PROGRAMMING AND CALIBRATION MANUAL

ASG DTT TORQUE METER

Version 4H

2013

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DTT Meter Layout

During normal operation, the LCD display will show: The Measurement Mode in the upper left-hand corner of the LCD. The Measurement Units in the upper right hand corner of the LCD. The Torque Reading in the center of the LCD, The Current Time in the lower left hand corner of the LCD and the circle (or CW / CCW arrow) showing the direction the torque was applied. This will be referred to as the operating display.

The ON/OFF SWITCH, CHARGER CONNECTOR and RS-232 PORT are on the left side of the meter. The SERIAL NUMBER is on the back of the meter
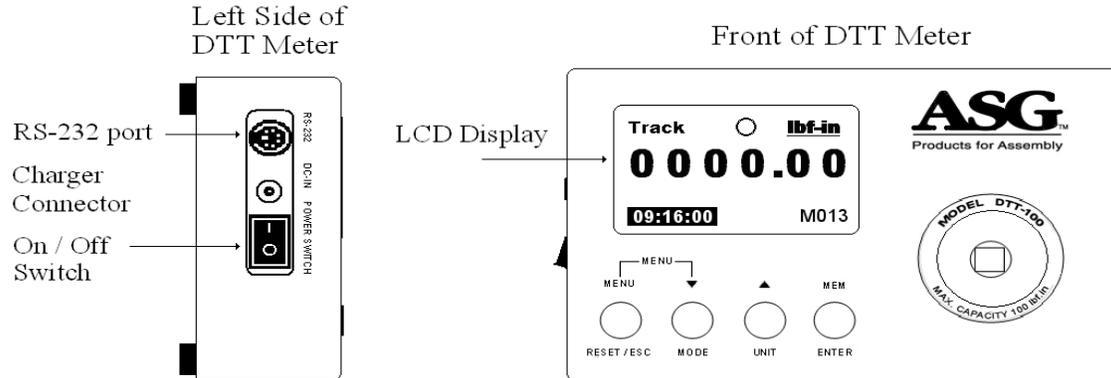
Note, DTT-200 & DTT-500 have a mounting plate attached.

The LCD display pictured above id the default display. The DTT meter has various options described herein. The LCD display below shows how it would look with all options enabled.
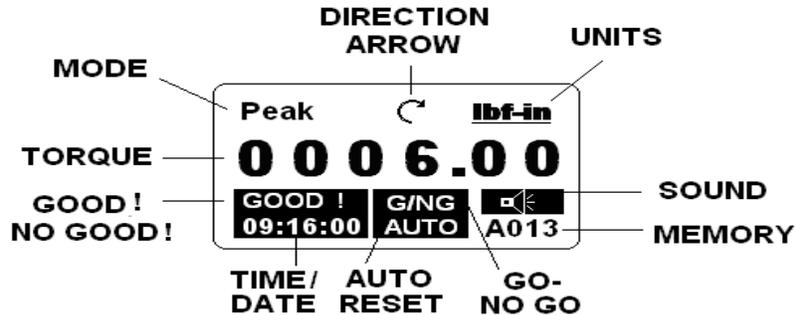
MODE Will show what mode the meter is set in, either PEAK, FIRST PEAK or TRACK

TORQUE Will show the torque that was applied.

GOOD, NO GOOD When GO-NO GO has been enabled the result will be displayed as either good or no good based on the parameters set up.

TIME/DATE will show the date or time. Press the UP/DOWN buttons at the same time to toggle between them.

AUTO Will be displayed when AUTO RESET has been enabled.

G/NG Will show if GO-NO GO is enabled.

MEMORY The letter A will appear in front of number of readings to indicate that AUTO MEMORY is enabled.

SOUND A SPEAKER ICON will appear when sound has been enabled in G/NG

UNITS The torque units selected will appear here.

DIRECTION ARROW. The "O" normally seen here will turn into either a clockwise arrow or a counterclockwise arrow to show the direction in which the torque was applied.

Button Functions (left to right)

Button (#1) MENU/RESET/ESC

In normal operation, pressing the MENU/ RESET/ESC button resets the torque readings to zero in either the PEAK or FIRST PEAK mode.

In TRACK MODE, pressing the MENU/RESET/ESC button takes you into the MAIN MENU. At any other place in the menu this button acts as an ESCAPE button to take you back to the previous screen.

Button (#2) DOWN/MODE

In normal operation, the DOWN/MODE button is used to change the MODE setting of the DTT meter. Each time the button is pressed the mode will change from TRACK mode to PEAK, or from PEAK to FIRST PEAK, or from FIRST PEAK to TRACK.

Within the menus this button is used to scroll DOWN to the next selection.

When inputting a number to set up the Date & Time, the Go, No-Go feature, the Auto Reset Mode or calibration, pressing this button will decrease the number by 1 digit.

Button (#3) UP/UNIT

In normal operation, pressing this button changes the torque units of the meter. Pressing the button will scroll through the 9 choices. Kgf-cm, gf-cm, Kgf-m, mN-m, cN-m, N-m, ozf-in, lbf-in, lbf-ft, in this order. Do not attempt to back up by pressing the DOWN button, you will only change the mode.

Within the menus this button is used to scroll UP to the next selection.

When inputting a number to set up the Date & Time, Go, No-Go feature, the Auto Reset Mode or calibration, pressing this button will increase the number by 1 digit.

Button #4 MEM/ENTER

In normal operation, pressing the MEMORY button enters the torque reading into the DTT meters memory.

In all other menus this button is used to ENTER the selection, or perform the action selected.

MENU DETAIL and INSTRUCTIONS

The DTT meter is menu driven. Please note that text actually seen on the LCD may have asterisks or other characters used for spacing. When an asterisk is noted here it is used to call attention to a specific item and is not part of the display. If confused or lost in a menu, press the **ESCAPE** button until you return to the operating display and start over. When pressing the buttons to navigate in a menu or increase or decrease a value, the button must be pressed and released once for each action. You will hear a beep each time a button is pressed. The button may not be held down to increment faster.

Main Menu

To enter the Main Menu, press the **MODE** button until the unit is in TRACK mode, then press the **MENU** button. You will see:

Main menu   1/2   *There is only room on the LCD to display 8 lines of text. When a menu*
1)Zero Adjust   *has more than 6 items, the "page number" will show to the right as*
2)Setup   *either 1/2 or 2/2 depending which page is displayed.*
3)Memory
4)Calibration
5)Communication
6)Date & Time
7)About

Use the **UP** or **DOWN** buttons to scroll to and select the desired menu and then press the **ENTER** button to enter that menu or activate that function.

4

Menu 1) Zero Adjust
<u>This operation cannot be performed with the charger connected.</u>

Use if the DTT meter does not automatically zero when turned on, or if the LCD does not return to zero when the **RESET** button is pressed.

To enter, select 1) Zero Adjust and press the **ENTER** button. You will see:
>**<u>Zero Auto Adjust</u>**
>**Reading: 00.012**
>
>**Key UP= Zero Adj**
>**Enter= Save Zero**
>**Unit= lbf.in***

>*These units are specified in the Calibration Menu. These are the "System Units". There is no way to change the units here. The System Units are used in calibration and when setting up the Auto Reset and Go/No Go functions. Do not confuse these units with changing the default units in set up or during normal operations.

