DOGA®
Productive solutions

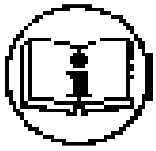
Torque Testers
EZ2 Smart V4
EZ10 Smart V4
EZ20 Smart V4

SERVICE MANUAL

IMPORTANT

The tool delivered with this manual may have been modified for specific needs.
In that case, please give us the tool code number written on our shipping note or the approximate tool delivery date when you place an order for a new similar tool or for spare parts.
In that way, you will be sure to get the required tool and/or spare part.

WARNING



This information has to be kept in a location know by all users.

Each operator has to read carefully this manual before installing, using, and mending the product.

Be sure that the operator has understood using recommendations and the meaning of signs put on the product.

Most accidents could be avoided respecting this Manual Instructions. As a matter of fact, they were created according to European laws and norms regarding products.

In each case, please respect and follow safety national norms. Do not take off nor damage the stickers or advise put on the product and above all the details imposed by the law.

SUMMARY

1) Tester Description

This product is dedicated to the Torque measurement of a fastening tool. It is necessary to use a fastening joint for electric or pneumatic screwdrivers in order to take into account the motor rotation speed.

1.1. Basic functionalities

1) Display 2 lines of 16 characters
2) Key “On/Off”
3) Key “Esc/RESET”
4) Menu keys
5) Parameter keys
6) Integrated transducer
7) Battery status indicator
8) 5 Way socket for external transducer
9) “Mini / OK / Maxi” limits state
10) USB Type B. (Charging & Print out)

Working principle:

The unit is based around a 72 MHz RISC microcontroller which can analyse the Torque signal every 20 micro seconds. These Torque signals are filtered with a Bessel filter to preserve the shape of the signal. The Torque signal is analysed by the microcontroller using different algorithms for the different measure modes and the values displayed on the OLED screen. Set up is via a membrane keypad giving navigation through a tree structure menu.

The different models:

EZ2 SMART – For Torque measurement up to 2Nm
EZ10 SMART - For Torque measurement up to 10Nm
EZ20 SMART – For Torque measurement up to 20Nm

1.2. Technical features

Main features:

Power Supply:

Voltage:	Rechargeable 3.7V Li-Ion
Nominal Consumption:	120mA
Normal operating time:	12h
Automatic turn off:	Inverse screen to prevent LED burn out. xx minutes.

Functioning temperature:	**from 0°C to 50°C**
Storage temperature:	**from -10°C to +60°C**

Construction:	Fabricated steel.
Measurement:	Torque.
Measurement modes:	Track, Peak (CW & CW), 1st Peak (Click), Impulse (CW & CCW).

Integrated transducer characteristics:

Measuring range:	EZ2 – 2Nm, EZ10 – 10Nm, EZ20 – 20Nm
Sensitivity:	2mV/V
Overload allowed:	125% of measuring range.
Accuracy:	2Nm - ± 2% of Span (FSD) 10Nm - ±1% of Span (FSD) 20Nm - ±1% of Span (FSD)
External Transducer sensitivity:	0.5 to 2.5mV/V (Adjustable)

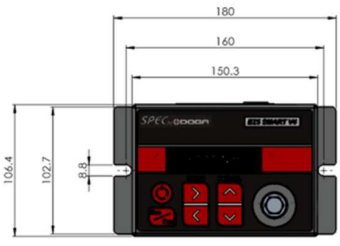
Digital part characteristics:

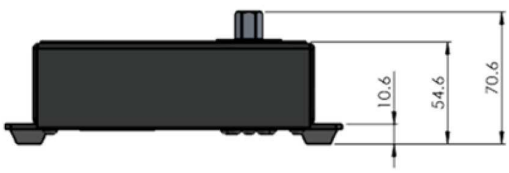
Filtering:	Bessel
A/D convertor:	16 bits (65,535 points)
Input range for ± measuring range:	±16384 points
Limits accuracy:	1 point on 2048
Data memory:	500 readings
Processor:	72Mhz XXX
Print:	Via USB to PC
Display:	64 x 256 pixel white OLED (21mm x 74mm)
Buzzer:	Fitted

Operating Languages:	French, English, German, Italian & Spanish.
Time/Date:	Real time clock.

