

Quality Assurance in Fastening

Sigma 2001/2D / Delta 4000/4D / Delta 5000/5D



Easy-to-use and Versatile

The **SIGMA** and **DELTA** are easy-to-use, versatile systems which allow the measurement of torque values with model **SIGMA 2001/2D**, **DELTA 4000/4D** or torque and angle values with model **DELTA 5000/5D**.

The parameters and features of all the transducers in the range are stored in the SIGMA / DELTA and are automatically set when selecting the type of transducer:

- Digital rotary transducers
- Static transducers
- Hand held torque wrenches
- Torque & Angle rotary transducers

The **memory** stores up to 1000 results (SIGMA 2001/2D), up to 5000 results (DELTA 4000/4D/5000/5D).

Lightweight and self-contained, the SIGMA & DELTA can operate for 14 hours without charge or 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 **SIGMA / DELTA** have the option to connect various parallel printers. They are fitted with an 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 transducers 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

It is possible to program up to 1000 operations. Each operation can include 4 to 5000 reading results depending on the number of operations stored.

DELTAPC Software

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

Torque measurement systems

Sigma 2001/2D / Delta 4000/4D / Delta 5000/5D

Integrated SPC Calculations

- CAM, CP and CPK calculation and measurement of mean & range on torque or angle values in accordance with ISO, NF, Q544000 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 one or several curves
- display histograms and control charts
- transfer the results and curves to an EXCEL or other type database.

Two Operations Modes

Acquisition Mode

In this mode, SIGMA / DELTA allows the operator to acquire and store torque values or torque and angle values:

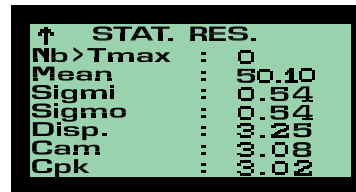
- either automatically, after each tightening operation
- or manually, by pressing the VAL key

In manual mode, 2 types of reading are available:

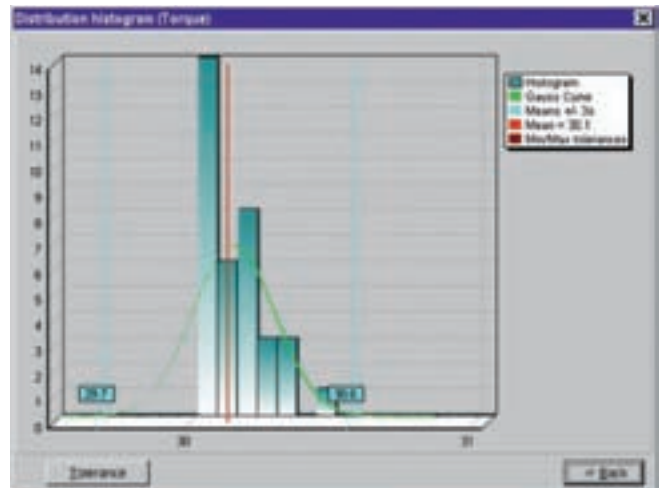
- peak: displays and stores the maximum torque read
- track: the values displayed follow the evolution of the torque in a continuous process.

Examples of application in track mode

- Hand torque measuring wrenches (AWT / DWT)
- 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.



↑ STAT. RES.	
Nb > Tmax	: 0
Mean	: 50,10
Sigma	: 0,54
Sigma	: 0,54
Disp.	: 0,29
Cam	: 0,08
Cpk	: 0,2



Programming Mode

With its ergonomic design, **SIGMA / 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 or torque & angle tolerances
- the number of readings for each operation
- the mode used to start the reading
- the parameters used to save the curves
- etc.

