KOLVER
The easy solution

TORQUE TESTER

mini K1/S
mini K5/S
mini K20/S
mini Ke/S

OPERATOR'S HANDBOOK

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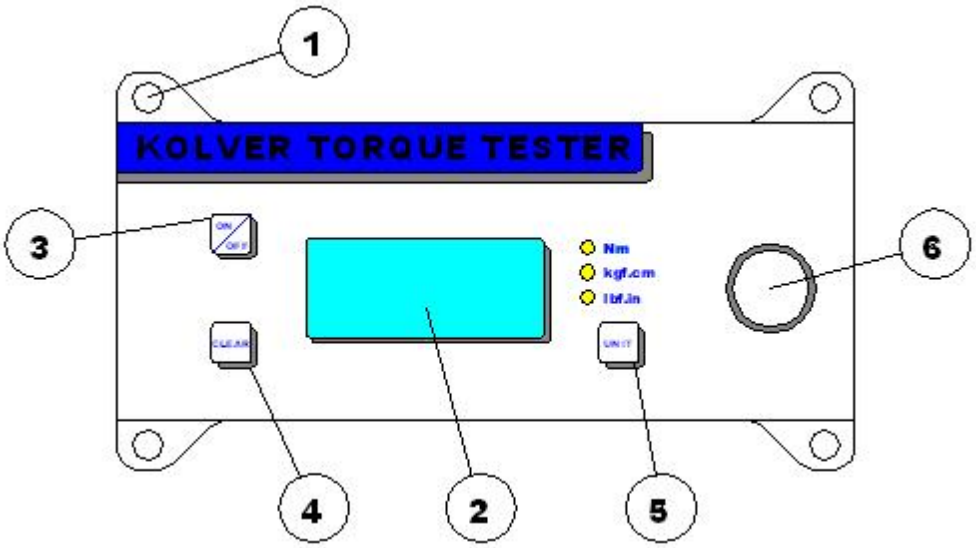
1. APPLICATIONS

Recommended for all hand screwdrivers, wrenches, or power tools.

2. FEATURES

Model	Torque range Nm	Accuracy
miniK1/S	0,05 – 1	± 1 cNm
miniK5/S	0,3 – 5	± 2 cNm
miniK20/S	0,5 – 20	± 3 cNm
minike/5/S	0,5 - 5	± 3 cNm
minike/25/S	2 - 25	± 10 cNm
minike/50/S	5 - 50	± 10 cNm

- Built-in transducer to measure on joint simulator.
- External transducer (**miniKe**).
- Three units of torque measurements: Nm, Kgf.cm, lbf.in.
- Battery powered (9V) and AC adapter cord. 9V batteries provide 20 hours of continuous operation.
- Manual and auto reset functions to clear displayed values.
- Automatic shut down.
- Better performances on hard joint
- Correction factor (FATC): to connect more ext. transducers on the same tester.
- RS232C serial port as option with date and hour.
- Certificate of calibration.



3. DESCRIPTION

1. Mounting holes
2. Display 4 digit / 8 lines
3. "ON/OFF" key : press for 3 seconds to switch tester on or off
4. "CLEAR" key : press to reset the displayed value
5. "UNIT" key : press to select the unit of torque measurements
6. Internal transducer or port for external transducer

4. MOUNTING

It is strongly recommended securing the tester through slots "1" to a workbench before operating. Immobilizing the tester when checking torque values over 1 Nm is critical for the safety the operator as well as for the accuracy of torque measurements during operation.

5. JOINT SIMULATOR

The Joint Simulator (JS) consists of a screw compressing a series of washers. The way the washers are mounted can simulate soft or hard joint. The screw comes with a ¼" hex male head for proper fit to any ¼" hex female screwdriver drive. Hardened thread components increase accuracy and life. Since a joint simulator cannot duplicate actual joints, the torque values displayed on the minik may vary from the actual torque that a screwdriver will apply to the actual assembly.

When critical applications are involved, we recommend to verify the torque output of the power tool being used on the actual assembly through an external transducer.
Minik1 is supplied with a built-in joint simulator.

NB. We recommend to grease the JS each 1000 cycles.

6. STARTING AND OPERATING THE TESTER

1. Immobilize the tester when checking torque values over 1 Nm. This is critical for the safety the operator as well as for the accuracy of torque measurements during operation.
2. Switch the tester on pushing the ON/OFF key.
If used only with battery check its status. If the tester does not switch on or the display is not clear enough, please replace the battery. When used it the AC adapter, this will disable the battery. The battery is not rechargeable. The display will show the main screen:

3. Insert the joint simulator into its 13mm hex seat and make sure the screw is in its upper position (if not run the driver anticlockwise to unscrew it). The tester is ready for a measuring cycle.
In minik1, only unscrew before measuring.
4. Run the joint simulator screw all the way down until it stops and read the torque value on the display. Run the screw up to be ready for the next cycle.
5. Press the “ON/ESC” key for 3 seconds to switch the tester off. The tester features a built-in auto shut off mode function to save power when not in use. If there is no activity for 3 minutes, such as key press or no torque input, the tester will shut down. To restore power press the “ON/ESC” key for 3 seconds

NB. Before starting, always check that the screen displays 0.000. Instead push CLEAR.

