OPERATION MANUAL

FERRITE CONTENT METER

FERRITE-CHECK 240

Firmware Version 733 and up

2025-02

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QM-System
ISO
9001:2015
zertifiziert

INTRODUCTION

The ferrite content meter **List-Magnetik FERRITE-CHECK 240** is an easy-to-use instrument with color display and external probe for measuring the ferrite content in austenitic and duplex steels according to the Basel standard DIN EN ISO 8249 using the magnetic induction method.

A completely new digital probe technology allows very stable measurements due to its high sampling rate. The signals are digitized in the probe for absolutely interference-free and precise measurement. This results in very accurate, reproducible measurements.

The Ferrite Content Meter has a graphic LCD touch panel with innovative user guidance and a resolution of 320x480 pixels. The menu navigation is in German, English, French, Italian and Spanish. The yellow-green silicone frame effectively protects the housing from damage. Measurements are possible in FN and Fe%.

With flexible a data logger, customizable calibration memories and wireless connectivity to Windows, Android or iOS, you have all the options you need to capture and process your measurements.

The scan function allows you to scan the entire surface of a workpiece and statistical evaluation of the data. The additional analog display complements the visualization of measured values, allowing you to see trends and peaks even out of the corner of your eye.

Powered by 3 AA batteries or an external USB power source. This allows you to run the instrument from a power supply or AC adapter.

The probe cable, which can be plugged in at both ends, connects the display unit to the digital probe and can be easily replaced if the cable breaks.

All List-Magnetik FERRITE-CHECK 240 ferrite content meters are high quality products "Made in Germany".

QUICK START GUIDE

- First connect the probe cable to the probe and the instrument.
- Turn on the **FERRITE-CHECK 240** with the red power button.
- **The device is factory-calibrated.**
- The probe will be recognized by the instrument and the model will be automatically displayed in the upper left corner of the status bar.

DISPLAY STRUCTURE

The display is divided into 5 sections.

The **status bar** shows the title of the current menu position and the battery status.

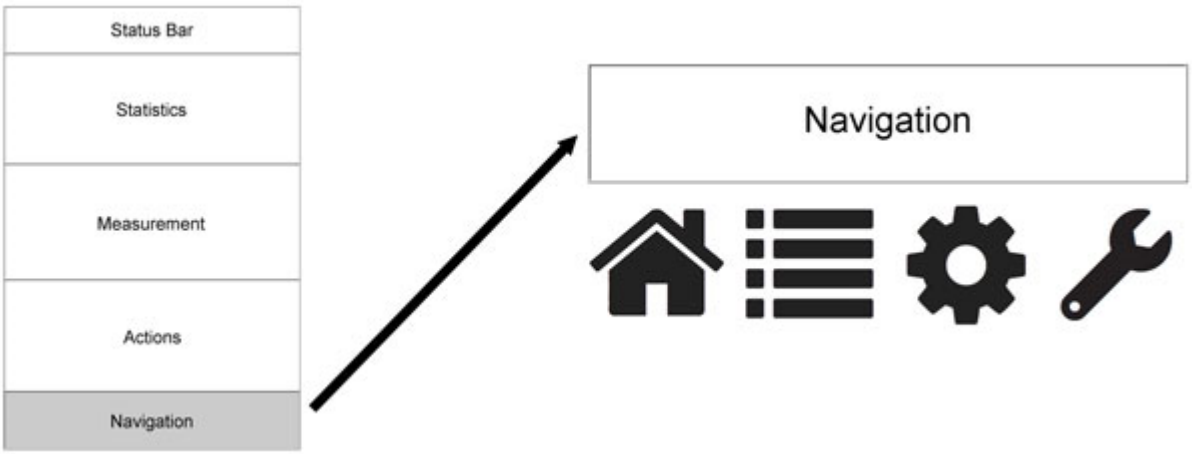
The **statistics** area displays statistics for a series of measurements. If no memory batch is active, the List-Magnetik logo is displayed here.

In the center is the **measurement** display with the current measurement and additional information about it.

Depending on the current display, there are symbols in the **action** area that trigger appropriate processing and special functions.

NAVIGATION

At the bottom of the screen is the **navigation** area. Here it is possible to jump to different service areas.



	Measurement "Home": Here you can always return to the measurement
	Data Log The individual measurements of the currently active memory batch or, if the data logger is off, of the last active memory batch are displayed.
	Setup This section allows you to set the language, unit of measure, and other measurement and display parameters, as well as power management settings.
	Info and System Turn off the unit, view hardware and software status, or perform a factory reset.

MEASUREMENT

	**This icon in the navigation will take you directly to the measurement**

The point-to-point measurement, without special functions such as scan measurement or continuous measurement, the FERRITE-CHECK 240 displays a measured value as soon as the probe is placed.

Take slow readings, allowing one second between readings and lifting the probe 10 cm from the material between readings.

The measured value is confirmed by an acoustic signal.

