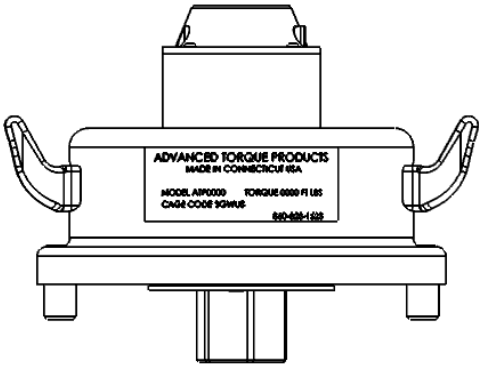
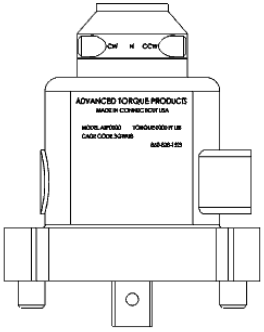
OPERATOR'S MANUAL

Digital Multipliers





Advanced Torque Products offers a diverse line of torque systems that range from several inch pounds to 40,000 foot pounds. Torque can be measured in various different units in American standard as well as Metric. All devices are equipped with a programmable overload alarm that has an audio as well as visual signal. The measured torque value can also be routed to a computer application or a printer. Measured torque can be displayed in real time in track mode as well as being stored as a peak value.

Contents

Safety Precautions

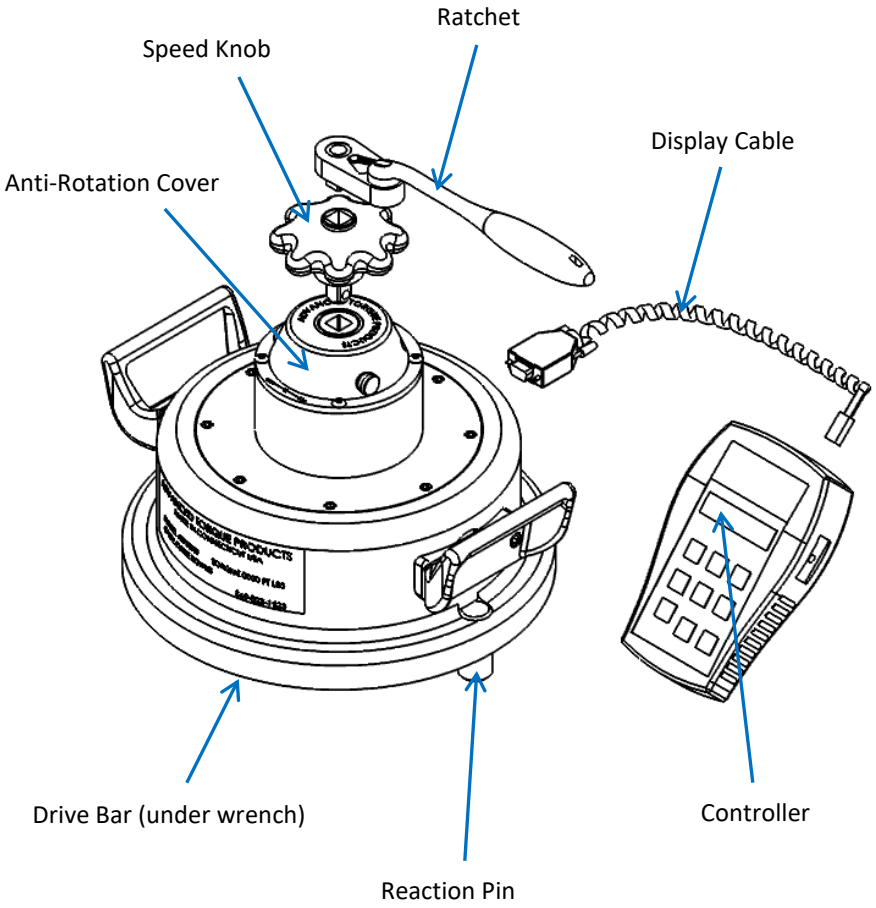
1. Read entire manual before using product.
2. Always wear eye protection when applying torque to fasteners.
3. Make sure Digital Multiplier is rated to match or exceed the torque you are applying.
4. Observe all equipment, system and manufacturer safety guidelines when using this product.
5. Do not use this product with the ATP Controller off; doing so could result in overloading the unit or the fastener.
6. Use the alarm feature to protect unit or fasteners from overload.
7. Do not press the ZERO button when torque is being applied; doing so can affect the unit's calibration.
8. Verify the calibration of any unit that displays a SENSOR OVERLOAD error message.
9. Always use the correct size socket or drive for the application.
10. Do not use sockets or drives that show wear or cracks.
11. Do not add any extensions such as pipes on the handle of a ratchet driving wrench.
12. When using a ratchet to drive a wrench, make sure its anti-rotation pawl is fully engaged.

