Spacer	1
21	-----	10-24x3/8" Socket Head Cap Screw	2
22	MR-1072	Chuck Screw Bracket	1
23	MR-1057	Chuck Jaw – L.H.	1
24	D-230	Table	1
25	MR-184	Bearing (Top)	1
26	D32	Base	1
27	D-0258	Lever Arm Assembly	1
28	-----	5/8-18 Nut	1
29	MR-185	Bearing (Bottom)	1
30	-----	Bearing Retaining Ring	1
31	MR-163	Washer	1
32	-----	5/16-18x1/2" Socket Head Cap Screw	1
33	D-260	Anchor Cap	1
34	-----	10-24x5/8" Socket Head Cap Screw	3
35	D-1061	Flexure Arm	1
36	D-0240	Flexure Arm Assembly	1
37	-----	8-32x1/2" Socket Head Cap Screw	2
38	D-210	Bottom Plate	1
39	MR-1058	Rubber Foot	3
40	-----	10-24x1/4" Round Head Machine Screw	6
41	D-168	Battery Holder	1