

# Impact Test Stand 41 Series with AWS-4050 Pulse/Impact

Firmware Version Menu-I v1.6E

## Manual

Use with Intellect and Impact Transducers



USER'S GUIDE

October, 2019

**CHECKLINE**<sup>®</sup>  
MADE TO MEASURE

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# INTRODUCTION

## DESCRIPTION

**AWS Small Impact Test Stand**



The AWS 41 Series Impact test stands are designed to test Impact and Pulse tools without experiencing damage to the torque transducer. We accomplish this by using a unique, AWS designed, S-spline transducer, which accurately measures and records the torque delivered by the tool being tested. The transducer is mounted into a frame that needs to be secured to a bench or sturdy work table.

The test stand is supplied with this impact transducer, a rundown fixture, transducer cable, AWS-4050-IMP display, AC power supply/battery charger and instruction manual.

It is important to use the supplied rundown fixtures, allowing the tool to perform "work" as in tightening a joint. The AWS test stands are supplied with user configurable rundown fixtures sized approximately to the full scale of the transducer. These should always be used when conducting tests. The rundown fixture should be loosened after each tightening cycle. Frequent lubrication is required.

**AWS Large Impact Test Stand**



Impact wrenches are very powerful, they utilize a striking "hammer" or "heavy cam" mechanism impacting onto the output shaft to deliver torque to the nut or bolt. These "blows" occur very rapidly and discontinuously and therefore have traditionally been very difficult to measure. These "blows" destroy conventional torque transducers and will even damage the nut or bolt and eventually the tool itself if allowed to "hammer" too long. Once equilibrium (input power vs rotational resistance) is reached the power to the tool motor should be discontinued.

**AWS Impact Transducer**



## Impact Test Stand Models and Capacities

41050f-imp	50 Lbf Ft capacity impact/impulse test stand, includes 5-50 rundown fixture, transducer, AWS-4050 display, transducer and power cable.	8" x 10" x 4"	10 Lbs
410250f-imp	250 Lbf Ft capacity impact/impulse test stand, includes 25-250 rundown fixture, transducer, AWS-4050 display, transducer and power cable.	8" x 10" x 4"	10 Lbs
410500f-imp	500 Lbf Ft capacity impact/impulse test stand, includes 50-500 rundown fixture, transducer, AWS-4050 display, transducer and power cable.	8" x 10" x 4"	10 Lbs
4101000f-imp	1000 Lbf Ft capacity impact/impulse test stand, includes 100-1000 rundown fixture, transducer, AWS-4050 display, transducer and power cable.	10" x 12" x 4"	14 Lbs
4102000f-imp	2000 Lbf Ft capacity impact/impulse test stand, includes 200-2000 rundown fixture, transducer, AWS-4050 display, transducer and power cable.	10" x 12" x 8"	16 Lbs
4102500f-imp	2500 Lbf Ft capacity impact/impulse test stand, includes 250-2500 rundown fixture, transducer, AWS-4050 display, transducer and power cable.	10" x 12" x 8"	16 Lbs
4105000f-imp	5000 Lbf Ft capacity impact/impulse test stand, includes 500-5000 rundown fixture, transducer, AWS-4050 display, transducer and power cable.	10" x 12" x 8"	16 Lbs
4120000f-IMP	TDB		



## INSTALLATION & ASSEMBLY

### INSTRUCTIONS

When unpacking the Impact test stand insure that all components are present.

- Frame with transducer
- Rundown fixture
- AWS 4050-Imp Display
- Transducer cable
- Power Supply/Battery Charger
- Manual

Mount the test stand to a sturdy table or bench. Insert the rundown fixture into the transducer, insure that the rundown fixture has "free" rotation for at least 1080 degrees of rotation.

Connect the transducer to the AWS-4050-IMP display using the supplied cable. Make sure that the AWS-4050 is charged and running on battery power or it is connected to mains power .

Turn AWS 4050 on and verify communication to the transducer. Placing the AWS 4050 in track mode you should see a stable zero on the display. If the display has a value press ENTER or CLEAR and that will re-zero the display and transducer.

If the system does not display a stable zero call your representative for assistance.