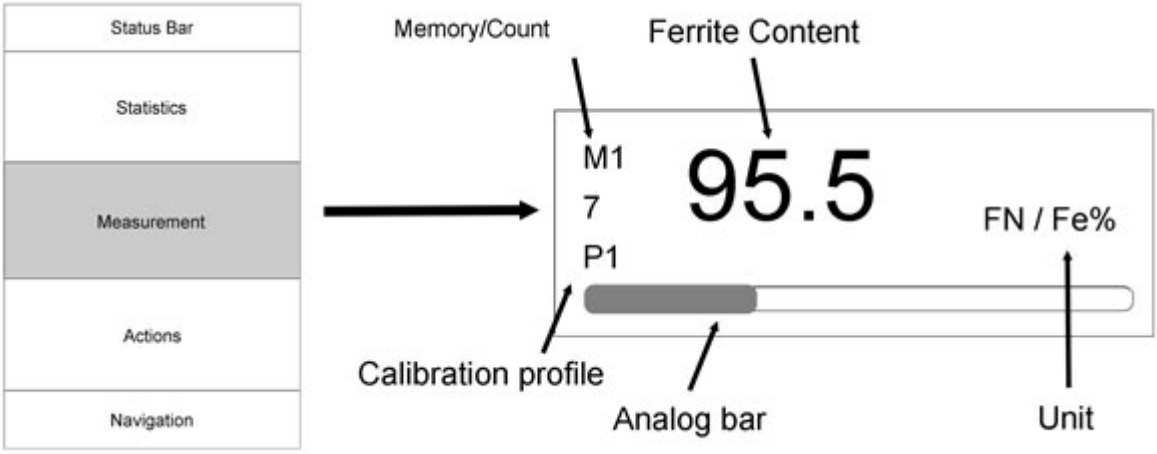
The middle section shows the measured value and the measuring unit (FN or Fe%). The left side shows the currently active memory batch and its fill level.

The number of the active calibration profile (here: P1) is displayed below the memory batch (here: M1/7).

The color of the reading is black. If limit values are set, the measured value is displayed in blue if it is below the lower limit value and in red if it is above the upper limit value.

If the measured value exceeds the maximum value of 140 FN or 100 Fe % due to an incorrect measurement, e.g. due to incorrect calibration, an overflow is displayed with **"---"**.

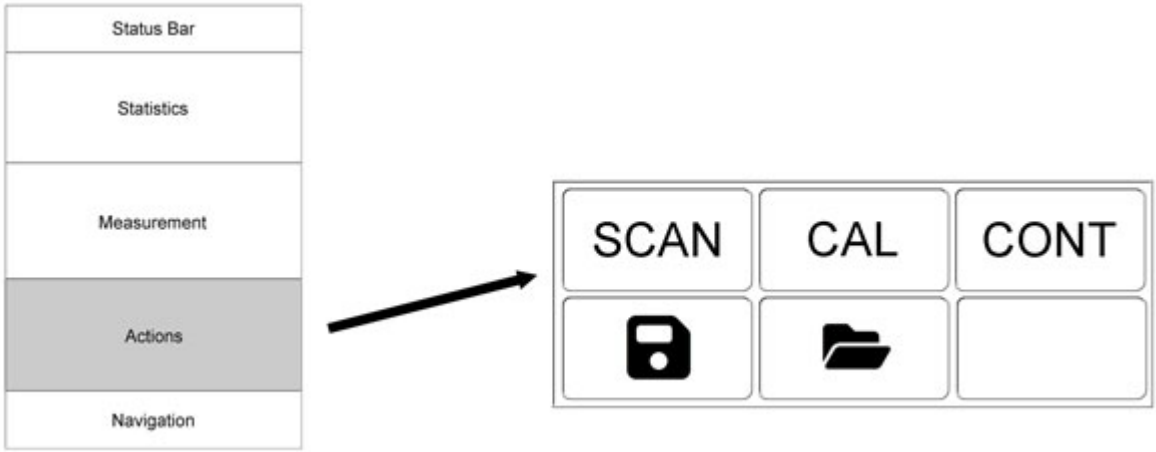
Below the reading is an analog bar graph. **When limits are set, the bar represents the range between the lower and upper limits.** The bar is complete when the value falls below the lower limit or exceeds the upper limit.



If you have activated a memory batch, the statistics for this memory batch will be displayed in the area above the reading instead of the logo.

Actions

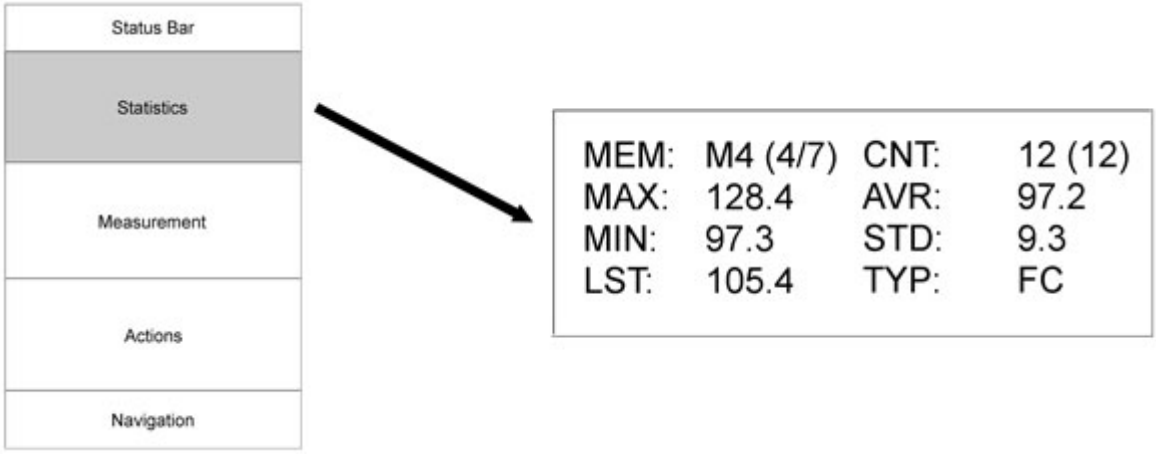
Overview of the action area in the measurement display.