General Wrench Operation

The use of Advanced Torque Product's line of digital multipliers is straightforward and intuitive. For best results, it is recommended that operators become familiar with the best practices and precautions in this manual.

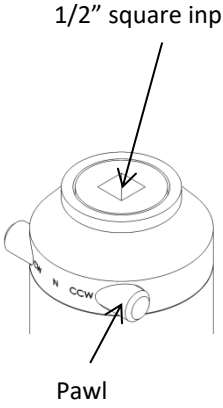
Wrench Components

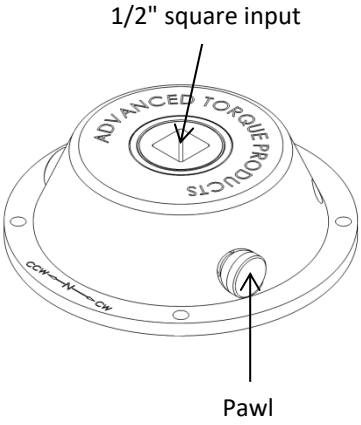
Common wrench components are shown below for reference when using this manual.



Anti-Rotation Cover Components

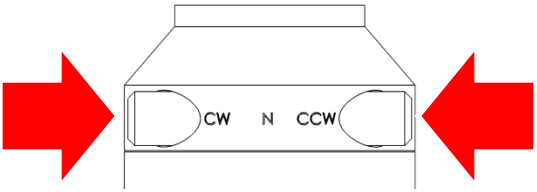
The anti-rotation cover is used to safely control the wrench at high torque levels.





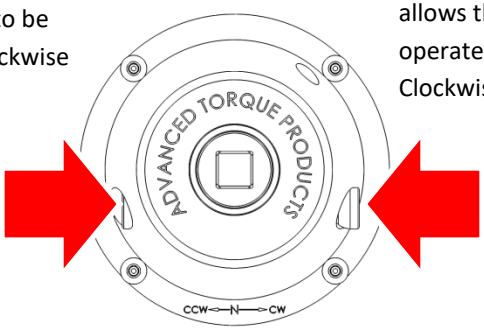
Anti-Rotation Cover Use

The anti-rotation cover is operated by sliding the pawl to either the left or right, or by placing it in the neutral position.



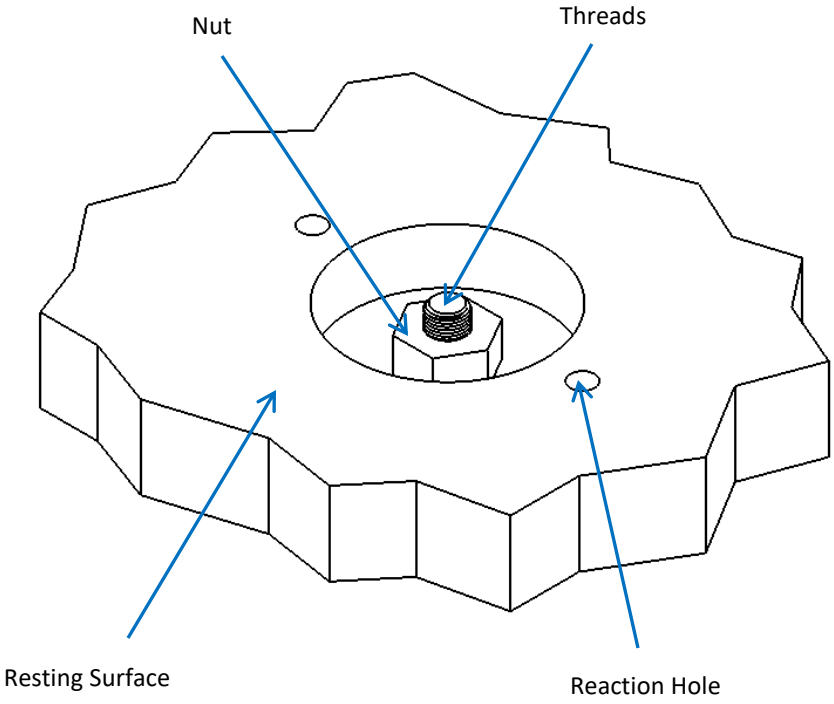
Pushing the pawl to the right allows the wrench to be operated in the Clockwise direction

