Operating Instructions

DP-IR™

SEWERIN
Technologies for leak detection.

Measurable success with SEWERIN equipment

Congratulations. You have chosen a quality instrument manufactured by Hermann Sewerin GmbH.

Our equipment will provide you with the highest standards of performance, safety and efficiency. They correspond with the national and international guide-lines.

Please read and understand the following operating instructions before using the equipment; they will help you to use the instrument quickly and competently. If you have any queries we are available to offer advice and assistance at any time.

Yours

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Display
Holder
Menu key
Arrow-up key
Arrow-down key
Alarm key
ON/OFF key
Zero point key
RS-232 port
Outlet
External power supply port

Fig. 1: DP-IR

Fig. 2: Carrying case with accessories

Operating Instructions

DP-IR™

25.03.2011 – 106623 – en

WARNING! Risk of personal injury!
This symbol is followed by safety instructions which must be observed to avoid personal injury.

WARNING! Risk of material damage!
This symbol is followed by safety instructions which must be observed to avoid material damage.

Note:
This symbol is followed by additional information beyond the scope of product operation.

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1 Introduction

The DP-IR (Detector Pac-Infrared) uses advanced optical technology to achieve a detection sensitivity of 1 ppm by means of IR-CIPS (Infrared Controlled Interference Polarization Spectrometry).

This innovative device combines the excellent measuring properties of an FID with the ease of use of gas-sensitive semiconductor systems. Moreover, is does not require fuel gas and is selective to methane. This technology is, therefore, asserting itself in network survey applications alongside traditional measuring techniques.

Distinguishing features of the DP-IR include its mechanical robustness and ease of use.

The DP-IR can be used in various operating conditions, including low and high temperatures. Its rugged design will withstand normal field use and operating conditions.

The DP-IR features an integrated self-test function for checking that the device is working properly. The user routinely runs the self-test every day using the integrated calibration cell when starting the device. The DP-IR continuously monitors several internal parameters during operation to ensure that it is working properly. As soon as any of these parameters deviates, a continuous alarm sounds and the ERROR symbol appears.

2 General

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.

Hermann Sewerin GmbH accepts no liability for any damages resulting from non-compliance with these instructions. The warranty and liability provisions of the terms of sale and delivery of Hermann Sewerin GmbH are not affected by the information given below.

- This product must only be operated after the relevant operating instructions have been read and understood.
- This product must only be used for its intended purpose.
- This product is only suitable for use in industrial and commercial applications.
- Repairs must only be carried out by the manufacturer or by other suitably trained personnel.
- The manufacturer cannot be held responsible for damages if unapproved modifications have been made.
- Only replacement parts that have been approved by Hermann Sewerin GmbH may be used.
- The manufacturer reserves the right to make technical modifications in the course of further development.

Generally applicable safety and accident-prevention regulations must be complied with, in addition to the information provided in this manual.

2.2 Safety information

These operating instructions must be read carefully and in full. All advice given in these operating instructions must be followed.

WARNING! Risk of personal injury!
All maintenance work must be carried out in a safe place.

WARNING! Risk of personal injury!
Always charge or replace the batteries in a safe place to minimise the risk of an inflammable or explosive environment.

Note:
Refer to the Troubleshooting section in the operating instructions if the device does not work correctly, or indicates a fault or warning.

3 System description

3.1 Structure of the DP-IR

The DP-IR is a device featuring controls, probe connection, charging socket and an interface for data logging.

You can find an overview of all parts inside the front cover (fig. 1 and fig. 2).

Carrying strap

The DP-IR includes a detachable wrist strap, which attaches to the device in three places. A padded shoulder strap also allows the device to be carried in different ways.

Charger

The device comes with a charger to recharge the batteries after use. The charger is a universal charger, 110–240 V AC, 50/60 Hz, and features a charge indicator.

Carrying case

The carrying case provides protection for the device during transportation and storage. The device must always be stored in this case when not in use.

Soil probe

The soil probe allows you to determine the gas concentration in bar holes and can be used to pinpoint leaks.

Bell probe

The bell probe is used to detect leaks at the surface.

3.2 Optional accessories

Bluetooth module

The Bluetooth module gives the DP-IR extra flexibility and mobility, as it provides a wireless interface to the device. Data can be transmitted from the device to a PDA or PC over a distance of up to 7.6 metres (30 feet) by Bluetooth communications protocol in accordance with the industry standard for the purposes of data logging.