Weight: Kg

Dimensions mm:





2) Measuring mode selection –application

1.3. Peak + / Peak - / Impulse Peak + / Impulse Peak –

Application type: release Torque measurement of a pneumatic or electric screwdriver.

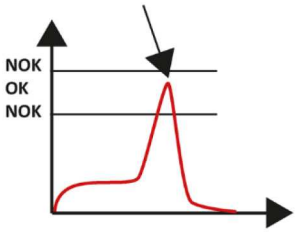


Fig 1.

The Torque peak value is displayed. This value corresponds to the screwdriver release Torque.

The buzzer alarm indicates the exceeding of the upper limit programmed with respect to the measured value
The User can set the measurement for Clockwise "+" and Anti-Clockwise "-"

The "Impulse Peak" mode allows the Torque measurement of Impulse Wrenches, In this case it will be necessary to choose a filter frequency.

1.4. Track mode

Application type: constant Torque measurement (control of a dial plate wrench for example).

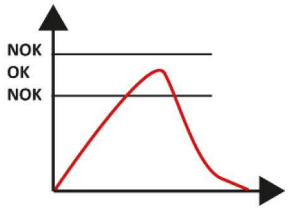


Fig 2.

All the measured values are displayed continuously.

The buzzer alarm indicates the exceeding of the Upper limit programmed with respect to the measured line.
(Fig 2. Value in real time)

1.5. First Peak mode

Application type: release Torque measurement of a Torque Wrench.

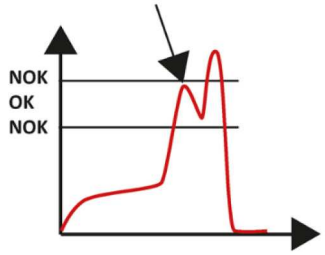


Fig 3.

All the measured values are displayed continuously.

The buzzer alarm indicates the exceeding of the Upper limit programmed with respect to the measure value.
(Fig 3. First peak)

3) Quick start guide

Ensure the EZ SMART is charged.

Press the on/off key 

Press the menu key  to select the measuring mode.

