mountz
the torque tool specialists®

P T T

Portable Torque Tester

Operating Instructions

Mountz, Inc
ISO 9001 (2000) company

PTT-2000

Features

- System Accuracy +/- 0.5% of reading from 20% to 100% of full scale.
  System Accuracy +/- 1% of reading from 10% to 20% of full scale.
- Recommended for all hand screwdrivers, wrenches or power tools.
- Provides "EZ-Plug & Play" with Mountz Transducers. Features "ARCII" technology, an instant auto-recognition system of the transducer connected to the PTT.
- Selection of six operating modes: (Track, Peak, First Peak, Audit, Torque + Angle, and Tool Test).
- Seven units of torque measurements: (ozf.in, lbf.in, lbf.ft, cN.m, N.m, kgf.m, kgf.cm).
- Features built-in Tool Tests operation.
- Includes two PC Windows based software programs:
  PTT Interface Program- for sensor calibrations, meter calibration and tool tests,
  PTT Bootloader - for updating the PTT operating systems.
  Mountz Statics Calculator - for SPC, CP & CPK calculations.
- "Flash" memory allows upgrades to be done by the user in the field & internet through the USB port.
- Five low-pass filter selections (3000, 2000, 1500, 500 and 200 Hz).
- Easy to use Menu Structure.
- Real Time Clock for time stamping of readings.
- Six-digit display.
- USB interface to download readings to PC.
- High Capacity Li-Ion Batteries for long life (30 hrs with standard transducers and 16 hrs with brushless rotary).
- Can connect to most mv/v transducers and can store calibration data for up to 50 non smart torque sensors.
- The 5VDC capability allows unit to be used with a Brushless Rotary Transducer for testing pulse tools and high RPM tools.
- Torque and Angle readings are displayed simultaneously and supports up to 8000 RPM.
- Stores a total of 2500 data points.
- Real time graph of torque vs. time using associated PC Windows software.
- Features a Buzzer and Go / No Go LEDs that illuminate when high or low setting is achieved.
- Display Accuracy is better than +/- 0.0625 of reading.

External Connections

USB

The computer connection is USB. There is no setup required. This allows for data to downloaded to a PC. The PC will require a USB I/O.

External Transducer Input

The transducer connector is a high density D-Sub connector with 15 pins. The pin description is shown below:

Pin Number	Function	Description
1	Analog Ground	
2	Brushless Signal	Output from Brushless Transducer + /- 5V
3	Not Used	
4	Sensor Direct	Used to detect transducers
5	Digital Ground	
6	Excitation Voltage +	5V or 16 volts depending on bridge or brush-less transducer
7	Bridge Signal -	Negative output from bridge transducer
8	Not Used	
9	Angle Lead	TTL output from angle detector in angle transducer
10	Sensor Drive	Used to detect transducers
11	Bridge Signal +	Positive output from bridge transducer
12	Shield	
13	Angle Trail	TTL output for angle lags Angle Lead by 90 degrees
14	+5 Volt Angle Supply	
15	Data for "Smart" Transducer	Proprietary ARCII protocol for smart transducers from Mountz

User Interface

Display Screen

Displays the menu structures, torque readings, operating mode, torque units.
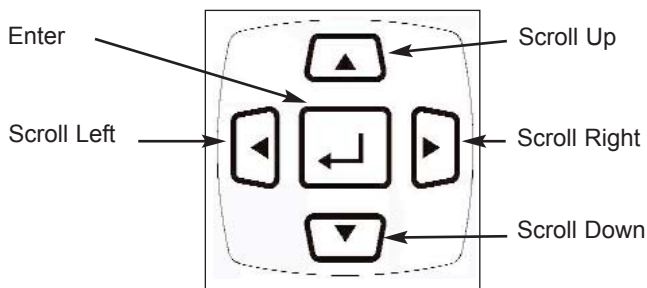
Function Keys

For selecting the following options: (Left to Right) Menu, Tool Tests & Cancel
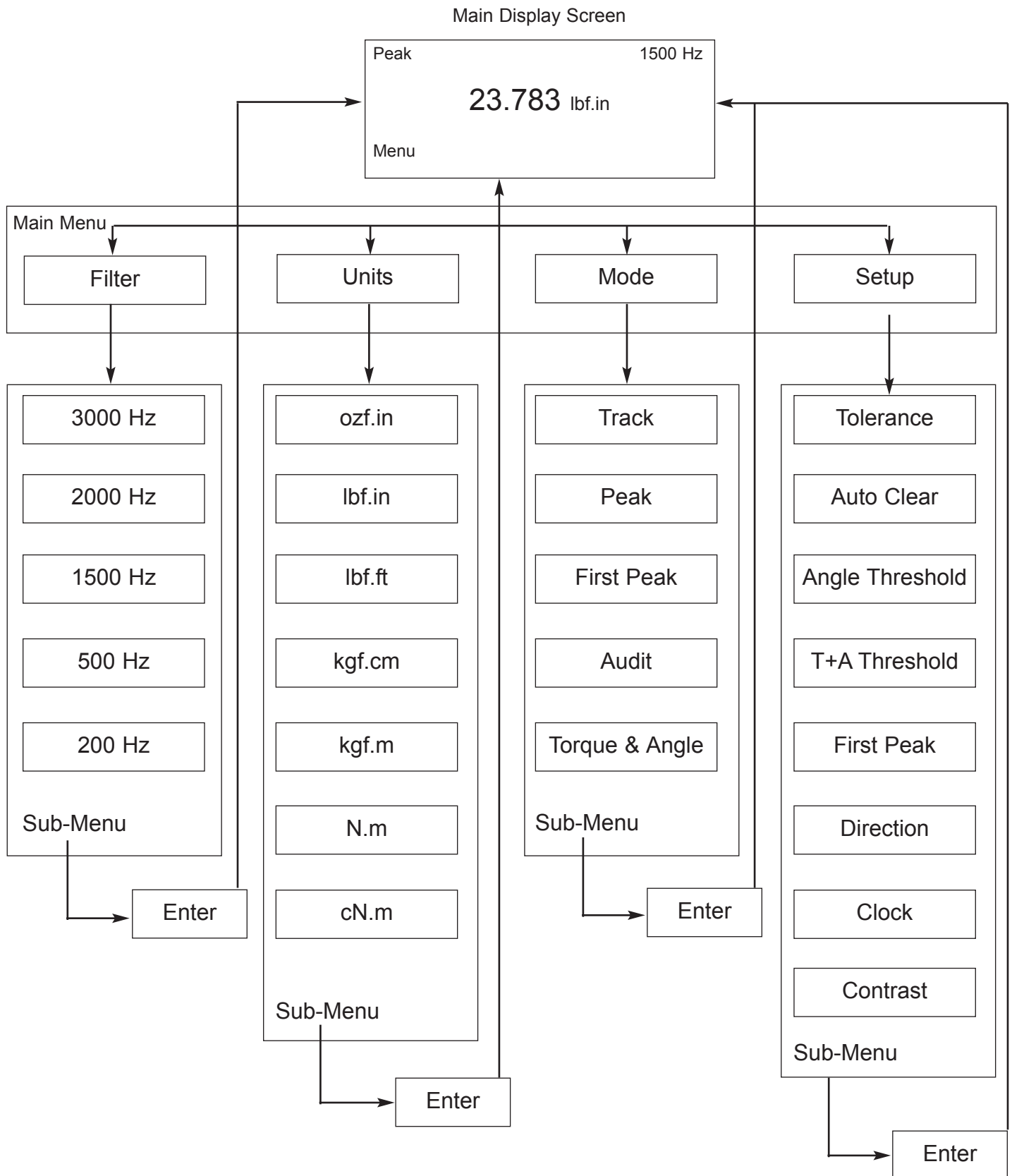
Go and No Go LEDs

Used to monitor lower and upper torque limits and receive a visual warning.