Press the **UP** button for automatic zero, this sets the unit's auto adjust feature to zero. Press the **ENTER** button to save the zero point in the system memory. You will see:
>**<u>Zero Auto Adjust</u>**
>**System Save OK**
>**Press any key**
>**to continue**

After pressing any button you have set the auto zero in the meter's memory and you will again see:
>**<u>Main menu   1/2</u>**
>**1) Zero Adjust**
>**2) Setup**
>**3) Memory**
>**4) Calibration**
>**5) Communication**
>**6) Date & Time**
>**7) About**

Press **ESCAPE** to return to the normal operating display.

Menu 2) Setup

The SETUP MENU contains 8 sub menus used to activate the various functions available on the DTT meter. Please go to the end of the MAIN MENU section on page 15 for details and instructions for the features in the **SETUP MENU**

Menu 3) Memory

The DTT meter can store 200 torque readings in the memory. This menu allows you to view the stored readings, clear the last reading or clear all readings in memory.

Select 3) MEMORY and press **ENTER**. You will see:
>**<u>Data Memory Menu</u>**
>**1) View**
>**2) Delete Last**
>**3) Delete All**

Select 1) View and press **ENTER**. You will see:

<u>Memory 013/200</u>	(this would indicate 13 readings in memory)
M013:	(this is the number of the last reading in memory)
0004.78 lbf.in	(this is the last reading entered)
20/02/04,11:20	(this is the date and time the data was entered)
M014:	(this will be the number of the next reading)
_ _ _ _ _ _ _ _	(this is the space for the next reading)
_ _ _ _ _ _ _ _	

Use the **UP** or **DOWN** buttons to scroll through and view the readings in memory.

Press **ESCAPE**. You will again see:

> **Data Memory Menu**
> **1) View**
> **2) Delete Last**
> **3) Delete All**

Select 2) Delete Last and press **ENTER**. You will see:

> **Delete Last?**
> **1) Cancel**
> **2) Accept**

Select either 1) Cancel, not to delete the last reading, or 2) Accept to delete the last reading and press **ENTER** You will again see:

> **Data Memory Menu**
> **1) View**
> **2) Delete Last**
> **3) Delete All**

If Cancel was selected, nothing changed. Select View again to see the same readings on the screen as before. The last reading will be **M013** etc.

If Accept was selected, reading **M013** was deleted. Select View again to now see that the last reading will be **M012.**

Select 3) Delete All and press **ENTER**. You will see:

> **Delete All?**
> **1) Cancel**
> **2) Accept**

Select either Cancel, to not delete all the readings or Accept, to delete all of the reading and press **ENTER**. You will again see:

> **Data Memory Menu**
> **1) View**
> **2) Delete Last**
> **3) Delete All**

If Cancel was selected, nothing changed. Select View again to see the same readings on the screen as before. The last reading will be **M013** etc.

If Accept was selected all readings were deleted. Select View again to now see that all readings will be blank

Note! Whenever Delete is selected either to delete the last reading, or to delete all readings, the **UP** or **DOWN** button must be used to select Accept. If **ENTER** is pressed inadvertently, without selecting Accept, The action is cancelled, the previous menu appears and nothing was changed.

It is not possible to selectively delete readings in memory, either all readings or the last reading may be deleted. If reading **M013** is deleted, then the last reading will be **M012**. This "new" last reading may then be deleted.

Delete Last reading is helpful if **ENTER** is inadvertently pressed with the display reading zero or an unwanted reading is entered due to running the tool in reverse to unwind the fidaptor.

Press **ESCAPE** to return to the normal operating display.

Memory Full Alert

The DTT meter's memory will hold only 200 torque readings. If an attempt is made to enter reading #201 the meter will beep several times and the **M200 (or A200)** in the bottom right hand corner of the LCD will flash **FULL**. Readings will have to be deleted before any more may be entered.

Menu 4: Calibration

The Calibration menu is used when the DTT meter requires re-calibration. The System units are selected here. ASG recommends annual re-calibration by qualified personnel. Re-calibration may also be necessary if a check reveals that the DTT meter is out of spec. Calibration, or a calibration check can only be performed with the DTT operating on battery power. Do not calibrate the unit with the battery charger attached.

It is not necessary to be in the calibration menu to check the meter to see if it is in spec. Attach the proper calibration arm, or wheel and hang enough weight to check the DTT meter at is maximum torque capacity. Allow the system to stabilize. Check the reading on the LCD and determine if it is within +-.2% of maximum capacity. (For a DTT-100 this will be +-.2 lbf.in, for other models check page 26) Check the DTT meter at several other points to insure that the meter is linear. The readings must be within +-.2 lbf.in of the actual torque applied.

If calibration is necessary make sure the DTT meter's battery is charged. Turn the meter on and let it warm up for 30 minutes. The meter cannot be calibrated with the battery charger attached.

The Calibration Menu is protected by a 4 digit password. The password is **9991**

Select 4) Calibration and press **ENTER**. You will see:
> **System   Password**
> **Enter   password**
> **4 Digit**
> **Password: 0**

Use the **UP** or **DOWN** button to select the first digit and press **ENTER**. You will then see:
> **Password: *0**

> Each time you enter a number, the previous number will be replace with an *

Use the **UP** or **DOWN** button to select the second digit and press **ENTER**. You will then see:
> **Password: **0**

Use the **UP** or **DOWN** button to select the third digit and press **ENTER**. You will then see:
> **Password: ***0**

Use the **UP** or **DOWN** button to select the fourth digit and press **ENTER**. You will then see:
> **Calibration   Menu**
> **1) System Unit**
> **2) CW Gain**
> **3) CCW Gain**
> **4) Set Password**
> **5) Save Value**

Select #1) System Unit and press **ENTER**. You will see:
> **Select Cal. Unit**
> **1) kgf-cm**
> **2) N-m**
> **3) lbf-in**

Note! These are the "System Units." The System units may be changed without having to re-calibrate the DTT meter. For initial calibration of a DTT meter, select the system units that match the weights and arm that will be used to calibrate the DTT meter. This will also set the units specified in the **ZERO ADJUST**, **AUTO RESET** and **GO-NO GO** functions.

Select the proper units and press **ENTER**. You will again see:
> **Calibration   Menu**
> **1) System Unit**
> **2) CW Gain**
> **3) CCW Gain**
> **4) Set Password**
> **5) Save Value**

Select #2) CW Gain and press **ENTER**. You will see:

> **Adjust   CW   Gain**
> **Reading :   000. 00**
> **Gain :   000000**
>
> **Up & Dn to Adjust**
> **Enter   to Accept**
> **Unit   =   lbf-in.**

Attach the calibration arm, or wheel, and hang the proper amount of weight to equal the maximum torque of the unit in the clockwise direction. Allow the display to stabilize. If the reading is off more than +-.2% of the Maximum torque of the DTT meter, In the case of a DTT-100 this will be +-.2 lbf.in. see page 26 for other models, adjustment is needed**.** If the reading is more than 100.2 lbf.in, or less than 99.8 lbf.in, use the UP or DOWN buttons to bring the reading within that range. When the reading is within the allowable limit change the amount of weight and repeat the process at a different torque reading. Check the readings at several other points of the scale to be sure that the readings are within +-.2 lbf.in of the proper reading. ASG checks 4 points. After checking in the CW direction Press the **ENTER** button. You will again see:

> **Calibration   Menu**
> **1) System Unit**
> **2) CW Gain**
> **3) CCW Gain**
> **4) Set Password**
> **5) Save Value**

Select #3) CCW gain and repeat the calibration procedure.

