

FerroTec FT 10



Structure

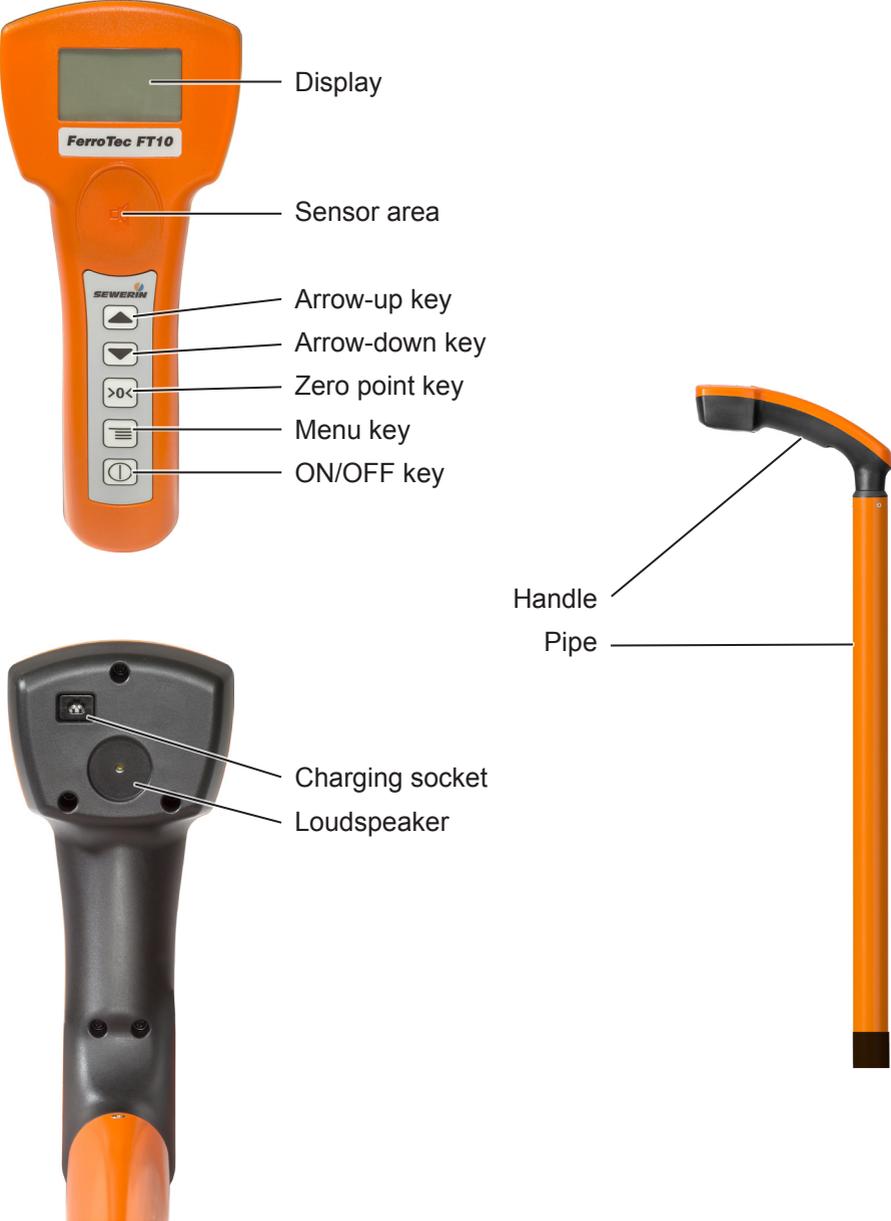


Fig. 1: **FerroTec FT 10** – Handle as seen from above (top left), handle as seen from below (bottom left), side view (right)