Choose the measurement mode using the parameter keys  or 

Press the menu key  to choose the RESET memory mode

Choose the automatic RESET with the parameter keys  or 

Press the menu  to go to the TRANSDUCER RESET

Set the TRANSDUCER RESET by pressing the  key

Press a number of times on the menu  to go to the THRESHOLD menu

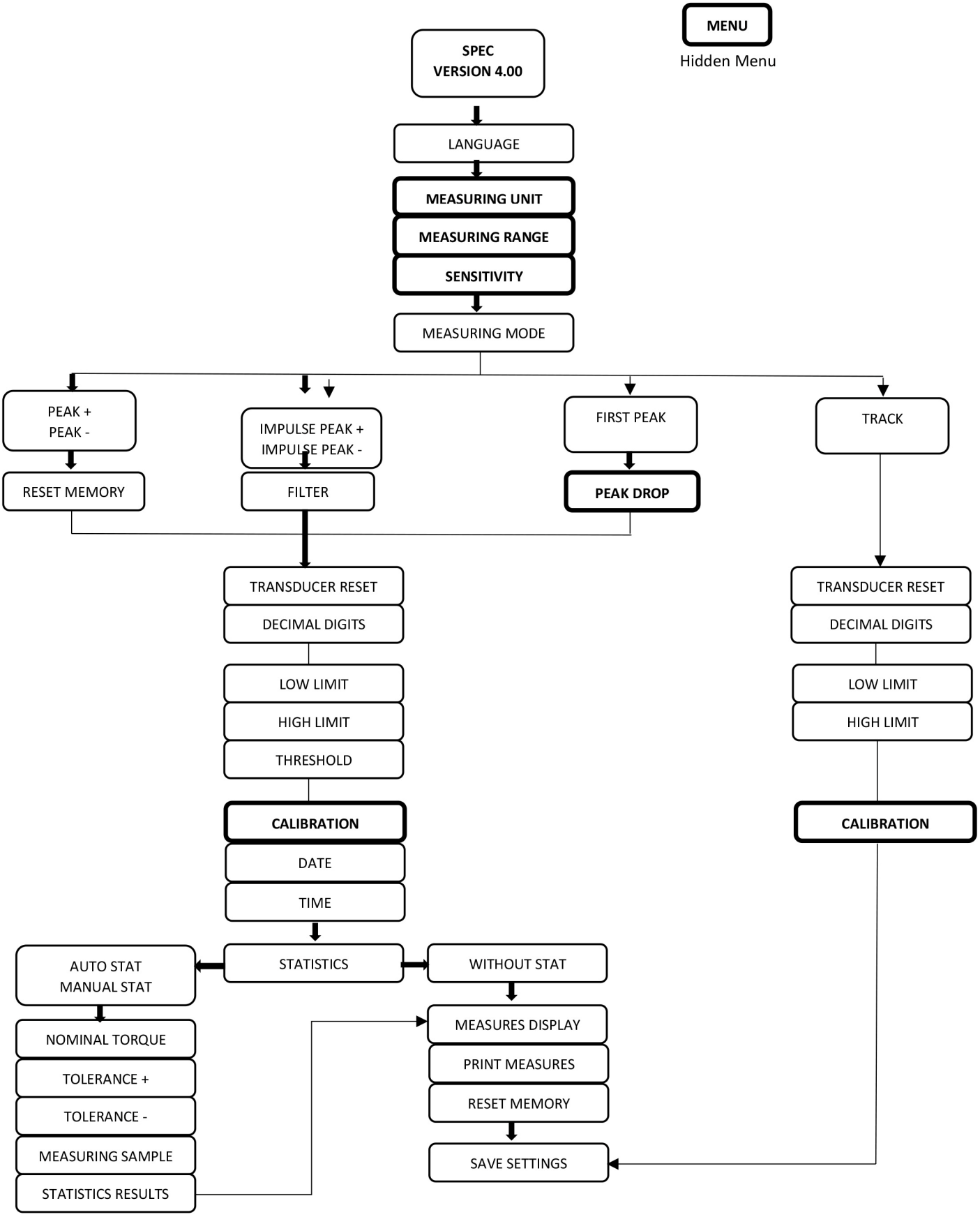
Choose this limit value with the parameter keys  or  (Choose a limit to at least 10% of the maximum Torque value required)

Press a number of times on the menu  to go to SAVE SETTINGS menu

Save the new parameters by pressing on 

You are now ready to make Torque measurements with your tool – don’t forget to use a test joint if you want to test your screwdriver.

4) The menus


MENU
Hidden Menu
SPEC
VERSION 4.00
LANGUAGE
MEASURING UNIT
MEASURING RANGE
SENSITIVITY
MEASURING MODE
PEAK +
PEAK -
RESET MEMORY
IMPULSE PEAK +
IMPULSE PEAK -
FILTER
FIRST PEAK
PEAK DROP
TRACK
TRANSDUCER RESET
DECIMAL DIGITS
LOW LIMIT
HIGH LIMIT
THRESHOLD
CALIBRATION
DATE
TIME
TRANSDUCER RESET
DECIMAL DIGITS
LOW LIMIT
HIGH LIMIT
CALIBRATION
STATISTICS
AUTO STAT
MANUAL STAT
NOMINAL TORQUE
TOLERANCE +
TOLERANCE -
MEASURING SAMPLE
STATISTICS RESULTS
WITHOUT STAT
MEASURES DISPLAY
PRINT MEASURES
RESET MEMORY
SAVE SETTINGS

4.1 General Menus

a) Language

Press the keys  or  to change the language.