Press **ENTER**. You will again see:

> **Calibration   Menu**
> **1) System Unit**
> **2) CW Gain**
> **3) CCW Gain**
> **4) Set Password**
> **5) Save Value**

Select #5) Save Value and press **ENTER**. You will see:

> **Calibration Save**
> **1) Cancel**
> **2) Accept**

Select 1) Cancel and press **ENTER**. You will have changed nothing and you will again see:

> **Calibration   Menu**
> **1) System Unit**
> **2) CW Gain**
> **3) CCW Gain**
> **4) Set Password**
> **5) Save Value**

Select 2) Save Value and press **ENTER**. You will again see:

> **Calibration Save**
> **1) Cancel**
> **2) Accept**

Select 2) ACCEPT and press **ENTER**. You will see:

> **Calibration Save**
>
> **System Save OK**
>
> **Press any key**
> **to continue**

Press any button. You have saved the calibration information. You will again see:
>
> **Calibration   Menu**
> **1) System Unit**
> **2) CW Gain**
> **3) CCW Gain**
> **4) Set Password**
> **5) Save Value**

Press **ESCAPE**. You will again see:
>
> **Main menu   1/2**
> **1) Zero Adjust**
> **2) Setup**
> **3) Memory**
> **4) Calibration**
> **5) Communication**
> **6) Date & Time**
> **7) About**

Press **ESCAPE** to return to the normal operating display.

CHANGE PASSWORD

To change the password select 4) Calibration and press **ENTER**. You will see.
>
> **System   Password**
>
> **Enter   password**
>   **4 Digit**
> **Password: 0**

WARNING if you select a new password and <u>lose</u> it, or <u>forget</u> it, the DTT meter **MUST** be returned to ASG to have the password reset.

Use the **UP** or **DOWN** button to select the first digit and press **ENTER**. You will then see:
>
> **Password: X0**
>
> Unlike when you enter the existing password, the numbers will remain on the LED as you enter them.

Use the UP or DOWN button to select the second digit and press **ENTER**. You will then see:
>
> **Password: XX0**

Use the UP or DOWN button to select the third digit and press **ENTER**. You will then see:
>
> **Password: XXX0**

Use the UP or DOWN button to select the fourth digit. **BEFORE YOU PRESS ENTER** you will see:
>
> **Password: XXXX**

This will be your new password. Write it in here _ _ _ _ to be sure you do not lose it. **<u>ASG can reset the password to 9991 but the meter will have to be returned to ASG to achieve this.</u>**

Press **ENTER**. You have changed the password. You will then again see:
>
> **Calibration   Menu**
> **1) System Unit**
> **2) CW Gain**
> **3) CCW Gain**
> **4) Set Password**
> **5) Save Value**

To save this new password select 5) Save Value and press ENTER. You will see:
>
> **Calibration Save**
> **1) Cancel**
> **2) Accept**

Select 2) ACCEPT and press **ENTER**. You will see:

<u>Calibration Save</u>

System Save OK

Press any key
to continue

Press any button. You have saved the new password. You will again see:

<u>Calibration   Menu</u>
1) System Unit
2) CW Gain
3) CCW Gain
4) Set Password
5) Save Value

Press **ESCAPE**. You will again see:

<u>Main menu   1/2</u>
1) Zero Adjust
2) Setup
3) Memory
4) Calibration
5) Communication
6) Date & Time
7) About

Press **ESCAPE** to return to the normal operating display.

Menu 5: Communication

This function is used to download the stored torque readings in the DTT Meter's memory to a PC, via the RS-232 to USB Serial bridge cable, or the RS-232 to DB9 Serial cable supplied with the DTT meter. Your computer must have the ASG Torque Memory Loader software, found on the CD-ROM provided with your DTT meter, installed on your PC. **NOTE** You must also load the driver (s) for the USB serial bridge cable if your PC does not recognize it. These drivers are on the CD supplied with your unit.

To download data, connect the USB connector to a USB port on your PC, or the DB9 Serial plug to a serial port on your PC. Connect the 6pin DINN connector to the RS-232 port marked on the side of the DTT meter. This can be found on the side of the meter with the power switch. Make sure the ASG Torque Memory Loader program is turned on in your computer.

Select 5) Communication and press **ENTER**. You will see:

_____

COMMUNICATION
       MODE
_____

This will remain on the LCD until you have finished downloading the torque readings and press any button.

With the DTT meter set in communication mode, start the ASG Memloader program in your computer.

When the program has loaded the following screen will be seen on the monitor of your PC:
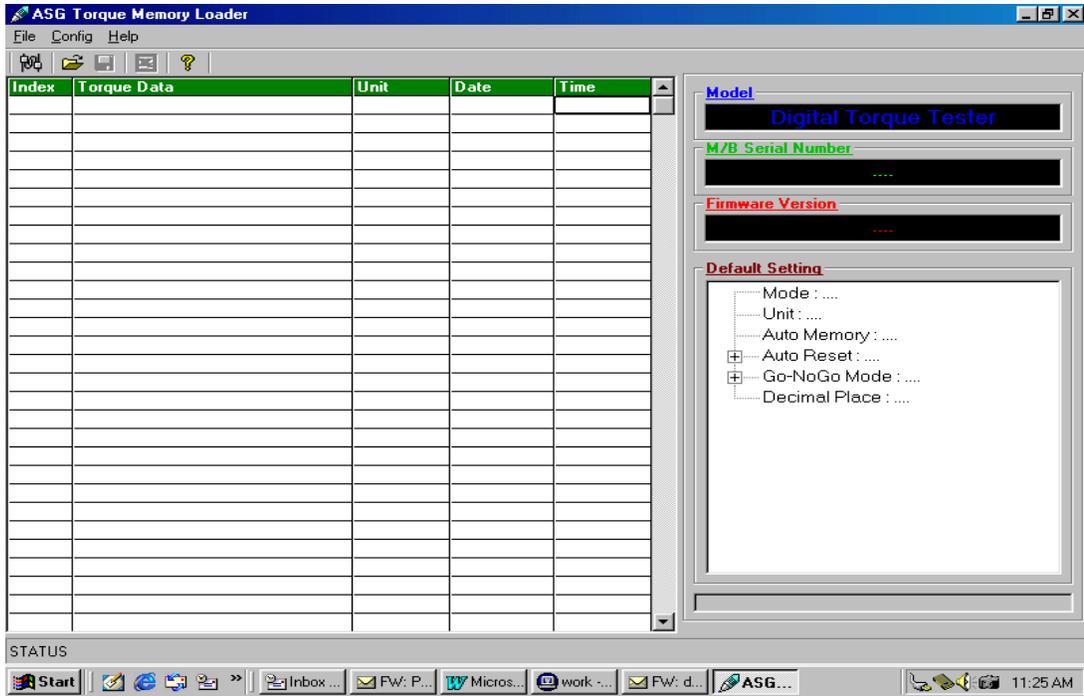
To begin to download the torque readings click on the icon shown below:
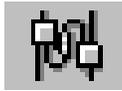
The following screen should now be seen on your PC.
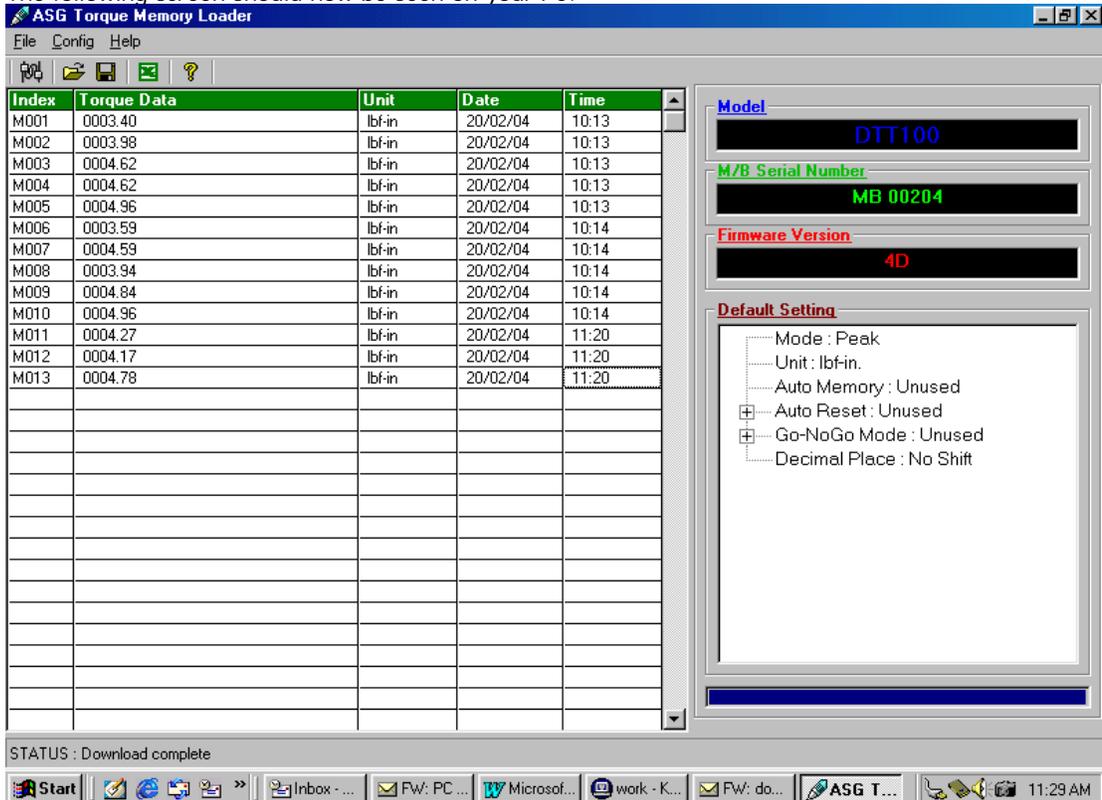
The software will default to COM-1 (communication port 1) on your PC. If you have a conflict you can change COM ports by clicking on CONFIG on the toolbar. You will see:

