Manual

MEGA-CHECK Basic, Profi, Master

OPERATION MANUAL

COATING THICKNESS METER

MEGA-CHECK BASIC

Firmware version 14.1 and up

2018-05

LIST-MAGNETIK
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QM-System ISO 9001:2015 zertifiziert

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MEGA-CHECK BASIC (2018-05)

INTRODUCTION

With the **LIST-MAGNETIK MEGA-CHECK** coating thickness meters you have the possibility to connect a variety of specialized probes. Whether for particularly small openings, for thick layers or for small measuring points, special requirements are met here.
In these measuring probes, a separate microcontroller digitizes the analog probe signals and transfers them to the display device. This technique is extremely interference-free and allows even more accurate and reproducible measured values.

A variety of probes for FE metals (iron and steel), NFE metals (non-ferrous metals such as Aluminum, brass, copper, bronze, non-magnetic stainless steels) and combined probes with automatic detection of the base material can be connected. The combined probe with swivel-mounted head is worldwide unique.
All kinds of paint, varnish, plastic and galvanic coatings on steel can be measured by means of the magnet-induction process, as well as insulating layers (paint, varnish, plastic, anodic) on non-ferrous metals by means of the eddy current method.

The devices are equipped with a large and clear graphic display.

The menu is offered in the languages German / English / Spanish / Dutch.
The probe cable can be plugged into both sides of the probe (on display unit and probe). In the event of a cable break, only the cable has to be replaced.

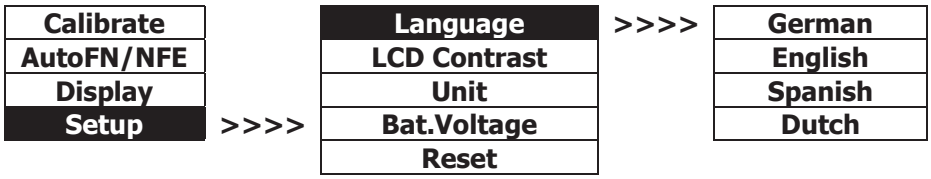
All LIST-MAGNETIK MEGA-CHECK coating thickness meters stand out for their quality "Made in Germany".

MEGA-CHECK Basic

MEGA-CHECK Basic is the standard device for rapid on-site measurement.

QUICK START

- Connect the probe cable to the probe and the device.
- Switch on the **MEGA-CHECK Basic** using the ON-OFF key. The value last measured will be displayed.
- To change the language (English by default) press the MENU key:



  Go through the menu using the arrow keys. Confirm your choice by pressing the OK key.
- Gently apply the probe on the coating to be measured until the value is displayed and the device confirms its measurement by means of an acoustic signal.
- Between each measurement, lift off the probe at least 5 cm for approx. 1 second. The stored calibration will then automatically be checked and corrected if applied.
- When using a combined probe (FE/NFE), the device will automatically select the appropriate measurement method after the probe has been applied. Behind the measurement value the symbol **FE** will be displayed for the magnetic induction method or **NFE** for the eddy current method.

IMPORTANT NOTES

USING THE PROBE

Do not run the probe along a measurement object. Always measure point by point. This means that after each measurement the probe should be lifted off for approx. 1 second. The calibration set will then automatically be checked and corrected if applicable.

Please make sure that the pole tip of the measurement probe and the calibration plates are clean and free of dust.

COATING THICKNESS OF 2000 µM AND UP

When measuring in higher range (more than 2 mm / 2000 µm) you will obtain a better accuracy, when you calibrate the device with a 1 mm calibration plate, which is available as option.

MEASUREMENT ON SMALL OR CURVED PARTS

With measurements on small or curved parts both, the zero adjustment and the foil calibration, should be carried out on a non-coated object with the same geometry.

The same applies to base material the structure of which differs strongly from the included base plate (cast, special steels, etc.)

For measuring small parts on steel as a base material the probes PF-1000, PF-1S and PF-3T are especially suitable.

When using the device for the first time its calibration should be checked by means of the included measurement foils.

RECOMMENDED THICKNESS OF THE BASE MATERIAL

Base material: iron / Steel (FE):	at least 300 µm / 0,3 mm
Base material: non-ferrous metals (NFE):	at least 200 µm / 0,2 mm

POWER SUPPLY

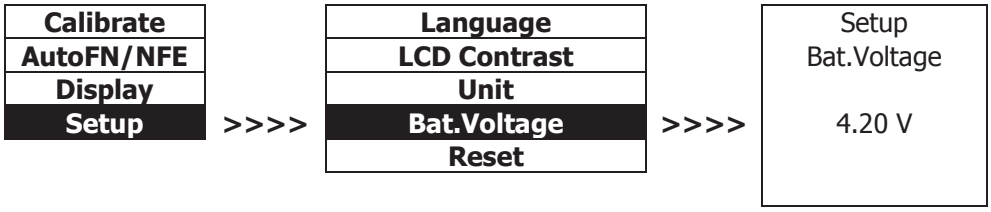
The device is delivered with three 1.5V batteries (Mignon) by series but it can also be operated with three 1.2 V NiCd batteries as an option. An appropriate charging device to be connected to the serial interface port is available.

Charging time: 8 – 10 hours.

It is also possible to have the battery charger connected all the time.

BATTERY AND/OR ACCUMULATOR TEST

As soon as only one bar is displayed on the active device the batteries have to be changed and/or the device has to be charged. If the message "change batteries" is displayed, the device will automatically switch off for protection should the battery voltage be too low. To check this, you can have the exact voltage be displayed:



The voltage should be more than 3.0V

Old batteries are special refuse and must be special disposed

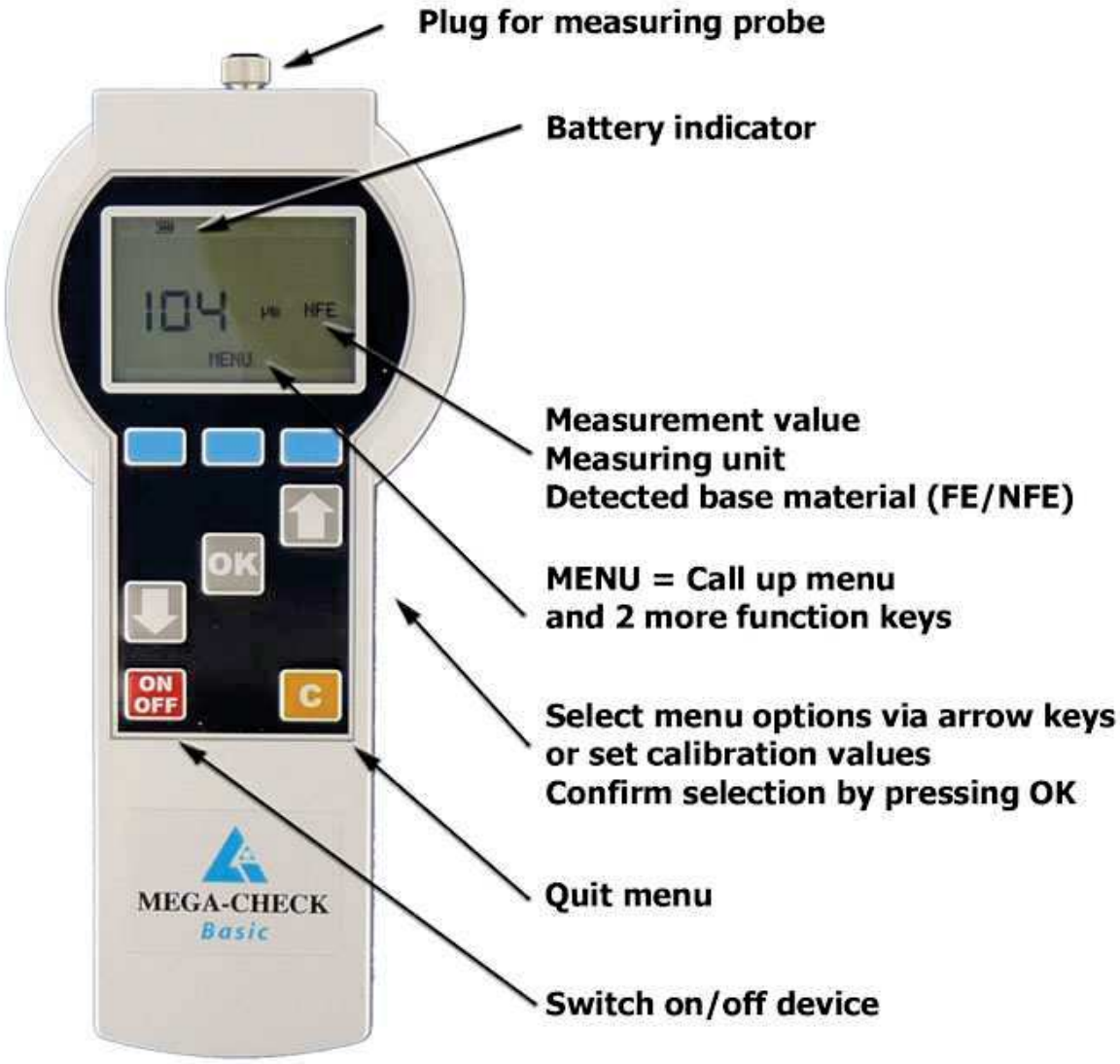
AUTOMATIC SWITCH-OFF

The device will switch off automatically 2 minutes after the last measurement

CHANGE OF THE PROBE

To change the probe, switch off the device first. Then connect the desired probe to the probe cable and switch on the device again.

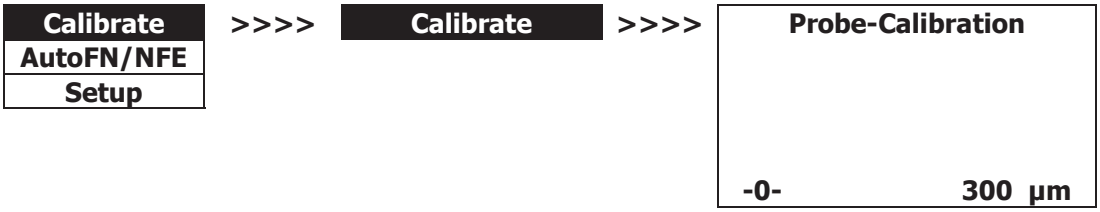
FUNCTIONS OF THE OPERATING KEYS



USE OF THE MENU

The different devices functions will be controlled via a menu. After switching on the device press the **MENU** key in order to call up the menu.
Using the arrow keys, you can select a menu option. The current selection is high-lighted in black. You will confirm your selection by pressing **OK**. Either a submenu or the selected device function will be displayed.
You will exit the menu of the device by pressing the **C** key.
The blue key in the center will call up the main menu.

CALIBRATE



Zero Adjustment (One-point-calibration)

Press the blue key -0- on the left. Set the probe on a blank base plate (FE = iron, steel; NFE = non-ferrous metals). In the display the message >calibrate<, then >calibrate ready< and 0.0 is indicated, the beep signal sounds. Now the probe can be removed.

Important: Zero adjustment with the probe PF-30 for thick coatings has to be carried out on a steel plate with a size of at least 60 x 40 mm.

Foil Calibration (Two-point-calibration)

After zero adjustment:

- Set the correct calibration value for the probe using the arrow keys (see Chapter MEASUREMENT PROBES).

  The value can be changed by ± 1 by pressing the keys shortly. Pressing the keys longer will result into the value continuously increasing and/or decreasing faster.
- Put the measurement foil onto the base plate. Apply the probe onto the foil then press the blue menu key on the right.
- After the acoustic signal the calibration value is displayed and the probe can now be removed.
- The device is now ready for measurements.