Display

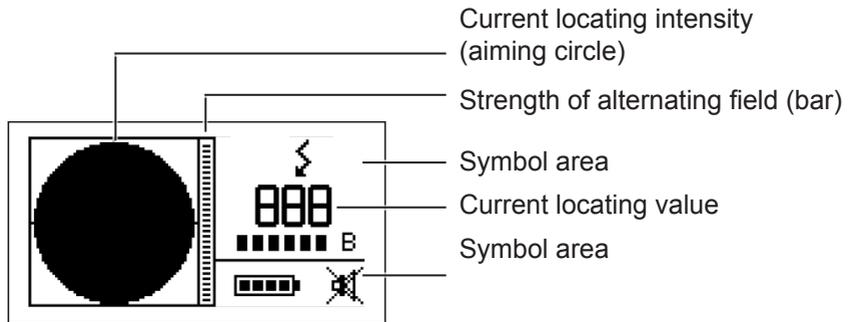


Fig. 2: Display with aiming circle view

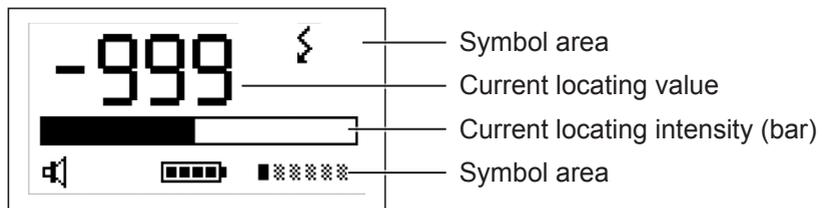


Fig. 3: Display with bar view

Symbols in the symbol areas

Symbol		Significance
Loudspeaker		Loudspeaker on
		Loudspeaker off
Battery		Battery full
		Battery flat
Sensitivity display		Highest sensitivity
		Lowest sensitivity
Alternating field		Warning of live cables
Sensitivity boost	B	Sensitivity boost enabled

Information about this document

The warnings and notes in the document mean the following:

WARNING!

Risk of damage to property.

Note:

Tips and important information.

Enumerated lists (numbers, letters) are used for:

- instructions that must be followed in a specific sequence

Bullet lists (bullet points, dashes) are used for:

- lists
- instructions comprising only one action

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1 Introduction

The **FerroTec FT 10** is a magnetometer used to locate concealed ferromagnetic objects (steel, iron, cast iron).

There are two sensors in the magnetometer. These respond to changes in the earth's magnetic field caused by ferromagnetic materials.

Changes to the earth's magnetic field only reach full strength days or even weeks after the object's last movement. That is why objects which have been in the ground for a long time are easier to locate than objects that have been placed on the ground, for example, for a trial detection.

Non-ferrous metals do not interfere with the detection process as they are not ferromagnetic.

The magnetometer warns of live cables with a symbol on the display.

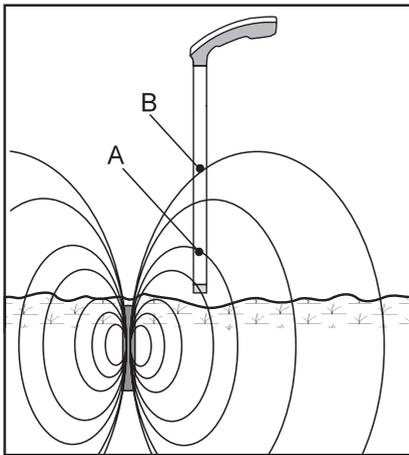


Fig. 4: Magnetic field lines of an object in the ground (cross section). The two sensors (A and B) record different magnetic field lines (signals). The magnetometer locates the object based on the signal difference.

2 Notes on handling the product

2.1 Warranty

The following instructions must be complied with in order for any warranty to be applicable regarding functionality and safe operation of this equipment.

- Read these operating instructions prior to operating the product.
- Use the product only as intended.
- Repairs and maintenance must only be carried out by specialist technicians or other suitably trained personnel. Only spare parts approved by Hermann Sewerin GmbH may be used when performing repairs.
- Changes or modifications to this product may only be carried out with the approval of Hermann Sewerin GmbH.
- Use only Hermann Sewerin GmbH accessories for the product.

