HAEHNE

Portable Strain Gauge Amplifier PAD2

Operating Manual

Content

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1. General notes and information

1.1. Description

The electronic force gauge is for measuring forces and weights. The display shows the measured values of the connected sensor with prefix and the specified unit. Factory calibration is performed according to your specifications and the units N or kN.

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

Some important data about your PAD2 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 can be done only at the factory.

1.2. Scope of supply

The PAD2 is supplied completely assembled including batteries.

1.3. Intended use

The force gauge is designed for measuring tension and compression forces. The force sensor may only be loaded up to its nominal load. The nominal load can be found on the type label of the sensor. You can also find this information on the force gauge display when switching it on.

The force gauge must not be subjected to any forces.

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

It is a highly sensitive measuring instrument and 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 PAD2 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) or similar regulations of other nations, are to be observed.

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Technical Data	
Nominal force	See type label on the sensor or on the force gauges display when switching on
Display	12 digits, 2 lines
Resolution	16 bit
Power supply of PAD2	4 x battery type AA
Operating time	> 8 h continuous operation
Power supply of force sensor	3,3 V
Nominal resistance of strain gauge	100 Ω to 500 kΩ
Auto off time	8, 30, 60 min / off
Operating temperature range	From 0 to +50° C (32° to 122° F)
Storage temperature range	From -20 to +70° C (-4 to 158° F)
Protection class	IP 40
Material and dimensions	ABS, 78 mm x 145 mm x 44 mm (w x l x h)

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3. Operating elements and functions

The portable force gauge has two operating modes:

- the measuring mode:
in this mode, the measurements are performed. This is the standard mode of the PAD2, which is always enabled after switching on.

- the menu mode:
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)
→0/T← ▲	ZERO POSITIONING/ TARING	- Zero adjustment/taring and - Clear peak values	up ▲	- scroll up in the menu - increase numeric values
PEAK ▼	PEAK	Toggle between displays: - of the actual measured value - of the max. value (= largest value in positive force direction) - of the minimum value (= largest absolute value in negative force direction)	down ▼	- scroll down in the menu - decrease numeric values
esc	ON/OFF	Switch on/off	escape	- exit sub menu option during entry without saving - exit menu, return to measuring mode
MENU enter	MENU	Open the menu	enter	- open selected menu option - confirm and save entry

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4. Operation

4.1. Switching on: ⏻

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

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

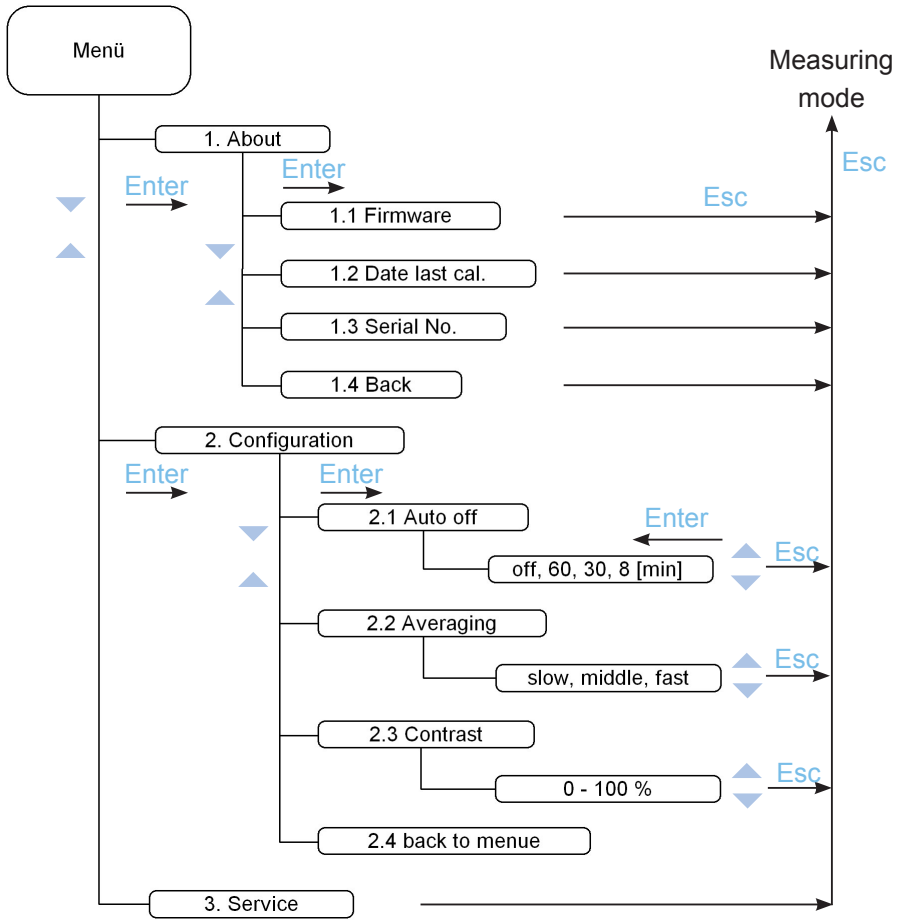
With the connected sensor the current measured value is shown in the display.