7. SELECTING THE UNIT

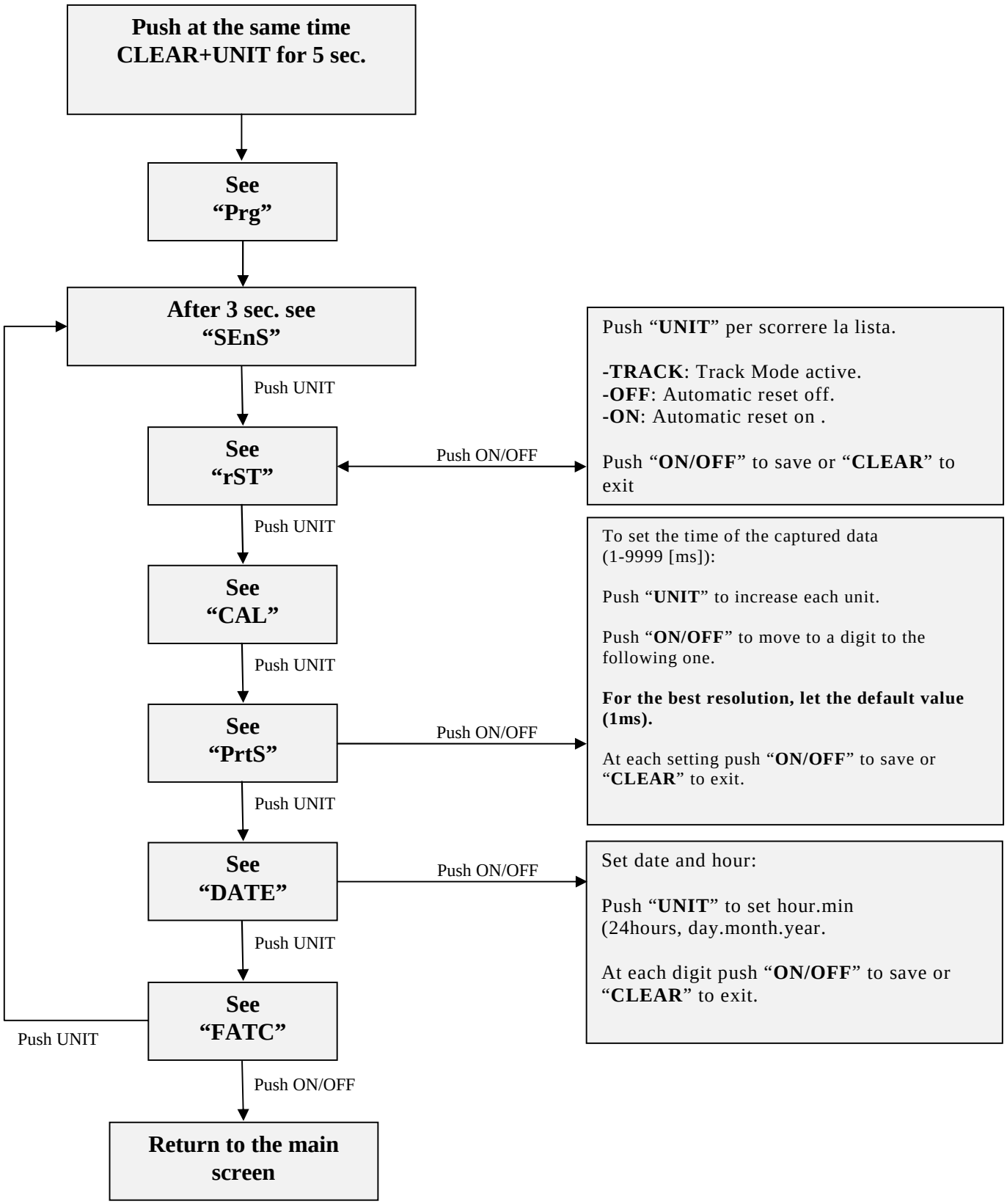
***MEASURING UNIT*:** Nm, kgf.cm and lbf.in

To change unit: press **Unit** key until the desired unit has been selected.
Each unit is indicated by a LED of different color: red for Nm, green for kgf.cm and yellow for lbf.in .

8. SELECTING MANUAL OR AUTO RESET

The flow chart below shows how to select **Manual** or **Auto Reset**.
Sens, Cal and **Fatc** functions (sensitivity, calibration and correction factor) can be modified only by authorized personnel.

When you select **Manual Reset “Coff”**: you need to push “CLEAR” to remove readings from the display and reset all values to zero.
When you select **Auto reset “Con”**: any new measure will replace the previous one without resetting the value to zero.


Push at the same time
CLEAR+UNIT for 5 sec.
See
“Prg”
After 3 sec. see
“SEnS”
Push UNIT
See
“rST”
Push ON/OFF
Push “UNIT” per scorrere la lista.
-TRACK: Track Mode active.
-OFF: Automatic reset off.
-ON: Automatic reset on .
Push “ON/OFF” to save or “CLEAR” to exit
Push UNIT
See
“CAL”
Push UNIT
See
“PrtS”
Push ON/OFF
To set the time of the captured data
(1-9999 [ms]):
Push “UNIT” to increase each unit.
Push “ON/OFF” to move to a digit to the following one.
For the best resolution, let the default value (1ms).
At each setting push “ON/OFF” to save or “CLEAR” to exit.
Push UNIT
See
“DATE”
Push ON/OFF
Set date and hour:
Push “UNIT” to set hour.min
(24hours, day.month.year.
At each digit push “ON/OFF” to save or “CLEAR” to exit.
Push UNIT
See
“FATC”
Push UNIT
Push ON/OFF
Return to the main screen

9. EXTERNAL TRANSDUCER for miniKe

The minike readouts support an external rotary or non rotary transducer. The minike can read torque up to 500 Nm. The external transducer must be calibrated together with the minike here at Kolver before shipment. The following transducers are always available ex stock:

Model	**Torque range Nm**
KTE5	0.5 – 5.0
KTE25	2.0 – 25.0

Rotary and non rotary transducers for lower or higher torque ranges available on request.

10. SERIAL PRINT (on request)

It is possible to print the results through the serial port placed near the power supply connector.
The serial print has the following settings:
VALUE - UNIT OF MEASUREMENT - TIME (hour; min; sec) – DATE (day/month/year)

Example of serial print:

0,247 Nm 14:07:27 30/05/2011
0,249 Nm 14:07:30 30/05/2011

PIN		**FUNCTION**
2	TX	Serial transmission
5	GND	0Vdc

0,255 Nm 14:07:33 30/05/2011
0,254 Nm 14:07:36 30/05/2011
0,249 Nm 14:07:39 30/05/2011
0,255 Nm 14:07:42 30/05/2011
0,247 Nm 14:07:45 30/05/2011

11. MAINTENANCE

The minike testers are maintenance free. The electronics and the internal transducers have no wearing parts except the battery once its charge is over. The internal transducer should be calibrated every 12 to 30 months, depending on the frequency of use.
WARNING: The overload protection of the internal transducer is limited to 125% of nominal value. Damages due to overloading will result in inaccurate readings and will not be covered by our warranty.

