

Digital force gauge SAUTER FL-M



Powerful digital force gauge with graphic assisted display for tensile and compressive force measurements with external load cell

Features	Technical data	Accessories
<ul style="list-style-type: none"> • Premium force gauge with external load cell, tension loops included • Turnable display with backlight • Peak-Hold function to capture the peak value or Track function for continuous display of measurement • Metal housing for durable use in harsh environmental conditions • Can be mounted on all SAUTER test stands from 1 kN • Capacity display: A bar lights up to show how much of the measuring range is still available • Measuring with tolerance range (limit-setting function): Upper and lower limit adjustable, in pull and push direction. The process is supported by a visual signal • Internal memory for up to 500 measurement values • Continuous analogue output: Linear voltage signal in dependence to the load (-2 to +2V) • USB data interface, as standard • Selectable measuring units: N, kN, kgf, ozf, lbf • Delivered in a robust carrying case 	<ul style="list-style-type: none"> • Transfer rate to PC: approx. 25 measured values per second • Measuring precision: 0,2 % of [Max] • Overload protection: 120 % of [Max] • Overall dimensions W×D×H 175×75×30 mm • Dimensions load cell W×D×H FL 2K: 76,2×51×19 mm FL 5K, 10K, 20K: 76,2×51×28 mm • Thread: M12 • Rechargeable battery pack integrated, as standard, operating time up to 10 h without backlight, charging time approx. 8 h • Net weight approx. 0,55 kg 	<ul style="list-style-type: none"> • Plug-In for data transfer of measuring data from the measuring instrument and transfer to a PC, e.g. in Microsoft Excel®, SAUTER AFI-2.0 • Data transfer software with graphic display of the measurement process, Force-time, SAUTER AFH FAST Force-displacement only in combination with SAUTER LD, SAUTER AFH LD Force-displacement only in combination with SAUTER LB, SAUTER AFH FD • USB cable, included in delivery, can be ordered separately, USB/PC connection cable (USB-A/USB mini), SAUTER FL-A01 • RS-232 adapter cable, SAUTER FL-A04 • Holders for object fixation and other accessories, please see page 40 onwards or our website

STANDARD



OPTION



Model	Measuring range [Max] N	Readout [d] N	Option DAkkS calibration certificate (≤ 5 kN)/ Factory calibration certificate (> 5 kN)		
			Tensile force	Compressive force	Tensile/Compressive force
SAUTER			KERN	KERN	KERN
FL 2K	2000	1	963-162	963-262	963-362
FL 5K	5000	2	963-163	963-263	963-363
FL 10K	10000	5	961-164	961-264	961-364
FL 20K	20000	10	961-164	961-264	961-364

Further calibration options on request

Digital force gauge SAUTER FL-S



Universal digital force gauge with graphic-assisted display and integrated load cell

Features

- Turnable display with backlight
- Peak-Hold function to capture the peak value or Track function for continuous display of measurement
- Metal housing for durable use in harsh environmental conditions
- Can be mounted on all SAUTER test stands up to 5 kN
- Capacity display: A bar lights up to show how much of the measuring range is still available
- Measuring with tolerance range (limit-setting function): Upper and lower limit adjustable, in pull and push direction. The process is supported by a visual signal
- Internal memory for up to 500 measurement values

- Continuous analogue output: Linear voltage signal in dependence to the load (-2 to +2V)
- USB data interface, as standard
- 1 Standard attachments: as shown
- Selectable measuring units: N, kN, kgf, lbf
- 2 Delivered in a robust carrying case

Technical data

- Transfer rate to PC: approx. 25 measured values per second
- Measuring precision: 0,2 % of [Max]
- Overload protection: 120 % of [Max]
- Overall dimensions W×D×H 175×75×30 mm
- Thread: M6
- Rechargeable battery pack integrated, as standard, operating time up to 10 h without backlight, charging time approx. 8 h
- Net weight approx. 0,55 kg

