



Operating Instructions



SEWERIN
Protecting Water, Gas and Life.

FERROPHON® FG 50

Generator



FG 50 generator

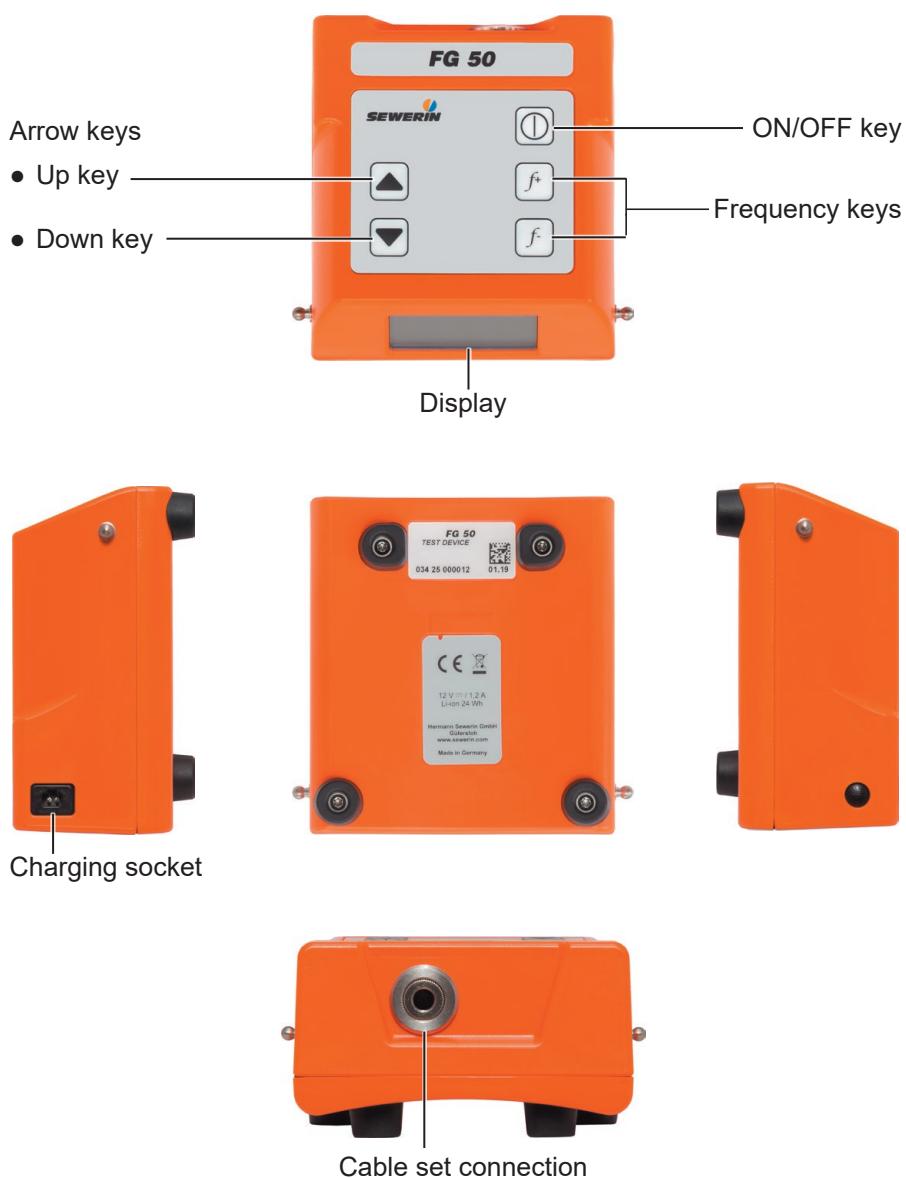


Fig. 1: FG 50 generator viewed from various angles

FG 50 generator

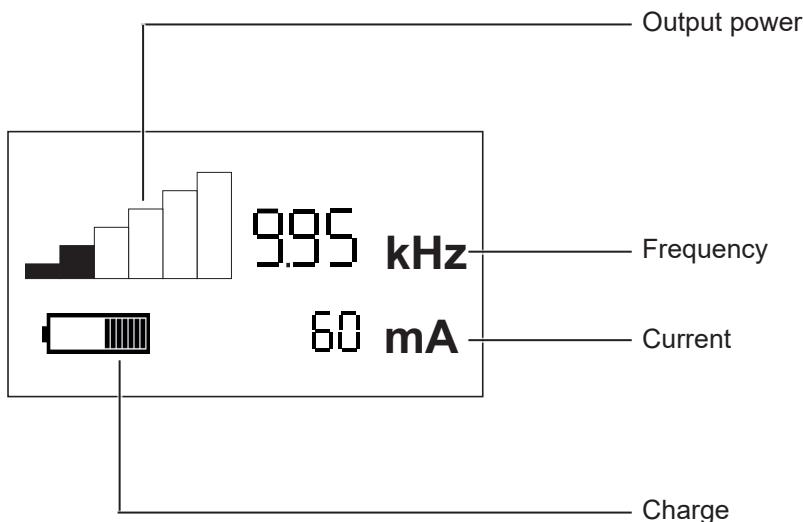


Fig. 2: Display with main view

Illustration of warnings in this document



WARNING!

Risk of personal injury. Could result in serious injury or death.

NOTICE!

Risk of damage to property.

1	Introduction	1
1.1	Information about this document.....	1
1.2	Purpose.....	1
1.3	Intended use	2
1.4	Safety information	2
2	Product description	3
2.1	Operating principle	3
2.2	Ports	3
2.3	Power supply.....	3
2.3.1	Powered by rechargeable battery	3
2.3.2	External power supply.....	4
3	Using the generator	5
3.1	Switching the generator on and off.....	5
3.2	Energize line	5
3.2.1	General information for locating by energizing.....	5
3.2.2	Connection via conductor loop.....	5
3.2.3	Connection with earthing spike	6
3.2.4	Set frequency	8
3.2.5	Setting the output power	8
3.2.6	Stop energizing	9
4	Maintenance	10
4.1	Charging the batteries.....	10
4.1.1	Charging the battery in the case	10
4.1.2	Charging batteries individually using the AC/DC adapter or vehicle cable	11
4.2	Handling faulty lithium ion rechargeable batteries	12
4.2.1	Identifying faulty batteries	12
4.2.2	Removing the battery	13
4.3	Care	13
4.4	Servicing	14
4.5	Dealing with problems.....	14
5	Appendix.....	15
5.1	Technical data	15
5.2	Accessories	16
5.3	Declaration of conformity	16
5.4	Advice on disposal	17
6	Index.....	18

1 Introduction

1.1 Information about this document

This document is a component part of the product.

- Read the document before putting the product into operation.
- Keep the document within easy reach.
- Pass this document on to any subsequent owners.
- Unless otherwise specified, the information in this document refers to the product as delivered (factory settings) and applies to all product variants.

Translations

