OPERATION MANUAL

Device type

ISOTEST® inspect pro

Manufacturer

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1. DEFINITION OF TERMS

| Test device | The device described in these instructions for detecting de- fects in coatings. |
|-----------------------|--|
| Test object | The object whose coating is to be tested. |
| Holiday | Representative term for all types of defects that are to be recognised. |
| Grounding Earthing | Both terms refer to the connection to a reference potential and is essential for safe operation. |

2. PRODUCT DESCRIPTION

2.1 Intended use

High voltage testing ("holiday testing") is used to find even the smallest defects in electrically non-conductive coatings on an electrically conductive substrate.

- The test device is not designed for stationary continuous operation!
- Any use other than that specified above is considered improper use!



The test device must not be operated in potentially explosive atmospheres

- Intended use also includes reading this operation manual and complying with all instructions contained herein - especially the safety instructions. It also includes that all inspection and maintenance work is carried out at the recommended intervals.
- During operation of the test device, interference with radio equipment or radio services may occur in the vicinity. In this case, stop operating the test device. Always keep the duty cycle as short as possible.
- Only instructed personnel shall work with the test device.
- Safe operation is only guaranteed if the test instrument is used in accordance with the above-mentioned regulations.
- The manufacturer shall not be held accountable for any personal injuries or property damages arising from improper use, while the responsibility lies with the operator of the equipment.

3.1 Operator's duty of care

The test device corresponds to the state of the art and guarantees maximum safety.

However, in operational practice this level of safety can only be achieved, if all necessary measures are taken. It is the operator's duty of care to plan these measures and to control their execution.

Make sure that

- the test device is only used for its intended purpose (see chapter 2. PRODUCT DESCRIPTION),
- the device is only operated in perfect condition,
- all necessary personal protective equipment is available and used by the operator,
- the operation manual is always available in a legible condition and complete at the place of use of the equipment,
- only sufficiently qualified and authorized personnel operate the device,
- the operator is regularly instructed in all applicable questions of industrial safety and environmental protection and knows and observes the operation manual and in particular the safety instructions contained therein,
- none of the safety and warning notices attached to the equipment are removed and that they remain legible.





3.2 Explanation of the safety symbols used

Safety symbols impart safety information through a combination of:

- geometric shape
- colour
- graphical symbol / text

They are used both on the device and in the operation manual to point out situations with a hazard potential, quickly and clearly.

All safety-related passages in this operation manual are highlighted with one of the following safety symbols. All personnel operating the device must be provided with the safety instructions.

Symbols indicate important information that must be strictly observed.

The following symbols are used in this operation manual:



This symbol indicates a dangerous situation. Non-observance can lead to serious injury or death.



This symbol indicates a warning of dangerous electrical voltage.



This symbol indicates the necessary grounding before use. Non-observance can lead to injuries as well as to damage or malfunction of the device.



This symbol indicates important information that must be observed. Non-observance can lead to damage or malfunction of the device.



This symbol indicates that people with a pacemaker or active implants are not allowed to operate the device and must maintain a distance of 3 meters from the device and parts electrically connected to it when the high voltage is activated.



This symbol indicates information that contributes to a better understanding of functions and processes.

3.3 Basic safety measures

- The basic safety guidelines and regulations of the relevant professional associations and federations apply.
- Before commissioning the test device, check the working area for possible obstacles and sources of danger (e.g. tripping hazards).
- Provide sufficient grounding for the test object and the test device.
- Make sure at all times that the handle of the test device remains dry and is not exposed to moisture.
- Depending on the ambient conditions, flashovers may occur in the area marked in yellow when the high voltage is activated. Therefore, in order to avoid electric shocks, no part of the body must enter the area marked in yellow.



- An (un)intentional touching of the high voltage and a resulting uncontrolled action must not lead to an indirect endangerment of the inspector. This applies in particular to work on ladders and scaffolds.
- Always switch off the test set at the appliance switch before inserting or changing electrodes. After switching on, never touch the area in front of the black insulator like the collet nut or the electrode in the handle.
- During the test, wear suitable work clothing and footwear that complies with the on-site applicable safety regulations.
- By using suitable electrodes, a test procedure must be established which excludes a contact of the operator with the electrode during the test.
- To maintain the high safety standard, use only original ELMED accessories and electrodes.



Special care has to be taken when using high voltage extension cables and high voltage extension rods, as there is no contact protection in the area of the electrode collet device on the handle.