Accessories

- Plug-In for data transfer of measuring data from the measuring instrument and transfer to a PC, e.g. in Microsoft Excel®, SAUTER AFI-2.0
- Data transfer software with graphic display of the measurement process, force-time, SAUTER AFH FAST
Force-displacement only in combination with SAUTER LD, SAUTER AFH LD
Force-displacement only in combination with SAUTER LB, SAUTER AFH FD
- USB cable, included in delivery, can be ordered separately, USB/PC connection cable (USB-A/USB mini), SAUTER FL-A01
- RS-232 adapter cable, SAUTER FL-A04
- Holders for object fixation and other accessories, please see page 40 onwards or our website

STANDARD



OPTION



Model	Measuring range [Max] N	Readout [d] N	Option DAkks calibration certificate		
			Tensile force DAkks KERN	Compressive force DAkks KERN	Tensile/Compressive force DAkks KERN
SAUTER					
FL 5	5	0,002	-	-	-
FL 10	10	0,005	963-161	963-261	963-361
FL 20	25	0,01	963-161	963-261	963-361
FL 50	50	0,02	963-161	963-261	963-361
FL 100	100	0,05	963-161	963-261	963-361
FL 200	250	0,1	963-161	963-261	963-361
FL 500	500	0,2	963-161	963-261	963-361
FL 1K	1000	0,5	963-162	963-262	963-362

Further calibration options on request

Digital force gauge SAUTER FL TM

PREMIUM
★★★



◀ **Note:** The shown load cell is not included in the scope of delivery! Combine the FL TM with a load cell suitable for your application from the SAUTER program, such as CR P1, CR Q1, CS P1 or CS Q1
You can find our load cells at page 88-98

Digital Premium force gauge with graphics display for tensile and compressive force measurements, prepared for external load cells

Features

- Premium force-measuring for connection of external load cells (load cell, tension loops and pressure plates not included with delivery)
- Adjustable nominal loads: 5 N, 10 N, 25 N, 50 N, 100 N, 250 N, 500 N, 1 kN, 2,5 kN, 5 kN, 10 kN, 20 kN, 50 kN
- Suitable for strain gauge sensors: up to 500 N characteristic value 1 mV/V, from 1 kN characteristic value 2 mV/V
- Maximum resolution 2500 d
- Peak-Hold function to capture the peak value or Track function for continuous display of measurement
- Metal housing for durable use in harsh environmental conditions
- Capacity display: A bar lights up to show how much of the measuring range is still available
- Measuring with tolerance range (limit-setting function): Upper and lower limit adjustable, in pull and push direction. The process is supported by a visual signal

- Internal data memory for up to 500 values
- Continuous analogue output: Linear voltage signal in dependence to the load (-2 to +2V)
- USB data interface, as standard
- Selectable measuring units: N, kN, kgf, lbf, ozf
- Delivered in a robust carrying case

Technical data

- Transfer rate to PC: approx. 25 measured values per second
- Measuring precision: 0,2 % of [Max]
- Overload protection: 120 % of [Max]
- Overall dimensions W×D×H 175×75×30 mm
- Rechargeable battery pack integrated, as standard, operating time up to 10 h without backlight, charging time approx. 8 h
- Net weight approx. 1,8 kg

Accessories

- Plug-In for data transfer of measuring data from the measuring instrument and transfer to a PC, e.g. in Microsoft Excel®, SAUTER AFI-2.0
- Data transfer software with graphic display of the measurement process, Force-time, SAUTER AFH FAST
Force-displacement only in combination with SAUTER LD, SAUTER AFH LD
Force-displacement only in combination with SAUTER LB, SAUTER AFH FD
- USB cable, included in delivery, can be ordered separately, USB/PC connection cable (USB-A/USB mini), SAUTER FL-A01
- RS-232 adapter cable, SAUTER FL-A04
- **Option FL-C01: Solder connector for FL TM to load cell and adjusting the device, SAUTER FL-C01**

STANDARD



OPTION



Model	Option DAkKS calibration certificate (≤ 5 kN) / Factory calibration certificate (> 5 kN)				
	Option	Measuring range optional load cell	Tensile force	Compressive force	Tensile/Compressive force
SAUTER	Load cell		KERN	KERN	KERN
		≤ 500 N	963-161	963-261	963-361
FL TM*	Load cells see page 90-97	≤ 2 kN	963-162	963-262	963-362
		≤ 5 kN	963-163	963-263	963-363
		≤ 20 kN	961-164	961-264	961-364
		≤ 50 kN	961-165	961-265	961-365

