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1. General notes and information

1.1. Description

The electronic force gauge is for measuring forces and weights. It consists of a transducer and the hand-held terminal connected by a cable. This displays the measured values with seven digits, prefix and the specified unit. Factory calibration is performed according to your specifications and the units N, kN,g, kg, t or lb. The transducer works bidirectionally, i.e. it measures in tensile as well as compression direction. You can specify which direction of force is displayed with positive prefix and which is displayed with negative prefix.

The force gauge can be tared and displays the current measured values or the top values in positive or negative load direction.

Some important data about your force gauge can be requested or changed via a user-friendly menu. Calibration of the force gauge, which is also performed via the menu, is password-protected and may only be done by the factory.

1.2. Scope of delivery

The force gauge is supplied completely assembled including batteries.

It consists of a transducer and a hand-held terminal.

It is optionally supplied with a calibration certificate.

1.3. Intended use

The force gauge is for measuring tensile and compression loads. The transducer may only be loaded up to its nominal load. The nominal load can be found on the type plate of the transducer. You can also find this information in the declaration of conformity on page 11 or read it on the force gauge's display when switching it on. There must be no transverse forces affecting the transducer. The hand-held terminal must not be subject to any forces.

This force gauge is only intended for exclusive use in areas that are not subject to calibration regulations.

The force gauge is a highly sensitive measuring instrument. It must be treated accordingly.

1.4. Safety instructions

There is risk to life and limb of the operator and other persons involved in case of incorrect operation or misuse of the force gauge or non-observance of the safety regulations. The measuring instrument or other material assets may be damaged.

All persons involved in commissioning, operation and maintenance of the force gauge must

- be qualified respectively,
- read, understand and adhere to these operating instructions carefully,
- ensure that the safety regulations are also observed by other persons involved.

Getting under a suspended load or entering the direct risk area is prohibited!

Apart from that, the general accident prevention regulations, in particular the UVV 18 VBG 9a as well as the trade association regulations for safety and health at work BGV A1 (previously UVV 1 VBG 1), are to be observed.



2. Technical data

Nominal load	see type plate on the transducer or in the declaration of conformity on page 11
Overload	1.2-fold nominal load
Measuring rate	slow (10 Hz) / middle (20 Hz) / fast (100 Hz)
Display	12 digits, 2 lines
Resolution	16 Bit
Hand-held terminal's power supply	4 × battery type AA
Operating time	> 8h continuous operation
Transducer's power supply	3.3V
Transducer's bridge resistance	100Ω to 1 kΩ
Auto off time	8, 30, 60 min / off
Operating temperature range	0 °C to +50 °C
Storage temperature range	-20 °C to +70 °C
Protection class of the hand terminal	IP 40
Material and dimensions	
of the hand terminal	ABS, 78 mm × 145 mm × 44 mm (b × l × h)

3. Operating elements and functions







The force gauge has two operating modes:

- the measuring mode:

in this mode, the measurements are performed. This is the standard mode of the force gauge, which is always enabled after switching on.


- the menu mode:

here, the most important data about the force gauge can be read out and configured.
 In this mode, the force gauge is calibrated in the factory.

Button	Name in the measuring mode	Function in the measuring mode (grey font)	Name in the menu	Function in the menu (light blue font)
	ZERO POSITIONING / TARING	- Zero positioning/taring and - Clear peak values	up 	- scroll up in the menu - increase numerical values
	PEAK	Toggle between displays: - of the current measured value - of the maximum value (= largest value in positive direction of force) - of the minimum value (= largest absolute value in negative direction of force)	down 	- scroll down in the menu - decrease numerical values
	ON / OFF	Switch device on/off	escape	- exit submenu option during entry without saving - exit menu, return to measuring mode
	MENU	Open the menu	enter	- open selected menu option - confirm and save entry

4. Operation

4.1. Switching on:

By pressing the  button, the force gauge is switched on.

The nominal load of the transducer is shown briefly on the display. Always make sure that this load is not exceeded.