Adapter for DC supply

The DP-IR can be powered from a 12V vehicle power circuit using an optional DC/DC adapter. The adapter decouples and filters out electronic noise from the vehicle power circuit which might otherwise affect or damage the DP-IR.

4 Operation

This section provides information on operating the DP-IR. It tells you how to use the menu, describes the external characteristics, explains how to adjust operational parameters, and the procedures for activating the various features of the device.

Fig. 3: Control panel

4.1 Control panel

Control	Function
Menu key	● Scroll through the various device settings.
Arrow-up key	● Increase a value, confirm user information or select an option
Arrow-down key	● Decrease a value, confirm user information or select an option
ON/OFF key	● Switch the device on/off by holding down for over one second.
Alarm key	● Enable or disable alarm.
Zero point key	● Set the zero point or activate other functions.

4.2 User interface

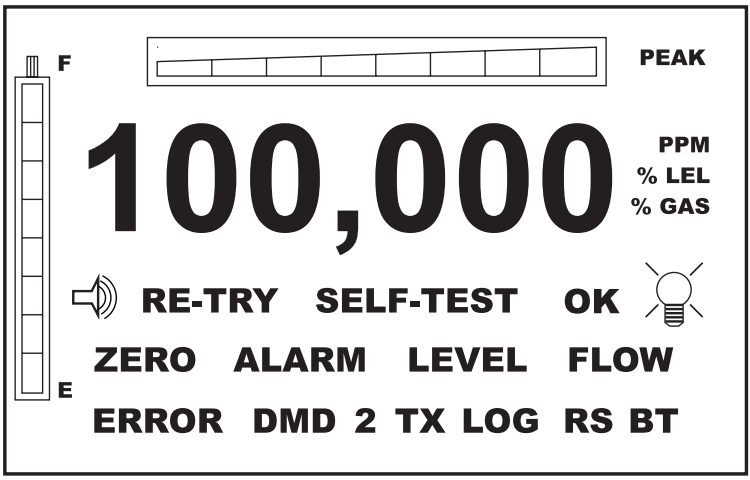


Fig. 4: User interface

Note:
The illustration shows all symbols displayed simultaneously. During actual operation, only those symbols related to an active function will be displayed.

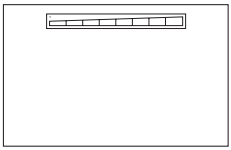
Gas concentration

Displays the volume of gas on the selected scale. The display “1 - - - - “ indicates a value is out of range.

Gas scale

Gas is either measured in parts per million (ppm) or in % vol. Scaling is performed automatically or as selected by the user.

Peak value graph



Bar chart showing the relative maximum value occurring in the last three seconds.

Battery display

Shows the remaining battery life in increments of 12.5%.

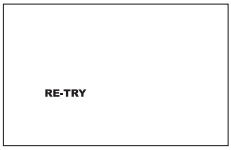
Alarm active

Shows whether or not the alarm sensor is activated.

Backlight

This symbol indicates that the backlight is switched on.

RE-TRY



The self-test failed and should be performed again.

SELF-TEST

Self-test mode is active.

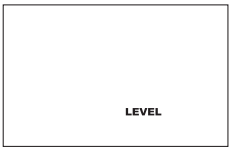
OK

The self-test has been successfully completed.

ZERO

The device‘s zero point is currently being set.

Alarm level

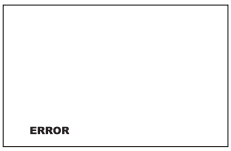


The alarm level has been reached or exceeded.

FLOW

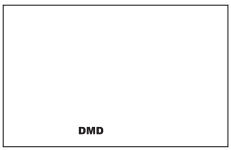
The inflow rate is too low.

ERROR



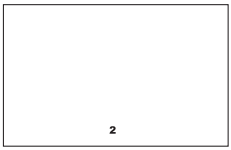
An error has occurred; the device is not working properly.

DMD mode



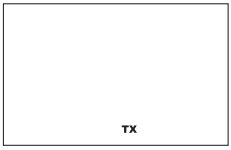
DMD (Digital Methane Detection) mode is on.

Tick mode



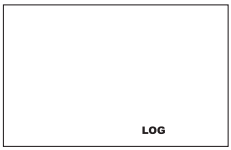
Tick mode helps you to pinpoint the precise leak.