Use your mouse to select COM-2, COM-3, COM-4, COM-5 or COM-6

With the data now on your PC you may now save this file just as you would any other file. It will have a *.trq extension. Determine how you want to label it then save it. You will be able to reopen this file at any time.

It is not possible to do any manipulation of the data while it is in this software. You can choose to export the data to a Microsoft Excel spreadsheet. To do this, click the "Excel" Icon. Just a reminder, you must have Microsoft Excel on your computer.

An Excel spreadsheet will open on your PC that looks like this:
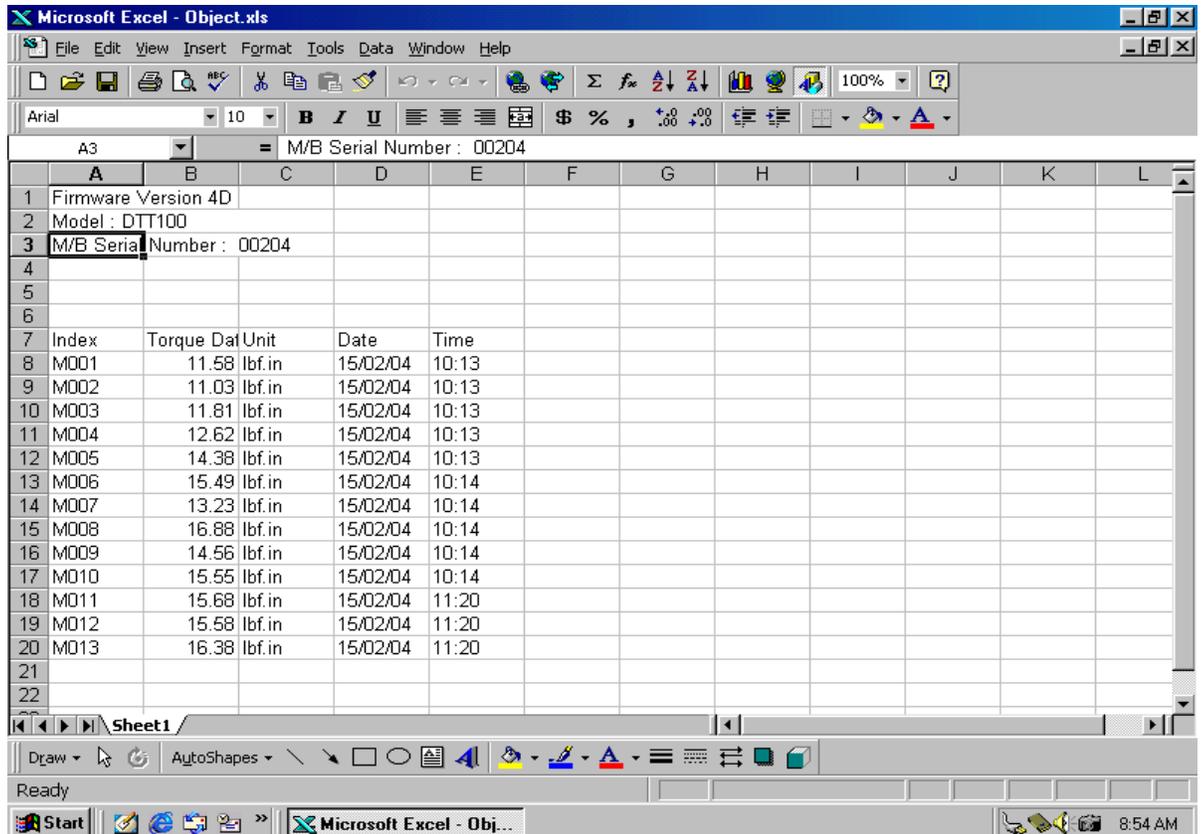
This file will be named "object.xls". You can then save it with any name you choose.

Once the data is in the spreadsheet the math functions in Excel may be used to manipulate the data to obtain statistics. You will have to determine how you want the data manipulated and what statistics you want to keep.

After the data has been downloaded to your PC press any button on the DTT meter. You will again see:

Main menu   1/2
1) Zero Adjust
2) Setup
3) Memory
4) Calibration
5) Communication
6) Date & Time
7) About

Press **ESCAPE** to return to the normal operating display.

Detach the RS-232 cable from the DTT meter. If the same PC will be used to download data each time, the cable may be left attached to the USB port on that PC.

MENU 6: Date & Time
This function is used to setup Date and Time of the unit's built in real time clock. The date is expresses as DD/MM/YY. The time is expressed as HH:MM:SS and will be in 24hr format.