Hermann Sewerin GmbH shall not be liable for damages resulting from the non-observance of this information. The warranty conditions of the General Terms and Conditions (AGB) of Hermann Sewerin GmbH are not broadened by this information.

In addition to the warnings and other information in these Operating Instructions, always observe the generally applicable safety and accident prevention regulations.

The manufacturer reserves the right to make technical changes.

2.2 Intended use

The **FerroTec FT 10** can be used to locate ferromagnetic objects (steel, iron, cast iron). In particular, the magnetometer is intended for locating sliding rods, manhole covers, metal pit covers, pavement markers and magnetic markers.

2.3 **General safety information**

This product was manufactured in keeping with all binding legal and safety regulations. It corresponds to the state-of-the-art and conforms to EC requirements. The product is safe to operate when used in accordance with the instructions provided.

However, if you handle the product improperly or not as intended, the product may present a risk to persons and property. For this reason, always observe the following safety information.

Risk of personal injury (health risk)

- Handle the magnetometer carefully and safely both during transport and when working. The pipe in particular could cause harm to yourself or others.
- Proceed with extreme caution in the vicinity of electrical lines.

Hazards for the product and other property

- Always handle the magnetometer with care. Only use the magnetometer as intended.
- Do not drop the magnetometer. Always set the magnetometer down carefully.
- Do not lean on the magnetometer.
- Do not immerse the magnetometer pipe more than 610 mm deep in liquids.

3 Product description

3.1 Setup

For overviews including all part names for the **FerroTec FT 10** , see the front cover flap (Fig. 1).

3.2 Power supply

The product is powered by special inbuilt NiMH rechargeable batteries. Only SEWERIN service personnel or other authorised specialists may replace the rechargeable batteries.

For information on charging the batteries see section 6.1 on page 21.

3.3 Operating mode

The operating mode determines how the sensor area operates.

Note:

The selected operating mode only affects the switching on and off of the beep.

You can choose between two operating modes.

- **Hold mode**

Place your thumb on the sensor area to listen. When you remove your thumb from the sensor area, the beep goes off.

- **Toggle mode**

To listen, briefly press the sensor area with your thumb. If you briefly touch the sensor area with your thumb again, the beep will switch off.

The operating mode is set in the menu under **MODE**. Information about changing the setting can be found in section 5.5.2 on page 19.

Information about how to enable the audible signals in both operating modes can be found in section 5.4 on page 18.

3.4 Playing back signals

3.4.1 Display on the screen

The elements shown on the screen are explained inside the front cover (Fig. 2 and Fig. 3). Some elements are always visible, others only in certain operating or locating situations.

The location of an object is displayed on the screen in two ways simultaneously:

- numerically
- visually

The point of reference in both display types is the last zero point setting.

Numerical display

The current locating value is displayed as a number.

- As the magnetometer moves closer to the object, the locating value increases.
- As the magnetometer moves away from the object, the locating value decreases.

Visual representation

You can choose between two types of visual representation.

- **Aiming circle view**

- As the magnetometer moves closer to the object, the aiming circle gets bigger.
- As the magnetometer moves away from the object, the aiming circle gets smaller.
- If there is no object in the locating area, the aiming circle is not displayed.

- **Bar view**

The bar starts in the centre and moves to the left or right.

- If there is no object in the locating area, the bar is not displayed.

You can set the type of visual representation in the menu under **VIEW**. Information about changing the setting can be found in section 5.5.2 on page 19.

3.4.2 Audible

In addition to the on-screen display, you can also use an audible signal (beep) to locate objects. The beep sounds from the integrated speaker.

- As the magnetometer moves closer to the object, the interval between the individual beeps gets shorter.
- As the magnetometer moves away from the object, the interval between the individual beeps gets longer.

Information on listening to the audible signal can be found in section 5.4 on page 18.

3.5 Alternating field display (warning of live cables)

The magnetometer automatically warns of live cables. If there is a live cable in the locating area, the **alternating field** symbol appears on the screen.

The strength of the alternating field is also indicated by a bar in the aiming circle view.