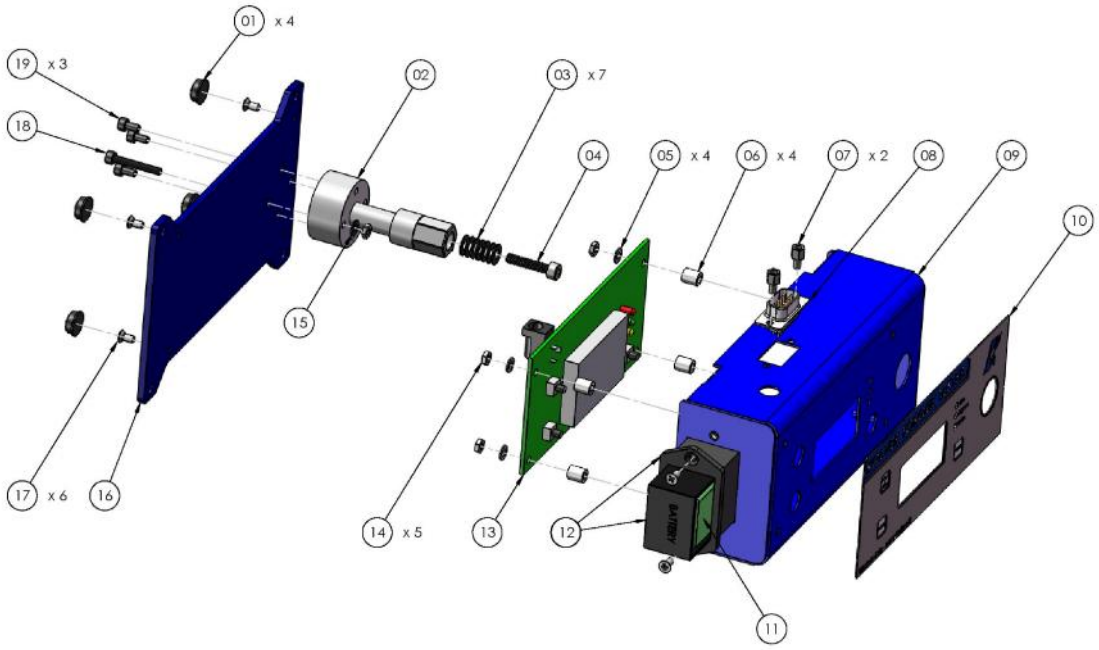
12. WARRANTY

1. This KOLVER product is guaranteed against defective workmanship or materials, for a maximum period of 12 months following the date of purchase from KOLVER, provided that its usage is limited to single shift operation throughout that period. If the usage rate exceeds of single shift operation, the guarantee period shall be reduced on a prorata basis.
2. If, during the guarantee period, the product appears to be defective in workmanship or materials, it should be returned to KOLVER or its distributors, transport prepaied, together with a short description of the alleged defect. KOLVER shall, at its sole discretion, arrange to repair or replace free of charge such items.
3. This guarantee does not cover repair or replacement required as a consequence of products which have been abused, misused or modified, or which have been repaired using not original KOLVER spare parts or by not authorized service personnel.
4. KOLVER accepts no claim for labour or other expenditure made upon defective products.
5. Any direct, incidental or consequential damages whatsoever arising from any defect are expressly excluded.
6. This guarantee replaces all other guarantees, or conditions, expressed or implied, regarding the quality, the marketability or the fitness for any particular purpose.

7. No one, whether an agent, servant or employee of KOLVER, is authorized to add to or modify the terms of this limited guarantee in any way. However it's possible to extend the warranty with an extra cost. Further information at kolver@kolver.it