	When the floppy disk icon for saving measurements appears in a highlighted color, measurements are being saved automatically. If the floppy disk icon for saving measurements appears in a normal color like the other buttons, no measurements are currently being saved automatically. There are two possibilities: If "Auto Save" is active (see Settings / Measurements), you can toggle between "Automatic Save" and "Save Off" by tapping the icon. If "Auto Save" is not active, you can save a measurement by tapping the icon. If the disk symbol is not visible, no memory batch is active. **<u>Please note when using Lima Connect:</u>** If the floppy disk symbol is active and the device is connected to the Lima Connect app (Windows, Android, iOS), the measured values are transferred immediately and are available as an online measured value in the app. If the floppy disk symbol is inactive, no online measurement can take place
CAL	Access to the calibration function. Here you can recalibrate the probe or select an existing calibration profile.
	To activate a memory batch, switch to data log management with this icon "Folder". From the moment of activation, measurements can be stored
CONT	Special function Continuous measurement. See separate chapter "Special Measurement Methods".
SCAN	Special function Scan measurement. See separate chapter "Special Measurement Methods".

Statistics display

Only when a memory batch is active, a statistical evaluation of the previous readings of this memory batch is created.



The statistics shown in the example state:

Memory batch number 4 is active (M4). There are 7 memory batches in total (4/7).

A total of 12 values are stored in this batch.

Maximum, minimum, average and standard deviation are calculated from these 12 values.

The last stored value was 105.4.

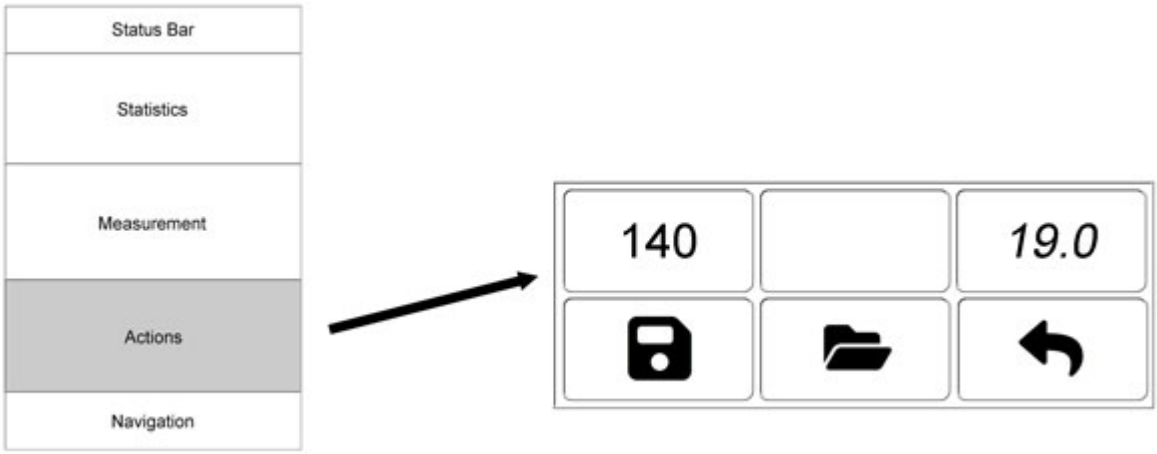
CALIBRATION

If the instrument has already been used and calibrated correctly, the last calibration value entered is automatically adjusted or corrected for any temperature fluctuations that may have occurred after the instrument was turned on.

> Caution:
>
> Check which unit of measurement your instrument is set to.
>
> If you have a calibration standard that **only shows a FN value**, but you are currently measuring in Fe% with the instrument, you must first change the measurement unit to FN.
>
> Only then will the reference value be displayed on the action button to match the standard.

Actions

Overview of the Calibration Display Action Area.



140	Calibration on pure steel (FN 140). The "zero calibration" on FN 140 or 100 Fe% is the first part of the two-point calibration A detailed explanation follows after this overview
25.0	25.0 or another value depending on the instrument setting - note that the value is displayed **in the unit in which the instrument is currently operating** (FN or Fe%). The function starts the reference calibration with a reference standard, in this case with the reference value FN 25.0. The reference calibration is the second part of the two-point calibration. You can adjust the reference value to your available reference standard in the settings menu (accessible via the navigation), but not if the button is highlighted after the calibration has started. In this case, press the button again. A detailed explanation follows this overview
	Back to measurement
	Save the calibration. The icon is not active until the calibration has been performed. This allows you to save the calibration curve generated in the probe during calibration. When saving, you can enter a comment text, for example, to describe the object.
	Access calibration profile management: Find, use, or delete an existing calibration profile

TWO-POINT CALIBRATION

Zeroing (Single Point Calibration)

"Zero calibration" is a common name here, even though it is not quite linguistically correct. It does not calibrate to FN=0 or Fe=0%, but to the full ferrite content of FN=140.