IMPORTANT

During start-up of the device and during measurements on small or curved objects zero adjustment and foil calibration using the included measurement foil (approx. 300 µm) should be carried out by all means.

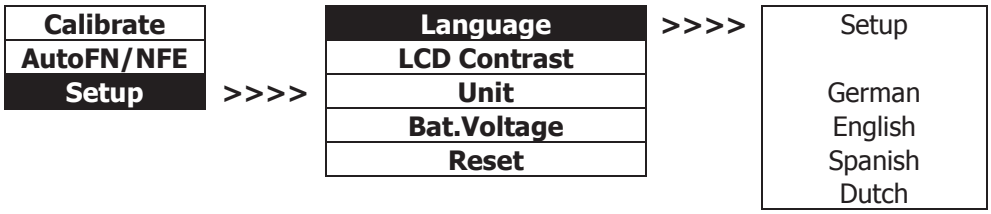
If the device had already been in use and has been calibrated correctly, the calibration value last entered will be automatically adjusted to any existing changes in temperature and/or corrected. New calibration is only required if the measurement is carried out on small or curved objects.

AUTO-FN/NFE–SWITCHING

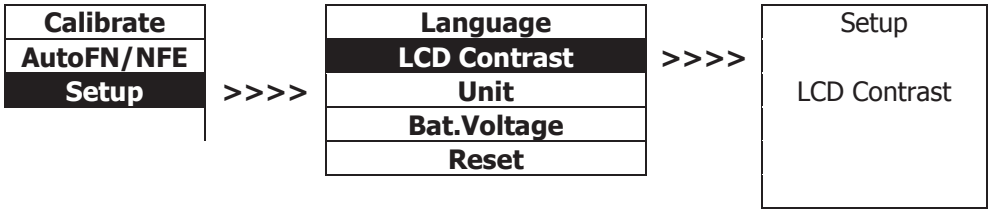
When using the combined probes **PFN-52D** and **PFN-52DS** and when measuring coatings on slightly magnetic stainless-steel materials, it is possible that the probe will automatically switch to **FE** and a wrong measurement value is displayed. In such case you have to switch automatically recognition of the measuring method to **NFE On** in order to activate NFE (the eddy current method). If the probe has been switched to this method the base material will be displayed inversely to show recognition to the **NFE On** method.

SETUP

LANGUAGE SELECTION:

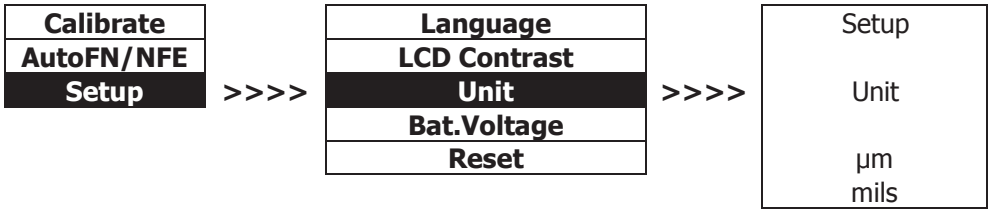


LCD CONTRAST

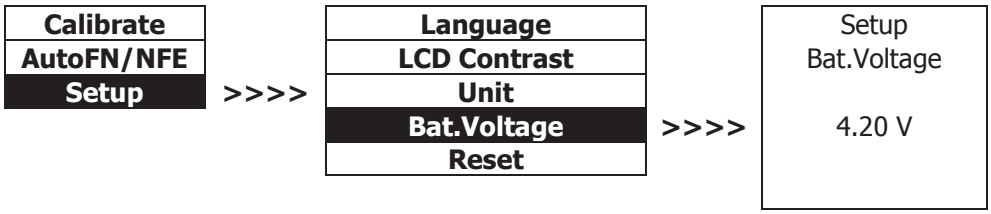


To regulate the contrast, use the up and down arrows.

MEASUREMENT UNIT (SWITCHING BETWEEN µM – MILS):

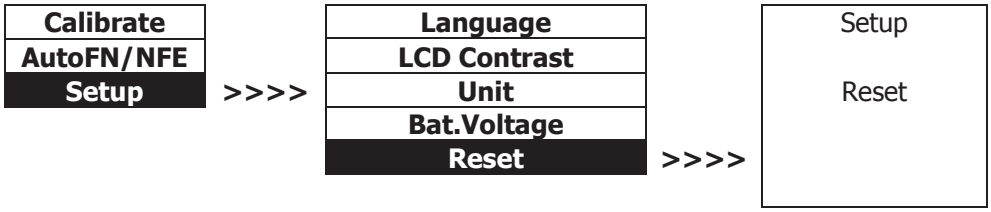


DISPLAY OF THE BATTERIES VOLTAGE



The voltage should be more than 3.0V

RESET



Using the reset function all adjustments are reset to the settings from factory. This function is important when settings have been modified or the device and the probe do not work properly.

MEASUREMENT PROBES

Special characteristic curves and calibration data

Several measurement probes can be connected to the device, which differ by their measurement method (magnetic induction and/or eddy current) and by their measurement range and/or by application (see below table).

The special characteristic curves and calibration data are stored in the probe, and after reconnecting this probe the last calibration is automatically activated. There is no new calibration necessary when changing the probe.

When the probe is changed, the device must first be switched off. Please then connect the probe and switch it on again.

Table of available measuring probes

Measurement method:
FE = magnetic induction on steel
NFE = eddy current on NE metals

Type	Meas. method	Model	Measuring range	Smallest area	Smallest curvature radius	Calibration value
PF-5	FE	with spring-loaded guide and prism	0-5000 µm	ø 4 mm	convex: 4 mm, concave: 38 mm	300 µm
PF-5S	FE	with spring-loaded guide and prism, swivel-mounted	0-5000 µm	ø 4 mm	convex: 4 mm, concave: 38 mm	300 µm
PFN-52D	FE + NFE combined	Dual function probe with spring-loaded guide and prism	FE 0-5000 µm, NFE 0-2000 µm	ø 8 mm	convex: FE 4 mm, NFE 6 mm, concave: 38 mm	300 µm
PFN-52DS	FE + NFE combined	Dual function probe with spring-loaded guide and prism, swivel-mounted	FE 0-5000 µm, NFE 0-2000 µm	ø 8 mm	convex: FE 4 mm, NFE 6 mm, concave: 38 mm	300 µm
PN-6	NFE	with spring-loaded guide and prism, for thick layers	0-6000 µm	ø 8 mm	convex: 6 mm, concave: 38 mm	3 mm
PF-1S	FE	with spring-loaded guide and prism for especially small parts and areas, swivel-mounted	0-1000 µm	ø 2 mm	convex: 1 mm, concave: 6 mm	300 µm
PF-1T	FE	bar-shaped probe for small spaces	0-1000 µm	ø 2 mm	convex: 2 mm, concave: 16 mm	300 µm
PF-2T	FE	bar-shaped probe for small spaces and pipes	0-2000 µm	ø 3 mm	convex: 2 mm, concave: 12 mm	300 µm
PF-3T	FE	bar-shaped probe for small spaces and pipes	0-3000 µm	ø 3 mm	convex: 2 mm, concave: 8 mm	300 µm
PF-6S	FE	two-pole probe for thick coatings, swivel-mounted	0-6000 µm	ø 14 mm	convex: 5 mm, concave: 25 mm	1 mm
PF-30	FE	two-pole probe for very thick coatings	0-30.000 µm	ø 40 mm	convex: 15 mm, concave: 60 mm	5 mm
PF-1000	FE	with springy sensing probe for small parts and complex areas	0-1000 µm	ø 2 mm	convex: 1 mm, concave: 6 mm	300 µm

TECHNICAL DATA

Applications:	Depending on the selection of the probe measurement of paint, varnish, plastic and galvanic layers on steel, measurement of insulating layers on non-ferrous metals with automatic recognition of the basic material
Standards:	ISO 2178, ISO 2360, BS 5411, ASTM
Measuring probe:	The measuring range is depending on the probe, on steel and iron up to 30 mm (30,000 µm), on NFE metals up to 6 mm (6000 µm). Minimum area, minimum radius of curvature and calibration value also depend on the probe.
Accuracy:	less than 100 µm: ± 1 µm, 100-1000 µm: ± 1%, 1000-2000 µm: ± 3%, > 2000 µm: ± 5%
Resolution:	1-100 µm: 0.1 µm, 100-1000 µm: 1 µm, > 1000 µm: 10 µm
Measuring units:	µm and mils
Environment temperature:	0 - 50° C
Display:	Graphic display
Multilingual menu navigation:	German / English / Spanish / Dutch
Power supply:	3x 1.5 V AA Mignon
Operating time:	approx. 60 hours
Dimensions:	198 x 92 x 35 mm
Weight:	265 g (with batteries)
Warranty:	12 months on the device, 3 months on the probe

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COATING THICKNESS METER

MEGA-CHECK PROFI

Firmware version 15.1 and up

2019-05

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MEGA-CHECK PROFI (2019-05)

INTRODUCTION

With the **LIST-MAGNETIK MEGA-CHECK** coating thickness meters you have the possibility to connect a variety of specialized probes. Whether for particularly small openings, for thick layers or for small measuring points, special requirements are met here.
In these measuring probes, a separate microcontroller digitizes the analog probe signals and transfers them to the display device. This technique is extremely interference-free and allows even more accurate and reproducible measured values.

A variety of probes for FE metals (iron and steel), NFE metals (non-ferrous metals such as Aluminum, brass, copper, bronze, non-magnetic stainless steels) and combined probes with automatic detection of the base material can be connected. The combined probe with swivel-mounted head is worldwide unique.
All kinds of paint, varnish, plastic and galvanic coatings on steel can be measured by means of the magnet-induction process, as well as insulating layers (paint, varnish, plastic, anodic) on non-ferrous metals by means of the eddy current method.

The devices are equipped with a large and clear graphic display.

The menu is offered in the languages German / English / Spanish / Dutch.
The probe cable can be plugged into both sides of the probe (on display unit and probe). In the event of a cable break, only the cable has to be replaced.

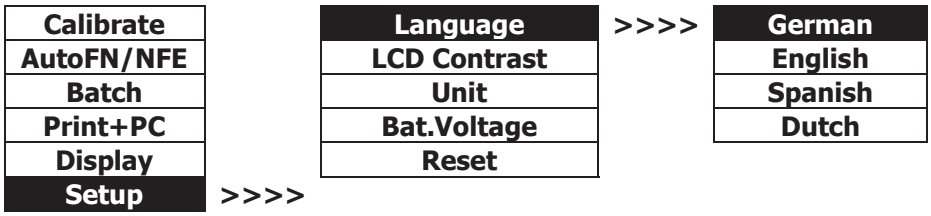
All LIST-MAGNETIK MEGA-CHECK coating thickness meters stand out for their quality **Made in Germany**.

MEGA-CHECK Profi

MEGA-CHECK Profi has a data logger and a RS232 interface.
The easy statistical evaluation and documentation of the measurement results is carried out via a connected PC or a printer. Three calibration memories are available to store special parts calibrations.

QUICK START

- Connect the probe cable to the probe and the device.
- Switch on the **MEGA-CHECK Profi** using the **ON-OFF** key. The value last measured will be displayed.
- To change the language (English by default) press the **MENU** key:



  Go through the menu using the arrow keys. Confirm your choice by pressing the **OK** key.
- Gently apply the probe on the coating to be measured until the value is displayed and the device confirms its measurement by means of an acoustic signal.
- Between each measurement, lift off the probe at least 5 cm for approx. 1 second. The stored calibration will then automatically be checked and corrected if applied.
- When using a combined probe (FE/NFE), the device will automatically select the appropriate measurement method after the probe has been applied. Behind the measurement value the symbol **FE** will be displayed for the magnetic induction method or **NFE** for the eddy current method.

