Measuring unit
Delta 4000/5000
EASY-TO-USE AND VERSATILE

The DELTA is an easy-to-use, versatile system which allows the measurement of torque values with model “4000” or torque and angle values with model “5000”.

The parameters and features of all the transducers in the range are stored in the DELTA which are automatically set when selecting the type of transducer:
- Rotary transducers, CMD4000 type
- Static transducers, ST4000 type
- Hand wrenches, CD or CF type
- Torque & angle, CMD5000 type rotary transducers (with DELTA5000)

Its memory contains up to 5 000 results.

Lightweight and self-contained, the DELTA can operate for 14 hours without charge or a change of batteries. In addition, there is an easily interchangeable battery block option which doubles this operating time. The data autosave function allows you to perform this operation without the loss of results.

Communication The DELTA offers the option to connect various parallel printers. It is fitted with a RS232C serial type PC port.

DESIGNED FOR YOUR QUALITY PROCEDURE

Checking operation
Sequence of checking operations throughout the assembly line to verify that the tooling is operating to specified torques.
Each operation setting includes all requisite parameters for its performance (type of transducer used – number of required readings – specified torque - tolerances – etc…).

Manual sequencing:
Manual selection of the operation corresponding to the tool being verified.

Automatic sequencing:
The selection of the various operations can also be carried out automatically, saving the operator the additional time to manually select the operation.

Number of operations:
You can program up to 1000 operations. Each operation can include 4 to 5 000 reading results depending on the number of operations stored.

DELTAPC SOFTWARE

The DELTAPC software allows you to save, control, modify and select all the checking operations, to define customised quality procedures. Each procedure can then be performed after being downloaded to the DELTA.

APPLICATIONS

Calibration of torque wrenches
Calibration of pneumatic screwdrivers
Calibration of controlled electric nutrunners
**POWER REQUIREMENTS**

**POWER SUPPLY**
Removable and rechargeable battery of 6 x 1.2 V (7.2V) NiMH elements inside or outside the unit.

**BATTERY LIFE**
14 hours minimum – 1000 Discharging/Recharging cycles – Programmable automatic stop.

**BATTERY CONTROL**
Low battery indication – Power miser – Charge level test – Global data backup during battery change.

**CHARGER**
Multi-voltage 115/230 Volts with multi-standard mains power cord.

**TORQUE**

<table>
<thead>
<tr>
<th>TRANSDUCER INPUTS</th>
<th>4001 / 5001</th>
<th>4005 / 5005</th>
<th>4010 / 5010</th>
<th>4050 / 5050</th>
<th>4100 / 5100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nm / ft-lb</td>
<td>1-15</td>
<td>10-70</td>
<td>10-150</td>
<td>100-700</td>
<td>100-1500</td>
</tr>
<tr>
<td>(Series 4000 / 5000 : DELTA4000)</td>
<td></td>
<td></td>
<td>7.4-111</td>
<td>74-517</td>
<td>74-1106</td>
</tr>
<tr>
<td>Nm / ft-lb</td>
<td>0.7-11</td>
<td>7.4-52</td>
<td>7.4-111</td>
<td>74-517</td>
<td>74-1106</td>
</tr>
</tbody>
</table>

**TORQUE RESOLUTION**
0.001

**ABSOLUTE MAXIMUM UNCERTAINTY (unit alone)**
0.006 / ±0.004

**ANGLE**

<table>
<thead>
<tr>
<th>RANGE CHANGEOVER</th>
<th>Automatic, depending on the transducer selected.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SENSITIVITY</td>
<td>Automatic selection depending on the transducer selected.</td>
</tr>
<tr>
<td>TRANSDUCER LOAD</td>
<td>Automatic reading in the case of fixed electric power tools.</td>
</tr>
</tbody>
</table>

**SPECIFIC**
Torque: from 1 to 10 000 Nm - up to 20 specific transducers can be defined.

**TRANSUCERS**
Force: from 1 to 50 000 daN Sensitivity 0.5 to 2.5 mV/V.

**UNITS**
Nm – N.cm – kg.cm – Ft.lb – ln.lb – kg – N – daN – kN

**SETTING**

<table>
<thead>
<tr>
<th>JOINT</th>
<th>Selection of the type of joint and application: Hard – Standard – Soft</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEASURING MODE</td>
<td>Standard – Impulse Wrenches.</td>
</tr>
<tr>
<td>ZERO POINT</td>
<td>Automatic zero correction independent of the display reset.</td>
</tr>
<tr>
<td>DISPLAY RESET</td>
<td>Acquisition mode - Programming Mode.</td>
</tr>
<tr>
<td>OPERATING MODE</td>
<td></td>
</tr>
</tbody>
</table>

**COMMUNICATION**

<table>
<thead>
<tr>
<th>LEDS</th>
<th>Tightening reports:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DELTA4000</td>
<td>Torque OK – Min. torque – Max. torque</td>
</tr>
<tr>
<td>DELTA5000</td>
<td>Torque OK – Min. torque – Max. torque – Angle OK – Min. angle – Max. angle.</td>
</tr>
</tbody>
</table>

**INPUTS**
Reset the reading and saving the result.
Reset the reading without saving the result.

**OUTPUTS**
3 torque reports: OK – Min. – Max.
Torque reached for action on external device.
Analog torque output (0-10V).

**MEMORY**
Up to 5 000 results (for 1 single operation programmed) including torque, (torque and angle with DELTA5000): Date and Time.
1 curve (DELTA4000) 5 curves (DELTA5000) can be programmed and displayed
Up to 1 000 checking operations (4 results).