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

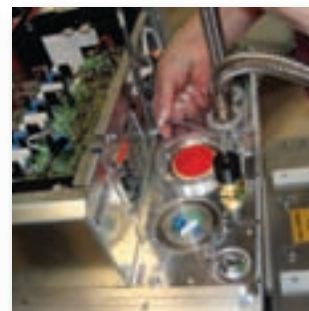
Fields of Application



Car industry



Aeronautics



Medical

Technical features

Sigma 2001/2D / Delta 4000/4D / Delta 5000/5D

MAIN FUNCTIONS	SIGMA 2001/2D	DELTA 4000/4D	DELTA 5000/5D
TORQUE			
Connection of strain gauge transducers, ART / AWT type or others (for Sigma2001/Delta4000 & 5000 only)	✓	✓	✓
Connection of digital transducers DRT4, DRT5, DTW and DST	✓	✓	✓
Range changeover: Automatic, depending on the transducer selected	✓	✓	✓
Sensitivity: Automatic selection depending on the transducer selected	✓	✓	✓
Transducer load: Automatic selection depending on the transducer selected	✓	✓	✓
Specific: Torque from 1 to 10 000Nm - up to 20 specific transducers can be defined	✓	✓	✓
Transducers: Force from 1 to 50 000 daN Sensitivity 0.5 to 2.5 Mv/v	✓	✓	✓
Units: Nm - N.cm - kg.cm - kg.m - Ft.lb - In.lb - kg - N - daN - Kn	✓	✓	✓
SETTING			
Joint: Selection of the type of joint and application: Hard - Standard - Soft and filter value (2 to 2048 Hertz)	✓	✓	✓
Measuring mode: Standard - Impulse Wrenches	✓	✓	✓
Display reset: Manual - External - Automatic (programmable)	✓	✓	✓
Operating Mode: Acquisition mode - Programmable mode	✓	✓	✓
INTEGRATED STATISTICAL CALCULATIONS			
CAM, CP and CPK calculation and measurement of mean range on torque or angle values in accordance with ISO, NF, Q544000 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		✓	✓
COMMUNICATION			
LEDs: Tightening reports		✓	✓
Torque OK - Min. torque - Max torque		✓	
Torque OK - Min. torque - Max. torque - Angle OK - Min angle - Max. angle			✓
Inputs: Reset the reading and saving the result - Reset the reading without saving the result		✓	✓
Outputs: 3 torque reports: OK - Min.- Max.		✓	✓
Analog torque output (0-10V)	✓	✓	✓
Memory: Up to 5000 results including, torque, torque & angle, date & time			✓
Up to 5000 results including, torque, date & time		✓	
Up to 1000 results including, torque, date & time	✓		
Tightening curves		✓	✓
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.	✓	✓	✓
Tachometer			✓
POWER REQUIREMENTS			
Power supply: Removable and rechargeable battery of 6 x 1.2 V (7.2V) NiMH	✓	✓	✓
Battery life: 1000 Discharging / Recharging cycles	14 hours	14 hours	14 hours
Automatic stop when not used during the selected	✓	✓	✓
Battery control: Low battery indication - Power miser - Charge level test	✓	✓	✓
Global data backup during battery	✓	✓	✓
Charger: Multi-voltage 115/230 Volts with multi-standard mains power cord	✓	✓	✓

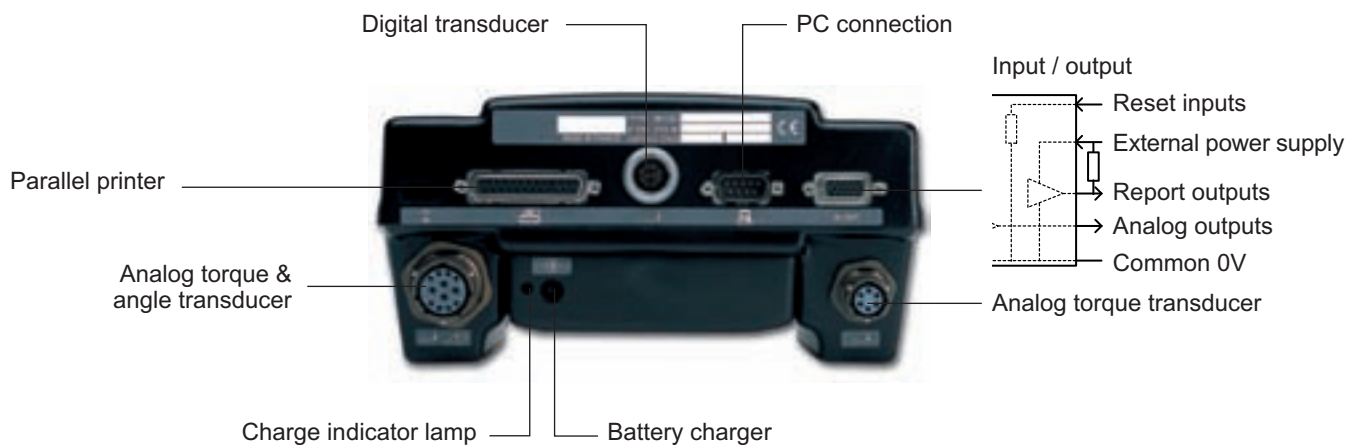
Measuring unit

Sigma 2001/2D / Delta 4000/4D / Delta 5000/5D

OPERATOR INTERFACE



CONNECTIONS



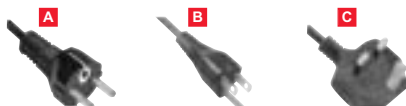
MODEL	PART NUMBER	POWER REQUIREMENTS		DIMENSIONS		DIMENSIONS		DIMENSIONS		WEIGHT	
		BATTERY LIFE	CHARGER	DEPTH	WIDTH	HEIGHT	mm	in.	kg	lb.	
		hours	Volts	mm	in.	mm	in.	mm	in.	kg	lb.
SIGMA2001 unit	615 935 037 0	14	115/230	190	7.48	230	9	100	3.9	1.05	2.3
DELTA4000 unit	615 935 035 0	14	115/230	190	7.48	230	9	100	3.9	1.05	2.3
DELTA5000 unit	615 935 043 0	14	115/230	190	7.48	230	9	100	3.9	1.05	2.3
SIGMA2D unit	615 935 051 0	14	115/230	190	7.48	230	9	100	3.9	1.05	2.3
DELTA4D unit	615 935 052 0	14	115/230	190	7.48	230	9	100	3.9	1.05	2.3
DELTA5D unit	615 935 053 0	14	115/230	190	7.48	230	9	100	3.9	1.05	2.3

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: **Plug + Cable**

PLUG	PART NO.
A European	615 917 201 0
C English	615 917 202 0
B USA	615 917 203 0



OPTIONAL ACCESSORIES

	PART NO.
• Extra battery block	615 935 042 0
• Unit/PC connection cable, type RS232C	615 917 047 0
• Parallel printer cable	615 917 057 0
• DELTAPC STD 1 Install	615 927 529 0
• DELTAPC STD 5 Install	615 927 530 0
• DELTAPC ADV 1 Install	615 927 520 0
• DELTAPC ADV 5 Install	615 927 532 0
• Demo case Delta (empty)	615 930 725 0