IMPORTANT NOTES

USING THE PROBE

Do not run the probe along a measurement object. Always measure point by point. This means that after each measurement the probe should be lifted off for approx. 1 second. The calibration set will then automatically be checked and corrected if applicable.

Please make sure that the pole tip of the measurement probe and the calibration plates are clean and free of dust.

COATING THICKNESS OF 2000 µM AND UP

When measuring in higher range (more than 2 mm / 2000 µm) you will obtain a better accuracy, when you calibrate the device with a 1 mm calibration plate, which is available as option.

MEASUREMENT ON SMALL OR CURVED PARTS

With measurements on small or curved parts both, the zero adjustment and the foil calibration, should be carried out on a non-coated object with the same geometry.

The same applies to base material the structure of which differs strongly from the included base plate (cast, special steels, etc.)

For measuring small parts on steel as a base material the probes PF-1000, PF-1S and PF-3T are especially suitable.

When using the device for the first time its calibration should be checked by means of the included measurement foils.

RECOMMENDED THICKNESS OF THE BASE MATERIAL

Base material: iron / Steel (FE):	at least 300 µm / 0,3 mm
Base material: non-ferrous metals (NFE):	at least 200 µm / 0,2 mm

MAINTENANCE OF STORED VALUES WHEN CHANGING BATTERY

The stored measurement values and calibrations will be maintained even after the device has been switched off or when the device is stored without batteries.

POWER SUPPLY

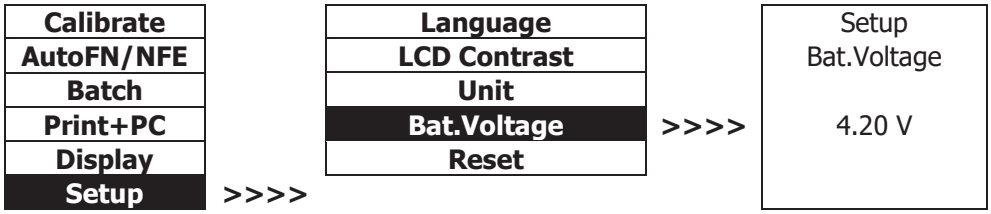
The device is delivered with three 1.5V batteries (Mignon AA) by series but it can also be operated with three 1.2 V NiCd batteries as an option. An appropriate charging device to be connected to the serial interface port is available.

Charging time: 8 – 10 hours.

It is also possible to have the battery charger connected all the time.

BATTERY AND/OR ACCUMULATOR TEST

As soon as only one bar is displayed on the active device the batteries have to be changed and/or the device has to be charged. If the message **change battery** is displayed, the device will automatically switch off for protection should the battery voltage be too low. To check this, you can have the exact voltage be displayed:



The voltage should be more than 3.0V

Old batteries are special refuse and must be special disposed

AUTOMATIC SWITCH-OFF

The device will switch off automatically 2 minutes after the last measurement

CHANGE OF THE PROBE

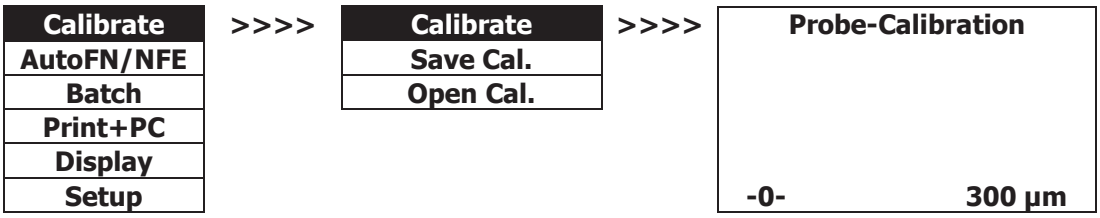
To change the probe, switch off the device first. Then connect the desired probe to the probe cable and switch on the device again.

FUNCTIONS OF THE OPERATING KEYS

USE OF THE MENU

The different devices functions will be controlled via a menu. After switching on the device press the **MENU** key in order to call up the menu.
Using the arrow keys, you can select a menu option. The current selection is highlighted in black. You will confirm your selection by pressing **OK**. Either a submenu or the selected device function will be displayed.
You will exit the menu of the device by pressing the **C** key.
The blue key in the center will call up the main menu.

CALIBRATE



Zero Adjustment (One-point-calibration)

Press the blue key **-0-** on the left. Set the probe on a blank base plate (FE = iron, steel; NFE = non-ferrous metals). In the display the message >calibrate<, then >calibrate ready< and 0.0 is indicated, the beep signal sounds. Now the probe can be removed.

Important: Zero adjustment with the probe PF-30 for thick coatings has to be carried out on a steel plate with a size of at least 60 x 40 mm.

Foil Calibration (Two-point-calibration)

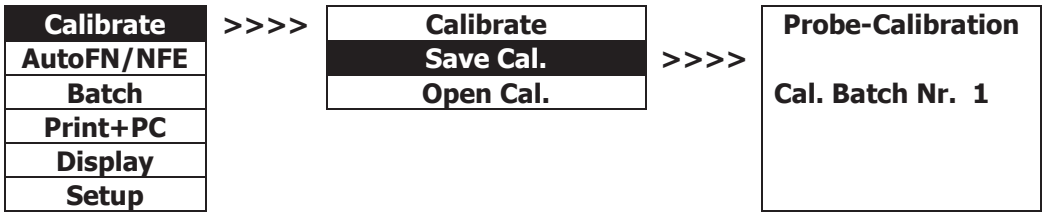
After zero adjustment:

- Set the correct calibration value for the probe using the arrow keys (see Chapter **MEASUREMENT PROBES**).

  The value can be changed by ± 1 by pressing the keys shortly. Pressing the keys longer will result into the value continuously increasing and/or decreasing faster.
- Put the measurement foil onto the base plate. Apply the probe onto the foil then press the blue menu key on the right.
- After the acoustic signal the calibration value is displayed and the probe can now be removed.
- The device is now ready for measurements.

Storage of object-related calibration:

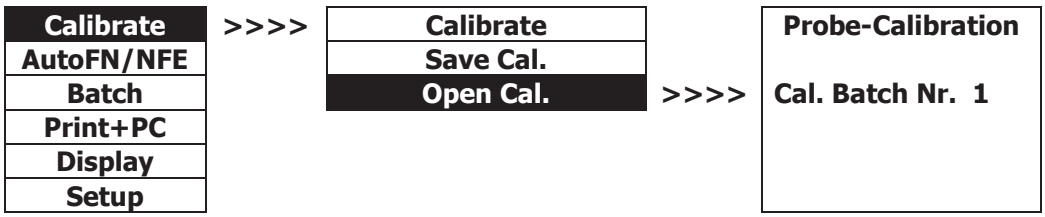
The device can store up to three different object-related calibrations in the probe and call them up if needed. To store a calibration value, proceed as follows:
First: carry out object-related calibration as described above under 1. Then call up the menu option **Save Cal.**:



Select the calibration batch no. 1 to 3 using the arrow keys, then store the calibration by using the **OK** key.

Open the object-related calibration:

In order to open stored object-related calibration select the menu operation Open Cal.:



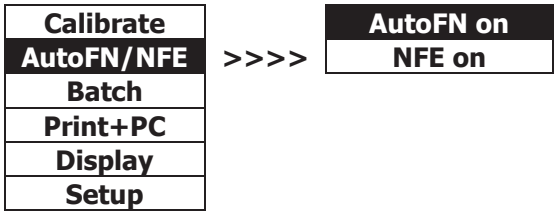
Select the calibration batch no. 1 to 3 using the arrow keys; then open calibration by pressing OK. The calibration batch opened is displayed on the upper right side.

IMPORTANT

During start-up of the device and during measurements on small or curved objects zero adjustment and foil calibration using the included measurement foil (approx. 300 µm) should be carried out by all means.

If the device had already been in use and has been calibrated correctly, the calibration value last entered will be automatically adjusted to any existing changes in temperature and/or corrected. New calibration is only required if the measurement is carried out on small or curved objects.

AUTO-FN/NFE–SWITCHING



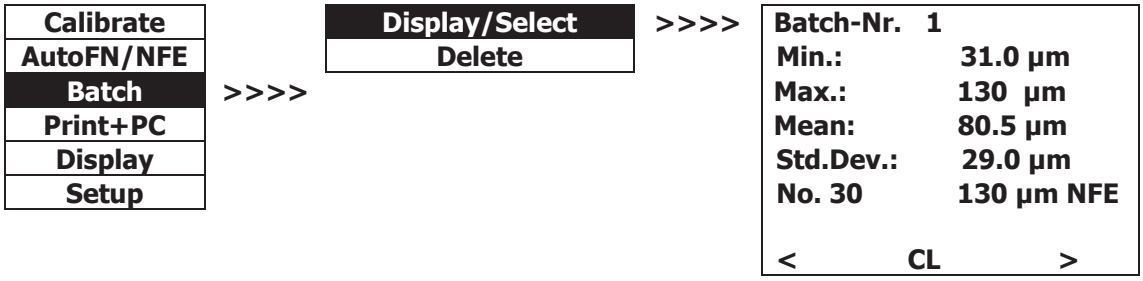
When using the combined probes **PFN-52D** and **PFN-52DS** and when measuring coatings on slightly magnetic stainless-steel materials, it is possible that the probe will automatically switch to **FE** and a wrong measurement value is displayed. In such case you have to switch automatically recognition of the measuring method to **NFE On** in order to activate NFE (the eddy current method). If the probe has been switched to this method the base material will be displayed inversely to show recognition to the **NFE On** method.

BATCH

MEGA-CHECK Profi provides an application batch for storage and for statistical evaluation of object-related measurement series. A total up to 10.000 measurements can be stored.

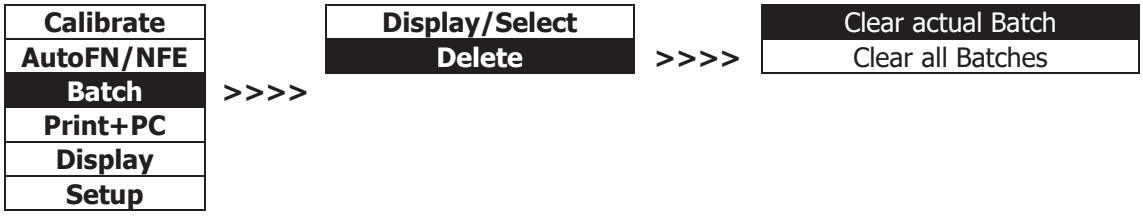
DISPLAY

Display of the current storage content:



Any measurement value can be selected using the arrow keys (measurement value No. is highlighted in black). With the blue key on the left, the selected measurement value can be deleted. The statistics will then be recalculated.
With the left or right blue Keys "<" / ">" the batch number can be selected.

DELETE



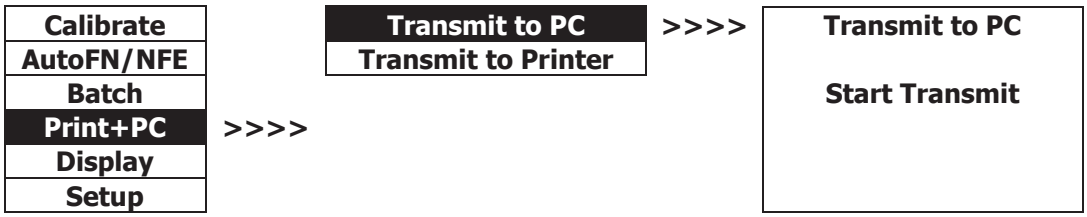
Here you can either delete the measurement values in the current batch or all measurement values in all batches.