3.4 Requirements for the operating personnel

The device should only be used by persons who have been instructed in the basic functions of the device and who are aware of the existing risks and necessary safety measures.

They must have read and understood the operation manual, in particular the chapter *3. GENERAL SAFETY INSTRUCTIONS*, and act accordingly.

In addition, they must be instructed in the basic regulations on work safety and accident prevention.

Trainee operating personnel shall only work with the test device under the supervision of an experienced operator.

3.5 Specific types of hazards





Important note for epileptics

Contact with high voltage or high voltage carrying parts can lead to epileptic seizures if the person is properly disposed.

4. FUNCTIONAL DESCRIPTION

With high-voltage testing, even the smallest holidays (defects such as cracks, weak points and alike) in coatings on a conductive substrate can be reliably detected.



In this process, a test electrode connected to a grounded high-voltage source (ISOTEST® device) is moved over the insulating coating.

In the case of a holiday, there is a spark between the test electrode and the grounded surface. The ISOTEST® device reports the pore by means of a visual and acoustic signal.

The high-voltage test device consists of the control unit and the handle for holding the test electrode, which are connected by the high-voltage cable.



Procedure:

- Make sure that the test device and test object are grounded. Set the required test voltage.
- Scan the surface of the test object completely and without gaps using a suitable electrode. If a holiday is detected, a spark will occur; an acoustic and optical signal is also given.



Missing or marginal grounding of the ISOTEST® test device and/or test object may result in accidents and injury to persons. Chapter *5. GROUNDING* contains a detailed description of all possible grounding methods.

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4.1 Coatings on conductive substrate

Detection of holidays in non- or slightly conductive coatings on electrically conductive substrate.

As the test object has a conductive substrate, this can be used for the grounding connection.

| Areas of application, e.g.: | Coating material, e.g.: |
|--|--|
| Systems for protection of pipelines | Polyethylene (PE) Bitumen |
| Coatings applied by the manufacturer (internal and external) | Butyl rubber bands Rubber coatings Rilsan |
| Coatings applied in the field | Halar Ceramic |
| Tanks and containers | Enamel Epoxy resin |
| Busbars | Powder coatings |
| | Substrate, e.g.: |
| | Ferrous and non-ferrous metals Electrically conductive fillers Electrically conductive fleece Concrete with sufficient residual mois- ture |

The test object and the ISOTEST® test device are grounded by attaching or applying a suitable grounding (see chapter 5. GROUNDING).

Subsequently, the surface of the test object is completely scanned with a test electrode, which must be in close contact with the surface.

The test voltage applied to the electrode should be chosen according to the coating thickness as well as the relevant standards and manufacturer specifications. A holiday is detected by sparking between the electrode and the electrically conductive substrate. The detection triggers an acoustic and visual alarm.





4.2 Coatings without conductive substrate

Holidays and porosity with or without inclusions can be detected in non-conducting material such as welded or glued seams.

As the test object does not have a conductive substrate, an additional grounding electrode must be applied.



| Material types, e.g. | Manufacturing types, e.g. |
|-------------------------------|---|
| All types of plastic Glass | Foils Plates |
| Ceramic | Vessels/Tanks Enclosures Pipelines Hoses |

The test object and the ISOTEST® test device are grounded by applying a suitable coating of electrically conductive material. Subsequently, a suitable test electrode is moved in close contact to the test object across the latter's entire surface.

The test voltage applied to the electrode has to be chosen according to the coating thickness as well as the relevant standards and manufacturer specifications. A holiday can be detected by sparking between the electrode and the applied conductive grounding electrode and is indicated by an acoustic signal and the pinhole indication in the display.

Among others, the following grounding methods can be applied:

- Applying electrically conductive foils, fabrics or fleeces
- Applying electrically conductive rubber mats
- Filling with electrically conductive liquids or solid matters
- Insertion of a metal wire

5. GROUNDING



The test object **<u>and</u>** the test device must be properly grounded (see illustration). The contact points must be free of corrosion and dirt.





The standard 15 m long grounding cable must not be extended. There is a risk of electric shock.



For safety reasons, the grounding plug must be plugged in along its entire length.



To protect and maintain the function of the grounding cable, make sure that the strain relief is in place when the plug is inserted.



5.1 Direct Grounding

Direct grounding is used when the grounding conductor can be connected to a contact surface free from contamination and stain.



