



# TORQUE MEASUREMENT SOLUTIONS 2020



For 50 years AIMCO has been working with manufacturers around the world. We are the complete global source for all critical fastening and bolting solutions. AIMCO can effectively and swiftly meet your needs whether you're in Thailand fastening a 3 mm nut at 3 Nm, or in Tennessee, USA torquing the last lug nut. AIMCO provides the tools and solutions, on a global scale, that guarantee the success of your project. It is with great pride that AIMCO can say the products that we manufacture are **MADE IN THE USA**.

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# **TORQUE MEASUREMENT: OVERVIEW**

Torque measurement and the verification of torque tools and applied torque are an integral part of today's threaded assembly process. The method used to measure torque can affect the judgments made regarding tool performance, assembly processes and overall product quality.

### **DYNAMIC TORQUE**

Dynamic torque is the torque produced during the actual tightening process, normally measured using rotary transducers and a torque analyzer.

### Advantages:

- · Reduces operator influence
- · Measures applied torque
- Can also include angle of rotation as error proofing parameter

# HARD JOINT Less than 30° degrees of rotation Metal Metal Metal AUDIT METHOD OR Dynamic Torque: 15 Nm Residual Torque: 18 Nm

### Values as examples only

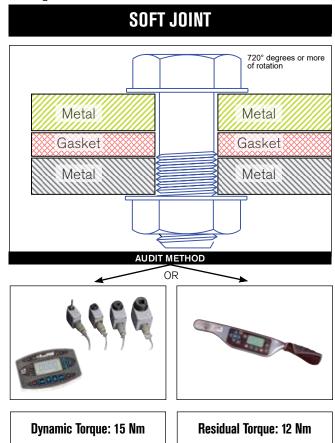
A hard joint, one requiring a low degree of rotation during tightening, will normally show very little relaxation after tightening. Due to the high amount of remaining clamp load and friction within the joint members, additional movement of the fastener requires additional torque energy to be applied. Therefore, Residual Torque values will be higher than Dynamic Torque values.

### **RESIDUAL TORQUE**

Residual torque is the torque measured by producing an incremental amount of movement of the fastener after the actual tightening process, normally measured using a dial or digital torque wrench.

### **Advantages:**

- Easy access to fastener
- · Error proofing
- Can detect missed fasteners or joints with significant relaxation



### Values as examples only

A soft joint, one requiring a high degree of rotation during tightening, will normally show significant amounts of relaxation after tightening. Relaxation leads to a loss of clamp load and friction within the joint members. Due to this relaxation, additional movement of the fastener requires relatively small amounts of additional torque energy and Residual Torque values will be lower than Dynamic Torque values.

# **TORQUE MEASUREMENT: OVERVIEW**

Checking torque measurement before, during, and after assembly ensures quality manufacturing. Proper torque measurement is critical in many assembly operations. AIMCO utilizes years of experience to design a process around your specific auditing requirements. From simple dial wrenches to electronic data collectors and joint analyzers for R&D, AIMCO is with you every step of the way.

### **BEFORE ASSEMBLY**

### **Tool Capability**



### Is the tool working correctly?

Testing and verifying tools under controlled conditions helps you identify accuracy and repeatability before using them in production.

### Equipment used:

- Desktop testers with internal transducers
- Auditor analyzers with either stationary or rotary transducers
- UFT hydraulic joint simulators and rotary transducers

### **DURING ASSEMBLY**

### **Process Capability**



# How does the tool work with the product being assembled?

Testing the tools during the actual process helps ensure that the process is working correctly. Variables in the parts and influences from the operator can be accounted for.

### Equipment used:

- Torque Data Collectors/ Analyzers
- Auditor Rotary Transducers

### **AFTER ASSEMBLY**

### **Product Capability**



# Does the finished product meet expectations?

Checking the product after assembly is the final opportunity to verify that product quality is satisfactory before user delivery

### Equipment used:

- Click/Dial wrenches
- Electronic wrenches with Auditor analyzers
- Rotary transducers and Auditor analyzers with hand driver to move fastener



# **TORQUE MEASUREMENT: OVERVIEW**

### **MEASURING QUALITY - PROCESS CAPABILITY**

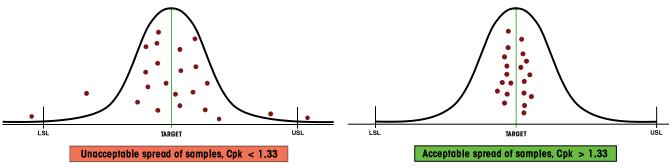
### STATISTICAL ANALYSIS IS AN IMPORTANT STEP IN ANY QUALITY CONTROL PROCESS.

One of the most widely accepted statistical indicators of process quality, and therefore product quality, is Cpk, or the process capability for a centered process. This value indicates how capable a process is and whether the results of that process are properly centered near a specific target. A capable process is one that approaches, as a limit, 100% conformance to specifications.

Cpk is a statistical value that indicates how tightly grouped a series of samples is around the target value. Cpk is a function of the Upper Specification Limit (USL), the Lower Specification Limit (LSL), the mean of the samples and the standard deviation ( $\sigma$ ) of the samples.

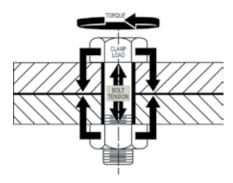
Cpk = either (USL - Mean) or (Mean - LSL), whichever is smaller. (3 
$$\times$$
  $\sigma$ )

An acceptable, or capable, process will normally have a Cpk value of at least 1.33.



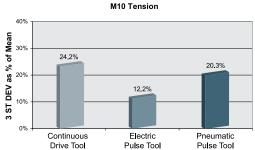
### **MEASURING QUALITY - CLAMP LOAD**

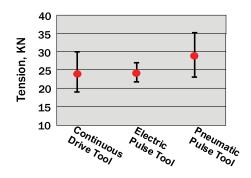
The purpose of threaded fastening is to produce the correct amount of clamp load within the joint.



Due to the cost and difficulty of measuring clamp load during the actual assembly process, torque is used as the control parameter during tightening. Many manufacturers use torque values as the primary indicator of threaded assembly quality. However, achieving repeatable clamp load is a better indicator of joint quality.

Studies have shown that discontinuous drive tools can produce equal or better clamp load results when compared to continuous drive tools.





# TORQUE MEASUREMENT SYSTEMS



| TORQUE M           | IEASUREMENT SYS                | STEMS             |                          |                  |                            |                                |                                     |                                       |                                |                                  |
|--------------------|--------------------------------|-------------------|--------------------------|------------------|----------------------------|--------------------------------|-------------------------------------|---------------------------------------|--------------------------------|----------------------------------|
| DEVICES            | MODEL SERIES                   | DATA<br>COLLECTOR | INTEGRATED<br>TRANSDUCER | TORQUE<br>WRENCH | TORQUE<br>WRENCH<br>LOADER | EXTERNAL<br>TRANSDUCER<br>PORT | STATIONARY<br>TRANSDUCERS<br>-SMART | STATIONARY<br>TRANSDUCERS<br>-IND STD | ROTARY<br>TRANSDUCER<br>-SMART | ROTARY<br>TRANSDUCE<br>- IND STD |
| Testers            | ATC                            |                   | Х                        |                  |                            |                                |                                     |                                       |                                |                                  |
|                    | AUET                           |                   | Х                        |                  |                            |                                |                                     |                                       |                                |                                  |
|                    | AUET-DC                        | Х                 | Х                        |                  |                            |                                |                                     |                                       |                                |                                  |
|                    | AUET/MTM                       |                   | Х                        |                  |                            | Х                              |                                     |                                       |                                |                                  |
|                    | AUET/MTM-DC                    | Х                 | Х                        |                  |                            | Х                              |                                     |                                       |                                |                                  |
| Analyzers          | ATDA                           |                   |                          |                  |                            | Х                              |                                     |                                       |                                |                                  |
|                    | ATDA-DC                        | Х                 |                          |                  |                            | Х                              |                                     |                                       |                                |                                  |
|                    | ATDA-8000-10-<br>DCA(-TA)(-TP) | Х                 |                          |                  |                            | Х                              |                                     |                                       |                                |                                  |
| Test Stands        | AHCTS*                         | χ*                | Х*                       | Х*               |                            |                                | χ*                                  | χ*                                    | Х*                             | χ*                               |
|                    | AHCTS-K*                       | χ*                | Х*                       | Х*               |                            |                                | Χ*                                  | χ*                                    | Х*                             | χ*                               |
|                    | AHDTS*                         | Х*                | Х*                       | Х*               |                            |                                | Х*                                  | χ*                                    | Х*                             | χ*                               |
|                    | AHBTS*                         | Х*                | Х*                       | Х*               |                            |                                | Χ*                                  | χ*                                    | Х*                             | χ*                               |
|                    | AIMTS*                         | χ*                | Х*                       | Х*               |                            |                                | χ*                                  | χ*                                    | Х*                             | χ*                               |
| Wrenches           | ADW                            |                   |                          | Х                |                            |                                |                                     |                                       |                                |                                  |
|                    | ADW-DC                         | Х                 |                          |                  |                            |                                |                                     |                                       |                                |                                  |
|                    | APTW                           |                   |                          | Х                |                            |                                |                                     |                                       |                                |                                  |
|                    | ATW                            |                   |                          | Х                |                            |                                |                                     |                                       |                                |                                  |
|                    | ATWL                           |                   |                          |                  | Х                          |                                |                                     |                                       |                                |                                  |
|                    | Moment Alpha                   | Х                 |                          | Х                |                            |                                |                                     |                                       |                                |                                  |
| Torque Cart        | iTVC*                          | χ*                | χ*                       | Х*               |                            |                                | Х*                                  | Х*                                    | χ*                             | Х*                               |
| Transducers        | ARTIS                          |                   |                          |                  |                            |                                |                                     |                                       |                                | Х                                |
|                    | ASTIS                          |                   |                          |                  |                            |                                |                                     | Х                                     |                                |                                  |
|                    | AISI                           |                   |                          |                  |                            |                                | Х                                   |                                       |                                |                                  |
|                    | AISF                           |                   |                          |                  |                            |                                | Х                                   |                                       |                                |                                  |
| Rundown            | AJKR                           |                   |                          |                  |                            |                                |                                     |                                       |                                |                                  |
| Fixtures           | AJKS                           |                   |                          |                  |                            |                                |                                     |                                       |                                |                                  |
|                    | ARDFA                          |                   |                          |                  |                            |                                |                                     |                                       |                                |                                  |
|                    | ARDIA                          |                   |                          |                  |                            |                                |                                     |                                       |                                |                                  |
| Joint<br>Simulator | UFT                            |                   |                          |                  |                            |                                |                                     |                                       |                                |                                  |

 $<sup>^{\</sup>star}$ configured to customer specifications

# **TORQUE MEASUREMENT TESTERS**

### TORQUE MEASUREMENT: TESTERS

### Features and Benefits

- · Heavy industrial design
- All software included
- Auditor Torque Testers are designed for intuitive











| and forestand condition AHET/MEM anadala and  |                         |                        | _                            |   |  |
|---|-------------------------|------------------------|------------------------------|---|--|
| and functional usability. AUET/MTM models are   | ATC                     | AUET                   | AUET/MTM                     | AUET-DC   | AUET/MTM-DC  |
| available with our unique dual integrated torque transducer package.                              | Auditor Torque Cube     | Auditor Universal      | Auditor Universal Electronic | Auditor Universal                               | Auditor Universal Electronic                       |
| панзийсен раскаде.  |                         | Electronic Tester      | Tester - Multiple Transducer | Electronic Tester - Data                        | Tester/Multiple transducer                         |
| Testers are designed to audit torque wrenches and   |                         |                        | Module                       | Collector                                       | Module - Data Collector                            |
| power tools, including pulse tools  | Compact vertical or     | Bench mount or line    | Bench mount or line side     | Bench mount or line side                        | Bench mount or line side tester                    |
|   | horizontal bench-mount  | side tester utilizing  | tester with dual integrated  | tester utilizing integrated                     | with dual integrated transducer                    |
|   | tester.                 | integrated transducer. | transducer and external      | transducer. Provides data                       | and external transducer                            |
|   |                         |                        | transducer capacity.         | collection capability with included software to | capacity. Data collection capability with included |
|   |                         |                        |                              | interface with PC.                              | software to interface with PC.                     |
| Integrated Transducer Range   | 1 - 1,350 Nm            | 1 - 1,000 Nm           | 1 - 1,000 Nm                 | 1 - 1,000 Nm                                    | 1 - 1,000 Nm                                       |
| (values are in full scale)  | 100 in-oz - 1,000 ft-lb | 100 in-oz - 750 ft-lb  | 100 in-oz - 750 ft-lb        | 100 in-oz - 750 ft-lb                           | 100 in-oz - 750 ft-lb                              |
| External Transducer Capacity<br>(Transducer sizes exceeding this range may be special ordered)    |                         |                        | up to 5,000 ft-lb            |   | up to 5,000 ft-lb                                  |
| Vertical / Horizontal Mount   | Х                       |                        |                              |   |  |
| Bi-directional accuracy of +/- X of indicated reading within the top 90% of the tester's capacity | 1%                      | 0.50%                  | 0.50%                        | 0.50%   | 0.50%  |
| Data Output to PC   | Х                       | Х                      | Х                            | Х   | Х  |
| Integrated Torque Transducer  | 1                       | 1                      | 2                            | 1   | 2  |
| External Transducer Port  |                         |                        | Х                            |   | Х  |
| Number of Stored Readings   | 999                     | 999                    | 999                          | 999   | 999  |
| Adjustable Rundown Fixture Included *   | 1                       | 1                      | 2                            | 1   | 2  |
| Rechargeable NiMH Battery   | Х                       | Х                      | Х                            | Х   | Х  |
| Measurement Modes   |                         |                        |                              |   |  |
| Peak  | Х                       | Х                      | χ                            | Х   | Х  |
| First Peak (Click)  | Х                       | Х                      | Х                            | Х   | Х  |
| Pulse   | Х                       | Х                      | Х                            | Х   | Х  |
| Track   | Х                       | Х                      | Х                            | Х   | Х  |
| Units of Measure Options  | 8                       | 8                      | 8                            | 8   | 8  |
| Tool Manager Software Included  |                         |                        |                              | Х   | Х  |
| * Included with all testers and analyzers with a range up to                                      | 1000 in_lh              |                        |                              |   |  |