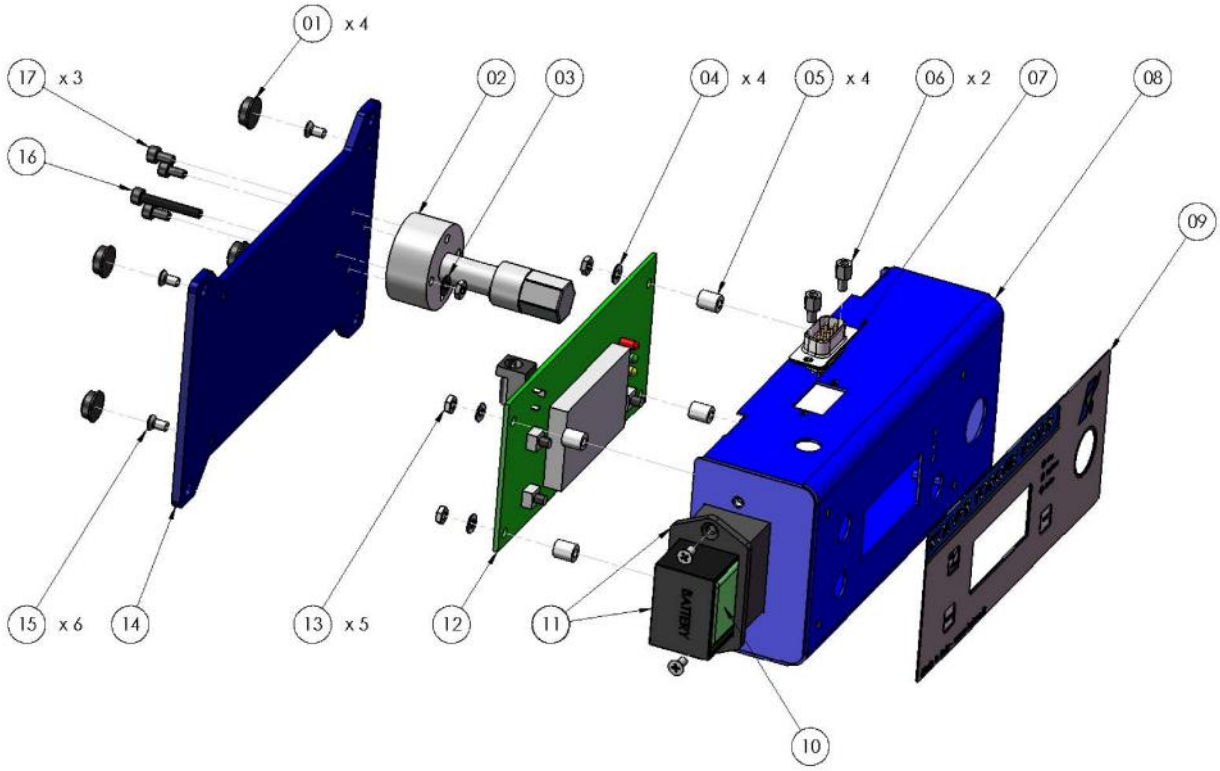
12. EXPLODED VIEWS AND PART LISTS

Minik1/S



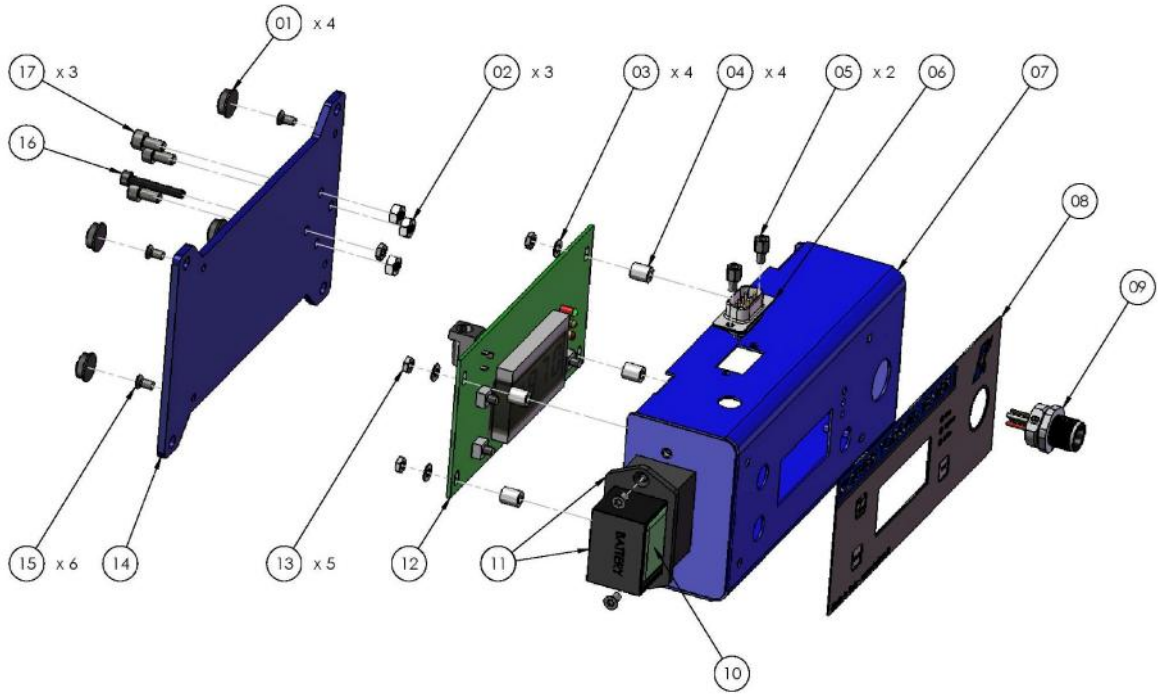
REF	DESCRIPTION	CODE
1	Plastic support (4 pcs)	800016
2	Internal transducer 1Nm (miniK1)	240505
3	Washer M4 (7 pcs)	241015
4	Screw M4 x 20	241014
5	Flat washer M3 (4 pcs)	800042
6	Nut 6,3 mm (4 pcs)	241003
7	Nut M3 (2 pcs)	872453
8	Serial connector M	890005
9	Metal housing miniK../S	240001/BCS
10	Membrane miniK	241008
11	Battery 9V not rechargeable	241010
12	Battery seat miniK	241005
13	Board miniK + display	241002/N
14	Screw M3 (5 pcs)	800056
15	Washer M3	800041
16	Base miniKe	240001/BF2
17	Screw M3 x 6 TSP (6 pcs)	210068
18	Screw M3 x 22	241012
19	Screw M4 x 8 (3 pcs)	241011
	Bit - hex 1/4", L=50 mm, diam. 4 mm	FE-13040
	Case	241000
	Power supply 12V	241009/N

minik5/S – minik20/S



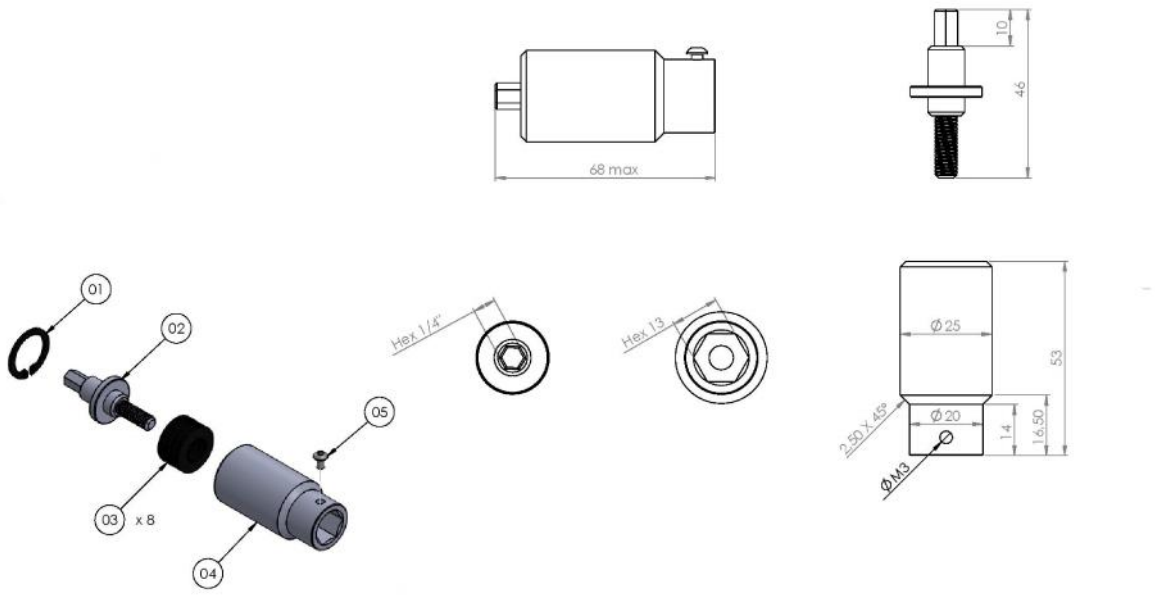
REF	DESCRIPTION	CODE
1	Plastic support (4 pcs)	800016
2	Internal transducer 5Nm (miniK5)	240503
	Internal transducer 20Nm (miniK20)	240504
3	Washer M3	800041
4	Flat washer M3 (4 pcs)	800042
5	Nut 6,3 mm (4 pcs)	241003
6	Nut M3 (2 pcs)	872453
7	Serial connector M	890005
8	Metal housing miniK../S	240001/BCS
9	Membrane miniK	241008
10	Battery 9V not rechargeable	241010
11	Battery seat miniK	241005
12	Board miniK + display	241002/N
13	Screw M3 (5 pcs)	800056
14	Base miniKe	240001/BF2
15	Screw M3 x 6 TSP (6 pcs)	210068
16	Screw M3 x 22	241012
17	Screw M4 x 8 (3 pcs)	241011
	Joint simulator M6 (miniK5)	240600
	Joint simulator M8 (miniK20)	240800
	Case	241000
	Power supply 12V	241009/N