Frame with mounted transducer, rundown fixtures, AWS 4050 and transducer cable.

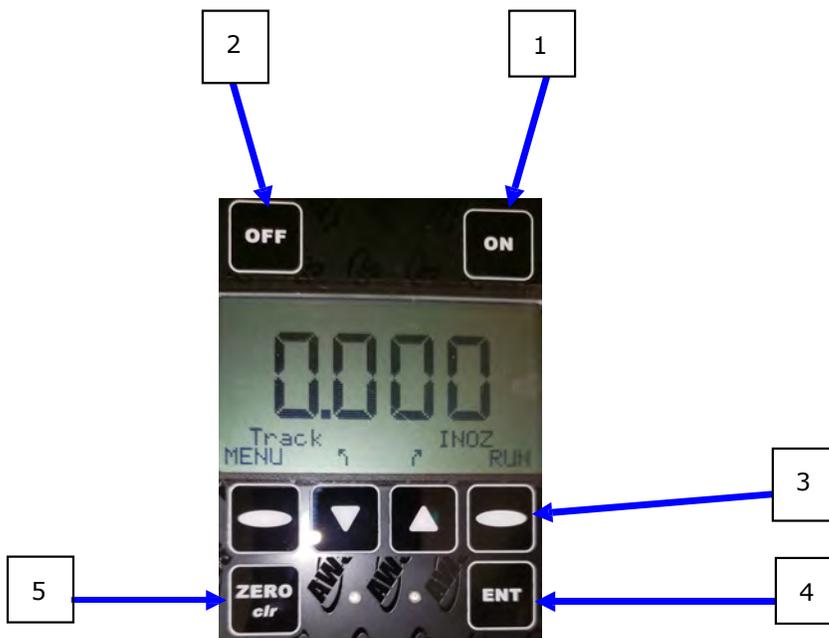
# OPERATION

## DISPLAY OPERATION

The AWS 4050 IMP is a powerful torque analyzer with multiple torque modes and numerous user settings. Please read manual completely before using.

### Button Function:

- 1: Turns the display On  
Zero the Transducer  
Clears the reading in Peak and 1<sup>st</sup> Peak Mode
- 2: Turns the display Off
- 3: Programmable 'Soft Buttons'. The function of these buttons vary with the current menu set and it's function is described on the bottom two lines of the display, just above the "soft" button.
- 4: Accepts the reading into memory  
Scrolls back one level in the menu system  
If set to print, sends the displayed value to printer or connected device.
- 5: Zero or clear button.

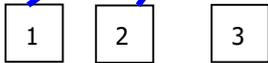


## BACK PANEL INPUTS

The back of the AWS-4050 contains various interface connections:

### (1) Transducer Input (10-pin connector)

To install or remove the cable simply push in or pull out. Do this by gripping the outer metal case of the cable and NEVER from the cord itself. **THIS IS NOT A TWIST LOCK CABLE!**



### (2) DC In

The connection for the AC/DC Adapter. Use this if you plan on working with the unit connected to Mains power. Use only the AC adapter provided with the unit. Use of another power source will void the warranty and may cause severe damage to the display. The AWS-4050 can be kept plugged in without damaging the battery or charging circuit.

### (3) Serial

If you are downloading to a printer, data collector, computer, etc., this is the mini-plug interface for the Serial cable. Values are sent via the serial port every time the unit auto-clears or the ENT/CLR button is pressed

## CHARGING THE BATTERIES

1. The batteries in this system should last approximately 12 hours when fully charged. The Low-Battery indicator on the display will illuminate when the battery voltage is low. Typically, the user will have between 15-30 minutes before the batteries become too weak to power the unit.
2. The batteries are charged any time the system is plugged-in. In Fast Charge mode, i.e. the unit is plugged in and the power is **OFF**, charge time is between 2 and 4 hours depending on battery charge level. The green LED on the front panel will flash when the battery is charging and turned off. It is recommended the tester be plugged in when not in use. This will not harm the unit and will increase battery life.

Note: If the tester is to be stored for several months, always ensure the battery is completely charged prior to storage.