Pushing the pawl to the left allows the wrench to be operated in the Counter-Clockwise direction



Application Components

Components commonly found on an example application are shown below.



Precautions Before Applying Torque

- As it would be impossible to know how any wrench is going to be used, there should always be specific work instructions for each application. **ALL** work instructions should always be followed.
- Ensure that all surfaces, threads, nuts, and any other parts are free of dirt and debris.
- The wrench's Controller should be fully charged before starting any torque application. When the Controller is finished charging, it should be unplugged and remain so for the duration of the torque application.

While Applying Torque

- The charger must be unplugged while using any wrench on an application.
- Turn the Controller on before starting any torqueing procedure, including loosening.
- Insert the Drive Bar into the application first, then rotate the input of the wrench until the reaction pins line up and fall into place.
- The Reaction Pins should be fully engaged in their corresponding holes on the application. There should not be any daylight between the bottom of the wrench and the resting surface of the application.
- Always make sure the wrench is “Loose”, IE it can be lifted away from the application, before zeroing the torque.
- When operating the wrench, activate the anti-rotation pawl to safely support the torque being applied.

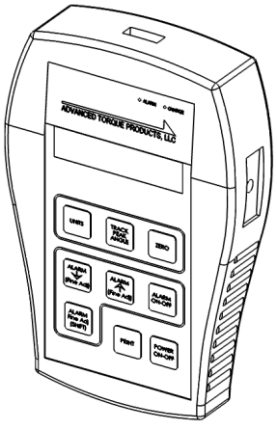
Safe Operation After Applying Torque

- After torqueing the proper technique is critical
- Firmly hold input wrench when disengaging the pawl and slowly rotate input wrench until all force has been eliminated.
- The ATPDA (Drill Adapter) can be purchased separately to mitigate this condition.

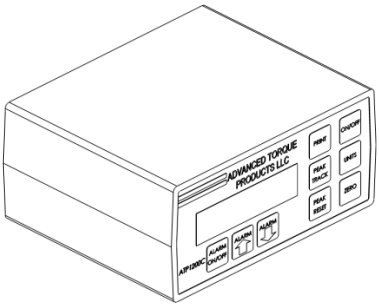
Wrench Identification

High Accuracy Line – Wrenches with Orange Handles and an orange label are part of Advanced Torque Product's High accuracy line. These wrenches are similar to the handheld controller models except they only display torque in Inch-pounds and have a higher accuracy over their range. These Wrenches require special treatment, the details of which can be found in the "High Accuracy Wrench Line" section of this manual located on page 11.

Handheld Controller Wrench Line – Wrenches with a "hand held" style controller as shown below are part of ATP's hand held line. Information about this line can be found in the "Handheld Controller Wrench Line" section on page 11.

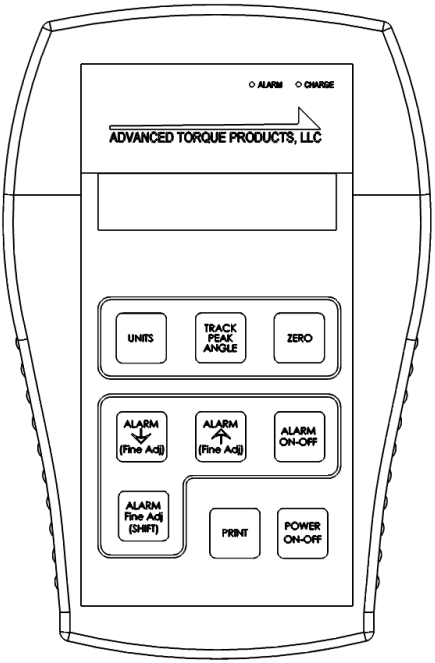


Black Box Controller Wrench Line – Wrenches that make use of the "Black Box" style controller shown below belong to ATP's Black Box Line. Information pertaining to Black Box controller can be found in the "Black Box Controller Wrench Line" section on page 19.



