

# OPERATION MANUAL

## FERRITE CONTENT METER

### FERRITE-CHECK 110

Firmware version 1.0 and up

**2022-11**



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**Function plan in the instruction center**

# **1. INTRODUCTION**

With FERRITE-CHECK 110 you can easily and quickly measure the ferrite content in steels according to ISO 8249.

ISO 8249 particularly focuses on austenitic steel and duplex steel (ferritic / austenitic) to be evaluated for welding operations: if the ferrite content is too low, the weld metal becomes susceptible to cracking; if the ferrite content is too high, toughness and corrosion resistance are reduced. For duplex steels, a lack of ferrite at the weld causes a reduction in strength.

The determined ferrite number is a description of the ferrite content in a weld metal, which is determined in a standardized procedure. Instead of the ferrite number (FN), the ferrite content (Fe%) can also be determined. The conversion is about 70% of the FN value. The ferrite content determined as Fe% does not necessarily correspond to the actual or absolute ferrite content. Therefore, the ferrite number is more commonly used.

Uneven or round surfaces (as on rods), as well as contamination of the surface, can lead to incorrect or inaccurate measured values

FERRITE-CHECK 110 is pre-calibrated, but is supplied with three calibration standards for easy recalibration. The instrument is calibrated before delivery using calibration standards provided by the National Institute of Standards and Technology (NIST).

The "FN140" standard placed on the left in the case has a bright steel surface and is to be used for zero calibration (base calibration) during two-point calibration.

In the center and right of the case are two standards covered with copper foil. They represent different ferrite numbers (approx. 6, approx. 17). The exact value is written on the respective standard.

The standard with the lower FN number is also used for the two-point calibration, the second step, called FN calibration.

Alternatively, you can also calibrate with the third standard, especially if you regularly have higher ferrite values on your workpieces. This increases the accuracy of these measurements.

## 2. QUICK START GUIDE

**The instrument is factory calibrated and ready for immediate use.**

**Switch on:** Press the red button for a long time, the display shows **Ready**

**Measure:** Place the device with measuring probe on the object to be measured and wait until a signal tone confirms the measurement.

**Switch off:** Press red key until display goes dark

## 3. OPERATING THE DEVICE WITH THE RED BUTTON

Press the key briefly to scroll through the menu functions, press and hold the key (with signal tone) to activate the desired menu function.

The menu functions can only be called up if the measuring probe is not placed on an object.

At the end of each submenu there is a display **Back** that allows you to exit the submenu.

In the delivery state, English is preselected as the language.

## 4. MEASUREMENT DISPLAY

The standard display shows the FN value of a single measurement



By changing the measuring unit (**Setup / Unit**), the measurement can be displayed in Fe%.



When the measurement type is changed to the average value measurement (**Mode / Average measurement**), the current single value and the average value of the measurement series are displayed, since the last time the probe was placed on the object.



You can also use the average measurement with unit Fe%.



## 5. MENU FUNCTIONS

### a. OFF



By pressing the key for a long time (long signal tone), the device is switched off manually.

If you keep the key pressed for more than 3 seconds after switching off, the firmware version is also displayed.



The automatic turnoff time is 2 minutes in the delivery state and can be changed under the menu item **Setup**.

### b. CALIBRATE



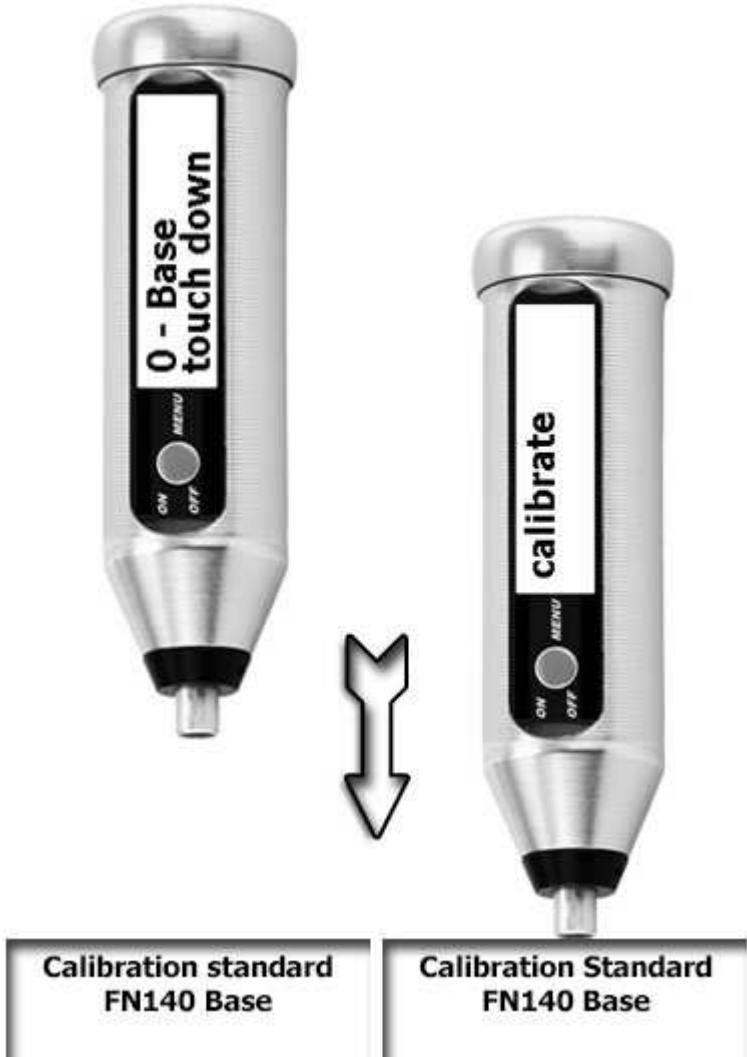
You can recalibrate the instrument at any time on the supplied calibration standards with a two-point calibration.