Select 6) Date & Time and press **ENTER**. You will see:

Date & Time Menu
1)   Set Date
2)   Set Time

Select 1) Set Date and press **ENTER**. You will see:

SET DATE_____

**   20/02/04**
Up   &   Down to Adj
Enter   for   Next
Esc   for   Back

Press the **UP** button to increase the number, press the **DOWN** button to decrease the number. When the correct day is showing press **ENTER**. You will now see:

SET DATE_____

**   20/02/04**
Up   &   Down to Adj
Enter   for   Next
Esc   for   Back

Press the **UP** button to increase the number, press the **DOWN** button to decrease the number. When the correct month is showing press **ENTER**. You will now see:

SET DATE_____

**   20/02/04**
Up   &   Down to Adj
Enter   for   Next
Esc   for   Back

Press the **UP** button to increase the number, press the **DOWN** button to decrease the number. When the correct year is showing press **ENTER**. You have successfully changed the date. You will again see:

Date & Time Menu
1) Set Date
2) Set Time

Select 2) Set Time and press **ENTER**. You will see:

SET TIME

09/16/00
Up   &   Down to Adj
Enter   for   Next
Esc   for   Back

Press the **UP** button to increase the number, press the **DOWN** button to decrease the number. When the correct hour is showing press **ENTER**. You will now see:

SET TIME

09/16/00
Up   &   Down to Adj
Enter   for   Next
Esc   for   Back

Press the **UP** button to increase the number, press the **DOWN** button to decrease the number. When the correct minutes are showing press **ENTER**. You will now see:

SET TIME
09/16/00
Up   &   Down to Adj
Enter   for   Next
Esc   for   Back

Press the **UP** button to increase the number, press the **DOWN** button to decrease the number. When the correct seconds are showing press **ENTER**. You have successfully changed the time. You will again see:

Date & Time Menu
1) Set Date
2) Set Time

After the Date and Time have been successfully entered the **ESCAPE** button must be pressed to return to the Main Menu. Press **ESCAPE** you will again see:

Main menu   1/2
1) Zero Adjust
2) Setup
3) Memory
4) Calibration
5) Communication
6) Date & Time
7) About

Switch Time or Date on the LCD

The time is the default setting showing on the lower left-hand corner of the LCD. To display the date, press the **UP** and **DOWN** button at the same time while in the normal operating mode. The date will now show in the lower left-hand corner. When the unit is turned off, it will again default to show the time.

Press **ESCAPE** to return to the normal operating display

MENU 7: About

This menu shows the model number of the meter, the version number of the firmware and the serial number of the main board & processor.

This firmware version should not be confused with the version of the ASG download software.

The serial number of the main board may or may not be the same as the physical serial found on the back of the DTT meter.

Select 7) About and press **ENTER**. You will see:

_____

TORQUE   TESTER v4F

Model   :   DTT100
**   MB 0204**
_____

There is nothing here you can change. Pressing any button returns you to:

Main menu   1/2
1) Zero Adjust
2) Setup
3) Memory
4) Calibration
5) Communication
6) Date & Time
7) About

Press **ESCAPE** to return to the normal operating display.

This is the end of the Main Menu section. The next section is the detail and instructions for Menu 2, the Setup menu.

SETUP MENU DETAIL and INSTRUCTIONS

Menu 2) Setup   (This is the #2 selection on the Main menu)

9) Save Setup

The Setup menu contains 9 sub menus. These submenus control the various optional functions available, and determine the default settings for the DTT meter. As part of the default settings, the function will be activated each time you turn the meter on for use.

To set anything up as part of the **default** settings you **must** save the setup. If a function is set up and not saved, that function will not be activated the next time the meter is turned on.

Since Save Setup will be used to save each function, the procedure will be described first rather than as part of each individual menu.

Select 2) Setup and press the **ENTER** button. You will see:

Setup menu 1/2	*There is only room on the LCD to display 8 lines of text.*
1)Zero Adjust	*If a menu has more than 6 items, the "page number" will the*
2)Setup	*show to the either 1/2 or 2/2 depending which page is*
3) Auto Print	
4) Auto Memory	
5) Auto Reset Mode	
6) Go-No Go Mode	
7) Decimal Place	
8) Mfg. Setting	
9) Save Setup	

Select 8) Save Setup and press **ENTER**. You will see:

Setup Save?
1) Cancel
2) Accept

Select 2) Accept and press **ENTER**. You will see:

Setup Save ?
System   Save   OK
Press any key
**   To   Continue**

The setup has been successfully saved. Pressing any button will bring you back to:

Setup Menu   1/2
1) Measure Mode
2) Measure Unit
3) Auto Print
4) Auto Memory
5) Auto Reset Mode
6) Go-No Go Mode
7) Decimal Place
8) Mfg. Setting
9) Save Setup

Note! Remember you have to change the mode to **TRACK** to enter the Main Menu. If you save the setup without changing back to Peak or First peak, then **TRACK** mode will be set as the default. With **TRACK** as the default mode pressing the **RESET** or **ESCAPE** button takes the meter into the Main Menu. This could confuse an operator.
Press **ESCAPE** to return to the normal operating display.

SET UP MENU

1) Measure Mode

Changes the measurement mode of the DTT meter and sets the default mode when saved.

Select 1) Measure Mode and press **ENTER**. You will see:
Setup Mode
1) Track
2) Peak
3) First Peak

Track mode is used to set the operating display to show real time torque value readings. The reading on the display will rise or fall as the torque rises or falls. This would be used when checking the meter to see if it is in spec.

Peak mode is used to show the peak reading of the applied torque. This peak value will be held on the display until the **ESCAPE** button is pressed or a higher torque is applied. If the AUTO RESET function has been selected then the display will then show the next reading as it is applied, as long as the next reading exceeds the threshold point programmed during set up.

First Peak mode is similar to peak mode, but this function will only detect the first torque applied. The display will not change as more torque is applied or if another reading is attempted. The RESET button will have to be pressed to set the display back to zero.

Use the **UP** or **DOWN** buttons to select your choice and press the **ENTER** button.
You have set the meter to the Mode of your choice and you will again see:
Setup Menu   1/2
1) Measure Mode
2) Measure Unit
3) Auto Print
4) Auto Memory
5) Auto Reset Mode
6) Go-No Go Mode
7) Decimal Place
8) Mfg. Setting
9) Save Setup

To avoid forgetting to reset to peak mode, save before exiting the setup menu.

Note! This procedure sets the default setting for the meter. While operating the meter, any Mode may be selected at any time by pressing the **MODE** button. When the meter is turned off, then turned back on it will default to the last mode saved.

Press **ESCAPE** to return to the normal operating display

2) Measure Unit

Sets the default torque units for the DTT meter. This should not be confused with changing the units in normal operation with the UNIT button or setting the system units in the calibration menu.
Select 2) Measure Unit and press ENTER. You will see:

Setup Unit   1/2
1) Kgf-cm.
2) gf-cm.
3) Kgf-m.
4) mN-m.
5) cN-m.
6) N-m.   Note only the first 6 choices will show on the LCD.
7) ozf-in.   Use the UP or DOWN buttons to scroll through the
8) lbf-in.   rest.
9) lbf-ft.

Select your choice of units and press **ENTER**. You have set the torque units. You will again see:

Setup Menu   1/2
1) Measure Mode
2) Measure Unit
3) Auto Print
4) Auto Memory
5) Auto Reset Mode
6) Go-No Go Mode
7) Decimal Place
8) Mfg. Setting
9) Save Setup

Before you save the setup make sure you have reselected PEAK or FIRST PEAK. Follow the Save Setup instructions.

Press **ESCAPE** to return to the normal operating display.

