

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

Deutsche Version
English Version
Version française
Versione italiana
Versión española

FMI-B
FMI-S

Operation Manual

Force Gauges FMI-S
FMI-B



FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

Content

| | | | | | |
|--------|---|----|--------|--|----|
| 1.0 | Safety precautions | 3 | 4.4. | Memory and statistic functions (P2) | 19 |
| 2.0 | Before starting operation | 4 | 4.4.1. | General considerations on memory functions | 19 |
| 2.1. | Scope of supply | 4 | 4.4.2. | Setting memory and statistics functions | 20 |
| 2.2. | Applying force by hand | 5 | 4.4.3. | Saving single values (Single) | 20 |
| 2.3. | Energy Harvesting (FMI-S) | 5 | 4.4.4. | Saving measuring cycles (Series) | 21 |
| 2.4. | Charging the battery (FMI-B) | 5 | 4.4.5. | Displaying statistics | 22 |
| 2.5. | Overview | 6 | 4.4.6. | Recalling memory | 23 |
| 2.6. | General remarks | 7 | 4.4.7. | Clearing memory | 23 |
| 3.0 | Starting Operation | 8 | 4.5. | Monitoring limit values (P3 und P4) | 24 |
| 3.1. | Preparing the Measurement | 8 | 4.5.1. | Working with limit values | 24 |
| 3.2. | Turning the instrument ON/OFF | 8 | 4.5.2. | Setting limit values | 24 |
| 3.2.1. | Autoreverse display | 9 | 4.5.3. | Deleting limit values | 25 |
| 3.2.2. | Selecting measuring units | 9 | 5.0 | Interfaces (series FMI-B30 und FMI-S30 and higher) | 25 |
| 3.3. | Selecting the operation mode | 10 | 5.1. | Data transfer via USB | 25 |
| 3.3.1. | Standard mode | 10 | 5.1.1. | Software FMI_Connect | 25 |
| 3.3.2. | Peak value detection with Peak modes | 10 | 5.1.2. | Software FMI_Analyze | 26 |
| 3.4. | Start/Stop Measurements | 12 | 5.1.3. | Software FMI_Analyze Pro+ | 26 |
| 3.5. | Taring | 13 | 5.1.4. | Software COM-Bridge | 26 |
| 3.6. | Displaying measured values | 13 | 5.1.5. | Laser distance sensor | 27 |
| 3.6.1. | Resetting the drag indicator | 14 | 5.2. | Hirose-Socket | 27 |
| 3.7. | Clearing the memory | 14 | 5.2.1. | Foot switch for data transfer | 27 |
| 3.7.1. | Deleting single values | 14 | 5.2.2. | Drive control | 27 |
| 3.7.2. | Clearing memory completely | 14 | 5.2.3. | Data cable for digitale I/O's | 28 |
| 4.0 | Setting measurement parameters | 15 | 6.0 | Test stand application of force gauges | 29 |
| 4.1. | Selecting the parameter menu | 15 | 7.0 | Technical Data | 30 |
| 4.2. | General settings (P1) | 16 | 8.0 | Service | 31 |
| 4.2.1. | Selecting dimensional units (P11) | 16 | 8.1. | Extended 5-Year Guarantee | 31 |
| 4.2.2. | Changing +/- prefix for push or pull operations (P12) | 17 | 8.2. | Product registration | 31 |
| 4.2.3. | Display-refresh rate (P13) | 17 | 8.3. | Calibration certificates | 31 |
| 4.2.4. | Automatic measuring stop – Auto-Stop for FMI-S (P14) | 17 | 9.0 | Frequent questions (FAQ) | 32 |
| 4.2.5. | Automatic measuring stop – Auto-Stop for FMI-B (P14) | 18 | A. | Appendix | 33 |
| 4.2.6. | Auto-Off function (instrument off) (P15) | 18 | A.1 | Notes | 33 |
| 4.2.7. | Automatic taring function – Auto-Tara (P16) | 18 | A.2 | Calibration confirmation acc. DIN EN 10204 2.1 | 33 |
| 4.3. | Resetting factory defaults (PO) | 19 | A.3 | Declaration of Conformity | 34 |

FMI-B FMI-S

Bedienungsanleitung
Operation manual

Notice d'utilisation

Instrucciones de servicio

Istruzioni per l'uso

Thank you for choosing one of our high quality instruments. Please read the entire operation manual thoroughly before using this instrument for the first time. The information contained herein will help you to achieve accurate and reproducible results and to avoid misuse or damages.

1.0 Safety precautions

The internal sensor (strain gauge) can be damaged if overloaded! Mind your gauge model's maximum measuring range! The maximum measuring range is written on the front of the instrument and on the back. Do not apply side or radial forces to the rigid measuring axle. Do not use any tools to screw the attachment onto the measuring axle.

Always transport and store the instrument in its carrying case when not in use. Thus, you will minimize the risk of damages caused by unmeant detrimental mechanical effects, which, as the case may be, can destroy the internal sensor.

Please consider the technical data in regard to the environmental conditions (see p. 30 chapter 7.0 Technical Data). The instrument is equipped with a temperature compensation for 0°...40°C (max. 85°F). Use the instrument in this temperature range only.

For test stand mounting please only use the fitting holes and the tapped holes on the rear side of the instrument.

Force gauges are delivered in a carrying case. Especially devices for small forces should always be stored and transported in this protective case, because the internal sensor may be harmed by bumps and shocks.



FMI-B FMI-S

Bedienungsanleitung
Operation manual

Notice d'utilisation

Instrucciones de servicio

Istruzioni per l'uso

2.0 Before starting operation

Please inspect the content before taking the instrument into operation.

Should, despite our careful inspection, parts be missing, please notify your dealer or our service team: service@alluris.de.

The following table provides you with an overview of the delivery's volume as well as the single components' part numbers in case you want to purchase them later.

For more accessories see www.alluris.de.



2.1. Scope of supply

| | FMI-B10 FMI-S10 | FMI-B20 FMI-S20 | FMI-B30 FMI-S30 | FMI-B50 FMI-S50 |
|--|--------------------------------|--------------------|--------------------|--------------------|
| ● Standard scope of delivery (part no.) ○ Optional accessories (not included) | | | | |
| Protection case | ● | ● | ● | ● |
| Base unit (Type label with serial number and measuring range on the back) | ● | ● | ● | ● |
| Quickstart manual | ● | ● | ● | ● |
| Hook (FMI-962M6 / FMI-962M10) | (● / -) | (● / ●) | (● / ●) | (● / ●) |
| Cone tip (FMI-965M6 / FMI-965M10) | (● / -) | (● / ●) | (● / ●) | (● / ●) |
| Flat head (FMI-961M6 / FMI-961M10) | (● / -) | (● / ●) | (● / ●) | (● / ●) |
| Notched head (FMI-964M6 / FMI-964M10) | (● / -) | (● / ●) | (● / ●) | (● / ●) |
| Handles (FMI-941M10 or T-Handle FMI-942M10) | ○ | ○ | ○ | ○ |
| Universal VAC charger with EC-, UK- and US wall plug connector and USB-cable (FMI-946) | ● (for all FMI-B force gauges) | | | |
| Calibration certificate with data (FMI-800N1 or FMI-800N2) | ○ | ○ | ○ | ● |
| USB interface cable (FMI-931USB) | - | - | ○ | ● |
| FMI_Connect software (FMI-972) | - | - | ○ | - |
| FMI_Analyze software (FMI-975) | - | - | ○ | ● |
| Cable for digital I/O's (FMI-934SO) | - | - | ○ | ○ |
| Laser distance sensor (FDM-250) | - | - | - | ○ |

FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

2.2. Applying force by hand

Hand held force gauges series FMI-B and FMI-S can be utilized for on-site measurement. In order to apply force manually, the housing comprises three M10 tapped holes to attach handles, two on each side and one opposite the measuring axis (Part no.: Handles FMI-941M10 and T-Handle FMI-942M10).



T-Handle



Side handles for easy handheld operation

2.3. Energy Harvesting (FMI-S)

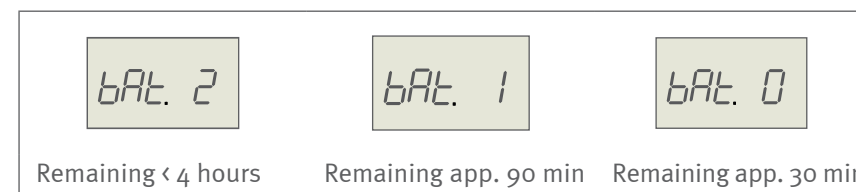
The instrument utilizes, also when turned off, the ambient light at the work place as energy source and charges an internal storage unit, to ensure that tests can be made even if the solar cell is covered for a short while. After storing the instrument for more than 2 month in the dark, you should expose it to light for at least 8 hours in the regular working environment (> 250 Lux) before use. Or you may use the USB-cable to charge the instrument quickly. A buffer battery maintains in any case the basic functions of the instrument.

2.4. Charging the battery (FMI-B)

Force gauges of the FMI-B series have a LiPo-battery with a capacity up to 150 hours of operation. Upon each start the remaining capacity is measured. If it is less than about 4 hours „bat.2“ is displayed on the screen. Then charge the battery by connecting the instrument via USB cable to the supplied AC charger or to a PC.

From the state of charge „bat.1“ or lower the indication will remain on the display until you confirm by pressing the 0 key.