Cable see page 103



Digital Rotary Transducers

Torque or Torque & Angle

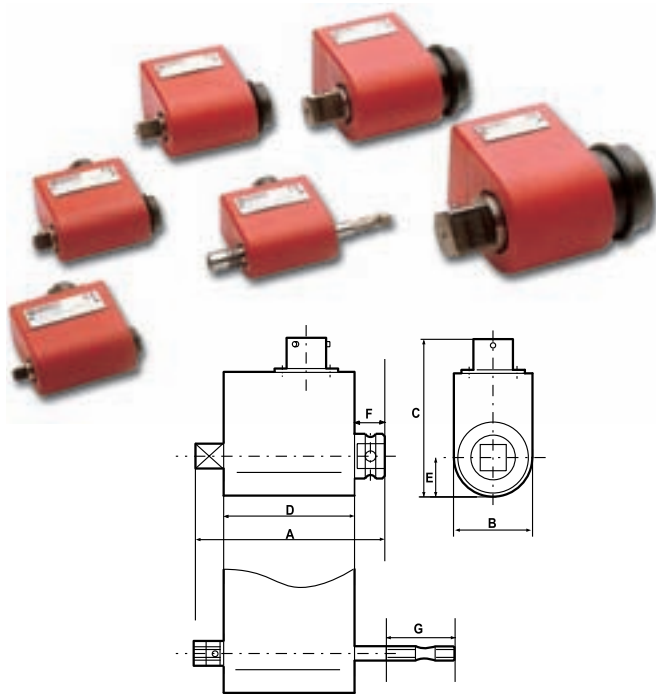
The DRT4 (torque) and DRT5 (torque & angle) transducers cover a torque range from 0.15 to 5000 Nm (0.11 to 3685 ft.lb). DRT5 transducers offer an angle resolution down to 0.5°. The built-in memory provides all transducer calibration data to Sigma or Delta data collector.

Features:

- Torque range from 0.15 to 5000 Nm..... (0.11 to 3685 ft.lb).
- Strain gauges transducer – sensitivity 2mV/V. – accuracy +/-0.35% full scale.
- Built-in smart chip memory with:..... Calibration features: type of transducer – sensitivity – nominal load – serial number. Maintenance information: date of last calibration – maximum torque applied on transducer.
- Unique contact system preventing the common problem of 'brush bounce'.
- Angle counting system 0.5° resolution
- Same size for torque or torque & angle transducers
- Digital connection between data collector and transducer. Torque value converted to a digital signal close to the strain gauges.

Benefits:

- Transducers used in line with screwdrivers – pneumatic tools – impulse tools – electric nutrunners and spindles.
- The most accurate and reliable type of torque transducer.
- No need for transducer selection. The data collector automatically recognises the transducer connected. Avoids risk of operator error in selecting a wrong type of transducer.
- Transducers can be used in line with impulse tools, but not with impact tools.
- Checks all types of joints, hard and soft.
- No problem of accessibility.
- Insensitive to cable length. Reliability of torque values transmitted to the data collector. Only one type of transducer cable needed. Easy to recalibrate by modifying the sensitivity coefficient. No hardware adjustment.



MODEL	PART NUMBER	TORQUE RANGE		OUTPUT
		Nm	ft.lb	

TORQUE TRANSDUCERS DRT4

DRT 4 H 2	615 165 209 0	0.15-2	0.11-1.5	Hex 1/4"
DRT 4 H 5	615 165 210 0	0.3-5	0.22-3.7	Hex 1/4"
DRT 4 H 20	615 165 211 0	1.5-20	1.11-14.7	Hex 1/4"
DRT 4 Sq 20	615 165 212 0	1.5-20	1.11-14.7	Sq 1/4"
DRT 4 Sq 25	615 165 213 0	1.8-25	1.33-18.4	Sq 3/8"
DRT 4 Sq 75	615 165 214 0	5.0-75	3.69-55.3	Sq 3/8"
DRT 4 Sq 180	615 165 215 0	12.0-180	8.85-132	Sq 1/2"
DRT 4 Sq 500	615 165 216 0	35.0-500	25.8-368	Sq 3/4"
DRT 4 Sq 1400	615 165 217 0	95.0-1400	70.0-1032	Sq 1"
DRT 4 Sq 3000	615 165 536 0	200-3000	147-2211	Sq 1-1/2"
DRT 4 Sq 5000	615 165 540 0	350-5000	258-3685	Sq 1-1/2"

TORQUE & ANGLE TRANSDUCERS DRT5

DRT 5 H 2	615 165 218 0	0.15-2	0.11-1.5	Hex 1/4"
DRT 5 H 5	615 165 219 0	0.3-5	0.22-3.7	Hex 1/4"
DRT 5 H 20	615 165 220 0	1.5-20	1.11-14.7	Hex 1/4"
DRT 5 Sq 20	615 165 221 0	1.5-20	1.11-14.7	Sq 1/4"
DRT 5 Sq 25	615 165 222 0	1.8-25	1.33-18.4	Sq 3/8"
DRT 5 Sq 75	615 165 223 0	5.0-75	3.69-55.3	Sq 3/8"
DRT 5 Sq 180	615 165 224 0	12.0-180	8.85-132	Sq 1/2"
DRT 5 Sq 500	615 165 225 0	35.0-500	25.8-368	Sq 3/4"
DRT 5 Sq 1400	615 165 226 0	95.0-1400	70.0-1032	Sq 1"

