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Instruction manual digital torque tester

SAUTER DA

Version 2.0
03/2020
GB

PROFESSIONAL MEASURING

DA-BA-e-2020

GB

SAUTER DA

V. 2.0 03/2020

Instruction manual digital torque tester

Thank you for purchasing the digital torque measuring device from SAUTER. We hope that you will be very satisfied with the high quality of the hardness tester and its extensive functionality. Although the device is a complex and technically advanced measuring instrument, it is designed for many years of trouble-free use, provided that it is used for its intended purpose and properly maintained. Before using the instrument for the first time, please read this operating manual carefully and ensure that it is always kept within easy reach during use. For any questions, requests and suggestions, please contact our customer service department at the telephone number provided.

Table of contents:

1 Before commissioning

Before putting the device into operation, check the delivery for any transport damage to the packaging, the plastic case and the device itself. Should this be the case, SAUTER must be contacted immediately.

2 General operating information

Functions of the digital torque measuring instrument that are used most frequently (i.e. display of the torque value, peak hold function, zeroing and changing the displayed unit) can be called up by pressing a corresponding button on the front panel (see paragraph *Basic functions of the measuring instrument*). The setting of the measuring instrument is done with the menu key (see paragraph *Main menu*).

3 Initial commissioning

The SAUTER DA digital torque measuring instrument is equipped with a battery set consisting of 4 rechargeable NiMH AAA batteries. To be on the safe side, the rechargeable batteries are completely discharged for transport and separated from the power supply. Insert batteries before using the unit for the first time. To achieve maximum battery life, recharge the batteries for at least 14-16 hours using the mains adapter supplied.

4 Weight and dimensions

Torque tester	DA 1-4	DA 5-3	DA 10-3
Dimension (LxWxH)	250x160x60		250x160x100
Weight	3kg		
Packaging	Plastic case		

5 Technical data

Torque tester	DA 1-4	DA 5-3	DA 10-3
Maximum torque	1 Nm	5 Nm	10 Nm
Usable measuring range	5-100% of FS (Full Scale)		
Accuracy (Composite error)	±0.5% of full scale range		
Creep	±0.002 of full scale range		
Non-linearity	±0.002 of full scale range		
zero load variation in temperature	±0.002 of full scale range/°C		
Nominal voltage	220V 50/60Hz		
Backup	3A		
Operating temperature	20±10°C		
Storage and transport temp.	-15°C up to 65°C		
Relative air humidity	Not more than 70		
Min/Max diameter of the test object	10mm/165mm		

6 Operation of the torque measuring instrument DA

6.1 Before commissioning

Insert the four rubberised bottle holders into the openings provided for this purpose, adjusting their arrangement to the diameter of the bottle or glass. Ensure that the rubberised bottle holders are inserted as far as they will go and that they are locked on the keyway. The rubberised holders must not twist after the test sample has been inserted. The rubber coating ensures a better adhesion of the inserted test sample, e.g. a bottle, to the measuring instrument. It must be ensured that the measuring plate is neither loaded nor exposed to the action of any other force when the instrument is switched on.

6.2 Switching on the device

There are 8 keys arranged on the control panel.

To switch on the device, press the ON/OFF button. A brief autotest will then be performed, during which the display will show the permissible load value in Newtons.