"Scroll and Enter Keys"

Used to toggle through the different menu structures.

Quick Menu Structure

Main Display Screen

Peak	1500 Hz
23.783 lbf.in	
Menu	

Main Menu

Filter	Units	Mode	Setup

Filter Sub-Menu
- 3000 Hz
- 2000 Hz
- 1500 Hz
- 500 Hz
- 200 Hz

Sub-Menu → Enter

Units Sub-Menu
- ozf.in
- lbf.in
- lbf.ft
- kgf.cm
- kgf.m
- N.m
- cN.m

Sub-Menu → Enter

Mode Sub-Menu
- Track
- Peak
- First Peak
- Audit
- Torque & Angle

Sub-Menu → Enter

Setup Sub-Menu
- Tolerance
- Auto Clear
- Angle Threshold
- T+A Threshold
- First Peak
- Direction
- Clock
- Contrast

Sub-Menu → Enter

Screen Display

When the Torque Analyzer is turned on and it is connected to a Mountz "Smart" Torque Transducer with ARCII technology it will display a Screen similar to that below for 5 seconds and then go into Reading Mode. This will also happen if a "Smart" transducer is disconnected and another smart transducer is connected.

```
Mountz PTT-2000
Version 1.00f


Tool Model
BMX750i
Serial Number
04-93-071
```
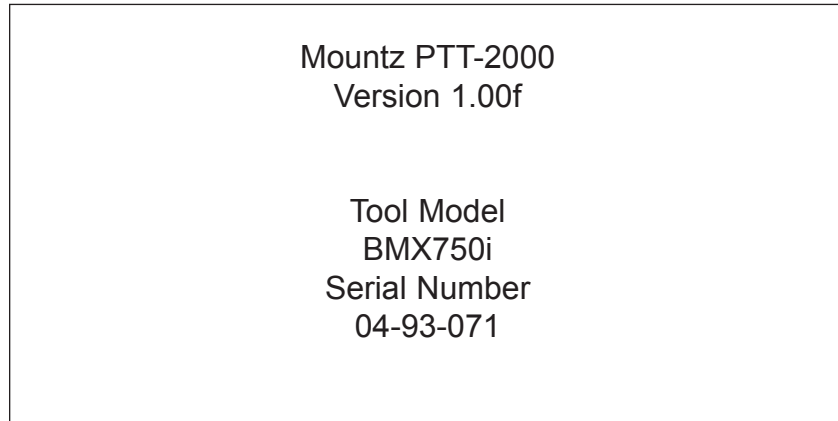
Note:
When disconnecting a smart transducer and connecting another, the operator must unplug the cable from the PTT unit.

If an un-calibrated transducer is connected then the Analyzer will display a screen as below.

```
Mountz PTT-2000
Version 1.00f



Uncalibrated Transducer -
Connect to Calibration
Software
```
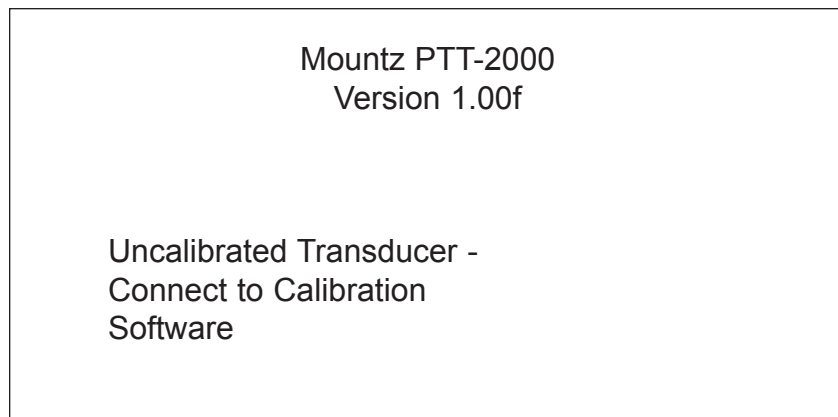
Note:
The PTT supports Non-Smart transducers and Non-Mountz transducers. Non-smart transducers can be detected and can be calibrated in the "internal" memory. The PTT will offer 2 choices. It offers to calibrate or choose from a list of transducers stored in the internal memory.
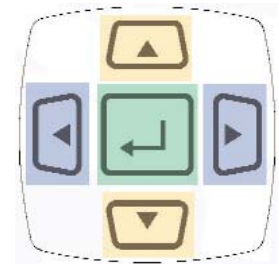
Reading Screen

```
Track                              3000 Hz



        +0.0000          Lbf.in


Menu              Tool Tests
```

Menu Selections

Pressing the "Menu" Key will present the following Screen:
1. Use the **Scroll Up or Down** key to toggle through:Filter, Units, Mode and Setup.
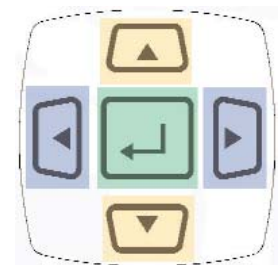2. Press **Enter** key to select a choice.

```
Filter

Units

Mode

Setup

Main
```

Selecting Filters

1. Select Filter by highlighting and pressing **Enter**.
2. Use the **Scroll Up or Down** key to toggle through the Filter options.
3. Press **Enter** key to select a Filter Setting.

```
Filter        3000 Hz
              2000 Hz
Units         1500 Hz
              500 Hz
Mode          200 Hz
Setup
Main              Cancel
```

Menu Selections

Selecting Units

▪ 1. Select Units by highlighting and pressing **Enter**.
▪ 2. Use the **Scroll Up or Down** key to toggle through the Unit options.
▪ 3. Press **Enter** key to select a Filter Setting.

Filter	lbf.in
Units	lbf.ft
	ozf.in
Mode	kgf.cm
	kgf.m
Setup	N.m
Main	Cancel
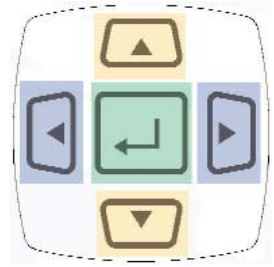
Note:
cN.m is also available but you must scroll down in the units as it does not fit on the screen.

Selecting Mode Options

▪ 1. Select Mode by highlighting and pressing **Enter**.
▪ 2. Use the **Scroll Up or Down** key to toggle through the Mode options.
▪ 3. Press **Enter** key to select a Mode Setting.
4. The Main (or reading screen) will display the value of the selected Mode.

Filter	Track
	Peak
Units	First Peak
	Audit
Mode	Torque + Angle
Setup	
Main	Cancel
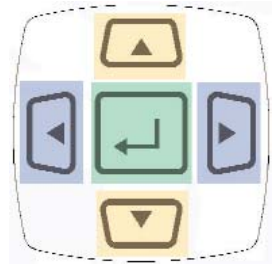
Selecting Setup

▪ 1. Select Setup by highlighting and pressing **Enter**.
▪ 2. Use the **Scroll Up or Down** key to toggle through the Setup options.
▪ 3. Press **Enter** key to select a Setup Setting.

| Filter	Tolerance
	Auto Clear
Units	Angle Threshold
	T+A Threshold
Mode	First Peak
Setup	Direction
Main	
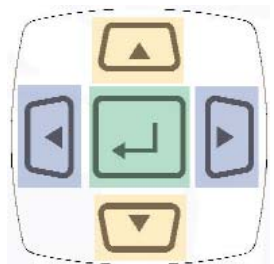
Note:
Clock is also available but you must scroll down in as it does not fit on the screen.