PRINT+PC

This menu option serves for sending the stored measurement data to the **TOP-PRINT4 printer** via the serial interface or to the **PC**. Both cables are plugged in the same port.

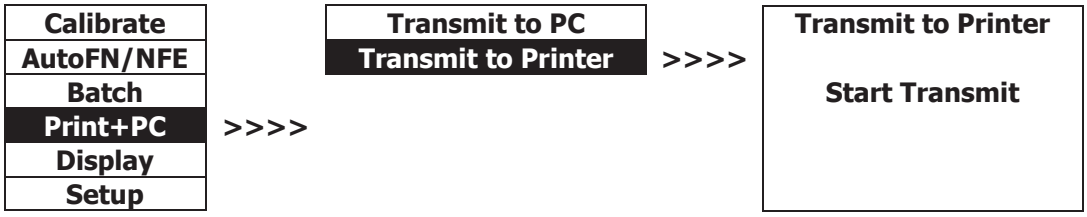
TRANSMIT TO PC

This function is only used to supply the data application TRANSFER.
The applications TRANSFER-EXCEL and STAT6 don't work any longer with firmware version 15.1 and up. To transfer data to PC, switch to the data transfer application **MEGA-CHECK TRANSFER** at https://www.list-magnetik.com/software



Send the measurements and statistics of the actual batch via serial interface and the USB cable to the PC. Before, the data transfer of the program must be activated.

TRANSMIT TO PRINTER



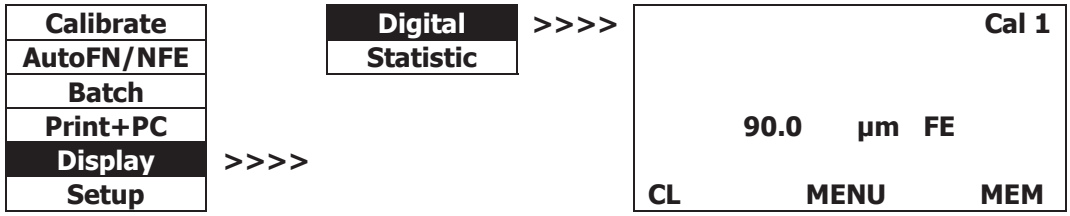
Send the measurements and statistics of the actual batch via serial interface and the printer cable to **TOP-PRINT4**.

Older printer models (MEGA-PRINT, TOP-PRINT) can't be connected with firmware version 14.1 and up.

DISPLAY

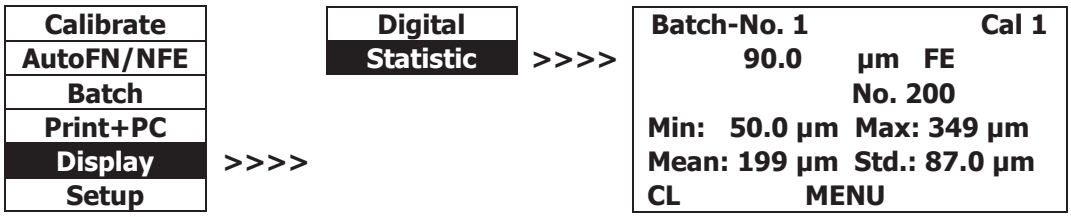
Here you can select the different display functions of the **MEGA-CHECK Profi** (digital / statistical display).

DIGITAL



The normal digital display mode is activated by default. Here the current measurement value is displayed but not saved automatically. In order to save the selected measurement value in the batch press the blue **MEM** key on the right once. Any wrong measurement value can be deleted by pressing the blue key **CL** on the left.

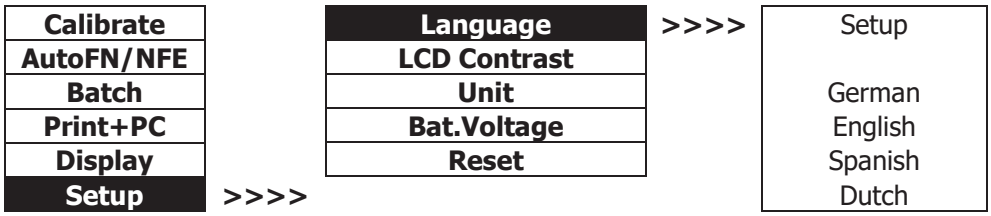
STATISTIC



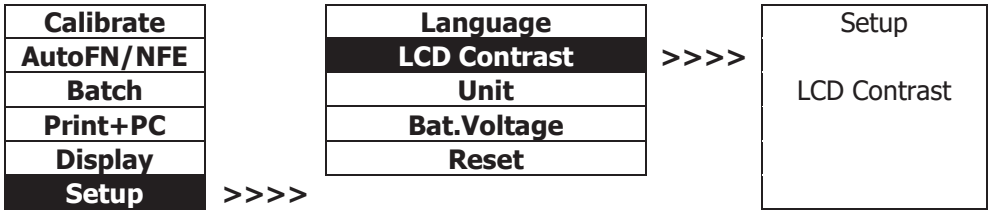
When activating the statistical display each measurement value is automatically stored in the selected batch and in addition the statistical parameters are displayed. To delete the last measurement value, press the blue key **CL** on the left once.

SETUP

LANGUAGE SELECTION:

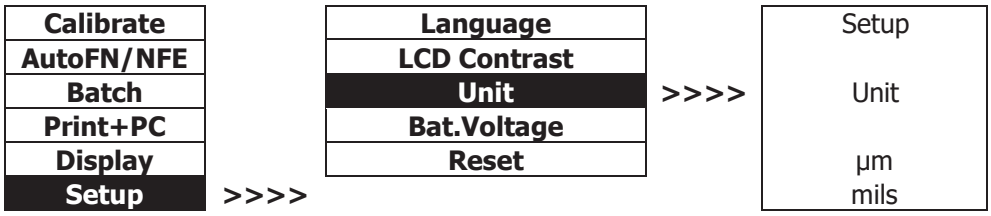


LCD CONTRAST

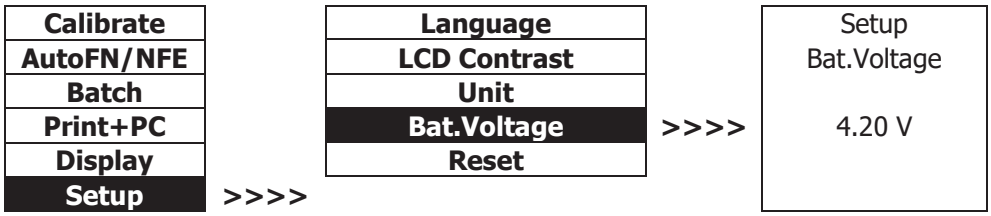


To regulate the contrast, use the up and down arrows.

MEASUREMENT UNIT (SWITCHING BETWEEN µM – MILS):

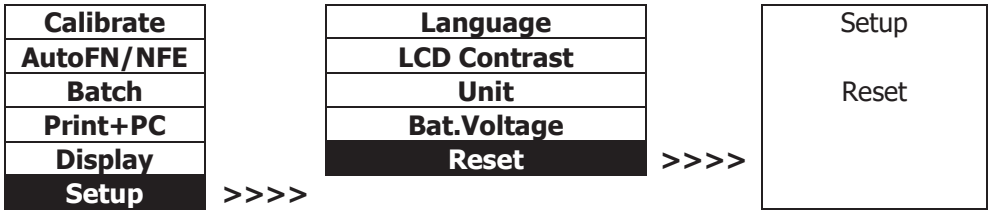


DISPLAY OF THE BATTERIES VOLTAGE



The voltage should be more than 3.0V

RESET



Using the reset function all adjustments are reset to the settings from factory. This function is important when settings have been modified or the device and the probe do not work properly.

Please note:
After having performed the Reset all custom calibration batches are cancelled.

MEASUREMENT PROBES

Special characteristic curves and calibration data

Several measurement probes can be connected to the device, which differ by their measurement method (magnetic induction and/or eddy current) and by their measurement range and/or by application (see below table).

The special characteristic curves and calibration data are stored in the probe, and after reconnecting this probe the last calibration is automatically activated. There is no new calibration necessary when changing the probe.

When the probe is changed, the device must first be switched off. Please then connect the probe and switch it on again.

Table of available measuring probes

Measurement method:
FE = magnetic induction on steel
NFE = eddy current on NE metals

Type	Meas. method	Model	Measuring range	Smallest area	Smallest curvature radius	Calibration value
PF-5	FE	with spring-loaded guide and prism	0-5000 µm	ø 4 mm	convex: 4 mm, concave: 38 mm	300 µm
PF-5S	FE	with spring-loaded guide and prism, swivel-mounted	0-5000 µm	ø 4 mm	convex: 4 mm, concave: 38 mm	300 µm
PFN-52D	FE + NFE combined	Dual function probe with spring-loaded guide and prism	FE 0-5000 µm, NFE 0-2000 µm	ø 8 mm	convex: FE 4 mm, NFE 6 mm, concave: 38 mm	300 µm
PFN-52DS	FE + NFE combined	Dual function probe with spring-loaded guide and prism, swivel-mounted	FE 0-5000 µm, NFE 0-2000 µm	ø 8 mm	convex: FE 4 mm, NFE 6 mm, concave: 38 mm	300 µm
PN-6	NFE	with spring-loaded guide and prism, for thick layers	0-6000 µm	ø 8 mm	convex: 6 mm, concave: 38 mm	3 mm
PF-1S	FE	with spring-loaded guide and prism for especially small parts and areas, swivel-mounted	0-1000 µm	ø 2 mm	convex: 1 mm, concave: 6 mm	300 µm
PF-1T	FE	bar-shaped probe for small spaces	0-1000 µm	ø 2 mm	convex: 2 mm, concave: 16 mm	300 µm
PF-2T	FE	bar-shaped probe for small spaces and pipes	0-2000 µm	ø 3 mm	convex: 2 mm, concave: 12 mm	300 µm
PF-3T	FE	bar-shaped probe for small spaces and pipes	0-3000 µm	ø 3 mm	convex: 2 mm, concave: 8 mm	300 µm
PF-6S	FE	two-pole probe for thick coatings, swivel-mounted	0-6000 µm	ø 14 mm	convex: 5 mm, concave: 25 mm	1 mm
PF-30	FE	two-pole probe for very thick coatings	0-30.000 µm	ø 40 mm	convex: 15 mm, concave: 60 mm	5 mm
PF-1000	FE	with springy sensing probe for small parts and complex areas	0-1000 µm	ø 2 mm	convex: 1 mm, concave: 6 mm	300 µm

TECHNICAL DATA

Applications:	Depending on the selection of the probe measurement of paint, varnish, plastic and galvanic layers on steel, measurement of insulating layers on non-ferrous metals with automatic recognition of the basic material
Standards:	ISO 2178, ISO 2360, BS 5411, ASTM
Measuring probe:	The measuring range is depending on the probe, on steel and iron up to 30 mm (30,000 µm), on NFE metals up to 6 mm (6000 µm). Minimum area, minimum radius of curvature and calibration value also depend on the probe.
Accuracy:	less than 100 µm: ± 1 µm, 100-1000 µm: ± 1%, 1000-2000 µm: ± 3%, > 2000 µm: ± 5%
Resolution:	1-100 µm: 0.1 µm, 100-1000 µm: 1 µm, > 1000 µm: 10 µm
Measuring units:	µm and mils
Environment temperature:	0 - 50° C
Display:	Graphic display
Multilingual menu navigation:	German / English / Spanish / Dutch
Data logger:	10,000 measured values
Statistics:	Count / Maximum / Minimum / Average / Standard deviation
Calibration memory:	3 calibration memories for storing individual calibrations
Interface:	RS232 interface with USB cable for communication with PC and printer
Power supply:	3x 1.5 V AA Mignon
Operating time:	approx. 60 hours
Dimensions:	200 x 95 x 41 mm
Weight:	265 g (with batteries)
Warranty:	12 months on the device, 3 months on the probe

OPTIONALS

TOP-PRINT4 THERMAL DATA PRINTER

Small, battery powered printer for measurement values and statistics.