- As the magnetometer moves closer to a live cable, the gauge of the alternating field display will increase.

Note:

The strength of the alternating field is only shown in the aiming circle view.

3.6 Sensitivity

The sensitivity setting for the magnetometer is displayed on the screen. The more segments that are visible in the sensitivity display, the greater the sensitivity.

The sensitivity must always be adjusted to the current locating scenario.

- The sensitivity can be increased for locating deep or smaller objects.
- If smaller objects are adversely affecting the location of larger objects, you can reduce the sensitivity.

The magnetometer features a **sensitivity boost**. The sensitivity boost can be switched on if the locating scenario requires a very high level of sensitivity.

Information about changing the sensitivity setting and activating the sensitivity boost can be found in section 5.2 on page 17.

3.7 Zero point

The zero point is the value at which a current, actual value is set to zero (offset). When the magnetometer is switched on, the zero point is set automatically.

You can manually reset the zero point again any time during the locating process. SEWERIN recommends this especially at the start of every new locating procedure.

Information on setting the zero point can be found in section 5.3 on page 17.

3.8 Automatic power off

The magnetometer has an automatic power off feature. This reduces the power consumption of the inbuilt rechargeable batteries and prevents them from being damaged by undervoltage.

The magnetometer automatically switches off in the following situations:

- The magnetometer is not operated for 20 minutes, i.e. no key is pressed and the sensor area is not touched. **AUTO POWER OFF** appears briefly on the screen during shutdown.
- The remaining battery capacity is too low. **BAT LOW** appears briefly on the screen during shutdown.



Fig. 5: Automatic power off
Magnetometer is not operated for 20 minutes (left)
The remaining battery capacity is too low (right)

3.9 Display backlight

The magnetometer features an illuminated display. The display automatically lights up when a key is pressed or the sensor area is touched. The display remains illuminated for 20 seconds.

The display illumination can be deactivated. When the display illumination is deactivated, operating time is extended.

The display illumination is disabled or enabled in the menu under **LED**. Information about changing the setting can be found in section 5.5.2 on page 19.

4 Locating objects

4.1 Handling the magnetometer during location

Note the following points to ensure that the locating process is successful:

- Reduce the impact of sources of interference as much as possible. Information about sources of interference can be found in section 4.3.2 on page 14.
- Hold the magnetometer above the surface as upright as possible¹.
- Hold the magnetometer away from your body.
- Hold the magnetometer steady. Do not swing the magnetometer back and forth.
- Start the locating procedure with low sensitivity. Then adjust the sensitivity to suit the locating conditions.

¹ Usually: earth's surface

4.2 Signals dependent on the position and size of an object

The beep usually reaches its maximum directly above the object. The display can show positive or negative values.

This applies to objects with the following position and size:

- objects in a vertical position (Fig. 6)
- small objects in a horizontal position

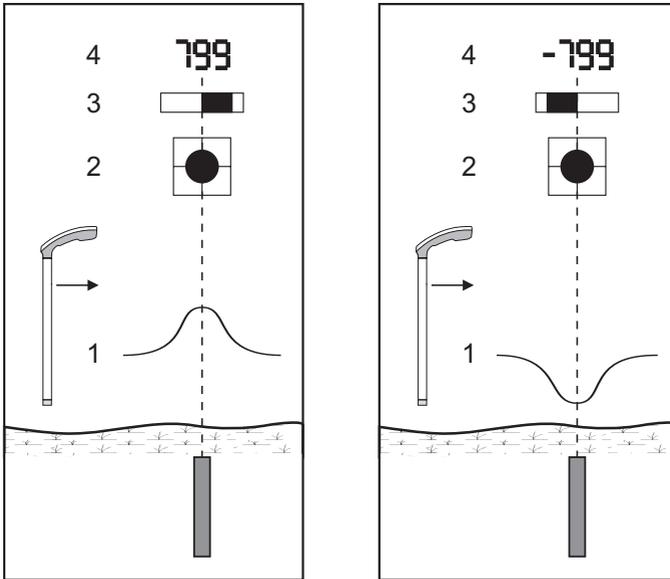


Fig. 6: Object in a vertical position (cross section) – Possible location results
1 audible signal (beep), 2 aiming circle view, 3 bar view, 4 locating value

There are two maximum points for objects lying horizontally in parallel to the earth's magnetic field. The maximum points occur at each end of the object (Fig. 7). One of the maximum points is positive, the other is negative.