Indicating the battery's state of charge



FMI-B FMI-S

Bedienungsanleitung
 Operation manual
 Notice d'utilisation
 Instrucciones de servicio
 Istruzioni per l'uso

2.5. Overview



Hirose-Socket

| Function | Accessory part | Part number |
|---------------|-------------------|-------------|
| Data transfer | Foot switch | FMT-936 |
| Digital I/O's | Data cable | FMI-934SO |
| Motor control | Drive unitcontrol | FMT-220.MK |

USB 2.0 Mini-B-socket



| Function | Accessory part | Part number |
|---|---------------------------|-------------|
| Data transfer to MS Excel ¹ | Software FMI_Connect | FMI-972 |
| Data analysis on PC | Software FMI_Analyze | FMI-975 |
| Data analysis on PC with motor controller | Software FMI_Analyze Pro+ | FMI-976 |
| Data transfer to CAQ-software | COM-Bridge | FMI-977 |
| Power supply and charging | USB cabel | FMI-946 |
| <i>For series FMI-B50 and FMI-S50:</i> | | |
| Connection to laser distance sensor | Laser-Distance-Sensor | FDM-250 |

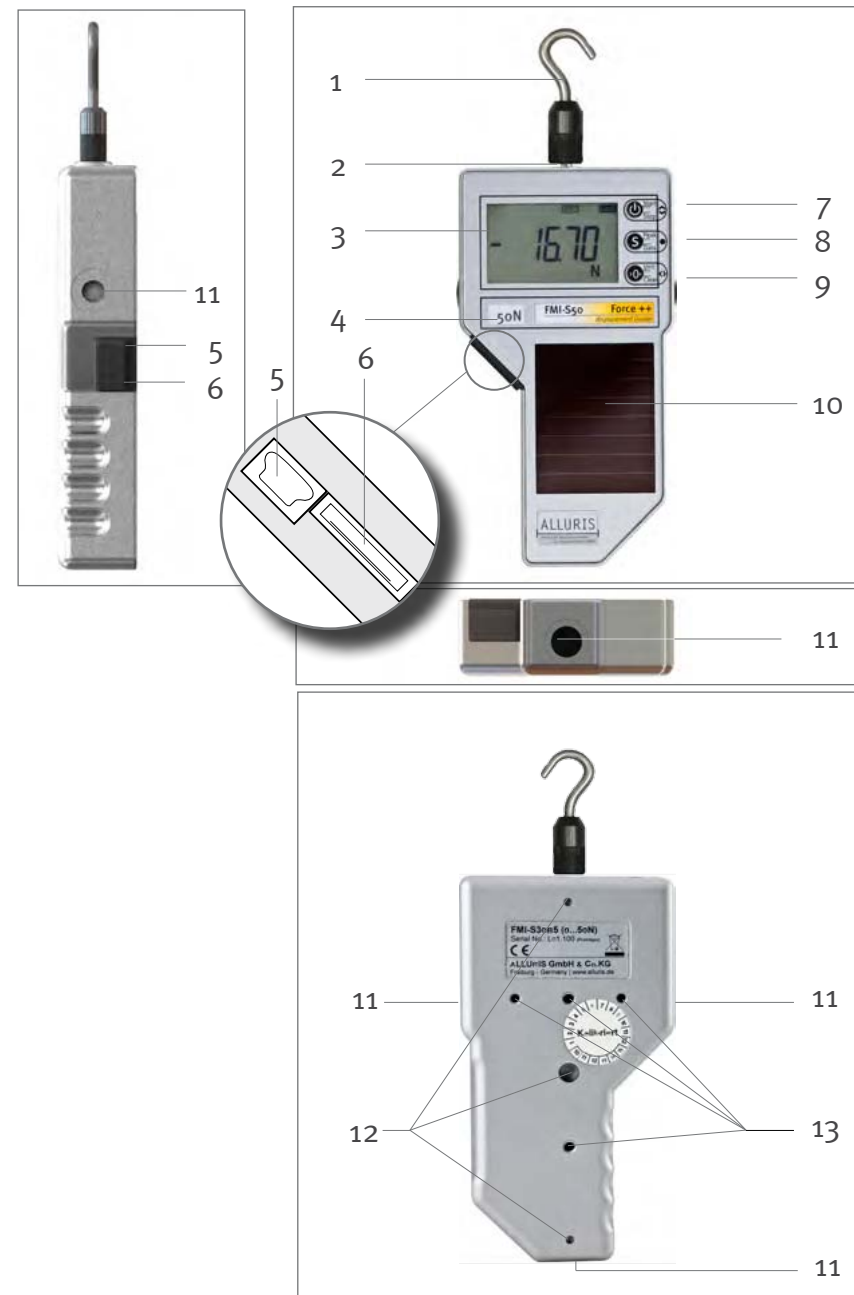


FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

2.6. General remarks

| | |
|----|---|
| 1 | Exchangeable attachments to apply force |
| | <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Standard</p>  </div> <div style="text-align: center;"> <p>Special accessories</p>  </div> </div> <p>(for more accessories see www.alluris.de)</p> |
| 2 | Measuring axle for attachments to apply force (M6, bzw. M10 (>1kN), L=13mm) |
| 3 | Display Adapts automatically to changing positions with a 180° screen rotation upon start (e. g. for test stand mounting) |
| 4 | Measuring range |
| 5 | USB 2.0 Mini-socket (series FMI-B30 und FMI-S30 and higher) also for charging the LiPo-battery of FMI-B devices and fast charging of FMI-S devices after long storage in the dark |
| 6 | 10-pole Hirose socket (series FMI-B30 und FMI-S30 and higher) for digital I/O's, service, calibration etc. |
| 7 | I-key On/Off (press 2 seconds); Start/Stop measurement; select next item of menus |
| 8 | S-key select operation mode; save data to the memory during the measurement; show measuring results; select/deselect setting menus (press 2 secs); select memory |
| 9 | O-key Taring manually; select settings; select measurement units |
| 10 | Solar cell (FMI-S) for in- and outdoor use. Collects energy even if the instrument is switched off. |
| 11 | Tapped holes (M10) to attach side handles or T-handle |
| 12 | Holes for location pins (8mm and 3mm without thread) for alignment in test stands |
| 13 | Tapped holes (M4 and M5) for test stand mounting |



FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

3.0 Starting Operation

3.1. Preparing the Measurement

The internal sensor works bi-directional, i.e. compression and tension. By default the instrument is attuned to display a positive value if compressive force is applied at the measurement axle, and a negative value if tensile force is applied. You may change this setting (see p. 17 chapter 4.2.2 Changing +/- prefix for push or pull operations (P12)).

Select an appropriate attachment for compression forces or use the hook to apply tension forces. An extension rod should be used only if the accessibility of the object cannot be achieved without. [Special adapters](#) for specific applications can be found on www.alluris.de.

Mount attachments by hand only. Do not use tools to screw adapters onto the instrument's threaded axle. Radial and side forces can damage the instrument.

As gauges are often used in the scope of destruction-tests or for appraising security-relevant thresholds you should always first become familiar with the potentially resulting risks – broken fragments, sudden change of force, crush risk – and, if necessary, take counter actions.

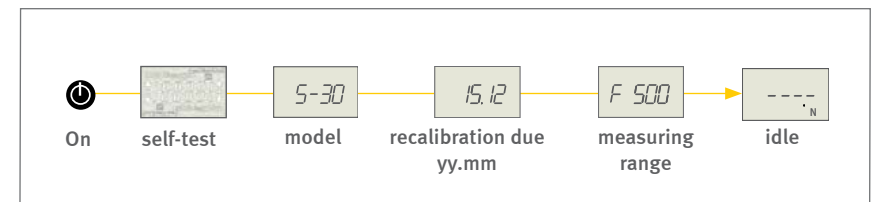
3.2. Turning the instrument ON/OFF

Switch the instrument on by pressing the I-key. After a self-test routine three sets of information are shown to inform you about the model number, the recommended date of next calibration and the nominal measuring range (Fn). Once the routine is completed the instrument is ready for use (idle).

With each start of the measurement an automatic taring (auto-tara-function) is performed to eliminate the gravitation force influence of the weight of measuring axis and other installed attachments which



Information sequence as shown when starting the instrument



FMI-B FMI-S

Bedienungsanleitung

Operation manual

Notice d'utilisation

Instrucciones de servicio

Istruzioni per l'uso

differs with the position of the instrument. At the same time the temperature offset is readjusted.

To turn the instrument off press the I-key.

If no external energy source is connected to the instrument, measurements can be automatically stopped after a defined period of time (see p. 17 chapter 4.2.4 Automatic measuring stop – Auto-Stop for FMI-S (P14)).

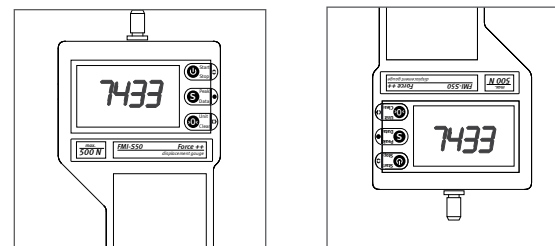
After five minutes of inactivity the auto-off function will turn the instrument off automatically if no external energy source is connected. You may adjust the period of time to your own needs (see p. 18 chapter 4.2.6 Auto-Off function (instrument off) (P15)).

Force gauges with LiPo-battery (series FMI-B) measure upon each start the remaining capacity. If it is less than about 4 hours „bat.2“ is displayed on the screen. In this case charge the battery by connecting the instrument via USB-cable to the supplied AC charger or to a PC.

3.2.1. Autoreverse display

If the force gauge is mounted head-down (e. g. for test stand mounting) the display adapts automatically with a 180° screen rotation upon start.

Autoreverse display

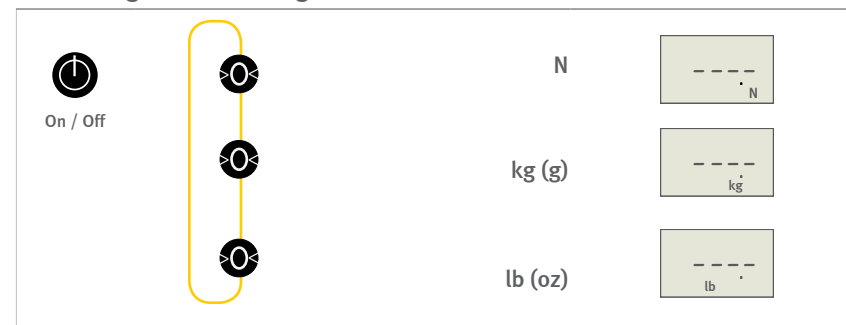


Display rotates when mounted head-down

3.2.2. Selecting measuring units

If the instrument is idle you can select the desired measuring unit by pressing the O-key.