OPTIONAL ACCESSORIES

Cables, see page 103

OUTPUT	A		B		C		D		E		F		G	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
Hex 1/4"	116.0	4.56	30.0	1.18	68.0	2.68	56.0	2.20	13.0	0.51	39.0	1.53	25.5	1
Sq 1/4"	71.5	2.81	30.0	1.18	71.5	2.81	56.0	2.20	13.0	0.51	6.0	0.24		
Sq 3/8"	77.0	3.03	30.0	1.18	74.0	2.91	56.0	2.20	15.0	0.59	8.0	0.31		
Sq 1/2"	87.0	3.42	42.0	1.65	82.5	3.25	58.0	2.28	21.0	0.83	12.0	0.47		
Sq 3/4"	106.0	4.17	52.0	2.05	93.5	3.68	60.0	2.36	26.0	1.02	21.0	0.83		
Sq 1"	125.0	4.92	63.0	2.48	104.0	4.09	64.5	2.54	31.5	1.24	29.0	1.14		
Sq 1-1/2"	165.0	6.50	106.0	4.17	148.5	5.85	88.0	3.46	53.0	2.09	35.2	1.39		

Analog Rotary Transducers

Torque

The ART4 (torque) transducers cover a torque range from 0.3 to 180 Nm (0.22 to 132 ft.lb).

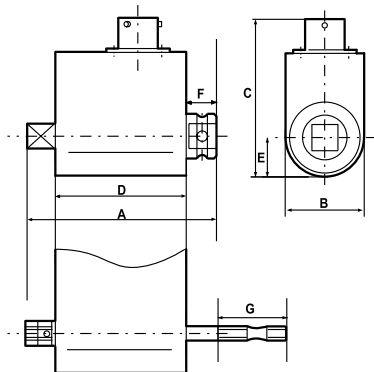
Features:

- Torque range from 0.3 to 180 Nm..... (0.22 to 132 ft.lb).
- Highly accurate strain gauges transducer
– sensitivity 2mV/V.
– accuracy +/-0.35% full scale.
- Unique contact system preventing the
common problem of 'brush bounce'.
- Same size for torque or torque & angle transducers
Same as DRT transducers.

Benefits:

- Transducers used in line with screwdrivers – pneumatic tools – impulse tools – electric nutrunners and spindles.
- The most accurate and reliable type of torque transducer.
- Transducers can be used in line with impulse tools, but not with impact tools.
- No problem of accessibility.

**Compatible with Sigma2001, Delta4000 & Delta5000
not with Sigma2D, Delta4D & Delta5D**



OUTPUT	A		B		C		D		E		F		G	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
Hex 1/4"	116.0	4.56	30.0	1.18	68.0	2.68	56.0	2.20	13.0	0.51	39.0	1.53	25.5	1
Sq 3/8"	77.0	3.03	30.0	1.18	74.0	2.91	56.0	2.20	15.0	0.59	8.0	0.31		
Sq 1/2"	87.0	3.42	42.0	1.65	82.5	3.25	58.0	2.28	21.0	0.83	12.0	0.47		

MODEL	PART NUMBER	TORQUE RANGE		OUTPUT
		Nm	ft.lb	

TORQUE TRANSDUCERS ART4

ART4 H 5	615 165 374 0	0.3-5	0.22-3.7	Hex 1/4"
ART4 H 20	615 165 375 0	1.5-20	1.11-14.7	Hex 1/4"
ART4 Sq 25	615 165 376 0	1.8-25	1.33-18.4	Sq 3/8"
ART4 Sq 75	615 165 377 0	5.0-75	3.69-55.3	Sq 3/8"
ART4 Sq 180	615 165 378 0	12.0-180	8.85-132	Sq 1/2"

OPTIONAL ACCESSORIES

Cables, see page 103

Torque wrenches

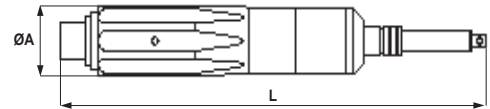
AWT - Analogic Wrench Torque

Torque screwdriver used for Quality control and for precise assembly.

Used with data acquisition unit, Delta4000/5000 & Sigma2001 analogic.

Sliding bush to convert left & right tightening. The very low friction avoids dragging the screws on the return motion.

Precision reversible ratchet consisting of two needle clutches for minimum backlash effect on 15 Nm model.



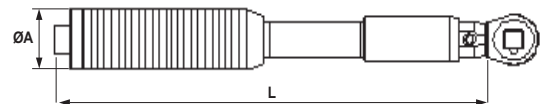
MODEL	PART NUMBER	TORQUE RANGE		ACCURACY	SQUARE DRIVE	DIMENSIONS				WEIGHT	
		Nm	ft.lb			L		ØA		kg	lb.
AWT 1 Nm - 6S	615 165 552 0	0.1-1	0.07-0.74	+/- 0.5% +/- 1 digit	1/4	mm	in.	mm	in.	kg	lb.
AWT 5 Nm - 6S	615 165 554 0	0.5-5	0.37-3.68	+/- 0.5% +/- 1 digit	1/4	143	5.6	35	1.38	0.22	0.48
AWT 15 Nm - 6R	615 165 556 0	1.5-15	1.10-11.0	+/- 0.5% +/- 1 digit	1/4	143	5.6	35	1.38	0.22	0.48
						190	7.5	35	1.38	0.36	0.79