The button is highlighted when 140 is selected. The instrument is now ready for zero calibration. Place the probe on the bright steel reference standard in FN 140. On the display appears **140.0**, the audible signal sounds, and the probe can be removed.

Reference Calibration (Two-Point Calibration)

After zeroing:

The reference calibration action button displays a value, such as 25.0, or similar. Take your copper reference standard with the **higher** value. Does the value match? If not, the instrument must first be calibrated to the existing reference standard. To do this, use the navigation to go to ⚙ Settings/Calibration.

Select 25.0 to highlight the button. The instrument is now ready for reference calibration. Place the probe on the reference standard. The display will show a reading that matches the reference standard, the beeper will sound, and the probe can be removed.

The instrument is now ready for measurement. The calibration just created can be saved as a calibration profile (with the floppy disk icon).

CALIBRATION PROFILE

The currently executed calibration is permanently retained in the device, even if it is switched off.

Save a calibration profile

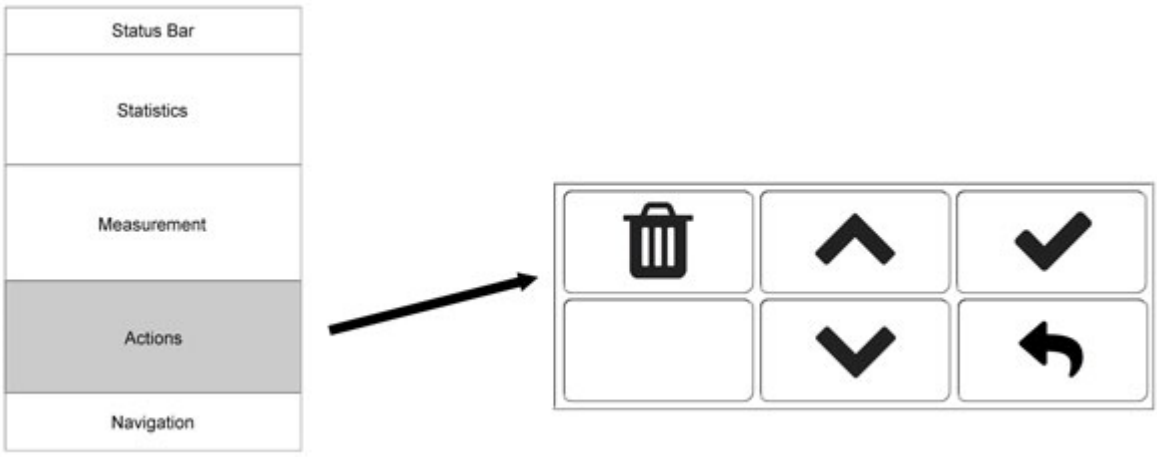
If you want to switch between several object-related calibration profiles, it is useful to save the current calibration. You can do this by pressing the floppy disc icon after a successful calibration.

Use a calibration profile

A saved calibration profile can be loaded and used without having to perform a two-point calibration again. To do this, select the data stack icon.

Actions

Overview of the calibration profile management action area.



	Back to calibration
	Scroll through the calibration profiles. In addition to the entered text and the set foil thickness, the internal data of the calibration curve is also displayed.
	Selection of a calibration profile for use immediately
	Deletion of the calibration profile currently displayed

SPECIAL MEASURING METHODS

CONTINUOUS

Continuous measurement takes 5-6 readings per second.
The display is constantly updated.

If the probe is outside the measuring range of the probe, e.g. in air, the overflow display "---" appears.

If you wish to store a measurement, you can add the current value to the current memory batch by briefly touching the floppy disc icon. The transfer is confirmed by a beep. The statistics of this memory batch are displayed in the area above the measurement display as in a punctual measurement.

	Return to punctual measurement
	If the floppy disk symbol for storing measurements is displayed normally, you can store measurements by tapping it. If the floppy disk icon is not visible, no memory batch is active.