High Accuracy & Handheld Controller Wrench Line Operation

Controller Components



UNITS: Toggles through the programmed units e.g. ft-lbs, in-bs and/or N/M.

TRACK / PEAK / ANGLE: Toggles through the track, peak and angle modes.

ZERO: Zeros the unit. Also resets the peak torque value in “Peak Mode” and angle value in “Angle Mode”.

ALARM ARROWS: Increases or decreases the alarm value. To decrease use left hand button (with down facing arrow); to increase use right hand button (with arrow facing up).

ALARM ON / OFF: Toggles the alarm on and off.

ALARM Fine Adj / (SHIFT): Holding this button while pressing the alarm arrow buttons changes the alarm value in finer increments.

PRINT: Sends the torque value being displayed to the output cable at the side of the controller.

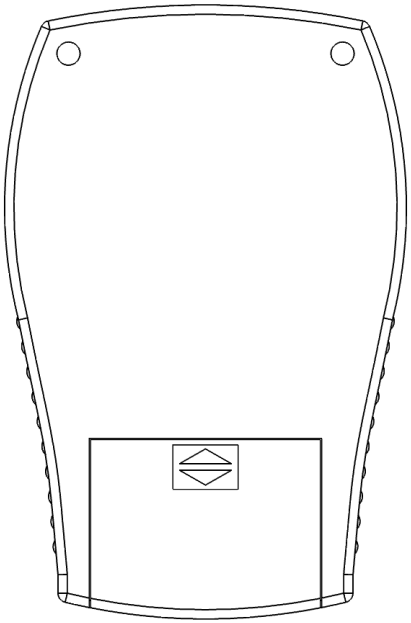
POWER ON / OFF: Powers the unit on and off.

Connections/Charging

The unit may be powered by the internal batteries or with the appropriate charger. The unit contains 3 rechargeable AA NIMH batteries. Before initial operation, the unit must be charged for four to five hours with the included charger. The ATP Controller may be operated with non-rechargeable batteries as well as the rechargeable batteries included from the factory.

CAUTION: Never connect the charger to the unit when using non-rechargeable batteries! Damage to the unit may result!

To change the batteries, slide the panel located on back of controller and replace batteries accordingly.



There are adapter plates available for other countries' power standards. The part numbers for those plates are given in the table below.

COUNTRY	AC INPUT PLATE #
USA	RPA
UK	RPK
EU	RPE
AUS	RPS

Table 1

Operation

When the unit is turned on an Advanced Torque greeting will display. This is followed by the maximum torque rating of the wrench. Before applying force wait until the initial Advanced Torque startup message has completed. If there is no load applied to the wrench the force should read "0.0" or "00". If the display is reading a number other then 0, or to reset the display back to zero, when using the peak mode press the ZERO button before use. You can now begin use.

WARNING: Pressing the ZERO button while torque is applied will cause the wrench to show an offset reading. To correct this, the zero button must be pressed with no load.

After a few seconds if only the Advanced Torque startup message is displayed but no torque rating is displayed, the unit is not properly connected to the ATP Controller or the cable is malfunctioning. If nothing happens when the power button is pressed, the batteries may need to be charged.

To charge the batteries, plug the supplied power charger into the adapter jack on the right side of the unit. Charging the batteries will require the unit to be plugged in for 4-5 hours with the unit off. If the display shows a "SENSOR OVERLOAD" message, the unit's calibration must be checked.

Selecting Units

Depending on the factory programming, the wrench may measure torque in several different units. Press the UNITS button to cycle through the available units. There are many available units such as ft-lbs, in-lbs, Nm, kg-cm and more.

Selecting Mode

There are up to three modes available for the ATP Controller to display torque values. To toggle through the different operating modes press the TRACK / PEAK / ANGLE button.

1. TRACK MODE: Recommended for Calibration / Verification. Track Mode will display the torque value the unit is measuring in real time. This is the default mode for the unit.

2. PEAK MODE: Recommended for Measuring Torque. Peak Mode will display the highest torque reading the unit has measured. To reset the ATP Controller press the ZERO button.

Caution: If the ATP Controller displays a sensor overload error message, stop applying load and calibrate the unit before continuing.