Minike/xx/S



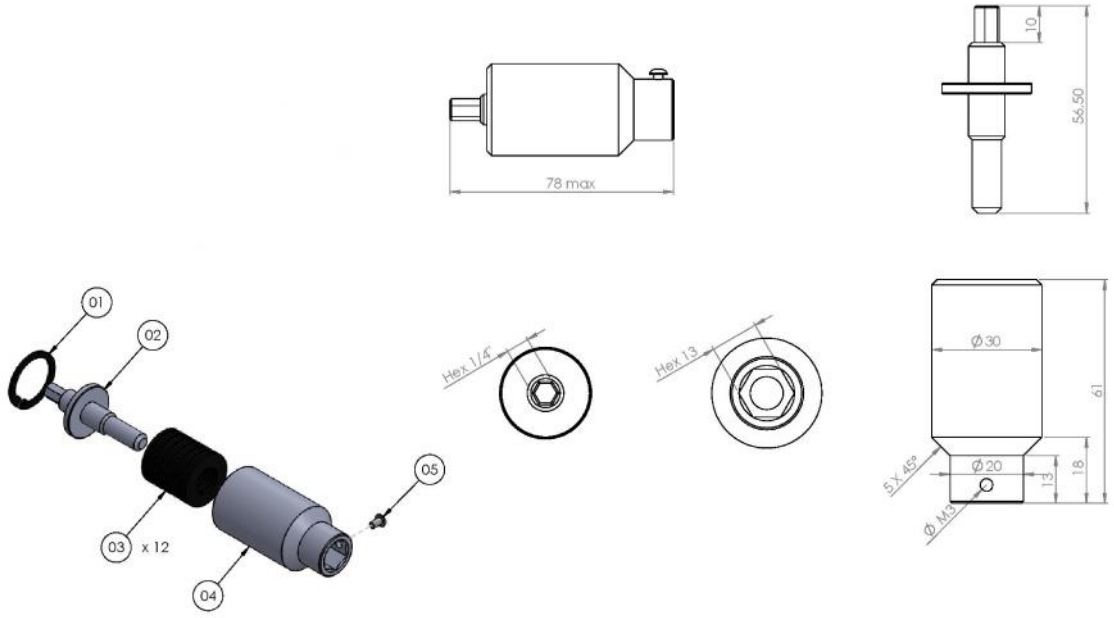
REF	DESCRIPTION	CODE
1	Plastic support (4 pcs)	800016
2	Washer M3	800041
3	Flat washer M3 (4 pcs)	800042
4	Nut 6,3 mm (4 pcs)	241003
5	Nut M3 (2 pcs)	872453
6	Serial connector M	890005
7	Metal housing miniK../S	240001/BCS
8	Membrane miniK	241008
9	Connector M 5 pin	231666
10	Battery 9V not rechargeable	241010
11	Battery seat miniK	241005
12	Board miniK + display	241002/N
13	Screw M3 (5 pcs)	800056
14	Base miniKe	240001/BF2
15	Screw M3 x 6 TSP (6 pcs)	210068
16	Screw M3 x 22	241012
17	Screw M4 x 8 (3 pcs)	241011
	Case	241000
	Power supply 12V	241009/N

M6 (code 240600)



Pos.	Description	Code
01	Seiger	240601
02	Joint shaft	240602
03	Washer spring (8)	240603
04	Joint housing	240604
05	Screw M3x5	872443/ZN

M8 (code 240800)



Pos.	Description	Code
01	Seiger	240801
02	Joint shaft	240802
03	Washer spring (12)	240803
04	Joint housing	240804
05	Screw M3x5	872443/ZN

DECLARATION OF CONFORMITY

CE

KOLVER S.r.l.
VIA MARCO CORNER, 19/21
36016 THIENE (VI) ITALIA

Declare that the new tool here described: Torque tester:

mini K1/S	021402/S	**Mini KE/5/S**	021405/5/S
Mini K5/S	021403/S	**Mini KE/25/S**	021405/25/S
Mini K20/S	021404/S	**Mini KE/50/S**	021405/50/S

Is in conformity with the following standards and other normative documents: 2006/42/CE, 2006/95/CE, 2004/108/CE, EN 60745-1, EN 60204-1, EN 61000-6-1, EN 61000-6-3.
It is also in conformity with RoHS II normative.

Name: Giovanni Colasante
Position: General Manager
Person authorized to compile the technical file in Kolver

Thiene, January 1st 2017

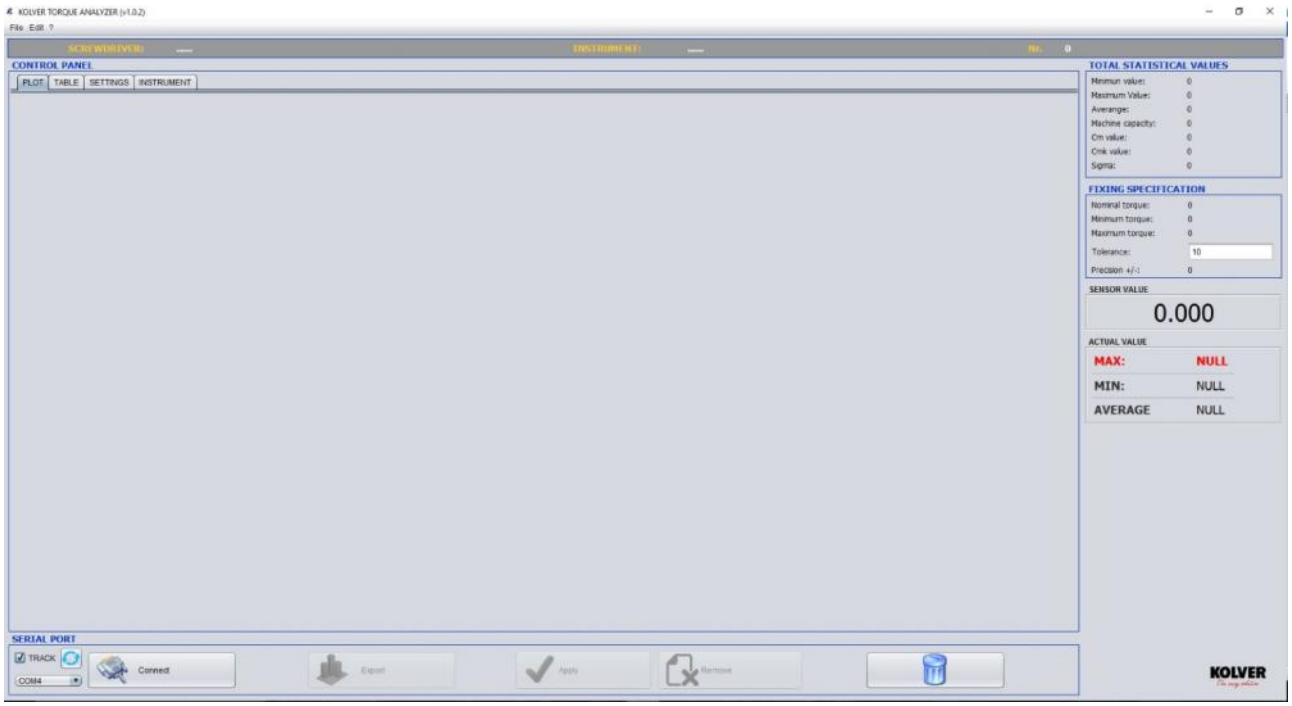
Giovanni Colasante

KOLVER TORQUE ANALYZER

Torque Analyzer software allows for communication between our mini k/s and mini ke/s series torque testers and your PC. Torque Analyzer software allows the capture of torque measurements directly from the torque tester including track mode, graphic display readings, and the real-time calculation of the machine capacity represented by Cm and Cmk dat0061.

1. INSTALLATION

Torque Analyzer is a plug-and-play software.
Just launch the "**Kolver_Torque_Analyzer_ver1_0_1.exe**".