The languages available are: French, English, German, Italian and Spanish.

b) Date and Time

Enables the Date to be adjusted. 

Holding the button down will move quicker through set up.

Enables the Time to be adjusted. 

Holding the button down will move quicker through set up.

c) Decimal digits

Allows the modification of the Decimal Digits from 0.0 to 0.000

Using the arrow keys will allow the digit after the "." to become less or more.

d) Transducer reset

The Transducer RESET is made by pressing 

If you press simultaneously the keys  and  the real transducer zero will be displayed.

e) Limit parameters

Allows the adjustment of the Lower limit (LSL)
If the measured value is under this limit the symbol < will be displayed on the screen.

Allows the adjustment of the Upper limit (USL)
If the measured value is above this limit the symbol > will be displayed on the screen and an audible beep will be heard.

Allows the adjustment of the measure starting limit.
The measurement will begin only after exceeding

A typical value would be approximately 20% of the nominal measurement planned.

f) Save Settings

The parameter Save Settings are made by pressing 

4.2 Measuring mode menus

a) "Peak+" and "Peak –" modes

These modes allow the definition of the Torque Peak value. This value corresponds to the screwdriver release Torque. The measure is made thanks to a fixed pass-range and a filter normalised at 500Hz.

The Peak + mode allows a clockwise sense measurement.
The Peak – mode allows an anti-clockwise sense measurement.

Display

In this measuring mode the display is as follows:

Reset

In these modes the Peak RESET can be AUTOMATIC or MANUAL.

The measured value RESET and sending results via USB to PC are made by pressing on the key "ESC / RESET".

The measured value RESET and result sending via USB to PC are made automatically. The readout considers that a new measure is present as soon as the THRESHOLD is exceeded.

b) <u>"Impulse Peak +" and "Impulse Peak –" modes</u>

These modes allow the definition of the Torque Peak value for very fast tools such as Impulse Wrenches. The measure is made with a fast sample rate & adjustable filter.

The RESET can be MANUAL only.

It is therefore necessary to pulse the key "Esc / RESET" 

between each measurement.

The "Impulse Peak +"mode allows a measurement in the clockwise direction.
The "Impulse Peak –"mode allows a measurement in the anti-clockwise direction.

<u>Display</u>

In this measuring mode the display is as follow:

<u>Filters</u>

For the Impulse Wrenches measurement, you must choose a filter frequency.

The possible filters are 5000Hz / 4000Hz / 2000Hz / 1000Hz / 500Hz / 250Hz / 125Hz

c) First Peak mode

This mode allows the user to define the Torque first Peak value.
The value corresponds to a Torque Wrench release Torque.

Display

In this measuring mode the display is as follows:

There is a sub menu in the first Peak menu that allows the user to choose the Peak drop type.

Four Peak drop levels are proposed LOW / MEDIUM / HIGH / VERY HIGH.

d) Track mode

This mode allow the user to display the Torque value in real time.

Display

In this measuring mode the display is as follows:

4.3 Statistics menu

a) Traceability mode choice

STATISTICS AUTO STAT	STATISTICS MANUAL STAT	STATISTICS WITHOUT STAT

Three modes are possible:

MANUAL STAT: The statistic calculations will be made on user request, and the results will be available on the display.

AUTO STAT: The statistic calculations will be made as soon as the hold measuring sample number is reached and the values will be automatically sent to a PC via USB connection.

WITHOUT STAT: No statistic calculation will be made, but the measurements will be remembered.

b) Nominal value

NOMINAL TORQUE 4.400 N.m

This is the reference value for statistic calculations.

c) Tolerances

TOLERANCE + 4.400 + 0.400

This is the Upper Tolerance (USL) with respect to the nominal value.

TOLERANCE - 4.400 - 0.400

This is the Lower Tolerance (LSL) with respect to the nominal value.

d) Samples

SAMPLE 020

This is the number of readings that you have chosen so that the statistic calculations can be made. The setting must be between 5 and 100.