Mode Selections

Track

This mode constantly tracks increasing or decreasing torque variations. Use this mode to monitor varying torque on motors and machinery. Also for calibration and testing of dial torque products (small wrenches or dial screwdrivers).

```
Track                    1500 Hz

           +00.000 lbf.in

Menu        Tool Tests
```
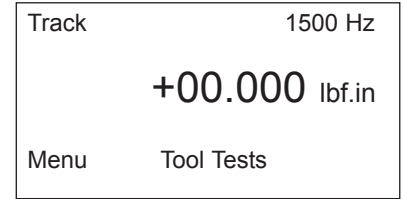
Peak

The display retains the highest torque applied. Use this mode during calibration or testing of any hand type torque wrench (dial, beam, and screwdriver), as well as power tools.
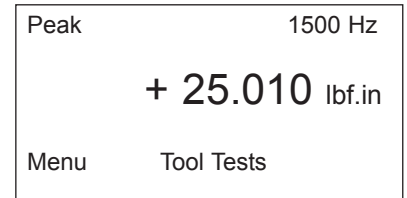
```
Peak                     1500 Hz

          + 25.010 lbf.in

Menu        Tool Tests
```

First Peak

The display holds the first detected torque peak applied. Before any torque is applied, the display show dashes in the torque value area. Once peak is detected, the display will show the torque value. If a second peak is detected then it will be displayed in the lower right (in small reverse video).

```
FPK                      3000 Hz

           ------- lbf.in

Menu        Tool Tests
```
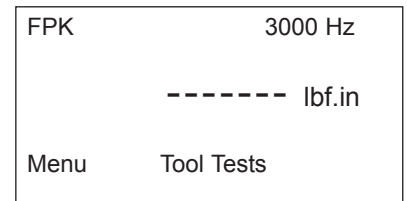
This function is primarily used for testing and calibrating click type mechanical torque wrenches. The PTT captures the point where the wrench clicks. This peak may be used for operator training on correct use of the wrench. Always apply torque smoothly to avoid false first peak readings.
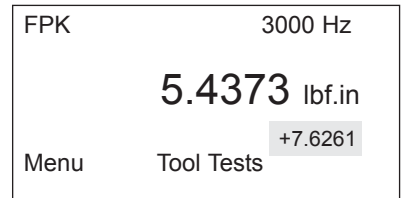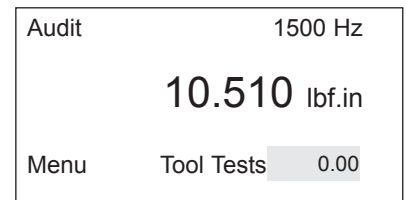
See page 11 for setting up First Peak.

```
FPK                      3000 Hz

           5.4373 lbf.in
                      +7.6261
Menu        Tool Tests
```

Audit

This mode is used to determine "first movement" or what is commonly known as "break-away" torque to determine the actual torque on the joint. An angle enabled transducer is required to operate in this mode.
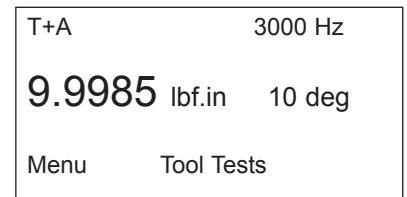
See page 9 for setting up Angle Threshold.

```
Audit                    1500 Hz

          10.510 lbf.in

Menu        Tool Tests     0.00
```

Torque + Angle

This allows an operator to set up an initial torque and follow up with a rotation to a specified angle and display the final torque.

The PTT can collect Torque and Angle data if the unit is connected to a transducer that includes the angle function. It is a "Real Time" angle function that can capture Torque and Angle up to 8000 RPM.

See page 10 for setting up Torque + Angle.

```
T+A                      3000 Hz

9.9985 lbf.in    10 deg

Menu        Tool Tests
```

Setup Selections

Tolerance

The Tolerance parameters control the Go and No-Go signal response (see Go / No Go Signal section). The user sets a lower and upper torque thresholds to get a visual and audible warning signals when these limits are reached or breached during operation. This function is primarily used for safety and quality control.

Selecting Tolerance

1. Press the **"Menu"** Button.
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Tolerance**.
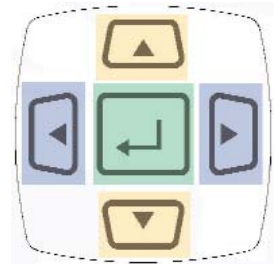
Filter	Tolerance
Units	Auto Clear
Mode	Angle Threshold
	T+A Threshold
Setup	First Peak
	Direction

1. Press the **Right** or **Left** key to toggle between High and Low Tolerance..
2. Use the **Scroll Up or Down** key to change the tolerance settings .
3. Press **Enter** key once setting is complete.
4. Press **Main** button to return to main display screen.

```
         Tolerance Setting

    Low:  _0.000         lbf.in
    High: 84.950         lbf.in

 Main
```

Clear

This function controls the method of clearing the display of torque readings.
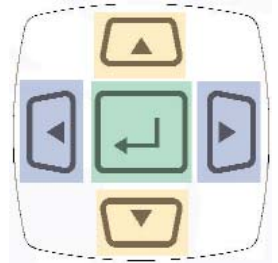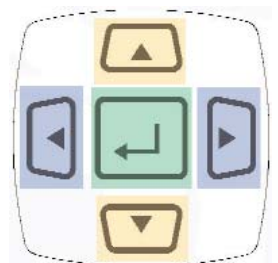
Auto Clear
When Auto Clear is selected, the torque values, during operation, will automatically be cleared from the display. The user can set the time threshold to control how long the values should be displayed before clearing.

Manual Clear
When Manual Clear is selected, the torque values during operation will indefinitely be display until the user presses the Clear key.

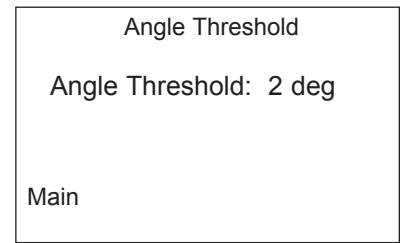## Selecting Clear

1. Press the **"Menu"** Button.
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Auto Clear**.

Filter	Tolerance
Units	Auto Clear
Mode	Angle Threshold
	T+A Threshold
Setup	First Peak
	Direction

1. Use the **Scroll Up or Down** key to toggle between Manual or Auto Clear.
2. Press the **Scroll Left or Right** key to move down to the Time selection
3. For Auto Clear, use the **Scroll Up or Down** key to toggle between the selection of time between 1- 5 seconds.
4. Press **Enter** key once setting is complete.
5. Press **Main** button to return to main display screen.

Auto Clear Setting

Mode: Auto

Time (seconds): 2

Main

Angle Threshold

This is for the Audit mode. The default setting is 2 degrees, but it can be set from 1 to 5 degrees.

Selecting Angle Threshold

1. Press the **"Menu"** Button.
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Angle Threshold**.

Filter	Tolerance
	Auto Clear
Units	Angle Threshold
Mode	T+A Threshold
	First Peak
Setup	Direction

1. Use the **Scroll Up or Down** key to toggle through the degree values (0.25-5)
   It move at increments of 0.25
2. Press **Enter** key once setting is complete.
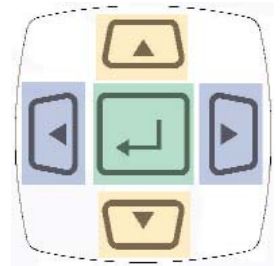3. Press **Main** button to return to main display screen.

```
           Angle Threshold

     Angle Threshold:  2 deg



 Main
```

Torque + Angle

This allows an operator to set up an initial torque and follow up with a rotation to a specified angle and display the final torque.
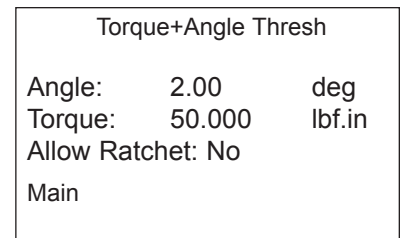
Selecting Torque + Angle

1. Press the **"Menu"** Button.
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Torque + Angle**.

Filter	Tolerance
Units	Auto Clear
	Angle Threshold
Mode	T+A Threshold
Setup	First Peak
	Direction

1. Press the **Right** or **Left** key to toggle between the three settings: Angle, Torque Allow Ratchet
2. Use the **Scroll Up or Down** key to set Angle (increments of 0.25)
3. Use the **Scroll Up or Down** key to set Torque (increments of 0.5)
4. Use the **Scroll Up or Down** key to set "Yes" or "No" for allowing ratchet*.
5. Press **Enter** key once setting is complete.
6. Press **Main** button to return to main display screen.
   * Note - "Yes" allows for ratcheting the wrench back without accumulating angle.

```
        Torque+Angle Thresh

 Angle:       2.00      deg
 Torque:      50.000    lbf.in
 Allow Ratchet: No
 Main
```

First Peak

The display holds the first detected torque peak applied. Before any torque is applied, the display show dashes in the torque value area. Once peak is detected, the display will show the torque value. If a second peak is detected then it will be displayed in the lower right (in small reverse video).