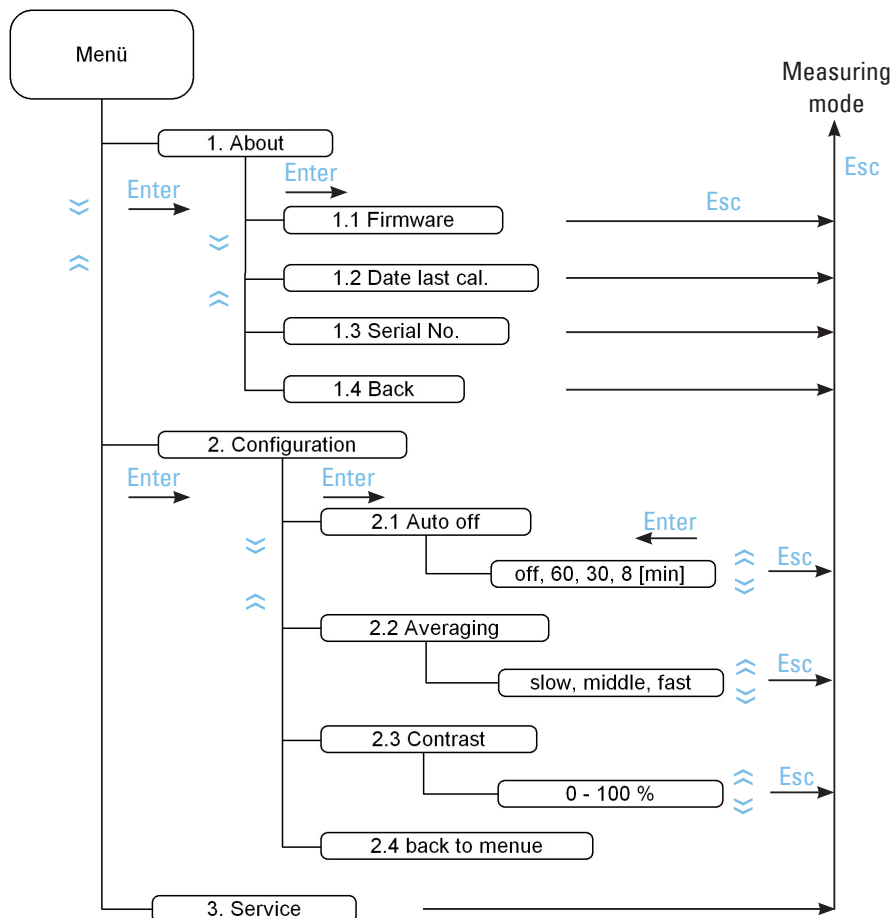
The current measured value is shown in the display.

Please note that a previously tared value has been retained. The peak values were deleted.

4.2. Using the menu: MENU

The menu provides the following options:

- Read out information about the device -> "About" menu option
- Configure device settings -> "Configuration" menu option
- Calibrate the device -> "Service" menu option (this area is password-protected and can only be configured by the factory).



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The menu is used via the four buttons:

- It is opened with the **MENU** button.
- You can scroll through the menu options / submenu options with the $\hat{=}$ $\hat{=}$ buttons, or increase or decrease adjustable values.
- The **enter** button is for opening the selected menu option or to confirm the entry.
- The menu is closed with the **escape** button. The device is then in measuring mode.

4.2.1. "About" menu option

With this menu option, you can read out the following information about your device:

Firmware	Version of the installed software
Data last cal.	Date of the last calibration
Serial No.	Serial number

Procedure:

- Press **MENU** to open the menu
 - Open menu item "1. About" with **enter**
 - Select the desired submenu option with $\hat{=}$ $\hat{=}$ and open it with **enter**
 - The device-specific information can be read in the display
 - Return to the submenu with **enter**
 - Select another submenu option with $\hat{=}$ $\hat{=}$
- or
- Select the submenu option "1.4 Back" with $\hat{=}$ $\hat{=}$ and return to the main menu with **enter**
- or
- Exit the menu with **escape**. The device returns to measuring mode.