## RS-232

The AWS-4050 display can be connected to a printer, computer or data collector via its serial interface. Every time a reading is accepted into memory, a peak is cleared, or data is transmitted via the print data menu(s), it is transmitted via the communications port. To download the readings, go to the DATA MENU. Cables are available directly from AWS, or they can be constructed according to the following tables. AWS also offers various software packages to get your readings into Excel or other programs. Call us for more information

### Serial Transfer Protocol

Protocol	Value
Cable	9 pin to mini-plug.
Baud	9600
Parity	None
Bits	8
S Bit	1
Flow	None



### Serial Datastream Format

**mmmsdxxxxbuuuucl**, where:

<b>m</b>	Memory Location	<b>c</b>	Carriage Return
<b>s</b>	Sign (space or -)	<b>l</b>	Line Feed
<b>d</b>	Data with Decimal Point	<b>b</b>	Blank
<b>u</b>	Units		

### Serial Cable Pinouts

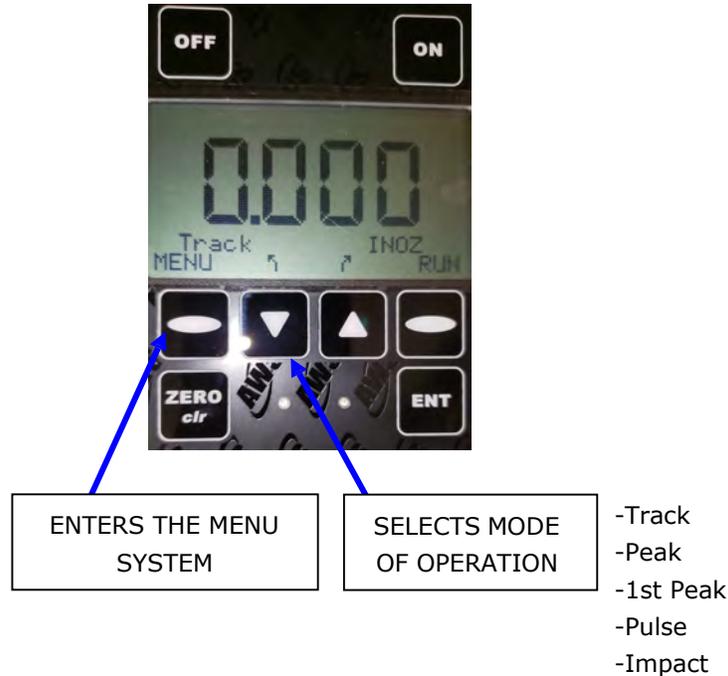
Pin #	Description	Pin #	Description
1	Unused	6	Unused
2	Transmit	7	Unused
3	Receive	8	Unused
4	Unused	9	Unused
5	Ground		

### ICBL-USB Serial Cable

This is a USB cable that Windows OS normally recognizes and configures the com port for, however we have experienced several instances when the PC selects a com port that is not available with the cable. When this happens manually select another available com port for this cable. Occasionally a device driver will be required. We can provide this if needed.