# 0 - BASE CALIBRATION



The base calibration is called zero calibration, although its result is not FN 0, but FN 140. FN 140 corresponds to 100% Fe and is the value of full iron or saturated ferrite material.

In the off-hook state, select in the menu **0 - Base Calibration**, then place the instrument with the measuring probe on the FN140 calibration standard. Now wait until the FN140 value is displayed and confirmed by a signal tone, and then lift the instrument again.



## FN CALIBRATION

The FN calibration is the second calibration point for the accurate calibration of the device (two-point calibration).



The FN calibration is normally performed on the calibration standard with the lower specified FN value.

Select **FN Calibration** in the off-hook state, then place the instrument with the measuring probe on the calibration standard and wait until the FN value is displayed and confirmed by a signal tone.

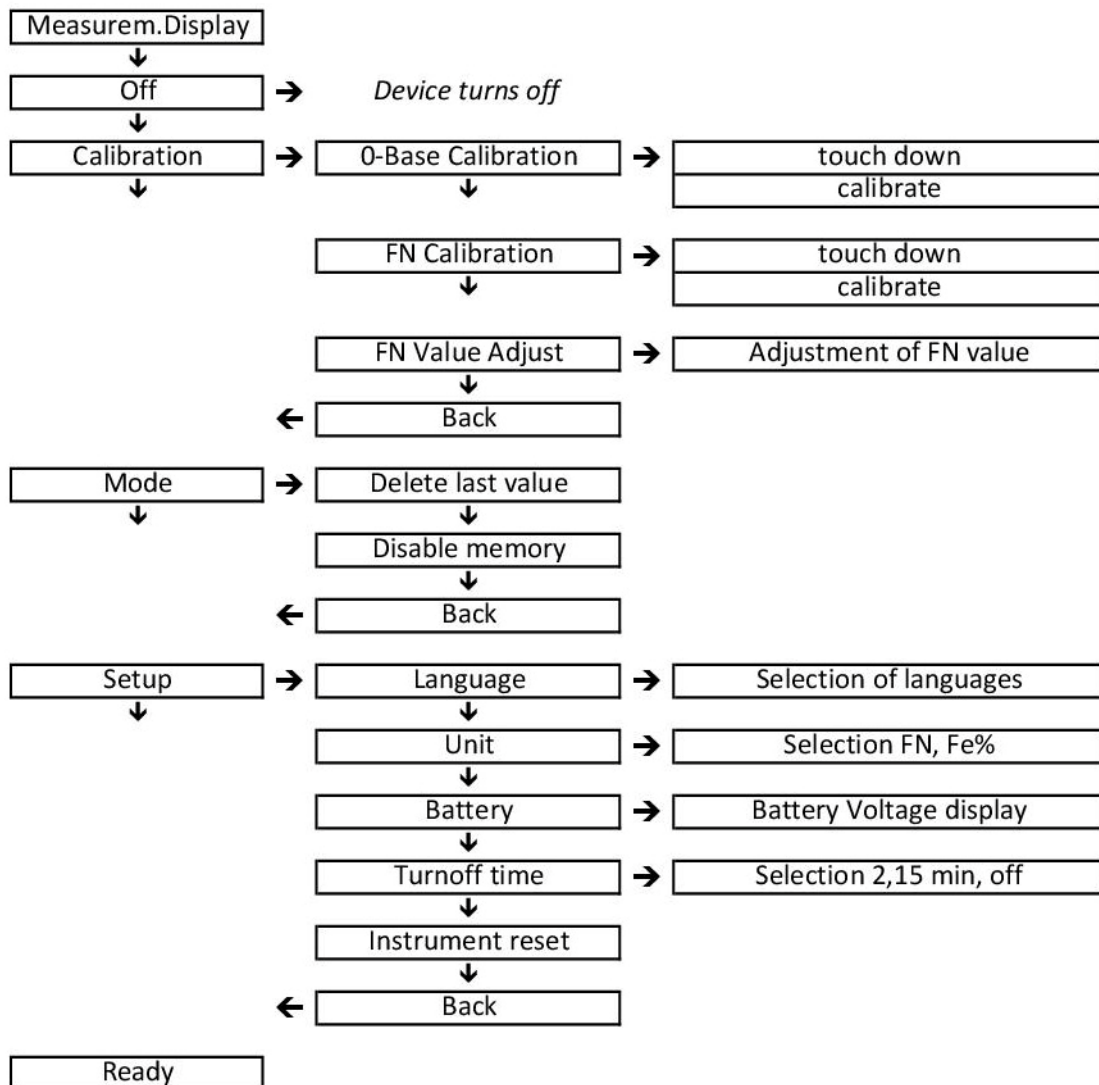


If high ferrite contents are measured regularly, it makes sense to use the calibration standard with the higher FN value.



## Function plan / menu structure

(Arrow down: red key short, Arrow right: red key long)



***Space for your notes***

## FN VALUE ADJUST

The two supplied calibration standards with copper foil have different standard values, the exact value is written on the standard. On delivery, the value is set to the standard with the smaller FN number placed in the middle of the case, should you exchange it or use the right standard for two-point calibration, this value must be adjusted in the device.



The arrow to the right indicates that the FN values increase by pressing the key.



The arrow to the left indicates that the FN values decrease by pressing the key.

Briefly pressing the key, changes the FN value in steps of 0.1. After releasing the key for at least 1 second, the arrow changes from < to > and back. This switches the direction of the change (increase / decrease FN value).

To change the rough FN value, after the tenth step in one direction the FN value is automatically changed without pressing the key until the current FN value stops by briefly pressing the key again. The exact FN value can then be set by pressing the key in both directions individually.

Press and hold the key to accept and save the FN value.

Because the internal baseline is completely recalculated when the calibration is accepted, this process can take a few seconds. This is indicated by a **W** (for wait) in the upper right corner. The device does not accept any input during this time.