DWT - Digital Wrench Torque

Digital Torque wrench non length dependent

Used for quality control: residual torque check

Used with data acquisition unit, Delta & Sigma



All models supplied with Reversible ratchet: 615 397 126 0 for DWT30/50 - 615 397 127 0 for DWT70/100 - 615 397 200 0 for DWT150/250 - 615 397 201 0 for DWT400 - 615 397 204 0 for DWT1000

MODEL	PART NUMBER	TORQUE RANGE		DRIVE		RATCHET	DIMENSIONS				WEIGHT	
		Nm	ft.lb	mm	in.		L		ØA		kg	lb.
DWT 30 Nm - 10	615 165 544 0	3-30	2.2-22	9x12	0.35x0.47	3/8	mm	in.	mm	in.	kg	lb.
DWT 50 Nm - 10	615 165 545 0	5-50	3.7-37	9x12	0.35x0.47	3/8	220	8.7	40	1.57	0.43	0.95
DWT 70 Nm - 13	615 165 546 0	7-70	5.2-52	9x12	0.35x0.47	1/2	220	8.7	40	1.57	0.44	0.97
DWT 100 Nm - 13	615 165 547 0	10-100	7.4-74	9x12	0.35x0.47	1/2	283	11.1	40	1.57	0.54	1.19
DWT 150 Nm - 13	615 165 548 0	15-150	11.1-110	14x18	0.55x0.71	1/2	363	14.3	40	1.57	0.63	1.39
DWT 250 Nm - 13	615 165 549 0	25-250	18.4-184	14x18	0.55x0.71	1/2	475	18.7	40	1.57	1.38	3.04
DWT 400 Nm - 20	615 165 550 0	40-400	29.5-294	14x18	0.55x0.71	3/4	475	18.7	40	1.57	1.44	3.17
DWT 1000 Nm - 25	615 165 551 0	100-1000	73.7-737	ø28	1.1	1	735	28.9	40	1.57	2.01	4.43
							1102	43.4	56	2.20	6.48	14.3

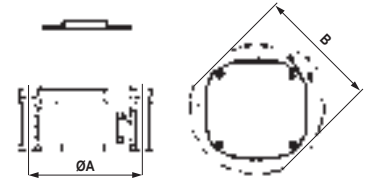
DWA - DIGITAL WRENCH ACCESSORIES

END FITTING TOOLS	PART NUMBER	DRIVE		DIMENSIONS								WEIGHT			
		mm	in.	A		B		H		L		kg	lb		
Open End				mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lb
A Open End 13mm	615 397 061 0	9x12	0.03x0.47	13	0.51	30	1.18	7	0.28	17.5	0.69	0.048	0.106		
A Open End 17mm	615 397 065 0	9x12	0.03x0.47	17	0.67	38	1.50	8.5	0.33	17.5	0.69	0.060	0.132		
A Open End 22mm	615 397 139 0	14x18	0.55x0.71	22	0.87	50	1.97	11	0.43	25	0.98	0.165	0.363		
A Open End 24mm	615 397 140 0	14x18	0.55x0.71	24	0.94	53	2.09	12	0.47	25	0.98	0.167	0.368		
Ring End				mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lb
B Ring End 17mm	615 397 087 0	9x12	0.03x0.47	17	0.67	27.2	1.07	13	0.51	17.5	0.69	0.059	0.130		
B Ring End 22mm	615 397 091 0	9x12	0.03x0.47	22	0.87	34.5	1.36	15	0.59	17.5	0.69	0.074	0.163		
B Ring End 22mm	615 397 181 0	14x18	0.55x0.71	22	0.87	34.5	1.36	15	0.59	25	0.98	0.145	0.319		
B Ring End 24mm	615 397 182 0	14x18	0.55x0.71	24	0.94	37.5	1.48	15	0.59	25	0.98	0.153	0.337		
Flared End				mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lb
C Flared End 22mm	615 397 113 0	9x12	0.03x0.47	22	0.87	39	1.54	15	0.59	19	0.75	0.092	0.202		
Reversible Ratchet				mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lb
D Reversible Ratchet 1/4"	615 397 125 0	9x12	0.03x0.47		1/4	22	0.87	14.5	0.57	17.5	0.69	0.062	0.137		
D Reversible Ratchet 3/8"	615 397 126 0	9x12	0.03x0.47		3/8	22	0.87	14.5	0.57	17.5	0.69	0.062	0.137		
D Reversible Ratchet 1/2"	615 397 127 0	9x12	0.03x0.47		1/2	22	0.87	14.5	0.57	17.5	0.69	0.062	0.137		
D Reversible Ratchet 1/2"	615 397 200 0	14x18	0.55x0.71		1/2	50	1.97	30.7	1.21	25	0.98	0.467	1.022		
D Reversible Ratchet 3/4"	615 397 201 0	14x18	0.55x0.71		3/4	50	1.97	30.7	1.21	25	0.98	0.467	1.022		
D Reversible Ratchet 1"	615 397 204 0	ø28			1	50	1.97	30.7	1.21	25	0.98	0.467	1.022		

DST - Digital Static Transducers

Used for Torque control & Calibration of electric, pneumatic & impulse tools

These transducers have vertical input axis with a female square drive to hold joint simulators (not needed to test non shut off impulse tool)
Used with data acquisition unit, Delta & Sigma