4.2.2. "Configuration" menu option

With this menu option, you can configure the following settings:

Auto off	Select the time after which the device automatically switches off to save batteries. You can select one of the following: off, 60, 30, 8 min. (Factory setting: 60 min)																
Averaging	Here, you can select the desired measuring rate customised for your application, at the same time, the frequency also changes with which the measured value display is updated in the display. The lower measuring rate is suited to slower loads, the higher rate is suited to short, fast load changes. The higher the measuring rate, the better the detection of peak loads. However, with the high measuring rate the measured value display becomes slightly more disturbed, as the noise element increases. You can select one of the following:																
	<table> <thead> <tr> <th>Setting</th> <th>Measuring rate</th> <th>Display frequency</th> <th></th> </tr> </thead> <tbody> <tr> <td>slow</td> <td>10 Hz</td> <td>2 Hz</td> <td></td> </tr> <tr> <td>middle</td> <td>20 Hz</td> <td>5 Hz</td> <td>(Factory setting)</td> </tr> <tr> <td>fast</td> <td>100 Hz</td> <td>10 Hz</td> <td></td> </tr> </tbody> </table>	Setting	Measuring rate	Display frequency		slow	10 Hz	2 Hz		middle	20 Hz	5 Hz	(Factory setting)	fast	100 Hz	10 Hz	
Setting	Measuring rate	Display frequency															
slow	10 Hz	2 Hz															
middle	20 Hz	5 Hz	(Factory setting)														
fast	100 Hz	10 Hz															
Contrast	Here you can set the contrast in the display, as you can best read it. You can select between 10 - 100 % in 10%-steps																

Procedure:

- Press **MENU** to open the menu
 - Select the "2. Configuration" menu option with \leftarrow \rightarrow and open it with **enter**
 - Select the desired submenu option with \leftarrow \rightarrow and open it with **enter**
 - Select the required value with \leftarrow \rightarrow and confirm it with **enter**
 - Select another submenu option with \leftarrow \rightarrow
- or
- Select the submenu option "2.4 Back" with \leftarrow \rightarrow and return to the main menu with **enter**
- or
- Exit the menu with **escape**. The device returns to measuring mode.

Note

If while entering the values you exit the menu with **escape** without having confirmed the values with **enter**, the entered value is not saved.



4.3. Measuring

Warning

There is risk to life and limb of the operator and other persons involved in case of incorrect operation or misuse of the force gauge or non-observance of the safety regulations. The force gauge or other material assets may be damaged.

To adapt the force gauge to existing lifting devices, only lifting gear (swivel heads, eyebolts etc.) may be used that correspond to the nominal load* of the transducer at least. The operator is responsible for selection and control. Product liability and warranty of the manufacturer exclusively refers to the standard equipment of the force gauge and the fixtures supplied ex factory.

The force gauge must not adapted under load.

Before using the force gauge, the operator needs to check all load suspension devices (swivel heads, eyebolts etc.) for secure fit and damages (fissures, cracks, deflections etc.). Damaged devices must no longer be used.

When measuring, the lifting of a load, e.g. with a lifting device, must be slow and steady. Fast or unsteady load suspension results in dynamic load peaks which can lead to overload, damages up to breaking of the load suspension devices or measuring device. In general, the applied load, consisting of static + dynamic + tared load, must not exceed the nominal load* of the transducer!

Getting under a suspended load or entering the direct risk area is prohibited!

* Information about the nominal load of the transducer can be found on its type plate or in the declaration of conformity on page 11, or you can read the nominal load in the display when switching on the force gauge.



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Procedure:

- Select suitable adapters to install the transducer.
- Make sure that the applied force is always vertical to the measuring axis of the transducer, for tensile as well as compression forces. The measuring result is falsified as soon as the force axis is not vertically oriented.

4.3.1. Zero positioning and taring: $\rightarrow 0/T \leftarrow$

By pressing the $\rightarrow 0/T \leftarrow$ button the force gauge is set to zero before a measurement and without a pre-load. Only perform zero positioning once the transducer and the hand-held terminal were moved to the correct starting position for measuring. This way the self-weight of the transducer and the respective adapter are set to zero.