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 ▲▼ 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 ▲▼ 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 ▲▼

or

Select the submenu option “1.4 Back” with ▲▼ 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 customized 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:

Settings	Measuring rate	Display frequency
slow	10 Hz	2 Hz
middle	20 Hz	5 Hz (factory setting)
fast	100 Hz	10 Hz

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Contrast	Here you can set the contrast in the display, to be most readable for you. You can select between 10 - 100 % in 10%-steps

Procedure:

Press MENU to open the menu

Select the “2. Configuration” menu option with ▲▼ and open it with enter

Select the desired submenu option with ▲▼ and open it with enter

Select the required value with ▲▼ and confirm it with enter

Select another submenu option with ▲▼

or

Select the submenu option “2.4 Back” with ▲▼ 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 entered values with enter, then 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 portable strain gauge force gauge PAD2 or non-observance of the safety regulations. The force gauge or other
material assets may be damaged.

To adapt the PAD2 to existing lifting devices, only lifting gear (swivel heads, eyebolts etc.) may be used that correspond at least to the nominal force* of the sensor. 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 PAD2 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 pick up results in dynamic load peaks which can lead to overload, damages up to breaking of the load pick up devices or measuring device. In general, the applied load, consisting of static + dynamic + tared load, must not exceed the nominal force* of the sensor!

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

* Information about the nominal force of the sensor can be found on its type label or you can read the nominal force in the display when switching on the force gauge.

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Procedure:

Select suitable adapters to install the force sensor.

Make sure that the applied force is always vertical to the measuring axis of the sensor, for tension as well as compression forces. The measuring result is falsified as soon as the force axis is not vertically oriented.

4.3.1. Zero adjustment and taring: →0/T←

By pressing the →0/T← button the force gauge is set to zero before a measurement and without a pre-load. Only perform zero adjust once the sensor and the portable force gauge are moved to the correct starting position for measuring. This way the dead load of the sensor 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 →0/T← button, in addition to 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, then the maximum value is displayed in positive load direction. “Peak Max” is displayed below the measured value.

Press the PEAK button once again 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 adjustment/taring.

4.3.3. Performing the measurement

Load the sensor 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 PAD2 switches off automatically after the set auto-off time. However, the saved peak values, the taring and the individual menu settings are kept.

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4.4. Changing the battery

The charging state of the battery is monitored by the portable strain gauge force gauge. If the battery charge is lower than 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 PAD2 must be switched off. Please keep four new batteries type AA at hand.

Remove the blue protective cover from the housing of the PAD2. 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 PAD2 is switched on or off. The individual settings entered in the menu are kept.

5. Calibration cycle

The operational reliability and accuracy of the PAD2 and any existing test weights must be checked at regular intervals according to the quality assurance regulations.

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

We recommend test intervals of one year or two years for checking and recalibrating the operational reliability of the PAD2.