MODEL	PART NUMBER	TORQUE RANGE		SQUARE DRIVE	DIMENSIONS				WEIGHT	
		Nm	ft.lb		ØA	B		kg	lb.	
DST 0.5 Nm - 13	615 165 537 0	0.05-0.5	0.04-0.4	1/2	81	3.19	91	3.58	2.3	5.1
DST 2 Nm - 13	615 165 532 0	0.2-2	0.15-1.5	1/2	81	3.19	91	3.58	2.3	5.1
DST 5 Nm - 13	615 165 533 0	0.5-5	0.37-3.7	1/2	81	3.19	91	3.58	2.3	5.1
DST 10 Nm - 20	615 165 534 0	1-10	0.74-7.4	3/4	86	3.38	93	3.66	3.1	6.8
DST 30 Nm - 20	615 165 535 0	3-30	2.21-22	3/4	89	3.50	96	3.78	3.4	7.5
DST 80 Nm - 25	615 165 538 0	8-80	5.89-59	1	108	4.25	116	4.57	5.8	12.8
DST 200 Nm - 25	615 165 539 0	20-200	14.7-147	1	108	4.25	116	4.57	5.8	12.8
DST 500 Nm - 32	615 165 541 0	50-500	36.8-368	1 1/4	133	5.24	144	5.67	11.8	26.0
DST 1000 Nm - 32	615 165 542 0	100-1000	73.7-737	1 1/4	133	5.24	144	5.67	11.9	26.2
DST 2000 Nm - 32	615 165 543 0	200-2000	147.4-1474	1 1/4	133	5.24	144	5.67	12.0	26.4

DSA - DELTA STATIC TRANSDUCERS ACCESSORIES

MODEL	PART NO.	MODEL	PART NO.
Adaptor SQ 3/4" M - 1/4" F	615 397 205 0	Female 1/4" - Female 1/4"	615 397 210 0
Adaptor SQ 3/4" M - 3/8" F	615 397 206 0	Female 3/8" - Female 3/8"	615 397 211 0
Adaptor SQ 1" M - 1/2" F	615 397 207 0	Female 1/2" - Female 1/2"	615 165 573 0
Adaptor SQ 1-1/4" M - 1/2" F	615 397 208 0	Female 3/4" - Female 3/4"	615 165 576 0
Adaptor SQ 1-1/4" M - 3/4" F	615 397 209 0		

Joint simulators



DJS - Digital Joint Simulator

Joint simulators are used to reproduce normal conditions of use of a power tool so that the calibration of the tool is suited to the resilience of the joint where the tool is used on the line.

The choice of Soft or Hard stiffness is needed as the torque developed by most tools varies with joint stiffness. Each joint simulator is identified by two coloured rings for fast, easy recognition by the operator.

MODEL	PART NUMBER	TORQUE RANGE		COLOR		SQUARE DRIVE		WEIGHT	
		Nm	ft.lb			INSIDE	OUTSIDE	kg	lb.
DJS Soft - 2	615 165 529 0	0.2-1	0.15-0.74	Yellow	Yellow	1/2	Hex 1/4	0.12	0.26
DJS Hard - 2	615 165 530 0	0.3-2	0.22-1.5	Yellow	Black	1/2	Hex 1/4	0.12	0.26
DJS Soft - 5	615 165 531 0	0.6-5	0.44-3.7	Green	Yellow	1/2	Hex 1/4	0.12	0.26
DJS Hard - 5	615 165 571 0	0.6-5	0.44-3.7	Green	Black	1/2	Hex 1/4	0.12	0.26
DJS Soft - 10	615 165 574 0	1-10	0.74-7.4	Red	Yellow	3/4	1/4	0.23	0.51
DJS Hard - 10	615 165 575 0	1-10	0.74-7.4	Red	Black	3/4	3/8	0.41	0.90
DJS Soft - 30	615 165 577 0	1-30	0.74-22	Blue	Yellow	3/4	3/8	0.41	0.90
DJS Hard - 30	615 165 579 0	1-30	0.74-22	Blue	Black	3/4	3/8	0.41	0.90
DJS Soft - 80	615 165 584 0	6-50	4.42-37	Purple	Yellow	1	1/2	0.75	1.65
DJS Hard - 80	615 165 587 0	10-80	7.37-59	Purple	Black	1	1/2	0.75	1.65
DJS Soft - 200	615 165 588 0	10-100	7.37-74	Grey	Yellow	1	1/2	0.75	1.65
DJS Hard - 200	615 165 589 0	20-200	14.7-147	Grey	Black	1	1/2	0.75	1.65
DJS Soft - 500	615 165 590 0	20-320	14.7-236	Black	Yellow	1 1/4	1/2	1.75	3.86
DJS Hard - 500	615 165 591 0	120-500	88.4-368	Black	Black	1 1/4	3/4	3.06	6.74
DJS 1000	615 165 572 0	300-1000	221-737			1 1/4	1	3.20	7.05

Alpha Digital Torque Tester

The ALPHA 1, 5 & 11 are designed for measuring and testing of torque controlled equipment such as wrenches, power tools or hand screwdrivers.