Selecting the measuring unit



FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

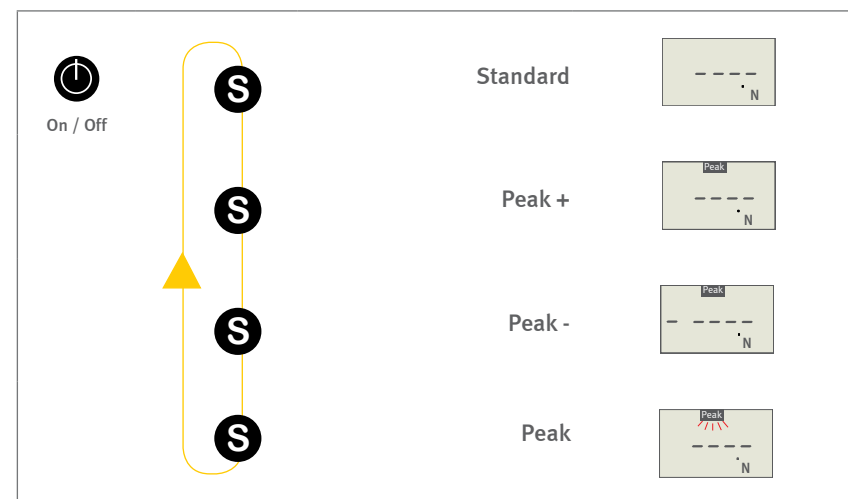
3.3. Selecting the operation mode

If the instrument is idle you can choose different modes of operation.

Selecting a specific operation mode you decide which values the instrument shall display and the measuring frequency (instruments series FMI-B10 and FMI-S10 have no Peak-option and high-speed-measuring is not available).

Select the operation mode and the measuring frequency by pressing the S-key.

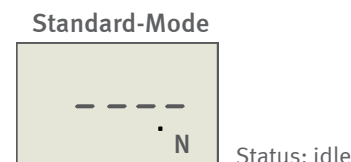
Selecting operation modes



Selecting the operation mode with the S-key (in series FMI-B10 und FMI-S10 the Peak-option is not available)

3.3.1. Standard mode

In standard mode the actual measured value is displayed. By default the display refresh rate is 10 Hz. In the settings menu P13 you may change the refresh rate (see p. 17 chapter 4.2.3 Display-refresh rate (P13)).



3.3.2. Peak value detection with Peak modes

The peak modes allow to detect peak values.

In **Peak +** and **Peak -** mode the display works as a drag indicator, that moves forward on increasing values. With temporarily decreasing values the display remains unchanged.

FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

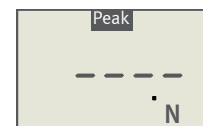
Peak + (with drag indicator)
The display shows a Peak symbol.

By default the instrument indicates the peak value for compression operations.

You may change the prefix (see p. 17 chapter 4.2.2 Changing +/- prefix for push or pull operations (P12)).

Instruments series FMI-B20 and FMI-S20 and higher can measure with increased frequency (high-speed measuring). The high frequency allows to measure the peak value precisely at the moment of rupture or tearing.

Peak + Modus



Display shows Peak symbol

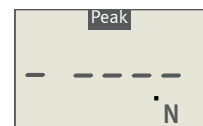
Peak – (with drag indicator)
The display shows a Peak symbol and the prefix minus.

The instrument indicates the peak value for tension operations.

You may change the prefix (see p. 17 chapter 4.2.2 Changing +/- prefix for push or pull operations (P12)).

Instruments series FMI-B20 and FMI-S20 and higher can measure with increased frequency (high-speed measuring). The high frequency allows to measure the peak value precisely at the moment of rupture or tearing.

Peak – Modus



Display shows Peak symbol and negative prefix

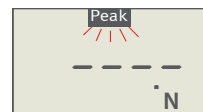
Peak (series FMI-B20 and FMI-S20 and higher)

The display shows a flashing Peak symbol.

The instrument indicates the value that is measured at the time.

Instruments series FMI-B20 and FMI-S20 and higher can measure with increased frequency (high-speed measuring). The high frequency allows to measure the peak value precisely at the moment of rupture or tearing.

Peak-Modus



Display shows a flashing Peak symbol

FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

3.4. Start/Stop Measurements

Switch the instrument on and bring it into the measurement position.

Start:

Start the measurement by pressing the I-key. The display shows „0.0“.

Measure:

The display shows the current measured value or the peak value (see p. 10 chapter 3.3 [Selecting the operation mode](#)). The symbol of the measuring dimension flashes as long as the instrument is measuring.

Stop:

By pressing the I-key the measuring cycle is completed.

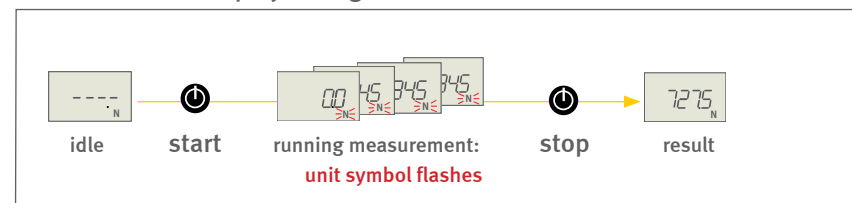
After stopping the measurement, the display shows the measured value. Depending on the selected operation mode, this is either the last measured value or the respective peak value. The dimension unit is now displayed continuously without flashing.

The auto-stop-function (see p. 17 chapter 4.2.4 [Automatic measuring stop – Auto-Stop for FMI-S \(P14\)](#)) allows to stop a measurement automatically, if measured values remain stable within a defined period of time. The feature can be deactivated if the instrument is connected to an external power source.

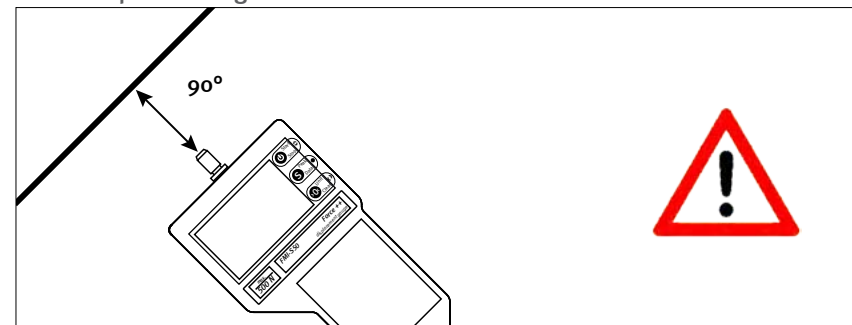
Please make sure that force – both compressive and tensile forces – is always applied perpendicularly to the measuring axle. The measuring results will be incorrect if the force axle is not aligned perpendicularly.

Forces that are not applied perpendicularly can damage the internal sensor especially of gauges with a measurement range designed for minute forces, when the radial or laterally operating forces are too big.

Indications on display during measurements



Correct positioning of the instrument



Keep the instrument always perpendicular to the probe

FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

3.5. Taring

On each start of the instrument the auto-tara function performs an automatic taring to eliminate the gravitation force influence of the weight of the sensor, the measuring axis and other installed attachments according to the position of the instrument. At the same time the temperature offset is readjusted.

The auto-tara-function can be deactivated, e.g. to continue a pausing measurement (see p. 18 chapter 4.2.7 Automatic taring function – Auto-Tara (P16)). Due to the very high sensitivity of the instrument even slight movements or minute vibrations in the environment are captured and displayed with values uneven zero.

In standard mode and in Peak mode you can tare the instrument during a measurement by pressing the O-key.

3.6. Displaying measured values

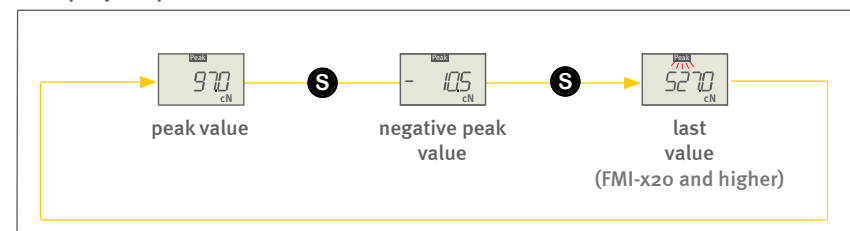
During measurements in standard mode the display shows the measured real-time value. In all of the three peak modes the instrument captures and stores beside the actual measured value also the positive and negative peak value. In **Peak+** mode or **Peak –** mode either the peak push value or peak pull value are displayed during measurements according to the chosen prefix settings. In **Peak** mode the real-time value is indicated during the measurement.

By pressing the S-key the display shows the measured values one after the other. In **Peak+** mode first the positive peak value is shown. By pressing the S-key next the negative peak value appears and after pressing the S-key once again the last measured value is displayed.

In **Peak –** the display sequence starts with the negative peak value. If the measurement has been taken in **Peak** mode (series FMI-B20 and FMI-S20 and higher), the Peak symbol flashes accordingly.

You start the next measurement without deleting the peak memory, by pressing the I-key. Peak values remain stored in the memory as long as a higher peak value is measured.

Peak modes:
Display sequence of stored values



FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

3.6.1. Resetting the drag indicator

In the operation modes **Peak+** or **Peak-** you may reset the drag indicator by pressing the O-key at any time during the measurement. The instrument will then not be tared, but resets the display to the measured value at the time.

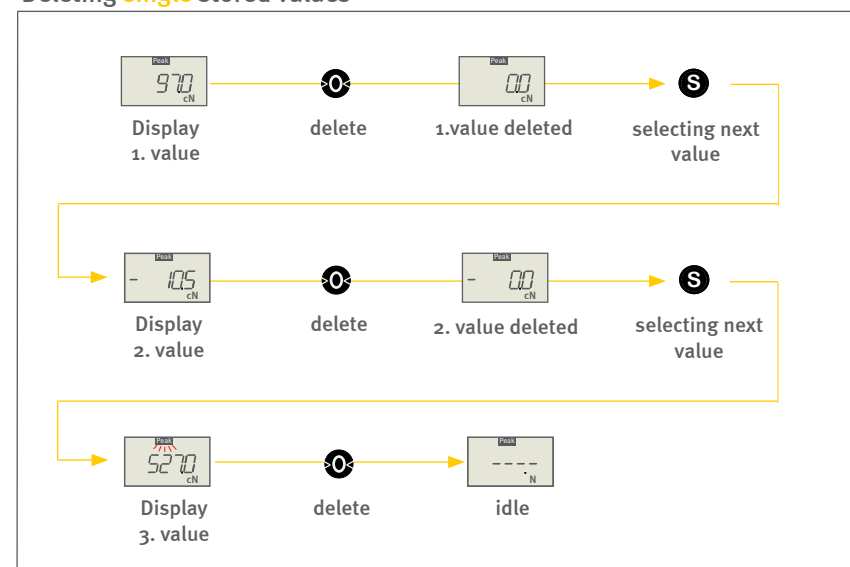
3.7. Clearing the memory

Memory can be cleared completely or selectively by pressing the O-key. If memory is completely cleared the display shows the idle symbol.