TX



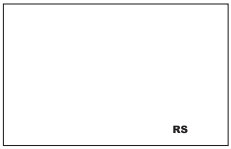
The device is in the process of transmitting data to the DP-IR data log program.

LOG



Data logging is active.

RS-232



RS-232 is the active communications link.

Bluetooth

Bluetooth (optional) is the active communications link.

4.3 External characteristics

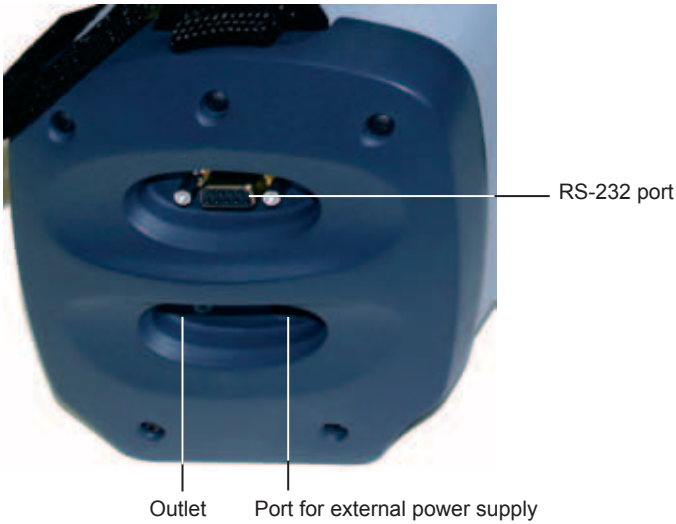


Fig. 5: Back of DP-IR

Outlet	This is where the gas taken in by the sampling probe is released from the device. This opening must not be covered.
External power supply port	Socket for the plug of the charger and the plug of the external power supply.
RS-232 port	Socket for a DB-9 plug for the serial interface to a computer.

4.4 Switch on/off

- Hold down the ON/OFF key for approx. 1 second.
- The display shows that the device is initialising (on ini) and is warming up (t◦ ini). The device can take up to 5 minutes to warm up.
- The battery indicator shows the state of the battery.
- A countdown indicates the time remaining until the device has warmed up.

The following settings are automatically saved in the event of a power cut and retrieved when power returns:

- Detection mode
- Alarm level
- Bluetooth/RS-232 selection
- Backlight on/off

4.5 Using the menu

The DP-IR menu allows the user to set certain operational parameters and to activate/deactivate other functions. The following operational parameters can be changed by the user:

- Self-test
- Backlight
- RS-232 or bluetooth-COM ports
- Detection mode

The following functions can be switched on/off or activated.

Pressing the menu key runs through the following screens in the order below:

Measurement

- Set zero point
- Turn alarm on/off
- Toggle measuring range

Alarm setting

- Set the alarm level
- Select the detection mode

Self-test

- Start the self-test routine

SEL

- Switch backlight on/off
- Select RS-232 or bluetooth communication

The following sections explain the individual screens and functions in more detail:

4.6 Setting the zero point

The background methane level can be set to zero using the zero point key when the main/measuring screen is showing. Setting the zero point only sets the background level of the gas to a reading value of zero.

- It does not calibrate the device.
- The alarm level does not change.

The zero point of the DP-IR can only be set from the main/measuring screen. Hold the zero point key down for approx. 2 secs. until the display changes to zero.

Note:
If it is very cold outside, it may be necessary to press the zero point key repeatedly after approx. 15 minutes until the device has reached a stable operating temperature.

4.7 Setting the measuring range automatically / manually

The user can select whether the device displays a range automatically, or only the selected range is displayed.

The ppm or % vol. symbol appears on the right-hand side to indicate the range for the gas.

The range mode (automatic/manual) of the DP-IR can only be changed from the screen for ongoing measurements.

- Press the arrow-down key once for manual ppm mode.
- Press the arrow-down key again for % vol. mode.
- Press the arrow-down key to return to the automatic measuring range setting mode.
- Press the arrow-up key to return to the automatic measuring range setting mode.

4.8 Alarm level

If the gas concentration measurement exceeds a certain limit (alarm level), the device issues an audible signal.

The alarm level should be set so that there are not many false alarms, but at the same time the value is not so high that gas leaks are missed (recommended: 3 – 5 ppm).

The inspection procedures used by some organisations may require that a specific value is used or a that a certain adjustment procedure is followed.