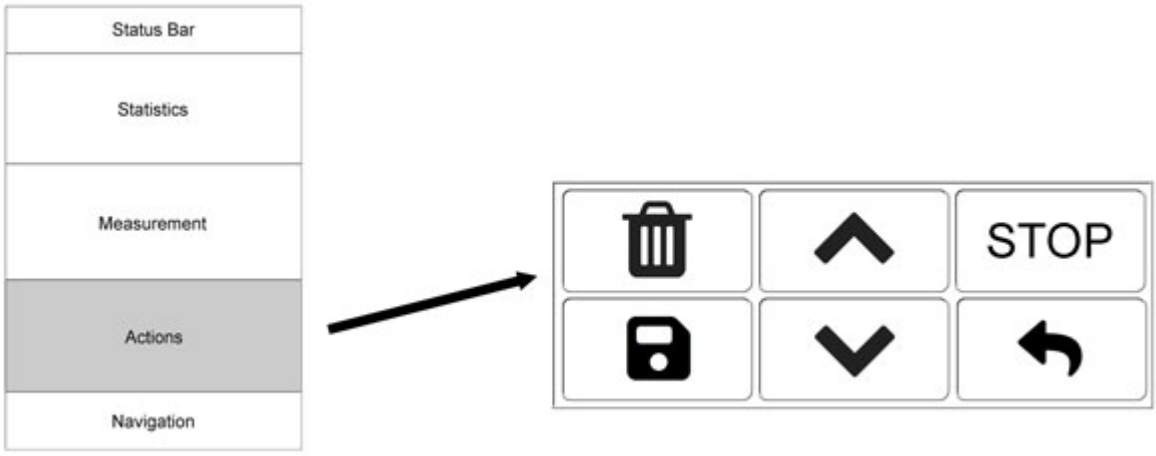
SCAN

The scan measurement function is suitable for accurately determining the average value of the ferrite content along an object.

After the probe is placed, the scan measurement begins automatically. Move the probe slowly along the coating to be measured. Approximately **5-6 measurements per second** are performed automatically.

The measurement is shown graphically on the display. In the statistics display, the count, minimum, maximum and average values are calculated and displayed.

To stop scanning, either press the **STOP** button or remove the probe from the coating. The measurement ends automatically.



STOP	End of a scan
	Back to punctual measurement.
	Save the scan. You can enter a short text that will be displayed later when scrolling below the statistics. You can create as many scan memories as you like. The memories get a unique free number and a prefixed "S".
	Browse through previously saved scans. Statistics, short text and graphical progress curve are displayed.
	Delete the currently displayed scan

MEMORY MANAGEMENT

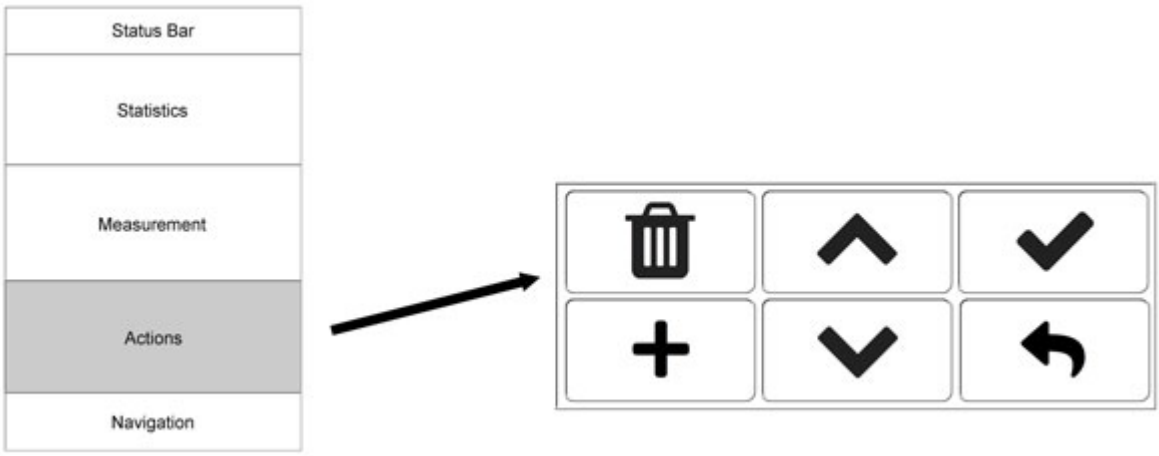
The data loggers record both the automatically stored individual measurements and the values actively stored during continuous measurement. The scan memories are separately managed memories that are not considered here.

You can create as many sample memories as you like. The memories are assigned a unique free number and a leading "M". A maximum of 10,000 measurements can be stored in the M memories.

If you have not created or activated a memory batch, not all results will be stored. The floppy disk symbol is then not visible during continuous measurement.

Actions

Overview of the data log management action area.



	Back to measurement
	Create a new memory batch. You can enter additional text to describe the new series of measurements. The new memory batch is active immediately. When you return to the measurement display, the floppy disk icon is highlighted and the next measurement is recorded in the memory batch.
	Scroll through the memory batches. The additional text entered will be displayed. You can view the individual values by clicking on the navigation icon of the data log. 
	Selection of a memory batch, for use immediately
	Deletion of the currently displayed memory batch

DATA LOG

	**This icon in the navigation takes you directly to the data log.**

When you navigate to the data log, the measurements of the current M memory batch are displayed. The current M batch is the same as the one shown in the reading display on the left, whose statistics are displayed above the reading.

For each entry, the current number, date and time of the measurement are displayed in the format MM-DD hh:mm (month, day, hour, minute), the DC/AC field type, and the measured value.

The color of the reading is black. If limit values are set, the measured value is displayed in blue if it is below the lower limit value and in red if it is above the upper limit value.

The data log of duplex readings always shows pairs. The two values have the same ID number, the first of type DNF (Duplex-NF) and the second of type DFE (Duplex-FE). They can only be cleared in pairs.