<sup>\*</sup> Included with all testers and analyzers with a range up to 1000 in-lb.

| TODOLLE MEAGUIDEMENT TECTEDO LIGED I  | NI CONTILINICTION I VIII | T. I |   |   |   |
|---|--------------------------|------|---|---|---|
| TORQUE MEASUREMENT TESTERS USED I   | IN CONJUNCTION WI        | IH   |   |   |   |
| ASTIS - Stationary  |                          |      | Х |   | χ |
| AISI / AISF - Stationary - Analog   |                          |      | X |   | Х |
| ARTIS - Rotary  |                          |      | χ |   | Х |
| Switch box for External Transducer  | l.                       |      |   | ] |   |
| AISWT-4L > 4 Way Intellect box  |                          |      | χ |   | Х |
| AISWT-6L > 6 Way Intellect box  |                          |      | Х |   | Х |
| Cables  |                          | •    |   | • |   |
| ICBL-USB - USB Serial > PC  | Х                        | Х    | Х | Х | Х |
| ATDBLIS - IS Transducer w/angle (10 Pin)  |                          |      | Х |   | Х |
| ATDBRIS - IS Transducer (4 Pin)   |                          |      | Х |   | Х |
| ICBL-10P - Intellect transducer cable<br>Identification chip in cable - 10 pin connector  |                          |      | Х |   | Х |
| ICBL-4P - Intellect transducer cable.<br>Identification chip in cable - 4 pin connector   |                          |      | Х |   | Х |
| ICBL-5000L - Connect from AUET/MTM & ATDA<br>to Intellect Transducers, Analog AISI / AISF |                          |      | Х |   | Х |

# **AUDITOR TORQUE CUBE**



ATC-10 ATC-25 ATC-100 ATC-250 ATC-500 ATC-750 ATC-1800



ATC-150F ATC-250F ATC-500F ATC-750F



### **AUDITOR TORQUE CUBE**

The Auditor Torque Cube (ATC) is a compact, versatile desktop tester that provides a multitude of capabilities. The ATC is designed to test hand or power tools with the following:

- · Peak, first peak, and track modes
- Multiple engineering units
- Manual and auto clear function
- · Multiple frequency response settings
- Bi-directional use and accuracy
- Accuracy is better than 1% of indicated reading top 90% of range
- · Serial data output
- Memory: 999 data samples
- Battery and/or mains powered

Because precision and quality are critical, you can depend on our testers to calibrate and certify your tools. Whether you are assembling large complicated systems or small precise time pieces, AIMCO provides the best system for your application. Our instruments have been judged "best in class" by independent National Standards laboratories. Auditor Torque Cube is rugged enough to test and verify tools at "point of use" while still being accurate enough to calibrate hand and power tools.

Each tester is shipped with a mains/battery charger power cord, a hex to allen drive bit, and a bolting template. Models with max torque of 1,000 in-lb or less also include a joint rundown fixture. The ATC can be positioned vertically or horizontally for the ergonomic testing of inline or pistol grip tools.

|                       | RECOMMENDE  | D TORQUE RANGE    | WEI  | GHT | WX           | CHXD               | SQUARE DRIVE |
|-----------------------|-------------|-------------------|------|-----|--------------|--------------------|--------------|
| MODEL                 | NM          | IN-LB/FT-LB       | KG   | LB  | MM           | IN                 | IN           |
| Vertical Configuratio | n           |                   |      |     |              |                    |              |
| ATC-10                | 0.13 - 1.13 | 1 - 10 in-lb      | 1.13 | 2.5 | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 1/4          |
| ATC-25                | 0.28 - 2.83 | 2.5 - 25 in-lb    | 1.13 | 2.5 | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 1/4          |
| ATC-100               | 1.13 - 11.3 | 10 - 100 in-lb    | 1.13 | 2.5 | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 1/4          |
| ATC-250               | 2.83 - 28.3 | 25 - 250 in-lb    | 1.13 | 2.5 | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 3/8          |
| ATC-500               | 5.65 - 56.5 | 50 - 500 in-lb    | 1.13 | 2.5 | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 3/8          |
| ATC-750               | 8.47 - 84.8 | 75 - 750 in-lb    | 1.13 | 2.5 | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 3/8          |
| ATC-1000              | 11.3 - 113  | 100 - 1000 in-lb  | 1.13 | 2.5 | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 3/8          |
| ATC-1800              | 21.2 - 203  | 188 - 1,800 in-lb | 1.13 | 2.5 | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 1/2          |
| Horizontal Configura  | tion        |                   |      |     |              |                    |              |
| ATC-150F              | 20 - 200    | 15 - 150 ft-lb    | 2.25 | 5   | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 1/2          |
| ATC-250F              | 34 - 340    | 25 - 250 ft-lb    | 2.25 | 5   | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 1/2          |
| ATC-500F              | 68 - 678    | 50 - 500 ft-lb    | 2.25 | 5   | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 3/4          |
| ATC-750F              | 102 - 1,017 | 75 - 750 ft-lb    | 2.25 | 5   | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 3/4          |

## **AUDITOR BENCH-MOUNT TESTERS**







AUET/MTM-DC

AUET/MTM

### **AUDITOR UNIVERSAL ELECTRONIC TESTERS**

Auditor Universal Electronic Testers (AUET) have a broad range of features to accommodate most requirements. They are designed to be bench-top mounted and are available in several configurations and various single or multiple torque ranges. Onboard memory allows you to capture 999 torque event readings. The testers are also available in file capability (DC) models that require PC software Auditor Tool Manager (ATM).

Instruments up to 1,000 in-lb are supplied with rundown adapters/joint kits. Rundown kits for larger instruments can be ordered separately. AUET/MTM units are supplied with an external transducer port and selector switch for connecting additional transducers.

AUET testers utilize the same transducers as the ATC instruments, providing the same high quality accuracy and durability. The common interface makes the Auditor tester extremely user friendly.



### Single Transducer Models

|                | RECOMMENDED       | TORQUE RANGE      |
|----------------|-------------------|-------------------|
| MODEL*         | KGF-CM/NM         | IN-OZ/IN-LB       |
| AUET-050(-DC)  | 0.4 - 3.6 kgf-cm  | 5 - 50 in-oz      |
| AUET-0100(-DC) | 0.7 - 7.2 kgf-cm  | 10 - 100 in-oz    |
| AUET-10(-DC)   | 1.1 - 11.5 kgf-cm | 1 - 10 in-lb      |
| AUET-50(-DC)   | 0.5 - 5.6 Nm      | 5 - 50 in-lb      |
| AUET-100(-DC)  | 1.1 - 11.3 Nm     | 10 - 100 in-lb    |
| AUET-250(-DC)  | 2.8 - 28.3 Nm     | 25 - 250 in-lb    |
| AUET-500(-DC)  | 5.7 - 56.5 Nm     | 50 - 500 in-lb    |
| AUET-1000(-DC) | 11.3 - 113 Nm     | 100 - 1,000 in-lb |
| AUET-1200(-DC) | 13.6 - 135.6 Nm   | 120 - 1,200 in-lb |
| AUET-1800(-DC) | 20.3 - 203.4 Nm   | 180 - 1,800 in-lb |

<sup>\*</sup> Add "-DC" to part numbers for data collecting models.

Data collecting models allow multiple files/tools/applications to be associated with torque data. Requires Tool Manager software.

Custom sizes are also available. Contact an AIMCO Customer Service Associate for ordering options, 1-503-254-6600, or toll free 1-800-852-1368.

### **Dual Transducer Models**

|                        |                 | RECOMMENDED     | TORQUE RANGE    |                   |
|------------------------|-----------------|-----------------|-----------------|-------------------|
| MODEL**                | TRANSDUCER<br>1 | TRANSDUCER<br>2 | TRANSDUCER<br>1 | TRANSDUCER<br>2   |
| AUET/MTM-050-25        | 0.04 - 0.4 Nm   | 0.3 - 2.8 Nm    | 5 - 50 in-oz    | 2.5 - 25 in-lb    |
| AUET/MTM-050-600       | 0.04 - 0.4 Nm   | 6.8 - 67.8 Nm   | 5 - 50 in-oz    | 60 - 600 in-lb    |
| AUET/MTM-0100-050      | 0.07 - 0.71 Nm  | 0.04 - 0.4 Nm   | 10 - 100 in-oz  | 5 - 50 in-oz      |
| AUET/MTM-10-100        | 0.11 - 1.12 Nm  | 1.3 - 11.3 Nm   | 1.0 - 10 in-lb  | 10 - 100 in-lb    |
| AUET/MTM-50-250        | 0.56 - 5.65 Nm  | 2.8 - 28.3 Nm   | 5.0 - 50 in-lb  | 25 - 250 in-lb    |
| AUET/MTM-50-500(-DC)   | 0.56 - 5.65 Nm  | 5.7 - 56.5 Nm   | 5.0 - 50 in-lb  | 50 - 500 in-lb    |
| AUET/MTM-50-1000(-DC)  | 0.56 - 5.65 Nm  | 11.3 - 113 Nm   | 5.0 - 50 in-lb  | 100 - 1,000 in-lb |
| AUET/MTM-100-500       | 1.13 - 11.3 Nm  | 5.7 - 56.5 Nm   | 10 - 100 in-lb  | 50 - 500 in-lb    |
| AUET/MTM-100-1000      | 1.13 - 11.3 Nm  | 11.3 - 113 Nm   | 10 - 100 in-lb  | 100 - 1,000 in-lb |
| AUET/MTM-100-1200      | 1.13 - 11.3 Nm  | 13.6 - 135.6 Nm | 10 - 100 in-lb  | 120 - 1,200 in-lb |
| AUET/MTM-100-1600(-DC) | 1.13 - 11.3 Nm  | 18.1 - 180.8 Nm | 10 - 100 in-lb  | 160 - 1,600 in-lb |
| AUET/MTM-100-2000      | 1.13 - 11.3 Nm  | 22.6 - 226 Nm   | 10 - 100 in-lb  | 200 - 2,000 in-lb |
| AUET/MTM-250-1600      | 2.82 - 28.2 Nm  | 18.1 - 180.8 Nm | 25 - 250 in-lb  | 160 - 1,600 in-lb |
| AUET/MTM-250-1800      | 2.82 - 28.2 Nm  | 20.3 - 203.4 Nm | 25 - 250 in-lb  | 180 - 1,800 in-lb |
| AUET/MTM-250-2500      | 2.82 - 28.2 Nm  | 28.2 - 282.5 Nm | 25 - 250 in-lb  | 250 - 2,500 in-lb |
| AUET/MTM-500-1200      | 5.7 - 56.5 Nm   | 13.6 - 135.6 Nm | 50 - 500 in-lb  | 120 - 1,200 in-lb |
| AUET/MTM-500-2500(-DC) | 5.7 - 56.5 Nm   | 28.2 - 282.5 Nm | 50 - 500 in-lb  | 250 - 2,500 in-lb |

Custom sizes are also available. Contact an AIMCO Customer Service Associate for ordering options, 1-503-254-6600, or toll free 1-800-852-1368.

# **AUDITOR TORQUE MEASUREMENT ANALYZERS**

### TORQUE MEASUREMENT: ANALYZERS

### Features and Benefits

- Auditor Torque Analyzers share similar features across all products and are designed for intuitive and functional usability.