## C. MODE



As measurement mode, the average measurement can be activated, or you can return to the preset normal measurement.

### AVERAGE MEASUREMENT



With the average value measurement, measured values are permanently recorded and arithmetically averaged. In this way, you can drag the device over a workpiece and see the current value as well as the average value of all previously measured values. After lifting the probe and placing it on the workpiece again, the average value is reset.

### NORMAL MEASUREMENT



In contrast to the average measurement, a single value is displayed for the normal measurement is displayed and confirmed by a signal tone.

## d. SETUP



In the setup menu you can change language, measuring unit and turnoff time.

### LANGUAGE

Selection of the menu language (German or English).



### UNIT

Change the unit of measurement between FN and Fe%.



The conversion from FN to Fe% is a simple formula with a constant factor.  
FN 140 = 100% Fe, the factor is always 1.4.

## BATTERY

Display of the current battery voltage (by long press).



## TURNOFF TIME

Selection of the automatic turnoff time of the device (2 minutes / 15 minutes / off = the device is always switched on). **Off** should only be selected in special cases, as this can greatly increase the power consumption.



## INSTRUMENT RESET



If the device can no longer be calibrated correctly or if any other malfunction occurs, the factory calibration can be reloaded here by performing a device reset. The device switches off automatically.

## 6. REPLACEMENT OF BATTERY



As soon as the warning message **Change batt.** appears when the device is switched on, the battery must be replaced.

From a battery voltage of  $< 1.0$  V, the device switches off automatically.

**Please use only leak-proof batteries.**



## 7. TECHNICAL DATA

Application	Measurement of ferrite content in austenitic and duplex steels
Measuring range	0,1 – 80 Fe% 0,1 – 110 FN
Measuring method	Single measurement or continuous measurement with averaging
Smallest measuring area	∅ 8 mm
Resolution	until 10: 0.01 above 10: 0.1
Ambient temperature	0 – 50 °C
Display	illuminated high-contrast graphic OLED display
Multilingual menu navigation	German, English
Power supply	1x 1.5 V AA Mignon
Operating time	approx. 30 hours
Dimensions	∅ 28 x 94 mm
Weight	72 g (with battery)

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