The picture shows the application of the grounding rod

Required accessories:

| Part number | Description |
|-------------|---|
| 0174600000 | Standard grounding cable with plug and clamp (supplied) |
| 0174200000 | Grounding rod with cable, 2 m and clamp |

- 1. Connect the plug of the standard grounding cable to the grounding socket of the ISOTEST® test device. To prevent inadvertent pulling of the plug, make use of the provided strain relief.
- 2. Connect the clamp at the other end of the grounding cable to the test object.
- 3. Connect the clamp at the cable from the grounding rod to an accessible area of the test object.
- 4. Deeply bury the grounding rod in the soil. If the soil is dry, thoroughly water the respective area to obtain a low-resistance connection.

alternatively

Required accessories:

| Part number | Description |
|-------------|---|
| 0174600010 | Grounding0174600010 cable Y-type (two clamps / on plug) |

Application:

- 1. Connect the plug of the Y grounding cable to the grounding socket of the ISOTEST® test device. To prevent inadvertent pulling of the plug, make use of the provided strain relief.
- 2. Connect the clamps at the other end of the grounding cable to the test object.
- 3. Connect the second clamp to a grounding terminal.

alternatively

Required accessories:

| Part number | Description |
|-------------|---|
| 0174600000 | Standard grounding cable with plug and clamp (supplied) |
| 0174200100 | Grounding cable, length of 15 m, with plug and clamp |

- 1. Connect the plug of the standard grounding cable to the grounding socket of the ISOTEST® test device. To prevent inadvertent pulling of the plug, make use of the provided strain relief. Connect the clamp at the other end of the grounding cable to the test object.
- 2. Connect one clamp of the second grounding cable (part number 0174200100) to the test object. Connect the other clamp to a grounding terminal (e.g. grounding rail, foundation ground).



5.2 Indirect grounding through the trailing ground

Indirect grounding is used where the distance between the test object and a suitable grounding terminal is greater than 15 m. Typical examples are fully coated pipelines.



The picture shows the application of the trailing ground

Required accessories:

| Part number | Description |
|-------------|---|
| 0174600020 | Trailing ground |
| 0174200000 | Grounding rod with cable, 2 m and clamp |

- 1. Connect the plug of the trailing ground to the grounding socket of the ISOTEST® test device. To prevent inadvertent pulling of the plug, make use of the provided strain relief.
- 2. Spread the trailing ground on the soil in full length.
- 3. Connect the clamp at the end of the cable from the grounding rod to a noninsulated area of the test object.
- 4. Deeply bury the grounding rod in the soil. If the soil is dry, thoroughly water the respective area to obtain a low-resistance connection.

Indirect grounding can only be used if the following conditions are met:

- The test object is grounded
- The soil has sufficient conductivity. Moist soils are therefore suitable, whereas dry soils such as sand, asphalt or paving stones are not.

5.3 Capacitive grounding – grounding of fully coated test objects

Capacitive grounding is used where direct or indirect grounding is not possible. This is the case when the test object has conductive body that is inaccessible or fully coated.



The picture shows the application of the grounding collar



5.3.1 Grounding collars

Commonly used test objects are pipelines that have been coated in the field after repair and are subject to high-voltage testing. As there is normally no possibility of direct or indirect grounding, grounding collars offer the only possibility of proper and safe grounding.

Required accessories (choose grounding collar that matches the pipe diameter)

| Part number | Description |
|-------------|---|
| 0174401020 | Grounding collar, type 1, for DN 100 - 200 |
| 0174402040 | Grounding collar, type 2, for DN 200 - 400 |
| 0174403060 | Grounding collar, type 3, for DN 300 - 600 |
| 0174450100 | Grounding collar, type 4, for DN 500 - 1000 |
| 0174200000 | Grounding rod with cable, 2 m and clamp |

- 1. Wrap the grounding collar tightly (without any air gaps) around the pipe and fix it with the lashing strap. The grounding collar must be aligned such that the two connecting bolts can be used for the connection of the grounding cables.
- 2. Bury the grounding rod deeply in the soil. If the soil is dry, water the respective area thoroughly to obtain a low-resistance connection.
- 3. Connect the clamp on the cable of the grounding rod to one of the connecting bolts on the grounding collar.
- 4. Connect the plug of the standard grounding cable to the grounding socket of the ISOTEST® test device. The clamp on the other end of the grounding cable must be connected to the remaining connection bolt of the grounding collar. The bolts must be metallic bright. The bolts should be free from contamination and stain.
- 5. Switch the ISOTEST® holiday detector on and perform the high-voltage test.