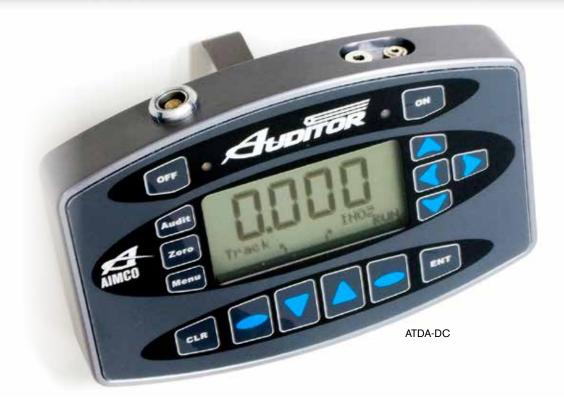




| <ul> <li>Connects to AIMCO's line of rotary</li> </ul> | ATDA   | ATDA-DC   | ATDA-8000  | ATDA-8000-10-DCA(-TA)(-TP)   |
|--|--|---|--|--|
| and stationary transducers                             | Auditor Torque Data Analyzer                             | Auditor Torque Data Analyzer with Data<br>Collection  | Auditor Torque Data Analyzer with 7" screen                            | Auditor Torque Data Analyzer 10" display with Data Collection. TA = Torque & Angle, TP = Torque & Pressure |
|  | Portable analyzer to be connected to various transducers | Portable analyzer to be connected to various transducers. Provides data collection capability with included software to interface with PC | 7" screen with high resolution display<br>and intuitive user interface | 10" touch screen with high resolution display and intuitive user interface with multiplexer                |
| Bi-directional   | Х  | Х   | Х  | Х  |
| Data Output to PC                                      | Х  | Х   | Х  | Х  |
| External Transducer Port                               | 1  | 1   | 1  | 4  |
| Number of stored readings                              | 999  | 999   | 999  | 999  |
| Rechargeable NiMH Battery                              | Х  | Х   | Х  | Х  |
| Digital I/O for external devices                       | Х  | Х   | Х  | Х  |
| Measurement Modes                                      | Х  | Х   | Х  | Х  |
| Peak   | Х  | Х   | Х  | Х  |
| First Peak (Click)'                                    | Х  | Х   | Х  | Х  |
| Pulse  | χ  | Х   | Х  | Х  |
| Track  | Х  | Х   | Х  | Х  |
| Measurement Units                                      | 8  | 8   | 8  | 8  |
| Software Included                                      |  | Х   | Х  | Х  |
| Barcode Reader Capable                                 |  |   | Х  | Х  |
|  |  |   |  |  |

| USED IN CONJUNCTION WITH   |   |   |   |   |
|--|---|---|---|---|
| Transducers  |   |   |   |   |
| AISI / AISF - Analog   | χ | Х |   |   |
| AISI / AISF - Digital  |   |   | Х | χ |
| ASTIS - Stationary   | Х | Х |   |   |
| ARTIS - Rotary   | Х | Х |   |   |
| Wrenches   |   |   |   |   |
| ATW  | Х | Х |   |   |
| Switch boxes for External Transducers  |   |   |   |   |
| AISWT-4L > 4 Way Intellect box   | Х | Х |   |   |
| AISWT-6L > 6 Way Intellect box   | Х | Х |   |   |
| Cables   |   |   |   |   |
| ICBL-USB - USB Serial > PC   | Х | Х |   |   |
| ATDBLIS - IS Transducer w/ angle (10 Pin)  | X | Х |   |   |
| ATDBRIS - IS Transducer (4 Pin)  | Х | Х |   |   |
| ICBL-10P - Intellect transducer<br>cable. Identification chip in cable<br>10 pin connector   | Х | Х |   |   |
| ICBL-4P - Intellect transducer<br>cable. Identification chip in cable<br>4 pin connector     | Х | Х |   |   |
| ICBL-5000L - Connect from AUET/<br>MTM & ATDA to Intellect Transducer,<br>Analog AISI / AISF | Х | Х |   |   |
| ICBL-800DIG - Connect from<br>ATDA-8000 series analyzer to<br>Digital AISI / AIFI transducer |   |   | Х | Х |

# **AUDITOR TORQUE DATA ANALYZERS**



### **AUDITOR TORQUE DATA ANALYZERS**

The Auditor Torque Data Analyzer (ATDA) DC is designed to be portable or conveniently placed on a bench. The tester can be connected to various transducers, as well as transducerized wrenches and rotary or stationary transducers. The user interface is common between the ATC (Cube), AUET, AUET-DC, AUET/MTM, AUET/MTM-DC, ATDA, and ATDA-DC. All of these instruments have similar menus. Additionally, all data collector testers utilize Auditor Tool Manager for tool testing and data management.

The Auditor Torque Data Analyzer is available in two configurations:

- ATDA: A simple torque analyzer with sequential memory, 999 data samples, engineering limits, limited statistical processing average, range, Cp and CpK with serial output
- ATDA-DC: Contains all of the features of the ATDA and has additional file capability. It can associate data with file names and manage data collection with a computer and Auditor Tool Manager software

This is a great "starter" tool management system. It provides testing, archiving, and analysis of tools at single or multiple torque targets. The tool and torque data is stored in a SQL database and can be exported to Excel or any .csv spreadsheet.

| MODEL   | DESCRIPTION                   |
|---------|-------------------------------|
| ATDA    | Auditor Torque Data Analyzer  |
| ATDA-DC | Auditor Torque Data Collector |



# **AUDITOR TORQUE DATA ANALYZERS**



### **TOUCH SCREEN AUDITOR TORQUE DATA ANALYZERS**

Auditor offers the ATDA-8000 and the ATDA-8000-10-DCA(-TA)(-TP). The ATDA-8000 is a touch screen instrument with a high resolution display and user interface that facilitates "point of use" tool validation. The user interface is intuitive and the display provides clear easy to read data. Features and parameter settings are password protected to ensure parameters cannot be inadvertently changed. After initial setup, the instrument provides semi-automatic tool validation and judgment.

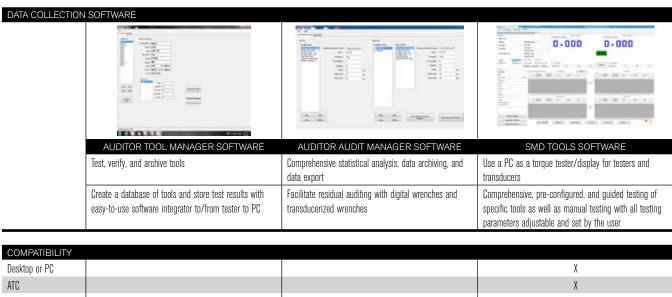
The ATDA-8000 is a single channel instrument. The ATDA-8000-10-DCA(-TA)(-TP) is a larger instrument that includes a multiplexor for connection to multiple transducers allowing a wide range of tools to be tested with one instrument. The (-TA) model is designed for torque and angle analysis and the (-TP) model is designed for torque and pressure analysis.

Both the ADTA-8000 and the ATDA-8000-10-DCA(-TA)(-TP) systems work with AIMCO's line of digital transducers.

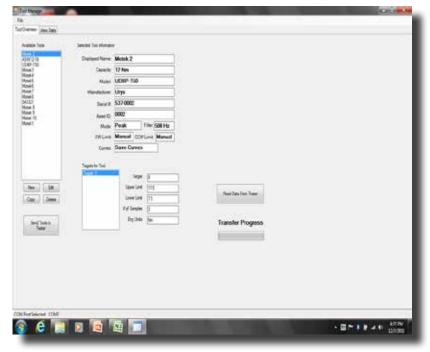
| MODEL                      | DESCRIPTION   |
|----------------------------|---|
| ATDA-8000                  | Auditor Torque Analyzer Single channel 7" touch screen point of use validation system       |
| ATDA-8000-10-DCA(-TA)(-TP) | Auditor Torque Analyzer Multiple transducer 10" touch screen point of use validation system |



# **AUDITOR DATA COLLECTION SOFTWARE**



| COMPATIBILITY       |   |   |   |
|---------------------|---|---|---|
| Desktop or PC       |   |   | Х |
| ATC                 |   |   | Х |
| ADW                 |   | Х |   |
| ATDA                |   |   | Х |
| ATDA-DC             | Х | Х |   |
| AUET                |   |   | Х |
| AUET-DC             | Х | Х |   |
| AUET/MTM            |   |   | Х |
| AUET/MTM-DC         | Х | Х |   |
| ARTIS               |   |   |   |
| ARTIS-DIG           |   |   | Х |
| AISI/AISF           |   |   |   |
| AISI/AISF (Digital) |   |   | Х |
| iTVC Torque Cart    |   |   | Х |



# AUDITOR TOOL MANAGER SOFTWARE

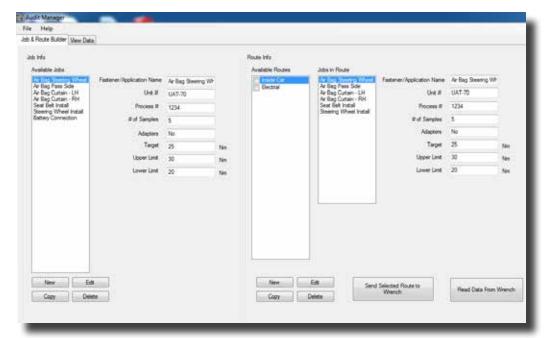
Tool Manager Software is included with the purchase of AUET-DC and AUET/MTM-DC data-collecting torque testers, as well as the ADW-DC data-collecting torque wrench. Create a database of tools and store test results with this easy-to-use software integrator to/from tester to PC.

Tool Manager Software, Tool Overview Screen

# **AUDITOR DATA COLLECTION SOFTWARE**

### **AUDITOR AUDIT MANAGER SOFTWARE**

Audit Manager Software is included with the purchase of ATDA-DC data collecting torque analyzers. The View Data tab allows you to look at the collected data and the trace file. This data can be exported to Excel as a .csv file and displayed by Excel charts. The trace file displays the data in a torque/time graph and allows the user to supersede the move-on reading selected by the wrench by visually discerning via the trace where the fastener started to rotate. When selecting a single job the average, range, sigma, Cp, and CpK values are listed.



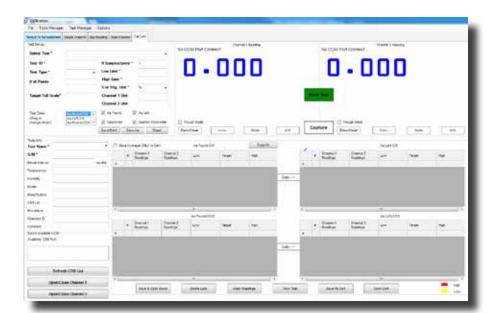
Audit Manager Software, Job and Route Builder Screen

### **SMD TOOLS SOFTWARE**

A digital signal between a PC and a digital transducer allows SMD Tools software to operate independently of a tester or analyzer to collect and store data in Microsoft Excel.

Tool Manager and Test Manager databases within the software stores tool details and test processes for easy access in the Cert Manger platform

Auditor branded analyzers and testers can network with this software to produce and store real-time data



SMD Tools Software, Cal Cert Screen

### TORQUE MEASUREMENT: HIGH CAPACITY TEST STANDS

### Features and Benefits

- Advanced test stations for larger tools and higher torque output
- Configured to meet application requirements











| 55                               |  |   |  |  |  |
|----------------------------------|--|---|--|--|--|
| Durable industrial grade devices | AHCTS  | AHCTS-K   | AHDTS  | AHBTS  | AIMTS  |
|                                  | Auditor High Capacity<br>Test Stand  | Auditor High Capacity<br>Test Stand - Hydraulic             | Auditor High Capacity<br>Test Stand Dual   | Auditor High Capacity<br>Stand w/variable joint  | Auditor High Capacity<br>Impact Test Stand   |
|                                  |  | -   | Transducer   | simulation   |  |
|                                  | Designed for testing tools with continuous rotating output spindles and pulse tools. | Specifically designed<br>for hydraulic wrenches<br>testing. | Two transducers, one for rotary tools and one for hydraulic tools. Includes rundown & reaction fixtures with a single display. | Designed for testing rotating tools without the use of rundown fixtures. Adjustable airbrake joint simulation eliminates CCW rotation after rundown. | Ideal for testing impact<br>wrenches and is<br>recommended to utilize<br>rundown fixtures when<br>testing impacts. |
| Capacity                         | 6,750 Nm   | 33,750 Nm   | 33,750 Nm  | 6,750 Nm   | 2,700 Nm   |

| ACCESSORIES      |   |   |  |
|------------------|---|---|--|
| Rundown fixtures |   |   |  |
| AHCTS-3/4RDF     | Х | Х |  |
| AHCTS-1RDF       | Х | χ |  |
| AHCTS-1.5RDF     | Х | Х |  |

### Adapters

|                          |  | AHCTS | AHCTS-K | AHDTS | AHBTS | AIMTS |
|--------------------------|--|-------|---------|-------|-------|-------|
| Square to Square Drive A | dapters*                                   |       |         |       |       |       |
|                          | CA1510 1-1/2" Male to 1" Female            | Х     |         | Х     | Х     |       |
|                          | CA1550 1-1/2" Male to 1/2" Female          | Х     |         | Х     | Х     |       |
|                          | CA1575 -1/2" Male to 3/4" Female           | Х     |         | Х     | Х     |       |
| Insert Adapters*         |  |       |         |       |       |       |
| 110                      | CA2510I 2-1/2" Male to 1" Female           | Х     | Х       | Х     | Х     |       |
|                          | CA2515I 2-1/2" Male to 1-1/2" Female       | Х     | Х       | Х     | Х     |       |
|                          | CA2575I 2-1/2" Male to 3/4" Female         | Х     | Х       | Х     | Х     |       |
| Square to Hex Drive Adap | oters*                                     |       |         |       |       |       |
|                          | CA150108DHD 1-1/2" Male to 1-1/2" Male Hex |       | X       |       |       |       |

<sup>\*</sup> Partial List. Contact An Aimco Customer Service Associate For More Options, 1-503-254-6600, Or Toll Free 1-800-852-1368.

