



Sauter GmbH

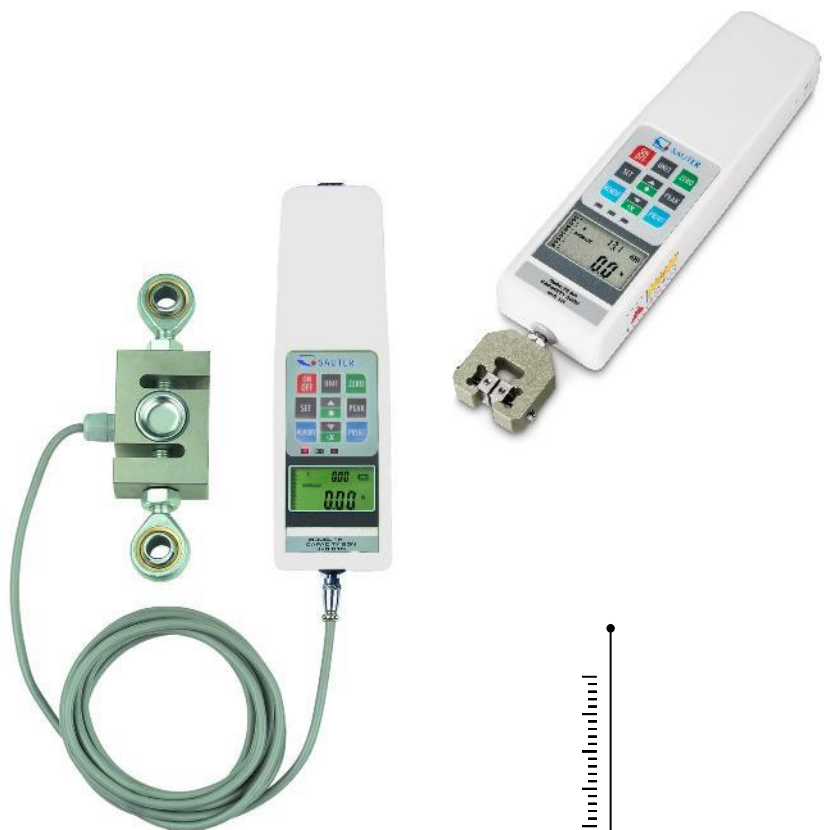
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Instruction manual digital force gauge

SAUTER FH

Version 2.0
01/2020
GB



PROFESSIONAL MEASURING



SAUTER FH

V. 2.0 01/2020

Instruction manual digital force gauge

Congratulations on purchasing a digital force measuring device with internal or external measuring cell from SAUTER. We hope you will enjoy your quality measuring device with a wide range of functions. Please do not hesitate to contact us if you have any questions, requests or suggestions.

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1 Introduction

Please read these operating instructions carefully before commissioning, even if you already have experience with SAUTER measuring instruments.

After receipt of the force gauge, it should be checked in advance that no transport damage has occurred, that the outer packaging, the plastic housing, other parts or even the gauge itself have not been damaged. If any damage is evident, please notify SAUTER GmbH immediately.

"Sensor outside/ext. "stands for a measuring cell outside the housing.

SAUTER offers optional software and accessories to make the measuring instrument more versatile in use. Please ask SAUTER or the SAUTER supplier or visit our website www.sauter.eu.

2 Scope of delivery

- SAUTER FH, incl. internal battery
- Transport case
- Battery charger
- 5 pieces M3 x 8 screws for mounting on SAUTER test benches

3 Technical data

3.1 Technical data FH with internal loadcell up to 500N

Measuring device	FH 2	FH 5	FH 10	FH 20	FH 50	FH 100.	FH 200	FH 500
Capacity	2N	5N	10N	20N	50N	100N	200N	500N
Measurement uncertainty	$\pm 0.5\%$ of Max (measuring range)							
Work temperature	10°C to 30°C							
Relative air humidity	15% to 80% Humidity							
Weight	Approx. 640g							
Dimensions Display unit (LxWxH)	240x65x35mm							
Thread	M6							