The alarm level can be set as follows:

Range (ppm)	Increments (ppm)	Range (ppm)	Increments (ppm)
1 – 16	1	400 – 700	50
16 – 40	2	700 – 1600	100
40 – 70	5	4000 – 7000	500
70 – 160	10	7000 – 9000	1000
160 – 400	20		

Changing the alarm level

- Press the menu key until the „AL“ option appears.
- Press the arrow-up key or arrow-down key to increase or reduce the threshold value. Setting a higher threshold value will decrease the sensitivity of the device.
- Press the menu key to return to the screen for ongoing measurements.

4.9 Detection modes

Two different operating modes allow the user maximum flexibility when using the device.

DMD (Digital Methane Detection)

An audible signal is only issued when the alarm level is exceeded. A rising and ebbing sound can be heard for as long as the alarm level is exceeded. In most situations, the user should carry out the inspection/test with DMD mode activated.

Tick mode

A continuous signal is emitted depending on the gas concentration. The higher the gas concentration (up to 1000 ppm), the faster the signal will sound. When you want to isolate the highest gas concentration within a leak area, tick mode is the most effective.

Toggling between DMD and tick mode

- Press the menu key until the „AL“ option appears.
- Press the zero point key to toggle between DMD and tick mode.
  - The DMD symbol is shown when the device is in DMD mode.
  - The 2 symbol is shown when the device is in tick mode.
- Press the menu key to return to the screen for ongoing measurements.

4.10 Using tick mode

Tick mode helps you to pinpoint the precise leak:

- Use the bell probe to check the leak area and its surroundings.
- Listen for the fastest signal.
- A constant fast signal indicates where exactly the leak is positioned.
- If the signal is erratic, continue to inspect the area. In some cases, the gas dispersal may be so large that precise pinpointing of the source is not possible (tip: drill bar holes).

4.11 Self-test

The DP-IR has an integrated function for performing a self-test and calibrating the device. The self-test function should be run on a daily basis to ensure trouble-free operation of the device. **HEATH** recommends always performing a self-test before use. Each self-test should be recorded in a daily log. A sample daily log is appended to these operating instructions.

Perform the self-test as follows:

- Remove the device from the carrying case.
- Switch the device on and let it warm up.
- Check that the battery indicator has at least four bars.
- Press the menu key until the SELF-TEST symbol appears on the display. (The RE-TRY and OK symbols are also shown).
- Press the arrow-up key to start the self-test.
- If the OK symbol appears the device has passed the self-test.
  - If the RE-TRY symbol is displayed, then the device has failed the self-test. Press the arrow-up key to try the self-test again.
- Press the menu key to return to the screen for ongoing measurements.

If the device repeatedly fails the self-test, ensure that the battery is fully charged and the device has warmed up properly.

Note:
The device may require another 10 to 15 minutes to stabilise. If necessary, reset the zero point or repeat the self-test.

Note:
If several attempts fail, the device must not be used for inspections or testing until the problem has been rectified. Please contact **HEATH** directly for assistance.

The device may fail the self-test after recording high gas concentrations (e. g. after measurements in a bar hole) due to gas still being present in the sensor. Thoroughly rinse the unit before running a self-test.

The device may fail the self-test if the battery voltage is too low (less than four bars).

Alarm sensor

- Press the alarm key to switch the alarm sensor on or off.

  If the alarm sensor is switched on the alarm symbol will be displayed. If the alarm sensor is switched off, the alarm symbol will not be displayed. To minimise the risk of performing inspections/ tests with the alarm sensor switched off, the alarm sensor will switch on again automatically after 5 min.

5 Power supply

5.1 Rechargeable battery

The DP-IR is powered by a replaceable and rechargeable lithium ion battery. This battery is designed to allow the device to be operated for up to eight hours when fully charged. The display shows the remaining battery life, with the eight bars indicating the remaining capacity in increments of 12.5 %. The indicator should only be used as a guideline. Always start the day with a fully charged battery to ensure that the device can be used for the whole day.

WARNING!
Only use a rechargeable battery supplied by **Heath** in the DP-IR. Failure to do so could permanently damage the device.

Note:
To ensure the battery maintains its full capacity, charge when the ambient temperature is above 10 ºC.

Note:
The DP-IR has an integrated overcharge protection to prevent the battery from overcharging. The device can be used indefinitely with an external power supply without damaging the battery.

Note:
Using functions such as Bluetooth, the backlight or operating in cold temperatures reduces the battery life.