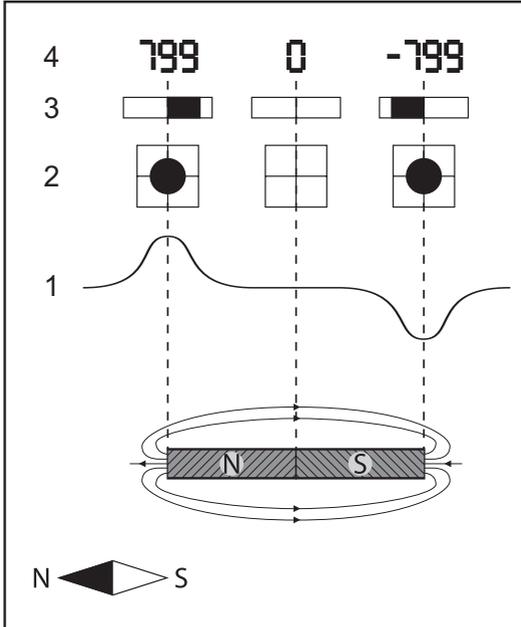


Fig. 7: Large object lying horizontally in parallel to the earth's magnetic field.
 1 audible signal (beep), 2 aiming circle view, 3 bar view, 4 locating value

Objects, that are long and very narrow and horizontal but perpendicular to the earth's magnetic field, show just one maximum point in practice (Fig. 8).

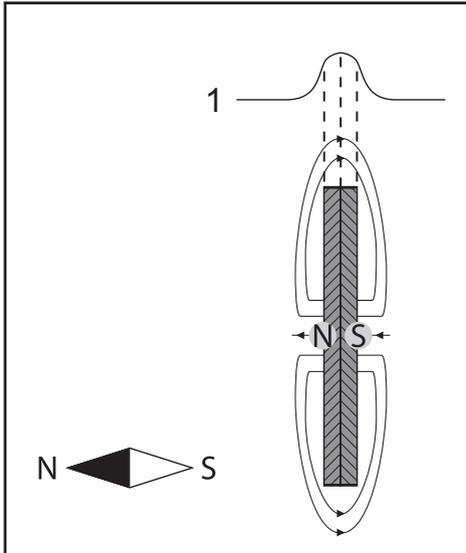


Fig. 8: Large object lying horizontally and perpendicular to the earth's magnetic field.
1 audible signal (beep)

4.3 Factors influencing the location results

4.3.1 Size of an object

The magnetometer can also be used to locate small objects, for example, nails and screws. The size of an object, however, affects the display.

The following applies to small objects:

- As the magnetometer moves away from an object, the locating value and the locating intensity decrease more sharply than with larger objects.

- If the distance between the magnetometer and surface² increase without the sensitivity changing, it is more difficult and maybe even impossible to locate the object (Fig. 9).
- The maximum area is narrower than with larger objects.

Note:

- You can use these effects to help you specifically locate small or large objects.
- Vary the sensitivity and the distance of the magnetometer from the surface according to the size of the object you are searching for.