Translations are produced to the best of our knowledge. The original German version is authoritative.

Right of reproduction

No part of this document may be edited, duplicated or circulated in any form without the express consent of Hermann Sewerin GmbH.

Registered trademarks

Registered trademarks are generally not indicated in this document.

1.2 Purpose

The portable **FG 50** generator is part of the **FERROPHON** system.

The generator is used to energize lines when locating pipes. It can be used with selected receivers of the **AQUAPHON** system, e.g. **AF 50** receiver.

Note:

These operating instructions describe the functions of the **FG 50** generator with firmware version 1.xxx. The manufacturer reserves the right to make changes.

1.3 Intended use

The product is suitable for the following uses:

- professional
- industrial
- commercial

The product must only be used for the applications specified in section 1.2.

Note:

The appropriate specialist knowledge is required for using this product.

1.4 Safety information

This product was manufactured in keeping with all binding legal and safety regulations.

The product is safe to operate when used in accordance with the instructions provided. However, when handling the product, there may be risks to persons and property. For this reason, observe the following safety information without fail.

- Observe all the applicable safety standards and accident prevention regulations.
- Use the product only as intended.
- Do not make any changes or modifications to the product unless these have been expressly approved by Hermann Sewerin GmbH.
- Only use accessories and consumables approved by Hermann Sewerin GmbH.
- Always observe the permitted operating and storage temperatures.
- Handle the product carefully and safely, both during transport and when working.
- Always adequately cordon off the work area.
- Do not use the product if it is damaged or faulty.
- Protect the ports and sockets against dirt, and electrical ports in particular against moisture.