Note:
The device constantly uses a small amount of power. This can drain the battery even when not in use for long periods. It does not damage the battery. Recharge the battery in the usual way.

5.2 Charging the battery

WARNING! Risk of personal injury!
To keep the ignition risk to a minimum in flammable or explosive environments, rechargeable batteries must only be replaced or charged in safe places (outside of explosive zones).

The DP-IR is equipped with a universal AC/DC adapter. The plug on the adapter can be changed to suit the type of socket available.

- First connect the battery charger to the socket for the external power supply.
- Check that the bars on the battery charge indicator illuminate alternately. If not, the charger is not supplying any power and you need to check the connection. When powered externally the battery is usually charged regardless of the operating status of the device.

5.3 Replacing the rechargeable battery

Change the rechargeable battery as follows:

- Unscrew the four screws on the battery compartment cover, which is at the bottom of the DP-IR.
- Undo the Velcro straps holding the battery in place.
- Disconnect the wiring between the battery and the device.
- Replace the battery with a new one as approved by **HEATH**.
- Reconnect the wiring, fasten the straps and screw on the cover of the battery compartment.

5.4 External power supply

The DP-IR is designed so that it can be used for mobile inspections from a vehicle. If the user prefers this option, he can conveniently use the vehicle's DC power circuit for continuous operation of the device regardless of the state of the battery. The DP-IR can be powered from 12V DC to 28V DC vehicle power circuits using the optional DC adapter. The charge indicator on the display shows bars in alternating sequence to indicate the external power. Depending on the level of supply voltage of the vehicle battery, the device battery can also be charged whilst the DP-IR is being powered externally.

6 Information on using the DP-IR

Note:
Please refer to your organisation's own training and procedural requirements for the specific qualifications necessary for leak testing and detection.

WARNING!
Do not immerse the probe in water. This could cause serious damage.

Note:
The integrated pump is permanently on. The error symbol FLOW ERROR and an alarm indicate insufficient gas flow through the device. To test whether the pump is running, cover the inlet with your finger; this should trigger a gas flow error (FLOW ERROR) and an alarm. If the gas flow error (FLOW ERROR) and alarm are not triggered, this means that the pump is not working properly.

Note:
Atmospheric air always contains a low level of methane. The DP-IR also measures this background methane level. The DP-IR is ideal for measuring slight changes to the environmental conditions.

Note:
If the DP-IR is moved quickly from a cold environment to a warm and humid one, condensation may form on the measuring lens. If this happens, leave the device running for a few minutes until the condensate is pumped out.

6.1 Working with the DP-IR

Observe the following basic rules when working with the DP-IR:

- Change the dust filter at least once a day. The filter may need to be changed more often in very dusty or wet environmental conditions.
- Recharge the battery after each use to ensure it is fully charged for the next day.
- Run the self-test at the start of the working day at least.
- Check that the alarm level has been set correctly.
- Check that the gas flow alarm and the pump are working properly.
- The zero point must be reset as soon as the environmental conditions change.

7 Maintenance and troubleshooting

7.1 Troubleshooting the device

Thanks to its sophisticated design, the DP-IR is one of the most reliable leak testing devices on the market. However, should you experience problems with the device or suspect that it is not working properly, do not use it to check for leaks or for inspections until the problem has been resolved.

Only personnel with the appropriate qualifications may repair and open the DP-IR. The DP-IR does not have any components which can be repaired or replaced by the user.

In most cases there is a simple explanation for problems with the device. The following table contains a list of the most common faults, their causes and solutions. Please contact SEWERIN for further assistance if a fault is encountered that is not listed here, or the suggested solution does not rectify the problem.

Symptom	Possible cause(s)	Solution
The device will not switch on	– Battery not charged	– Charge the internal battery or – use the external power source
Reduced sensitivity	– Filters need replaced – Alarm level is set too high for the prevailing conditions	– Check filters and change if necessary – Set the zero point on the device in a gas-free environment – Reduce alarm level – Run self-test
Excessive number of false alarms	– Zero point drift – Alarm level is set too low for the prevailing conditions – Filters need replaced	– Check filters and change if necessary – Set the zero point on the device – Increase alarm level – Run self-test
ERROR symbol and alarm constantly on	– Battery not charged – Failure of an internal component	– Check battery charge and recharge if necessary – Run self-test

Gas flow error symbol (FLOW ERROR) displayed	– Filter needs to be changed – Probe blocked	– Check filters and change if necessary – Clean probe filter and clean or replace probe hoses
Very slow to purge	– Leak inside device	– Check leak-tightness of integrated hydrophobic filter

7.2 Servicing

In order to maintain the DP-IR in proper working order, the following maintenance tasks must be carried out at the specified intervals.