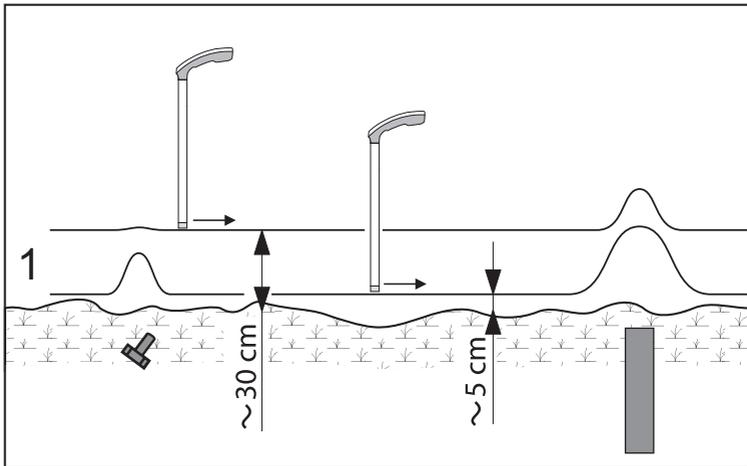


Fig. 9: Locating small and large objects with the same sensitivity. The distance of the magnetometer varied from the surface (cross section).
1 audible signal (beep)

² Usually: earth's surface

4.3.2 Sources of interference

All ferromagnetic objects generate interference fields. Interference fields can make it more difficult to locate an object.

Interfering objects include for example:

- Steel fences, gratings
- Vehicles
- Safety shoes with steel toecaps
- Bunches of keys
- Mobile phones
- Iron jewellery (e.g. belt buckles)

Note:

Reduce the number of sources of interference that you yourself have control over.

- Carry as few sources of interference on your body as possible (keys, mobile phone etc.).
 - Wear safety shoes with toecaps made of aluminium or plastic.
- If you cannot avoid wearing magnetic objects on your body:
- Hold the magnetometer as far away from your body as possible.
-

If there are large immovable sources of interference at the locating area (e.g. steel fences), the following measures might help:

- Set the sensitivity low.
- Perform locating without the sensitivity boost.

5 Operation

5.1 Switching the magnetometer on and off

The ON/OFF key switches the magnetometer on and off.

Switching on

Note:

- When switching it on, hold the magnetometer firmly, keeping your fingers away from the sensor area.
 - Keep the magnetometer as steady as possible until it is switched on so that the zero point is correctly set.
-

1. Hold the ON/OFF key down for approx. two seconds. A start screen appears briefly on the display.



Fig. 10: Start screen

The message **DON'T TOUCH** will then appear.

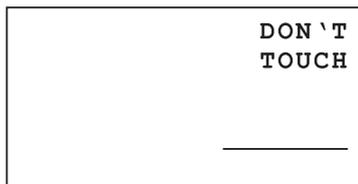


Fig. 11: **DON'T TOUCH** message

Note:

Do not touch the sensor area while the **DON'T TOUCH** message is displayed.

2. Wait until the **DON'T TOUCH** message disappears. The magnetometer is then ready for use.

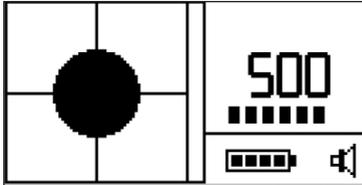


Fig. 12: Magnetometer ready for use with aiming circle view
In the example shown there is at least one object in the locating area.

The magnetometer locates continuously. To stop the locating process, the magnetometer must be switched off.

Switching off

- Hold the ON/OFF key down again for approx. two seconds. The magnetometer switches off.

5.2 Changing the sensitivity

You can change the sensitivity during the locating process.

The magnetometer is switched on.

- Press the arrow-down key to reduce the sensitivity.
- Press the arrow-up key to increase the sensitivity.

Enabling the sensitivity boost

The magnetometer is switched on.

1. Press the Menu key. The **SETUP** menu appears.
2. Using the arrow keys, select **BOOST** from the menu.
3. Press the ON/OFF key to set the value to **1**.
4. Press the Menu key. The sensitivity boost is enabled. The magnetometer is ready for use again.
5. Change the sensitivity according to the location scenario (see above).

Note:

The sensitivity boost is only required in certain location scenarios.

- Disable the sensitivity boost as soon as you have located the object you were searching for. To do this set the value back to **0** under **BOOST** in the menu.
-

5.3 Setting the zero point

The magnetometer is switched on.

- Press the zero point key. The value is reset to zero.