Tapping a line inactivates the reading and marks it for deletion; it changes color and is crossed out. Tap again to reactivate the reading.

	8 readings are displayed per page. You can use the scroll buttons to view the next/last 8 values.
	The trash can icon deletes the entire series of measurements. The memory batch remains active, however, so that further measurements will be written to this memory batch.
	If an individual reading is inactive, it can be permanently deleted by clicking the scissors icon.

SETUP

	**This icon in the navigation takes you directly to the setup.**

DISPLAY

Language, backlight and volume can be adjusted in the display menu.

LANGUAGE

The available languages are English, German, Italian, French and Spanish.

After changing the language, the unit will shut down and must be restarted.

BACKLIGHT

You can use the slider to make the display brighter or darker. Higher brightness uses more power.

VOLUME

Use the slider to adjust the volume of the beep.

POWER

You can set the automatic shutdown time: 5 minutes, 10 minutes, 30 minutes or "never off" if you do not want the device to turn off automatically.

The power save mode switches the brightness back to 10% after 1 minute.

PROBE SETTINGS

UNITS (FN – FE% SWITCH)

The measuring units FN and Fe% are supported.

The range of FN is between 0 and 140.
0 means that no ferrite content is recognizable, 140 is a completely ferritic measured object. The device can record values from 0.2.

The range of Fe% is between 0 and 100.
0 means that no ferrite content is recognizable, 100 is a completely ferritic measured object. The device can record values from 0.2.

The conversion between FN and Fe% is not linear.

Internally, the device always works in FN; when Fe% is selected, the display values are converted.

AUTO SAVE

When Auto Save is turned on, each measurement is immediately saved if 1) a memory is active and 2) the floppy disk button is previously highlighted (yellow). If you do not want to save measurements during Auto Save, you must deactivate the Disk button.

If Auto Save is turned off, the measurement can be saved one at a time in the punctual measurement by pressing the floppy disk button.

CALIBRATION

REFERENCE VALUE ADJUST

The reference value is factory set to the supplied higher copper reference standard. The value is approximately FN 25.0. The reference standard supplied may be different; the exact value is indicated on the standard.

The calibration display immediately shows the value just set on the action button for reference calibration.

This function is disabled when the reference calibration is started (button with reference value highlighted). In this case, press the button again.

A note about the input dialog:

The previous value is displayed lighter. You must either enter a new value and confirm it with the check mark, or cancel the entry with the keyboard icon.

LIMITS

Setting an upper and lower limit influences the display of the measured values. The values must always be entered in the selected unit of measurement.

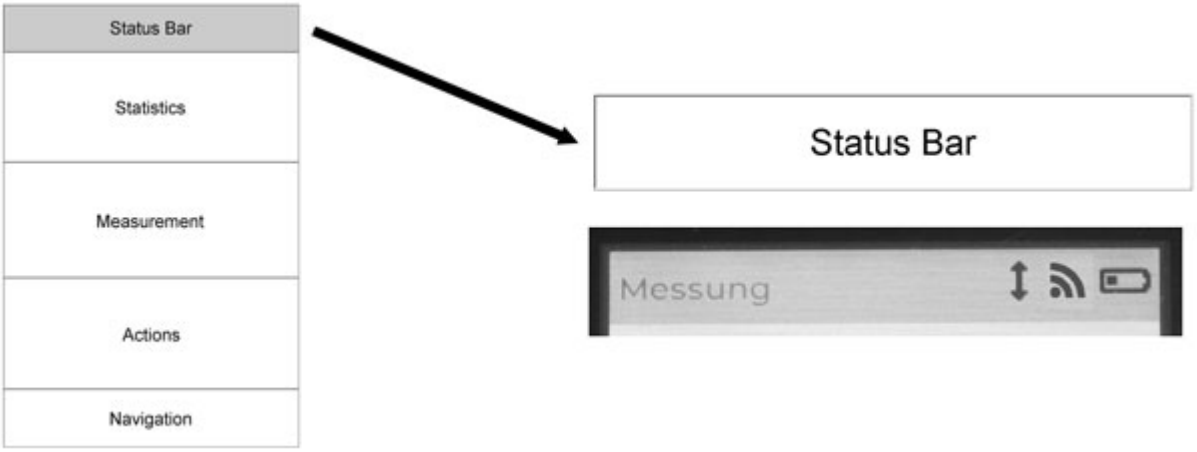
Upper limit value exceeded: measured value red
Falling below the lower limit: measured value blue

The color change occurs both in the measurement display and in the data logger.

INFO AND SYSTEM

	This icon in the navigation takes you directly to the info and system functions.

STATUS BAR



The system display includes the contents of the status line. The status line shows the connected probe on the left, and there are three symbols on the right for probe, wireless indicator and power supply.

The symbol for the probe and for wireless is highlighted when an action takes place: for the probe a measurement, for wireless a data transfer.

The power supply is either an external power supply via USB or a battery with an approximate remaining capacity.

POWER OFF

There are two ways to turn off the unit: press and hold the red on/off button until you hear the beep, or use the System Menu to turn off the unit.

DATE & TIME

Date and time can be set manually or via the PC application **Lima Connect**.