Maintenance task	Frequency
Self-test and calibration	Daily, to ensure that the device continues to function correctly
Recharge battery	Recharge fully after every use
Replace dust filter	Daily or more often, as required in the prevailing conditions

Note:
There is a hydrophobic filter in the front cover, behind the dust filter.
Change filter if it is clogged with water or dust. A hydrophobic safety filter is located in the device housing to prevent water damage to the device. The user should replace the external filters as required.

Note:
Do not use the device without a dust filter or a hydrophobic filter.

WARNING! Risk of personal injury!
To keep the ignition risk to a minimum in flammable or explosive environments, rechargeable batteries must only be replaced or recharged in safe places.

WARNING! Risk of material damage!
Always use rechargeable battery pack P/N 102961-0 from **HEATH** Consultants Inc.

8 Appendix

8.1 Technical data

Detection procedure:	IR-CIPS (Infrared Controlled Interference Polarization Spectrometer)	
Measuring range:	0 – 10 000 ppm 0 – 100% gas	
Indication range	– Automatic measuring range setting ppm: 0 – 10 000 % gas: 1 – 100% – Manual measuring range setting: ppm scale: 0 – 10 000 % gas: 0 – 100%	
Sensitivity:	0 – 1000 ppm: 1 ppm 1000 – 10 000 ppm: 5 ppm 1-100% gas: 0.5%	
Accuracy:	Better than +/- 0.5% or +/-10% of the display value (typical, normal conditions) (% gas with manual operation)	
Alarm modes for detection:	– DMD (Digital Methane Detection): – Audible signal when detection threshold is exceeded. – Alarm level adjustable between 1 and 9000 ppm – Ticking: – Continuous audible signal, variable pitch according to concentration.	
System fault warning:	Audible signal and display on screen	
Self-test and calibration	Integrated self-test and calibration function to check function and calibrate to maximum sensitivity. Test gas cell integrated in device.	
Compliant with standards:	– EN 61326-1 Grid-bound faults Class B – Radiated faults Class B – ANSI C63.4 Class B – FCC 47 CFR, Part 15 Class B	EN 61326-1 EN 61000-4-2 4 kV/8 kV EN 61000-4-3 3 V/M
Dust filter:	Replaceable filter to protect from dust. Easily replaceable, detachable filter cover.	
Display:	Large, easy to read LCD with backlight (0.75 inch, numeric)	
Operating temperature	-17 – +50°C (0 to + 122 F) (nominal battery voltage)	
Humidity:	5 - 95% relative humidity (non-condensing)	

Housing:	IP54 (protected against water spray and dust)
Weight of device:	2.54 kg (5.6 lbs).
Carrying case:	5.90 kg (13 lbs) empty, 9.52 kg (21 lbs filled) approx. 62.2 cm × 53.3 cm × 22.9 cm (24.5 inches × 21 inches × 9 inches)
Power supply:	Integrated lithium-ion rechargeable battery
Battery operating life:	8 hours at 0 °C (32 F) with backlight switched off
Charger:	External universal charger, 110 - 240 V AC, 50/60 Hz. 10 hours up to 90% charge
Shoulder strap:	Single shoulder strap, padded
Speaker volume:	108 dBs @ Alarm-Port (A-fast)
Bell probe:	Quick-connect with safety lock. Length adjustable between 63.5 cm and 104 cm (25 inches and 41 inches)
Soil probe:	Standard 50.8 cm (20 inches); optional 91.4 cm (36 inches)
Intrinsic safety:	Class 1, Department 1, Group DT3 UL 913 MetLab No. E112840

8.2 Serial data transmission

Interface:	Serial RS-232 cable or optional Bluetooth v1.2, class 2
Connection:	Baud: 38 400 kbps Data bits: 8 Parity: none Stop bits: 1 No data flow control

Further information can be found in the supplementary communications manual (available on request).

8.3 Daily log DP-IR self-test

Date	Operator	Self test successful?	Self test ppm measurement value	Alarm level	Notes

8.4 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
Disposable battery, re-chargeable battery	16 06 05

Used 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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