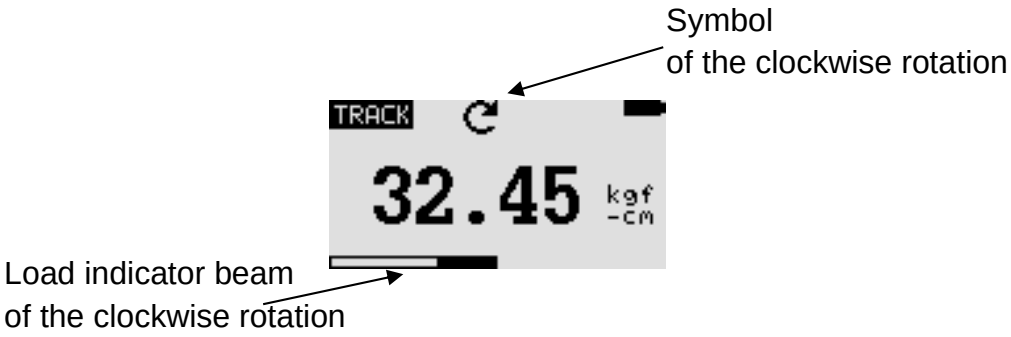
As soon as the autotest is performed, zero values are displayed, provided that the measuring plate is unloaded. This is because the meter is automatically zeroed during the autotest procedure.

Please do not overload the load sensor! Risk of irreparable damage! If the torque value exceeds 120% of the full scale range, an acoustic signal is triggered and the symbol OL (*eng. overload*) appears on the display. If this is the case, remove the test load and then press the RESET key.
Pressing the ON/OFF key switches the unit off.
When switching off, all current settings are saved, so that the same operating mode is selected when switching on again.

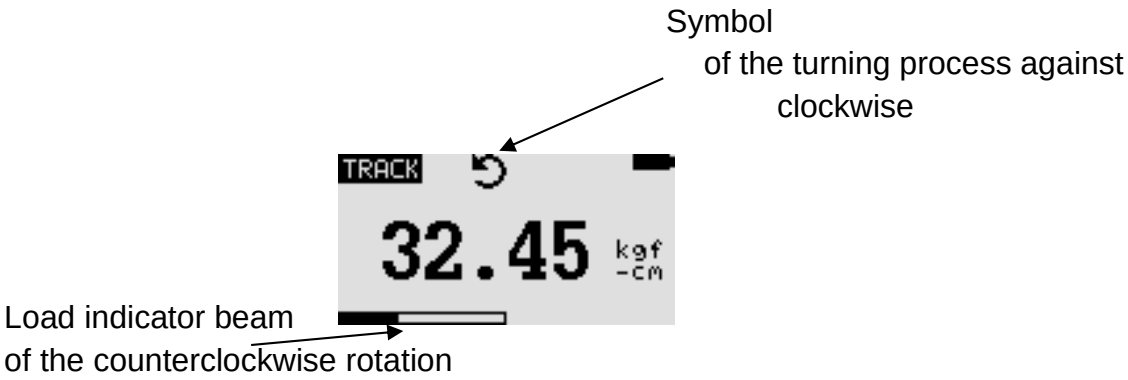
6.3 Basic functions of the device

The torque gauge can display the torque value for both clockwise (clock-wise, CW, symbol: ↻) and counter-clockwise (CCW, symbol: ↺) operation.

6.3.1 **CW torque value display function**



6.3.2 **Display function of the CCW torque value**



The load indicator bar of the rotation is used to display the load to which the load sensor is exposed.
When turning clockwise (CW), the load indicator bar moves from right to left. When turning counterclockwise (CCW), the load indicator bar moves from left to right.

6.3.3 **Zeroing the display**

During operation it is often necessary to zero the display so that the values already displayed are not taken into account in the next measurement. To do this, press and then release the ZERO button.

6.3.4 **Changing the measuring unit**

Depending on the permissible load of the measuring instrument used, the following measuring units are available: N-m, kgf-cm, kgf-m, in-lbf, ft-lbf.
To change the measuring unit, press the UNITS key. Each time this key is pressed again, another measuring unit is displayed until the originally set measuring unit is displayed. During the selection process, the measurement results are automatically converted.
Important! *It must be remembered that not all units of measurement are always available. This depends on the permissible load of the respective instrument.*

6.3.5 Changing the measuring mode

The following measuring functions are available: Track, First *Peak-Torque* and *Peak-Torque*.
The measuring function is changed by pressing the MODE button. Pressing this key again selects the following measuring function until the originally set function is displayed.