2 Product description

2.1 Operating principle

The **FG 50** generator can be used to directly energize electrically conductive lines. The generator is designed for use in buildings. An alternating current is sent.

Transmitting frequency and output power are selected depending on the local conditions.

The frequency and power can be set on the generator.

2.2 Ports

The generator has the following ports:

- Charging socket For charging the rechargeable battery.
The following can be connected:
 - **M4** AC/DC adapter
 - **M4** vehicle cable
 - Connection cable in case **SK 10**
- Cable set connection For connecting the **universal** cable set.

2.3 Power supply

The generator can be operated:

- with rechargeable battery
- externally via AC/DC adapter/vehicle cable

2.3.1 Powered by rechargeable battery

The **FG 50** generator is equipped with a special, built-in lithium ion rechargeable battery.

The battery must be charged regularly. Information about charging the rechargeable battery can be found in section 4.1.

NOTICE! Reduced battery life when not in use

The battery in the receiver can discharge (self-discharge) even when the receiver is not in use.

- You should charge the battery at least once every 6 months.

NOTICE! Risk of damage when changing the lithium ion battery

There are parts in the receiver that can be damaged mechanically or by electrostatic discharge when changing the battery.

- Only SEWERIN service personnel or other authorised specialists may replace the lithium ion rechargeable battery.

**WARNING! Risk of explosion due to short-circuit**

Faulty lithium ion rechargeable batteries can explode due to internal short-circuit.

- Components containing faulty lithium ion batteries must not be shipped.

2.3.2 External power supply

The generator can also be powered externally (12 V). To do this, the generator is connected to a suitable power source using the AC/DC adapter or vehicle cable.

With an external power supply, the maximum transmitting power is reduced.

3 Using the generator

3.1 Switching the generator on and off

Switching on

- Press the ON/OFF key for approx. 1 second.

A start screen with the firmware version will appear briefly on the display. The main view then appears.

Switching off

- Press the ON/OFF key for approx. 2 seconds.

The generator switches off.

3.2 Energize line

3.2.1 General information for locating by energizing

In order to be able to locate a line, it must carry a current with a certain frequency, so that an electromagnetic field is generated. This field is then located.

Lines that are not carrying a current must be energized for locating.

Direct energizing involves supplying power from a generator to the line via a cable. This is only possible if a galvanic connection can be made to at least an exposed part of the line.

The following options are available for direct galvanic connection:

- Connection via conductor loop
- Connection with earthing spike

3.2.2 Connection via conductor loop

Two connection options on the line are required for direct galvanic connection via a conductor loop. The line to be located must be located between the two connection points.

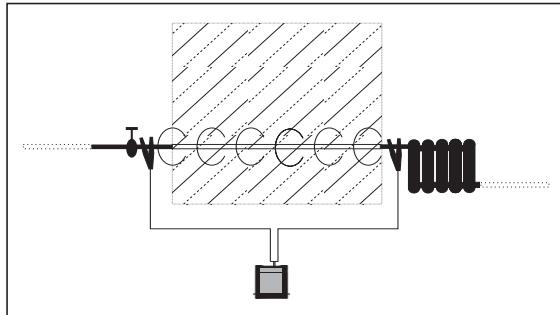


Fig. 3: Direct galvanic connection via conductor loop



WARNING! Risk of injury from electric shock

High voltages can be applied to exposed parts of the lines.

- Disconnect electrical lines before locating.
- Observe the specified sequence of actions.

The generator is switched off.

1. Attach one terminal of the cable set to an exposed part of the line to be energized.
2. Attach the second terminal of the cable set to another exposed part of the line to be energized.
3. Connect the cable set to the generator.
4. Switch on the generator.
5. Set the frequency (section 3.2.4).
6. Set the output power (section 3.2.5).

The line is energized with the selected settings.

3.2.3 Connection with earthing spike

The direct galvanic connection with earthing spike can be used if there is only one connection option on the line.

The earthing spike is placed outside of buildings in the ground. The distance from the earthing spike to the line must be at least 3 metres. The electrical conductivity of the ground is improved by moisture. SEWERIN recommends: Moisten the ground if necessary.