Technical data

Printing method:	Thermal printer
Characters/line:	32
Transfer speed:	38400 baud
Interface:	Bluetooth class 2 and Serial
Paper:	Thermal paper 57 mm wide – max. 10 m long
Power supply:	Li-Io rechargeable battery (approx. 60 hours of operation)
Dimensions:	100 x 75 x 45 mm
Weight	210 g

Operating instructions

1. Connect the printer cable to the left USB port (**COM**) at the printer.
2. Connect the printer cable to the device (serial port next to the probe).
3. Insert paper roll
4. Switch on printer (is it already charged? See below)
5. Switch on the device

Charging the built-in Li-Io rechargeable battery

When delivered new, the Li-Io rechargeable battery in the TOP-PRINT4 must be charged up before first-time use. The rechargeable battery is charged up with the mains charger supplied. The cable from the mains charger is plugged into the connection socket on the right-hand side. **The charging time should be at least 4 hours.** The blue LED blinks during the charging process; it lights steadily when the battery is fully charged. The charger then switches automatically to maintenance charging mode. The capacity of the rechargeable battery is sufficient for approx. 60 hours of operation.

Notes on operation

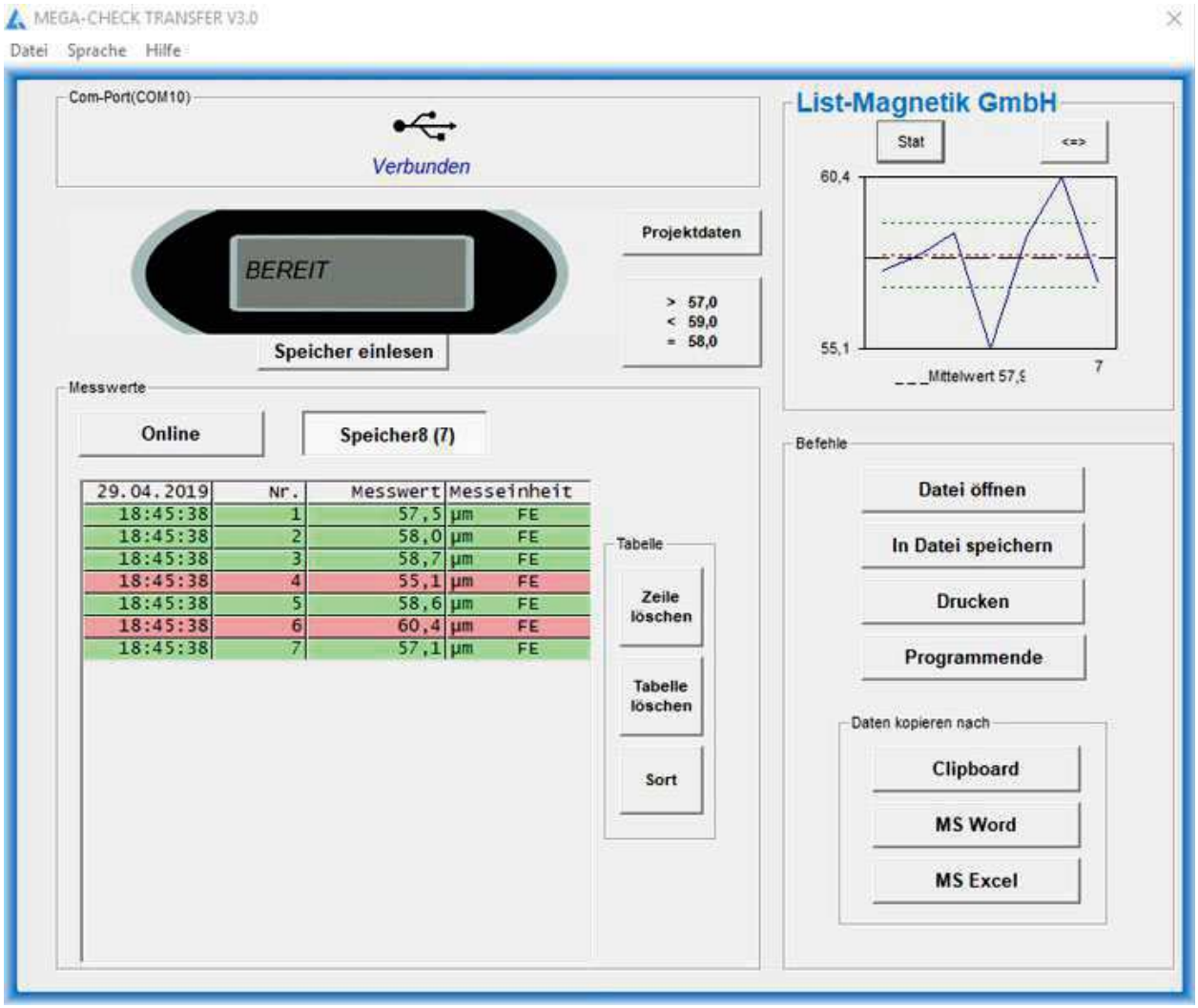
1. The paper is manually transported using the **Feed** key. After completion of the printout the paper strip is transported out of the housing by pressing this key and can then be cut off cleanly.
2. Faulty printout: The **TOP-PRINT4** must be charged up again if individual lines of the printout are not printed correctly.
3. Inserting a new paper roll: Open the cover, Insert the paper roll, pull out the end of the paper, Close the cover

AVAILABLE APPLICATIONS

MEGA-CHECK TRANSFER

On www.list-magnetik.com, in the category **Applications** you may obtain the free of charge data transfer application **MEGA-CHECK TRANSFER**, to transfer measurement data to your PC.

With MEGA-CHECK TRANSFER, you can measure online or read the device's memory, you can evaluate the data statistically or visualize as chart. You can print the results or hand over the data to applications like Microsoft Word and Microsoft Excel.



TRANSFER

- free download from our website www.list-magnetik.com
- easy to handle transfer program to display measurement values as text

  This software reads the data into a file and displays it.

  The free **TRANSFER** software for the transmission of data to the PC or laptop can be downloaded from www.list-magnetik.com category **Applications.**

We supply:

- Coating Thickness Meters
- Magnetic Meters
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Internet: https://www.list-magnetik.com
E-mail: info@list-magnetik.de

QM-System
ISO 9001:2015 zertifiziert

OPERATION MANUAL

COATING THICKNESS METER

MEGA-CHECK MASTER

Firmware version 15.1 and up

2019-05

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TABLE OF CONTENTS
MEGA-CHECK MASTER (2019-05)

INTRODUCTION

With the **LIST-MAGNETIK MEGA-CHECK** coating thickness meters you have the possibility to connect a variety of specialized probes. Whether for particularly small openings, for thick layers or for small measuring points, special requirements are met here.
In these measuring probes, a separate microcontroller digitizes the analog probe signals and transfers them to the display device. This technique is extremely interference-free and allows even more accurate and reproducible measured values.

A variety of probes for FE metals (iron and steel), NFE metals (non-ferrous metals such as Aluminum, brass, copper, bronze, non-magnetic stainless steels) and combined probes with automatic detection of the base material can be connected. The combined probe with swivel-mounted head is worldwide unique.
All kinds of paint, varnish, plastic and galvanic coatings on steel can be measured by means of the magnet-induction process, as well as insulating layers (paint, varnish, plastic, anodic) on non-ferrous metals by means of the eddy current method.

The devices are equipped with a large and clear graphic display.

The menu is offered in the languages German / English / Spanish / Dutch.
The probe cable can be plugged into both sides of the probe (on display unit and probe). In the event of a cable break, only the cable has to be replaced.

All LIST-MAGNETIK MEGA-CHECK coating thickness meters stand out for their quality **Made in Germany**.

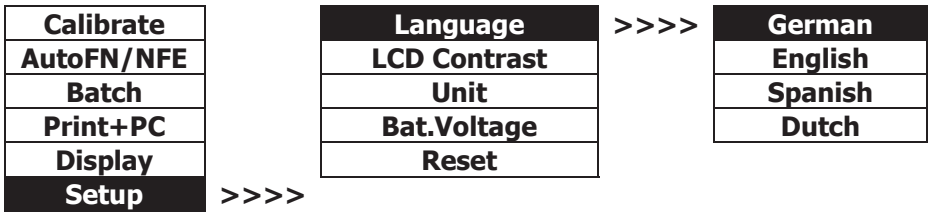
MEGA-CHECK Master

The high-end device with comfortable functions, which offers the professional user many possibilities.
A measured value memory and an RS232 interface are available. The measured values can be statistically evaluated. This allows a PC or printer to be connected to the measuring results with simple operation.
Three calibration memories are available for storing specific parts calibrations.

The scan function for the determination of the layer thickness on rough or blasted surfaces is available, and the duplex function for the exact determination of the individual layer thickness for measurements of insulating layers on galvanized steel parts.
The analog representation of the measured value profile is an important support for continuous measurement of the coating thickness.

QUICK START

- Connect the probe cable to the probe and the device.
- Switch on the **MEGA-CHECK Master** using the **ON-OFF** key. The value last measured will be displayed.
- To change the language (English by default) press the **MENU** key:



  Go through the menu using the arrow keys. Confirm your choice by pressing the **OK** key.
- Gently apply the probe on the coating to be measured until the value is displayed and the device confirms its measurement by means of an acoustic signal.
- Between each measurement, lift off the probe at least 5 cm for approx. 1 second. The stored calibration will then automatically be checked and corrected if applied.
- When using a combined probe (FE/NFE), the device will automatically select the appropriate measurement method after the probe has been applied. Behind the measurement value the symbol **FE** will be displayed for the magnetic induction method or **NFE** for the eddy current method.

IMPORTANT NOTES

USING THE PROBE

Do not run the probe along a measurement object. Always measure point by point. This means that after each measurement the probe should be lifted off for approx. 1 second. The calibration set will then automatically be checked and corrected if applicable.

Please make sure that the pole tip of the measurement probe and the calibration plates are clean and free of dust.

COATING THICKNESS OF 2000 µM AND UP

When measuring in higher range (more than 2 mm / 2000 µm) you will obtain a better accuracy, when you calibrate the device with a 1 mm calibration plate, which is available as option.

MEASUREMENT ON SMALL OR CURVED PARTS

With measurements on small or curved parts both, the zero adjustment and the foil calibration, should be carried out on a non-coated object with the same geometry.

The same applies to base material the structure of which differs strongly from the included base plate (cast, special steels, etc.)

For measuring small parts on steel as a base material the probes PF-1000, PF-1S and PF-3T are especially suitable.

When using the device for the first time its calibration should be checked by means of the included measurement foils.