6.3.6 Track function

Press and hold the MODE button until the display shows the name of the measurement function "Track". The torque value for the rotation detected by the load sensor is displayed. The measurement results are displayed continuously:

Symbol of the track function

6.3.7 first peak torque function

Press and hold the MODE key until the display shows the designation of the measuring function "F-Peak". The first torque peak value is displayed:

Symbol of the
First Peak Torque Function

6.3.8 Peak torque function

Press and hold the MODE key until the display shows the name of the measurement function "Peak". The highest measured torque value is displayed:

Symbol of the
Peak torque function

6.3.9 Resetting the device

Stored peak values of both types are deleted with the RESET button. This also enables the acquisition of further peak values.

6.3.10 **Display backlight**

By pressing any key, the backlight of the display switches on for 60s. The same applies if the torque value detected by the load sensor will be higher than 0.5% of the full scale range.

6.3.11 **Saving measured values**

Measured values can be saved at any time. To do this, press the MEM/ENTER key. The memory capacity allows you to store up to 500 measurement results, including measurement units.

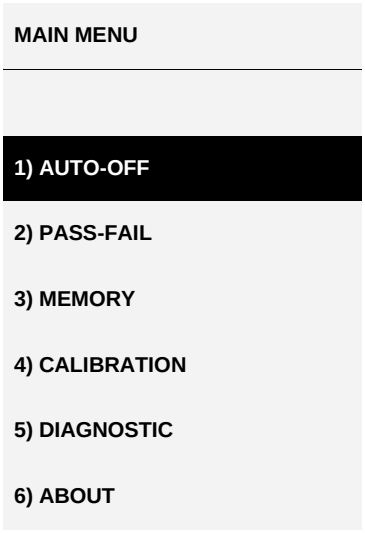
6.3.12 **Output signal**

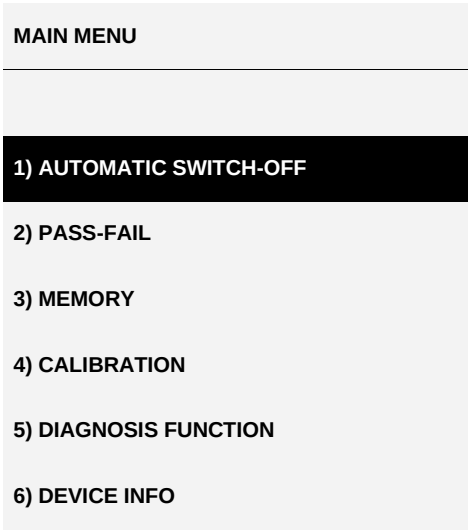
The measurement result obtained can be transferred to the PC. It is done by pressing the PRINT key or by interrogating the instrument from the PC. The respective command can be sent via RS232 or USB.

RS-232 Command	Action
„m“	Changing measure mode
„u“	Changing measure unit
„z“	Zero the gauge
„r“	Resett he gauge
„l“	Send live reading value with unit
“x” or pressing PRINT key	Send live reading value with unit, if current mode is track mode Send F-Peak value with unit, if current mode is F-Peak mode Send peak value with unit, if current mode is peak mode
“d”	Send memory of
“!”	Send information of torque tester (model, capacity, serial number, firmware revision, original offset, current offset, overload count)

6.4 Main menu

Pressing the MENU/ESC key calls up the "Main Menu" screen. The arrow keys UP or DOWN are used to select desired positions in the mask. Pressing the ENTER key selects the desired sub-menu, then calls up the desired function and then enters the respective value. The arrow keys UP, DOWN, LEFT and RIGHT are also used to change numerical values. Pressing the ESC key returns to the main menu screen.