The magnetometer uses the zero point setting as the new reference value for playing back signals.

5.4 Listening to the audible signal (beep)

5.4.1 In hold mode

The magnetometer is switched on. The value under **MODE** in the menu is set to **0**.

- Place your thumbs on the sensor area to switch on the beep.
- Remove your thumbs from sensor area to switch off the beep.

Note:

Lift your thumbs well clear of the sensor area (at least 1 cm) to switch off the beep. It is best to position your thumb beside the sensor area.

5.4.2 In toggle mode

The magnetometer is switched on. The value under **MODE** in the menu is set to **1**.

- Briefly touch the sensor area with your thumb to switch on the beep.
- Briefly touch the sensor area with your thumb again to switch off the beep.

Note:

Lift your thumb well clear of the sensor area (at least 1 cm) after touching it. It is best to position your thumb to the side of the sensor area.

5.5 Settings

5.5.1 SETUP menu

The **SETUP** (Fig. 13) menu contains five menu items. Each menu item can assume two states (value **0** or value**1**).

SETUP	
MODE:	0
VIEW:	1
BOOST:	0
LED:	1
RESET:	0

Fig. 13: SETUP menu

Menu item	Significance	Values	
MODE	Operating mode	0	Hold mode
		1	Toggle mode
VIEW	Display view	0	Bar view
		1	Aiming circle view
BOOST	Sensitivity boost	0	Disabled
		1	Enabled
LED	Display illumination	0	Disabled (energy-saving mode)
		1	Enabled
RESET	Factory default settings	0	The menu items MODE , VIEW , BOOST , LED can be set individually
		1	Settings and sensitivity are reset to factory settings

5.5.2 Changing settings

The magnetometer is switched on.

1. Press the Menu key. The **SETUP** menu appears.
2. Select the desired menu item using the arrow keys. The selected menu item will be highlighted.
3. Press the ON/OFF key. The value is changed.

4. Press the Menu key.

The set values are accepted. The **SETUP** menu closes. The magnetometer is ready for use again.

Note:

The set values are permanently saved until the next change.

Cancelling

- Press the Menu key to exit the **SETUP** menu without making any changes.

Restoring the factory default settings

You can restore the factory default settings at any time in the **SETUP** menu.

Note:

When you reset the settings, the sensitivity setting is also reset.

1. Press the Menu key. The **SETUP** menu appears.
2. Using the arrow keys, select **RESET** from the menu.
3. Press the ON/OFF key to set the value to **1**.
4. Press the Menu key. The values are reset to the factory default. The magnetometer switches off.
5. Switch the magnetometer on again. The magnetometer is ready for use again.

6 Maintenance

6.1 Charging the batteries

When there are no more bars visible in the battery symbol, it is time to charge the batteries. They can also be charged sooner, i.e. even when the battery symbol displays sufficient remaining capacity.

WARNING! Risk of shortening battery life!

The built-in NiMH rechargeable batteries must not be exposed to high temperatures during the charging process. Otherwise full charging capacity will not be reached. In extreme cases the charging process is halted following an error message.

- Ensure that the maximum permitted operating temperature is not exceeded when charging the batteries.
-

When the batteries are completely empty, the charging process lasts approx. four hours.

The **M4 AC/DC adapter** is required to charge the batteries. Alternatively, an **M4 vehicle cable** can be used. The AC/DC adapter is included in delivery. The vehicle cable is available to buy as an accessory.

The magnetometer can be switched on or off when charging the batteries. SEWERIN recommends that the magnetometer be switched off when charging the batteries.

1. Plug the AC/DC adapter plug into the charging socket of the magnetometer.
2. Plug the AC/DC adapter into a socket.

The start screen appears. Charging starts automatically. The battery symbol bars are displayed in motion.

3. Wait until all of the bars are visible again in the battery symbol. The bars stop moving.
4. Disconnect the AC/DC adapter from the magnetometer and the mains socket. Battery charging is complete.

6.2 Care

All that is necessary to care for the magnetometer is to wipe it down with a damp cloth. SEWERIN recommends removing significant contamination immediately.