5.3.2 Grounding foil

Required accessories:

| Part number | Description |
|-------------|---|
| 0174600010 | Grounding cable Y-type (two clamps / on plug) |
| 0174500010 | Grounding foil set |

- 1. The contact area of the grounding foil with the test object must be at least ten times as large as the contact area of the test electrode with the test object.
- 2. Tear off the protective foil by holding at the edges and fold one corner. Glue the remainder of the grounding foil over the entire surface and remove all air bubbles by wiping. Remove the protective foil step by step.
- 3. Connect the plug of the Y-type grounding cable to the grounding socket of the ISOTEST® test device. To prevent inadvertent pulling of the plug, make use of the provided strain relief.
- Attach one clamp of the grounding cable to the folded corner of the grounding foil, and attach the second clamp to ground, ensuring a low-resistance path. To obtain safe strain relief for the clamp at the grounding foil, secure the clamp with adhesive tape.
- 5. Turn the ISOTEST® test device on and perform the high-voltage test.
- 6. Remove the grounding foil after the test.



5.4 Testing non-conductive materials

The high-voltage test is well suited for detecting leaks in non-conductive parts, e.g. in plastic parts or their weld seams.

To allow using the high-voltage test method, coat back of the welding seam and/or area with an electrically conductive material (grounding electrode). Attach a grounding electrode to the entire rear of the area to be tested. Ensure close contact with the back. Pinholes and voids will safely be detected by sparking between the test electrode and the grounding electrode.

Required accessories:

| Part number | Description |
|-------------|---|
| 0174600010 | Grounding cable Y-type (two clamps / on plug) |
| 0174500010 | Grounding foil set |

Application:

- 1. Tear off the protective foil by holding at the edges, and fold one corner. Glue the remainder of the grounding foil to the entire rear of the welding seam or area to be tested, press against the test object, and remove all air bubbles by wiping. Remove the protective foil step by step.
- 2. Connect the plug of the Y grounding cable to the grounding socket of the ISOTEST® test device.
- 3. Attach one clamp of the grounding cable to the folded corner of the grounding foil and attach the second clamp to ground, ensuring a low-resistance path.
- 4. To obtain safe stress relief for the clamp at the folded corner of the grounding foil, secure the grounding foil with adhesive tape.
- 5. Remove the grounding foil after the test.

As an alternative to the grounding foil described above, you can also use electrically conductive fleeces, grounding mats or grounding collars made of electrically conductive rubber for testing of plastic parts.

The leakage test of containers can be performed using electrically conductive liquids, e.g., saltwater, acids, etc.

Welding seams can also be tested by inserting a wire.

Grounding brushes are available for cylindrical test objects.

6. COMMISSIONING

It is essential to observe the following points during commissioning to avoid personal injury or damage to the test instrument:



Only qualified personnel, in compliance with the safety instructions, shall carry out the commissioning of the device.

Check the following points before each use:

- 1. Insert a charged battery pack into the battery compartment.
- 2. Remove any dirt and moisture from the test electrode, handle, accessories, sockets and plugs.
- 3. Check high-voltage parts for mechanical damage.
- 4. Grounding the test device (see chapter 5. GROUNDING)
- 5. Grounding of the test object (see chapter 5. GROUNDING)
- 6. Selection of a suitable test electrode
- 7. Insert the testing electrode into the electrode collet on the insulator of the handle as follows:
- 8. Loosen the grey collet nut by turning it anticlockwise.
- 9. Insert test electrode up to the limit.
- 10. Tighten the grey collet nut hand-tight by turning it clockwise.
- 11. Extension rods are used instead of the test electrode on the handle, the test electrode is then inserted into the electrode collet at the end of the extension as described above.
- 12. Switch on the test device while observing the safety instructions (see chapter 3. GENERAL SAFETY INSTRUCTIONS).





Safe choice of accessories and test electrodes

For safe, trouble-free operation, consider the entire test setup when selecting accessories, designing and dimensioning test electrodes. The user is responsible for this, as well as for the intended use and maintenance.



Function test

Before starting the test session, hold the test electrode against the grounding terminal with the test voltage switched on. When approaching the grounding terminal a spark must occur. The distance depends on the set test voltage.