RECOMMENDED THICKNESS OF THE BASE MATERIAL

Base material: iron / Steel (FE):	at least 300 µm / 0,3 mm
Base material: non-ferrous metals (NFE):	at least 200 µm / 0,2 mm

MAINTENANCE OF STORED VALUES WHEN CHANGING BATTERY

The stored measurement values and calibrations will be maintained even after the device has been switched off or when the device is stored without batteries.

POWER SUPPLY

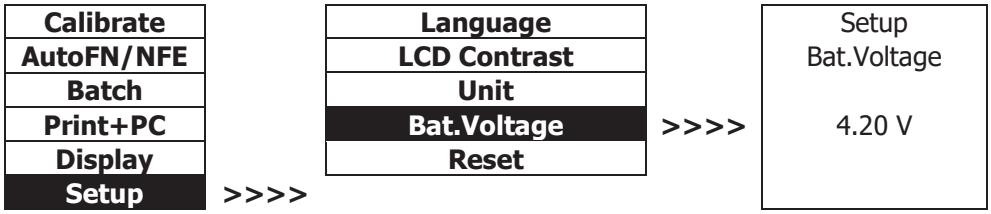
The device is delivered with three 1.5V batteries (Mignon AA) by series but it can also be operated with three 1.2 V NiCd batteries as an option. An appropriate charging device to be connected to the serial interface port is available.

Charging time: 8 – 10 hours.

It is also possible to have the battery charger connected all the time.

BATTERY AND/OR ACCUMULATOR TEST

As soon as only one bar is displayed on the active device the batteries have to be changed and/or the device has to be charged. If the message **change battery** is displayed, the device will automatically switch off for protection should the battery voltage be too low. To check this, you can have the exact voltage be displayed:



The voltage should be more than 3.0V

Old batteries are special refuse and must be special disposed

AUTOMATIC SWITCH-OFF

The device will switch off automatically 2 minutes after the last measurement

CHANGE OF THE PROBE

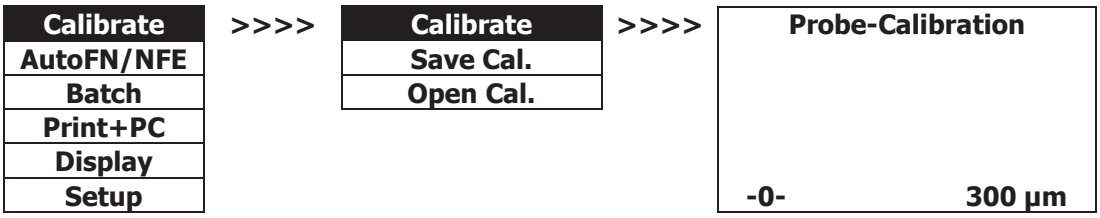
To change the probe, switch off the device first. Then connect the desired probe to the probe cable and switch on the device again.

FUNCTIONS OF THE OPERATING KEYS

USE OF THE MENU

The different devices functions will be controlled via a menu. After switching on the device press the **MENU** key in order to call up the menu.
Using the arrow keys, you can select a menu option. The current selection is highlighted in black. You will confirm your selection by pressing **OK**. Either a submenu or the selected device function will be displayed.
You will exit the menu of the device by pressing the **C** key.
The blue key in the center will call up the main menu.

CALIBRATE



Zero Adjustment (One-point-calibration)

Press the blue key **-0-** on the left. Set the probe on a blank base plate (FE = iron, steel; NFE = non-ferrous metals). In the display the message >calibrate<, then >calibrate ready< and 0.0 is indicated, the beep signal sounds. Now the probe can be removed.

Important: Zero adjustment with the probe PF-30 for thick coatings has to be carried out on a steel plate with a size of at least 60 x 40 mm.

Foil Calibration (Two-point-calibration)

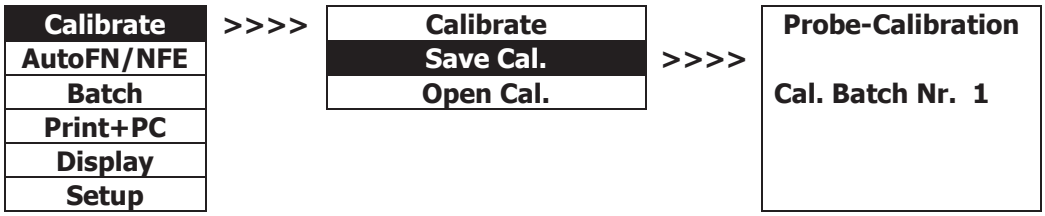
After zero adjustment:

- Set the correct calibration value for the probe using the arrow keys (see Chapter **MEASUREMENT PROBES**).

  The value can be changed by ± 1 by pressing the keys shortly. Pressing the keys longer will result into the value continuously increasing and/or decreasing faster.
- Put the measurement foil onto the base plate. Apply the probe onto the foil then press the blue menu key on the right.
- After the acoustic signal the calibration value is displayed and the probe can now be removed.
- The device is now ready for measurements.

Storage of object-related calibration:

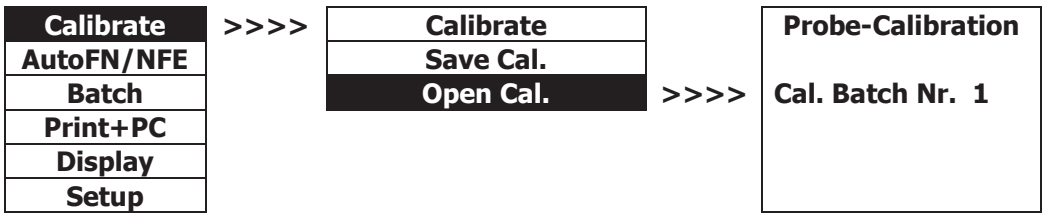
The device can store up to three different object-related calibrations in the probe and call them up if needed. To store a calibration value, proceed as follows:
First: carry out object-related calibration as described above under 1. Then call up the menu option **Save Cal.**:



Select the calibration batch no. 1 to 3 using the arrow keys, then store the calibration by using the **OK** key.

Open the object-related calibration:

In order to open stored object-related calibration select the menu operation Open Cal.:



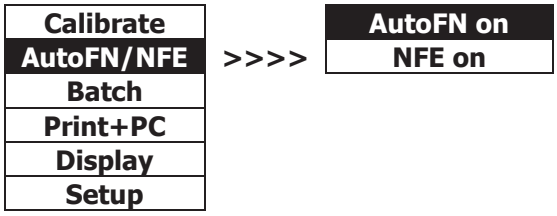
Select the calibration batch no. 1 to 3 using the arrow keys; then open calibration by pressing OK. The calibration batch opened is displayed on the upper right side.

IMPORTANT

During start-up of the device and during measurements on small or curved objects zero adjustment and foil calibration using the included measurement foil (approx. 300 µm) should be carried out by all means.

If the device had already been in use and has been calibrated correctly, the calibration value last entered will be automatically adjusted to any existing changes in temperature and/or corrected. New calibration is only required if the measurement is carried out on small or curved objects.

AUTO-FN/NFE–SWITCHING



When using the combined probes **PFN-52D** and **PFN-52DS** and when measuring coatings on slightly magnetic stainless-steel materials, it is possible that the probe will automatically switch to **FE** and a wrong measurement value is displayed. In such case you have to switch automatically recognition of the measuring method to **NFE On** in order to activate NFE (the eddy current method). If the probe has been switched to this method the base material will be displayed inversely to show recognition to the **NFE On** method.

BATCH

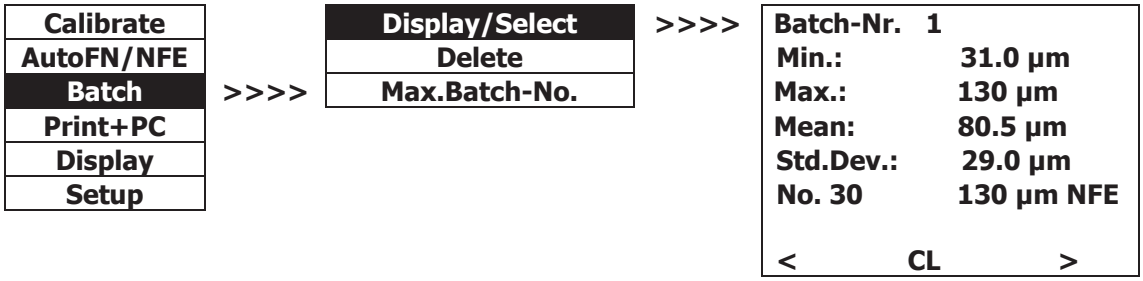
MEGA-CHECK Master provides up to 100 different application batches for storage and for statistical evaluation of object-related measurement series. From these 100, 96 batches are usable by you. Batch No. 96 is reserved for scan measurement, and the batches No. 97-99 are reserved for duplex measurement.

A total up to 10.000 measurements can be stored. The maximum number of measurements per application batch depends on the set number of batches. First you should select the number of batches needed. Then activate the current batch number in the menu **Display** where the measurement values are to be stored.

The selected batch number is shown in the upper left corner of the display.

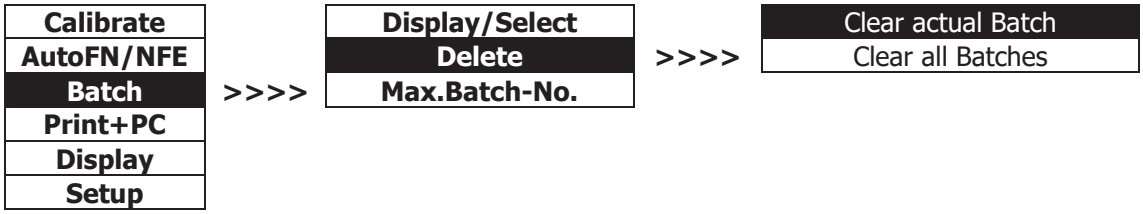
DISPLAY

Display of the current storage content:



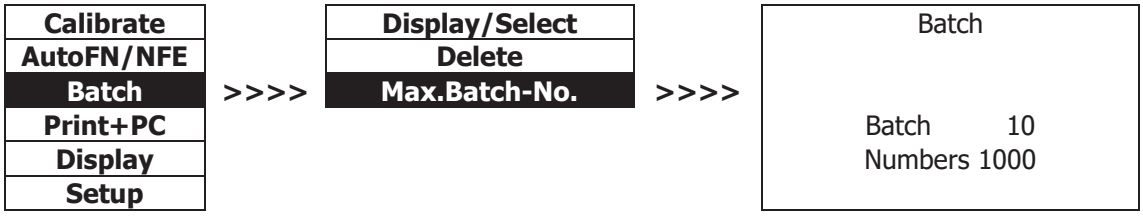
Any measurement value can be selected using the arrow keys (measurement value No. is highlighted in black). With the blue key on the left, the selected measurement value can be deleted. The statistics will then be recalculated.
With the left or right blue keys < / > the batch number can be selected.

DELETE



Here you can either delete the measurement values in the current batch or all measurement values in all batches.

MAXIMUM BATCH NO.



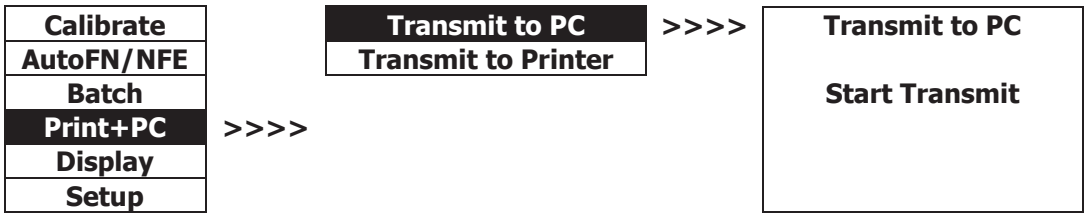
Here the number of required batches are selected. At the same time the maximum number of measurement values which can be entered per batch are displayed.