3.7.1. Deleting single values

In peak modes the stored values can be deleted one after the other by pressing the O-key. The display shows „0.0“ after having deleted a value. By pressing the S-key you can select the next stored value and proceed in the same way to delete the value. After having deleted all values from the memory, the display shows the idle symbol.

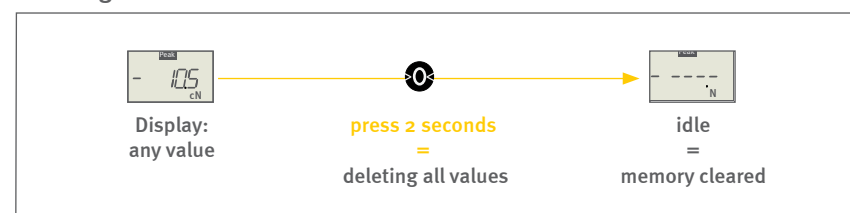
Deleting **single** stored values



3.7.2. Clearing memory completely

To clear the memory completely press the O-key for 2 seconds. If the memory is completely cleared the display shows the idle symbol.

Deleting **all** stored values



FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

4.0 Setting measurement parameters

4.1. Selecting the parameter menu

Several settings menus allow to customize the general functions and measurement settings of the instrument.

Series FMI-B30 and FMI-S30 and higher offer a memory and a statistics function as well as limit value functions. Each of these functions can be adjusted using the parameter menu.

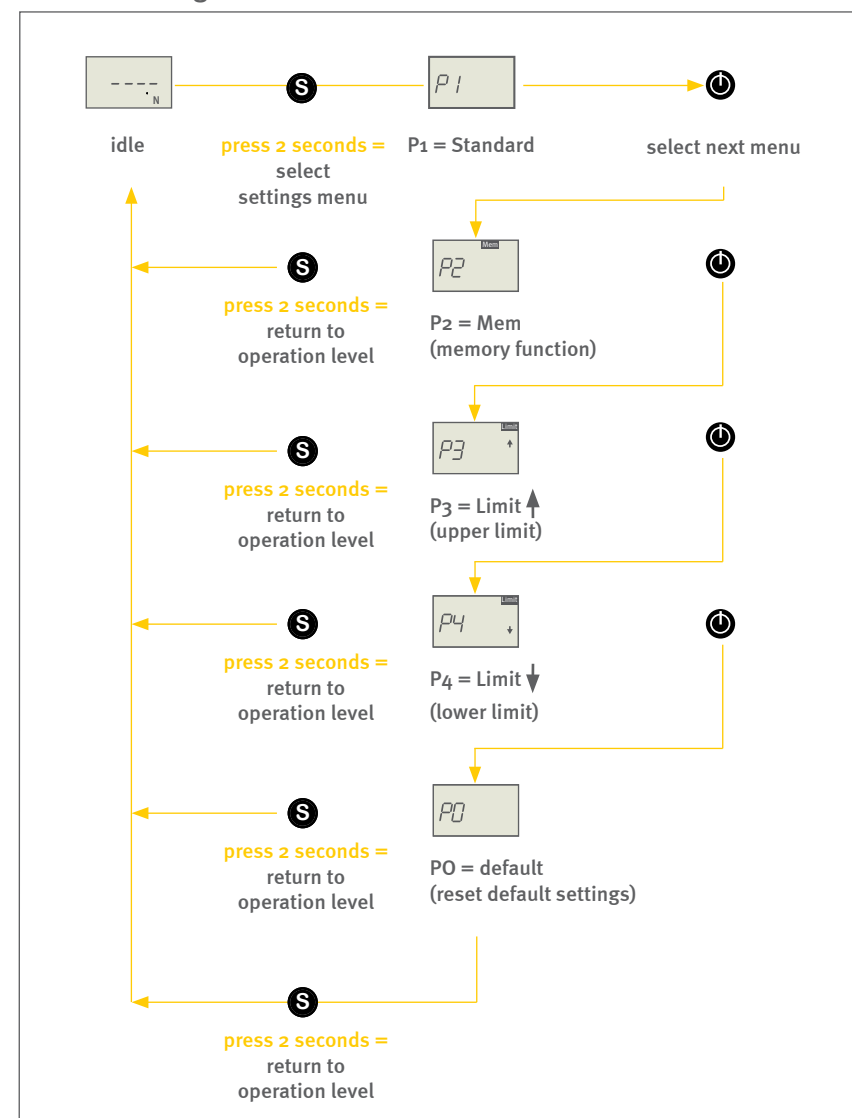
Select the parameter menu by pressing the S-key for 2 seconds starting from the idle status of the device. In the same way you return from any point of the parameter menu to the operation mode.

Pressing the I-key you select the following specific settings menus:

- P1 General settings
(see p. 16 chapter 4.2 General settings (P1))
- P2 Memory (FMI-B30 and FMI-S30 and higher)
(see p. 19 chapter 4.4 Memory and statistic functions (P2))
- P3 Upper limit (FMI-B30 and FMI-S30 and higher)
(see p. 24 chapter 4.5 Monitoring limit values (P3 und P4))
- P4 Lower limit (FMI-B30 and FMI-S30 and higher)
(see p. 24 chapter 4.5 Monitoring limit values (P3 und P4))
- PO Default settings
(see p. 19 chapter 4.3 Resetting factory defaults (PO))

Pressing the S-key for 2 seconds you return to the operation mode.

Select settings menus



FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

4.2. General settings (P1)

Menu P1 allows to adjust the general functions and settings of the force gauge.

The menu offers the following submenus:

- P11 Select dimensional units
- P12 Changing +/- prefix for push or pull operations
- P13 Select display-update frequency
- P14 Automatic measuring stop
- P15 Automatic switch off
- P16 Automatic taring

Select the submenus one after the other by pressing the O-key.

With the I-key you select the settings in the submenus. The actual set value flashes on the display will be set by leaving the submenu at this point. You can leave the submenu by selecting the next submenu pressing the O-key or by reverting to the menu on the level above.

By pressing the S-key you revert to the level above.

By pressing the S-key for 2 seconds you revert to the operation level.

4.2.1. Selecting dimensional units (P11)

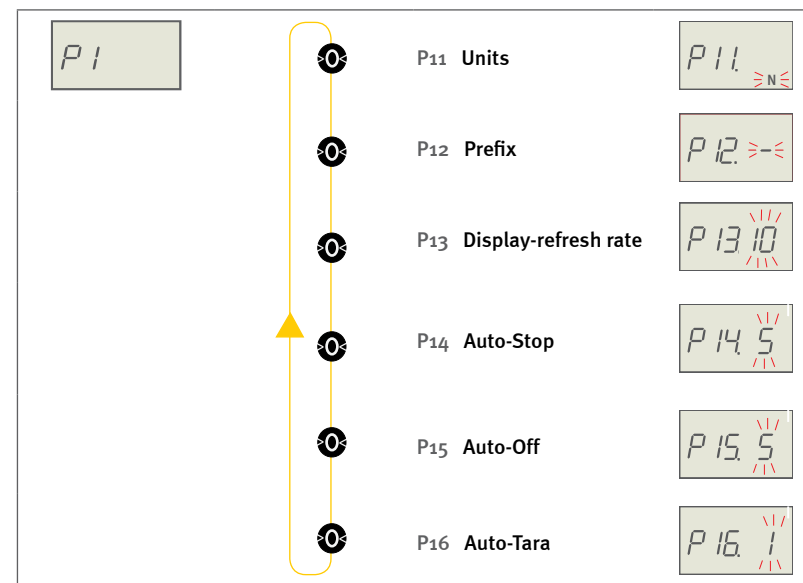
The SI-unit Newton (N) is set by default.

Submenu P11 allows to change the measuring unit displayed. Press the I-key to navigate between the options. The selected unit flashes on the display.

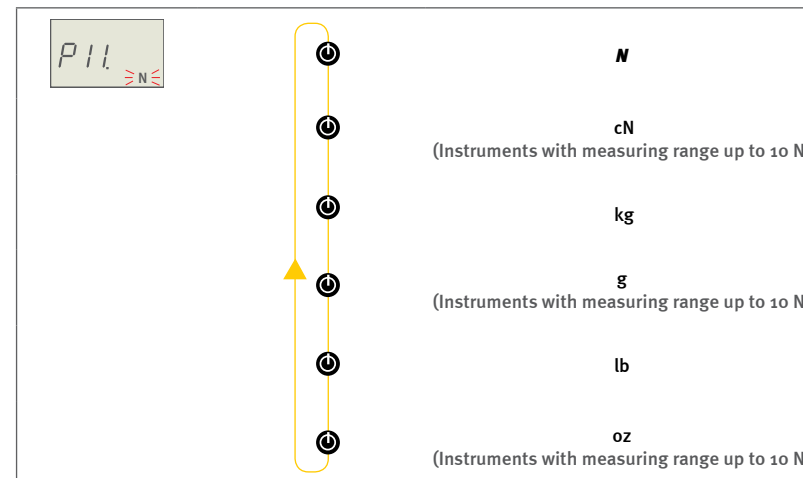
[Measuring range up to 10 N: N - cN - g - oz]

[Measuring range up to 50 N: N - kg - lb]

Selecting submenus in the menu P1 General settings



Example setting parameters:
P11 - Dimensional units



The selected measuring unit flashes on the display

FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

4.2.2. Changing +/- prefix for push or pull operations (P12)

By default pull forces applied to the measuring axle are displayed with negative prefix and push forces accordingly as positive values (without prefix). Submenu P12 allows to change the settings by pressing the I-key.