Alternatively, the test can also be carried out on a sample defect.

When the spark-over occurs, a signal tone must sound and at the same time the LED in the handle changes to red.

Handling the high voltage cable

Please note the minimum bending radius of 130 mm of the cable from the control unit to the handle.

Never bend the cable to a smaller radius during operation or when stowing the appliance, as this will irreversibly damage the cable Do not step on the cable.

Do not place any objects on the cable.

Do not pull on the cable.

7. OPERATION

7.1 Housing

7.1.1 Overview

Operation is performed using a combination of buttons on the front and touch display.



| Pos. | Description |
|------|---|
| 1 | Switch on |
| 2 | Switch off |
| 3 | Increase value |
| 4 | Decrease value |
| 5 | Accept / Confirm / Open widget |
| 6 | Open settings / Back |
| Ø | Selecting the active area (see chapter 7.1.2) |
| 8 | Help |

| Help | |
|------------------|---|
| Earth Plug | Help |
| Handle Operation | Offers animations on the relevant themes. |



| Pos. | Description |
|------------|---|
| \bigcirc | Yellow arrow when high voltage is active |
| B | Set voltage (touch to change) |
| Ô | Trigger level for holiday detection (slide to adjust) |
| D | Signal level of holiday detection |
| E | Widgets – see chapter 7.3.3 Widgets |
| Ē | Storage medium detected |
| G | Log control |
| Ξ | Time |
| | Brightness adjustment |
| \bigcirc | Sound settings for holiday indication |
| K | Battery indicator (charge status) |
| | Equivalent Voltage Mode & Value |



7.1.3 Set custom voltage

The voltage of the test device can be adjusted as follows:



7.1.4 Voltage setting according to test standards & coating thickness

Selection of the test standard:



If required, further test standards can be added via the USB stick during updates.



The test voltage for a given coating thickness is determined by different standards depending on the application.



7.1.5 Adjusting the sensitivity

The sensitivity of the tester can be set as follows:



During the test, the sensitivity can be adjust directly on the handle (see chapter 7.2.3 Adjusting the sensitivity on the handle).

7.2.1 Overview



| Pos. | Description |
|------|---|
| 1 | Collet for fastening the test electrode |
| 2 | Collet nut |
| 3 | Insulator |
| 4 | Status - optical display (with RGB LED) |
| 5 | Enable button |
| 6 | Handle |
| 7 | High voltage cable |
| 8 | Operation / Safety button |

| | • | The functions and the design of the operating buttons ensure a maximum of safety when using the test device. |
|--|---|--|
| | • | The high voltage is commissioned via an enable and a safety button on the handle. |
| | • | The safety push-button has two switching points which are triggered by varying pressure. |



7.2.2 Enabling the high voltage



By briefly pressing the enable button on the handle, the LED changes to green and signals readiness.



If the safety button is pressed within 3 seconds, this activates the high voltage.



The LED display in the handle changes to blue, the high voltage is activated as long as the safety button is pressed.



In addition to the set high voltage, the display of the control unit also shows the activated high voltage with a symbolic yellow flash.

A red flash indicates that the set voltage could not be maintained, usually due to overload.

7.2.3 Adjusting the sensitivity on the handle



During the test, the sensitivity can be adjusted particularly easily with the upper button by pressing it at a point on the coating that is known to be free of holidays. The threshold of the pore display is automatically set to a value slightly above the bar.

7.2.4 Safety button

The test devices have 2 switching levels in the safety button, the so-called safety mode. This is always activated and cannot be switched off.



Safety mode

- In this mode the switching points perform the following function:
- Switch point 1 activates the test voltage
- Switch point 2 deactivates the test voltage ("EMERGENCY STOP" function)
- Switching point 1 activation of test voltage Pressing the safety button after enabling the high voltage (see chapter 7.2.2 Enabling the high voltage) with "light" pressure up to the first switching step activates the test voltage.

The optical display in the handle changes to blue, the high voltage is activated as long as the safety button is pressed.

 Switching point 2 – "EMERGENCY STOP" function If the safety button is actuated beyond switching point 1 to switching point 2, the test voltage is switched off immediately.

This safety mechanism greatly improves user safety by shutting down the high voltage in situations where it is not possible for the user to release the safety button.

The switch-off is indicated by an alarm signal and an animation on the display.

To reactivate the high voltage:

- 1. Release the safety button completely.
- 2. Wait until the animation is no longer visible on the display.
- 3. The unit is ready for operation again.