PRINT+PC

This menu option serves for sending the stored measurement data to the **TOP-PRINT4 printer** via the serial interface or to the **PC**. Both cables are plugged in the same port.

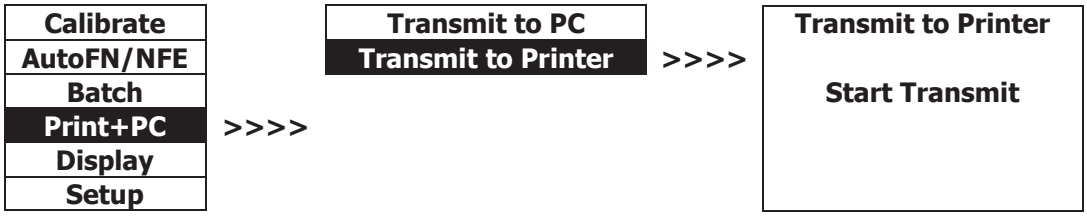
TRANSMIT TO PC

This function is only used to supply the data application TRANSFER.
The applications TRANSFER-EXCEL and STAT6 don't work any longer with firmware version 15.1 and up. To transfer data to PC, switch to the data transfer application **MEGA-CHECK TRANSFER** at https://www.list-magnetik.com/software



Send the measurements and statistics of the actual batch via serial interface and the USB cable to the PC. Before, the data transfer of the program must be activated.

TRANSMIT TO PRINTER



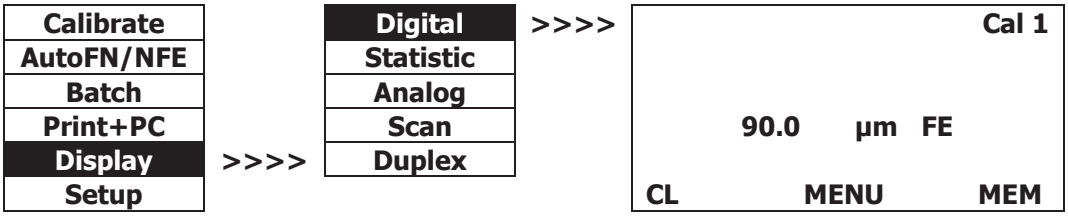
Send the measurements and statistics of the actual batch via serial interface and the printer cable to **TOP-PRINT4**.

Older printer models (MEGA-PRINT, TOP-PRINT) can't be connected with firmware version 14.1 and up.

DISPLAY

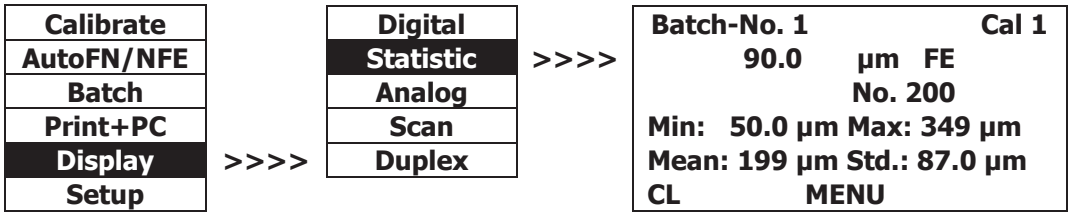
MEGA-CHECK Master provides various display and measurement modes: Scan measurement, Duplex measurement, Analog display, Statistical display.

DIGITAL



The normal digital display mode is activated by default. Here the current measurement value is displayed but not saved automatically. In order to save the selected measurement value in the batch press the blue **MEM** key on the right once. Any wrong measurement value can be deleted by pressing the blue key **CL** on the left.

STATISTIC

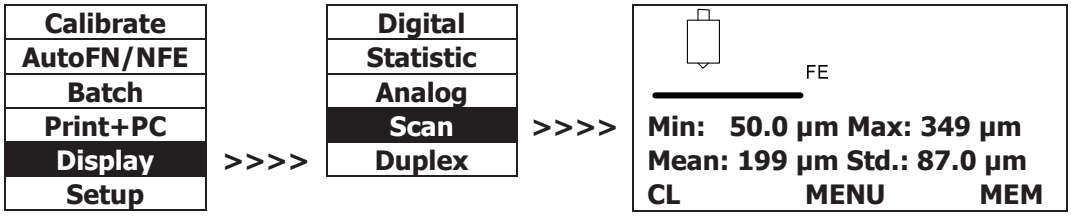


When activating the statistical display each measurement value is automatically stored in the selected batch and in addition the statistical parameters are displayed. To delete the last measurement value, press the blue key **CL** on the left once.

ANALOG

After activation of the analog display mode, first the measurement range (minimum value / maximum value) is entered. Then the analog display with the pre-selected measurement range is displayed. When exceeding any set measurement range, the symbol **> MAX** or **< MIN** appears before the digitally displayed measurement value. When applying the probe onto the coating to be measured the measurement value will be updated every 0.5 seconds resulting in a trend display when moving the probe on the coating. To store the measurement value in the batch, press the blue key **MEM** on the right once. Any wrong measurement value can be deleted by pressing the blue key **CL** on the left once.

SCAN MEASUREMENT



The Scan measurement function serves for determining the exact mean value of the coating thickness on rough surfaces or coatings.

To activate the Scan measurement, place the probe on the coating to be measured and touch down (probe symbol on display goes down to coating), then press the **START** key and slowly move the probe along the coating to be measured. Automatically, about **3-4 measurements per second** are performed and at the same time the minimum, maximum and average values are calculated and displayed.

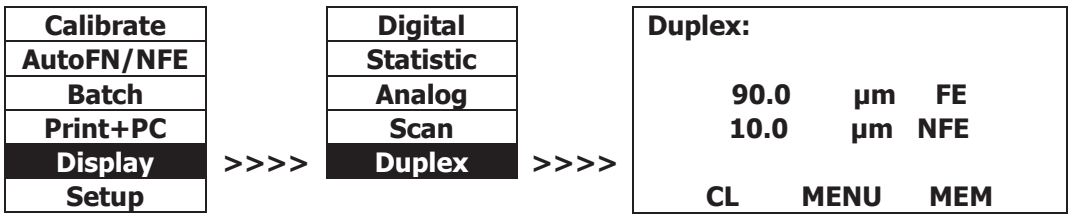
As the probe moves through peaks and valleys with every movement - due to the roughness - and the measuring rate is very fast, an accurate mean value measurement becomes possible. A maximum of 100 individual measured values can be recorded.

To stop scanning, press the **END** key and then remove the probe from the coating (probe icon on the display goes up into air).

All individual readings of the scan are stored in batch **No. 96** and can be recalled or viewed as needed. A new scan process clears and overwrites the measurements in this batch.

Depending on the surface roughness, the probe tip can wear off fast. The harder ruby pole of probes **PF-5 / PF-5S / PFN-52D / PFN-52DS / PN-6** is better to use with rough surfaces. With smooth coatings over rough base material (e.g. cast iron), all probes are useable.

DUPLEX MEASUREMENT



The Duplex measurement function serves for measuring twofold coatings (determination of the coating thickness of insulating coatings on galvanized steel base materials).

With this function the **thickness of the insulating coating and the zinc coating thickness** is displayed at the same time after putting the probe on the coating.

The measurement of the overall thickness is made according to the magnetic induction method and the insulating layer measured with eddy current is automatically deducted.

Important

In order to avoid erroneous measurements, the following requirements have to be fulfilled:

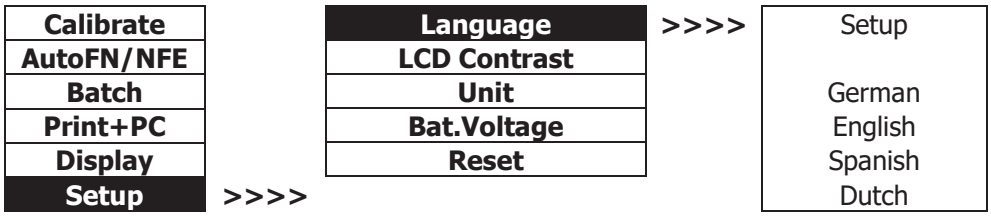
- The zinc coating thickness must be at least **60 µm**.
- If possible zero adjustment should be made with the eddy current method NFE on the same galvanized part without insulating coating. Activate the Duplex and the calibrate functions, perform the zero setting on a non-coated zinc plated material. The device selects by itself the function **NFE on**. This calibration remains stored even when the device is switched off.
- The Duplex measurement function will only work with the probe types **PFN-52D und PFN-52DS.**

Both individual readings (FE / NFE value) are stored in batch No. 97 and No. 98 by pressing the right key **MEM**. The total layer thickness (sum of FE + NFE value) is stored in batch No. 99.

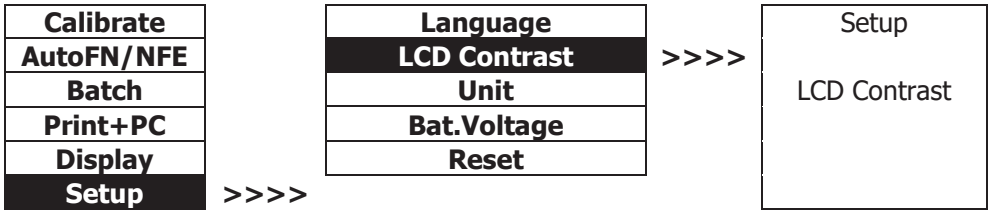
An incorrect pair of measured values can be deleted with the left blue **CL** key.

SETUP

LANGUAGE SELECTION:

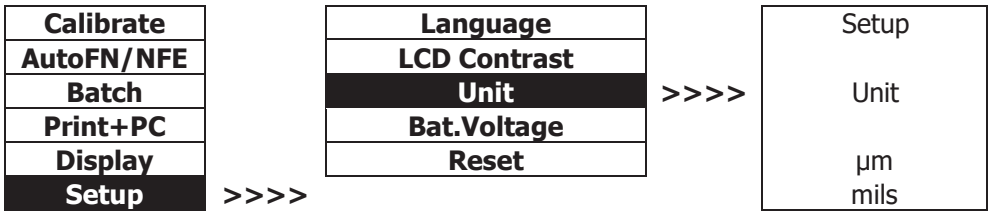


LCD CONTRAST

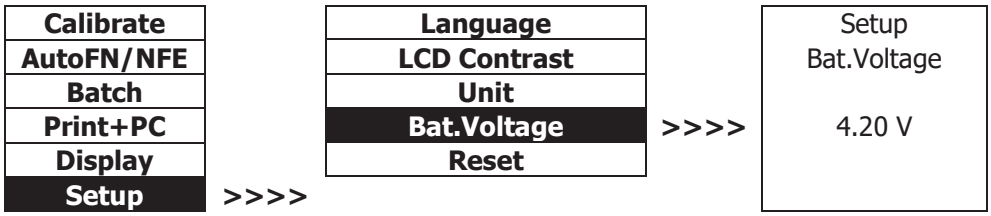


To regulate the contrast, use the up and down arrows.