Selecting First Peak

1. Press the **"Menu"** Button.
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **First Peak**.
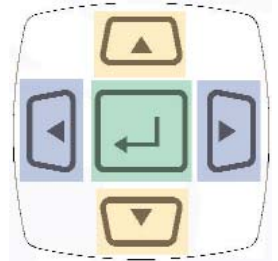
Filter	Tolerance
Units	Auto Clear
Mode	Angle Threshold
Setup	T+A Threshold
	First Peak
	Direction

1. Use the **Scroll Up or Down** key to toggle through the sensitivity settings: (Low, Medium & High)
2. Press the **Right** or **Left** key to move down to the Min Peak setting location
3. Use the **Scroll Up or Down** to set the Minimum Peak
4. Press **Enter** key once setting is complete.
5. Press **Main** button to return to main display screen.

First Peak Setup

Sensitivity: Low
Min Peak: 5.0089   Lbf.in

Main

Note:

First Peak Sensitivity

This feature is provided for click wrenches. It is not relevant for Mountz Break-over or Cam-over products such as MMTB, TB, TBIH, MTBN, TSN, TSP, and TSC.

High sensitivity will clearly display the "double" peak produced by a click wrench. Low sensitivity will reduce "false peaks" caused by operator hesitation.

For most click wrenches try using Medium sensitivity this works for many types of click wrenches such as the Mountz Titan and DM wrenches. As different types of click wrenches differ in how quickly they move from a first peak (click) to a second peak (over torque). Some experimentation, with sensitivity, may be required in order to get repeatable results.
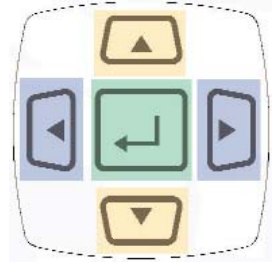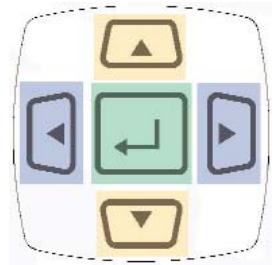
Direction

Allows an operator to set the direction for capturing the torque readings: (Clockwise, Counter Clockwise and Both directions).

When performing a dead weight calibration, the direction should be set for both directions.

Selecting Direction

1. Press the **"Menu"** Button .
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Direction**.

Filter	Tolerance
Units	Auto Clear
Mode	Angle Threshold
	T+A Threshold
Setup	First Peak
	Direction

1. Use the **Scroll Up or Down** key to toggle through the dIrection settings:
   (Both, CW, CCW)
2. Press **Enter** key once setting is complete.
3. Press **Main** button to return to main display screen.

```
        Direction Setting

   Direction: BOTH



   Main
```

Selecting Clock

1. Press the **"Menu"** Button.
2. Use the **Scroll Down** key and select Setup by highlighting and pressing **Enter**.
3. Use the **Scroll Up or Down** key to toggle through the Setup options.
4. Press **Enter** key to select a setup setting for **Clock**.

Filter	Auto Clear
Units	Angle Threshold
	T+A Threshold
Mode	First Peak
	Direction
Setup	Clock

1. Use the **Scroll Up or Down** key to toggle through the digits for the date and time.*
2. Use the **Right and Left** key to move through the time and date sections.
3. Press **Enter** key once setting is complete.
4. Press **Main** button to return to main display screen.

Note:

Must toggle through the first "time digits" to change from AM to PM.

```
        Clock Setting

          2:57 PM

          11/15/05


Main
```

Transducer Calibration Reminder

Six months from the date of the transducer's calibration a message will appear on the screen informing the operator it has been six months since the date of calibration. At this point the operator can pull the Transducer out of service or decide to continue to use it. After the initial message the user will be reminded one a month.

ARCII (Auto Recognition Chip)

The PTT provides "EZ-Plug & Play" with Mountz Transducers that feature "ARCII" technology, an instant auto-recognition system of the transducer connected to the PTT. When an ARCII Transducer is connected to the PTT it automatically recognizes the transducer and displays the Model and Serial Number of the connected transducer on the PTT.

The information stored in the ARCII chips contains:

- The Model of Transducer
- The Serial Number of the Transducer
- True Calibration Information
- Date of Calibration

Power On & Battery Operation

There is no switch to turn the PTT unit. Just press a key and the unit will power on. When the unit has not been used for a designated time frame it will enter a "Sleep Mode". The unit features a processor that checks to see if a key pressed while it is in the Sleep Mode. There is no significant drain on the batteries.

The PTT is powered using the high capacity Li-Ion batteries for a long battery life. The battery pack should last up to 30 hours with normal use and 16 hours with a brushless transducer with a maximum charge. The battery icon is always on the display. It is filled in completely when fully charged and shows white space as the battery depletes.

Installation of PTT Interface Software

The PTT interface software allows the operator to conduct Tool Tests, Sensor Calibration and Meter calibration.

1. Put the disk in and the Installation will start automatically. Click the Next Button to begin installation
2. Enter the required information and click Next Button.

1.

2.
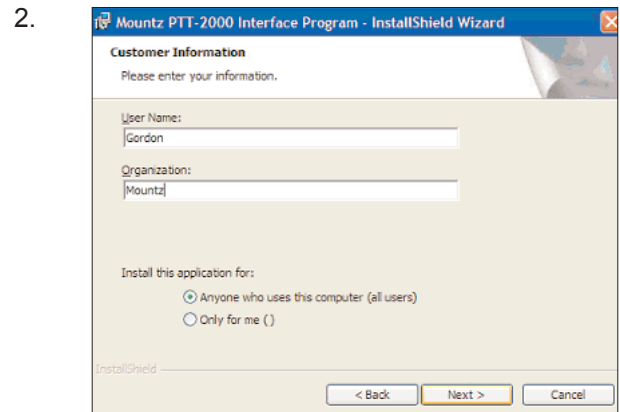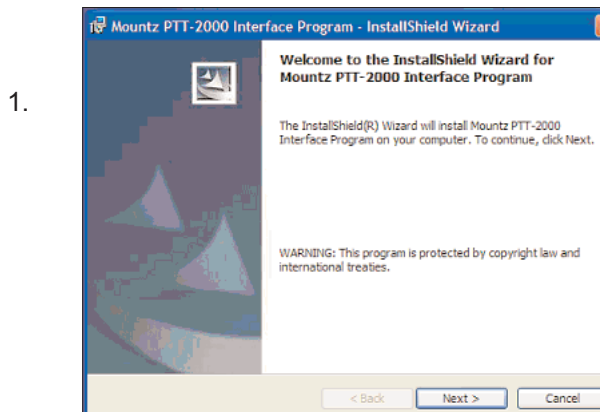
3. Click install.
4. After the installation is successful just click Finish.

3.