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7.3 Advanced Functions

7.3.1 Settings

The menu "Settings" can be accessed via the button 📃

| Settings Pulse detection Earthing Monitor Language Rotate Display Info Log | Settings overview |
|--|--|
| | Pulse Detection When active, even very faint sparks are detected as holi- days. |
| | Grounding Monitor Cuts the high voltage, if an insufficient grounding is detected. |
| Language English German French | Language Allows the selection of one of the listed languages. Must be confirmed with the button |
| | Rotate Display When active, the display is rotated 180°. |
| Calibration expires 5/2025 Version 3.3 (522) Serial Nr. X000000000000000000000000000000000000 | Information Display of important information such as the version number and the date of the next maintenance. |
| | Log Call the Log submenu. (see chapter 7.3.4 Log) |
| Code: 7 8 9 4 5 6 1 2 3 0 0 0K Extended System Update Voltage Display Select Plot Date 26.02.24 User PIN | Extended (It may be necessary to scroll the display) Access to the advanced settings is protected with a pin code. On delivery, this is 0000. The protection can be deactivated after entering the code by checking the checkbox. |

| System Update Start Update Load Images | System Update A new device firmware can be loaded from the USB stick with "Start update". New images for the animated help function are loaded from the USB stick with "Load images". After removing the battery, the USB stick with updated files can be inserted into the connection provided for this purpose in the battery compartment. Reinsert the battery and make sure that it does not collide with the stick. |
|--|--|
| Voltage Display Pulse Voltage Equiv. VDC Pulse Voltage/Equiv. VDC Equiv. VDC/Pulse Voltage | Voltage Display Selection of the voltage display – either pulse voltage or equivalent DC voltage (The conversion takes into account the different sparkover voltages of air gaps with equal dis- tance for pulse and DC voltages at voltages below 10 kV.) The current mode is displayed in the top right-hand corner of the screen. |
| | Select Plot Selection of the item to be plotted. (see chapter 7.3.2 Real-time plotting) |
| | Date Here the current date can be corrected. |
| | User Pin Code to access the advanced functions can be customized here. |



7.3.2 Real-time plotting

By swiping across the main display, real-time diagrams for important measured values can be displayed:

| Select Plot Level/% Voltage -20.+20% Voltage 0-110% Load | Plot selection The selection is made via the "Select Plot" item in the "Set- tings" menu |
|--|---|
| 100 Level/5 | (Detection) Level The detection level plot shows the increased signal value when passing over holidays. The trigger threshold is indicated by a dashed line and can be set by swiping or using the arrow keys. |
| | High Voltage The high voltage plot clearly shows the collapse of the high voltage when passing over holidays. The scale can be switched between $+/-20$ % and $0 - 110$ %. The percentage refers to the set voltage. |
| 100 Level/5 | (Capacitive) Load The load on the holiday detector depends on the set voltage, the shape, size and contact area of the electrode, the type and thickness of the coating and the type of grounding. If the load exceeds the capacity of the holiday detector, the set high voltage can no longer be maintained. |

7.3.3 Widgets

| 0 2107 ☆ 0 ● V 7.90 kV Count 0 1.97mm | The grey fields ("widgets") at the bottom of the screen can be assigned different functions. |
|---|--|
| Voltage Actobet 200ml 1.58mm 0 0 0,00kV | By pressing the button for a longer time, the widget con- figuration is called. Widgets can be dragged from the upper area to the desired position. |

7.3.3.1 Automatic Test Voltage Setting



7.3.3.2 Voltage setting according to test standards & coating thickness



7.3.3.3 Holiday Counter



7.3.3.4 Holiday Voltage

| Holiday Voltage | |
|--------------------|--|
| 0.00kV | |

The holiday voltage is the lowest voltage measured at a holiday during flashover. The determined value can be used to set a reasonable test voltage, if no other specifications exist. The test voltage should be significantly higher than the determined minimum value. The dielectric strength of the coating material must also be taken into account.



7.3.3.5 Load Indicator



The load indicator shows which energy is required for the test. Large test electrodes in combination with a large contact area and high test voltage cause a high load, so that the set test voltage may not be reached (red high-voltage arrow).