3. ANGLE MODE: Angle mode will display the angle reading the unit has measured. To reset the angle measurement press the ZERO button. *Note: See page 16 for more instruction on angle mode.*

Setting the Alarm

The alarm function is toggled on and off by pressing the ALARM ON/OFF button. When enabled an audible tone is produced by the ATP Controller when the alarm value is exceeded. This tone will continue until the unit no longer senses torque beyond the alarm's threshold. When enabled, the alarm value will be shown in the lower right corner of the display unless angle mode is in use. Pressing the up and down arrows next to the alarm button will raise and lower the alarm's value. Pressing and holding the ALARM Fine Adj / (SHIFT) button while pressing the arrow buttons will allow for a finer adjustment of the alarm's value.

Note: If the alarm feature is desired while in "Angle" mode, enable the alarm and set the alarm value while in "Track" or "Peak" mode. Then switch to "Angle" mode.

Measuring Torque

The following procedure should be used to torque fasteners with an Advanced Torque Products unit. When the unit senses torque in excess of the unit's rated capacity an alarm will sound and the display will show a sensor overload message.

1. Turn on the ATP Controller by pressing the ON/OFF button. The display should briefly show an Advanced Torque greeting message and the maximum torque range for the connected sensor. Other initial start-up behaviors are covered in the OPERATION section of this manual. *(page 8)*

2. If the zero sensor message appears after power up, press the ZERO button with no torque applied.

Caution: pressing the zero button with torque applied in Track Mode will compromise the calibration of the unit.

3. Select the desired unit of measure by pressing the UNITS button.

4. Select the proper mode for your application. There are up to three modes available: track, peak and angle. More information on the different mode functions can be found in the "Selecting Modes" section on page 14.

NOTE: Peak Mode is the recommended mode for most Torque Applications.

5. If the torque sensing alarm is desired, press the ALARM button. The alarm value will appear in the lower right corner of the display. The alarm can be adjusted with the arrow buttons next to the alarm button. Holding the ALARM Fine Adj button while pressing the arrow buttons will adjust the alarm's value in finer increments.

6. Place the unit on the application and place the unit's output drive, reaction pins and or reaction plate on the appropriate surfaces.

7. Engage the anti-rotation pawl to hold force while torqueing. Apply torque slowly to the input drive in the desired direction and monitor the display. When approaching final torque value place anti-rotation pawl in the "neutral" position until desired torque limit is reached.

To release the anti-rotation pawl:

a. Apply slight pressure to ratchet in the same direction.

b. Push the anti-rotation pawl to place it into the “neutral” (middle) position.

(see image on page 7)

8. When desired torque has been reached, release all force. If the alarm was set a tone will be heard when the desired torque is reached.

Caution: the ratchet wrench will spin in the opposite direction when placed in the “neutral” position.

9. If “Peak Mode” was selected press the ZERO button to reset the ATP Controller’s reading.

10. If “Angle Mode” was selected press the ZERO button to reset the ATP Controller’s reading.

11. When the torque application is finished turn off the ATP Controller.

Stretch Dial Use

An optional stretch dial may be used to measure the degrees of rotation of the fastener system as it is torqued. Turn the input drive until all backlash is removed in the direction to be torqued and move the stretch dial pointer to the zero degree mark. The degrees of rotation at required torque may now be measured.

Angle Encoder

An encoder is an instrument that measures angle in degrees and minutes. In the "ANGLE" mode, the instrument displays Peak mode (P) and Track mode (T). To measure using the angle encoder:

1. Push the (TRACK/PEAK/ANGLE) button until the LCD Display shows angle information.

2. When the ANGLE mode is selected, the controller will automatically zero the angle measurement and displays all zeros until output shaft is turned clockwise or counterclockwise. Angle is measured in degrees and minutes.

3. Pressing the ZERO button will zero the angle value being displayed.

NOTE: Pushing the ZERO button in ANGLE mode zeros the angle reading, not the torque reading. To zero the torque reading, change the mode from ANGLE to TRACK or PEAK then push the ZERO button.

Printing

The torque value being displayed by the ATP controller can be sent to a computer through the output port at any time by pressing the PRINT button. In order for applications to receive this data it is necessary to have some sort of Wedge software installed on the computer to route the data to the appropriate application. The settings for the Wedge software are contained in the Table 2.