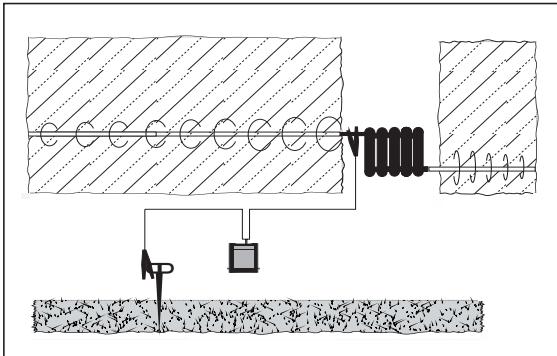


Fig. 4: Direct galvanic connection with earthing spike



WARNING! Risk of injury from electric shock

High voltages can be applied to exposed parts of the lines.

- Never connect the terminals of the cable set to lines that are already live.
- Observe the specified sequence of actions.
- Always switch off the generator before moving the earthing spike.

The generator is switched off.

1. Attach one terminal of the cable set to an exposed part of the line to be energized.
2. Insert the earthing spike firmly into the ground outside a building.
 - Maintain a minimum distance of 3 meters from the line to be located.
3. Attach the second terminal to the earthing spike.
4. Connect the cable set to the generator.
5. Switch on the generator.
6. Set the frequency (section 3.2.4).
7. Set the output power (section 3.2.5).

The line is energized with the selected settings.

3.2.4 Set frequency

The generator can transmit with different frequencies. The options are:

- 512 Hz
- 1.1 kHz
- 9.95 kHz

- Press one of the two frequency keys to set the frequency.



Increase frequency



Reduce frequency

Note:

The generator and receiver must be of the same frequency.

- Adjust the receiver frequency to the generator frequency.

3.2.5 Setting the output power

The output power of the **FG 50** generator can be adjusted to the conditions.

As soon as the generator is switched on, it will supply an output power of up to 1 Watt in battery operation. Whether the generator can actually deliver this value depends on the local conditions.

The output power can be changed gradually.

Note:

Even if no segment is filled in the **output power** symbol, the generator still delivers power.

In the energized line, the current from the generator is limited to 100 milliamps. If this value is already reached at average output power, the generator will not increase the actual output

power any further. This also applies if the Up key continues to be pressed and the **output power** symbol then displays an increased output power.

- Press the Up key to increase the output power.
- Press the Down key to reduce the output power.

3.2.6 Stop energizing

Once the locating process has been completed, the following steps must be carried out in the following order:

1. Switch off the generator.
2. Disconnect the cable set from the generator.
3. Disconnect the terminals from the line and, if necessary, from the earthing spike.

4 Maintenance

4.1 Charging the batteries

The rechargeable battery of the **FG 50** generator must be charged, if necessary. The typical charging time is less than 6 hours.

The battery is protected against overcharging. Therefore the generator can be left connected to the power supply once it is fully charged.

Always observe the permitted temperature range during charging. If the temperature falls below or exceeds the limit values, charging stops until the temperature returns to within the permitted range.

There are two ways to charge the **FG 50** generator:

- simultaneously with the **AQUAPHON** system components in the **SK 10** case
- individually by AC/DC adapter or vehicle cable

4.1.1 Charging the battery in the case

The rechargeable battery of the **FG 50** generator can be charged simultaneously with the **AQUAPHON** system components in the **SK 10** case. The case is connected to the power supply using the **L** AC/DC adapter or the **L** vehicle cable.

The **L** AC/DC adapter and the **L** vehicle cable are available to buy as accessories.

The connection cable for the components can be found in the case. There is a connection socket on the outside of the case for connecting to the power supply.



Fig. 5: **SK 10** case
White circles: Connection cable
Black arrow: Connection socket (on the outside)

1. Place the components in the dedicated spaces in the case.
2. Connect the components using the connection cables.
3. Connect the case to the power supply using the **L** AC/DC adapter or the **L** vehicle cable. Charging starts automatically.

The charging process is complete after less than 6 hours.