[Push () - Push (-)]

By pressing the S-key for 2 seconds you return to the operation level.

4.2.3. Display-refresh rate (P13)

The internal sensor captures forces with a frequency of 3,6 kHz. To ensure the legibility of the display the display-refresh rate is limited by default to 10 Hz. Submenu P13 allows to reduce this value further. Press the I-key to select the desired frequency rate.

[Refresh rate: 1 - 2 - 3 - 5 - 10 Hz]

By pressing the S-key for 2 seconds you return to the operation level.

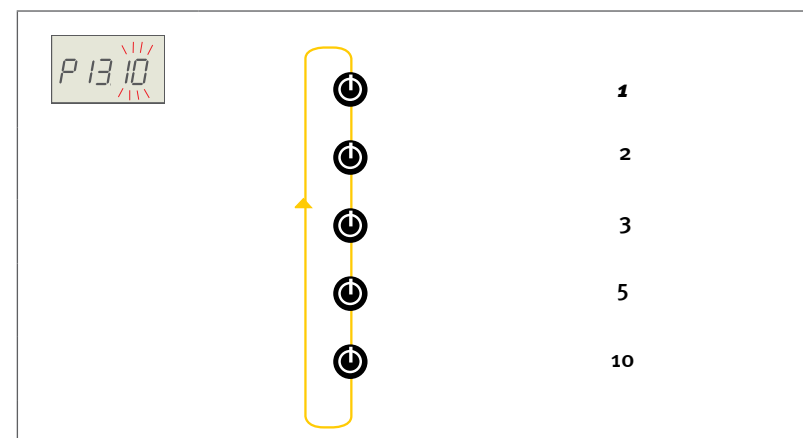
4.2.4. Automatic measuring stop – Auto-Stop for FMI-S (P14)

Measurements are stopped automatically when the measured values are stable for 5 seconds, if you run the device without USB-cable. Submenu P14 allows to adjust this period of time.

[Auto-Stop after: 5 - 10 - 20 - 30 seconds]

By pressing the S-key for 2 seconds you return to the operation level.

Example selecting parameter settings:
P13 - Display-refresh rate



The selected refresh rate flashes on the display

FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

4.2.5. Automatic measuring stop – Auto-Stop for FMI-B (P14)

Force gauges series FMI-B come as well as series FMI-S with an auto-stop function. Measurements are stopped automatically when measured values are stable over a defined period of time. The auto-stop function applies if the device is not connected to an external power supply. By default instruments series FMI-B are set to 0 = no auto-stop. Submenu 14 allows to adjust this function by pressing the I-key.

[Auto-Stop after: 0 - 10 - 20 - 30 seconds]

By pressing the S-key for 2 seconds you return to the operation level.

4.2.6. Auto-Off function (instrument off) (P15)

Force gauges running without USB cable are turned off, if no button is pressed for more than five minutes - as long as you are not working in the settings menus. Submenu 15 allows to adjust this period of time by pressing the I-key.

[Auto-Off after: 1 - 2 - 3 - 5 - 10 - 30 - 60 - 90 minutes]

By pressing the S-key for 2 seconds you return to the operation level.

4.2.7. Automatic taring function – Auto-Tara (P16)

Instruments are taring automatically when starting a measurement. Thus the influence of the installed attachments according to the position of the instrument and temperature variations between measurements are eliminated.

To continue with a pausing measurement it can be necessary to deactivate this function. Submenu 16 allows to deactivate this function with the I-key.

[Auto-Tara: 1 = On - 0 = Off]

By pressing the S-key for 2 seconds you return to the operation level.

FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

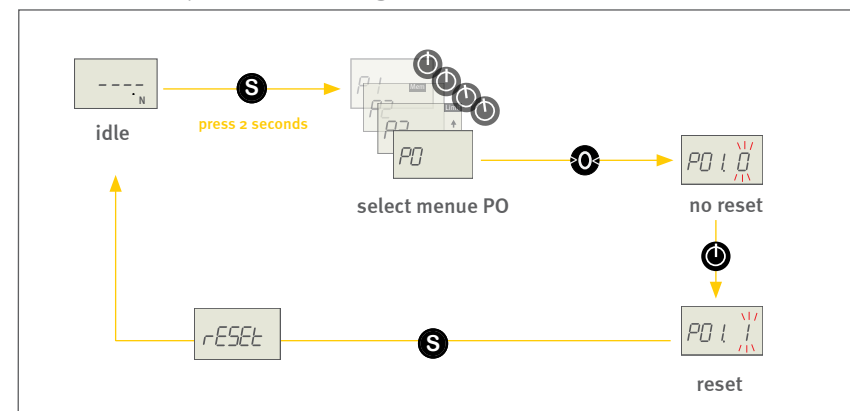
4.3. Resetting factory defaults (PO)

Submenu PO allows to reset all settings to factory defaults. Select menu PO and press the O-key. The display shows PO1 and a flashing O (= no reset). By pressing the I-key you can select 1 (= reset). Confirm by pressing the S-key and all settings are reset to factory defaults. The display shows shortly rESEt.

If you decide not to reset the settings after having chosen 1, select again O by pressing the I-key und return to the operation level by pressing the S-key.

[Reset factory defaults: 0 = no Reset - 1 = Reset]

Reset factory default settings



4.4. Memory and statistic functions (P2)

4.4.1. General considerations on memory functions

Force gauges series FMI-B30 and FMI-S30 and higher are able to capture and memorize measuring values either as a sequence of single values (Single) or as continuously saved measuring cycles (Series), which can be displayed with simple statistical functions (Maximum, minimum, average and standard deviation).

$$DEV = \frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2$$

For datatransfer via USB to a PC we recommend the software FMI_Connect (Part no.: FMI-972). More detailed tests, displaying larger numbers of single values, a more comprehensive analysis of measurement results and test stand applications are possible with the software FMI_Analyze (Part no.: FMI-975).

FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

4.4.2. Setting memory and statistics functions

To activate the memory function enter the settings menu by pressing the S-key for 2 seconds and select menu P2 with the I-key.

On the display appears the Mem symbol.

Enter the menu P21 by pressing the O-key and select with the I-key the desired memory function:

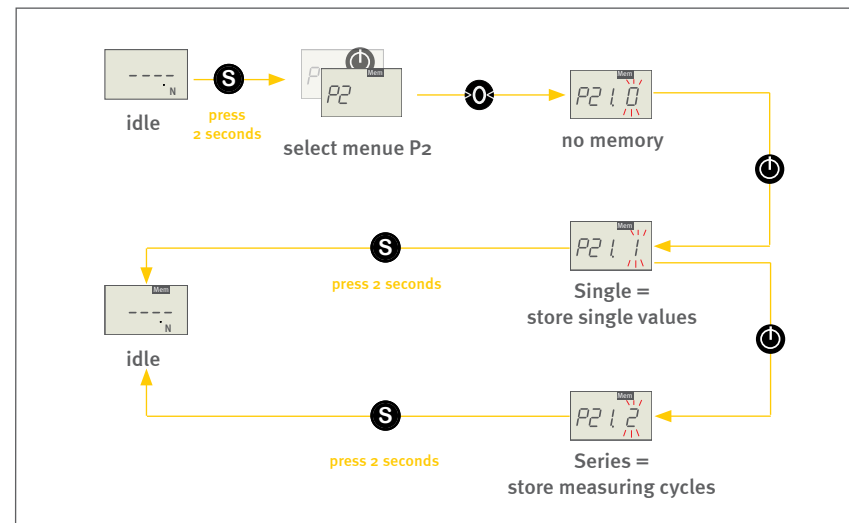
- 0** = no memory
- 1** = save single values (Single)
- 2** = save measuring cycles (Series)

Pressing the S-key for 2 seconds the instrument returns to the operation level in idle status. To confirm activated memory the display now shows the according Mem symbol (in addition to the symbols of other possibly selected features).

4.4.3. Saving single values (Single)

Having selected the Single function, with each pressing of the S-button a single value is stored during a running measurement. You may repeat this procedure during a measurement or within several subsequent measurings up to 1000 times.

Activate memory and statistics



FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

4.4.4. Saving measuring cycles (Series)

Having set the Series feature, with start of the measurement cycle all measured values are recorded.

During the recording the Mem symbol (and the unit symbol) in the display flashes.

All measured values are saved according to the display-refresh rate. In addition - if a peak mode is selected - the respective peak values are captured in high-speed mode and stored. A series of measurements can capture up to 1000 individual values.

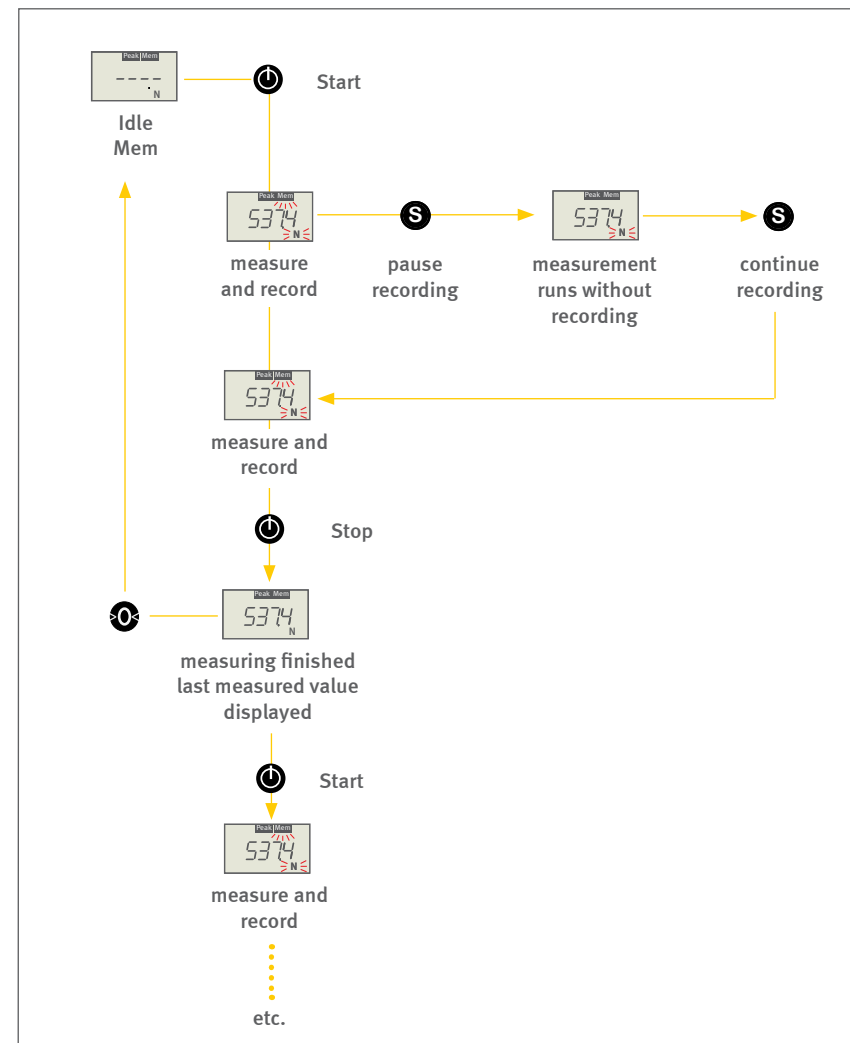
You may pause the recording of measurement values while the measuring keeps running and restart the recording, both by pressing the S-key.