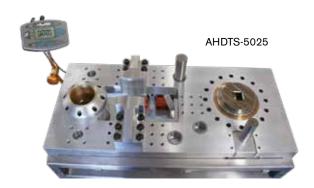




Designed for testing tools with continuous rotating output spindles. The test stand includes a rundown fixture, bushing for side load support, reaction post or reaction paddles, transducer and torque analyzer display.

| MODEL      | DESCRIPTION                         |
|------------|-------------------------------------|
| AHCTS-0500 | 3/4" Square Drive w/rundown fixture |
| AHCTS-2500 | 1.5" Square Drive w/rundown fixture |
| AHCTS-5000 | 1.5" Square Drive w/rundown fixture |
| AHCTS-7500 | 1.5" Square Drive w/rundown fixture |

Please refer to Configuration Options on following page for required ordering options.



# AHDTS DUAL TEST STAND FOR ROTATING AND HYDRAULIC TOOLS

This stand has two transducers embedded into the base, one for rotary tools and one for hydraulic tools. It comes with rundown and reaction fixtures and one display.

| MODEL      | DESCRIPTION  |
|------------|--|
| AHDTS-5025 | 1.5" Sq Dr dual station w/rundown fixture and reaction devices |

Contact an AIMCO Customer Service Associate for ordering options, 1-503-254-6600, or toll free 1-800-852-1368.



AHCTS-001K

### **AHCTS-K STAND FOR HYDRAULIC TOOLS**

The AHCTS-K stands are specifically designed for hydraulic wrench testing. Hydraulic wrenches have very low profiles but very high torque output, therefore, working height must be minimized to prevent side loading which could lead to errors in data or damage to tool or reaction devices.

Either stand can be ordered with options such as extension legs, casters, embedded or attached torque analyzers with various rundown fixtures and reaction devices. Contact an AIMCO Customer Service Associate for additional information, 1-503-254-6600, or toll free 1-800-852-1368.

| MODEL      | DESCRIPTION                         | CAPACITY<br>Ft-Lb |
|------------|-------------------------------------|-------------------|
| AHCTS-0.5K | 3/4" Square Drive w/reaction device | 500               |
| AHCTS-001K | 1" Square Drive w/reaction device   | 1,000             |
| AHCTS-2.5K | 1.5" Square Drive w/reaction device | 2,500             |
| AHCTS-005K | 1.5" Square Drive w/reaction device | 5,000             |
| AHCTS-010K | 1.5" Square Drive w/reaction device | 10,000            |
| AHCTS-025K | 2" Square Drive w/reaction device   | 25,000            |

Please refer to Configuration Options on following page for required ordering options.



| AHCTS Series High Capacity Test Stands for Rotary and Hydraulic Tools Configuration Options |   |  |  |   |   |                     |                           |  |  |  |
|---|---|--|--|---|---|---------------------|---------------------------|--|--|--|
| Base Model<br>Number  | Display   | Legs   | Base Size  | Rundown Fixture<br>Capacity (ft-lb)   | Reaction Post   | Casters             | Articulated Arm and Mount | Digital Module                                       |  |  |
| AHCTS-xxxx  | 1 = ATDA 2 = No Embedded Display 3 = ATDA-DC 4 = ATDA-8000 Digital (7") 5 = ATDA-8000-10 Digital 6 = Standard Embedded Display (1, 3, 4, 5 include articulated arm) | 1 = 6"<br>2 = No legs<br>(Standard)<br>3 = 18"<br>4 = Custom | 0 = 8 x 8"<br>1 = 12 x 12"<br>3 = 14 x 19"<br>(Standard)<br>4 = 18 x 24"<br>5 = 18 x 36"<br>6 = NA | 1 = 500<br>2 = No<br>3 = 1,000<br>4 = 2,500<br>5 = 5,000<br>6 = 7,500<br>7 = 1.5" Kit<br>Max. capacity<br>7,500 Ft-Lb<br>8 = 2.5" Kit<br>Max. capacity<br>7,500 Ft-Lb | 1 = Single 6" Post<br>and Paddles<br>2 = No<br>3 = Multiple Posts 6"<br>4 = Paddles<br>5 = Custom<br>6 = Single 9" Post<br>and Paddles<br>7 = Multiple Posts 9" | 1 = Yes<br>2 = No   | 1 = Yes<br>2 = No         | 1 = Yes<br>(for Tablet<br>or PC<br>direct)<br>2 = No |  |  |
| Model Number<br>Digits 1–10   | Model #<br>Digit 11   | Model #<br>Digit 12  | Model #<br>Digit 13  | Model #<br>Digit 14   | Model #<br>Digit 15   | Model #<br>Digit 16 | Model #<br>Digit 17       | Model #<br>Digit 18                                  |  |  |
| Auditor High Capacity   | Test Stand for Rotary Too   | ıls  | !  | !   | !   | ı                   | !                         |  |  |  |
| AHCTS-0500<br>680 Nm / 500 ft-lb  |   |  | O, 1, or 3   |   |   |                     |                           |  |  |  |
| AHCTS-1000<br>1,360 Nm / 1,000 ft-lb  |   |  | O, 1, or 3   |   |   |                     |                           |  |  |  |
| AHCTS-2500<br>3,400 Nm / 2,500 ft-lb  |   |  | 0, 1, or 3   |   |   |                     |                           |  |  |  |
| AHCTS-5000<br>6,800 Nm / 5,000 ft-lb  |   |  | 0, 1, or 3   |   |   |                     |                           |  |  |  |
| AHCTS-7500<br>10,200 Nm / 7,500 ft-lb   |   |  | 0, 1, or 3   |   |   |                     |                           |  |  |  |
| Auditor High Capacity   | Test Stand for Hydraulic  | Tools  |  |   |   |                     |                           |  |  |  |
| AHCTS-0.5K<br>680 Nm / 500 ft-lb  |   |  | 0-5<br>(3-5 come with<br>casters)  | 2   |   |                     |                           |  |  |  |
| AHCTS-001K<br>1,360 Nm / 1,000 ft-Ib  |   |  | 0-5<br>(3-5 come with<br>casters)  | 2   |   |                     |                           |  |  |  |
| AHCTS-2.5K<br>3,390 Nm / 2,500 ft-lb  |   |  | 0-5<br>(3-5 come with<br>casters)  | 2   |   |                     |                           |  |  |  |
| AHCTS-005K<br>6,800 Nm / 5,000 ft-lb  |   |  | 0-5<br>(3-5 come with<br>casters)  | 2   |   |                     |                           |  |  |  |
| AHCTS-010K<br>13,600 Nm / 10,000<br>ft-lb   |   |  | 0–5<br>(3–5 come with<br>casters)  | 2   |   |                     |                           |  |  |  |
| AHCTS-025K<br>34,000 Nm / 25,000 ft-lb  |   |  | 0–5<br>(3–5 come with<br>casters)  | 2   |   |                     |                           |  |  |  |
| AHCTS-050K<br>68,000 Nm / 50,000 ft-lb  |   |  | 0–5<br>(3–5 come with<br>casters)  | 2   |   |                     |                           |  |  |  |

### AIMTS TEST STAND FOR IMPACT TOOLS

Obtain accurate test results with the AIMTS Series Impact Test Stand. When used with an Auditor ATDA Analyzer or AUET/MTM Desktop Torque Tester, the tool's performance data can be recorded and stored. Each Auditor Analyzer comes standard with PC-based software to store and organize data for use within a quality system. It is necessary to bolt the AIMTS to a bench. We also recommend that a rundown fixture always be used for testing impacts.













AIMTS-0500 Test stand for small impact tools

Test stand for large impact tools

| MODEL      | DESCRIPTION                         |
|------------|-------------------------------------|
| AIMTS-0500 | 3/4" square drive impact test stand |
| AIMTS-2000 | 1.5" square drive impact test stand |

Refer to Configuration Options below for required ordering options.

### AIMTS Series High Capacity Impact Test Stand Configuration Options

| Base Model #                         | Display  | Legs   | Base Size                | Rundown Fixture Capacity (ft-lb)*  | Options   | Digital Module                                    |
|--------------------------------------|--|--|--------------------------|--|---|---|
| AIMTS-xxxx                           | 1 = ATDA<br>2 = No Embedded Display<br>3 = ATDA-DC<br>4 = ATDA-8000 Digital (7")<br>5 = ATDA-8000-10 Digital | 1 = 6"<br>2 = No legs<br>(Standard)<br>3 = 18"<br>4 = Custom | 6 = Bench Stand          | $\begin{array}{lll} 1 = 500 & 6 = 10,000 \\ 2 = No & 7 = 20,000 \\ 3 = 2,000 & 8 = 250 \\ 4 = 50 & 9 = 2,500 \\ 5 = 5,000 & \end{array}$ | Not available for<br>AIMTS test stands.<br>Enter 222 for<br>model # digits<br>15–17 | 1 = Yes<br>(for Tablet or<br>PC direct)<br>2 = No |
| Model Number<br>Digits 1–10          | Model Number<br>Digit 11   | Model Number<br>Digit 12                                     | Model Number<br>Digit 13 | Model Number<br>Digit 14   | Model Number<br>Digits 15-17  | Model Number<br>Digit 18                          |
| AIMTS-0050<br>68 Nm / 50 ft-lb       |  | 2  | 6                        |  | 222   |   |
| AIMTS-0250<br>340 Nm / 250 ft-lb     |  | 2  | 6                        |  | 222   |   |
| AIMTS-0500<br>680 Nm / 500 ft-lb     |  | 2  | 6                        |  | 222   |   |
| AIMTS-2000<br>2,720 Nm / 2,000 ft-lb |  | 2  | 6                        |  | 222   |   |
| AIMTS-2500<br>3,390 Nm / 2,500 ft-lb |  | 2  | 6                        |  | 222   |   |
| AIMTS-5000<br>6,780 Nm / 5,000 ft-lb |  | 2  | 6                        |  | 222   |   |

<sup>\*</sup> Ordering more than one rundown fixture is highly recommended if you're doing a lot of testing. Having multiple rundown fixtures ensures that you have spares when dealing with heat issues.

AIMTS test stands are available in capacities of up to 20,000 ft-lb. Capacities other than what is shown here are quoted separately. Contact an AIMCO Customer Service Associate at 1-503-254-6600, or toll free 1-800-852-1368.



AHBTS-2500 Auto Release test stand for quickly testing large rotating tools

### AHBTS TEST STAND WITH BRAKING SYSTEM FOR ROTATING TOOLS

These test stands are for testing rotating tools without requiring the use of rundown fixtures. We utilize an airbrake for testing tools that cannot or should not be used in reverse. These test stands are compatible with any Auditor Torque Analyzer.

| MODEL      | DESCRIPTION  |
|------------|--|
| AHBTS-2500 | 1.5" square drive, brake system w/reaction device, rotary transducer and display |
| AHBTS-5000 | 1.5" square drive, brake system w/reaction device, rotary transducer and display |

Refer to Configuration Options below for required ordering options.