WARNING! Risk of scratching!

The display surface is plastic.

- Do not use any mechanical or aggressive chemical agents for care.
-

6.3 Servicing

SEWERIN recommends having the magnetometer serviced regularly by SEWERIN Service or an authorised professional. Only regular servicing can ensure that the magnetometer is always ready for use.

6.4 Solving problems

The occurrence of an error when working with the magnetometer does not always indicate a serious problem. In some cases it may simply be an operating error. SEWERIN recommends first looking for the cause of the problem yourself. If the cause of the problem cannot be found, SEWERIN Service will be pleased to help.

6.4.1 Troubleshooting

Problem	Possible cause	Corrective action
Sensor area does not respond	The sensor area was touched while the magnetometer was being switched on	Switch off the magnetometer and switch it on again
	Sensor area very wet	Dry the sensor area
	Sensor area dirty	Clean the sensor area
Typical operating time not attained	End of the battery life has been reached	Send magnetometer to Sewerin Service to get a new rechargeable battery fitted
After switching on: current locating value is not zero	The magnetometer was not held steady while being switched on	Manually readjust the zero point

6.4.2 Error messages

The magnetometer displays errors with an error code. If the errors continue to occur, the magnetometer must be sent to SEWERIN Service.

ERR001

Meaning: Internal error

Consequence: Settings are reset to factory default

Display:

Error code is visible for approx. two seconds in the top right-hand corner of the screen

ERR003

Meaning: Error during the charging process:

- AC/DC adapter faulty
- or
- permitted operating temperature exceeded

Consequence: Battery charging interrupted

Corrective action:

- Replace AC/DC adapter
- Allow magnetometer to cool down
- Look for a cooler environment

Display: The error code is repeatedly displayed until corrective action has been taken

7 Appendix

7.1 Technical data

Device data

Dimensions (W × D × H):	89 × 211 × 760 mm
Weight:	1.28 kg

Certificates

Certificate	CE
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Features

Display	Monochromatic graphic display, 128 x 64 pixels
Processor	Digital signal processor 2 x 16 bit
Controls	Membrane keypad with five keys, capacitive sensor area

Permitted operating conditions

Operating temperature	-20 °C – +50 °C
Storage temperature	-25 °C – +60 °C
Humidity	15 % r.h. to 90 % r.h. (non-condensing)
Atmospheric pressure	950 hPa – 1100 hPa
Protection rating	Total: IP65 Pipe: IP67
Permitted operating environments	Pipe in normal position of use up to 610 mm temporarily submersible (measured from bottom edge of pipe)
Normal position of use	Vertical

Power supply

Power supply	NiMH rechargeable batteries, inbuilt
Operating time, typical	10 h
Nominal capacity	3000 mAh
Nominal voltage	2.7 V
Charging time	4 h
Charging temperature	0 °C – +40 °C
Charging voltage	12 V
Charging current	300 mA
Charger	AC/DC adapter M4

Measurement

Filter	50 – 60 Hz
Measurement principle	Fluxgate
Measuring rate	400 Hz, resolution 16 bit
Indication range	0 – 999 digit
Indication error	20% of end value
Sensitivity levels	6

7.2 Factory default settings

The product is delivered with the following default settings:

Menu item	MODE	Value 0
	VIEW	1
	BOOST	0
	LED	1
	RESET	0
Sensitivity		Lowest sensitivity

7.3 EU declaration of conformity

Hermann Sewerin GmbH hereby declares that the **FerroTec FT 10** fulfils the requirements of the following guidelines:

- **2014/30/EU**

The complete declaration of conformity can be found online.

7.4 Advice on disposal

The European Waste Catalogue (EWC) governs the disposal of appliances and accessories.

Description of waste	Allocated EWC waste code
Device	16 02 13
Rechargeable battery	16 06 05

End-of-life equipment

Used equipment can be returned to Hermann Sewerin GmbH. We will arrange for the equipment to be disposed of appropriately by certified specialist contractors free of charge.

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