Recording ends with the termination of the measurement by pressing the I-key or by the auto-stop function.

Restarting a measurement adds the newly captured values to the already stored values in the memory.

The memory content can be cleared completely by pressing for 2 seconds the O-key or by turning the instrument off.

Speichern von Messreihen



FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

4.4.5. Displaying statistics

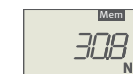
After having finished a measurement, you may review the statistical results of the measurement. By pressing the S-key you call the different statistical values (see adjacent chart).

Displaying the statistics sequence

Standard mode is set:

last measured value

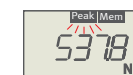
S



Peak modes are set:

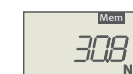
Peak (last measured value)

S



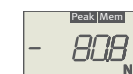
Peak + (positive peak value)

S



Peak - (negative peak value)

S



Statistical values

Maximum value
in positive sense

S



Minimum value
in positive sense

S



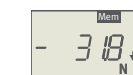
Maximum value
in negative sense

S



Minimum value
in negative sense

S



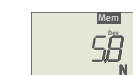
Average value
(arithmetic average) Avg

S



Standard deviation Dev

S



FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

4.4.6. Recalling memory

All recorded values can be downloaded by software in addition to the displayed statistical values (series FMI-B30 and FMI-S30 and higher). If the device has not been turned off this can be done even after having finished a measurement.

With instruments series FMI-B measurements can be carried out without connection via USB cable. The device can be subsequently connected to the PC and data can be read out then by software.

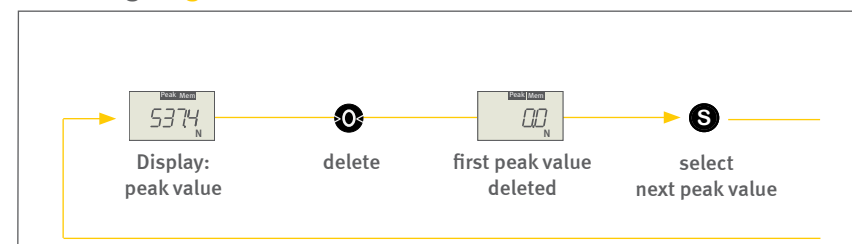
Devices of series FMI-S have to be connected to PC already during measurements.

4.4.7. Clearing memory

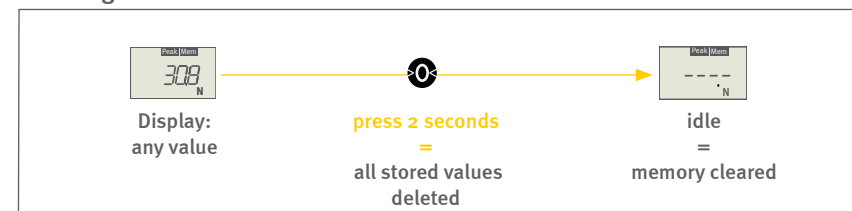
You have three possibilities to clear the memory:

- Single peak values can be deleted by pressing the O-key. The display shows „0.0“ when the value is deleted.
- By pressing the O-key for 2 seconds all recorded values (both statistical values and measured values) will be entirely cleared.
- Turning the instrument off deletes the memory content (both statistical values and measured values) completely.

Deleting **single** stored values



Deleting **all values** stored values



FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

4.5. Monitoring limit values (P3 und P4)

Force gauges series FMI-B30 and FMI-S30 and higher can compare the actual measured value with individually set upper or lower limit values. The surpassing of the thresholds is indicated on the display and signal outputs are switched accordingly. To utilize the output signals a data cable for digital I/Os (part no.: FMI-93450) is needed (see p. 28 chapter 5.2.3 Data cable for digital I/O's). The limit function replaces the overload function of the instrument (provided the set limit value does not exceed the admissible overload).

4.5.1. Working with limit values

If a limit value is set (at least one of the limit values is uneven zero) the limit function is activated and the display shows the Limit symbol. As soon as the measured value is smaller than the lower limit value a downward pointing arrow is shown on the right side of the display. Accordingly an upward pointing arrow is shown if the measured value surpasses the upper limit value. No arrow appears if the measured values are within the limits.

A reset of the instrument sets limit values to zero.

4.5.2. Setting limit values

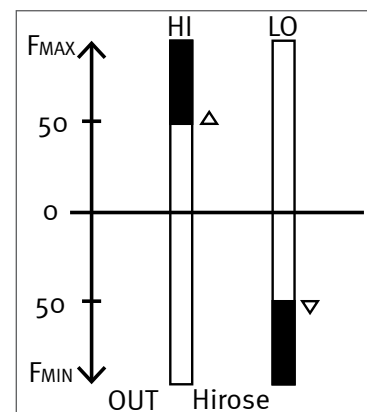
Select the menu P3 to set the upper limit values and P4 to set the lower limit values.

Pressing the O-key you select the digit. There are six digits (a prefix and five numbers). The active digit flashes. By pressing the I-key you select the desired number. Any pressing of the key increments by one.

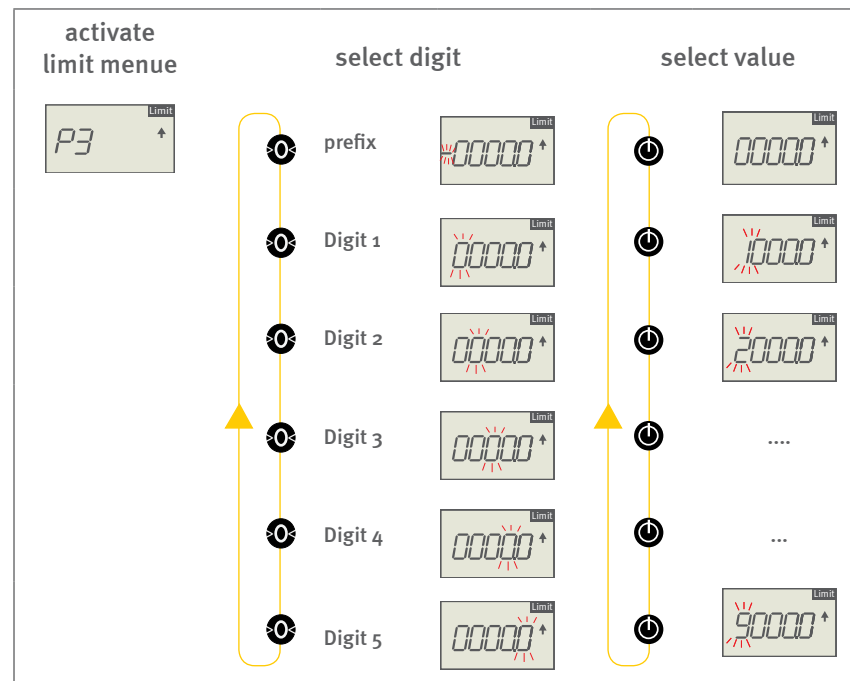
By pressing the S-key you save the selected values and return to the upper menu level.

To set the lower limit value, select menu P4 and proceed as described above.

Working with limit values



Setting the upper limit



FMI-B FMI-S

Bedienungsanleitung
Operation manual

Notice d'utilisation

Instrucciones de servicio

Istruzioni per l'uso

4.5.3. Deleting limit values

You delete limit values by setting new values as described above. If all values are set to zero the limit value function is deactivated.

Resetting the instrument to factory defaults sets back all limit values to zero.

5.0 Interfaces (series FMI-B30 und FMI-S30 and higher)

Force gauges series FMI-B30 and FMI-S30 and higher can transfer measured data and incidents like overload or the exceeding of limit values via USB (2.0) or Hirose-cable to a PC or a motor driven test stand.

5.1. Data transfer via USB

For data transfer via USB you need a USB cable (part no.: FMI-931USB) and a software with the device driver.

5.1.1. Software FMI_Connect

The software FMI_Connect (part no.: FMI-972) enables to transfer data from Alluris force gauges to MS Excel and generate graphs. You may control the instrument via PC as well as set parameters.

Install the software FMI_Connect before connecting the instrument first time to your PC or notebook, in order to ensure the instrument is detected automatically. Use FMI_S-Connect for series FMI-S and FMI_B-Connect for series FMI-B from the installation CD.

Software FMI_Connect



Screenshot interface

FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

5.1.2. Software FMI_Analyze

The software FMI_Analyze (part no: FMI-975) allows real-time visualization of your measuring results. The captured force vs. time or force vs. distance diagrams can be evaluated online and real time with threshold values, envelope or failure lines, windows with entrance and leaving definition. Further the software allows to manage results easily and to generate reports.

FMI_Analyze can be utilized also to configure the three additional digital outputs according to specific applications.

5.1.3. Software FMI_Analyze Pro+

The software FMI_Analyze Pro+ (part no.: FMI-976) offers basically all analyzing functions as FMI_Analyze. Furthermore the software package allows to control the optional motor for test stands series FMT-220 and enables the setting of parameters for straight forward test stand applications.