3.2 Technical data FH with external load cell up to 500N

Measuring device	FH 10 ext.	FH 20 ext.	FH 50 ext.	FH 100 ext.	FH 200 ext.	FH 500 ext.
Capacity	10N	20N	50N	100N	200N	500N
Measurement uncertainty	$\pm 0.5\%$ of Max (measuring range)					
Work temperature	10°C to 30°C					
Relative air humidity	15% to 80% Humidity					
Weight display unit	Approx. 600g					
Dimensions display unit (LxWxH)	240x65x35mm					
Thread	M6					



3.3 Technical data FH with external load cell from 1kN

Measuring device	FH 1k	FH 2k	FH 5k	FH 10k	FH 20k	FH 50k	FH 100k
capacity]	1000N	2000N	5000N	10000N	20000N	50000N	100000N
Measurement uncertainty	$\pm 0.5\%$ of Max (measuring range)						
Working temperature	10°C to 30°C						
Relative air humidity	15% to 80% Humidity						
Weight display unit	Approx. 600g						
Dimensions display unit (LxWxH)	230x65x35mm						

Important remarks:

The **RESET button** (on the right side of the housing) can be used to reset or delete individual settings and stored values, e.g. to restart the device after an operating error.

The **description of how to attach all force measuring devices to SAUTER test benches** is given in the operating instructions of the respective test benches



3.4 Technical data external load cell (from 1kN)

Maximum load	LxWxH	Thread type	Cable length
1 kN	76x51x19mm	M12x1.75	Approx. 2,5m
2 kN	76x51x19mm	M12x1.75	
5 kN	76x51x28mm	M12x1.75	
10 kN	76x51x28mm	M12x1.75	
20 kN	76x51x28mm	M12x1.75	
50 kN	108x76x25,5mm	M18x1.5	
100 kN	178x125x51mm	M30x2.0	



4 Battery operation / power supply

Optionally available in mains or battery operation

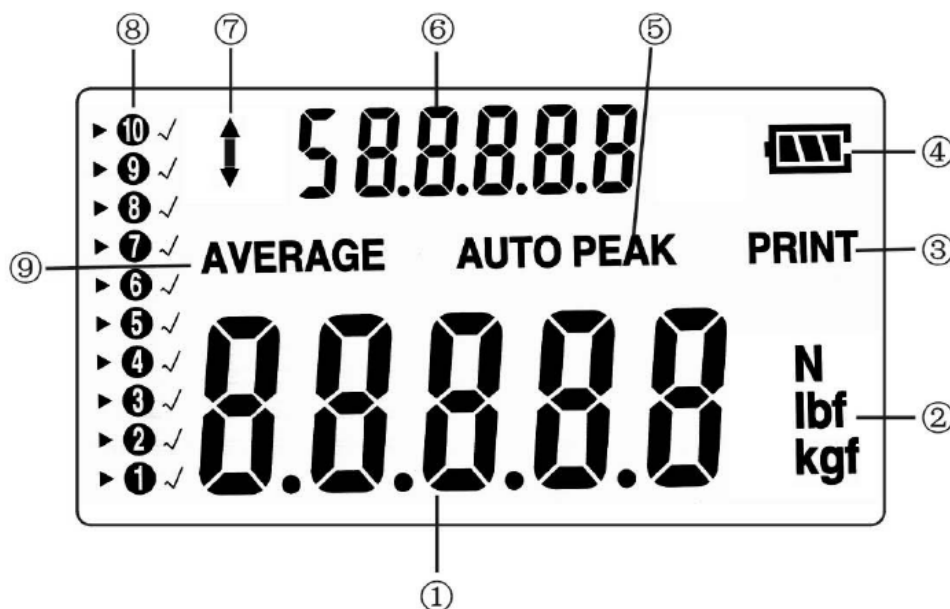
Mains operation:

- Connection via mains adapter to mains power supply
- Simultaneous charging of the integrated battery

Battery operation for mobile use:

- Type: Ni 8.4V / 600 mAh
- Charging time: about 1 hour. As soon as the device is connected to the mains via the charging cable, the integrated battery is charged.
- Battery operating time: approx. 15h