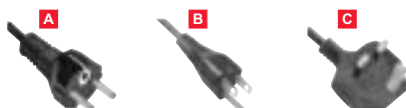
Features Overview

- Accuracy $\pm 1\%$ of reading from 20% to 100% of full scale
- Built-in torque transducer
- For all small hand tools & non impacting power tools
- Selection of two operation modes: (Track, Peak)
- Four units of torque measurements: (lbf.in, cN.m, N.m, kgf.cm)
- Four low-pass filter selections (3000, 1500, 1000 and 500 Hz)
- Battery powered with up to 10 hours of operation
- RS-232 interface to download readings in «real time»
- Large screen and easy to use menus (5 languages)



START-UP KIT to be ordered with the unit
Including: **Plug + Cable**

PLUG	PART NO.
A European	615 917 201 0
C English	615 917 202 0
B USA	615 917 203 0



ACCESSORIES INCLUDED

	PART NO
• Aluminium case	615 936 036 0
• Battery charger	615 936 031 0
• Run down adaptors kit	615 936 033 0
• RS232 cable	615 936 035 0
• Battery pack	615 936 032 0

MODEL	PART NUMBER	TORQUE RANGE		DIMENSIONS			WEIGHT				
		Nm	in.lb	WIDTH		HEIGHT	DEPTH				
				mm	in.	mm	in.	mm	in.	kg	lb.
ALPHA 1	615 935 045 0	0.11 - 1.1	1 - 10	185	7.28	50	1.97	110	4.33	2.0	4.4
ALPHA 5	615 935 046 0	0.56 - 5.65	5 - 50	185	7.28	50	1.97	110	4.33	2.0	4.4
ALPHA 11	615 935 047 0	1.13 - 11.3	10 - 100	185	7.28	50	1.97	110	4.33	2.0	4.4

Measurement Accessories



MODEL	PART NUMBER	TORQUE RANGE		INCREMENTS		OUTPUT	LENGTH		WEIGHT	
		metric	imperial	metric	imperial		mm	in.	kg	lb.
PRESET TORQUE ADJUSTABLE SCREWDRIVERS - FOR TIGHTENING										
AS-120	81892	10-120 cNm		1 cNm		1/4" fem. hex.	168	6.6	0.16	0.35
AS-600 ₁	81922	1-6 Nm		0.1 Nm		1/4" fem. hex.	184	7.2	0.34	0.75
AS-900 ₁	81942	4-9 Nm		0.1 Nm		1/4" fem. hex.	184	7.2	0.34	0.75
AS-07	91902	10-120 ozf in		1 ozf in		1/4" fem. hex.	168	6.6	0.16	0.35
AS-50 ₁	81932	5-50 lbf in		1 lbf in		1/4" fem. hex.	184	7.2	0.34	0.75

1) supplied with T bar



MODEL	PART NUMBER	TORQUE RANGE		INCREMENTS		OUTPUT	LENGTH		WEIGHT	
		metric	imperial	metric	imperial		mm	in.	kg	lb.
DIAL INDICATING TORQUE SCREWDRIVERS - FOR MEASURING + TIGHTENING										
TS-050	81852	0-50 cNm	0.70 ozf in	2 cNm	5 ozf in	3/8" fem. hex.	178	7.0	0.2	0.44
TS-100	81862	0-100 cNm	0.140 ozf in	5 cNm	10 ozf in	3/8" fem. hex.	178	7.0	0.2	0.44
TS-250 ₁	81872	0-250 cNm	0.20 ozf in	10 cNm	1 lbf in	1/2" fem. hex.	250	9.8	0.5	1.10
TS-500 ₁	81882	0-500 cNm	0.40 ozf in	20 cNm	2 lbf in	1/2" fem. hex.	250	9.8	0.5	1.10

1) supplied with T bar



MODEL	PART NUMBER	TORQUE RANGE		INCREMENTS		OUTPUT	LENGTH		WEIGHT	
		metric	imperial	metric	imperial		mm	in.	kg	lb.
DIAL INDICATING TORQUE WRENCHES - FOR MEASURING + TIGHTENING										
TW-4	81962	0.3-4 Nm	3-35 lbf in	0.1 Nm	1 lbf in	1/4" sq.	255	10	0.52	1.15
TW-13	81972	0.5-13.5 Nm	4-120 lbf in	0.5 Nm	2 lbf in	3/8" sq.	255	10	0.52	1.15
TW-27	81982	1-27 Nm	1-20 lbf in	1 Nm	0.5 lbf ft	3/8" sq.	255	10	0.52	1.15
TW-80	81992	6-80 Nm	5-60 lbf ft	2 Nm	1 lbf ft	1/2" sq.	455	18	1.36	3.0
TW-160	82002	10-160 Nm	6-120 lbf ft	2.5 Nm	2 lbf ft	1/2" sq.	535	21	1.36	3.0

Cable for Connecting Measuring Units & Transducers

CABLE TYPE	DATA COLECT SIDE <-> TRANS SIDE	DATA COLLECTOR TYPE	FOR TRANSDUCER	LENGTH	PART NUMBER
Analog	6 pins <-> 6 pins	Sigma 2001, Delta 4/5000	AWT + ART4	2m (78.7") long	615 917 251 0
Analog	6 pins <-> 6 pins	Sigma 2001, Delta 4/5000	AWT + ART4	5m (196.8") long	615 917 252 0
Analog	6 pins <-> 6 pins	Sigma 2001, Delta 4/5000	AWT + ART4	2m (78.7") long, spiral	615 917 253 0
Analog	12 pins <-> 6 pins	Delta 5000	AWT + ART4	2m (78.7") long	615 917 254 0
Analog	12 pins <-> 6 pins	Delta 5000	AWT + ART4	2m (78.7") long, spiral	615 917 255 0
Digital	Push pull <-> 12 pins	All types of Sigma & Delta	DRT / DWT / DST	2m (78.7") long	615 917 430 0
Digital	Push pull <-> 12 pins	All types of Sigma & Delta	DRT / DWT / DST	2m (78.7") long, spiral	615 917 432 0
Digital	Push pull <-> 12 pins	All types of Sigma & Delta	DRT / DWT / DST	5m (196.8") long	615 917 433 0

DeltaPC Software

“to make your monitoring operations easier”

This software, which is compatible with Windows™, enables connection of torque or torque and angle measuring equipment in the Sigma and Delta range.