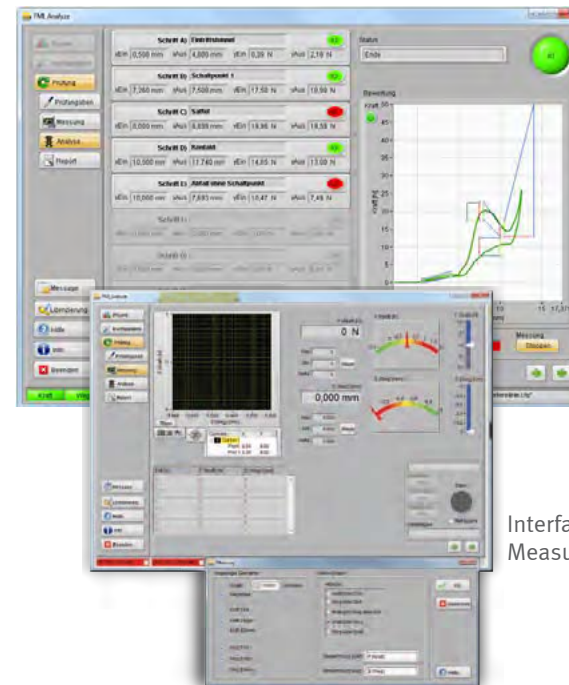
5.1.4. Software COM-Bridge

The software COM-Bridge allows direct data transfer from force gauges with USB interface to PC applications (e. g. Procella/Q-DAS, specific applications etc.).

Data transfer can be configured to be carried out via S-key on the instrument or an external foot switch. In the latter case connect a foot switch (part no.: FMI-936) with Hirose connector to the Hirose-socket (see p. 27 chapter 5.2.1 Foot switch for data transfer).

Note: Activate the memory function before using the COM-Bridge software (see p. 20 chapter 4.4.3 Saving single values (Single)).

Software FMI_Analyze



Interface:
Evaluation protocol

Interface:
Measuring

Software COM-Bridge



Screenshot interface

FMI-B FMI-S

Bedienungsanleitung

Operation manual

Notice d'utilisation

Instrucciones de servicio

Istruzioni per l'uso

5.1.5. Laser distance sensor

For real-time capturing of force vs. distance data force gauges series FMI-B50 and FMI-S50 and higher can be combined to a laser distance sensor. This allows a measurement under conditions of chronological synchronism.

The laser distance sensor is directly mounted to the force gauge and connected via USB cable. A non-contact measurement is carried out on the test object or on a reference mark.

Alluris sensors cover a measuring range from 50 mm (FDM-250B5) or 100 mm (FDM-250C1) with a distance of 25 mm respectively 45 mm to the reference mark.

5.2. Hirose-Socket

Force gauges series FMI-B30 and FMI-S30 and higher have a 10-pole Hirose-socket for several extension options and service functions.

5.2.1. Foot switch for data transfer

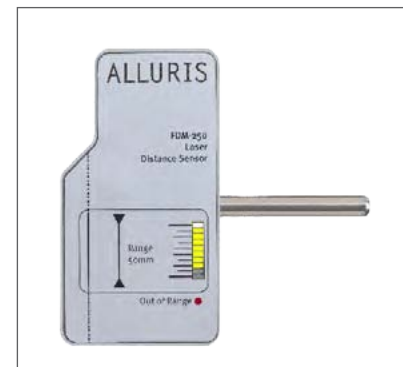
A foot switch with Hirose-connector (part no.: FMI-936) to initiate data transfer can be connected. Combined with the software COM-Bridge data are easily transferred to PC applications such as CAQ software. The foot switch needs no additional power supply.

Length of cable: app. 3 m.

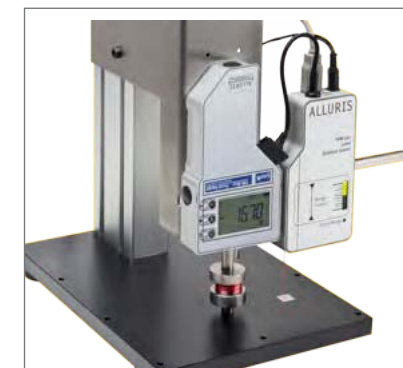
5.2.2. Drive control

Connected to a motor driven test stand the force gauge allows to start elementary driving profiles. Parametrisation is done via software FMI_Analyze Pro+ (part no.: FMI-976).

Laser distance sensor



Suitable for FMI-B50 and FMI-S50



Laser sensor mounted to a test stand

FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

5.2.3. Data cable for digital I/O's

Cable with Hirose-socket (part no.: FMI-934SO):

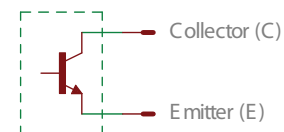
- 3VDC power supply
- Digital input
- Trigger signal for synchronized measuring frequency
- Digital output (setting via FMI_Analyze)
- Digital limit/overload output

Cable assignment wire end

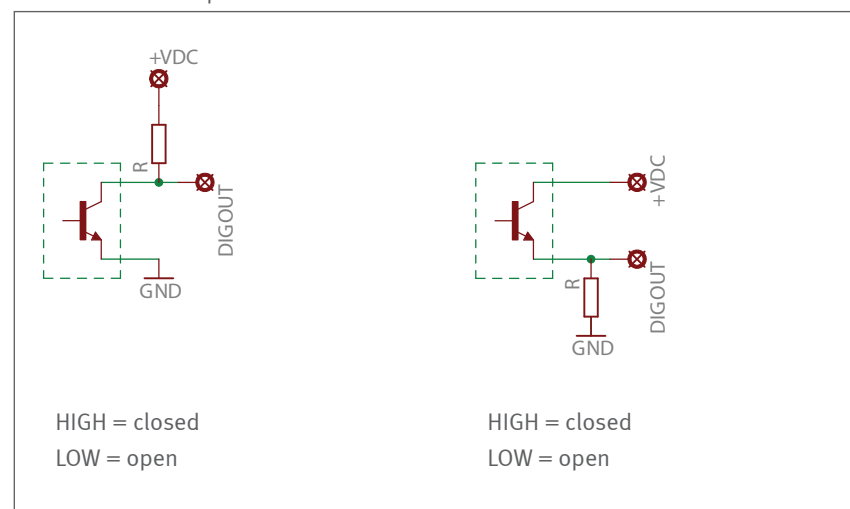
| | Colour | Assignment | Function |
|----|-----------------------------|----------------|--|
| 1 | Weiss / White | Supply 3VDC | 3VDC supply |
| 2 | Braun / Brown | GND | |
| 3 | Grün / Green | DIGIN1 | Digital input |
| 4 | Gelb / Yellow | TRIGGER_OUT(C) | Trigger signal measuring frequency |
| 5 | Grau / Grey | TRIGGER_OUT(E) | |
| 6 | Orange / Orange | DIGOUT1(C) | Digital output setting via FMI_Analyze |
| 7 | Blau / Blue | DIGOUT1(E) | |
| 8 | Rot / Red | DIGOUT2(C) | |
| 9 | Schwarz / Black | DIGOUT2(E) | |
| 10 | Violett / Violet | DIGOUT3(C) | |
| 11 | Schwarz-Weiss / Black-White | DIGOUT3(E) | |
| 12 | Rot-Weiss / Red-White | LIMIT_MAX(C) | Digital limit/overload output |
| 13 | Weiss-Grün / White-Green | LIMIT_MAX(E) | |
| 14 | Braun-Weiss / Brown-White | LIMIT_MIN(C) | |
| 15 | Weiss-Gelb / White-Gelb | LIMIT_MIN(E) | |

Connecting the digital outputs

Output Open Collector NPN



Connection examples



FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

6.0 Test stand application of force gauges

The rugged aluminium die cast housing of the force gauges enables the use in test stands. Appropriate tapped holes for mounting are at the rear of the housing.

Please pay attention on that force effects are carried out perpendicularly to the measuring axle. To align the instrument properly there are two holes for locating pins $D = 3$ ($t = 3$) and one hole $D = 8$ ($t = 8$). To mount the device firmly to the stand there are two tapped holes $M4$ ($t = 6$) and two $M5$ ($t = 8$). Please consider the tap hole depth of the screws.

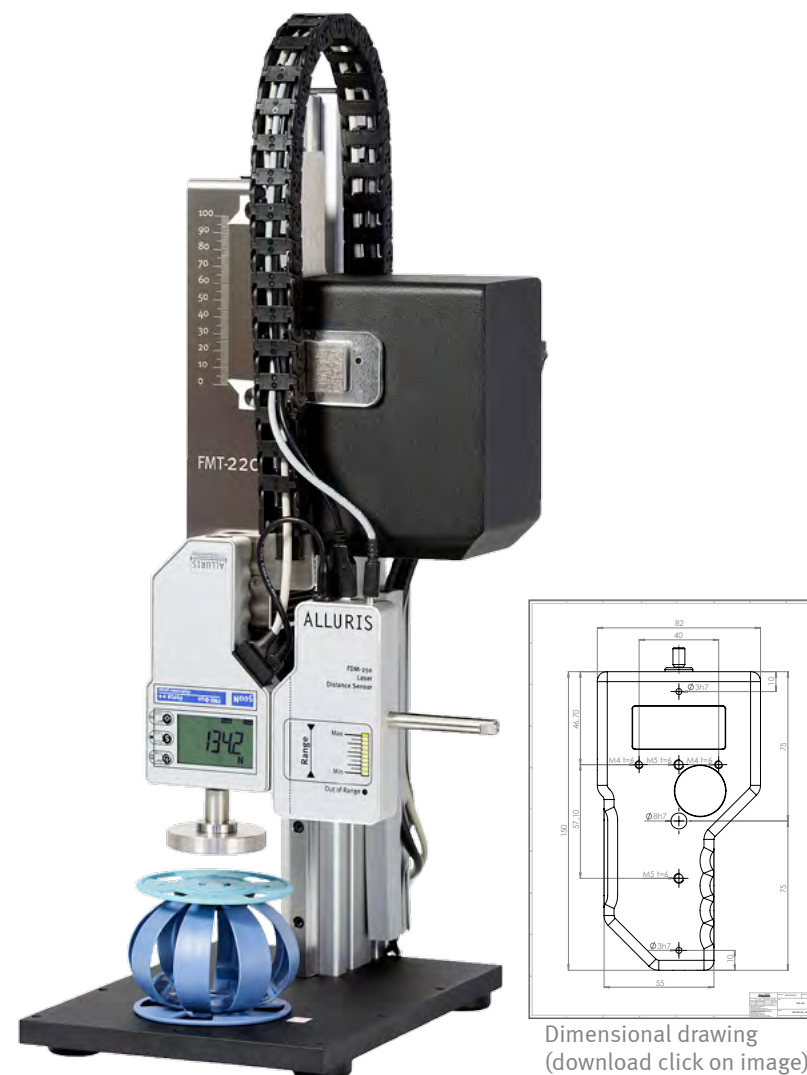
If the force gauge is mounted head down to the test stand, the display adjusts automatically with a 180° reverse on turning on the instrument.