3) Auto Print

With Auto Print turned on, the torque data is automatically sent to the RS-232 port on the meter in real time each time a reading is taken. It is not necessary to press any button. This function will work only in <u>PEAK MODE</u> and only with the torque readings applied in the <u>clockwise</u> direction. See page

Select 3) Auto Print and you will see:

Setup AutoPrint
1) OFF
2) Use AutoPrint

Select 2) Use Auto Print and press **ENTER**. Auto Print is activated and you will again see:

Setup Menu   1/2
1) Measure Mode
2) Measure Unit
3) Auto Print
4) Auto Memory
5) Auto Reset Mode
6) Go-No Go Mode
7) Decimal Place
8) Mfg. Setting
9) Save Setup

Before you save the setup make sure you have reselected PEAK or FIRST PEAK. Follow the Save Setup instructions.

4) Auto Memory

With Auto Memory turned on, the torque reading is automatically entered into the DTT memory each time a new reading is taken. It is not necessary to press the **ENTER** button each time. This will function only in <u>PEAK MODE</u> and only with torque readings applied in the <u>clockwise</u> direction.

Select 3) Auto Memory and press **ENTER**. You will see:

> **<u>Setup AutoMemory</u>**
> **1) OFF**
> **2) Use AutoMemory**

Select 2) Use Auto Memory and press **ENTER**. Auto Memory is activated and you will again see:

> **<u>Setup Menu   1/2</u>**
> **1) Measure Mode**
> **2) Measure Unit**
> **3) Auto Print**
> **4) Auto Memory**
> **5) Auto Reset Mode**
> **6) Go-No Go Mode**
> **7) Decimal Place**
> **8) Mfg. Setting**
> **9) Save Setup**

Before you save the setup make sure you have reselected PEAK as your default setting. Follow the Save Setup instructions. In the bottom right hand corner of the LCD where it showed **"MO13"** indicating 13 readings in memory, **"AO13"** will now be displayed. This indicates 13 readings in memory with Auto Memory activated.

To turn Auto Memory off, enter the Main Menu, select Set Up, select Auto Memory and select Off. Press **ENTER**. Auto Memory is deactivated and you will again see:

> **<u>Setup Menu   1/2</u>**
> **1) Measure Mode**
> **2) Measure Unit**
> **3) Auto Print**
> **4) Auto Memory**
> **5) Auto Reset Mode**
> **6) Go-No Go Mode**
> **7) Decimal Place**
> **8) Mfg. Setting**
> **9) Save Setup**

Before you save the setup make sure you have reselected PEAK as your default setting. Follow the Save Setup instructions. In the bottom right hand corner of the LCD where it showed **"AO13"** indicating 13 readings in memory with Auto Reset de-activated, **"MO13"** will now be displayed indicating 13 readings in memory with Auto Memory activated.

5) Auto Reset Mode

Auto Reset is used to automatically reset the meter and display the next torque reading without having to press the **RESET** button each time to clear the previous reading. Auto reset can be used in PEAK mode only. Auto Reset can be used with Auto Memory to automatically enter the reading into memory and reset the reading.

If a high torque value is selected for the threshold, say 20 lbf.in, and a lower torque is applied first, say 10 lbf in, the 10 lbf.in will be displayed on the LCD. If the next reading is 15 lbf.in it will also be displayed. Until you reach the threshold the DTT meter acts as it does in peak mode. Any reading higher than the previous reading will be displayed. A lower reading will not register. Once the threshold has been reached any torque reading that is higher than the threshold will be displayed whether it is higher than the previous reading or not.

Select 4) Auto Reset Mode and press **ENTER**. You will see:

> **<u>Setup Auto Reset</u>**
> **1) OFF**
> **2) Use Auto Reset**

Select 2) Use Auto Reset and press **ENTER**. You will see:

> **AutoReset min 2%***
> **Enter Percent**
> **of 100 lbf.in****
> **Old Data   :   00%**
> **Enter New :   00%**

*This % number will depend on which model DTT meter is used. See page 26 for other models. This will be a minimum % of the <u>torque units shown</u>. The torque units can not be changed here. The torque units can only be changed in the calibration menu.

**This number is the maximum torque value of the meter. The maximum torque of the DTT-100 is 100 lbf.in (See page 26 for other models) therefore, For the DTT-100 the minimum threshold that can be set to act as the "trigger" to over write the existing reading with the new reading is 2% of 100 lbf.in, or 2 lbf.in. Any %, from 2% to 99%, can be selected, for the DTT -100, which would then represent 2 to 99lbf.in.

To set up the threshold to 15 lbf.in, on a DTT-100 you would use UP or DOWN to enter 15%. 15 lbf.in will be 15% of 100. Press **UP** or **DOWN** to change **Enter New : <u>0</u>0** to **ENTER NEW :   1<u>0</u>** You do not have to worry about which value will change. Only the zero underlined in the ENTER NEW line will change. No other number will change until **ENTER** is pressed. After you change the <u>0</u>0 to 1<u>0</u> and press **ENTER** you will see:

> **AutoReset min 2%**
> **Enter Percent**
> **of 100 lbf.in**
> **Old Data   :   00%**
> **Enter New :   1<u>0</u>%**

Use the UP or DOWN button to change **Enter New   :   1<u>0</u>** to **Enter New   : 1<u>5</u>** and press **ENTER**. 15% has been set as the threshold. Auto Reset has been activated and you will again see:

Before you save the setup make sure you have reselected PEAK as your default setting. Follow the Save Setup instructions. The word **"AUTO"** will now show between the time and the memory number at the bottom of the LCD when the unit is turned on.

To turn Auto Reset off, enter the main menu, select set up, select Auto Reset Mode and press **ENTER**. You will see:

> **Setup Auto Reset**
> **1) OFF**
> **2) Use Auto Reset**

Select 1) Off and press **ENTER**. Auto Reset has been de-activated and you will again see:

> **Setup Menu   1/2**
> **1) Measure Mode**
> **2) Measure Unit**
> **3) Auto Print**
> **4) Auto Memory**
> **5) Auto Reset Mode**
> **6) Go-No Go Mode**
> **7) Decimal Place**
> **8) Mfg. Setting**
> **9) Save Setup**

Before you save the setup make sure you have reselected PEAK as your default setting. Follow the Save Setup instructions. The word **"AUTO"** will no longer show on the LCD in the normal operating display.

Caution, If Auto Reset is set too low you could experience "kick back" in the driver adaptor when the tool shuts off. This can cause erroneous low torque readings. If you see what seems to be very low reading based upon the torque the tool is set at, check the direction arrow on the LCD. If it shows counter clockwise, set the threshold higher, closer to the torque setting of the tool.

5) Go-No Go Mode

Go-No Go mode is used to set a range or "window" for acceptable torque readings. This can be used only with the meter in PEAK or FIRST PEAK modes. When a torque falls within the range the meter will show the word **"GOOD!"** on the LCD just above the time. Any torque reading outside this range, higher or lower, will cause the LCD show message **"NO GOOD!"** This range can be set between 2 and 99% of the maximum torque of the meter. There is also a sound option that will cause the meter to "beep" when a reading is within the range.

Say you wish to test a number of hand torque drivers that are supposed to be set at 15 lbf.in. You may say that as long as the driver is above 13 lbf.in but below 17 lbf.in the driver is acceptable.