### AHBTS Series High Capacity Test Stand with Brake System Configuration Options

| Base Model<br>Number                 | Display  | Legs   | Base Size  | Rundown Fixture<br>Capacity (ft-lb) | Reaction Post   | Casters             | Articulated Arm and Mount | Digital<br>Module                                    |
|--------------------------------------|--|--|--|-------------------------------------|---|---------------------|---------------------------|--|
| AHBTS-xxxx                           | 4 = ATDA-8000 Digital (7") 5 = ATDA-8000-10 Digital  (Requires Display Controller) | 1 = 6°<br>2 = No legs<br>(Standard)<br>3 = 18"<br>4 = Custom | 0 = 8 x 8"<br>1 = 12 x 12"<br>3 = 14 x 19"<br>(Standard)<br>4 = 18 x 24"<br>5 = 18 x 36"<br>6 = NA | 2 = No                              | 1 = Single Post<br>2 = No<br>3 = Multiple<br>Posts 6"<br>5 = Custom<br>6 = Single Post 9"<br>7 = Multiple<br>Posts 9" | 1 = Yes<br>2 = No   | 1 = Yes<br>2 = No         | 1 = Yes<br>2 = No<br>(For Tablet<br>or PC<br>Direct) |
| Model # Digits<br>1−10               | Model #<br>Digit 11  | Model #<br>Digit 12  | Model #<br>Digit 13  | Model #<br>Digit 14                 | Model #<br>Digit 15   | Model #<br>Digit 16 | Model #<br>Digit 17       | Model #<br>Digit 18                                  |
| AHBTS-2500<br>3,400 Nm / 2,500 ft-lb |  |  |  | 2                                   |   |                     |                           |  |
| AHBTS-5000<br>6,800 Nm / 5,000 ft-lb |  |  |  | 2                                   |   |                     |                           |  |

# **AUDITOR TORQUE WRENCHES**

### **Features and Benefits** • Multiple Options from Simple to Sophisticated · Similar Interface with other **Auditor Products** ADW ADW-DC APTW ATW MOMENT ALPHA Durable \* Auditor Digital Wrench \* Auditor Digital Wrench with **Auditor Preset** Auditor Torque Wrench Digital Wrench with Data Collection Torque & Angle Torque Wrench 10 - 500 Nm 10 - 500 Nm 5 - 200 Nm Screwdriver: 0.5 - 5 Nm Torque Range 5 - 340 Nm 7 - 370 ft-lb 7 - 370 ft-lb 4 - 250 ft-lb 4 - 148 ft-lb 0.4 - 3.7 ft-lb Wrench: 4 - 1,000 Nm 3.0 - 738 ft-lb 5 - 340 Nm Click: 3.7 - 251 ft-lb Digital wrench with multiple Data-collecting digital wrench Interchangeable heads. Preset Transducer on a stick. Ensure accuracy in quality OR head options for line side with multiple head options for uses proprietary adjustment Communicates with data production applications. Wifi/ testing/auditing line side testing/auditing tool to guard against collecting testers and Bluetooth delivery unauthorized setting changes analyzers Bi-Directional accuracy of +/- X of indicated reading 3% 1% 1% 0.50% ±4% within the top 90% of the tester's capacity Open Protocol χ Mechanical Click Data χ

| USED IN CONJUNCTION    | WITH |  |   |  |
|------------------------|------|--|---|--|
| ATDA(DC) Data Analyzer |      |  | Х |  |
| AUET(DC) Tester        |      |  | χ |  |
| AUET/MTM(DC) Tester    |      |  | Х |  |

χ

### TORQUE WRENCH LOADERS

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Collection
Software Included

TORQUE MEASUREMENT: TORQUE WRENCH



For Calibration of all types of torque wrenches eliminating human variable for more accurate measurement - digital transducer used with ATDA-8000-10-DCA

| ATWL-250  | Torque range up to 340 Nm / 250 ft-lb     |
|-----------|---|
| ATWL-750  | Torque range up to 1,020 Nm / 750 ft-lb   |
| ATWL-1000 | Torque range up to 1,360 Nm / 1,000 ft-lb |

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# **AUDITOR DIGITAL WRENCH SERIES**





ADW-1400F125312222

### **ADW DATA COLLECTING TORQUE WRENCH**

- Large memory capacity
- · Every torque value has associated trace file
- "Pick a Point" and "Move On" feature
- · Barcode scanner
- Alpha Numeric screen for entering text
- Field replaceable batteries
- · Docking station connection
- · Serial connection
- Battery charger connection
- Ergonomic handle

- Switch between measure and data collection modes at any time
- · Multiple files and route capability
- Data memory and simple statistics "On Board"
- Complete statistical analysis, data archiving and exporting in Audit Manager software
- Five models standard ranges 10 500 Nm full scale
- Torsion transducer not length dependent
- Transducer is replaceable
- 1,400 Nm model uses different handle design

|           | TORQUE      | RANGE       | WEIGHT |     | OVERALI | LENGTH | SQ. DRIVE |
|-----------|-------------|-------------|--------|-----|---------|--------|-----------|
| MODEL     | NM          | FT-LB       | LB     | KG  | IN      | MM     | IN        |
| ADW-0010K | 1 - 10      | 0.7 - 7.4   | 2.2    | 1   | 18      | 457.2  | 1/4       |
| ADW-0075K | 7.5 - 75    | 5.5 - 55    | 3.1    | 1.4 | 23.5    | 596.9  | 3/8       |
| ADW-0180K | 18 - 180    | 13 - 130    | 3.6    | 1.6 | 30.1    | 765.2  | 1/2       |
| ADW-0270K | 27 - 270    | 20 - 198    | 3.6    | 1.6 | 30.1    | 765.2  | 3/4       |
| ADW-0500K | 50 - 500    | 37 - 369    | 4      | 1.8 | 36      | 914    | 1         |
| ADW-1400F | 140 - 1,400 | 103 - 1,033 | 4.8    | 2.2 | 60      | 1,524  | 1         |

Unit accuracy is  $\pm$  1.0% FSD of indicated reading for the top 95% of full scale as indicated above.

Each model includes a case, a battery charger, and a standard square-drive head. Other heads are available at additional cost.

\*Part numbers with K, D or F followed by a 1 designate models with file and route capability. K followed by 2 indicate sequential memory but no file capability.

Part numbers with K, D or F followed by a 1,1 indicate file and route with bar code and docking station capability. K, D or F followed by a 1,2 indicate file and route capability with serial port only.

Please refer to the Configuration Options table on following page for required ordering options.

# **AUDITOR DIGITAL WRENCH SERIES**

| ADW Series Digit                     | ADW Series Digital Torque Wrenches Configuration Options                      |                     |   |   |  |                                  |  |  |  |  |
|--------------------------------------|---|---------------------|---|---|--|----------------------------------|--|--|--|--|
| Base Model Number                    | Style   | Data Collector      | Bar Code and<br>Docking Station         | Square Drive<br>Size  | Type of<br>Transducer                                  | Engineering<br>Unit              | Future Options   |  |  |  |
| ADW-xxxx                             | K = Katana<br>D = Katana with<br>Dovetail<br>Transducer<br>F = Straight Stick | 1 = Yes<br>2 = No   | 1 = Yes<br>2 = No (Serial Port<br>Only) | 1 = 1/4"<br>2 = 3/8"<br>3 = 1/2"<br>4 = 3/4"<br>5 = 1"<br>6 = N/A | 1 = Intellect<br>2 = Industrial<br>Standard<br>3 = N/A | 1 = Nm<br>2 = Ft-lb<br>3 = In-lb | Not yet<br>available.<br>Enter 2222<br>for model #<br>digits 15-18 |  |  |  |
| Model # Digits 1-8                   | Model #<br>Digit 9  | Model #<br>Digit 10 | Model #<br>Digit 11                     | Model #<br>Digit 12   | Model #<br>Digit 13                                    | Model #<br>Digit 14              | Model #<br>Digits 15–18  |  |  |  |
| Non Data-Collecting (Sequ            | iential Memory)   | ,                   | ·                                       | ·   | ·  |                                  |  |  |  |  |
| ADW-0010K2<br>10 Nm / 7.4 ft-lb      | K or D  | 2                   | 2                                       | 1 or 2  | 3  | 1                                | 2222   |  |  |  |
| ADW-0075K2<br>75 Nm / 55 ft-lb       | K or D  | 2                   | 2                                       | 2   | 3  | 1                                | 2222   |  |  |  |
| ADW-0180K2<br>180 Nm / 130 ft-Ib     | K or D  | 2                   | 2                                       | 3   | 3  | 1                                | 2222   |  |  |  |
| ADW-0270K2<br>270 Nm / 198 ft-Ib     | K or D  | 2                   | 2                                       | 3   | 3  | 1                                | 2222   |  |  |  |
| ADW-0500K2<br>500 Nm / 369 ft-lb     | K or D  | 2                   | 2                                       | 4   | 3  | 1                                | 2222   |  |  |  |
| ADW-1000K2<br>1,000 Nm / 738 ft-lb   | F   | 2                   | 2                                       | 4 or 5  | 3  | 1                                | 2222   |  |  |  |
| ADW-1200K2<br>1,200 Nm / 885 ft-lb   | F   | 2                   | 2                                       | 5   | 3  | 1                                | 2222   |  |  |  |
| ADW-1000K2<br>1,400 Nm / 1,033 ft-lb | F   | 2                   | 2                                       | 5   | 3  | 1                                | 2222   |  |  |  |
| ADW-1200K2<br>2,000 Nm / 1,475 ft-lb | F   | 2                   | 2                                       | 5   | 3  | 1                                | 2222   |  |  |  |
| Data Collecting (File and I          | Route Capability)   |                     |   |   |  |                                  |  |  |  |  |
| ADW-0010K1<br>10 Nm / 7.4 ft-lb      |   | 1                   |   | 1 or 2  | 3  | 1                                | 2222   |  |  |  |
| ADW-0075K1<br>75 Nm / 55 ft-lb       |   | 1                   |   | 2   | 3  | 1                                | 2222   |  |  |  |
| ADW-0180K1<br>180 Nm / 130 ft-Ib     |   | 1                   |   | 3   | 3  | 1                                | 2222   |  |  |  |
| ADW-0270K1<br>270 Nm / 198 ft-lb     |   | 1                   |   | 3   | 3  | 1                                | 2222   |  |  |  |
| ADW-0500K1<br>500 Nm / 369 ft-lb     |   | 1                   |   | 4   | 3  | 1                                | 2222   |  |  |  |
| ADW-1000K2<br>1,000 Nm / 738 ft-lb   | F   |                     |   | 4 or 5  | 3  | 1                                | 2222   |  |  |  |
| ADW-1200K2<br>1,200 Nm / 885 ft-lb   | F   |                     |   | 5   | 3  | 1                                | 2222   |  |  |  |
| ADW-1000K2<br>1,400 Nm / 1,033 ft-lb | F   |                     |   | 5   | 3  | 1                                | 2222   |  |  |  |
| ADW-1200K2<br>2,000 Nm / 1,475 ft-lb | F   |                     |   | 5   | 3  | 1                                | 2222   |  |  |  |

Standard capacities shown. Additional capacities available on request. Contact an AIMCO Customer Service Associate at 1-503-254-6600, or toll free 1-800-852-1368.

# **AUDITOR ELECTRONIC TORQUE WRENCHES**

### ALLOW PRECISE TIGHTENING AND AUDITING OF YOUR ASSEMBLY APPLICATIONS

### "TRANSDUCERS ON A STICK"

- Non-Length Dependent Where the operator's hand is positioned during use has no effect on torque readings
- Available in Industry Standard (IS) or Intelligent (Intellect) Configurations – Transducer is compatible with a wide variety of IS style instruments or Auditor Intellect instruments that self recognize the transducer
- Durable Steel, Aluminum and Carbon
   Fiber construction provide optimal strength
   and weight. Transducer supplied with overload
   capacity of 150% of full scale
- Accurate Torque readings are accurate to 1% of indicated reading in top 95% of full scale



|           | TORQUE      | SQUARE DRIVE |     |
|-----------|-------------|--------------|-----|
| MODEL     | NM          | FT-LB        | IN  |
| ATW-0100F | 14 - 136    | 10 - 100     | 3/8 |
| ATW-0200F | 27 - 272    | 20 - 200     | 1/2 |
| ATW-0500F | 68 - 680    | 50 - 500     | 3/4 |
| ATW-1000F | 136 - 1,360 | 100 - 1,000  | 1   |

Required Accessory: ATDBRIS IS cable to connect Auditor ATDA instrument.



# **AUDITOR PRESET TORQUE WRENCHES**

Auditor's APTW preset wrenches provide a flexible, easy way to audit fastener torque. A wide range of interchangeable heads provide flexibility and convenience.