* ONLY WHILE STOCKS LAST! Further calibration options on request



Adjusting program (CAL):
For quick setting of the instrument's accuracy. External adjusting weight required



Calibration block:
Standard for adjusting or correcting the measuring device



Peak hold function:
Capturing a peak value within a measuring process



Scan mode:
Continuous capture and display of measurements



Push and Pull:
The measuring device can capture tension and compression forces



Length measurement:
Captures the geometric dimensions of a test object or the movement during a test process



Focus function:
Increases the measuring accuracy of a device within a defined measuring range



Internal memory:
To save measurements in the device memory



Data interface RS-232:
Bidirectional, for connection of printer and PC



Profibus:
For transmitting data, e.g. between scales, measuring cells, controllers and peripheral devices over long distances. Suitable for safe, fast, fault-tolerant data transmission. Less susceptible to magnetic interference.



Profinet:
Enables efficient data exchange between decentralised peripheral devices (balances, measuring cells, measuring instruments etc.) and a control unit (controller). Especially advantageous when exchanging complex measured values, device, diagnostic and process information. Savings potential through shorter commissioning times and device integration possible



Data interface USB:
To connect the measuring instrument to a printer, PC or other peripheral devices



Bluetooth* data interface:
To transfer data from the balance/measuring instrument to a printer, PC or other peripherals



WLAN data interface:
To transfer data from the balance/measuring instrument to a printer, PC or other peripherals



Data interface Infrared:
To transfer data from the measuring instrument to a printer, PC or other peripheral devices



Control outputs (optocoupler, digital I/O):
To connect relays, signal lamps, valves, etc.



Analogue interface:
To connect a suitable peripheral device for analogue processing of the measurements



Analog output:
For output of an electrical signal depending on the load (e.g. voltage 0 V - 10 V or current 4 mA - 20 mA)



Statistics:
Using the saved values, the device calculates statistical data, such as average value, standard deviation etc.



PC Software:
To transfer the measurement data from the device to a PC



Printer:
A printer can be connected to the device to print out the measurement data



Network interface:
For connecting the scale/measuring instrument to an Ethernet network



KERN Communication Protocol (KCP):
It is a standardized interface command set for KERN balances and other instruments, which allows retrieving and controlling all relevant parameters and functions of the device. KERN devices featuring KCP are thus easily integrated with computers, industrial controllers and other digital systems



GLP/ISO record keeping:
Of measurement data with date, time and serial number. Only with SAUTER printers



Measuring units:
Weighing units can be switched to e.g. non-metric. Please refer to website for more details



Measuring with tolerance range (limit-setting function):
Upper and lower limiting can be programmed individually. The process is supported by an audible or visual signal, see the relevant model



Protection against dust and water splashes IPxx:
The type of protection is shown in the pictogram cf. DIN EN 60529:2000-09, IEC 60529:1989+A1:1999+A2:2013



ZERO:
Resets the display to "0"



Battery operation:
Ready for battery operation. The battery type is specified for each device



Rechargeable battery pack:
Rechargeable set



Plug-in power supply:
230V/50Hz in standard version for EU. On request GB, AUS or USA version available



Integrated power supply unit:
Integrated, 230V/50Hz in EU. More standards e.g. GB, AUS or USA on request



Motorised drive:
The mechanical movement is carried out by an electric motor



Motorised drive:
The mechanical movement is carried out by a synchronous motor (stepper)



Fast-Move:
The total length of travel can be covered by a single lever movement



Verification possible:
Models with type approval for construction of verifiable systems



DAkKS calibration possible:
The time required for DAkKS calibration is shown in days in the pictogram



Factory calibration:
The time required for factory calibration is specified in the pictogram



Package shipment:
The time required for internal shipping preparations is shown in days in the pictogram



Pallet shipment:
The time required for internal shipping preparations is shown in days in the pictogram

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