[Dimensional drawings](#) and 3D-CAD-data for test stand application of the instruments are ready for [download](#) on our website.

Manual or motor driven test stand for precise linear hub movements for compression or tensile force tests are a useful addition to force gauges. They allow to detect material strength in composed materials, operating forces of control elements or adhesive forces of packaging materials or foils exactly and reproducibly.

Please do not hesitate to contact us for more comprehensive application advice. Product information for test stand and entire force test systems can also be found on our website www.alluris.de.

Force gauges in test stands



Dimensional drawing
(download click on image)

Force gauge FMI-B50 mounted to motor driven test stand FMT-220

7.0 Technical Data

FMI-B
FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

| | | FMI-B10 / FMI-S10 | FMI-B20 / FMI-S20 | FMI-B30 / FMI-S30 | FMI-B50 / FMI-S50 | |
|--------------------------------------|--|-------------------|-------------------|-------------------|------------------------|--|
| Measuring Range [N] | A5 | | | 0 - 5 | | |
| | B1 | | | 0 - 10 | | |
| | B5 | | | 0 - 50 | | |
| | C1 | | | 0 - 100 | | |
| | C5 | | | 0 - 500 | | |
| | K1 | | | 0 - 1000 | | |
| | K2 | | | | 0 - 2500 | |
| | K5 | | | | 0-5000 | |
| Resolution of display [N] | A5 | | | 0,001 | | |
| | B1 | | | 0,002 | | |
| | B5 | 0,05 | | | 0,01 | |
| | C1 | 0,1 | | | 0,02 | |
| | C5 | 0,5 | | | 0,1 | |
| | K1 | 1 | | | 0,2 | |
| | K2 | | | | 0,5 | |
| | K5 | | | | 1 | |
| Measuring frequency (internal) | up to 3,6 kHz | | | | | |
| Display refresh rate | 1 - 10 Hz | | | | | |
| Peak capturing | app. 1 kHz | | | | | |
| Accuracy* (f.s. \pm 1 digit) | $\pm 0,3\%$ | $\pm 0,2\%$ | | | $\pm 0,15\%$ | |
| Temperature offset (Tk relative) / K | $\pm 0,02\%$ | | | | | |
| O-Point offset (To absolute) / K | $\pm 0,02\%$ | | | | | |
| Permissible error of measurement** | $\pm 0,5\%$ | | | $\pm 0,3\%$ | | |
| Tracking (To suppressed) | Auto-Tara (automatic compensation) | | | | | |
| Overload output | | | | | ● | |
| USB-interface, max app. 1kHz | | | | | 2.0 | |
| Memory function | | | | | ● | |
| Statistical function | | | | | MAX MIN AVG DEV | |
| Limit (threshold) function | | | | | ● | |
| Temperature range (operation) | 0° ... 40° (max. 85 %rF) | | | | | |
| Temperature range (storage) | -5° ... 45° (store dry) | | | | | |
| Protection code < 500N | Protect against small parts (IP40) | | | | | |
| Protection code > 500N | Splash proof (IP 65) | | | | | |
| Power supply FMI-S | Solar cell and internal HighCap-buffer | | | | | |
| Battery FMI-B | internal LiPo capacity app. 150 h charging time 10-12h | | | | | |
| Weight | 480 g /app. 1150 g (from measuring range 2,5 kN) | | | | | |
| Dimensions (L x W x H) | 150 x 82 x 29 mm | | | | | |

* Permissible display deviation; **according to DIN 1319

FMI-B FMI-S

Bedienungsanleitung
Operation manual
Notice d'utilisation
Instrucciones de servicio
Istruzioni per l'uso

8.0 Service

8.1. Extended 5-Year Guarantee

We extend the guarantee to five years provided that the instrument has been registered with us immediately after the purchase, and that the maintenance and calibration intervals are observed. Consumption material, normal wear and tear as well as damages caused by improper use are excluded from this warranty. Besides, the warranties as agreed upon in our general terms and conditions shall apply.

8.2. Product registration

In order to receive information about product changes and updates and to enjoy full warranty, please register your product on our [website](#).

8.3. Calibration certificates

Force gauges can be calibrated in our certified calibration laboratory working in accordance with ISO 17025.

Our calibrations can be performed to the following standards and directives:

- VDI/VDE-Directive 2624 sheet 2.1
- DAkkS (DKD) R 3-3
- ISO 376:2011-09

Traceability to the national standards of PTB / DKD is guaranteed and will be shown in the calibration certificates.



FMI-B

FMI-S

Bedienungsanleitung
 Operation manual
 Notice d'utilisation
 Instrucciones de servicio
 Istruzioni per l'uso

9.0 Frequent questions (FAQ)

| | |
|---|--|
| The display shows numbers upside down! | The display direction changes automatically according to the position of the device when the instrument is switched on. |
| Display shows values only in compressive or tensile force direction! | Change the mode of operation using the S-key. The actual force value, either tensile or compression force indicated if the Peak symbol flashes or this symbol is not shown (see p. 10 chapter 3.3 Selecting the operation mode). |
| Force values are shown with negative prefix! | Depending on your usage you may set a negative prefix either for tensile forces (default) or for compressive forces (see p. 17 chapter 4.2.2 Changing +/- prefix for push or pull operations (P12)). |
| The depicted peak-value is higher than the maximum value! | The maximum value equals the average value of the last taken single values, whereas the amount of single values depends on the set display update time. The peak value, in contrast, is the absolute highest value measured. |
| Does the instrument work also after a being stored in the dark for a longer period? | Yes. Even after a self discharging of the internal energy storage the instrument can be used immediately. A back-up battery guarantees the basic function of the device (see p. 5 chapter 2.3 Energy Harvesting (FMI-S)). |
| USB communication is disturbed! | Is the right device driver installed? Devices series FMI-S must be turned on only after connecting via USB, else they can not be detected. Alternatively, press any button on the device. |
| The display shows "OvErL"! | Remove the excessive load immediately and check the instrument. If the indicated measuring values are obviously untrue the load cell has to be changed by the manufacturer. Important note: After overloading the device the calibration certificate becomes invalid. |
| The display shows "bat.1" or "bat.o" and the device does not respond! | Press the O-button and charge the battery (see p. 5 chapter 2.4 Charging the battery (FMI-B)). |
| Software FMI Analyze: Display shows that S-key and / or external switches are not active (green Button) although the unit is connected! | Activate the memory function (see p. 20 chapter 4.4.2 Setting memory and statistics functions). |
| The device turns off automatically! | The auto-off function turns off the instrument, if no button has been pressed for more than five minutes. This period of time can be changed and set between 1 und 90 minutes (see p. 18 chapter 4.2.6 Auto-Off function (instrument off) (P15)). |

FMI-S FMI-B

A. Appendix

A.1 Notes

1 The use of general descriptive names, trade names, trademarks, etc. in this manual, even if not specially labeled is not to imply that such names are exempt from the trademark and trade protection laws would have to be considered as free.

A.2 Calibration confirmation acc. DIN EN 10204 2.1

We hereby certify that the equipment has been tested in the production process in accordance with the requirements of DIN EN 9001: 2008. The force gauge fulfills all values and accuracy described in the technical data.

The instruments and sets of weights used to determine the accuracy are traceable to the globally accepted (ILAC) standards of the Physikalisch-Technische Bundesanstalt (PTB, Braunschweig) and DAkkS ([see p. 31 chapter 8.3 Calibration certificates](#)).



Konformitätserklärung

Declaration of Conformity

Déclaration de
Conformité

Declaración de
conformidad

Dichiarazione di
conformità

FMI-S FMI-B

A.3 Declaration of Conformity

We hereby confirm that the below designated product is designed and manufactured in accordance to the general safety and health requirements of EC-Directive 2004/108/EG (EMC-electromagnetic compatibility), 2011/65/EU (RoHS) und der Richtlinie ST/SG/AC.10/11/Rev.5 Section 38.3/Amend.2 (Transport of Dangerous Goods). With any non-authorized changes of the device or application this declaration becomes void.

Konformitätserklärung

Declaration of Conformity

Déclaration de
Conformité

Declaración de
conformidad

Dichiarazione di
conformità

| | | |
|-----------------------|---|------------|
| Manufacturer: | Alluris GmbH & Co. KG Basler Strasse 65 79100 Freiburg Germany | |
| Type Number: | FMI-S10xx; FMI-S20xx; FMI-S30xx; FMI-S50xx; FMI-B10xx; FMI-B20xx; FMI-B30xx; FMI-B50xx (see type label) | |
| Description: | Digital Force Gauge | |
| Serial number: | See type label | |
| Applicable standards: | EN 55022 (RF Emission) | Class B |
| | EN 61000-4-2 (ESD) | Criteria A |
| | EN 61000-4-3 (RF Field) | Criteria A |
| | EN 61000-4-4 (Burst) | Criteria A |
| | EN 61000-4-8 (Magn. Field) | Criteria A |

The compliance to the requirements of all applicable EU directives is confirmed by the CE-marking of the product.

In accordance to WEEE Directive 2012/19/EU this device is categorized as “Monitoring and Control Instrument” and should not be disposed as unsorted municipal waste. You may return it to Alluris for recycling (WEEE Reg.No. DE 49318045). For more information please contact our website www.alluris.de.

Alluris GmbH & Co. KG
Freiburg (DE), 15. June .2015

(Klaus Hartkopf - CEO)