MEASUREMENT UNIT (SWITCHING BETWEEN µM – MILS):

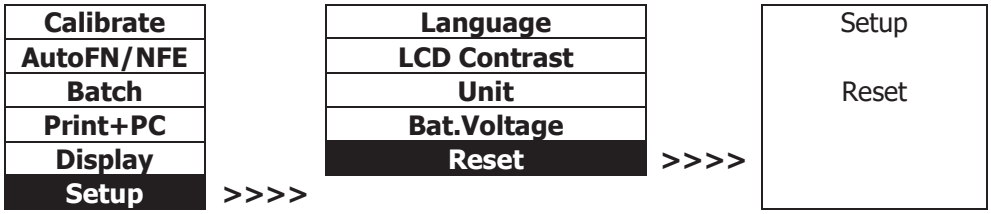


DISPLAY OF THE BATTERIES VOLTAGE



The voltage should be more than 3.0V

RESET



Using the reset function all adjustments are reset to the settings from factory. This function is important when settings have been modified or the device and the probe do not work properly.

Please note:
After having performed the Reset all custom calibration batches are cancelled.

MEASUREMENT PROBES

Special characteristic curves and calibration data

Several measurement probes can be connected to the device, which differ by their measurement method (magnetic induction and/or eddy current) and by their measurement range and/or by application (see below table).

The special characteristic curves and calibration data are stored in the probe, and after reconnecting this probe the last calibration is automatically activated. There is no new calibration necessary when changing the probe.

When the probe is changed, the device must first be switched off. Please then connect the probe and switch it on again.

Table of available measuring probes

Measurement method:
FE = magnetic induction on steel
NFE = eddy current on NE metals

Type	Meas. method	Model	Measuring range	Smallest area	Smallest curvature radius	Calibration value
PF-5	FE	with spring-loaded guide and prism	0-5000 µm	ø 4 mm	convex: 4 mm, concave: 38 mm	300 µm
PF-5S	FE	with spring-loaded guide and prism, swivel-mounted	0-5000 µm	ø 4 mm	convex: 4 mm, concave: 38 mm	300 µm
PFN-52D	FE + NFE combined	Dual function probe with spring-loaded guide and prism	FE 0-5000 µm, NFE 0-2000 µm	ø 8 mm	convex: FE 4 mm, NFE 6 mm, concave: 38 mm	300 µm
PFN-52DS	FE + NFE combined	Dual function probe with spring-loaded guide and prism, swivel-mounted	FE 0-5000 µm, NFE 0-2000 µm	ø 8 mm	convex: FE 4 mm, NFE 6 mm, concave: 38 mm	300 µm
PN-6	NFE	with spring-loaded guide and prism, for thick layers	0-6000 µm	ø 8 mm	convex: 6 mm, concave: 38 mm	3 mm
PF-1S	FE	with spring-loaded guide and prism for especially small parts and areas, swivel-mounted	0-1000 µm	ø 2 mm	convex: 1 mm, concave: 6 mm	300 µm
PF-1T	FE	bar-shaped probe for small spaces	0-1000 µm	ø 2 mm	convex: 2 mm, concave: 16 mm	300 µm
PF-2T	FE	bar-shaped probe for small spaces and pipes	0-2000 µm	ø 3 mm	convex: 2 mm, concave: 12 mm	300 µm
PF-3T	FE	bar-shaped probe for small spaces and pipes	0-3000 µm	ø 3 mm	convex: 2 mm, concave: 8 mm	300 µm
PF-6S	FE	two-pole probe for thick coatings, swivel-mounted	0-6000 µm	ø 14 mm	convex: 5 mm, concave: 25 mm	1 mm
PF-30	FE	two-pole probe for very thick coatings	0-30.000 µm	ø 40 mm	convex: 15 mm, concave: 60 mm	5 mm
PF-1000	FE	with springy sensing probe for small parts and complex areas	0-1000 µm	ø 2 mm	convex: 1 mm, concave: 6 mm	300 µm

TECHNICAL DATA

Applications:	Depending on the selection of the probe measurement of paint, varnish, plastic and galvanic layers on steel, measurement of insulating layers on non-ferrous metals with automatic recognition of the basic material
Standards:	ISO 2178, ISO 2360, BS 5411, ASTM
Measuring probe:	The measuring range is depending on the probe, on steel and iron up to 30 mm (30,000 µm), on NFE metals up to 6 mm (6000 µm). Minimum area, minimum radius of curvature and calibration value also depend on the probe.
Accuracy:	less than 100 µm: ± 1 µm, 100-1000 µm: ± 1%, 1000-2000 µm: ± 3%, > 2000 µm: ± 5%
Resolution:	1-100 µm: 0.1 µm, 100-1000 µm: 1 µm, > 1000 µm: 10 µm
Measuring units:	µm and mils
Environment temperature:	0 - 50° C
Display:	Graphic display
Multilingual menu navigation:	German / English / Spanish / Dutch
Analog display:	Analog measured value display with continuous measurement
Scan function:	for accurate measurement on rough or blasted surfaces
Duplex function:	for the exact determination of the individual layer thickness for measurements of insulating layers on galvanized steel parts (the zinc layer must be > 60 µm)
Data logger:	10,000 measured values, divisible into 100 batches
Statistics:	Count / Maximum / Minimum / Average / Standard deviation
Calibration memory:	3 calibration memories for storing individual calibrations
Interface:	RS232 interface with USB cable for communication with PC and printer
Power supply:	3x 1.5 V AA Mignon
Operating time:	approx. 60 hours
Dimensions:	200 x 95 x 41 mm
Weight:	265 g (with batteries)
Warranty:	12 months on the device, 3 months on the probe

OPTIONALS

TOP-PRINT4 THERMAL DATA PRINTER

Small, battery powered printer for measurement values and statistics.

Technical data

Printing method:	Thermal printer
Characters/line:	32
Transfer speed:	38400 baud
Interface:	Bluetooth class 2 and Serial
Paper:	Thermal paper 57 mm wide – max. 10 m long
Power supply:	Li-Io rechargeable battery (approx. 60 hours of operation)
Dimensions:	100 x 75 x 45 mm
Weight	210 g

Operating instructions

1. Connect the printer cable to the left USB port (**COM**) at the printer.
2. Connect the printer cable to the device (serial port next to the probe).
3. Insert paper roll
4. Switch on printer (is it already charged? See below)
5. Switch on the device

Charging the built-in Li-Io rechargeable battery

When delivered new, the Li-Io rechargeable battery in the TOP-PRINT4 must be charged up before first-time use. The rechargeable battery is charged up with the mains charger supplied. The cable from the mains charger is plugged into the connection socket on the right-hand side. **The charging time should be at least 4 hours.** The blue LED blinks during the charging process; it lights steadily when the battery is fully charged. The charger then switches automatically to maintenance charging mode. The capacity of the rechargeable battery is sufficient for approx. 60 hours of operation.

Notes on operation

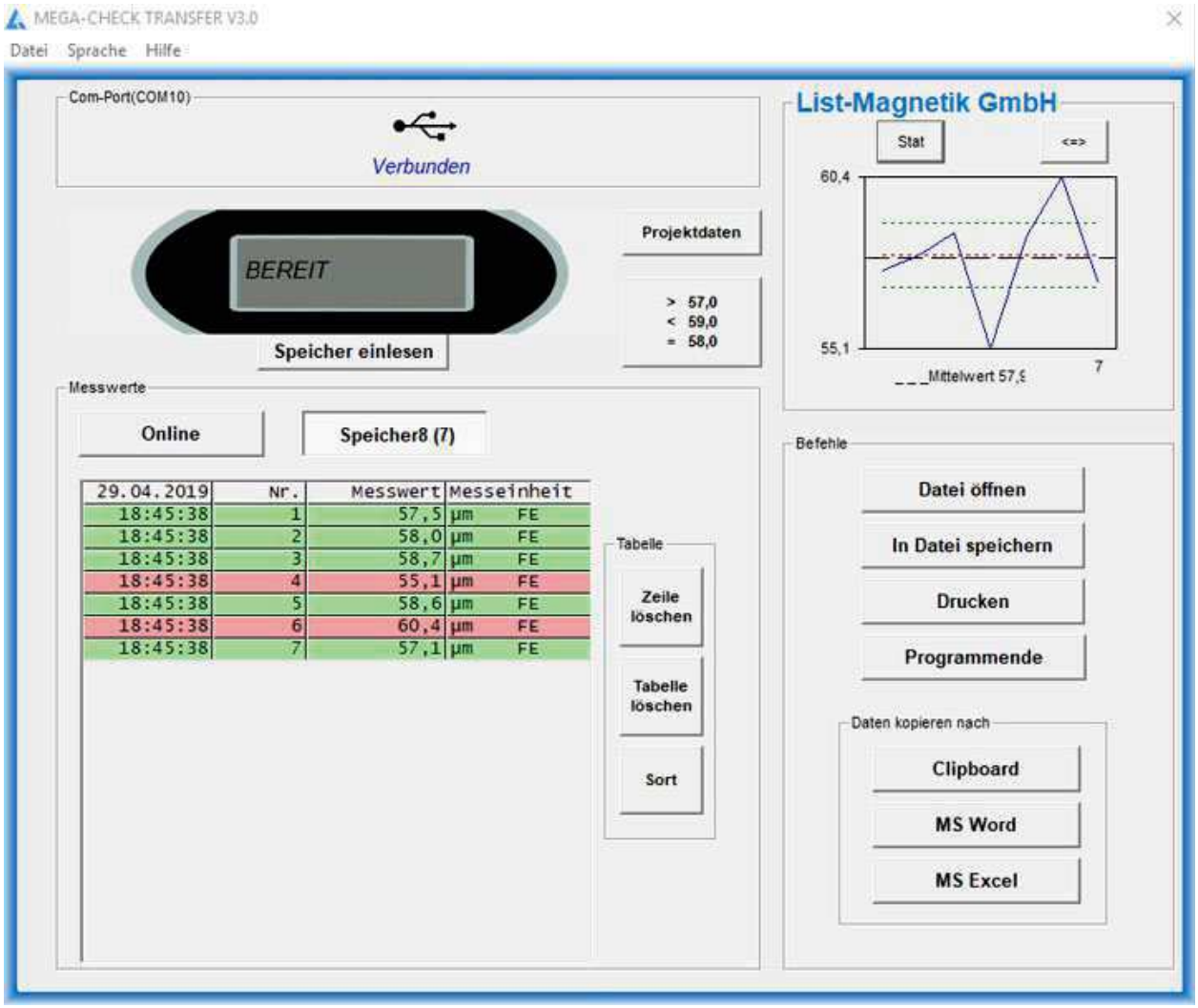
1. The paper is manually transported using the **Feed** key. After completion of the printout the paper strip is transported out of the housing by pressing this key and can then be cut off cleanly.
2. Faulty printout: The **TOP-PRINT4** must be charged up again if individual lines of the printout are not printed correctly.
3. Inserting a new paper roll: Open the cover, Insert the paper roll, pull out the end of the paper, Close the cover

AVAILABLE APPLICATIONS

MEGA-CHECK TRANSFER

On www.list-magnetik.com, in the category **Applications** you may obtain the free of charge data transfer application **MEGA-CHECK TRANSFER**, to transfer measurement data to your PC.

With MEGA-CHECK TRANSFER, you can measure online or read the device's memory, you can evaluate the data statistically or visualize as chart. You can print the results or hand over the data to applications like Microsoft Word and Microsoft Excel.



TRANSFER

- free download from our website www.list-magnetik.com
- easy to handle transfer program to display measurement values as text

  This software reads the data into a file and displays it.

  The free **TRANSFER** software for the transmission of data to the PC or laptop can be downloaded from www.list-magnetik.com category **Applications.**

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