4.1.2 **Charging batteries individually using the AC/DC adapter or vehicle cable**

The **FG 50** generator is connected directly to the power supply for charging using the **M4** AC/DC adapter or the **M4** vehicle cable. The generator is charged individually.

The **M4** AC/DC adapter and the **L** vehicle cable are available to buy as accessories.

4.2 Handling faulty lithium ion rechargeable batteries

Lithium ion batteries are always classed as dangerous goods for transport purposes.

The transportation of faulty lithium ion batteries is only permitted under certain conditions (e.g. must not be transported as air freight). Where transportation is permitted (e.g. by road or rail), it is subject to strict regulations. Faulty lithium ion batteries must therefore always be removed before shipping. Transportation by road or rail must occur in compliance with the current applicable version of the ADR¹ regulations.

NOTICE! Risk of damage when opening housing

When opening the housing, components can be damaged mechanically or by electrostatic discharge.

- The lithium ion battery may only be removed if you have legitimate grounds to suspect that the battery may be defective.
- Only SEWERIN Service personnel or an authorized specialist may replace rechargeable batteries.

4.2.1 Identifying faulty batteries

A lithium ion battery is considered to be faulty if one of the following criteria applies:²

- Housing damaged or badly deformed
- Liquid leaking from battery
- Smell of gas from battery
- Rise in temperature with the receiver switched off (more than hand-hot)
- Plastic parts melted or deformed
- Connection leads melted

¹ French abbreviation for: Accord européen relatif au transport international des marchandises Dangereuses par Route, *Engl.: European Agreement concerning the International Carriage of Dangerous Goods by Road

² According to: EPTA – European Power Tool Association

4.2.2 Removing the battery

The rechargeable battery is located in the generator. The upper part and the lower part of the housing are screwed together.

NOTICE! Risk of damage

There are parts in the generator that may be damaged mechanically or by electrostatic discharge when removing the battery.

- It is essential to read section 4.2 and section 4.2.1 before removing the battery.
- Avoid electrostatic discharges at all costs, e.g. by using an ESD workstation.

Switch off the generator.

1. Undo the four screws on the bottom section of the housing.
2. Carefully lift off the bottom section of the housing.
3. Disconnect the electrical supply to the faulty battery. Carefully remove the white plug on the circuit board.
4. The battery is fixed in place in the bottom section of the housing by means of a retaining plate. Loosen the three screws on the retaining plate.
5. Remove the battery.
6. Screw down the retaining plate again.
7. Screw the bottom section of the housing to the top section again.

4.3 Care

All that is necessary to care for the generator is to wipe it down with a damp cloth.

NOTICE! Risk of damage

The display surface of the **FG 50** generator is sensitive to mechanical and chemical stress.

- Always use a clean, soft cloth to clean the display surface.
- Never use cleaning agents containing aggressive constituents (e.g. acidic or abrasive constituents) to clean the display surface.

SEWERIN recommends: Always remove significant contamination immediately.

4.4 Servicing

SEWERIN recommends: Have the **FG 50** generator serviced regularly by SEWERIN Service or an authorized professional. Only regular maintenance can ensure that the generator is always ready for use.

4.5 Dealing with problems

Problem	Possible cause	Corrective action
FG 50 cannot be switched on	Insufficient power supply	<ul style="list-style-type: none">● Recharge battery
	ON/OFF key not pressed long enough	<ul style="list-style-type: none">● Press ON/OFF key for at least 1 s
	Rechargeable battery has switched itself off (e. g. due to short circuit when inserted)	<ul style="list-style-type: none">● Charge battery briefly: connect charger and remove again immediately.
Energizing not working	Line is not electroconductive	—
	Set of cables faulty	<ul style="list-style-type: none">● Replace faulty set of cables
	Cable set not correctly connected	<ul style="list-style-type: none">● Check connections
FG 50 switches off during energizing	Insufficient power supply	<ul style="list-style-type: none">● Reduce power at FG 50● Recharge battery

5 Appendix

5.1 Technical data

Device data

Dimensions (W x D x H)	115 x 114 x 60 mm
Weight	410 g
Material	polycarbonate (housing)

Certificate

Certificate	FCC, CE
-------------	---------

Features

Display	2" FSTN display (240 x 128 pixels, LED backlight)
Processor	DSP 16 bit
Operation	membrane keypad