4.
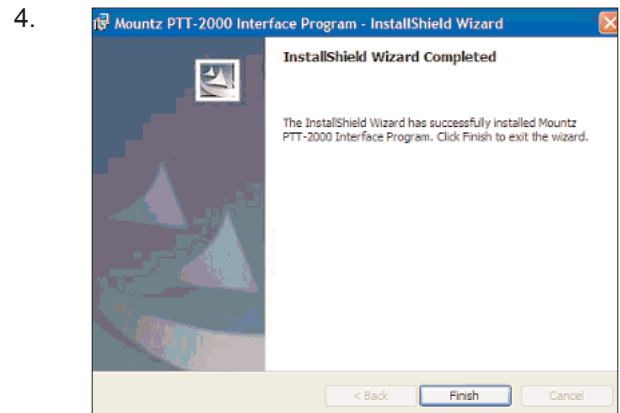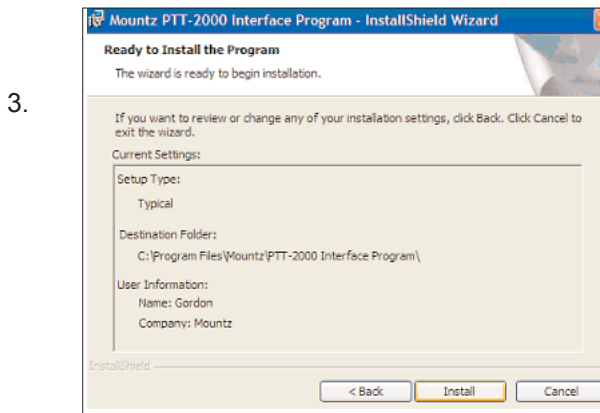
5. After installation of the PTT Interface Program turn on the PTT unit. Connect the USB cable to the PTT. and connect the other end to the computer. The computer detects the device in the lower right side of the screen.
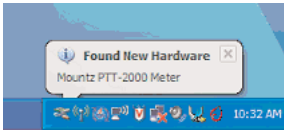
6. Shortly after the PTT is detected the following screen will appear. Do not allow Windows to search for software. Click "No, not this time".
7. The CD should still be inserted from the installation, but if not insert it. Click "Install from a list or specific location" and click Next Button.

6.

7.
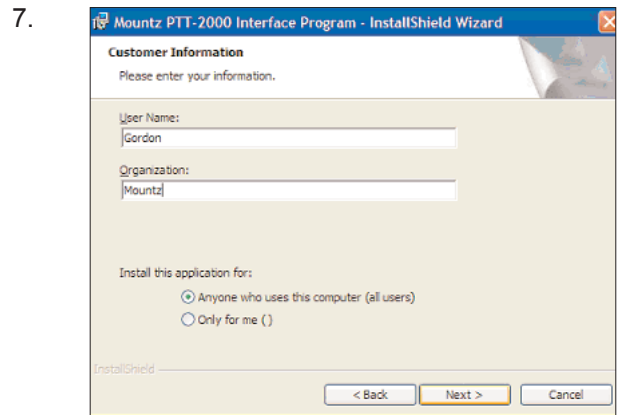
8. Check the "Search removable media" box and click Next Button.
9. The USB drivers will begin to be installed. If a pop up window appears that the product has not passed the Windows Logo Testing, just click "Continue Anyway". Mountz has tested the product with both the Home version and Professional version of XP. You will not get this message if you are installing under Windows 2000.
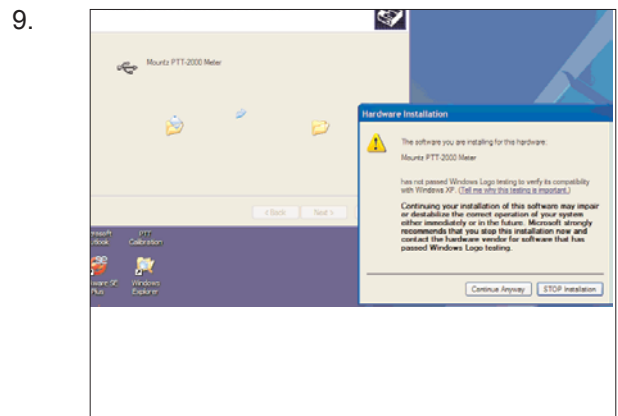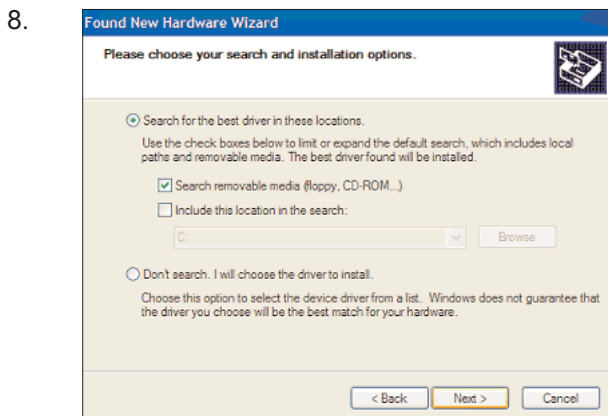
8.

9.

10. The initial screen will appear The "Online" LED should be green and Torque values are displayed on the right side of the screen. For most users the only Tab that will be used is the "Tool Tests". The other Tabs are used for Transducer and Meter calibrations, which should only be done by a certified calibration lab.

