



**Lou Zampini & Associates**  
2 Douglas Pike, Rt. 7  
Smithfield, RI 02917  
1 800 353 4676  
FAX 1 401 679 0165



**Chicago  
Pneumatic™**

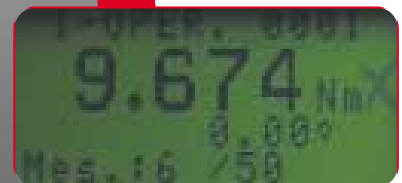
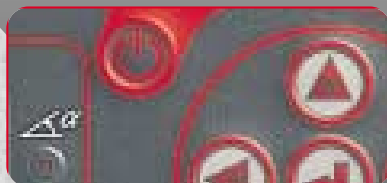


**Desoutter™**



**GEORGES  
RENAULT™**

## Measuring unit Delta 4000/5000



# 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:

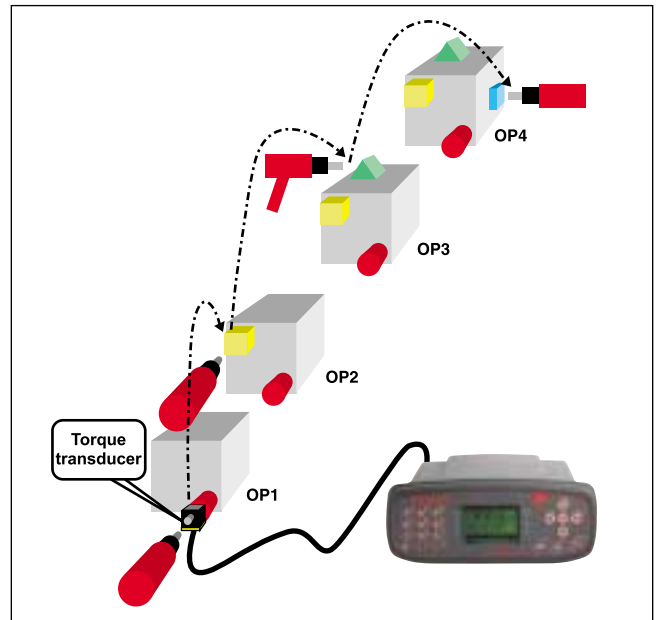
The selection of the various operations can also be carried out automatically, saving the operator the additional time to manually select the operation.

### 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.



Continuous verification of the torque applied by the tightening tools

## APPLICATIONS



Calibration of torque wrenches



Calibration of pneumatic screwdrivers



Calibration of controlled electric nutrunners

## POWER REQUIREMENTS

|                        |  |
|------------------------|--|
| <b>POWER SUPPLY</b>    | Removable and rechargeable battery of 6 x 1.2 V (7.2V) NiMH elements inside or outside the unit.     |
| <b>BATTERY LIFE</b>    | 14 hours minimum – 1000 Discharging/Recharging cycles – Programmable automatic stop.                 |
| <b>BATTERY CONTROL</b> | Low battery indication – Power miser – Charge level test – Global data backup during battery change. |
| <b>CHARGER</b>         | Multi-voltage 115/230 Volts with multi-standard mains power cord.                                    |

## TORQUE

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| <b>TRANSDUCER INPUTS</b>  | Connection of strain gauge transducers, CMD / ST / CD / CF /TD type or others.   |  |  |  |  |
| <b>TRANSDUCER INPUTS</b><br>(Series 4000 : DELTA4000)<br>(Series 4000/5000 : DELTA5000) | <b>4001 / 5001</b><br>Nm / ft-lb<br>1-15 / 0.7-11  | <b>4005 / 5005</b><br>Nm / ft-lb<br>10-70 / 7.4-52 | <b>4010 / 5010</b><br>Nm / ft-lb<br>10-150 / 7.4-111 | <b>4050 / 5050</b><br>Nm / ft-lb<br>100-700 / 74-517 | <b>4100 / 5100</b><br>Nm / ft-lb<br>100-1500 / 74-1106 |
| <b>TORQUE RESOLUTION</b>  | 0.001  | 0.01   | 0.01   | 0.1  | 0.1  |
| <b>ABSOLUTE MAXIMUM UNCERTAINTY (unit alone)</b>  | ±0.006 / ±0.004  | ±0.06 / ±0.04                                      | ±0.06 / ±0.04  | ±0.6 / ±0.44   | ±0.6 / ±0.44   |
| <b>RANGE CHANGEOVER SENSITIVITY</b>   | Automatic, depending on the transducer selected.   |  |  |  |  |
| <b>TRANSDUCER LOAD</b>  | Automatic selection depending on the transducer selected.<br>Automatic reading in the case of fixed electric power tools.  |  |  |  |  |
| <b>SPECIFIC TRANSDUCERS UNITS</b>   | Torque: from 1 to 10 000 Nm - up to 20 specific transducers can be defined.<br>Force: from 1 to 50 000 daN Sensitivity 0.5 to 2.5 mV/V.<br>Nm – N.cm – kg.cm – Ft.lb – In.lb – kg – N – daN – kN |  |  |  |  |