SETTING	VALUE
BAUD RATE	1200
DATA	7 BITS
PARITY	NONE
STOP BITS	2
FLOW CONTROL	NONE

Table 2

Calibration/Verification

The following calibration procedure has been developed for calibration systems traceable to N.I.S.T. standards. Units should be calibrated annually or as necessary. A DVD of product calibration is included with the unit.

1. Load the torque wench onto the calibration system making sure the drive bar and reaction pins are fully engaged.

2. To put in calibration mode, hold the ALARM / SHIFT button and simultaneously press the ZERO button on the ATP Controller.

3. When the display prompts: “ZERO LOAD (-)” make sure the torque wrench has no load on it and press ZERO button.

4. When the display prompts: “FULL LOAD (-)” load the torque wrench to full capacity in the CCW direction and press the UNITS button.

NOTE: the repeatability and accuracy is dependent on how stable you hold the force at maximum load.

5. When the display prompts: “IF YOU ARE SURE PRESS UNITS”, press the UNITS button to lock in the calibration values.

6. When the display prompts: “ZERO LOAD (+)”, release the load so there is no force on the wrench. Then press the ZERO button.

7. When the displays prompts; “FULL LOAD (+)” load the wrench to the full capacity in the CW direction and press the UNITS button.

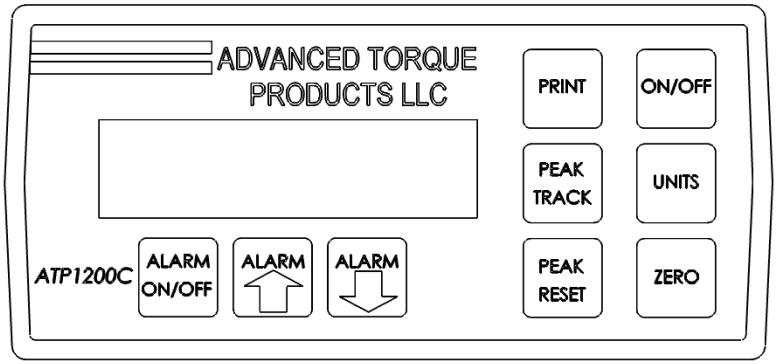
8. When the display prompts: “IF YOU ARE SURE PRESS UNITS”, press the UNITS button to lock in the calibration values.

Your unit is now calibrated and ready for verification.

Note: Verification should be done in Track Mode.

Black Box Controller Wrench Line Operation

Controller Components



ON/OFF: Powers the unit on and off.

PEAK/TRACK: Toggles through modes such as track, peak, auto and power. More information is provided in the selecting modes section of this manual

UNITS: Toggles through programmed units e.g. ft-lbs, in-lbs and/or N·m

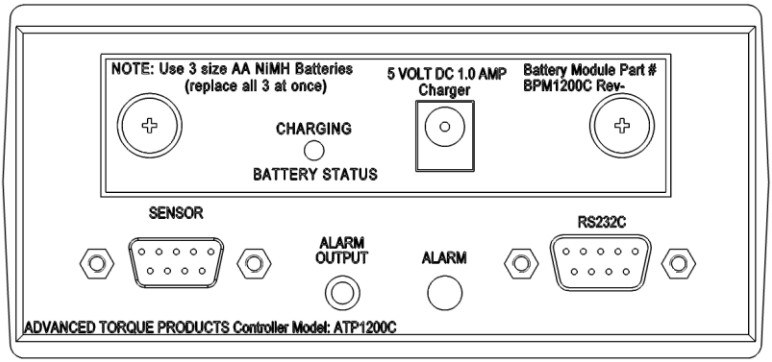
PEAK RESET: Resets the peak value when in peak mode.

ZERO: Zeros the unit.

ALARM ON/OFF: Toggles the alarm on and off.

ALARM ARROWS: Increases or decreases the alarm value. Holding the PRINT button while pressing the arrow buttons changes the alarm value in finer increments.

PRINT: Sends the torque value being displayed to the RS-232 port on the rear of the display.



SENSOR: Inputs the signal from the unit.

RS232: Outputs the reading of the unit to a RS-232 device when the print button is pressed.

CHARGER JACK: This jack is for a 5V 1A AC adapter that charges the internal batteries and/or powers the unit.

CHARGING LIGHT: This will glow when internal batteries are charging.

ALARM OUTPUT: This jack produces a signal when the alarm is triggered that can be routed to headphones.