5 Display indication



Position	Description
1	Measurement result
2	Display unit of the measurement result
3	Activating the print function
4	battery charge indicator
5	PEAK indicates that peak hold mode is activated AUTO PEAK holds the peak value in the display for a defined time only
6	Average value or individual peak value
7	Display of the direction of force
8	Assignment of the memory locations
9	AVERAGE or save mode

6 Control buttons

ON / OFF:



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

UNIT: Units of measurement



- Press the key briefly: Selection between N, kg and lb
- Press key for at least 2 s: Reverse display

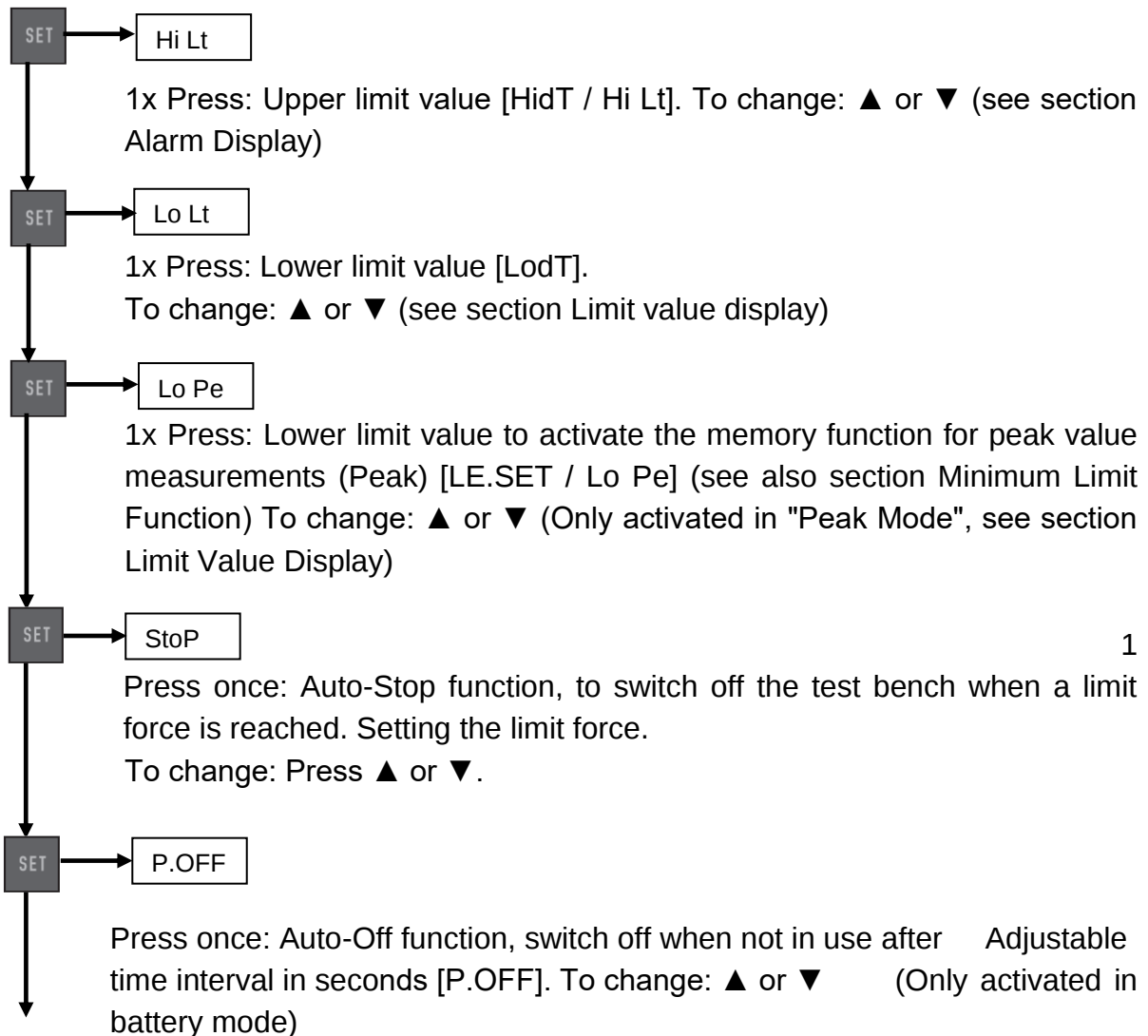
ZERO: Zero position

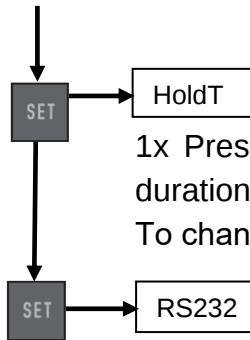


Assignment with three functions

- Zeroing the display (tare function)
- Zeroing of the peak value (Peak)
- Storing a setting (in SET mode)