### **FEATURES AND BENEFITS**

- Easy-to-use preset wrenches for fastener torque auditing
- Torque ranges from 5 340 Nm
- · User friendly, sleek, ergonomic design
- Tactile feedback on achievement of preset torque
- Proprietary adjustment tool guards against unauthorized setting changes
- Wide range of interchangeable heads provide flexibility and convenience
- +/- 3% accuracy when used in clockwise or counterclockwise directions





| WRENCH MODEL | TORQUE RANGE | INSERT ACCEPTED |
|--------------|--------------|-----------------|
| APTW-25      | 5 - 25 Nm    | 12 mm           |
| APTW-50      | 10 - 50 Nm   | 12 mm           |
| APTW-100     | 20 - 100 Nm  | 12 mm           |
| APTW-150     | 30 - 150 Nm  | 12 mm           |
| APTW-200     | 40 - 200 Nm  | 14 mm           |
| APTW-340     | 60 - 340 Nm  | 14 mm           |

### **TORQUE WRENCH INSERTS**

| ADAPTERS |            | DESCRIPTION              |
|----------|------------|--------------------------|
| 1        | APTH-12ADP | 9 x 12 M to<br>14 x 18 F |
| 1        | APTH-14ADP | 14 x 18 M to<br>9 x 12 F |

| BLANK END | DESCRIPTION  |       |
|-----------|--------------|-------|
|           | APTH-12BLANK | 12 mm |
|           | APTH-14BLANK | 14 mm |

| RATCHET HEA | DESCRIPTION |              |
|-------------|-------------|--------------|
| TOTIONETTIE | 9 x 12      | BEGORII HOIV |
| 6           | APTH-12RT25 | 1/4" Sq. Dr. |
|             | APTH-12RT38 | 3/8" Sq. Dr. |
|             | APTH-12RT50 | 1/2" Sq. Dr. |
|             | 14 x 18     |              |
|             | APTH-14RT50 | 1/2" Sq. Dr. |
|             | APTH-14RT34 | 3/4" Sq. Dr. |

| RING END INSE | DESCRIPTION |                          |
|---------------|-------------|--------------------------|
|               | APTH-12RE50 | 1/2" Ring End,<br>12 mm  |
| 0             | APTH-14RE32 | 32 mm Ring End,<br>14 mm |

| SQUARE DRIVE | DESCRIPTION |              |
|--------------|-------------|--------------|
|              | 9 x 12      |              |
|              | APTH-12SD25 | 1/4" Sq. Dr. |
|              | APTH-12SD38 | 3/8" Sq. Dr. |
|              | APTH-12SD50 | 1/2" Sq. Dr. |
|              | 14 x 18     |              |
|              | APTH-14SD50 | 1/2" Sq. Dr. |

| OPEN END HEAD INSERTS |             |             |             |             |              |             |  |  |
|-----------------------|-------------|-------------|-------------|-------------|--------------|-------------|--|--|
| MODEL                 | DESCRIPTION |             | MODEL       | DESCRIPTION | MODEL        | DESCRIPTION |  |  |
| 9                     | x 12        | $\setminus$ |             |             |              |             |  |  |
| APTH-120E7            | 7 mm OE     | $\setminus$ | APTH-140E1  | 1" OE       | APTH-140E25  | 25 mm OE    |  |  |
| APTH-120E8            | 8 mm OE     | $\setminus$ | APTH-140E13 | 13 mm OE    | APTH-140E27  | 27 mm OE    |  |  |
| APTH-120E9            | 9 mm OE     | $\setminus$ | APTH-140E14 | 14 mm 0E    | APTH-140E30  | 30 mm 0E    |  |  |
| APTH-120E10           | 10 mm 0E    | $\setminus$ | APTH-140E15 | 15 mm OE    | APTH-140E32  | 32 mm OE    |  |  |
| APTH-120E11           | 11 mm 0E    | $\setminus$ | APTH-140E16 | 16 mm 0E    | APTH-140E34  | 34 mm 0E    |  |  |
| APTH-120E12           | 12 mm 0E    | $\setminus$ | APTH-140E17 | 17 mm 0E    | APTH-140E36  | 36 mm 0E    |  |  |
| APTH-120E13           | 13 mm 0E    | $\setminus$ | APTH-140E18 | 18 mm 0E    | APTH-140E38  | 38 mm OE    |  |  |
| APTH-120E14           | 14 mm 0E    | $\setminus$ | APTH-140E19 | 19 mm 0E    | APTH-140E41  | 41 mm 0E    |  |  |
| APTH-120E15           | 15 mm 0E    | $\setminus$ | APTH-140E21 | 21 mm 0E    | APTH-140E118 | 1-1/8" OE   |  |  |
| APTH-120E16           | 16 mm 0E    | $\setminus$ | APTH-140E22 | 22 mm OE    | APTH-140E138 | 1-3/8" OE   |  |  |
| APTH-120E17           | 17 mm 0E    | $\setminus$ | APTH-140E24 | 24 mm OE    |              |             |  |  |
| APTH-120E18           | 18 mm 0E    |             |             |             |              |             |  |  |
| APTH-120E19           | 19 mm 0E    |             |             |             |              |             |  |  |
| APTH-120E20           | 20 mm 0E    |             |             |             |              |             |  |  |
| APTH-120E50           | 1/2" OE     |             |             |             |              |             |  |  |

# **MOMENT ALPHA DIGITAL TORQUE WRENCH**

# ULTIMATE FLEXIBILITY

### **ENSURE ACCURACY IN QUALITY OR PRODUCTION APPLICATIONS**

Moment Alpha is a modular digital wrench/torque system that ensures accurate, measurable tightening every time. Designed for both torque and angle measurement, the system can be used in both quality and production applications.

The Moment Alpha wrench is now available with Open Protocol, which allows instant data transfer to the plant network. Production and Quality audit results can be sent on the network after each event, and PLC logic can be developed to communicate signals to I/Os.



With the introduction of the new Mechanical Click system, Moment Alpha offers increased functionality. Quick and easy torque validation with data collection to ensure accurate rundowns on critical joints.

### **FEATURES**

- Torque and angle measurement
- Modular system with automatic detection of accessories
- Bluetooth communication between wrench and controller
- Now available with Open Protocol
- One wrench/tablet analyzer to perform audits in full torque range from 0.5 – 1,000 Nm (with optional accessories)
  - Screwdriver mode from 0.5 – 5 Nm
  - Flexion mode (wrench)from 4 1,000 Nm
- Works in both clockwise and counter-clockwise operation
- Click wrench option provides tactile and audible feedback, as well as double hit and overshoot detection
- Uses standard drive adapters
- Data collection with Data storage of 50,000 readings and 1,000 traces
- Rechargeable battery pack for wrench handle



# **MOMENT ALPHA DIGITAL TORQUE WRENCH**

### WRENCH HANDLE



| WRENCH<br>HANDLE | TORQUE RANGE  | LENGTH         | WEIGHT             | TORQUE TRANSDUCER<br>ACCURACY | TIGHTENING<br>ACCURACY | ANGLE<br>TRANSDUCER<br>ACCURACY |
|------------------|---|----------------|--------------------|-------------------------------|------------------------|---------------------------------|
| CPSKV00          | Screwdriver Mode: 0.5 - 5 Nm<br>Wrench Mode: 4 - 40 Nm (requires CPSJP81 adapter)<br>4 - 1,000 Nm (with appropriate extension*) | 7.9"<br>200 mm | 0.82 lb<br>0.37 kg | ISO 6789 < 1%                 | < ±4%                  | ±1%                             |

<sup>\*</sup> Wrench handle supplied with one battery. Specific extensions for specific torques available separately. Contact an AIMCO Customer Service Associate, 1-503-254-6600 or toll free 1-800-852-1368.

### **CONTROLLERS**



| DESCRIPTION            | SIZE                | WEIGHT   |
|------------------------|---------------------|----------|
| Portable Controller    | 7.1" x 13.8" x 5.9" | 1.05 lbs |
| Portable Controller    | 180 x 350 x 150 mm  | 0.5 kg   |
| Danah Maunt Controllar | 8.7" x 5.4" x 1.3"  | 7.05 lbs |
| Bench-Mount Controller | 221 x 138 x 32 mm   | 3.2 ka   |

### **FEATURES**

- Preset tightening settings
- Audible alarm
- Four tightening modes: Torque, Angle, Torque and Angle Monitoring, Angle and Torque Monitoring
- 7" color display touchscreen
- International units: Nm, kg/m, kp/m, ft-lb, in-lb, ft-oz, in-oz
- Sturdy and suited to industrial environments
- For greater flexibility, software is interchangeable between benchmount and portable models
- Portable controller comes with a protective screen, rugged case, and carrying strap

# **MOMENT ALPHA DIGITAL TORQUE WRENCH**

### **CHOOSE YOUR SYSTEM**

### 1) Start with the Basics

All Moment Alpha systems start with a basic kit.

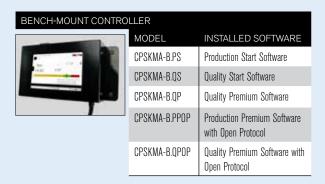
### **CPSKV01 Basic Kit**

| MODEL   | DESCRIPTION            |  |                           |  |  |  |  |
|---------|------------------------|--|---------------------------|--|--|--|--|
| CPSKVOO | Wrench Handle          |  |                           |  |  |  |  |
| CPSJP75 | Battery Unit for Handl | Battery Unit for Handle (includes 3 rechargeable AA batteries) |                           |  |  |  |  |
| CPSJP73 | Battery Charger        | Battery Charger  |                           |  |  |  |  |
| CPSJP81 | Adapter 4 – 40 Nm      | Length: 3.5" / 89 mm   | Weight: 0.03 lb / 0.01 kg |  |  |  |  |



### 2) Choose Your Controller and Software

Either the portable or bench-mount controller type can be selected for either the Production or Quality systems. For software options, contact an AIMCO Customer Service Associate, 1-503-254-6600, or toll free 1-800-852-1368.



| PORTABLE CONTROLLER |               |  |
|---------------------|---------------|--|
| Nes. 174 4          | MODEL         | INSTALLED SOFTWARE                             |
|                     | CPSKMA-P.PS   | Production Start Software                      |
|                     | CPSKMA-P.QS   | Quality Start Software                         |
| Total Co.           | CPSKMA-P.QP   | Quality Premium Software                       |
|                     | CPSKMA-P.PPOP | Production Premium Software with Open Protocol |
|                     | CPSKMA-P.QPOP | Quality Premium Software with<br>Open Protocol |

### 3) Choose Your Extensions

AIMCO offers a variety of extensions to meet all of your application needs.







CPSK90 60 Nm Adapter

| EXTENSI       | EXTENSIONS                                   |                           |                          |                   |  |  |  |  |  |
|---------------|--|---------------------------|--------------------------|-------------------|--|--|--|--|--|
| MODEL         | DESCRIPTION                                  | LENGTH                    | END EFFECTOR CONNECTION  | WEIGHT            |  |  |  |  |  |
|               |  |                           |                          |                   |  |  |  |  |  |
| CPSKS86       | Extension 20 – 100 Nm                        | 5.71" / 145 mm            | 14 x 18*                 | 0.06 lb / 0.03 kg |  |  |  |  |  |
| CPSKS81       | Extension 40 – 200 Nm                        | 14.41" / 366 mm           | 14 x 18*                 | 1.1 lb / 0.5 kg   |  |  |  |  |  |
| CPSKS85       | Extension 60 – 300 Nm                        | 27.06" / 688 mm           | 14 x 18*                 | 2.6 lb / 1.2 kg   |  |  |  |  |  |
| CPSKS87       | Extension 80 – 400 Nm                        | 30.27" / 769 mm           | 14 x 18*                 | 3.08 lb / 1.4 kg  |  |  |  |  |  |
| CPSKS82       | Extension 120 – 600 Nm                       | 42.72" / 1,085 mm         | 14 x 18*                 | 5.07 lb / 2.3 kg  |  |  |  |  |  |
| CPSKS98       | Extension 200 – 1,000 Nm                     | 70.86" / 1,800 mm         | 1"                       | 5.07 lb / 2.3 kg  |  |  |  |  |  |
| CLICK EX      | CTENSIONS                                    |                           |                          |                   |  |  |  |  |  |
| CPSPH05       | Extension 5 – 25 Nm                          | 6.85" / 174 mm            | 9 x 12*                  | 1.15 lb / 0.5 kg  |  |  |  |  |  |
| CPSPH10       | Extension 10 – 50 Nm                         | 9.21" / 234 mm            | 9 x 12*                  | 1.4 lb / 0.6 kg   |  |  |  |  |  |
| CPSPH20       | Extension 20 - 100 Nm                        | 12.09" / 307 mm           | 9 x 12*                  | 1.65 lb / 0.7 kg  |  |  |  |  |  |
| CPSPH30       | Extension 30 – 150 Nm                        | 15.59" / 396 mm           | 9 x 12*                  | 1.85 lb / 0.8 kg  |  |  |  |  |  |
| CPSPH40       | Extension 40 – 200 Nm                        | 17.83" / 453 mm           | 14 x 18*                 | 3.5 lb / 1.6 kg   |  |  |  |  |  |
| CPSPH60       | Extension 60 - 340 Nm                        | 21.30" / 541 mm           | 14 x 18*                 | 4.3 lb / 2.0 kg   |  |  |  |  |  |
| END EFF       | ECTOR ADAPTERS                               |                           |                          |                   |  |  |  |  |  |
| CPSKS93       | Mini Adapter 4 – 40 Nm + Detection           | 1.9" / 49 mm              | Adapts 14 x 18 to 9 x 12 | -                 |  |  |  |  |  |
| CPSKS90       | Adapter 6 - 60 Nm + Detection                | 3.8" / 96 mm              | Adapts 14 x 18 to 9 x 12 | _                 |  |  |  |  |  |
| * End Effecto | irs sold separately. Contact an AIMCO Custor | mer Service Associate, 1- | -800-852-1368.           |                   |  |  |  |  |  |

# **ITVC TORQUE CART**





AIMCO's iTVC Torque Cart is designed for "lineside" or "point of use" tool validation and calibration. Our torque carts allow testing of tools on repeatable joint simulators and "in process" use on production joints, allowing users to identify process capability. Multiple torque cart configurations are available with simple to sophisticated options:

- Manual push carts equipped with simple torque testers
- Manual push carts equipped with data collectors and database application software
- Self propelled cart with computer and relational database application
- Driven cart with computer and relational database application



### **FEATURES AND BENEFITS**

- For testing on repeatable joint simulators or actual production joints
- Mobile test carts can be configured for testing continuous and discontinuous drive tools, including DC electric, clutch, battery, impulse, and torque wrenches
- Each cart is customizable to meet testing needs from 1-1,400 Nm
- Hydraulic braking systems available as an option where linear control of a braking ramp is desired and/or to eliminate the need to reverse each rundown
- Data management software options are available to suit specific audit or assettracking needs
- Torque wrench loaders are configurable to suit wrench populations