With this function, it is also possible to tare pre-loads. These pre-loads are to be positioned properly before measuring and tared by pressing the button.

By pressing the $\rightarrow 0/T \leftarrow$ button, apart from the display the saved peak values are also set to zero.

4.3.2. Switching the measured value display: PEAK

When switching on the force gauge and exiting the menu, the current measured value is always shown in the display.

You can also select display of the peak values with the PEAK button. In this setting, the measured value display corresponds to a drag indicator which is further advanced in case of increasing/decreasing values.

- If you press the PEAK button once the maximum value is displayed in positive load direction. "Peak Max" is displayed below the measured value.
- Press the PEAK button once more to display the minimum value, i.e. the largest absolute value in negative direction of force. "Peak Min" is displayed below the measured value.
- If you press PEAK for a third time the current measured value is displayed again.

By pressing the escape button you can return to the display of the current measured value from each peak value display.

The peak values are always recorded during measurement with the set measuring rate, independently of the selected measured value display. They are saved until the force gauge is reset by zero positioning/taring.

4.3.3. Performing the measurement

- Load the transducer and read the measured value in the display.
- If required, change the measured value display with the PEAK button during measuring (see 4.3.2).

Note

If no button is pressed, the force gauge switches off automatically after the set auto-off time. However, the saved peak values, the taring and the individual menu settings are kept.




4.4. Changing the battery

The charging state of the battery is monitored by the force gauge. If the battery is starting to get depleted (battery charge < 4V), "Batt" flashes in the bottom line of the display. In this case, for safe operation of the force gauge, the battery needs to be replaced.

To replace the battery, the hand-held terminal must be switched off. Please keep four new batteries type AA at hand.

- Remove the blue protective cover from the housing of the hand-held terminal. The battery compartment is at the rear of the device.
- With slight pressure on the ribbed surface, slide the lid of the battery compartment downwards beyond the housing.
- Remove the used-up batteries and insert the new ones. Observe the batteries' polarity in doing so.
- Slide the lid along the lateral guide back onto the battery compartment and let the nose click into place in the housing by applying slight pressure.
- Thread the housing first on the cable side and then on the opposite side back into the protective cover.

4.5. Turning off:

By holding the  button down, the force gauge is switched off.

The peak values are deleted. If the system was tared, this tare value is kept even if the force gauge is switched on or off. The individual settings you entered in the menu are kept.

5. Calibration cycle

The functional efficiency and accuracy of the measuring device and any existing test weights must be checked at regular intervals according to the quality assurance regulations.

For this force gauge, those responsible need to determine a suitable interval in which it is regularly presented to HKM-Messtechnik GmbH for testing. The type and scope of this test also need to be stated by those responsible.

We recommend test intervals of a year or two years. The force measuring device is checked for its functional efficiency and recalibrated.

Force gauge

Sensor + Hand Terminal HT6.0

Declaration of conformity

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6. Declaration of conformity

Declaration of conformity for devices with CE mark

We, HKM-Messtechnik GmbH
Ziegelhofstraße 228
79110 Freiburg
Germany

herewith declare that the product below conforms to the stated guidelines and standards.

Product: Sensor



and Hand-held Terminal HT6.0

	EU guideline	Standards	
CE	2004 / 108 / EU Electro-magnetic compatibility	EN 61000-6-3 EN 55011 EN 61000-6-2 EN 61000-4-2 Severity level 3 EN 61000-4-3 Severity level 3 ENV 50204 Severity level 3	Living area Interfering field strength Industrial application Electrostatic discharge (ESD) Electro-magnetic fields Electro-magnetic fields (mobile radiation)

In case the above mentioned product has been changed without having obtained permission from HKM-Messtechnik GmbH, this declaration is no longer valid.

Freiburg, 15 February 2011



Dipl. Ing. (FH) Martin Schlegel
Plant management
HKM-Messtechnik GmbH

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