# PROGRAMMING & NAVIGATION

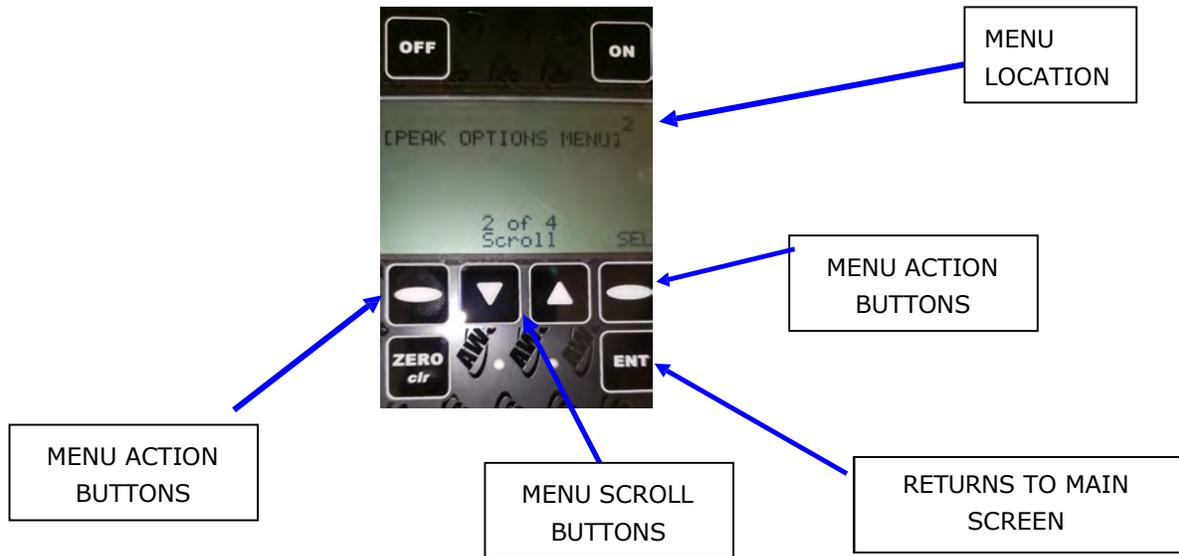


The AWS product line has been newly redesigned to provide a consistent interface throughout the product line. We have made the user interface menu driven, as opposed to 'hard coded'. This has provided several advantages. First, once you learn the basics, you can operate any of our products with the shortest learning curve possible. Second, it allows us to offer a greater array of functionality than was previously possible. Third, it allows the user the opportunity to economically upgrade and/or customize the tester at any point in the future.

The four buttons on the bottom of the display window are programmable or "Soft Buttons". The functionality of the buttons will vary with the current user selection. There are two ways to change settings, or otherwise gain access to the operation of the tester:

1. Live programming: Where the "soft" buttons have text above them, pressing the button will scroll through the options. In the picture above, pressing the down arrow will scroll through the Modes of Operation. These include Track, Peak, 1<sup>st</sup> Peak, Pulse and Impact. The Up Arrow will scroll through the engineering units.
2. Menu Driven: There are several sets of menus in the display, they are often specific to the intended use or requirements of the affiliated test stand or transducer.

- a. Bottom right Oval button will scroll through the Tester Operating Functions. For basic testers, this includes the RUN MODE and MEMORY (MEM) MODE. Toggling this button will change the functions of the other soft buttons appropriately.
- b. MENU (bottom left oval) will take you to the main menu system. Shown below is a sample of one menu screen



**MENU TREE**

Operation Overview: There are 8 buttons on the display face: Off, On, four (4) programmable or 'soft' buttons Zero and Enter. The exact function of the soft buttons is defined by the bottom two rows of text and will vary depending on the current mode of operation and firmware. Pressing the ENT button will take you back to the previous screen, repeated pressing will return you to the run mode.

**Button Operation:**

Run Mode (Current mode displayed):

ON: Clears the peak reading if saved, Zero's the display and erases the memory location otherwise.

ENT: Saves current reading in memory if memory is on and clears the peak reading.

Memory Mode (MEM displayed instead of Run):

ON: Goes to run mode without erasing memory location.

ENT: Scrolls to next empty location.

Either Mode:

RUN -> MEM: (soft button) changes the mode of the arrow buttons.

When in RUN mode Up and Down arrows change Units and Mode.

When in MEM mode Up and Down arrows scroll through saved readings. MENU: Enter menus.

**MENU Operation:**

ENT: Previous place in Menus - similar to a back up key.

Up and Down: Scroll through the current menu.

Programmable keys: Menu actions. The text varies depending of the active menu selection. SET, SEL, CLR, Send, +, -, High, Low, Change, DIG, TD, SYS

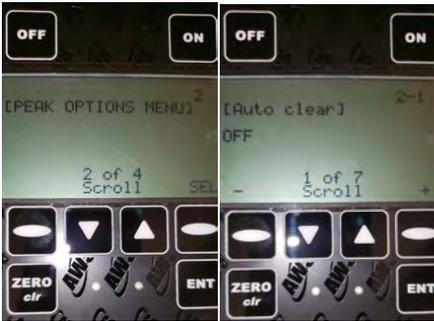


## 1-4 1-1 IMPACT CORRECTION

SEL: Enters menu.