Carts can be equipped to specific customer requirements. Ancillary test stands up to 50,000 ft-lb available. Contact an AIMCO Customer Service Associate for a quote or for more details, 1-503-254-6600, or toll free 1-800-852-1368.





|         |                |                              |            | OW<br>RQUE |       | GH<br>QUE |  |
|---------|----------------|------------------------------|------------|------------|-------|-----------|--|
|         | MODEL          | DESCRIPTION                  | NM         | FT-LB      | NM    | FT-LB     |  |
|         | Mobile-Powered |                              |            |            |       | 1         |  |
|         | ITVC.A         | Torque Cart, UFT Mobile BASE | #          |            |       |           |  |
|         | iTVC.A2XXXXXX  | NO JOINTS                    | 0          | 0          | 0     | 0         |  |
|         | iTVC.A2XBCXXX  | 2 UFTs                       | 15         | 11         | 190   | 140       |  |
|         | iTVC.A2XBCDXX  | 3 UFTs                       | 15         | 11         | 686   | 506       |  |
|         | iTVC.A2ABCDXX  | 4 UFTs                       | 1          | 0.7        | 686   | 506       |  |
| UFT     | iTVC.A2ABCDEP  | 4 UFTs, 1 AJKR, Printer      | 1          | 0.7        | 1,400 | 1,033     |  |
| UFI     | Manual         |                              |            |            |       |           |  |
|         | iTVC.A1XXXXXX  | Torque Cart, UFT Manual BASI | <b>E</b> # |            |       |           |  |
|         | iTVC.A1XBCXXX  | 2 UFTs                       | 15         | 11         | 190   | 140       |  |
|         | iTVC.A1XBCDXX  | 3 UFTs                       | 15         | 11         | 686   | 506       |  |
|         | iTVC.A1ABCDXX  | 4 UFTs                       | 1          | 0.7        | 686   | 506       |  |
|         | iTVC.A1ABCXEX  | 3 UFTs, 1 AJKR               | 1          | 0.7        | 1,400 | 1,033     |  |
|         | iTVC.A1ABCDEP  | 4 UFTs, 1 AJKR               | 1          | 0.7        | 1,400 | 1,033     |  |
|         | Mobile-Powered |                              |            |            |       |           |  |
|         | iTVC.B2XXXXX   | Torque Cart, AJKR Mobile BAS | E#         |            |       |           |  |
|         | iTVC.B2XBCXX   | 2 JOINTS                     | 27         | 20         | 271   | 200       |  |
|         | iTVC.B2XBCEX   | 3 JOINTS                     | 27         | 20         | 1,400 | 1,033     |  |
| AJKR -  | iTVC.B2ABCEP   | 4 JOINTS                     | 6          | 4.4        | 1,400 | 1,033     |  |
| 7.01111 | Manual         |                              |            |            |       |           |  |
|         | iTVC.B1XXXXX   | Torque Cart, AJKR Manual BA  | SE#        |            |       |           |  |
|         | iTVC.B1XBCXX   | 2 JOINTS                     | 27         | 20         | 271   | 200       |  |
|         | iTVC.B1XBCEX   | 3 JOINTS                     | 27         | 20         | 1,400 | 1,033     |  |
|         | iTVC.B1ABCEP   | 4 JOINTS                     | 6          | 4.4        | 1,400 | 1,033     |  |
|         | Mobile-Powered |                              |            |            |       |           |  |
|         | iTVC.X2X       | CART, NO COMPUTER            | -          | -          | -     | -         |  |
| BASE    | iTVC.X2A       | CART, W/COMPUTER             | _          | _          | _     | _         |  |
| -57-62  | Manual         |                              |            |            |       |           |  |
|         | iTVC.X1X       | CART, NO COMPUTER            | -          | _          | -     | _         |  |
|         | iTVC.X1A       | CART, W/COMPUTER             | -          | -          | -     | -         |  |

# **TRANSDUCERS**

| Features and Benefits   | Rotary  | Stationary   |  |
|---|---|--|--|
| Superior:  Accuracy Compatibility Durability  |   |  |  |
| Auditor offers multiple styles of transducers in various configurations. Industry standard transducers (2mv/v) and intellect transducers for Auditor instruments that reduce configuration set up time. | ARTIS Auditor Rotary Transducer Industry Standard | ASTIS  Auditor Stationary Transducer Industry Standard | AISI - AISF* Auditor Industry Standard Stationar |
| Used in Conjunction with Analyzer   |   |  |  |
| ATC   | Х   |  |  |
| AUET  | Х   |  |  |
| AUET/MTM  | Х   | Х  | Х  |
| ATDA  | Х   | Х  | Х  |
| ATDA-8000   |   |  | V  |

<sup>\*</sup> See Configuration Options on following page to configure complete part number for AISI / AISF models. Please contact an AIMCO Customer Service Associate for additional information, 1-503-254-6600, or toll free 1-800-852-1368.

### **AUDITOR ROTARY TRANSDUCERS**

Suitable for use with all continuous drive tools, impulse tools and torque wrenches.



ARTIS Series

|                     | DRIVE   | MAX  | MAX TORQUE  |     |  |
|---------------------|---------|------|-------------|-----|--|
| MODEL               | IN      | NM   | IN-LB/FT-LB | LB  |  |
| ARTIS-25H-2T(A)     | 1/4 Hex | 2    | 18 in-lb    | 1.0 |  |
| ARTIS-25H-5T(A)     | 1/4 Hex | 5    | 44 in-lb    | 1.0 |  |
| ARTIS-25H-10T(A)    | 1/4 Hex | 10   | 88 in-lb    | 1.0 |  |
| ARTIS-25H-20T(A)    | 1/4 Hex | 20   | 180 in-lb   | 1.0 |  |
| ARTIS-25S-10T(A)    | 1/4 Sq. | 10   | 88 in-lb    | 1.0 |  |
| ARTIS-25S-20T(A)    | 1/4 Sq. | 20   | 180 in-lb   | 1.0 |  |
| ARTIS-38S-25T(A)    | 3/8 Sq. | 25   | 225 in-lb   | 1.2 |  |
| ARTIS-38S-75T(A)    | 3/8 Sq. | 75   | 50 ft-lb    | 1.2 |  |
| ARTIS-50S-180T(A)   | 1/2 Sq. | 180  | 130 ft-lb   | 1.5 |  |
| ARTIS-75S-250T(A)   | 3/4 Sq. | 250  | 180 ft-lb   | 2.2 |  |
| ARTIS-75S-500T(A)   | 3/4 Sq. | 500  | 370 ft-lb   | 2.2 |  |
| ARTIS-100S-750T(A)  | 1 Sq.   | 750  | 553 ft-lb   | 4.0 |  |
| ARTIS-100S-1400T(A) | 1 Sq.   | 1400 | 1,025 ft-lb | 4.0 |  |

<sup>\*</sup>Add "A" to the end of the part number to indicate torque/angle transducer.



# **TRANSDUCERS**

### **AUDITOR STATIONARY TRANSDUCERS**

Stationary Transducers with joint rundown fixtures and, where applicable, bench stands.



ASTIS industry standard transducers can be used with multiple analyzers.

ASTIS

|                 | MAX -    | DRIVE       |     |
|-----------------|----------|-------------|-----|
| MODEL           | NM       | IN-LB/FT-LB | IN  |
| ASTIS-25D-11    | 11       | 100 in-lb   | 1/4 |
| ASTIS-25D-28    | 28       | 250 in-lb   | 1/4 |
| ASTIS-38D-135   | 135      | 100 ft-lb   | 3/8 |
| ASTIS-50D-270   | 270      | 200 ft-lb   | 1/2 |
| ASTIS-75D-1000  | 1017     | 750 ft-lb   | 3/4 |
| ASTIS-100D-1700 | 1,695 Nm | 1,250 ft-lb | 1   |



AISI

AISI / AISF Transducers connect to the AUET/MTM, ATDA, and ATDA-8000 analyzers and mount directly to a benchtop.

|             | MAX   | TORQUE WEIGHT |      | WXHXD |              | DRIVE              |     |
|-------------|-------|---------------|------|-------|--------------|--------------------|-----|
| MODEL*      | NM    | IN-LB/FT-LB   | KG   | LB    | MM           | IN                 | IN  |
| AISI-200025 | 2.8   | 25 in-lb      | 1.13 | 2.5   | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 1/4 |
| AISI-200100 | 11.3  | 100 in-lb     | 1.13 | 2.5   | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 1/4 |
| AISI-200500 | 56.5  | 500 in-lb     | 1.13 | 2.5   | 79 x 95 x 83 | 3.13 x 3.75 x 3.25 | 3/8 |
| AISF-200100 | 135.6 | 100 ft-lb     | 2.25 | 5     | 100 x 65     | 4 x 3              | 1/2 |
| AISF-200250 | 339   | 250 ft-lb     | 2.25 | 5     | 100 x 65     | 4 x 3              | 1/2 |
| AISF-201000 | 1,350 | 1,000 ft-lb   | 2.8  | 6     | 100 x 65     | 4 x 3              | 1   |

<sup>\*</sup> See Configuration Options below to configure complete part number for AISI / AISF models.

### Auditor AISI / AISF Industry Standard Transducers Configuration Options

| Base Model #                | Angle                   | Capacity  | Configuration   | Expanded<br>Range*                       | Digital                                  | Drive Size  | Wireless                 |
|-----------------------------|-------------------------|---|---|--|--|---|--------------------------|
| Model #<br>Digits 1–5       | 2 = No  Model # Digit 6 | 00025 = 25 In-Lb / 25 Ft-Lb<br>00050 = 50 In-Lb / 50 Ft-Lb<br>00100 = 100 In-Lb / 100 Ft-Lb<br>00250 = 250 In-Lb / 250 Ft-Lb<br>00350 = 350 In-Lb / 350 Ft-Lb<br>00500 = 500 In-Lb / 500 Ft-Lb<br>00600 = 600 In-Lb / 600 Ft-Lb<br>00750 = 750 In-Lb / 750 Ft-Lb<br>01000 = 1,000 In-Lb / 1,000 Ft-Lb | 1 = Bench<br>Stand<br>2 = Inline<br>3 = Loader<br>(1000<br>Series<br>Only)<br>Model #<br>Digit 12 | 1 = Yes<br>2 = No<br>Model #<br>Digit 13 | 1 = Yes<br>2 = No<br>Model #<br>Digit 14 | 1 = 1/4" Hex<br>(up to 100 In-Lb / 8.3 Ft-Lb)<br>2 = 1/4" Sq.<br>(up to 100 In-Lb / 8.3 Ft-Lb)<br>3 = 3/8" Sq.<br>(150-500 In-Lb / 12.5-41.7 Ft-Lb)<br>4 = 1/2" Sq.<br>(1,800-3,000 In-Lb / 150-250 Ft-Lb)<br>5 = 3/4" Sq.<br>(3,000-12,000 In-Lb / 250-1,000 Ft-Lb)<br>6 = 1" Sq.<br>(12,000-24,000 In-Lb / 1,000-2,000 Ft-Lb)<br>7 = 1-1/2" Sq.<br>(24,000+ In-Lb / 2,000+ Ft-Lb)<br>Model # Digit 15 | 2 = No  Model # Digit 16 |
| Stationary                  |                         |   |   |  |  |   |                          |
| AISI-<br>(in-lb capacities) | 2                       |   |   |  |  |   | 2                        |
| AISF-<br>(ft-lb capacities) | 2                       |   |   |  |  |   | 2                        |

<sup>\*</sup>Standard range is 10%-100% of maximum capacity. Expanded range is 5%-100% of maximum capacity.

Transducers are available in capacities of up to 10,000 Ft-Lb. Contact an AIMCO Customer Service Associate at 1-503-254-6600, or toll free 1-800-852-1368.

# **RUNDOWN FIXTURES**

# Features and Benefits • Enables accurate and repeatable testing of pneumatic or electric power tools • Mechanical Belleville system of bolt, nut or nut body, Belleville washers and main housing. 1/4" – 3/4" drive sizes.







| 10 in-lb – 1,200 ft-lb      Fixtures can be ordered to simulate hard, med., or soft joints | ARDFA-XXXXHD<br>ARDIA-XXXHD | ARDFA-XXXHDS<br>ARDIA-XXXHDS | ARDFA-XXXHDE<br>ARDIA-XXXHDE | ARDFA-XXX<br>ARDIA-XXX |
|--|-----------------------------|------------------------------|------------------------------|------------------------|
| Wear-Resistant Heavy Duty  | Х                           |                              |                              |                        |
| Heavy Duty, Fully Encapsulated   |                             | Х                            |                              |                        |
| Heavy Duty, Encapsulated Washers   |                             |                              | Х                            |                        |
| Standard (Included w/analyzer)   |                             |                              |                              | Х                      |
| Spline Drive   |                             |                              |                              |                        |
| Used in Conjunction with External Transducer   |                             |                              |                              |                        |
| ASTIS  | Х                           | Х                            | Х                            | Х                      |
| AISI / AISF  | Х                           | Х                            | Х                            | Х                      |
| PITAV  | γ                           | Y                            | Y                            | ¥                      |

<sup>\*</sup>Spline drive feature provides rundown control when testing pulse tools.