SET:





1x Press: Result Hold Time [PE.2E / A.PE / HoldT]: Setting the display duration (in seconds) of the peak value.

To change: ▲ or ▼

Press once: Optional transmission of the output signal [rS232] to PC (PC) or printer (Print) or (in version U 5.3) to the test bench (stand)

To change: ▲ or ▼

Backlight:



PEAK (peak value):



Assignment with three functions:

- Track mode (continuous measurement)
- Peak mode (peak value acquisition)
- Auto-Peak mode, like Peak function, but without minimum limit function



MEMORY (memory function):

- Saves the peak value for calculating the average of the measurement results (see section Saving the peak values)

Delete function:



- Erasing memory values (only in "Memory" mode)

PRINT (print function):



- Output of the memory contents to PC or printer

Limit value display Good / Bad



LED display for good / bad tests

- ▼ lower than the lower limit value
- indicates that the STOP value has been reached
- ▲ higher than the upper limit value

An upper and a lower limit value can be programmed. The measuring instrument compares the measurement result with the limit values and outputs the result in red or green light diodes as well as with an acoustic signal.

Setting of the limit values see SET menu under "Buttons"

Simple measurement (track mode)

Display (pos. 1) of the currently acting force and force direction (pos. 7; arrow)

Zero position through:



Peak Hold Function (Peak Mode)

Switch over by pressing:

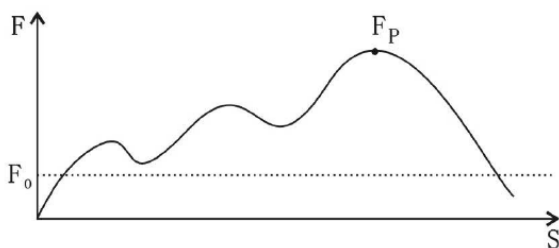


Auto Peak Hold Mode (Auto Peak Mode)

Switch over by pressing:



Minimum limit value function to activate the measured value storage



This function is used for measurements where unwanted "pre-peaks" occur that are below the peak value (F_P) being searched for. The adjustable limit value (F_0) prevents the meter from storing the "pre-peaks".

Minimum limit function is only possible in "Peak Mode"

Setting the minimum limit value function see SET menu under "Operating buttons"

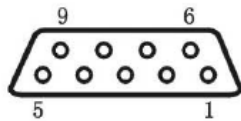
Storage of peak values and average value calculation

(from up to 10 measured values)

Storage of the peak values in the measuring instrument

- Activation of the "AUTO PEAK function" via the PEAK button
- Deactivation of the "Average Function" via the MEMORY key
- Now all peak values are automatically transferred to the instrument memory.
- Individual peak values can be recalled using the arrow keys ▲ and ▼ (displayed in the upper display segment)
- The average value can be called up via the MEMORY button (visible in the upper display segment)
- Deleting the memory contents by pressing ▼ button in AVERAGE mode

7 Assignment of the RS 232 data interface



SUB-D 9Pin male

Pin	Signal	Designation
2	TxD	Data output
3	RxD	Input for control signal
5	GND	Ground
6	+1.6 to + 2 V	> upper limit value
7	+1.6 to + 2 V	< lower limit value
8	+1.6 to + 2 V	OK

7.1 Interface protocol

RS-232 Parameters

- Baud rate: 9600
- Data bit: 8
- Parity: none
- Stop bit: 1

The measured value is requested by the ASCII character "9".