Its user-friendly design makes it possible to program complete flowcharts of measurement sequences just by copying and pasting or clicking on icons.

Main software functions:



Common to all the Sigma and Delta control boxes

‘Standard’ version of the software

- recovery and display of tightening results
- treatment of results in accordance with ISO, NF, Q544000 and CNOMO standards
- memorising the results and export to databases (ASCII)
- complete recovery of the control box parameters
- multi-language

Specific to Delta control boxes

‘Advanced’ version of the software

- all the functions of the ‘Standard’ version +
- recovery and display of the tightening curves
- management of the periodical control of fastening tools
- programming control operations
- programming control sequences



DESCRIPTION	PART NUMBER	DESCRIPTION	PART NUMBER
Standard version		Advanced version	
1 installation	615 927 529 0	1 installation	615 927 520 0
5 installations	615 927 530 0	5 installations	615 927 532 0

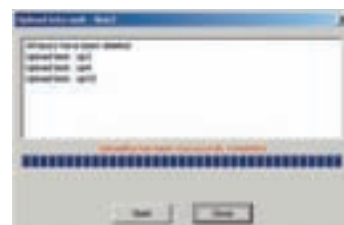
RS232 cable between control box and PC not supplied with the software – Part Number: 615 917 047 0

DOWNLOADING between controller and PC:

Controller => PC

With just one click, you can:

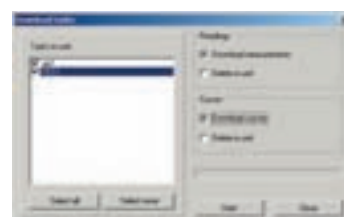
- select one or more operations
- recover the control operations from the control boxes
- recover the results and tightening curves



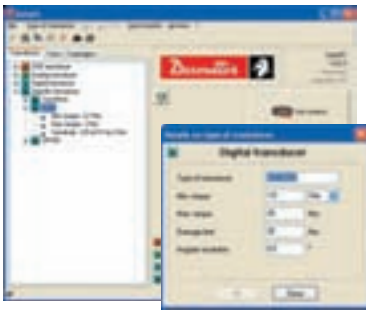
PC => Controller

You can download to the control boxes

- one or more operations
- a control flowchart



Functions



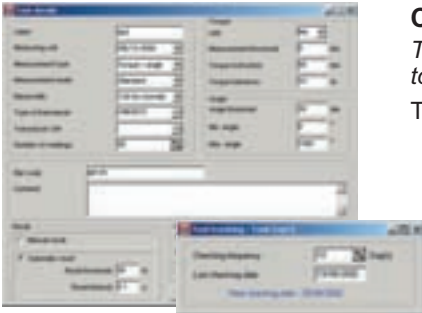
PROGRAMMING

'Torque' or 'torque and angle' transducers for analogue and digital signals

Select the better transducer for your control operation.

- by selecting a standard transducer in the range, you can display all its characteristics
- you can associate the serial numbers of your transducers with the table of parameters
- you can also define your own* 'specific' transducers with their own characteristics

* provided that they are based on a strain gauge technology.



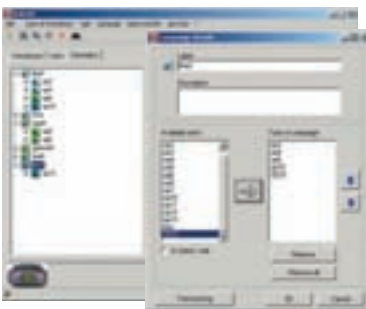
Control operation: 'A checking tool'

To ensure that the fastening tools on the assembly line continue to tighten to the right torque level.

The software makes it easy to programme all the parameters required for the control:

- the type of transducer
- the number of measurements to be made
- the settings and tolerances
- the triggering thresholds for acquisition of the tightening curves
- etc...

With just one click, the operation is downloaded to the control box.



Campaign 'Designed to manage your monitoring operations'

A control campaign is made up of a range of monitoring operations on the assembly line.

With just a click in the list of operations, you can set up your own control campaign.

The Delta control box then manages the sequence of operations.

With another click, the range is downloaded to the measurement control box.

Presentation of RESULTS

Torque or torque and angle results

After each operation or campaign, the operator can transfer all the results.

He or she can display them and select the desired columns, sort them by type of report, and scroll them on the screen.

All the results can be exported to a database; the format is of ASCII type.

Tightening curves

The software can display from ONE to FOUR tightening curves at the same time.

Type of curves:

- torque as a function of time $f(t)$
- torque and angle as a function of time $f(t)$
- torque as a function of angle $f(\text{angle})$

it is possible to:

- zoom in on all or part of one or more curves
- move the curves along the X axis
- calculate a running average for N points (N=3,5,7 or 9)
- archive them
- print them

Statistic

This software could calculate statistics for torque or angle results.

These calculations are carried out under the current standards (ISO, NF, Q544000 and CNOMO).

Results displayed:

- statistical report with CP, CPK, CAM, - ratio of change, average, range deviation...
- display of the scatter diagram
- histogram
- control charts

Printing of the full statistical report.

