AIMCO

TORQUE CUBE™

AUDITOR

OPERATIONS MANUAL

GENERAL SAFETY RULES

WARNING! Read all instructions. *Failure to follow all instructions listed below may result in irreparable damage to the product or injury to the user.*

WORK AREA

- **Keep work area clean and well lit.** *Cluttered work areas invite accidents.*
- **Keep Children and bystanders. away during operation.** *Distractions can cause the user to lose control.*

ELECTRICAL SAFETY

- **Product plugs must match the outlet.** *Never modify the plug in any way. Unmodified plug matching outlets will reduce the risk of electrical shock*
- **Do not expose product to moisture or wet conditions.** *Water entering the device will increase the risk of product damage or electrical shock.*
- **Do not abuse the transformer. Never use the cord for carrying, pulling or unplugging from the wall outlet. Keep cord away from heat, oil, sharp edges or moving parts.** *Damaged or entangled cords increase the risk of electrical shock.*

PERSONAL SAFETY

- **Stay alert, observe the task at hand and use common sense when using product. Do not use when tired or under the influence of drugs, alcohol or medication.** *A moment of inattention can cause personal injury.*
- **Use safety equipment. Always wear eye protection.** *Safety equipment such as eye protection will reduce personal injuries.*
- **Do not overreach. Keep proper footing and balance at all times.** *This enables control of the process in unexpected situations.*
- **Dress properly. Do not wear loose clothing or jewelry. Keep your hair or gloves away from moving parts.** *Loose clothing, jewelry or hair can get caught in moving parts.*

SERVICE

- **Have your product serviced by a qualified repair person using only identical replacement parts.** *This ensures the safety and reliability of the product is maintained.*

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MOUNTING INSTRUCTIONS

The Auditor Torque Cube™ is a portable device delivering full featured testing abilities in a small ultra-portable package.

Once brought to the work area, it is important for accuracy and safety reasons to securely mount your Auditor Torque Cube to the workstation prior to use.

The Auditor Torque Cube™ is setup with thru-holes for (3/8" / 9mm) x (4" / 100mm) fastening bolts or screws. During operational use, the Auditor Torque Cube™ is subjected to rotational forces that require 2 points of attachment to the work station to secure against. Dowel pins of at least 2" / 50mm may also be used at the work station which will then allow the unit to be dropped onto and lifted off of the pins for maximum portability.

Included with the product, is a vertical and horizontal mounting template for ease of use.

INTRODUCTION

DESCRIPTION

Thank you for purchasing an Auditor Torque Cube™ tester from AIMCO. You have chosen a unit that is designed to accomplish a wide range of torque testing applications in the smallest footprint with great value. The Auditor Torque Cube™ features a LCD display, built in NiMh battery pack for portability, and the ability to test in 2 planes, Vertical and Horizontal. AIMCO's Auditor Torque Cube™ also is enabled with RS-232 output for use with a serial printer or Windows® PC device.

SYSTEM SPECIFICATIONS

Dimensions:	3.125" / 79.375 mm Wide 3.75" / 95.25 mm High 3.23" / 82.55 mm Deep 2.5 lb / 1.13 kg
Power Requirements:	9-26V DC, 150 mA min Supplied by 100-220VAC Input Transformer
Battery:	Internal (non-field serviceable) NiMh pack
Operating Temperature Range:	32°F / 0°C to 122°F / 50°C
Data Communications:	RS-232
Accuracy:	1% of Indicated Reading within top 90% of Full Scale
Range:	10% to 100% of Full Scale
Display:	4 Active Digits
Units of Measure:	Eight (8) Selectable Engineering Units: In.Oz., In.Lb., Ft.Lb., Nm, CNm, KgfCm, gfCm, Kgfm
Frequency Filter:	Selectable filtering frequencies: 125Hz, 250Hz, 500Hz, 750Hz, 1500Hz

PREPARING THE ATC FOR USE

The **ATC** testers feature a supplied **Joint Simulator** (Fig. A) that is configurable to a wide variety of joint conditions. The **Joint Simulator** is made up of a series of **Beville Washers** that allow the user to pre-configure the joint to match the actual application joint as closely as possible. Each of the **Beville Washers** is concave in shape. By aligning all the concave curves in the same direction a simulated hard joint is achieved (Fig. B). Alignment of the concave shapes in an opposing manner a simulated soft joint is achieved (Fig. C). Differing combinations allow for simulated medium joints to be achieved (Fig. D).