10. The initial screen will appear The "Online" LED should be green and Torque values are displayed on the right side of the screen. For most users the only Tab that will be used is the "Tool Tests". The other Tabs are used for Transducer and Meter calibrations, which should only be done by a certified calibration lab. Image below is "Torque Calibration" screen.
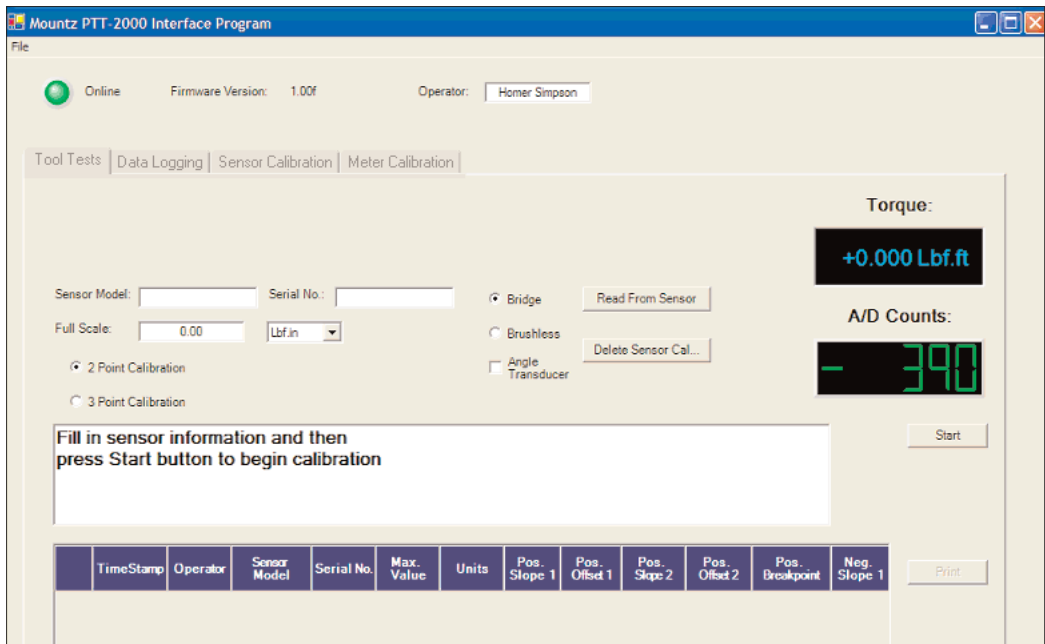
11. Image below is "Meter Calibration" screen.
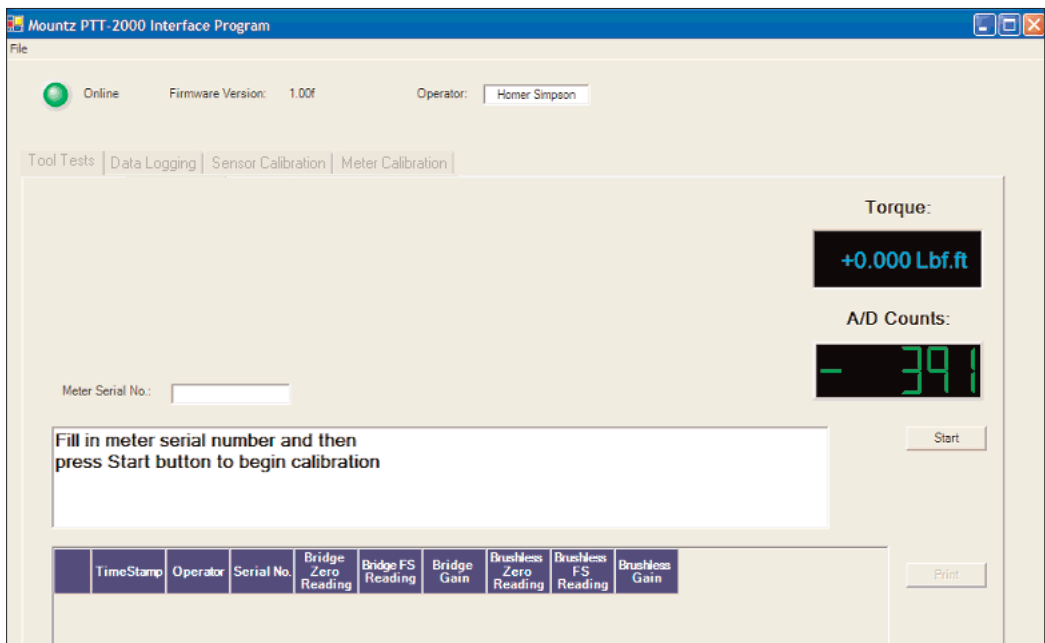
12. The Tool Test Screen is below.
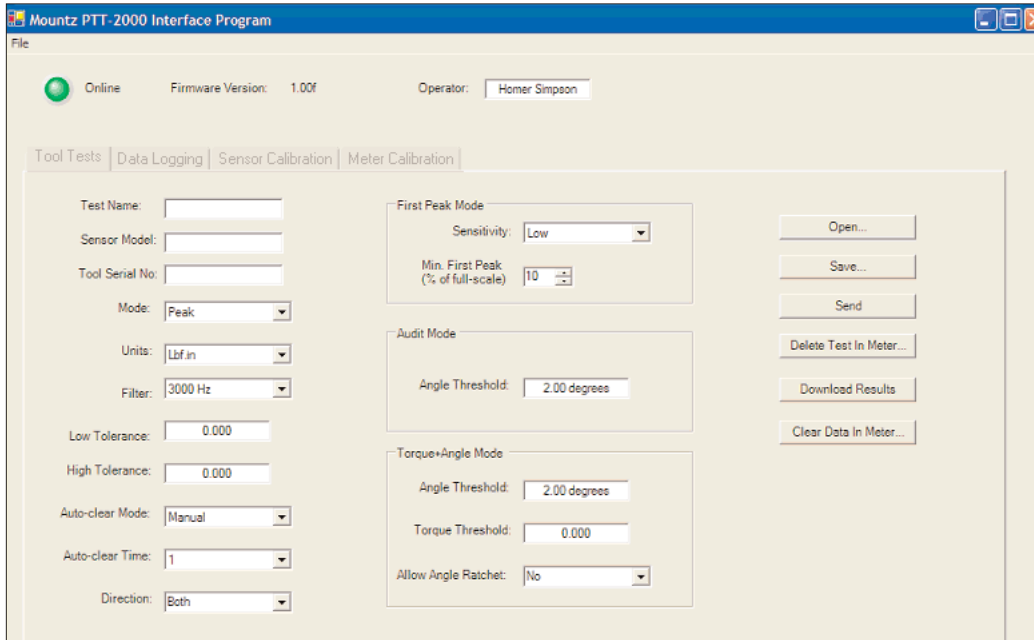
The Tool Test mode contains the follow fields.

A. Test Name
B. Sensor Model
C. Tool Serial No.
D. Mode
E. Units
F. Filter
G. Low Tolerance
H. High Tolerance
I. Auto-Clear Mode

J. Auto-Clear Time
K. Direction
L. Comments
M. Operator
N. First Peak Sensitivity
O. Minimum First Peak (% of full scale)
P. Audit Mode (Angle Threshold)
Q. Torque and Angle Mode (Angle Threshold)
R. Torque and Angle Mode (Torque Threshold)
S. Torque and Angle Mode (Allow Angle Ratchet)

Tool Test Operation

All tool tests must be entered using the PC Windows based Calibration Program. Once this is done the tests can be accessed using the "Tool Test" soft key on the PTT.

Entering data for the Tool Test is done using the PC Windows based Calibration Program. See the Screen above. Select the "Tool Tests" tab. Enter the relevant information on this screen such as the Test Name, which is the name by which the test will be identified on the PTT. Then enter all required information on the screen because once the tool test is activated on the PTT no changes can be made with the units, tolerances or other information. There is a field for comments to include user specific information. The transducer being used for the Tool Test must be identified. This is done to prevent a test being run on a transducer with an inappropriate range.

When entering the "Sensor Model" this must match exactly with the sensor identification that was used to identify the transducer when it was calibrated. If you are not sure about how the transducer is identified, unplug the transducer from the PTT unit and plug it back in.
Note - the Sensor Model identification appears on the PTT screen during the initialization.

There are various control buttons to perform operations with this program, these include:

There are various control buttons to perform operations with this program, these include:

Save - Saves the Tool Test Setups on the PC so it can be used to run further tests in the future.

Open - Opens previously saved Tool Test Setups.

Send - Send a Tool Test to the PTT. It can store up to 100 tests with 25 readings or 25 tests with100 readings or any similar combination that does not exceed 2500 results

Delete Test in Meter - Deletes this specific test from the PTT. The operator will be asked for confirmation before the action takes place.

Download Results - Retrieves the results of a tool test after it has been run. It will offer a change to add further notes to the test at this point. The results will be saved in the PC in C:\PTT 2000\Tool Test Results\Operator Folder where the "Operator Folder" will be the name of the Operator entered in the upper portion of the Tool Test Screen. The results are stored in a .csv file which can be opened in Excel or using a text editor program, such a Notepad. The file name will be the name given to the tool followed by the date and the time at which to test was started.

Clear Data in Meter - Clears the test data for this Tool Test in the PTT meter. Make sure to Download the Results before clicking this button. The operator will be asked for confirmation before the action takes place.

Using the Tool Tests on the PTT

Once 1 or more tool tests are sent to the PTT meter the operator can press the "Tool Test" soft key on the PTT and following Menu choices will appear:

Select
Start
Stop
Clear Memory

Choose the function desired, from the menu list, by using the **Up /Down** keys and use **Enter** key to finalize the selection highlighted in reverse video.

Select is used to select the desired test from a list of tests that have been downloaded. When an operator selects this he/she will view an introduction for 3 seconds that provide directions, and then this will display:

Choose Tool Test from List of available tests.

Use **Up /Down** keys to toggle between tests.

Use **Enter** to select test.

After the short introduction the operator will see the tool tests displayed and can select the desired test.