When setting manually, please note the notation xxxx-xx-xx (with hyphens) for the date and xx:xx:xx (with colons) for the time.

DELETE MEMORY

All memory batches from individual measurements or scan are cleared.
Settings and calibration profiles will not be cleared.

FACTORY RESET

The factory reset restores all pre-installed settings of the instrument. All memories (data logger and calibration profiles) are erased. This function should be used when settings have been changed and the instrument does not work properly or the calibration of the probe does not work properly.

SYSTEM

The device data shows, for example, the serial number, the firmware version, the current battery voltage and the MAC address for the wireless connection. This data helps in the event of support.

Battery voltage must be above 2.8V. Below 2.8V, the unit will automatically shut down.

PROBE

Probe and device are independently configured. The probe can be plugged into another FERRITE-CHECK 240. The probe data includes the serial number and firmware version of the probe and the configuration.

TECHNICAL DATA

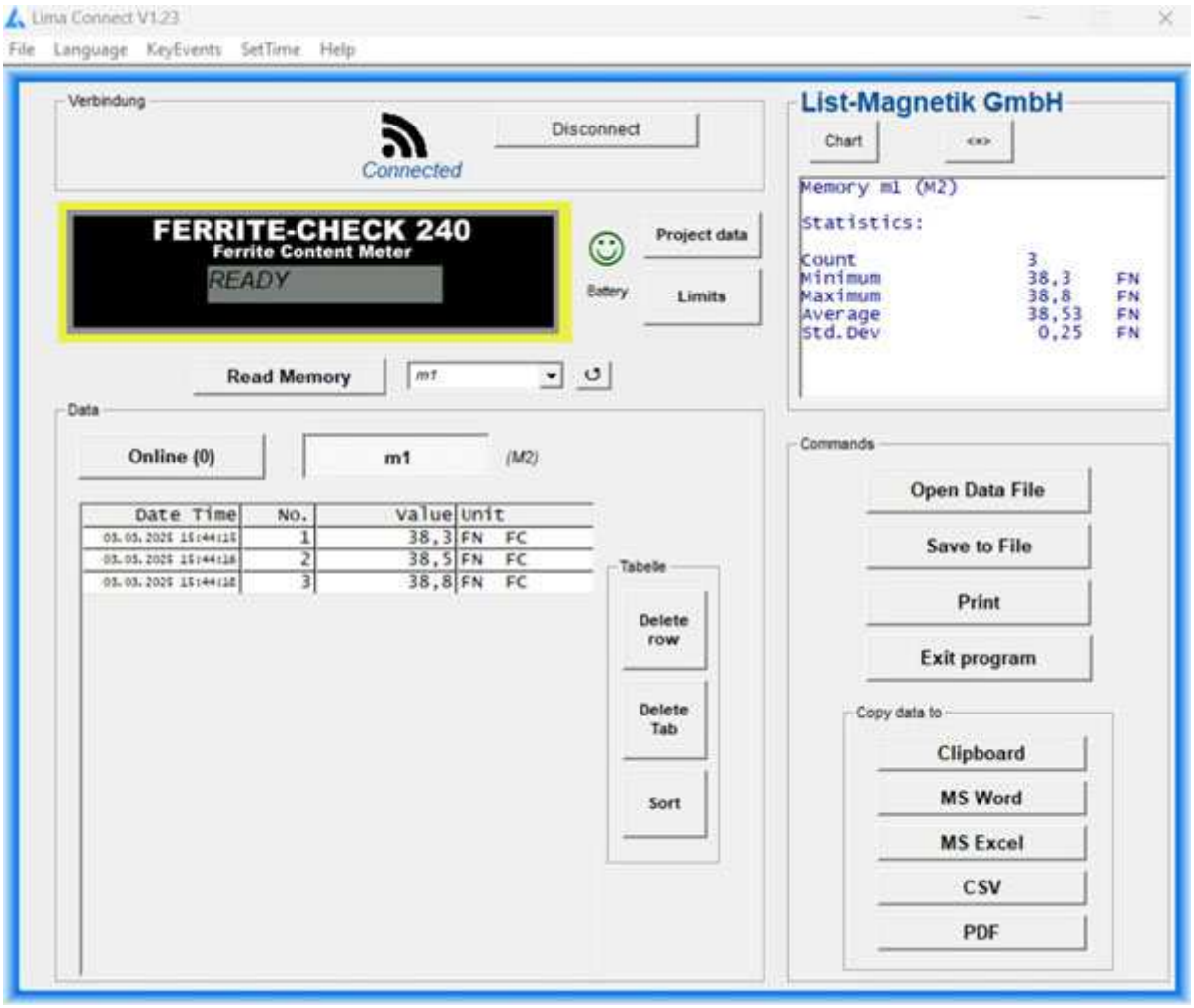
Applications:	Measurement of ferrite content in austenitic and duplex steels
Probe:	Ferrite-2000, special probe for ferrite testing. Externally connected
Measurement units:	Fe% and FN
Measuring range:	0.2 - 100 Fe%, 0.2 - 140 FN
Measurement method:	Single measurement or scanning
Smallest measuring area:	ø 2 mm
Accuracy:	5 %
Resolution:	under 10: 0.01, over 10: 0.1
Ambient temperature range:	0 - 50° C
Display:	LCD color touch panel 320x480 pixels
Multilingual menu:	English, German, Italian, French, Spanish
Data logger:	10,000 measurements, flexibly divisible
Statistics:	count / maximum / minimum / average / standard deviation
Interface:	Wireless interface for communication with Android, iOS and Windows
App for Android, iOS, Windows:	free via Google Play Store, Apple App Store, List-Magnetik website
External control:	USB and SCPI communication interface
Power supply:	3x 1.5V AA Mignon. External power supply can be connected via USB
Operating time:	approx. 25 hours with battery, unlimited with external power supply
Dimensions:	150 x 85 x 35 mm
Weight:	320 g with batteries