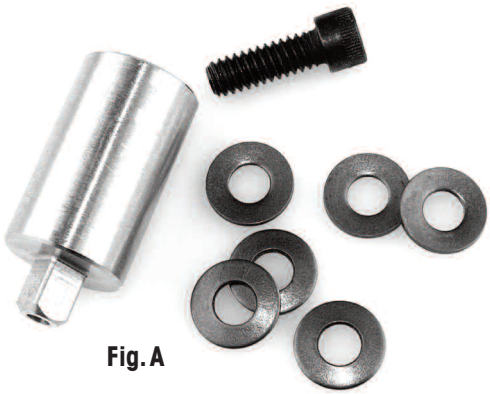

Fig. A

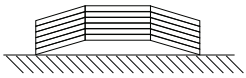

Fig. B

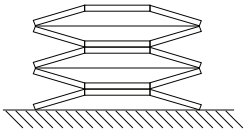

Fig. C

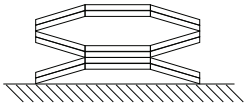

Fig. D

Prior to use, remove the **Joint Simulator** from its bag. Loosen the **Hex Screw** and stack the **Beville Washers** according to your joint condition needs. Hand thread the **Hex Screw** into the housing several threads. Place the square drive end of the simulator into the female square drive on the **ATC** Tester.

BASIC OPERATION

Power ON and OFF
Pressing any key (CLR, MDE, ENG, ENT) turns unit power ON.
Pressing CLR & ENT simultaneously turns unit power OFF.

CLR
Pressing CLR clears the current reading or zeros the transducer if no reading is current.

MDE
Pressing MDE will display the current mode for a 1 second period of time. The unit will revert to ACTIVE DISPLAY mode after that time. Depressing the MDE key a second time will scroll through the list of MODES available ("PK, AC", "1PK,AC", "CAL", "TRACK"). Depressing any other key will return the unit to ACTIVE DISPLAY mode. See page 9 for more descriptions.

ENG
Pressing ENG will display the current Unit of measure for a 1 second period. Pressing ENG while the Units of Measure are displayed will scroll through the available units (Kgf M, Kgf Cm, gf Cm, Ncm, Nm, FT LB, IN LB, IN OZ). Pressing any other key will return to SAMPLE mode.

ENT
Pressing ENT will send the current reading to the serial port and clears the screen.

MDE & ENG
Pressing MDE & ENG buttons simultaneously displays the Program Menu. See Program Menu section for details.

ACTIVE DISPLAY
Active Display Mode is the normal operating mode used by the Auditor Torque Cube™ for measurement. When a measurement is taken, the transducer reading or peak is displayed for the length of time set by Auto Clear (see Program Menu). If High and Low limits have been preset (see Program Menu) then the LED light will show Green for a sample within the limits, or Red for one that is outside the preset limits. In Peak and 1st Peak modes, the LED will illuminate Green upon completion of the reading if no limits are preset in the unit. No LED illumination will occur during Track mode.

PROGRAM MENU

Buttons for Menu Navigation

ENG - Functions as an UP button in this menu. Pressing ENG sequentially advances the menu to the next item.

MDE - Functions as a DOWN button in this menu. Pressing MDE sequentially advances the menu to the previous item.

CLR - Pressing CLR will exit from the PROGRAM MENU and return the unit to ACTIVE DISPLAY MODE.

ENT - Pressing ENT will change the current item as advanced to or displayed in the PROGRAM MENU

AC

Auto Clear is time, in seconds 1-9 and off. When AC is displayed, pressing ENT will sequentially advance the time increment by 1 second at each press of ENT. After 5 seconds of no changes, the unit will revert to Active Display Mode and the last shown setting will be held. Setting OFF will deactivate the Auto Clear function and readings will need to be cleared from the screen manually using the CLR key.

FILT

Peak filter frequency response in Hz. Options of 125, 250, 500, 750 and 1500 are available. Press ENT key to sequentially scroll thru these options. After 5 seconds of no changes, the unit will revert to Active Display Mode and the last shown setting will be held.

PPER (PEAK BLANKING)

Minimum peak as a percentage of full scale. Readings below the SET value will not be displayed. Settings in the range of 2%-50% are available. Pressing ENT will sequentially increase the % by one with each press. At 50% the unit will scroll back to 2% with the next press of ENT. After 5 seconds of no changes, the unit will revert to Active Display Mode and the last shown setting will be held.