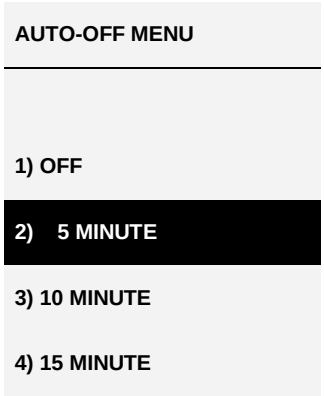




6.4.1 AUTO-OFF (AUTOMATIC SWITCH-OFF)

Press the MENU key. The main menu mask appears on the display. Use the UP or DOWN arrow keys to position the cursor on the AUTO-OFF function. Press the ENTER key. The AUTO-OFF menu mask appears on the display. Press the ESC key to return to the main menu screen.

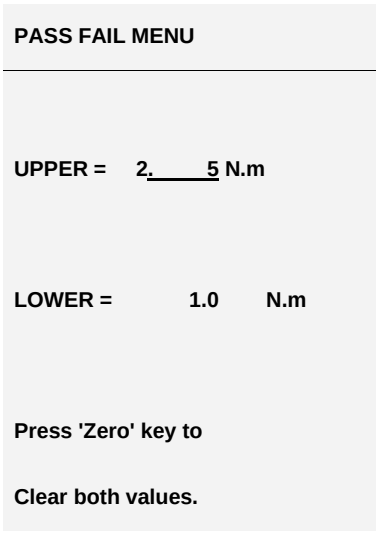
The AUTO-OFF function helps to extend the battery life. It can be used to set the time after which the device should be switched off after the last operating activity (setting values: Off, 5, 10 and 15 min). If this function is activated, the symbol *AO* appears in the main menu mask.

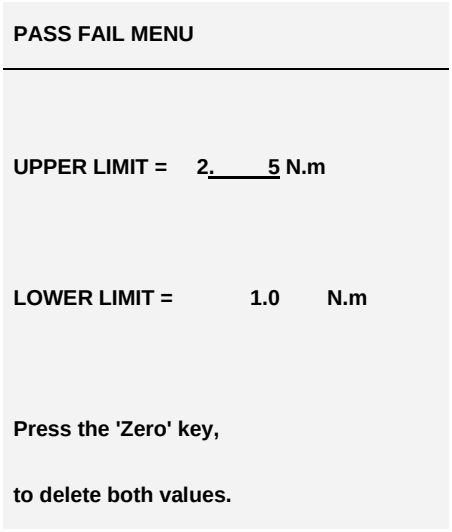


Use the UP or DOWN arrow keys to position the cursor accordingly. Then press ENTER to select the AUTO-OFF function and return to the main menu screen.

6.4.2 **PASS-FAIL**

This function is used to set the permissible torque range. Thus, the upper and the lower limit value of the torque range are determined. If the torque value falls within the defined range, the display shows the message *PASS* (OK). If the torque value detected is outside the specified range (above or below the range), the display shows *FAIL* (NOK). When the PASS-FAIL function is active, the display shows the symbol.
To call up the *PASS-FAIL* menu screen, position the cursor on the *PASS-FAIL* function using the UP or DOWN arrow keys, then press the ENTER key. The display shows the *PASS-FAIL* function screen. Press the ESC key to return to the main menu screen.





Use the LEFT arrow key to position the cursor on the *selected value.* Set the desired value with the UP or DOWN arrow keys. Press and hold the key to scroll the list. Select the desired measuring unit with the RIGHT key. Press the ENTER key to save the setting made and return to the main menu screen.

The *PASS-FAIL* function is automatically turned off when the setting of the lower limit (LOWER) and upper limit (UPPER) is 0 N.
The LOWER value must be lower than the UPPER value.