Select 5) Go-No Go and press **ENTER**. You will see:
> **Setup Go - NoGo**
> **1) Set Lower Level**
> **2) Set Upper Level**
> **3) Set Sound**

Select 1) Set Lower Level and press **ENTER**. You will see:
> **Set Lower Level**
> **1) Off**
> **2) Use Lower Level**

Select 2) Use Lower Level and press **ENTER**. You will see:
> **Set   Lower   Level**
> **Enter   Percent**
> **of   100   lbf.in***
> **Old Data   :   00%**
> **Enter New: 00**

*This number is the maximum torque value of the meter. On a DTT-100 this is 100 lbf.in. The minimum lower level that can be set up is 2%. 2% of 100 lbf.in will be 2 lbf.in. (See page 26 for the min torque value for other models). Any number from 2 to 99 can be selected which would then represent 2% to 99% of 100 lbf.in on a DTT-100, or 2 to 99 lbf.in.

To set up the lower level to 13 lbf.in, on a DTT-100, you would use **UP** or **DOWN** to enter 13%. 13 lbf.in will be 13% of 100. Use **UP** or **DOWN** to change **Enter New : 00** to **ENTER NEW** : **10.** You do not have to worry about which value will change. Only the zero underlined in the ENTER NEW line will change. No other number will change until **ENTER** is pressed. After you change the **00 to 10** and press **ENTER** you will see:
> **Set   Lower   Level**
> **Enter   Percent**
> **of   100   lbf.in**
> **Old Data   :   00%**
> **Enter New: 10**

Use the **UP** or **DOWN** button to change **Enter New   :   10** to **Enter New   :   13** and press **ENTER**. 13% has been set as the lower level and you will again see:
> **Setup Go - NoGo**
> **1) Set Lower Level**
> **2) Set Upper Level**
> **3) Set Sound**

Select 2) Set Upper Level and press **ENTER**. You will see:
> **Set Upper Level**
> **1) Off**
> **2) Use Upper Level**

Select 2) Use Upper Level and press **ENTER**. You will see:

> **Set   Upper   Level**
> **Enter   Percent**
> **of   100   lbf.in***
> **Old Data   :   00%**
> **Enter New: 00**

*This number is the maximum torque value of the meter. On a DTT-100 this is 100 lbf.in The maximum upper level that can be set up is 99 lbf.in (See page 26 for other models). Any number from 3 to 99 can be selected, which would then represent 3% to 99% of 100 lbf.in, or 3 to 99 lbf.in.

To set up the upper level to 17 lbf.in, on a DTT-100, you would use **UP** or **DOWN** to enter 17%. 17 lbf.in will be 17% of 100. Use **UP** or **DOWN** to change **Enter New : 0**0 to **ENTER NEW : 1**0 You do not have to worry about which value will change. Only the zero underlined in the ENTER NEW line will change. No other number will change until **ENTER** is pressed. After you change the **00 to 10** and press **ENTER** you will see:

> **Set   Upper   Level**
> **Enter   Percent**
> **of   100   lbf.in**
> **Old Data   :   00%**
> **Enter New: 10**

Use the **UP** or **DOWN** button to change **Enter New   :   10** to **Enter New   :   17** and press **ENTER**. 17% has been set as the lower level and you will again see:

> **Setup Go   -   NoGo**
> **1) Set Lower Level**
> **2) Set Upper Level**
> **3) Set Sound**

To turn on the sound, select 3) Set Sound and press **ENTER**. You will see

> **Set Sound**
> **1) Sound   OFF**
> **2) Sound   ON**

Select 2) Sound ON and press **ENTER**. The sound option has been turned on. You will again see

> **Setup Go   -   NoGo**
> **1) Set Lower Level**
> **2) Set Upper Level**
> **3) Set Sound**

Before you save the setup make sure you have reselected PEAK as your default setting. Follow the Save Setup instructions. **G N/G** and a **speaker icon** will now show just above the memory number at the bottom of the LCD in the normal operating display.

When you test a tool and the torque is above 13 lbf, in but below 16 lbf.in you will hear a beep and you will see the word "**GOOD!**" just above the time on the LCD. If the torque is above 16 lbf.in or below 13lbf.in there will be no beep and you will see the word "**NO GOOD!**" above the time on the LCD.

To turn Go-No Go off, enter the main menu, select setup select Go No Go Mode and press **ENTER**. You will see:

> **Setup Go   -   NoGo**
> **1) Set Lower Level**
> **2) Set Upper Level**
> **3) Set Sound**

Select 1) Set Lower Level and press **ENTER**. You will see:

> **Set Lower Level**
> **1) Off**
> **2) Use Lower Level**

Select 1) OFF and press **ENTER**. You will see:

> **Setup Go   -   NoGo**
> **1) Set Lower Level**
> **2) Set Upper Level**
> **3) Set Sound**

Select 2) Set Upper Level and press **ENTER**. You will see:

> **Set Upper Level**
> **1) Off**
> **2) Use Lower Level**

Select 1) OFF and press **ENTER**. You will see:

> **Setup Go - NoGo**
> **1) Set Lower Level**
> **2) Set Upper Level**
> **3) Set Sound**

Select 3) Set Sound and press **ENTER**. You will see:

> **Set Sound**
> **1) Sound   OFF**
> **2) Sound   ON**

Select 1) Sound Off and press **ENTER**. You will again see:

> **Setup Go - NoGo**
> **1) Set Lower Level**
> **2) Set Upper Level**
> **3) Set Sound**

Press **ESCAPE** and you will again see:

> **Setup Menu   1/2**
> **1) Measure Mode**
> **2) Measure Unit**
> **3) Auto Print**
> **4) Auto Memory**
> **5) Auto Reset Mode**
> **6) Go-No Go Mode**
> **7) Decimal Place**
> **8) Mfg. Setting**
> **9) Save Setup**

Go-No Go has been turned off. Before you save the setup make sure you have reselected PEAK as your default setting. Follow the Save Setup instructions. "**G N/G**" and the **speaker icon** will no longer show on the LCD when the unit is turned on.

6) Decimal Place

The decimal point on the DTT meter will float depending on the choice of torque units selected. For Example, a DTT-100 set in lbf.in will show 0000.00 lbf.in in the normal operating display. Select lbf.ft and the LCD will show 000.000 lbf.ft. Select ozf.in and the LCD will show 00000.0 ozf.in. The default location of the decimal place can be adjusted, either to the right, or to the left to provide more or fewer places after the decimal point.

Select 6) Decimal place and press ENTER. You will see:

> **Decimal   Place**
> **1) Shift +1 Digit**
> **2) No Shift**
> **3) Shift   -1 Digit**
> **4) Shift   -2 Digit**

Select your choice and press ENTER. You will again see:

> **Decimal   Place**
> **1) Shift +1 Digit**
> **2) No Shift**
> **3) Shift   -1 Digit**
> **4) Shift   -2 Digit**

When you return to the normal operating display the location of the decimal point will be determined by the selection made.

> Select 1) Shift + 1 Digit the display will show 000.000 lbf.in
> Select 3) Shift - 1 Digit the display will show 00000.0 lbf.in
> Select 4) Shift - 2 Digit the display will show 000000 lbf.in
> Select 2) No shift to return to 0000.00 lbf.in

Before you save the setup make sure you have reselected PEAK as your default setting. Follow the Save Setup instructions.

Press ESCAPE to return to the normal operating menu.