SL

Sign Lock. Options of ON or OFF are available. Press ENT to scroll between the selections. After 5 seconds of no changes, the unit will revert to Sample Mode and the last shown setting will be held.

LOW

Lower limit target. A setting of 0.000 disables the limit. Press ENT to enter the Number Edit Mode.

The current digit or decimal point flashes. The Number Edit Mode will remain active without time out until the CLR button is pressed.

Press ENG to sequentially increase the flashing digit. Press MDE to sequentially decrease the flashing digit. Press ENT to save the digit and move on to the next.

Once all digits have been adjusted/entered the decimal point is able to be moved. ENG will then move the decimal one position to the right with each press. MDE will move the decimal point one position to the left with each press. Press ENT to exit the Number Edit Mode and save the number displayed.

HIGH
High limit target. A setting of 0.000 disables the limit. Press ENT to enter the Number Edit Mode.

The current digit or decimal point flashes. The Number Edit Mode will remain active without time out until the CLR button is pressed.

Press ENG to sequentially increase the flashing digit. Press MDE to sequentially decrease the flashing digit. Press ENT to save the digit and move on to the next.

Once all digits have been adjusted/entered the decimal point is able to be moved. ENT will then move the decimal one position to the right with each press. MDE will move the decimal point one position to the left with each press. Press ENT to exit the Number Edit Mode and save the number displayed.

FS
Full Scale in the current Units of Measure. This is not editable by the user.

SLEEP
Sleep is used to conserve battery power. Settings are OFF and from 1-20 seconds. Press ENT to sequentially scroll through from OFF to the sequential numbers 1-20. Pressing ENT at the number 20 scrolls the menu selection back to OFF. After 5 seconds of no changes, the unit will revert to Active Display Mode and the last shown setting will be held.

CHARGING THE BATTERY

The internal battery pack contained in the Auditor Torque Cube™ is non-user serviceable. When treated properly, the battery pack should provide approximately 12 hours of continuous use from a full charge.

The battery chemistry contained within the Auditor Torque Cube™ is NiMh and charges with the supplied power transformer. Any time the Auditor Torque Cube™ is plugged in, the batteries are trickle charged at a rate that takes approximately 8 hours for a full charge. There is no indication to the user that the unit is charging and it is recommended to simply leave the unit charging at anytime it is not in use. There is no harm in leaving the charger connected and this will actually improve battery life.

If the Auditor Torque Cube™ is going to be stored for a lengthy period of time, it is recommend to charge the battery prior to doing so. Also note, the unit should be checked and charged on a bi-monthly basis to insure that the batteries remain in a chargeable condition.

SIDE PANEL INPUT / OUTPUT

When viewing the Auditor Torque Cube™ from the operators perspective, there are 2 connectors on the left side of the unit.

DC IN
The interface for the AC Adapter that was supplied with the unit is the upper connector. This connection may be used when the unit is charging or during operation. Use only the supplied Auditor Torque Cube™ AC Adapter with this unit. Use of any other adapter may cause damage to the unit.

RS-232
The lower connector is for an RS-232 (P/N RS232) cable enabling connection to a serial printer, data collector, computer or other RS-232 enabled device. Values are sent via RS-232 each time the unit Auto Clears (AC) or the ENT or CLR buttons are pressed.

RS-232

RS-232 Transfer Protocol

Protocol	Value
Cable	P/N RS232C Mini-Plug (Auditor CUBE) – Dsub 9 Pin
Baud Rate	9600
Parity	None
Bits	8
Stop Bit	1
Flow	None

RS-232 Data Stream Format

Mmmbsdddddbuuuuucl ***where:***

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

RS-232 Cable Pinouts

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

DESCRIPTION OF FUNCTIONS IN ACTIVE DISPLAY

PEAK
Displays and retains the maximum torque exerted by the tool or wrench as occurring in the tightening direction. The peak mode is used for power tools and some dial wrenches.

1st Peak
Detects the "first peak" of torque exerted by the wrench as experienced by the Auditor Torque Cube™ when the wrench cams or clicks over its set torque level. First peak is used primarily for click-type torque wrenches and torque-limiting screwdrivers.

TRACK
Displays torque as it is directly applied to the Auditor Torque Cube's sensor.