The returned measured value looks like this:

e.g. 0011.70 means -11.70 Newton if Newton is set

|_____ > first character describes the sign (0 = minus = pressure; 1 = plus = pull)

|----- |____ > the remaining 6 digits describe the measured value as ASCII character string

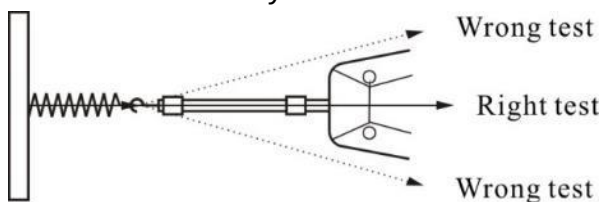
or: 1021.15 means +21.15 N (tractive force)

8 Warnings

Incorrectly performed force measurements can lead to serious injury to persons and damage to objects and must therefore only be performed by trained and experienced personnel.

In particular, it must be avoided that forces act on the purchased measuring instrument that exceed the maximum load (Max) of the instrument or that do not act axially on the instrument via the external load cell; or if high impulse forces act on the measuring instrument.

Avoid twisting the loadcell, otherwise it could be damaged and the measuring accuracy will decrease in any case.



Inappropriate use

Do not use the measuring instrument for medical weighing.

If small quantities of the material to be measured are removed or added, incorrect measurement results may be displayed due to the "stability compensation" in the measuring instrument! (Example: Slow flow of liquids out of a container suspended from the measuring cell).

Do not apply a continuous load to measuring instruments with external measuring cell.

Overloads

Please prevent the measuring instrument from being overloaded beyond the specified maximum load (Max), minus any tare load that may already be present. This can damage the measuring instrument (danger of breakage!).

Attention:

- Make sure that there are never people or objects under the load, as they could be injured or damaged!
- The measuring instrument is not suitable for weighing people, do not use it as an infant measuring instrument!
- The measuring device does not comply with the German Medical Devices Act (MPG).
- Never operate the measuring instrument in rooms where there is a risk of explosion. The standard version is not explosion-proof.
- The design of the measuring instrument must not be changed. This can lead to incorrect measurement results, safety-related defects and the destruction of the measuring device.
- The measuring instrument may only be operated or maintained by trained personnel.
- The measuring instrument may only be used in accordance with the described specifications.
- SAUTER must give written approval for any other areas of use / applications.

Warranty

Warranty expires in case of

- Non-compliance with our guidelines of the operating instructions
- Use outside the described field of application
- Modifying or opening the device
- mechanical damage and damage caused by agents such as liquids or liquids have been caused
- improper assembly or electrical installation
- Overloading the measuring cell

Test equipment monitoring

As part of quality assurance, the metrological characteristics of the measuring instrument and any test weight that may be present must be checked at regular intervals. The user responsible must define a suitable interval for this purpose as well as the type and scope of this inspection.

Information on the monitoring of measuring instruments and the necessary test weights is available on the SAUTER homepage (www.sauter.eu). The weights and measuring instruments can be checked and adjusted quickly and at favourable prices in KERN's accredited DAkkS laboratory (traceability to the national standard).

Note:

To view the CE declaration, please click on the following link:

<https://www.kern-sohn.com/shop/de/DOWNLOADS/>

9 Adjustment instruction FH

1. switch on the device	Press ON/OFF button	The green light goes on
2. switch to calibration mode	Directly after pressing the ON/OFF button, press the PEAK and PRINT buttons simultaneously, several times and very quickly one after the other until the left red light comes on.	The left red light goes on
3. device type	Press SET immediately after the red light has come on.	The maximum Newton value of the device is displayed, or can now be set.
3a) (<i>Back in normal mode???</i>)	<i>(In the meantime, if you are back in normal mode, turn off the power and start over from step 1. If necessary, press keys faster)</i>	
4. select device	Use the keys ▼▲ to select the maximum load (N) of the respective device.	The value matching the device is shown in the display.
5. save settings	Press SET	
6. switch to calibration	Press MEMORY	The right red light comes on
7. indicate the available calibration weight	Press UNIT and enter the calibration weight in Newton with ▼▲. ($X \text{ kg} * 9.81$)	The weight in Newton is shown in the display
8. save	Press SET and UNIT simultaneously	
9. attach weight	Hang the weight on the device and keep it as still as possible. Then press ZERO	The instrument returns to normal mode and is calibrated

10 Technical drawings