1.1 The correction allows the user to enter a ratio that changes the dynamic torque reading to a different value - greater or less than the dynamic displayed/recorded value. Can be used for joint rate compensation, matching residual to dynamic or to compensate for inertia effects.

To "set" this compensation factor use the Up and Down Arrow keys to change the digit values. Use the Right oval key under DIG text to select the desired digit and/or decimal position to change numeric values using the Up and Down Arrow keys. Press Enter when done.



## 2-4 1-7 PEAK OPTIONS MENU

SEL: Enters menu.

### 2-1 Auto Clear

### 2-2 Pulse/Impact Filter

+/- Scroll left or right through available choices.

### 2-3 Peak/1st Peak Filter- Hz filter settings

+/- Scroll left or right through available choices.

### 2-4 Peak Blanking

+/- Set Blanking in % of full scale of the active transducer.

Peak Blanking sets the minimum threshold at which torque is captured as a peak. Pressing the + and - buttons will toggle this from 2% through 50% of Full Scale. Pressing the ENT button will accept this value and return to Run Mode.

### 2-5 Cycle End Timer

+/- Scroll left or right through available choices.

Cycle End Timer is used to segregate events into samples. The timer is initiated after a value is registered and the torque crosses the threshold in the descending direction. If there is no ascending torque, crossing the threshold before the timer expires, the previously recorded Peak value is a sample. The range of settings is from 0.10 to 5.00 seconds. This timer is used when testing tools with multiple torque events within one tightening cycle as with ratcheting, impact or pulse tools.

### 2-6 Sign Lock

+/- Toggle On or Off.

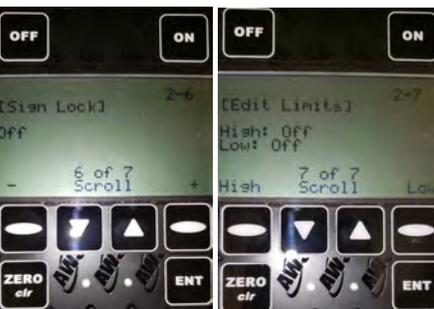
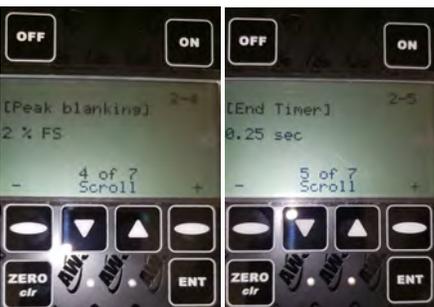
The Sign Lock feature allows the user to select the torque direction of the peak to be captured. With Sign Lock ON, the initial direction or sign is the default direction. Any peak measured in the non-selected direction will be measured, but not captured as a peak. To reset the sign, either cycle the power or zero the unit.

With Sign Lock OFF, the tester will capture both CW and CCW torque.

### 2-7 Set Limits

Using the oval soft keys Select High or Low to edit limits.

Once you have entered either High or Low limit editing use the Up and Down Arrow keys to change the digit values. Use the Right oval key under DIG text to select the desired digit and/or decimal position to change numeric values using the Up and Down Arrow keys. Press Enter when done.



## 3-4 1-4 SYSTEMS MENU

### 3-1 Sleep

+/- Scroll left or right through available choices.  
Set the time in minutes.

### 3-2 Lockout Menu

SEL: Enter menu.

#### 3-2-1 Mode Lockout

+/- Toggle on or off.

#### 3-2-2 Units Lockout

+/- Toggle on or off.

#### 3-2-3 Scroll Lockout

+/- Toggle on or off.