Note: In AUTO STAT mode, the statistic values are sent automatically to the PC when connected using the USB output.

e) Statistic result

```
STATISTIC RESULTS
PRESS ON ^
```

The statistic calculations are made by pressing 

The displayed results are:

Average and standard deviation:

```
STANDARD DEVIATION  =  0.66
AVERAGE                 = 4.483
```

Mini and maxi value:

```
MINI  =  4.246
MAXI  =  4.653
```

Statistic indicators calculated according to AFNOR standard:

```
CM   =  2.024
CMK =  1.873
```

If the available measured sample is smaller than the setting chosen, the following display appears:

```
MEASURING SAMPLE
ERROR!!!
```

4.4 Memory menus

a) Memory reading

MEMORY READING PRESS ON ^

Access memorised values by pressing 

The display begins with the last registered value.
To display a specific value, you have to make the run off with by pressing the keys  or 

Display

In this menu the display is as follows:

+ 4.382 N.m =
0036 1.721 11:49

The first line displays the measured value, the unit and the limits state.
The second line displays the measured Torque, the measure period and time.

In case there is no stored measured sample, the following display appears:

EMPTY MEMORY

b) Memory printing

MEMORY PRINTING PRESS ON ^

The stored value printing is made by pressing 

Printing examples

0036 + 4.382 N.m = 1.721s	11.49	08dec16
0037 + 4.246 Nm = 1.834s	11.49	08dec16
0038 + 4.367 Nm = 1.529s	11.50	08dec16
0039 + 4.352 Nm = 1.312s	11.50	08dec16
0040 + 4.653 Nm = 1.544s	11.51	08dec16
NOMINAL TORQUE	4.400 N.m	
TOLERANCE +		
TOLERANCE -		
MEASURES HOLD		
STANDARD DEVIATION = 0.066		AVERAGE = 4.483
MINI = 4.246	MAXI = 4.653	
C.M. = 2.024	C.M.K = 1.873	

c) Reset Memory

The stored values can be deleted by pressing 

NOTE: the configuration (sensitivity, measure range…) are still stored.

4.5 Hidden menus

To access the hidden menus you will have to:

Whilst in the measure screen, press and hold  for over 5 seconds. This will then take you to the Hidden menus.

a) Measuring unit

This is the measuring unit that will be used. It is text. **Changing the measuring unit does not modify the measuring scales.**

Possible units:

N.m	m.daN	cm.daN	cm.kgf	lbf.in	lbf.ft	m.kg	N	N.cm
daN	kN	g	kgf	tonne	lbf			

b) Measuring range

Enter the measuring range corresponding to the Transducer (identified on the Transducer or on the technical sheet) in the chosen measuring unit. (Adjustable from 0.1000 to 200.000).

c) Sensitivity

This is the Transducers sensitivity (see Transducer technical sheet). The sensitivity must be expressed in mV/V.

d) Calibration

```
CALIBRATION
PRESS ON ^
```

WARNING: you will access the CALIBRATION menu by pressing 

This function is used during Calibration of the tester or of the set Transducer / Readout. You have to apply a <<master>> Torque to adjust the value read on the screen so that it corresponds to the master value; the sensitivity will be corrected. The new sensitivity value will be saved thanks to the SAVE SETTINGS menu.

The display in this menu will be as follows:

```
E : 5.000    S : 0.869
+ 0.000 N.m
```

E: Transducer measuring range of the chosen unit.
S: Transducer sensitivity corrected to obtain the master value.

5) Downloading data

Make sure that on your EZ the communication parameters correspond to the parameters you have set in the hyperterminal. (Bits per second: 9600, Data bit: 8, Parity: none).