Start begins collecting test data. The tool name will be followed by a colon and then the number of data points collected.
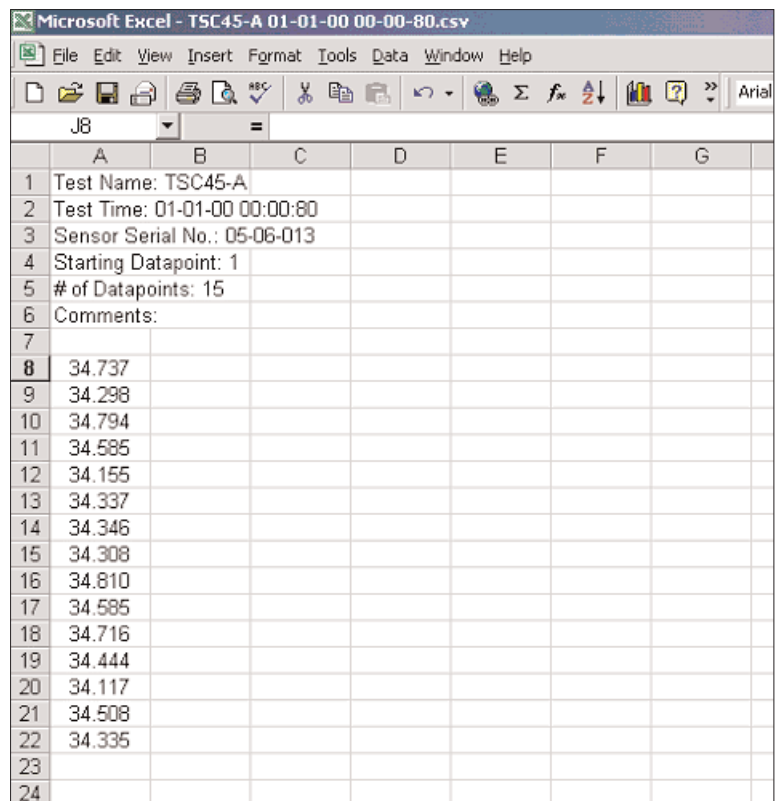
Stop ends the test. This is required as some users may want to collect 10 data or others may want to collect 25 points or more.

Clear Memory allows the test points to be cleared in the meter itself. The operator will be asked for confirmation before the action takes place. This function should only be used if the readings have been downloaded to the PC or test data is invalid for some reason.

Once all desired tests are run the operator can return to the PC to download all Tool Tests stored in the PTT. During a particular test download the operator will be given the opportunity to add further notes to the file stored on the PC.

An example of one Tool Test Result file is shown on the right.

There is an optional Excel Add-In included on the PTT CD to perform statistical analysis on the data from the tool test. It is located in the folder Optional Excel Statistics Add-In. Follow the instructions in the readme file, in this folder, to use this Add-In.

Transducer Calibration

Transducer Calibration should only be performed by an operator with the necessary calibration wheels or arm and weight sets or by a calibration lab. Mountz offers calibration services to perform this function.

PTT calibrations are done in conjunction with a PC Windows based Calibration Program. The program is easy to use and guides the user through the calibration steps.

Once the program is started and connected to the PTT meter, a button **"Start"** is provided to start the calibration. All the needed information must be entered in the appropriate text boxes. This includes information such as the Sensor Model, Serial Number, the Full Scale torque value, the units of calibration and the transducer type (Bridge or Brushless). Once all required information is entered, the Start button is clicked, and its function changes to "Continue" as shown in figure below and procedural information will be given in the large text box. A 2-point calibration should work well in all but exceptional circumstances.

Once the calibration is complete the calibration data will be stored in a Mountz "Smart" transducer using the ARCII protocol. For non-smart transducers calibration data will be stored in the PTT internal memory. A sophisticated error correction algorithm assures that the data written to and retrieved from memory is always correct.

Once the calibration is complete, Torque Values will be displayed in the Torque Window allowing for verification of calibration data points.

PTT Calibration

This procedure is used to calibration the gain of the PTT to a high degree of accuracy.   This allows all PTT to exhibit the same accuracy with a Mountz "Smart" transducer as the meter that was used to perform the calibration.

The PTT Calibration requires special equipment.   This equipment is available from Mountz for those that require it as an optional item.

Data Logging

This program is used for graphing the data. This feature can be utilized to evaluate and confirm torque specifications in both production or R & D environments.
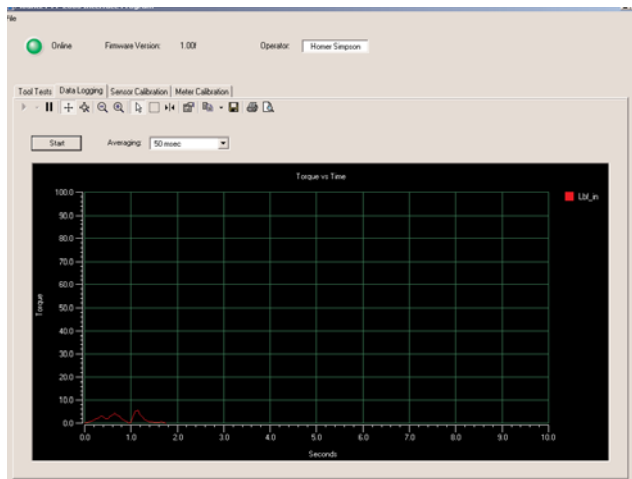
When the graph first appears you can enlarge it by clicking on the Zoom-Box, which is the square box made up of dashed lines just to the right of the big arrow. Then drag the cursor to surround the small graph and the view will expand the graph as shown
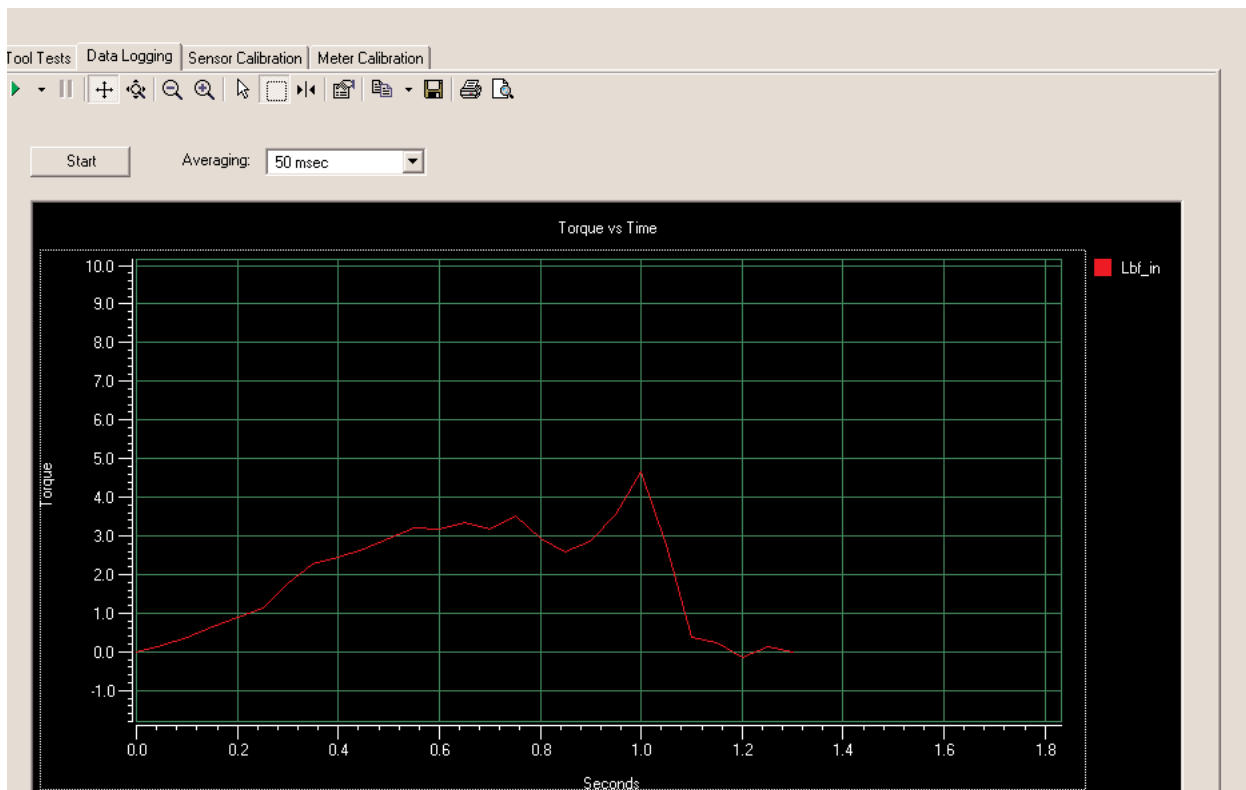
The PTT interface program contains a Tab for Data Logging. The actual plot on the Screen is Torque vs. Time. If you have an Angle enabled transducer the Torque and Angle data will be collected in a .csv file. The data collection begins when you click the "Start" button and ends when you click the same button which changes to "Stop" after the data collection begins. The data is collected is available in:

C:\Program Files\Mountz\PTT Interface Program\Streaming Data Files\"operator name"

Where the "operator name" is the operator entered on the Data Logging Tab. If you use this function frequently you probably will want to create a shortcut to this folder.

The .csv file can be opened using Excel. You can use Excel to plot this data in a variety of formats or by using other Windows based tools of your choice. There is also an Excel Spreadsheet with a Macro as an example of Plotting Torque and Angle. This is available on the PTT CD in the folder Excel Macro for Torque and Angle. Open this Excel file, highlight the Torque and Angle data, click the Graphing Icon that is on the spreadsheet, the Torque and Angle will be plotted for you. If you have your own Torque and Angle data you can just replace the example data with your own, highlight it and click the Graphing Icon to plot it.

Angle	Torque
6	3.64
21	3.62
36	3.63
137	4.34
153	3.99
167	4.05
182	4.23
196	4.30
211	4.13
225	3.74
240	3.99
254	4.32
269	4.52
283	4.31
298	4.01
313	4.18
327	4.38
342	4.23
356	3.95
371	3.74
385	3.99
400	4.13
414	4.15
429	4.19
444	4.13
458	3.88
473	3.90
488	4.09
503	4.01
517	3.77
532	3.79
547	4.31
561	4.26
576	4.22
591	4.05
605	3.91
620	3.86
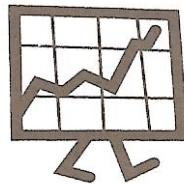
This Spreadsheet gives an example of Plotting Torque and Angle Values. Simply highlight the cells containing the values of Angle and Torque and click on the Graphing Icon above.

If you have collected Torque and Angle values, using the PTT Data Logging Program, you can use this Template to Plot Torque and Angle. Simply substitute your own values for those on the left.

The data is collected is available in:
C:\Program Files\Mountz\PTT Interface Program\Streaming Data Files\"operator name"
Where the "operator name" is the operator entered on the Data Logging Tab. If you use this function often you probably will want to create a shortcut to this folder.

Bootloader

This program is used to update the code in the PTT unit. The following assumes the operator has copied the files from the supplied CD to the computer, installed the PTT-2000 Interface program and installed the USB drivers. Locate the Bootloader folder on your computer as shown below.
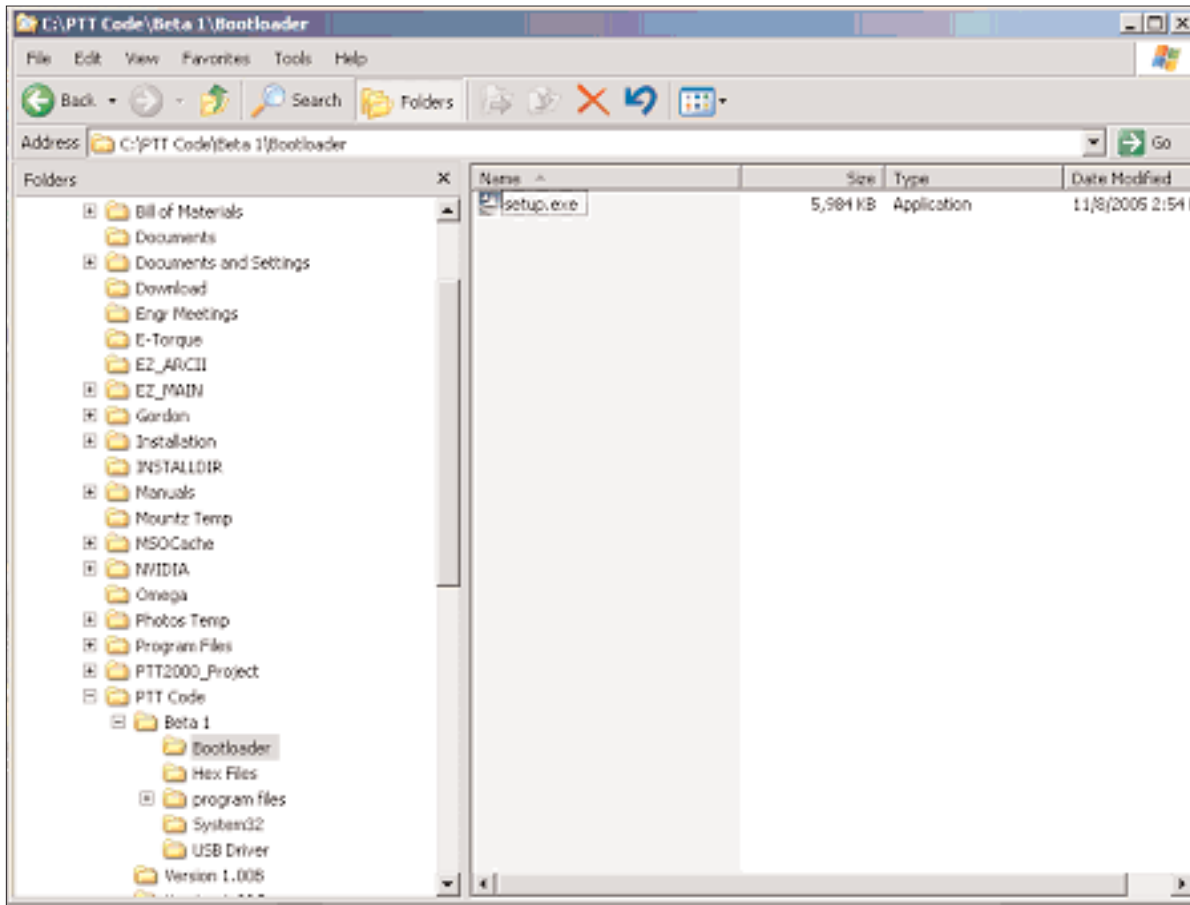
Select the"Bootloader" folder. Run the Setup.exe file by right clicking on it and choosing "Open". After installation the program will be located in the Mountz folder when you select All Programs.

The operator can put an icon on your desktop by right clicking on the PTT-2000 Bootloader and then "Send to" and 'Desktop (create shortcut).

The icon will then be on the desktop. When the operator runs the program he/she will see a window as shown below. Connect the USB cable to the PTT and the computer and turn on the PTT unit. Click the button "Start boot loader on device". Both LED's on the PTT will turn on and the screen will indicate the PTT is in bootloader mode.

To update the firmware click the "Boot load HEX file to device.." button. Locate the HEX file update. It will be in the Hex Files folder. The file is named Mountz App.hex. This is the current application so there is no need to update but if the operator chooses he/she can reload it to see how this feature works. The process will take about 6 minutes as there is quite a lot of code in the product. The status will be shown in the PTT Boot Loader window as the process takes place

As updates are available these will be available on the Mountz Web site.