APPLICATIONS FOR WINDOWS, ANDROID, IOS

LIMA CONNECT FOR WINDOWS

The free Lima Connect application for data transfer to the PC can be downloaded from https://www.list-magnetik.com/en/lima-connect.

With Lima Connect you can connect to a Windows PC using wireless technology, take online measurements or read out the device's memory, statistically evaluate the data and display it as a graph. You can print the results or transfer them to subsequent applications such as Microsoft Word and Microsoft Excel.



LIMA CONNECT FOR ANDROID AND IOS

To further process your measurement data, you can also pair your device with mobile Android and iOS devices. You can measure online or read the device memory with Lima Connect for Android and iOS. Exclusively in these two mobile versions you can manage projects and assign the measuring points on a photo. The measurement results can be statistically evaluated and displayed graphically. The app for Android and iOS is also free.


Lima Connect
Version V1.0.14
List-Magnetik
FERRITE-CHECK 240
Ferrite Content Meter
Disconnect device
Project data
Limit
Voice output on
Set Time
Info
German
English
Lima Connect
Version V1.0.04
List-Magnetik
Mark measure point in Picture
Font size
20
Clear Pic
Save Pic
52,4 FN
Memory
Online
List-Magnetik
Online
Delete
1 to 7 out of 7
Datum
Numbe
Value
Unit
1 52,6 FN
2 53,0 FN
3 51,2 FN
4 51,9 FN
5 53,4 FN
6 52,6 FN
7 52,4 FN
Count 7
Min 51,2
Max 53,4
Mittel 52,44
Std.Dev 0,72

Android	iOS

SCPI COMMUNICATION INTERFACE

SCPI (Standard Commands for Programmable Instruments) is a standardized protocol for controlling and querying instruments such as multimeters, oscilloscopes, or spectrum analyzers via various interfaces such as GPIB (General Purpose Interface Bus), USB, RS-232, or Ethernet. It enables standardized and easy communication between computers and instruments, regardless of the manufacturer.

The List-Magnetik instruments **MP-4000 (magnetic field measurement)**, **FerroPro compact (permeability measurement)**, **MEGA-CHECK DX (coating thickness measurement)**, **FERRITE-CHECK 240 (ferrite content measurement)** and **FLUX-CHECK 250 (fluxmeter)** are equipped with an SCPI interface, which allows the instrument to perform remote measurements in line operation and to provide measured values. The connection is made via USB, which also ensures power supply and continuous operation.

Basic SCPI Commands

SCPI commands consist of keywords that are organized hierarchically. They can be optionally parameterized. The commands are usually written in uppercase letters, but shorter forms of the keywords can be used if they are unique.

Examples of basic SCPI commands

- *IDN?: Get device identification.
- MEAS:VOLT:DC?: Measure DC voltage.
- CONF:CURR:AC: Configure the instrument to measure AC current.
- READ? Read the current measurement.

Special implementation for List-Magnetik meters

- Setting the Date and Time
- Set measurement unit
- Setting of measurement types (Magnetic Field measurement: DC/AC, auto range, range 1 or 2, peak on/off. Coating thickness measurement: automatic, FE only, NF only, duplex)
- Zero calibration, also two-point calibration for coating thickness measurement
- Retrieve measured value (Coating thickness measurement: spot or continuous)

Documentation and Application Examples

On our website you will find further documentation, an example application based on Lab-View and a LabView runtime environment to test the possibilities.

Contents of the "SCPI Demo" installation package

The SCPI Demo installation package contains: a runtime environment for LabView, a sample application (EXE) for each of the three devices MP-4000, FerroPro compact and MEGA-CHECK DX as well as the sources (SRC) for these three applications. To be able to read and edit the sources, however, a license for LabView is required, which is not included. The installation package can be unpacked to any Windows directory. The LabView runtime environment "ni-labview-2024-runtime-engine_24.1.0_offline.iso" must be installed so that the sample applications (e.g. "LabView MEGA-CHECK DX.exe") can be started.

IMPORTANT INFORMATION

USING THE PROBE

With normal measurement: 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.

For continuous measurement or scan measurement: only **apply light pressure** to the probe. Do not push the probe through to the object.

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

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.

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.

We supply:

- Coating Thickness Meters
- Magnetic Field Meters
- Devices for Materials Testing
  (Permeability and Ferrite content)

We provide expert advice and design metrology solutions tailored to your specific needs.

Fast calibration and repair service

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