## ANGLE

|                     |  |
|---------------------|--|
| <b>(DELTA 5000)</b> | The angle measurement resolution is 0.25° with the G. RENAULT Series 5000 transducers. |
|---------------------|--|

## SETTING

|                              |  |
|------------------------------|--|
| <b>JOINT MEASURING MODE</b>  | Selection of the type of joint and application: Hard – Standard – Soft<br>Standard – Impulse Wrenches. |
| <b>ZERO POINT ADJUSTMENT</b> | Automatic zero correction independent of the display reset.  |
| <b>DISPLAY RESET</b>         | Manual – External – Automatic (programmable).  |
| <b>OPERATING MODE</b>        | Acquisition mode - Programming Mode.   |

## COMMUNICATION

|                       |   |
|-----------------------|---|
| <b>LEDS</b>           | Tightening reports:<br><b>DELTA4000:</b> Torque OK – Min. torque – Max. torque<br><b>DELTA5000:</b> Torque OK – Min. torque – Max. torque – Angle OK – Min. angle – Max. angle.   |
| <b>INPUTS</b>         | Reset the reading and saving the result.<br>Reset the reading without saving the result.  |
| <b>OUTPUTS</b>        | 3 torque reports: OK – Min. – Max.<br>Torque reached for action on external device.<br>Analog torque output (0-10V).  |
| <b>MEMORY</b>         | Up to 5 000 results (for 1 single operation programmed) including torque, (torque and angle with DELTA5000), Date and Time.<br>1 curve (DELTA4000) 5 curves (DELTA5000) can be programmed and displayed<br>Up to 1 000 checking operations (4 results). |
| <b>STATISTICS</b>     | ISO and CNOMO: CAM, CP, CPK, Mean, Standard deviation, ideal tolerances for a given compatibility.  |
| <b>PRINTER</b>        | Connected to SubD25 point parallel port with printing:<br>- either in order of occurrence (print after each reading, automatically)/parameters/statistics/curves<br>- or in increments of N readings starting from a given date.                        |
| <b>TRANSFER TO PC</b> | via serial link RS232 on SubD 9 points.   |

## MISCELLANEOUS

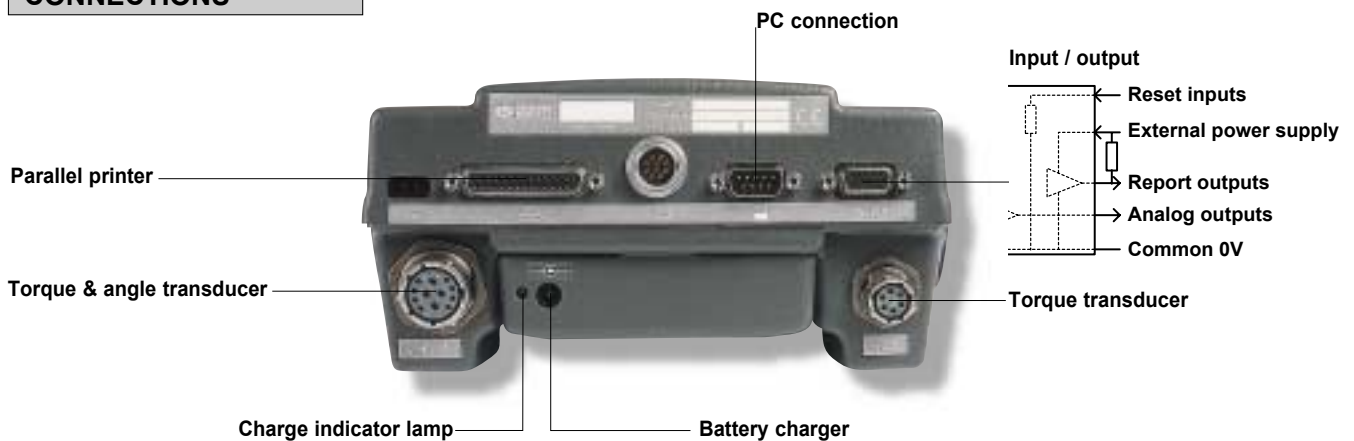
|                     |   |
|---------------------|---|
| <b>WEIGHT</b>       | 1050 gr   |
| <b>OVERALL SIZE</b> | Depth: 190 mm - Width: 230 mm – Height: 100 mm              |
| <b>TEMPERATURES</b> | Storage: from -10°C to +60°C - Operation: from 0°C to +50°C |