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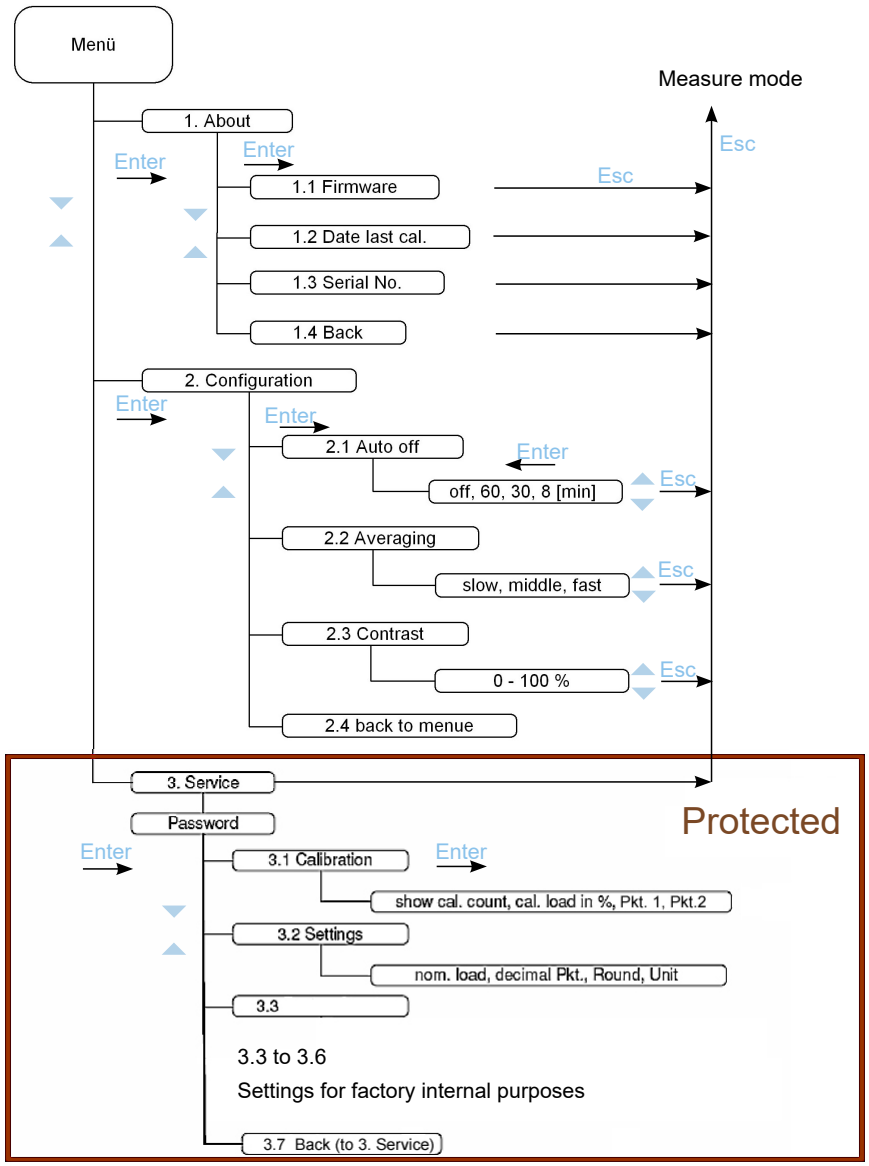
The first menu item (About) includes display functions such as firmware, calibration date, serial number.
The second point (Configuration) includes items such as “auto off”, “averaging” (measurement rate setting) and “Contrast”. These are described in the Operating Manual PAD2.
The third menu item contains the factory settings / calibration. This area is password protected with a 4-digit number. During each calibration, a counter is counted up irrevocably, this count reading is displayed in each case before the re-calibration.

The settings in the service menu (3) must be conducted out with great care.
The default settings should be listed first.



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3. Service

The following settings can be configured here.
To save the set values must be confirmed with the key „Enter“ until the menu item has been left
The „Service“ menu is protected by a 4-digit password (currently the last 4 digits of the serial number which is located on the rear panel)
While entering the password use the „Esc“ key to navigate one point back if a number was incorrectly entered and confirmed. Press „Enter“ to confirm the single digits.

3.1 Calibration

The following operations are performed: **(each point is confirmed with „Enter“)**

Cal. count	Display of the number of previous calibrations. Only fully traversed calibrations lead to the increase of the counter. If canceled with „Esc“, the counter is not increased

Note: Termination is currently available only at the display „Load [%]“ - is still changed!

Load [%]	Here, the applied test load can be specified in 10% increments of the rated load.
Pkt. 1 (min.)	The zero point is set (without load)
Pkt. 2 (max.)	Max is set (with X% of load) The calibration process is completed successfully, for 1.5 seconds „Cal Ready“ appears on the display, the calibration values are stored. It goes to 3.2 immediately.

3.2 Settings

The following operations are performed **(each point is confirmed with „Enter“)**

Nominal Load	Enter the amount of the nominal load (max. 99999). While entering use „Esc“ key to navigate back one digit if a number was incorrectly entered and confirmed. Press „Enter“ to confirm the single digits.
Dez. Pos	Here can be specified the number of decimal places after the decimal point. (0,0 / 0,00 / 0,000)
Round	Indication of the rounding of values of the last displayed digit (1 / 2 / 5 / 10 / 20 / 50 / 100)
Unit	The unit can be given (N, daN, kN, g, kg, t, lb)

3.3 to 3.6 for factory internal purposes

3.7 Back

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Declaration of Conformity

Portable Strain Gauge Amplifier PAD2

Declaration of conformity for devices with CE mark

Hereby the Company *HAEHNE* GmbH declares, that the product

PAD2

conforms with the guidelines and standards below.

	EC-Guide Line	Standards	
CE	2004 / 108 / EC Electromagnetic Compatibility EMC	EN 61000-6-3 EN 55011 EN 61000-6-2 EN 61000-4-2 Test level 3 EN 61000-4-3 Test level 3 ENV 50204 Test level 3	Residential area Interference field strength Industrial sector Electrostatic discharges (ESD) Electromagnetic fields Electromagnetic fields (mobile phone radiation)

Before commissioning the PAD2 it is necessary to ensure that the system - consisting of the portable strain gauge force gauge PAD2 and a connected sensor - is according to the EC-Guidelines EMC

in case of modifications to the instrument PAD2 without the approval of the Company *HAEHNE* GmbH this declaration loses its validity.

Erkrath, den 01.04.2011

Dr. Frederic Goronzy
General Manager

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