7) Mfg. Setting

This menu allows a quick return to the **FACTORY DEFAULT** menu settings. You can return your DTT meter to the menu options it had when it was received without having to turn off each option

Setup Menu   1/2
1) Measure Mode
2) Measure Unit
3) Auto Print
4) Auto Memory
5) Auto Reset Mode
6) Go-No Go Mode
7) Decimal Place
8) Mfg. Setting
9) Save Setup

Select 7) Mfg. Setting and press ENTER. You will see:

Load Mfg. Setting
1) Cancel
2) Accept

Select either choice and press **ENTER**. You will see:

Setup   Menu   2/2
7) Mfg. Menu
8) Save Setting

This is actually page 2 of the Setup Menu. If you selected CANCEL you changed nothing. If you selected Accept you reset everything to the original factory settings, but you must save your setting

Select 8) Save Setup and press **ENTER.** You will see

Setup Save   ?
1) Cancel
2) Accept

Press Accept and the default settings are saved.

Press Escape to return to the normal operating display

This is the end of the Setup Menu and Main Menu Section.

SYSTEM OVERVIEW

ASG DIGITAL TORQUE TESTER

Electronics

Display:	Graphics LCD display size 128 x 64 dots
Battery:	12 Hours (NiMH 7.2V rechargeable)
Battery charger:	110-120 VAC 60 Hz 12W input 12 VDC 500mA output Optional 220-240 VAC input available
ADC:	24 bits
CPU:	8 bits
Communication:	RS232C
Key button:	4 Buttons
Unit of measure:	9 User Selectable Torque Units
Mode of Measure:	3 Modes
Display Digits:	6 Digits maximum
Special Function:	Auto Reset, Auto Memory, Auto Zero, Go – No Go, Real Time Clock, Auto Print
Memory:	200 readings with alarm when full

Port Settings for Auto Print option

Bits per second; The computer this was tested upon defaults the port to 9600 bps.

Data bits;   8

Parity;   None

Stop bits;   1

Flow control;   None

DTT METER SPECIFICATIONS SHEET

	MODEL	kgf-cm	lbf.in	N-m
MEASUREMENT RANGE	DTT-5	.025 - 5.00	.025 – 5.0	.0025 – 0.50
	DTT-10	.057 – 11.00	.050 – 10.0	.005 – 1.10
	DTT-30*	.171 – 33.0	.150 – 30.0	.015 – 3.30
	DTT-50*	.288 – 57.6	.250 - 50.0	.028 -5.65
	DTT-100	.576 - 115.2	.500 – 100.0	.056 – 11.30
	DTT-200	1.152 - 230.4	1.000 - 200.0	0.112 -22.60
	DTT-500	2.880 – 576.0	2.500 – 500.0	0.282 – 56.5
MEASUREMENT UNIT	kgf.cm, gf.cm, kgf.m, mN.m, cN.m, N.m, ozf.in, lbf.in, lbf.ft			
ACCURACY	Better than +- 0.2 % of full scale			
MEASUREMENT MODE	TRACK , PEAK , FIRST PEAK			
BATTERY CHARGER	AC.120 VAC INPUT, DC 12 V. 500 mA OUTPUT OPTIONAL 220-240 VAC unit AVAILABLE			
RECHARGEABLE BATTERY	7.2 V. NIMH CELL 1200 mA.			
RECHAGING TIME	Up to4 HOURS			
CONTINUOUS USE AT FULL CHARGE	12 HOURS			
OUTPUT	RS232C (serial port)			
OVER LOAD	200 % of full scale			

* Special Order Items Only.

Calibration Check Readings
DTT-5 = +-0.01 lbf.in of reading.
DTT-10 = +- 0.02 lbf.in of reading
DTT-30 = +-0.06 lbf.in of reading.
DTT-50 = +- 0.10 lbf.in of reading
DTT-100 = +- 0.20 lbf.in of reading
DTT-200 = +-0.40 lbf.in of reading
DTT-500 = +- 1.0 ;bf.in of reading

Calibration Check Readings
DTT-5 = +-0.01 lbf.in
DTT-10 = +- 0.02 lbf.in
DTT-30 = +-0.06 lbf.in
DTT-50 = +- 0.10 lbf.in
DTT-100 = +- 0.2 lbf.in
DTT-200 = +-0.4 lbf.in
DTT-500 = +- 1.0 lbf.in

Minimum Auto Reset Levels
DTT-5 max torque = 5 lfb.in, minimum Auto Reset Level is 20% of max or 1 lbf.in
DTT-10 max torque = 10 lbf.in, minimum Auto Reset Level is 10% of max or 1lbf.in
DTT-30 max torque = 30 lfb.in, minimum Auto Reset Level is 5% of max or 1.5 lbf.in
DTT-50 max torque = 50 lbf.in, minimum Auto Reset Level is 5% of max or 2.5 lbf.in
DTT-100 max torque = 100 lbf.in, minimum Auto Reset Level is 2% of max or 2 lbf.in
DTT-200 max torque = 200 lbf.in, minimum Auto Reset Level is 2% of max or 4 lbf.in
DTT-500 max torque = 500 lbf.in, minimum Auto Reset Level is 2% of max or10 lbf.in

Minimum Go-No Go Levels
DTT-5 minimum Go-No Go Level is 0.1 lbf.in
DTT-10 minimum Go-No Go Level is 0.2 lbf.in
DTT-30 minimum Go-No Go Level is 0.6 lbf.in
DTT-50 minimum Go-No Go Level is 1 lbf.in
DTT-100 minimum Go-No Go Level is 2 lbf.in
DTT-200 minimum Go-No Go Level is 4 lbf.in
DTT-500 minimum Go-No Go Level is 10 lbf.in

Maximum Go-No Go Levels
DTT-5 Max Go-No Go Level is 5 bf.in
DTT-10 Max Go-No Go Level is 10 lbf.in
DTT-30 Max Go-No Go Level 30 lbf.in
DTT-50 Max Go-No Go Level 50 lbf.in
DTT-100 Max Go-No Go Level is 99 lbf.in
DTT-200 Max Go-No Go Level is198 lbf.in
DTT-500 Max Go-No Go Level is495 lbf.in

Torque Conversion Factors

ozf.in = inch ounces   **gmf.cm** = gram centimeters   **mNm** = mili Newton meters
lbf.in = inch pounds   **kgf.cm** = kilogram centimeters   **cN.m** = centi Newton meters
lbf.ft = foot pounds   **kgf.m** = kilogram meters   **N.m** = Newton Meters

Units to be Converted	Imperial			Metric			International		
	ozf.in	lbf.in	lbf.ft	gf.cm	kgf.cm	kgf.m	mN.m	cN.m	N.m
1 ozf.in =	1.0	0.0625	0.005	72.0	0.072	0.0007	7.062	0.706	0.007
1 lbf.in =	16.0	1.0	0.083	1152.1	1.152	0.0115	113.0	11.3	0.113
1 lbf.ft =	192.0	12.0	1.0	13826.0	13.83	0.138	1356.0	135.6	1.356
1 gf.cm =	0.014	0.0009	0.00007	1.0	0.001	0.0001	0.098	0.01	0.0001
1 kgf.cm =	13.890	0.868	0.072	1000.0	1.0	0.01	98.07	9.807	0.098
1 kgf.m =	1389.0	86.8	7.232	100000.0	100.00	1.0	9807.0	980.7	9.807
1 mN.m =	0.142	0.009	0.0007	10.2	0.01	0.0001	1.0	0.1	0.001
1 cN.m =	1.146	0.088	0.007	102.0	0.102	0.001	10.0	1.0	0.01
1 N.m =	141.6	8.851	0.738	10197.0	10.20	0.102	1000.0	100.0	1.0

Multiply the units to be converted by the number under the units you want.

Example 20 kgf.cm = ? lbf.in

1 kgf.cm = .868 lbf.in, therefore 20 kgf.cm = 20 x .868 or 17.36 lbf.in

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