Example 1 LOWER LIMIT= 0 N-m, UPPER LIMIT= 20 N-m

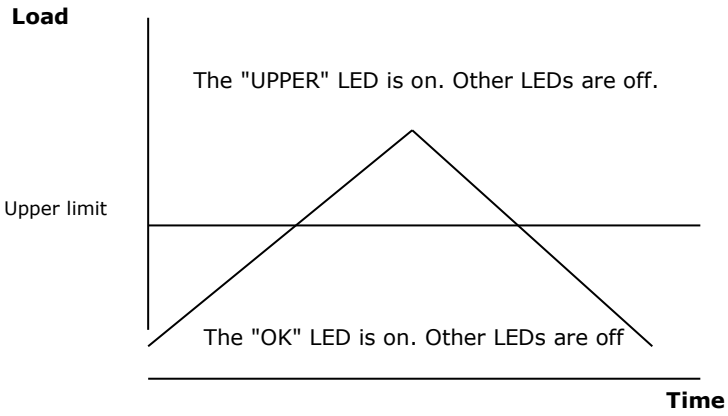


Figure 6b

Example 2 LOWER LIMIT= 20 N-m, UPPER LIMIT= 0 N-m

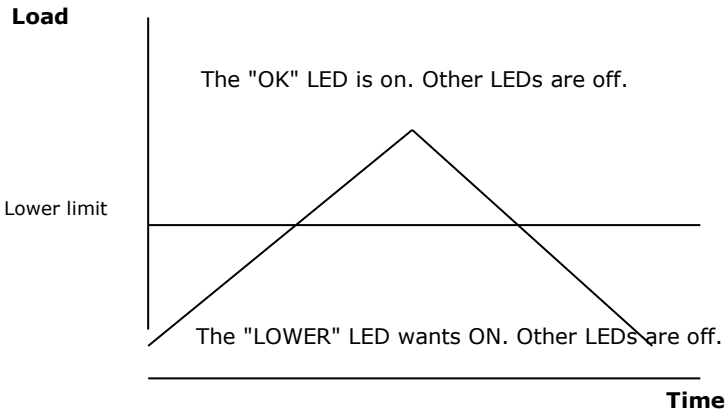


Figure 6b

Example 3 LOWER LIMIT= 10 N-m, UPPER LIMIT= 20 N-m

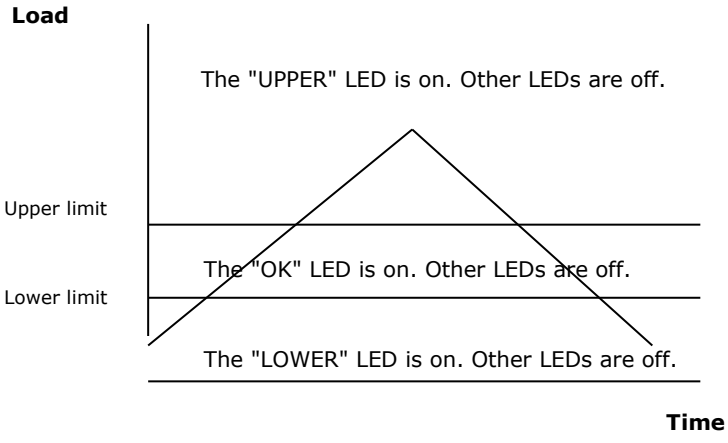
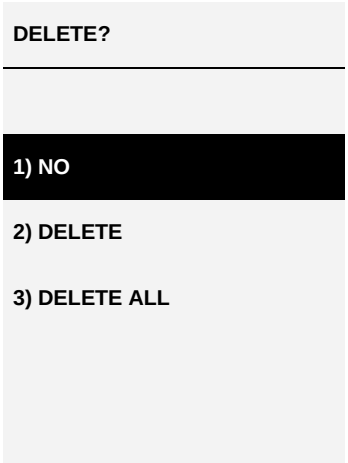


Figure 6c

6.4.3 **MEMORY (MEMORY)**

This function is used to view stored data records, to delete current data records, to delete all data records and to print data stored in these data records.
To access the *MEMORY* menu mask, first call up the main menu mask. Then use the UP or DOWN arrow keys to move the cursor to the *MEMORY* position and then press ENTER. The display shows the memory mask. To return to the main menu screen, press the ESC key.