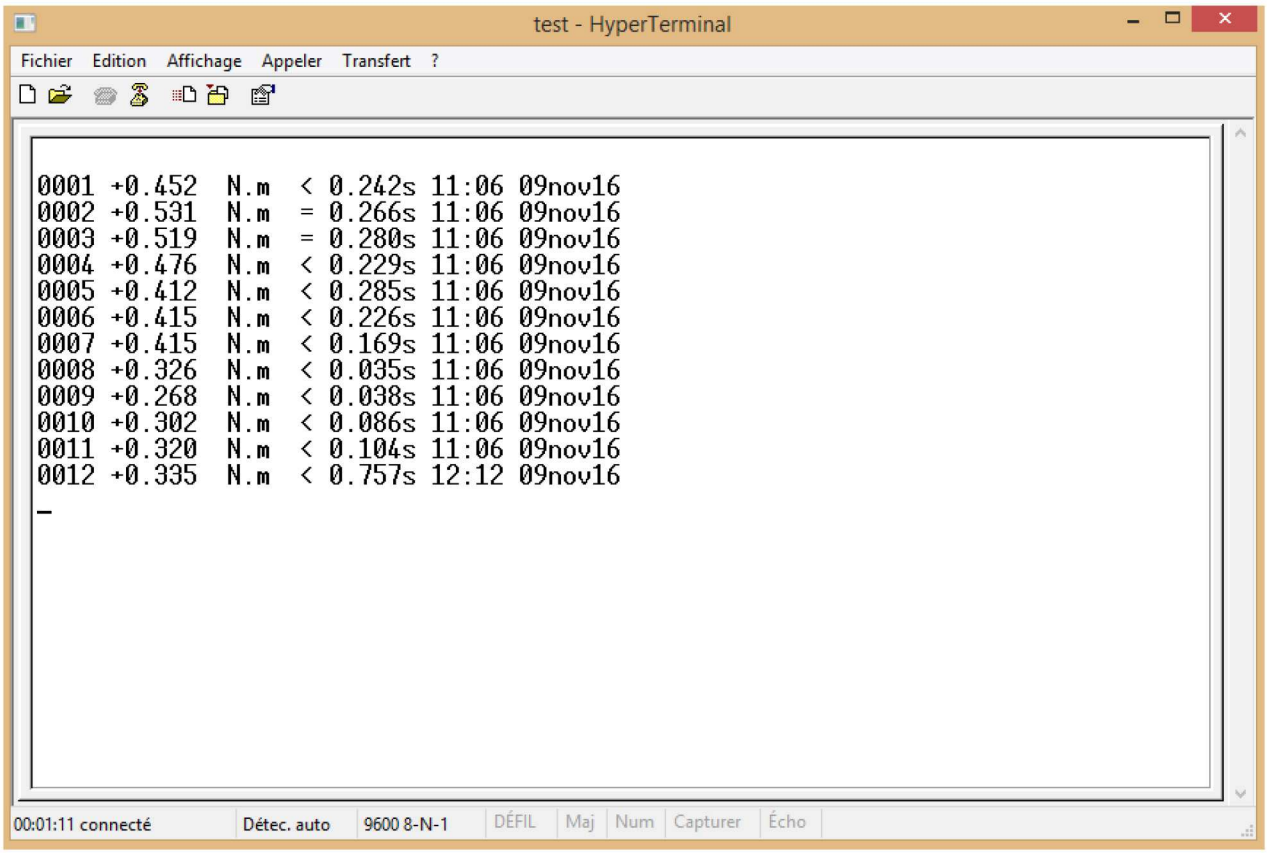
To see this menu, you have to access to the hidden menu of the EZ.

On the EZ when you are in measuring mode you can upload data on ongoing communication with the measures you are doing. It is done automatically, there is no settings to do.

It is also possible to make some packet measurement upload from the EZ to the computer.

On the EZ select by using the menu arrows ***print measures***

Measurements will appear on the hyperterminal application.



Go to ***folder*** and save your file on your desktop. On your desktop do a right click on the folder you have just save and select ***open with*** and ***choose Excel***.

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