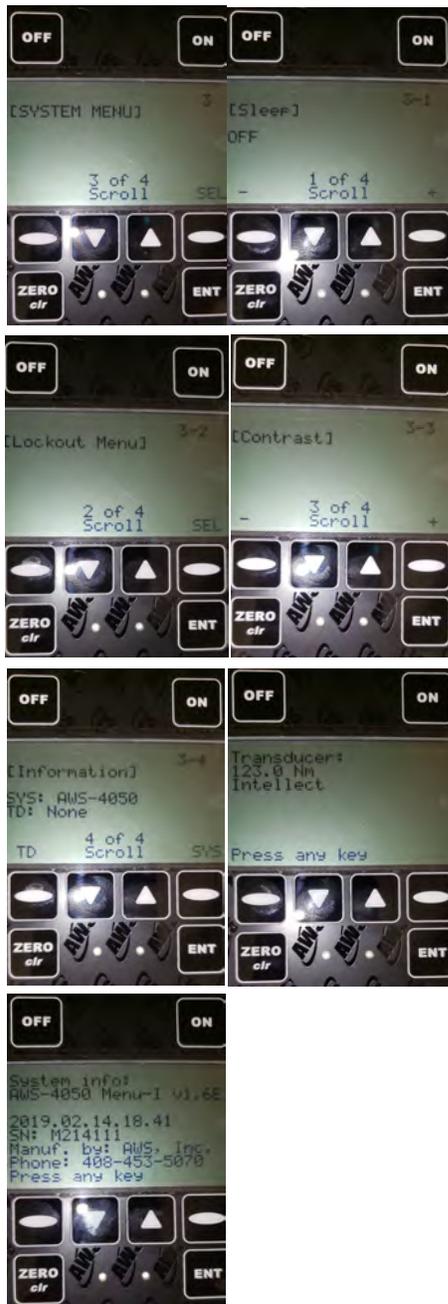
### 3-3 Contrast

+/- Change the contrast of the display.

### 3-4 Information

SYS: Gives detailed info about the system.

TD: Gives detailed info about the transducer.





#### 4-4 1-3 DATA MENU

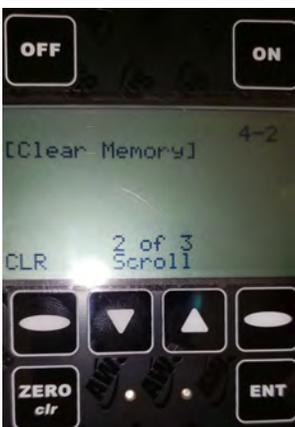
SYS: Gives detailed info about the system.

TD: Gives detailed info about the transducer.



#### 4-1 Print Memory

Send: Prints the currently saved readings.



#### 4-2 Clear Memory

CLR: Followed by ENT clears the readings saved in memory.



#### 4-3 Reset All

CLR: Followed by ENT clears all readings and all sets. Should be used approximately every 5000 readings.

## DESCRIPTION OF FUNCTIONS

The following is a description of the standard features of the AWS product line.

### OPERATING MODE

Current operating mode (Track, Peak, 1st Pk, Pulse and Impact) will show on the display. Press the down arrow key to toggle between them.

#### Track

Displays torque as it is being applied to the transducer. Track mode is used primarily for verifying calibration of the unit.

#### Peak

Displays and retains the maximum torque experienced by the wrench, as occurs when operating the wrench in the tightening direction. The Peak Mode is used for all power tools and some dial wrenches.

#### 1st Peak

Detects the "first peak" of torque experienced by the wrench, capturing the initial torque as occurs when the torque wrench cams over. First Peak is used primarily for Click torque wrenches and cam over screwdrivers.

#### Pulse

Displays and retains the maximum torque experienced by the wrench, as occurs when operating the wrench in the tightening direction. Works just as the Peak Mode except counts the events within a cycle (blows) and offers more signal filtering choices. Used for all Pulse and Impact power tools. Additional filters allow for compensation due to joint rate conditions – requires some testing by users to determine settings.

#### Impact Correction

This function is used to "set" displayed torque value to represent "move-on" torque. Requires testing by user to set accurately.

### SELECTING A TRANSDUCER

IMPORTANT NOTE: On power-up, the transducer that is selected will be active and ready to use. When changing transducers, you MUST Zero the unit. Do this by pressing the On/Zero. The transducer capacity can be verified by going to the Information screen in the Systems Menu (2-4). Full Scale capacity screen is shown. Press the ENT button twice to return to the run mode.