Press the arrow keys UP or DOWN to change the memory mask. Press and hold the key to scroll to the position for changing the memory mask. Pressing the PRINT key controls the print output of stored data and data transmitted via serial port. To access the *DELETE* menu screen, press the ZERO key.



Select the desired delete option with the UP or DOWN arrow keys. If the *NO* option is selected and then the ENTER key is pressed, the system returns to the memory mask. If the *DELETE* option is selected and the ENTER key is pressed*, the* current stored results are deleted and the memory mask is returned to. Selecting the *DELETE ALL* option and pressing ENTER *will* delete all stored results and return to the memory mask.

6.4.4 CALIBRATION (CALIBRATION)

Calibration of the measuring instrument is carried out by the manufacturer's service personnel. Detailed information in this regard can be obtained from SAUTER's dealer or directly from the manufacturer.

6.4.5 DIAGNOSTIC (DIAGNOSTIC FUNCTION)

This function is used to check the status of the load cell. If there are indications that the load cell transformer has been overloaded, it is possible to check the state of the load cell directly.
To do this, place the measuring instrument horizontally on a level, horizontal surface and call up the main menu screen. Select the *DIAGNOSTIC* function with the UP or DOWN arrow keys and press ENTER. The "Diagnostic" menu mask appears on the display. To return to the main menu screen, press the ESC key.

DIAGNOSTIC	
OVERLOAD COUNT: 2	← ~~Total~~ overload measurement
ORG. OFFSET : +0.4 %	← ~~Offset~~ value from the last calibration (%)
CUR. OFFSET : +0.4 %	← ~~Curr~~ent offset value (%)

If the offset value is in the range of 5% to 10%, contact the instrument supplier to have a new calibration performed.

If the offset value exceeds 10%, contact the device supplier to have the load cell replaced.
The values given are only approximate values. Calibration/repair of the instrument can be caused by various circumstances. This is due to device-specific parameters of the load cell.

6.4.6 **ABOUT (DEVICE INFO)**

This function is used to display device-related information (firmware version, model, permissible load, serial number). To enter the *ABOUT* menu screen, first call up the main menu screen, then position the cursor on the *ABOUT* function using the UP or DOWN arrow keys, and then press ENTER. The display shows the About menu screen. To return to the main menu screen, press the ESC key.

ABOUT

FIRMWARE REV. : 3.0

MODEL: DA

CAPACITY: 10 N.m

S/N: 05130001

6.5 Measurement methods

In order to achieve higher accuracy of measurements, the torque ratio must correspond to the value specified for the respective device. The bending and torque loads acting on the load cell must be reduced, as they can affect the measurement result.

The permissible load according to the specifications on the front of the device must not be exceeded under any circumstances. Otherwise the load cell will be permanently damaged, even in the event of a short-term overload. Such damage is excluded from the warranty.

7 Control buttons

MENU/ESC: 

- Opens the menu window with the individual submenus
- By pressing the MENU/ESC button in the menu, you can return to the previous page

ZERO (zeroing): 

- Zeroing the display in track mode (tare function)

ENTER: 

- Confirm the selection in the menu
- Saving a measured value in PEAK mode

PRINT (print function): 

- Output of the memory contents to PC or printer

RESET (delete function): 

- Delete the current PEAK value

UNIT (units of measurement): 

- Press the key briefly: Switch between N, gf, kgf, ozf, lbf, mN

Mode (mode change): 

Assignment with three functions:

- Track mode (continuous measurement)
- Peak⏷Mode Train
- Peak⧗Mode Print

ON / OFF: 

- On / Off button (press button for approx. 1 s)

8 Conversion factoren

Unit	n.m.	p.cm.	plc	Calo-funt	Stopo-funt
N. m	1	10,197	0,10197	8,8507	0,73756
p.cm.	0,0980665	1	0,01	0,86796	0,07233
plc	9,80665	100	1	86,796	7,233
calofunt	0,11298	1,152	0,01152	1	0,08333
stopofunt	1,3558	13,8255	0,138255	12	1