Operating conditions

Operating temperature	-20 – 50 °C
Storage temperature	-20 – 50 °C
Humidity	15% – 90% non-condensing
Protection rating	IP 65
Non-permitted operating environments	in potentially explosive areas

Power supply

Power supply	lithium ion battery (rechargeable) [1357-0002], built-in
Operating time, minimum	6 h
Operating time, maximum	40 h
Battery power	24 Wh
Charging time	< 6 h
Charging temperature	0 – 40 °C
Charging voltage	12 V
Charging current	0.6 A
Charger	M4 AC/DC adapter

Locating

Transmitting frequency	512 Hz, 1100 Hz, 9950 Hz
Transmitting power	Rechargeable battery: max. 1 W, AC/DC adapter/vehicle cable: max. 0.5 W
Transmitting current	max. 100 mA
Transmitting voltage effective	max. 32 V

Additional data

Shipping instructions	UN 3091: lithium metal batteries contained in equipment or lithium metal batteries packed with equipment net weight of battery/batteries: 0.096 kg
-----------------------	---

5.2 Accessories

Part	Order number
L12 V AC/DC adapter	LD26-10000
L12 V vehicle cable	ZL05-10200
SK 10 case	ZD63-10000

Other accessories are available for the system. Please contact the SEWERIN sales department for further information.

5.3 Declaration of conformity

Hermann Sewerin GmbH hereby declares that the **FG 50** generator fulfils the requirements of the following guidelines:

- 2014/30/EU
- 2006/95/EC

The complete declaration of conformity can be found online.

5.4 Advice on disposal

The European Waste Catalogue (EWC) governs the disposal of appliances and accessories in accordance with EU Directive 2014/955/EU.

Waste	EWC code
Device	16 02 13
Disposable battery, rechargeable battery	16 06 05

Alternatively, used equipment can be returned to Hermann Sewerin GmbH.

6 Index

C

- Charging socket 3
- Connecting
 - via conductor loop 6
 - with earthing spike 5
- Connection
 - charging socket 3
 - set of cables 3

D

- Dealing with problems 14
- Display c

E

- Earthing spike 6
- Energizing 5
 - general 5
 - via conductor loop 5
 - with earthing spike 6

F

- Firmware version 1, 5
- Frequency keys 8

G

- Generator
 - operating principle 3
 - power supply 3
 - switching off 5
 - switching on 5

L

- Lithium ion rechargeable battery
 - charging 10
 - identifying a fault 12
 - removing 13
 - transport regulations 12

P

- Power supply 3
 - external 4
 - via rechargeable battery 3

R

- Rechargeable battery *see* Lithium ion rechargeable battery

S

- Set frequency 8
- Setting the output power 8
- Switching off 5
- Switching on 5

Hermann Sewerin GmbH

Robert-Bosch-Straße 3
33334 Gütersloh, Germany
Tel.: +49 5241 934-0
Fax: +49 5241 934-444
www.sewerin.com
info@sewerin.com

SEWERIN IBERIA S.L.

Centro de Negocios Eisenhower
Avenida Sur del Aeropuerto
de Barajas 28, Planta 2
28042 Madrid, España
Tel.: +34 91 74807-57
Fax: +34 91 74807-58
www.sewerin.com
info@sewerin.es

Sewerin Sp. z o.o.

ul. Twórcza 79L/1
03-289 Warszawa, Polska
Tel.: +48 22 675 09 69
Tel. kom.: +48 501 879 444
www.sewerin.com
info@sewerin.pl

SEWERIN SARL

17, rue Ampère – BP 211
67727 Hoerdt Cedex, France
Tél. : +33 3 88 68 15 15
Fax : +33 3 88 68 11 77
www.sewerin.fr
sewerin@sewerin.fr

Sewerin Portugal, Lda

Avenida dos Congressos da
Oposição Democrática, 65D, 1º K
3800-365 Aveiro, Portugal
Tlf.: +351 234 133 740
Fax.: +351 234 024 446
www.sewerin.com
info@sewerin.pt

Sewerin Ltd.

Hertfordshire
UK
Phone: +44 1462-634363
www.sewerin.co.uk
info@sewerin.co.uk