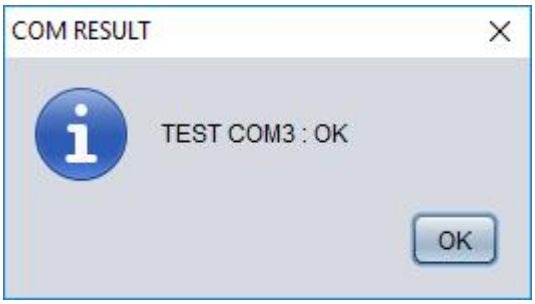
1: Kolver_Torque_Analyzer_ver1_0_1 software main screen

The home page is made of three sections:

1- "**Control Panel**": to display results, graphics, tables, setting and info of the tester.
2- "**Report"**: to display values (max, min, cm, cmk, in total, in real time...etc.)
3- "**Interface"**: connection, modification and export of data.

2. CONNECTION TO MINIK/S

Connect the minik/s to your pc through the serial/usb port. Then push the Connect button.
The software will display the correct connection (see Picture 2).
Unless it will show the error and how to proceed.



2 :Output of correct connection.

3. TORQUE VALUE CAPTURE

How to capture the torque values:

1- Track Mode: it allows to capture and display the trend of the torque signal given by the mini k.

2- Max Value Mode: it allows to capture and display the max torque value given by the mini k.

The mode must be set on the mini k: on the main screen flag or not the Track option.
However, Torque Analyzer has been designed to automatically align the receipt of the first measure by detecting the capture mode set in mini k.

Picture 3: To flag Track mode.

4. DISPLAY AND SETUP

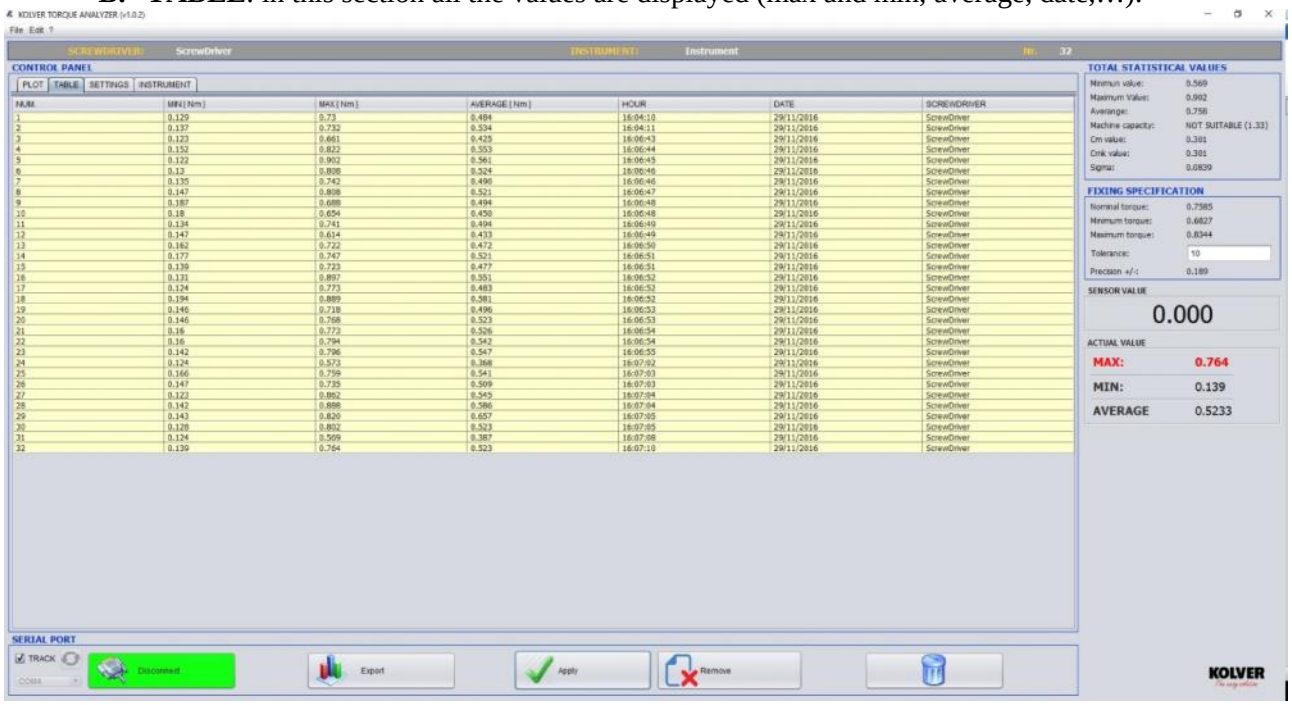
"**Control Panel**" area has 4 sections:

A. GRAPHIC: This section allows to display the graphics of the values (See picture 3).
There is also the possibility to zoom on specific areas.

Two types of visualizations:
1- '**X-Y Plot**' : temporal visualization of values.
2- '**Bar Plot'** : bar visualization of values.

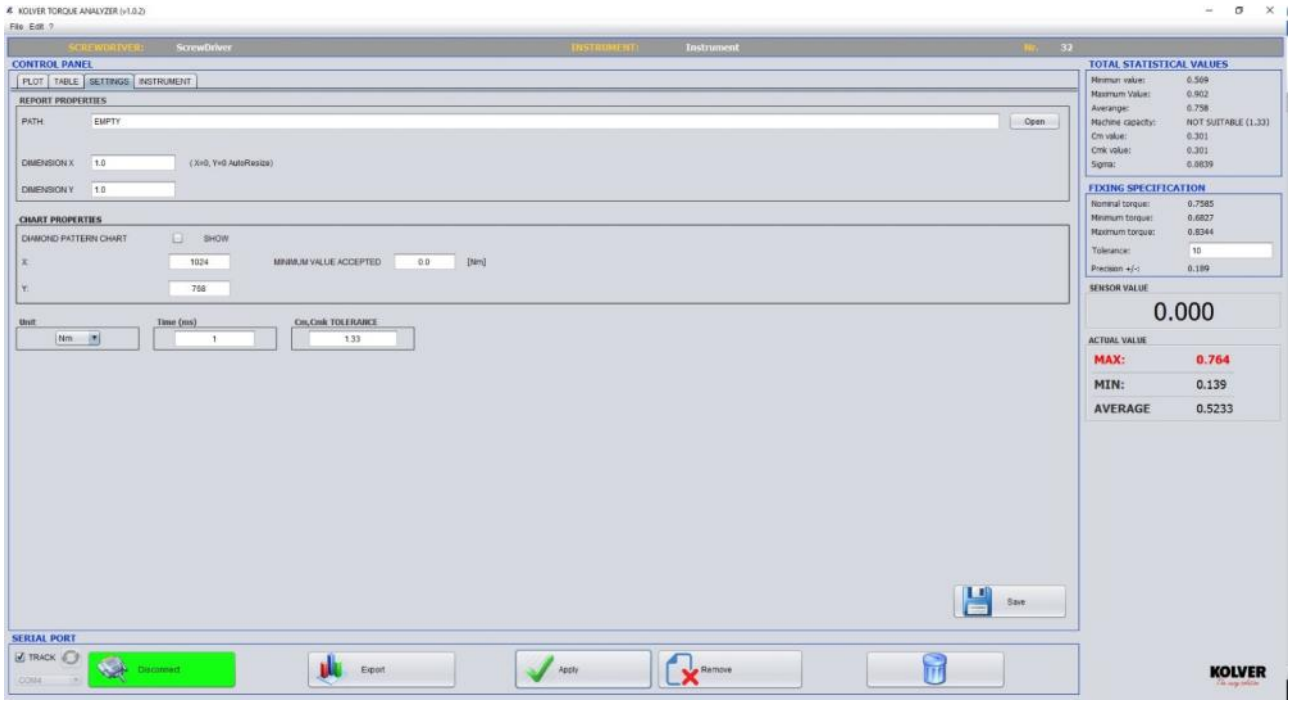
Type of visualization can be set from the menu:
Edit ➔ Modify ➔ Chart.