### ENGINEERING UNITS

Shows the current engineering units. Press  $\blacktriangle$  key to cycle through the eight possible choices: Kg f m, Kg fCm, gfCm, cNm, Nm, FT LB, IN LB, IN OZ.

### FULL SCALE

This screen shows the Full-Scale value of the Torque Shaft. This is not a field adjustable value.

## LOW LIMIT

Use the low limit setting as a means of visually flagging the operator when a reading fails to reach a desired minimum value. A small down arrow will appear on the screen if a peak is captured below the limit setting.

The limit is adjusted by using the navigation buttons to set the first four digits to the desired value. The fifth digit is used to select the decimal point position. The up and down buttons under the "Soft" button **Change** will change the value from 0-9. Pressing the "soft" **DIG** will scroll through the digit positions. When the correct value is entered, pressing the **ENT** button will return you to the menu system.

Once all the digits have been set, press the **MEM** key to accept the value and return to Program Function mode. The next time a reading is taken, "LO" will appear on the display if the captured value is less than the low limit

## HIGH LIMIT

Use the high limit setting as a means of visually flagging the operator when a reading falls over a desired maximum value. High limits are set in the identical way as low limits. Please refer to the Low Limit section for details.

***NOTE ON LIMITS: The green LED on the front of the display will flash when a peak is captured that falls within the limit setting.***

## SERVICE AND WARRANTY

### SERVICE

To ensure the best possible support for our customers, Advanced Witness Series maintains a complete calibration and repair facility for all its products. We keep in stock most replacement parts for torque testers, transducers, and our line of digital wrenches. When you buy a product from us, the only place you need to go for parts and service is...us! For service, call (408) 453-5070, Monday through Friday, between the hours of 9:00am and 5:00pm Pacific Coast Time.

### THE WARRANTY CARD

In order to ensure protection of the warranty as described below, you MUST fill in the appropriate information on the warranty card that came with your unit and return it to Advanced Witness Series, Inc. within 30 days of receipt of item.

We wish to call your attention to the fact that this system and various components need calibration and certification on a periodic basis. By returning the card to us, you will receive timely notification as to when this re-calibration and re-certification is due.

### STATEMENT OF LIMITED WARRANTY

ADVANCED WITNESS SERIES, INC. products are warranted free of defects in material and workmanship for a period of one (1) year from date of shipment. This warranty does not include failures due to application of torque to transducers or loaders beyond the stated capacity, operating system with a damaged transducer cord, nor any other misuse, abuse, or tampering. When used with impact type wrenches, the warranty is limited to the electronic digital display units only. This warranty does not cover calibrations.

All freight charges are the responsibility of the company or individual returning the item(s) for repair. Freight collect shipments will not be accepted.

Any modification to any of this equipment, without the express written approval of ADVANCED WITNESS SERIES, INC., will void this warranty. ADVANCED WITNESS SERIES disclaims any and all liability, obligation or responsibility for the modified product; and any claims, demands or causes of action for damage or for personal injuries resulting from the modification and/or use of such a modified ADVANCED WITNESS SERIES product.

ADVANCED WITNESS SERIES, INC.'S OBLIGATION WITH RESPECT TO ITS PRODUCTS SHALL BE LIMITED TO REPAIR OR REPLACEMENT, AND IN NO EVENT, SHALL ADVANCED WITNES SERIES, INC. BE LIABLE FOR ANY LOSS OR DAMAGE, CONSEQUENTIAL OR SPECIAL, OF WHATEVER KIND OR NATURE OR ANY OTHER EXPENSE WHICH MAY ARISE IN CONNECTION WITH OR AS A RESULT OF SUCH PRODUCTS OR THE USE OR INFORMATION THEREOF IN A JOB. THIS WARRANTY IS EXPRESSLY MADE IN LIEU OF ALL OTHER WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NO EXPRESS WARRANTIES AND NO IMPLIED WARRANTIES WHETHER OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE OTHER THAN THOSE EXPRESSLY SET FORTH ABOVE SHALL APPLY TO ADVANCED WITNESS SERIES.