ENGINEERING UNITS
8 Possible Units of Measure are available with the Auditor Torque Cube™: In.Oz., In.Lb., Ft.Lb., Nm, CNm, KgfCm, gfCm, Kgfm

FULL SCALE
The FS screen shows the Full Scale value of the Auditor Torque Cube™ sensor. This is not a field adjustable value.

LOW LIMIT
Use the Low Limit setting as a means of visually alerting the operator when a reading fails to reach a desired minimum value. The RED LED will illuminate to let the operator know that the achieved reading was below the preset level.

HIGH LIMIT
Use the High Limit setting as a means of visually alerting the operator when a reading is above a desired maximum value. The RED LED will illuminate to let the operator know that the achieved reading was above the preset level.

CAL
For factory authorized service center use only.

WARRANTY

NEW TOOL AND ACCESSORY WARRANTY

Any new tool or accessory branded with the AIMCO, Uryu, AcraDyne or Eagle Industries name, and purchased from AIMCO, or through one of its authorized distributors or agents, is warranted to the original buyer against defects in materials and workmanship for a period of one (1) year* from date of delivery. Under the terms of this warranty, AIMCO will repair or replace any product or accessory warranted hereunder and returned freight prepaid proving to AIMCO's satisfaction to be defective as a result of workmanship or materials. In order to qualify for this warranty, written notice to AIMCO must be given immediately upon discovery of such defect, at which time AIMCO will issue an authorization to return the tool. The defective item must be promptly returned to an authorized AIMCO service center with all freight charges prepaid.

REPAIRED TOOL WARRANTY

Once a tool is beyond the new product warranty period as detailed above, AIMCO repairs are subject to the following warranty periods: pneumatic tools: 90 days*; electric tools and Acra-Feed: 90 days; battery tools: 30 days*; DC Electric tools: 90 days*

EXCLUSION FROM WARRANTY

This warranty is valid only on products purchased from AIMCO, or thru its authorized distributors or agents. AIMCO shall have no obligation pursuant to the AIMCO Warranty with respect to any tools or accessories which in AIMCO's sole judgment have been altered, damaged, misused, abused, badly worn, lost or improperly maintained. This Warranty is null and void if the customer, or any other person other than an authorized representative of AIMCO, has made any attempt to service or modify the tool or accessory prior to its return to AIMCO under this Warranty.

The warranty provision with respect to each such product may be amended by AIMCO from time to time in its sole discretion. The liability of AIMCO hereunder shall be limited to replacing or repairing, at its option, any products which are returned freight prepaid to AIMCO and which AIMCO determines to be defective as described above or, at AIMCO's option, refunding the purchase price of such products.

AIMCO reserves the right to make periodic changes in construction or tool design at any time. AIMCO specifically reserves the right to make these changes without incurring any obligation or incorporating such changes or updates in tools or parts previously distributed.

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AIMCO'S LIABILITY PURSUANT TO WARRANTY OF THE PRODUCTS COVERED HEREUNDER IS LIMITED TO REFUND OF THE PURCHASE PRICE. IN NO EVENT SHALL AIMCO BE LIABLE FOR COSTS OF PROCUREMENT OF SUBSTITUTE GOODS BY THE BUYER. IN NO EVENT SHALL AIMCO BE LIABLE FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL OR OTHER DAMAGES (INCLUDING WITHOUT LIMITATION, LOSS OF PROFIT) WHETHER FOR BREACH OR REPUDIATION OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE OR OTHERWISE. THIS EXCLUSION ALSO INCLUDES AND LIABILITY WHICH MAY ARISE OUT OF THIRD PARTY CLAIMS AGAINST BUYER. THE ESSENTIAL PURPOSE OF THIS PROVISION IS TO LIMIT THE POTENTIAL LIABILITY OF AIMCO ARISING OUT OF THE AGREEMENT AND/OR SALE.

Note: The AIMCO Warranty confers specific legal rights, however some states or jurisdictions may not allow certain exclusions or limitations within the warranty.

* All warranty periods addressed herein are determined using a standard shift, eight-hour work day.

NOTES

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AIMCO

POWER TOOLS

DC CONTROLLED FASTENING TOOLS

TORQUE MEASUREMENT SYSTEMS

ASSEMBLY SYSTEMS

TOOL SUPPORT SYSTEMS

FASTENER TOOLS

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