### **AUDITOR RUNDOWN FIXTURES**

To test power tools, pneumatic or electric, consistent rotational speed must be achieved. The joint rundown fixture/simulator provides the means by which the tool motor and spindle rotates freely at the start of the test cycle and then develops torque as rotation resistance increases as fastener/joint load increases. The linearity and consistency of the joint rundown fixtures/simulators vary greatly and the tool test data is a product of the variations in these rundown fixtures. Higher quality joint rundown fixtures produce torque data with less scatter.

### **ARDIA Models**

| MODEL*                   | RECOMMENDEI<br>NM | TORQUE RANGE<br>IN-LB | SQUARE<br>DRIVE |
|--------------------------|-------------------|-----------------------|-----------------|
| ARDIA-10(HD)(HDE)(HDS)   | .13 - 1.13        | 1.0 - 10              | 1/4"            |
| ARDIA-25(HD)(HDE)(HDS)   | .28 - 2.8         | 2.5 - 25              | 1/4"            |
| ARDIA-50(HD)(HDE)(HDS)   | .56 - 5.6         | 5 - 50                | 1/4"            |
| ARDIA-100(HD)(HDE)(HDS)  | 1.3 - 11.3        | 10 - 100              | 1/4"            |
| ARDIA-150(HD)(HDE)(HDS)  | 1.7 - 16.9        | 15 - 150              | 1/4"            |
| ARDIA-250(HD)(HDE)(HDS)  | 2.8 - 28.3        | 25 - 250              | 3/8"            |
| ARDIA-350(HD)(HDE)(HDS)  | 4 - 40            | 35 - 350              | 3/8"            |
| ARDIA-500(HD)(HDE)(HDS)  | 5.6 - 56.5        | 50 - 500              | 3/8"            |
| ARDIA-750(HD)(HDE)(HDS)  | 8.5 - 84.7        | 75 - 750              | 3/8"            |
| ARDIA-1000(HD)(HDE)(HDS) | 11.3 - 113        | 100 - 1,000           | 3/8"            |

<sup>\*</sup>Add "HD" to part numbers for wear resistant models. Add "HDS" to part numbers for fully encapsulated wear resistant models.

### ARDFA Models

| MODEL*                  | RECOMMENDE<br>NM | D TORQUE RANGE<br>FT-LB | SQUARE<br>DRIVE |
|-------------------------|------------------|-------------------------|-----------------|
| ARDFA-100(HD)(HDE)(HDS) | 13.6 - 136       | 10 - 100                | 1/2"            |
| ARDFA-150(HD)(HDE)(HDS) | 20.4 - 204       | 15 - 150                | 1/2"            |
| ARDFA-250(HD)(HDE)(HDS) | 34 - 340         | 25 - 250                | 1/2"            |
| ARDFA-500(HD)(HDE)(HDS) | 67.8 - 678       | 50 - 500                | 3/4"            |
| ARDFA-600(HD)(HDE)(HDS) | 81.6 - 816       | 60 - 600                | 3/4"            |
| ARDFA-750(HD)(HDE)(HDS) | 101.7 - 1,017    | 75 - 750                | 3/4"            |

<sup>\*</sup> Add "HD" to part numbers for wear resistant models. Add "HDS" to part numbers for encapsulated wear resistant models.

<sup>\*</sup>Add "HDE" to part numbers for partial encapsulated wear resistant models.

<sup>\*</sup> Add "HDE" to part numbers for partial encapsulated wear resistant models.

# **JOINT KITS / JOINT SIMULATORS**

### **JOINT KITS**

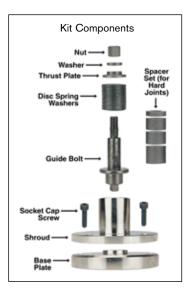
Joint kits are an essential accessory for accurate off-line testing of powered assembly tools.

- Represent production joint conditions off the production line
- Can be adjusted to include joint conditions specified by ISO 5393
- Allows free running of bolt before torque gradient
- Provide linear response.
   Repeatable 1/4" 1" drive sizes, 28 1,695 Nm.

| ROTARY KIT*      | MODEL                | DRIVE SIZE - IN |
|------------------|----------------------|-----------------|
|                  | AJKR-28              | 1/4             |
| 1                | AJKR-135             | 3/8             |
|                  | AJKR-271             | 1/2             |
|                  | AJKR-1017            | 3/4             |
| AJKR             | AJKR-1695            | 1               |
| STATIONARY KIT** |                      |                 |
| STATIONARY KIT** | MODEL                | DRIVE SIZE - IN |
| STATIONARY KIT** | MODEL<br>AJKS-25D    | DRIVE SIZE - IN |
| STATIONARY KIT** |                      |                 |
| STATIONARY KIT** | AJKS-25D             | 1/4             |
| STATIONARY KIT** | AJKS-25D<br>AJKS-38D | 1/4<br>3/8      |



<sup>\*\*</sup>AJKS for use with ASTIS or ARTIS external transducers.



### **UFT SERIES HYDRAULIC MECHANICAL JOINT SIMULATORS**







- Designed for pulse tool and continuous drive tool certification and testing, UFT Joint Simulators offer the most repeatable and linear joint rate simulation on the market
- · For use with ARTIS external transducers
- Bolt tightening body and hydraulic pressure loading mechanism are connected by a hydraulic pressure circuit. Ideal for ISO 5393 test procedures
- Quickly and easily simulate three joint rates by opening or closing two external valves
- Specially coated testing bolt produces over 100,000 cycles without variation or deformation

|                  | BOLT | TORQUE      | RANGE     | WE  | IGHT |
|------------------|------|-------------|-----------|-----|------|
| MODEL            | SIZE | NM          | FT-LB     | LB  | KG   |
| UFT-6            | M5   | 3.2 - 5.4   | 2 - 4     | 8   | 3.6  |
|                  | M6   | 5.4 - 14.7  | 4 - 11    |     |      |
| UFT-10 / UFT-S10 | M6   | 6.7 - 14.7  | 5 - 11    | 43  | 19.5 |
|                  | M8   | 14.7 - 31.4 | 11 - 23   |     |      |
|                  | M10  | 31.4 - 53.9 | 23 - 40   |     |      |
| UFT-16 / UFT-S16 | M12  | 53.9 - 88.2 | 40 - 65   | 88  | 40   |
|                  | M14  | 88.2 - 149  | 65 - 110  |     |      |
|                  | M16  | 149 - 190   | 110 - 140 |     |      |
| UFT-24*          | M18  | 190 - 294   | 140 - 217 | 108 | 49.1 |
|                  | M20  | 294 - 441   | 217 - 325 |     |      |
|                  | M24  | 441 - 686   | 325 - 506 |     |      |

<sup>\*</sup> UFT-24 medium hard/soft joints only

Reaction fixture for continuous drive tools not included. Sockets included.

# **TORQUE MEASUREMENT CABLES**



### Torque Measurement Cables

| MODEL        | DESCRIPTION  | SERIAL<br>CABLE | TRANSDUCER<br>CABLE | ROTARY | ROTARY<br>W/ANGLE | STATIONARY | IND STD | INTELLECT |
|--------------|--|-----------------|---------------------|--------|-------------------|------------|---------|-----------|
| ICBL-USB*    | Connects between COM port of display to PC                                   | Х               |                     |        |                   |            |         |           |
| ATDBLIS*     | Connect to IS transducer w/ angle - 10 pin                                   |                 | Х                   |        | Х                 |            | Х       |           |
| ATDBRIS*     | Connect to IS transducer - 4 pin   |                 | Х                   | Х      |                   | Х          | Х       |           |
| ICBL-10P*    | Intellect transducer cable. Identification chip in cable - 10 pin connector  |                 | Х                   |        | Х                 |            |         | Х         |
| ICBL-4P*     | Intellect transducer cable. Identification chip in cable - 4 pin connector   |                 | Х                   | Х      |                   | Х          |         | Х         |
| ICBL-5000L   | Connect from AUET/MTM & ATDA to Intellect<br>Transducers, Analog AISI / AISF |                 | Х                   |        |                   | Х          |         | Х         |
| ICBL-8000DIG | Connect from ATDA-8000 series analyzer to AISI / AIFI transducer             |                 | Х                   |        |                   |            |         |           |

<sup>\*</sup> Compatible with ATDA, AUET, ADW products

### Tester / Analyzer Compatibility

| MODEL        | ATC | AUET | AUET/<br>MTM | AUET-<br>DC | AUET/<br>MTM-DC | ATDA | ATDA-<br>DC | ATDA-8000-10-DCA<br>(-TA)(-TP) | AISWT<br>SWITCHBOX | ADW | ADW-<br>DC | AIMTS TEST<br>STAND |
|--------------|-----|------|--------------|-------------|-----------------|------|-------------|--------------------------------|--------------------|-----|------------|---------------------|
| ICBL-USB     | Х   | Х    | Х            | Х           | χ               | χ    | Х           |                                |                    | Х   | Х          |                     |
| ATDBLIS      |     | Х    | Х            | Х           | χ               | Х    | χ           |                                |                    |     |            |                     |
| ATDBRIS      |     | Х    | Х            | Х           | χ               | Х    | Х           |                                |                    |     |            |                     |
| ICBL-10P     |     | Х    | Х            | Х           | χ               | Х    | χ           |                                |                    |     |            |                     |
| ICBL-4P      |     | χ    | Х            | Х           | χ               | Х    | Х           |                                |                    |     |            |                     |
| ICBL-5000L   |     |      | Х            |             | χ               | Х    | Х           |                                | Х                  |     |            | χ                   |
| ICBL-8000DIG |     |      |              |             |                 |      |             | Х                              |                    |     |            |                     |

### Transducer Compatibility

|              |       | ROTARY           |                   |       |
|--------------|-------|------------------|-------------------|-------|
| MODEL        | ASTIS | ANALOG AISI/AISF | DIGITAL AISI/AISF | ARTIS |
| ATDBLIS      |       |                  |                   | Х     |
| ATDBRIS      | Х     |                  |                   | Х     |
| ICBL-10P     |       |                  |                   | χ     |
| ICBL-4P      |       |                  |                   | Х     |
| ICBL-5000L   |       | Х                |                   |       |
| ICBI-8000DIG |       |                  | Х                 |       |



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| AHCTS-2.5K   | 17  | APTH-12SD25  | 25   | ARDIA-1000(HD)(HDE)(HDS) 32   | AUET-1000(-DC)10          | CPSPH05 28               |
| AHCTS-3/4RDF | 16  | APTH-12SD38  | 25   | ARTIS-25H-2T(A) 30            | AUET-1200(-DC)10          | CPSPH10 28               |
| AHCTS-005K   | 17  | APTH-12SD50  | 25   | ARTIS-25H-5T(A) 30            | AUET-1800(-DC)10          | CPSPH20 28               |
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| AJKR-135     | 33  | APTH-140E36  |      | ATC-25                        | CA150108DHD16             | UFT-633                  |
| AJKR-271     | 33  | APTH-140E38  |      | ATC-1009                      | CA1510 16                 | UFT-10                   |
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| AJKS-38D     |     | APTH-14RE32  |      | ATC-5009                      | CA2515I16                 | UF1-510                  |
| AJKS-50D     |     | APTH-14RT34  |      | ATC-500F                      | CA2575I16                 |                          |
| AJKS-75D     |     | APTH-14RT50  |      | ATC-7509                      | CPSJP7328                 |                          |
| AJKS-100D    |     | APTH-14SD50  |      | ATC-750F                      | CPSJP7528                 |                          |
| APTH-12ADP   |     |  |      | ATC-1000                      | CPSJP8128                 |                          |
| APTH-12BLANK |     | APTW-100   |      | ATC-1800                      | CPSKMA-B.PPOP 28          |                          |
| APTH-120E7   |     | APTW-100   |      |                               | CPSKMA-B.PS 28            |                          |
| APTH-120E8   | 25  | APTW-200   |      | ATDA-8000                     | CPSKMA-B.QP 28            |                          |
| APTH-120E9   |     | APTW-340   |      | ATDA-8000-10-DCA(-1A)(-1P) 13 | CPSKMA-B.QPOP 28          |                          |
| APTH-120E10  | 23  | ARDFA-100(HD)(HDE)(HDS)  |      | ATDBLIS                       | CPSKMA-B.QS 28            |                          |
| APTH-120E11  | 23  | ARDFA-150(HD)(HDE)(HDS)  |      | ATDBRIS                       | CPSKMA-P.PPOP 28          |                          |
| APTH-120E12  | 25  | (כעח)(חשואלוויאויים ויאיויים ויאיויים ויאיוים אוויים ויאיוים ויאיוים ויאיוים ויאיוים ויאיוים ויאיוים ויאיוים | 52   | כוחטעוה                       | CPSKMA-P.PS 28            |                          |
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