B. TABLE: in this section all the values are displayed (max and min, average, date,…).



Picture 4 : "TABLE" section; 10 values.

C. SETTINGS: Setting section (reports, graphics, date, torque tester info).



Picture 5 : "SETUP"Section

1- REPORT

- **Path:** path to search the image file to enter in the head of the report.
  We suggest to upload images not bigger than 240x240 pixels.

- **Dimension X:** Value of adaptation along the X axis of the uploaded image.

- **Dimension Y:** Value of adaptation along the Y axis of the uploaded image.

2- GRAPHIC FEATURE

-Diamond pattern chart: in Track mode, it allows the visualization of points of interpolation of captured values.

-X: width in pixels of the uploaded image.
-Y: height in pixels of the uploaded image

-Min value accepted: Min value captured and accepted by the software.

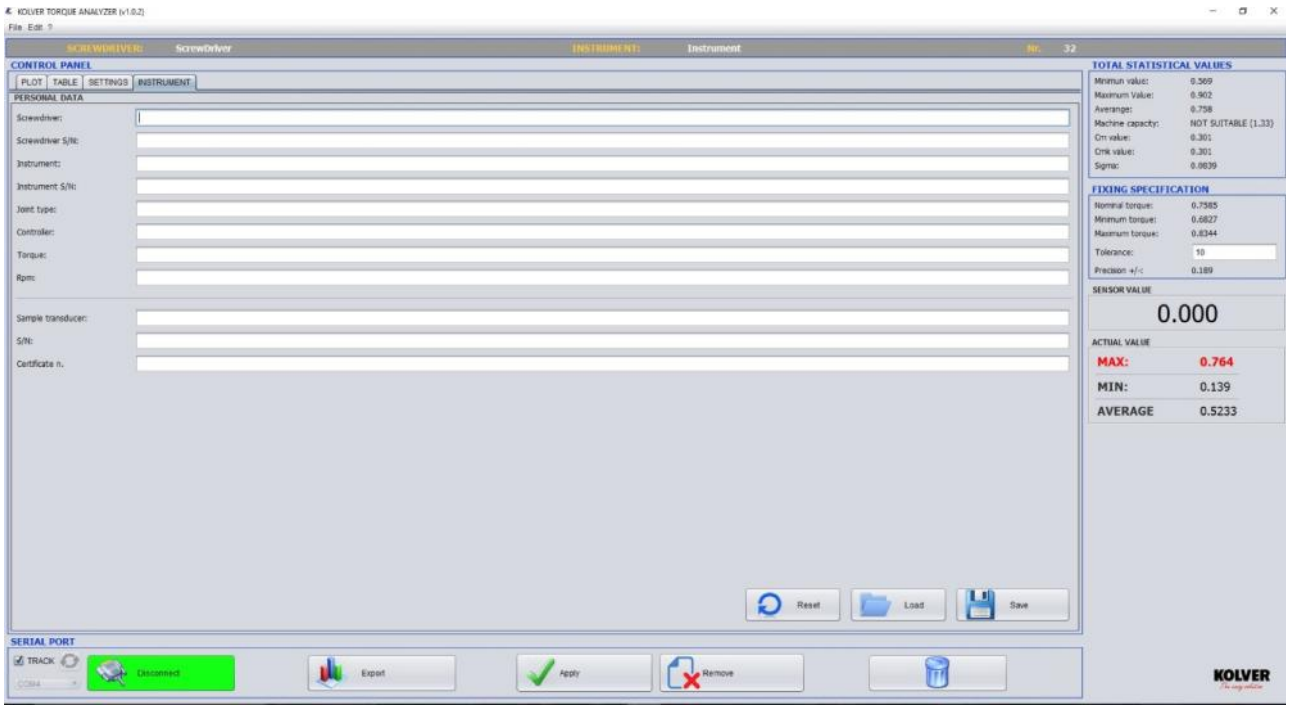
3- UNIT AND TIME

-Unit: it allows to choose between the following units of measurements: **Nm, lbf.in and kgf.cm**

-Time (ms): it allows to set the time of samples.
However, once connected, Torque Analyzer has been designed to automatically read the value set in the mini k and align to it.

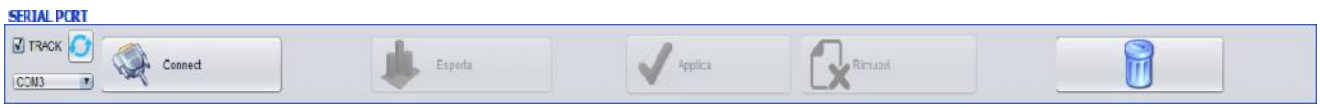
It's also possible to save the set up data pushing **Save** and keep the same setting for the next sessions.

D. TORQUE TESTER: in this section it is allowed to enter all the data of the mini k.



Picture 6 : "TESTER" section.

5. RESULTS: MODIFICATION AND EXPORT



Picture7 : Connection, data capture, export.

A- MODIFICATION

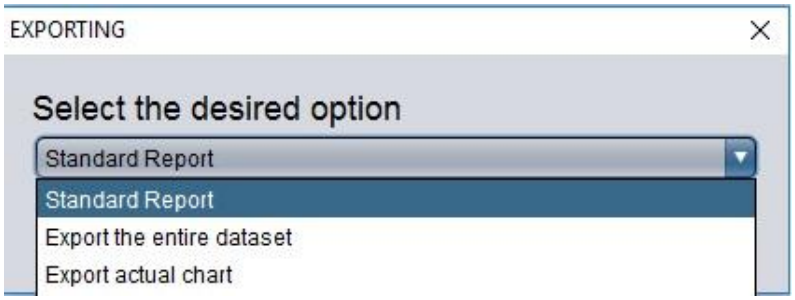
It’s possible to modify or delete one or more captured data (see picture 7).

- **Removal**: in the “**TABLE**” section of the Control Panel, select one or more rows to be deleted. Then push “Delete” to confirm.
  To delete all the data, push the basket icon, then confirm.