# Environment

## OPERATOR INTERFACE



## CONNECTIONS



### ORDERING ORDER

|                | PART NO.      |
|----------------|---------------|
| DELTA4000 unit | 615 935 035 0 |
| DELTA5000 unit | 615 935 043 0 |

### ACCESSORIES INCLUDED

|                         | PART NO.      |
|-------------------------|---------------|
| Universal charger       | 615 922 948 0 |
| Multilingual literature | 615 993 801 0 |

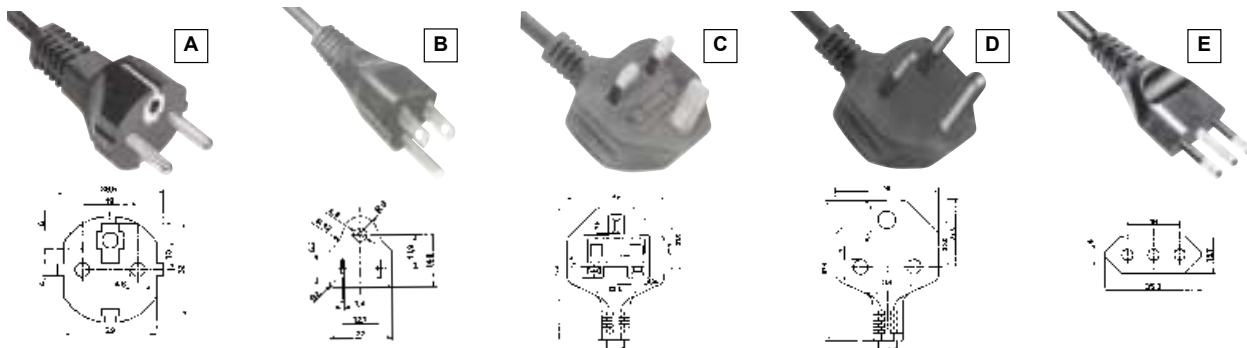
### START-UP KIT

To be ordered with the unit  
Including: plugs + cable

| PLUG | PART NO.      |
|------|---------------|
| A    | 615 917 201 0 |
| C    | 615 917 202 0 |
| D    | 615 917 205 0 |
| B    | 615 917 203 0 |
| E    | 615 917 204 0 |

### OPTIONAL ACCESSORIES

|  | PART NO.      |
|--|---------------|
| Extra battery block                                | 615 935 042 0 |
| DELTA PC software                                  | 615 927 520 0 |
| Torque & angle cable, 3 m long                     | 615 917 250 0 |
| Torque & angle cable, 4 m long                     | 615 917 258 0 |
| Analog torque cable, 2m long                       | 615 917 251 0 |
| Analog torque cable, 5m long                       | 615 917 252 0 |
| Spirally wound analog torque cable (stretched: 2m) | 615 917 253 0 |
| Unit/PC connection cable, RS232C type              | 615 917 047 0 |
| Parallel printer cable                             | 615 917 057 0 |



## INTEGRATED STATISTICAL CALCULATIONS

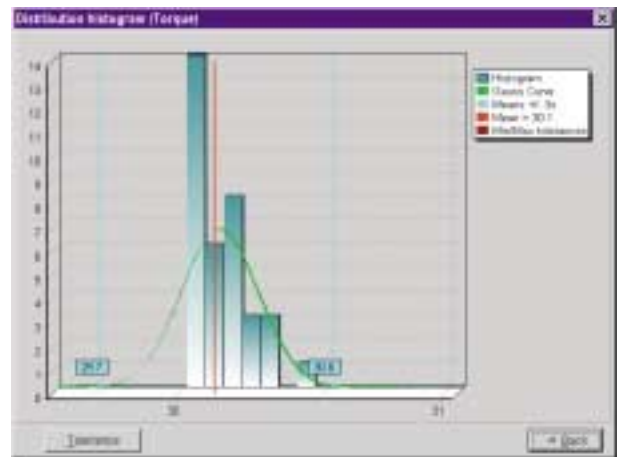
- CAM, CP and CPK calculation and measurement of mean range on torque or angle values in accordance with ISO and CNOMO standards.
- Calculation of ideal tolerances
- Data screening (date or value interval)
- Tolerance interval selection
- "Population homogeneity" test
- Normal distribution" test
- Exporting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

| STAT. RES. |         |
|------------|---------|
| Nb > Tmax  | : 0     |
| Mean       | : 50.10 |
| Sigma      | : 0.54  |
| Disp.      | : 0.29  |
| Cam        | : 0.08  |
| Cpk        | : 0.2   |



## 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 alphanumeric 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