Connections/Charging

The unit may be powered by the internal batteries or with an appropriate 5 volt AC adapter. The unit contains 3 rechargeable AA NIMH batteries. Before initial operation, the unit must be charged for four to five hours with the included AC adapter. The AC adapter included with the unit is a smart charger that will turn itself off after six hours of charging.

CAUTION: Never connect the AC adapter/charger to the unit when using NON-RECHARGABLE batteries! Damage to the unit may result!

To change the batteries, unscrew the two thumb screws on the back of the unit and pull the battery tray out. There are adapters available for other countries' power standards. The part numbers for those plates are given in Table 1. The ATP1200C display is connected to the unit by a standard RS-232 cable. Insert the female end of the cable into the unit and the male end to the jack on the back of the ATP1200C display marked SENSOR.

Operation

Power Up:

When the unit is turned on it will run a routine diagnostic. A check sensor message will be displayed briefly followed by an Advanced Torque greeting and the maximum torque rating of the unit. If the check sensor message continues for more than a few seconds, the unit is not properly connected to the ATP1200C display or the RS-232 cable is malfunctioning. If this is the first time the ATP1200C display is to be used with the attached unit, a zero sensor message will be displayed. At this point press the ZERO button with no torque applied.

WARNING: Pressing the ZERO button while torque is applied will cause the wrench to show an offset reading. To correct this, the unit must be zeroed with no load.

If nothing happens when the power button is pressed, the batteries may need to be charged. To charge the batteries, plug the supplied AC adapter into the charger jack in the rear of the unit. Charging the batteries will require the unit to be plugged in for 4-5 hours with the unit off. If the display shows a sensor overload message, the unit's calibration must be checked.

Selecting Units

Depending on the factory programming, the wrench may measure torque in several different units. Press the UNITS button to cycle through the available units. E.g. ft-lbs, in-lbs, N·m. Custom units are also available.

Selecting Mode

There are up to four modes available for the ATP1200C display to provide torque values. To toggle through the different operating modes press the MODE button.

1.TRACK MODE:

Recommended for Calibration / Verification. Track Mode will display the torque value the unit is measuring in real time. This is the default mode for the unit.

2.PEAK MODE:

Recommended for Measuring Torque. Peak Mode will display the highest torque reading the unit has measured. To reset the peak value, press the PEAK RESET button.

3.AUTO MODE:

If enabled, Auto Mode is similar to peak mode. The unit will show the highest value it has sensed and then the peak value will reset itself after being displayed for two seconds.

4.POWER MODE:

If enabled, Power Mode is high speed unfiltered peak mode used for non-impact applications. The highest value the unit senses will be displayed until the value is reset by pressing the PEAK RESET button.

Setting the Alarm

The alarm function is toggled on and off by pressing the ALARM button. When enabled an audible tone is produced by the ATP1200C display when the alarm value is reached. This tone will continue until the unit no longer senses torque beyond the alarm's threshold. This signal can also be heard with headphones that are plugged into the alarm output jack on the back of the unit. Using headphones to monitor the alarm signal may help make the signal audible in noisy environments. When enabled, the alarm value will be shown in the lower right corner of the display. The default value for the alarm is 10% of the unit's full capacity. Pressing the up and down arrows next to the alarm button will raise and lower the alarm's value in 10% increments. Pressing and holding the print button while pressing the arrow buttons will allow for a finer adjustment of the alarm's value.

Stretch Dial Use

An optional stretch dial may be used to measure the degrees of rotation of the fastener system as it is torqued. Turn the input drive until all backlash is removed in the direction to be torqued and move the stretch dial pointer to the zero degree mark. The degrees of deflection at required torque may now be measured.

Printing

The torque value being displayed by the ATP1200C display can be sent to a computer through the RS-232 port at any time by pressing the PRINT button. In order for applications to receive this data it is necessary to have some sort of terminal software installed on the computer to route the data to the appropriate application. The settings for the wedge software are contained in Table 3.

Setting	Value
Baud Rate	1200
Data	7 bits
Parity	None
Stop Bits	2
Flow Control	None

Table 3

Measuring Torque

The following procedure should be used to torque fasteners with an Advanced Torque Products unit. An alarm will sound and the display will show a sensor overload message when the unit senses torque in excess of 112% of the unit's rated capacity. Caution: If the ATP1200C Display displays a sensor overload error message, stop applying load and calibrate the unit before continuing.