**STATISTICS**
ISO and CNOMO: CAM, CP, CPK, Mean, Standard deviation, ideal tolerances for a given compatibility.

**PRINTER**
Connected to SubD25 point parallel port with printing:
- either in order of occurrence (print after each reading, automatically) / parameters / statistics / curves
- or in increments of N readings starting from a given date.
via serial link RS232 on SubD 9 points.

**TRANSFER TO PC**
via serial link RS232 on SubD 9 points.

**MISCELLANOUS**

<table>
<thead>
<tr>
<th>WEIGHT</th>
<th>1050 gr</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERALL SIZE</td>
<td>Depth: 190 mm - Width: 230 mm – Height: 100 mm</td>
</tr>
<tr>
<td>TEMPERATURES</td>
<td>Storage: from -10°C to +60°C - Operation: from 0°C to +50°C</td>
</tr>
</tbody>
</table>
OPERATOR INTERFACE

- On / off key
- Keys for browsing through the menus
- LEDs for reading angle reports “OK – Min. – Max.”
- “Escape”, “Validate” and “Print” keys
- Alphanumeric keyboard
- LEDs for reading torque reports “OK – Min. – Max.”

CONNECTIONS

- Parallel printer
- Torque & angle transducer
- PC connection
- Charge indicator lamp
- Battery charger

ORDERING ORDER

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>DELTA4000 unit</th>
<th>DELTA5000 unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>615 935 035 0</td>
<td>615 935 043 0</td>
</tr>
</tbody>
</table>

ACCESSORIES INCLUDED

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>Universal charger</th>
<th>Multilingual literature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>615 922 948 0</td>
<td>615 993 801 0</td>
</tr>
</tbody>
</table>

START-UP KIT

To be ordered with the unit
Including: plugs + cable

<table>
<thead>
<tr>
<th>PLUG</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>615 917 201 0</td>
</tr>
<tr>
<td>B</td>
<td>615 917 205 0</td>
</tr>
<tr>
<td>C</td>
<td>615 917 202 0</td>
</tr>
<tr>
<td>D</td>
<td>615 917 203 0</td>
</tr>
<tr>
<td>E</td>
<td>615 917 204 0</td>
</tr>
</tbody>
</table>

OPTIONAL ACCESSORIES

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>Extra battery block</th>
<th>DELTA PC software</th>
<th>Torque &amp; angle cable, 3 m long</th>
<th>Torque &amp; angle cable, 4 m long</th>
<th>Analog torque cable, 2m long</th>
<th>Analog torque cable, 5m long</th>
<th>Spirally wound analog torque cable (stretched: 2m)</th>
<th>Unit/PC connection cable, RS232C type</th>
<th>Parallel printer cable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>615 935 042 0</td>
<td>615 927 520 0</td>
<td>615 917 250 0</td>
<td>615 917 258 0</td>
<td>615 917 251 0</td>
<td>615 917 252 0</td>
<td>615 917 253 0</td>
<td>615 917 047 0</td>
<td>615 917 057 0</td>
</tr>
</tbody>
</table>
INTEGRATED STATISTICAL CALCULATIONS

- CAM, CP and CPK calculation and measurement of mean range on torque or angle values in accordance with ISO and CNOMO standards.
- Calculation of ideal tolerances
- Data screening (date or value interval)
- Tolerance interval selection
- “Population homogeneity” test
- Normal distribution test
- Exporting the results

The results of the readings can be exported to the DELTAPC* software in order to:
- Store the results and perform statistical calculations
- Save and display curves
- Display histograms and control charts
- Transfer the results and curves to an EXCEL or other type data base.

*Available end of 2001

2 OPERATING MODES

Acquisition Mode
In this mode, DELTA allows the operator to acquire and store torque values or torque and angle values:
- Either automatically, after each tightening operation
- Or manually, by pressing the VAL key.

In manual mode, 2 types of reading are available:
- Peak: displays and stores the maximum torque read
- Track: the values displayed follow the evolution of the torque in a continuous process.

Examples of application in track mode
- Hand torque measuring wrenches (CF, CD)
- Reading the tension in a joint with a force meter
- Calibration of assembly machines in “static mode”

In this mode, the values are not stored.

Programming Mode
With its ergonomic design, DELTA can be easily programmed by using the 5 browsing and the multifunction alphanumerical keys of the keyboard.

The main parameters that can be programmed are:
- Selection of transducer connected to unit
- The torque measuring unit
- The nominal torque
- The nominal torque tolerances
- The number of readings for each operation
- The mode used to start the reading
- The parameters used to save the curves

The unit is multilingual: Français, English, Espagnol, Deutsch, Italiano, Nederlands, Svenska.

FIELDS OF APPLICATION

Car industry  Aeronautics  TGV (high speed train)  Electronics
Sales Contacts:

- Asia, Australia, New Zealand, Japan
telephone (852) 235 70 963
facsimile (852) 276 31 875

- Austria
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facsimile (43) 2246 4682

- Belgium & Luxembourg
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facsimile (32) 2 672 6092

- France
telephone (33) 2 40 80 20 00
facsimile (33) 2 40 33 27 07

- Germany
telephone (49) 6181 4110
facsimile (49) 6181 411184

- International
telephone (44) 1442 344 300
facsimile (44) 1442 344 602

- Italy
telephone (39) 039 244 101
facsimile (39) 039 465 5025

- India
telephone (91) 22 564 0011/21
facsimile (91) 22 568 3705

- Netherlands
telephone (31) 765 878 668
facsimile (31) 765 878 825

- Portugal
telephone (35) 121 3158792
facsimile (35) 121 3158793

- South Africa
telephone (27) 11 821 9300
facsimile (27) 11 821 9360

- Spain
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facsimile (34) 91 590 3161

- United Kingdom
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facsimile (44) 1442 344 600

- U.S.A., Canada, Mexico
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facsimile (1) 800 232 6611

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