- **Modify**: in the “**TABLE**” section of the Control Panel, position the cursor on the cell to modify, double click, enter the data and puch Apply to confirm.
  In case of any error, they won’t be considered and the value will remain the same. In case of typing error, in the Menu ➔File ➔ Go back.

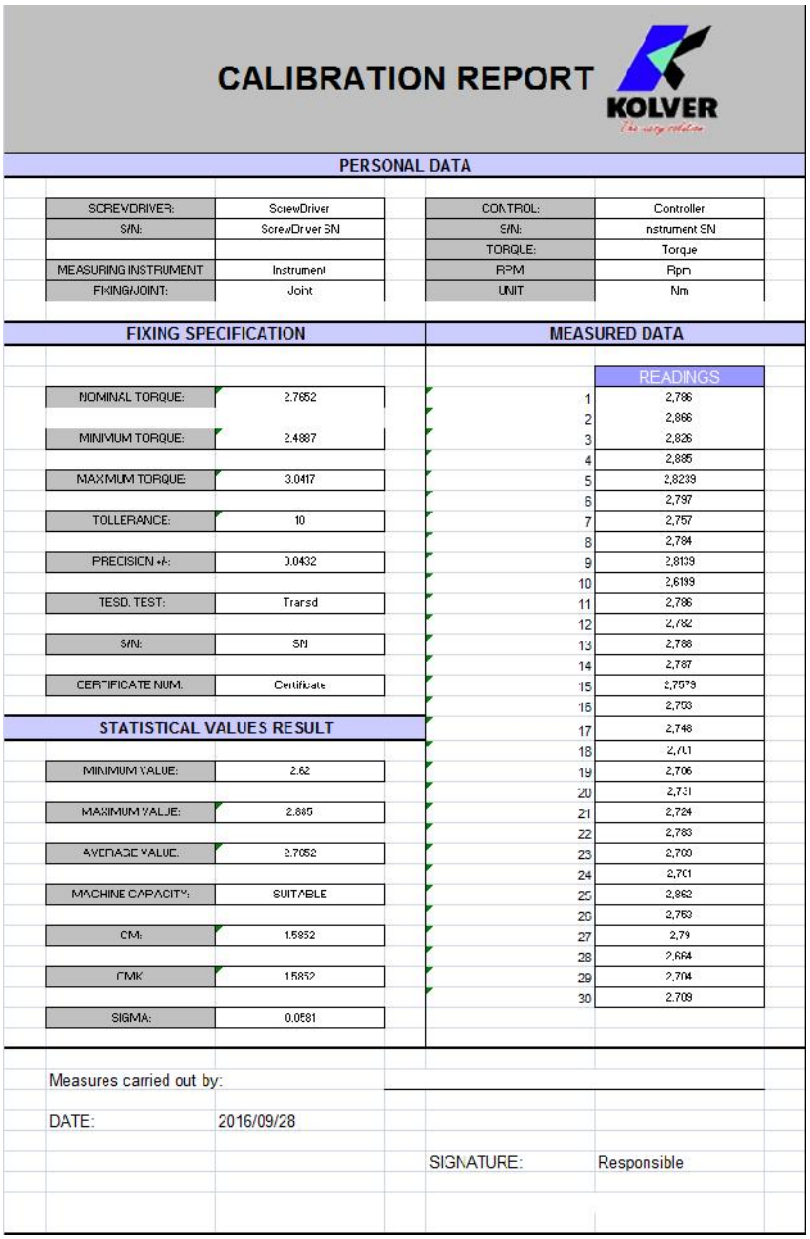
B- EXPORT

While pushing “**Export**”, it will be displayed a window to select how to export the results (see Picture 8).



Picture 8 : To select how to export

-Standard Report: it allows to export a standard report including 30 values max, Cm, Cmk and all the feature of the tester used (see picture 9).



CALIBRATION REPORT

KOLVER

PERSONAL DATA

SCREWDRIVER:	ScrewDriver	CONTROL:	Controller
S/N:	ScrewDriver SN	S/N:	nstrument SN
		TORQUE:	Torque
MEASURING INSTRUMENT	Instrument	RPM	Rpm
FIXING/JOINT:	Joint	UNIT	Nm

FIXING SPECIFICATION

NOMINAL TORQUE:	2.7652
MINIMUM TORQUE:	2.4887
MAXIMUM TORQUE	3.0417
TOLLERANCE:	10
PRECISION +/-:	0.0432
TESD. TEST:	Transd
S/N:	SN
CERTIFICATE NUM.	Certificate

STATISTICAL VALUES RESULT

MINIMUM VALUE:	2.62
MAXIMUM VALUE:	2.885
AVERAGE VALUE:	2.7052
MACHINE CAPACITY:	SUITABLE
CM:	1.5852
CMK	1.5852
SIGMA:	0.0581

MEASURED DATA

	READINGS
1	2,786
2	2,866
3	2,826
4	2,885
5	2,8239
6	2,797
7	2,757
8	2,784
9	2,8139
10	2,6199
11	2,786
12	2,782
13	2,788
14	2,787
15	2,7979
16	2,703
17	2,748
18	2,701
19	2,706
20	2,731
21	2,724
22	2,783
23	2,709
24	2,701
25	2,862
26	2,763
27	2,79
28	2,664
29	2,704
30	2,709

Measures carried out by:

DATE: 2016/09/28

SIGNATURE: Responsible

Picture 9 : Standard Report

-Complete set of values: it allows to export a complete set of captured values and the graphics of the results.
-Export current graphic: it allows to export any value in Graphic section of the Control Panel. For the resolution of the image see SETTING chapter.

6. REPORT AREA

In this section, it will be displayed the statistics results of all the values including the instantaneous data. In particular:

-Max value: max value of torque acquired
-Min value: min value of torque acquired (only in Track mode).
-Average value: average value of torque acquired (only in Track mode).

-Cm: value that indicates the machine capacity or process within the tolerance range.
-Cmk: value that indicates the machine capacity or process within the tolerance range of the nominal torque value. A high Cmk indicated the the machine or the has a low dispersion, and is well centered in the middle of the range of tolerance.
-Capacity: it indicates if the process f measurement is suitable or not.

Cm, Cmk ≥ 1.33 ➔ SUITABLE

Cm, Cmk < 1.33 ➔ NOT SUITABLE

There is the possibility to modify the index of tolerance to check the capacity (default=1.33): in "**SETTINGS**", set the desired value in "**TOLERANCE Cm,Cmk**".

-**Nominal Torque (Cn):** average torque value
-**Max torque:** Cn+Tolerance(Cn)%
-**Min torque:** Cn-Tolerance(Cn)%

- **Sensor value:** torque value given from the mini k.
-**Current values:** values referred to the last one acquired.

7. LANGUAGE

Three languages available: English, French and Italian.
To change the language, in the menu push on Edit ➔Language.