Caution: Pressing the zero button while torque is being applied will compromise the calibration of the unit.

1. Turn on the ATP1200C Display by pressing the ON/OFF button. The display should briefly show a check sensor message followed by an Advanced Torque greeting message and the maximum torque range for the connected unit. Other initial start-up behaviors are covered in the power up section of this manual.

2. If the zero sensor message appears after power up, press the ZERO button with no torque applied.

3. Select the desired unit of measure by pressing the UNITS button.

4. Select the mode of the ATP1200C Display. There are four modes available: track, peak, auto and power. There is more information on the different mode functions in the selecting modes section of this manual.

5. If the torque sensing alarm is desired, press the ALARM button. The alarm value will appear in the lower right corner of the display. The alarm can be adjusted with the arrow buttons next to the alarm button. Holding the print button while pressing the arrow buttons will adjust the alarm's value in finer increments.

6. Place the unit on the application and place the unit's output drive, reaction pins and or reaction plate on the appropriate surfaces.

7. Apply torque slowly to the input drive in the desired direction and monitor the display. Engage the anti-rotation pawl to hold force while torqueing.

Note: Desired torque must be measured with the anti-rotation pawl in the neutral position in order to ensure an accurate measurement. To release the anti-rotation pawl once final torque is reached:

a. Apply slight pressure to ratchet in the same direction.

b. Push the anti-rotation pawl to place it into the "neutral" (middle) position.

Caution: the ratchet wrench will spin in the opposite direction when placed in the "neutral" position.

8. When desired torque has been reached, release all force.

9. If peak mode was selected press the PEAK RESET button to reset the ATP1200C Display's reading.

10. When the torque application is finished turn off the ATP1200C Display.

Calibration/Verification

The following calibration procedure has been developed for use on calibration systems traceable to N.I.S.T. standards. Units should be calibrated annually or as necessary. A DVD of product calibration is included with the unit.

Note: Once calibrated the ATP1200C Display and Wrench it was calibrated with should remain as a paired system.

1. Load unit onto the calibrating system.
2. To enter calibration mode hold the PRINT button down while simultaneously pressing the ZERO button. The display should read 'ZERO LOAD (-).'
3. When the display prompts: "ZERO LOAD (-)" make sure the torque wrench has no load on it and press ZERO button again.
4. When the display prompts: "FULL LOAD (-)" load the torque wrench to the capacity shown on the controller's start-up message in the CCW direction and press the UNITS button. *NOTE: the repeatability and accuracy is dependent on how stable you hold the force at the peak reading.*
5. When the display prompts: "ZERO LOAD CELL", release the load so there is no force on the wrench.
6. When the displays prompts; "FULL LOAD (+)" load the wrench to the capacity shown on the controller's start-up message in the CW direction and press the UNITS button.
7. When the display prompts: "IF YOU ARE SURE PRESS UNITS", press the UNITS button to lock in the calibration values. Your unit is now calibrated and ready for verification. *Note: Verification should be done in Track Mode.*

In conjunction with the preceding calibration instructions, Digital Torque Multipliers™ equipped with digital encoders may be further validated with the use of Advanced Torque Product's Angle Validation Stand (ATP-AVS-E). The Angle Validation Stand is an easy to use piece of equipment used to validate the angular output of the tool to ensure consistency and accuracy in angle measurement.

Wrench Maintenance

Suggested Maintenance: Hand Held & Black Box Line: (1.0% accuracy)

Recommendation	Period	Description
Calibration / Verification	Every 1 year	Torque Validation with certificates traceable to N.I.S.T.
"ATP Tune Up"	Every 5 years	10 point check including mechanical checks, electronic checks, lubricant checks and battery replacement.

Suggested Maintenance: High Accuracy Line: (0.4% accuracy)

Recommendation	Period	Description
Calibration / Verification by ATP	Every 3 months	Torque and Angle Validation with certificates traceable to N.I.S.T.
"ATP Tune Up"	Every 3 years	10 point check including mechanical checks, electronic checks, lubricant checks and battery replacement.

Note: *All fasteners on High Accuracy wrenches should not be tampered with. Doing so will void calibration.*

Contact Us

Feel free to contact us with any questions, comments, or concerns.

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Revised: 9/22/16 – AS


ADVANCED
TORQUE PRODUCTS