7.3.4 Log

Important events can be recorded in the log. These can be retrieved later to trace or log the progress of the test.

| © (197 ☆ +) ■ V+ 7.90 kV Holday Count 0 1.97mm | Logging is started by tapping 🔤. The icon changes colour to red 📴. When tapping 🔤 again, the log is terminated. |
|---|--|
| Protokoll 2023-7 2 3 4 12 5 2 6 2 7 16 8 9 10 11 13 12 6 13 14 16 15 16 17 11 18 2 19 10 12 17 22 23 24 25 26 27 28 29 30 | The log can be called up in the Settings menu. In the calendar, the number of hol- idays found is displayed in red and the test duration in green. The calendar can be scrolled back and forth using the ar- row keys. |
| Log 2023-10-27 08 28 45 Logging started Test 08 28 45 Voltage autoset started 08 28 45 Voltage autoset success, 9 40kV 08 41 21 High Voltage activated 15 0kV 08 46 04 Holiday detected 12 3kV 08 52 57 High Voltage deactivated | By tapping on a calendar entry, the events of the selected tag are displayed. |
| Log Export Month Export Year Create Demo Erase Log | You can access additional calendar functions by pressing on The export functions save the log for the selected period as a CSV file on the USB stick. "Create demo" generates data for test purposes. Attention! The current protocol will be deleted! The protocol can also be deleted here. |

8. MAINTENANCE

8.1 Storage

If the test device is not used for more than a week, the following measures must be taken:

- Remove the battery from the test device. If the battery is less than 50% charged, it should be charged with the charger before storage. If the battery is not used for several months, it must be recharged in the meantime.
- Clean the test device and accessories.
- Protect the test device and accessories from damage by storing them in dry rooms.
- To avoid condensation formation due to falling below the dew point, the correct storage temperature must be ensured: Storage temperature: -20°C to +50°C (heat time constant > 10 K/h)

8.2 Maintenance

- Clean sockets and plugs from dirt.
- Only clean the test device and accessories with a soft, slightly damp or dry cloth. Only use mild detergents for cleaning.
- Do not bring the high voltage cable into contact with hot and/or sharp-edged parts.
- Do not throw the test device or subject it to strong impacts.

8.3 Inspection / Calibration / Repairs



To maintain the reliability and high quality level of the test device over a long period, the manufacturer should carry out an annual inspection and calibration.

Observance of the recommended inspection intervals contributes decisively to the functional reliability of the device and in many cases protects against expensive repairs. During the inspection, all device-specific functions are checked and calibrated. The result of the performed inspection is stored in a database and documented in a works test report or a calibration certificate.



As a reminder, the date of the next inspection prior to the expiry date is regularly displayed at start up. Under the "Information" item in the settings, you can independently display the date up to when the next inspection / calibration is due.





Damaged or functionally restricted equipment parts must not be used any more.

To ensure the safety and functionality of the unit, only original spare parts may be used for repairs.



For inspection or repair, please send the test device to

ELMED Dr. Ing. Mense GmbH Weilenburgstr. 39 D-42579 Heiligenhaus Germany



The proper performance of maintenance and repairs is only guaranteed by the manufacturer or by designated and authorised service centres.

8.5 Disposal



Test devices, battery packs, batteries and accessories must be disposed of in accordance with the legal regulations.

EC Declaration of Conformity according to the EU Directive 2014/30EU (electromagnetic compatibility)

We,

ELMED Dr. Ing. Mense GmbH Weilenburgstr. 39 D-42579 Heiligenhaus Germany

confirm, for the products listed below

ISOTEST® inspect pro

that they comply with the protection requirements under the conformity assessment procedure of the competent body as laid down in Council Directive 2014/30/EU on the approximation of the laws of the Member States relating to electromagnetic compatibility

This declaration applies to all specimens manufactured in accordance with the relevant manufacturing records which form an integral part of this declaration.

The products have been assessed for electromagnetic compatibility in accordance with the relevant harmonised standards.

| Immunity: | EN 61000-6-2 including: |
|-----------|--------------------------------|
| | EN 61000-4-2; EN61000-4-3 + A1 |
| | IEC 61000-4-2 |
| | IEC 61000-4-3 + A1 |
| | |

Emission: EN 55011 (IEC/CISPR 11)

In standby mode, the devices meet the requirements of Class A and are intended for use in an industrial environment. Should radio interference occur during use in residential or business premises, the use should be kept as short as possible or the device should be switched off.

It is declared in accordance with other EU directives that also apply to the product:

EU Directive (RoHS) 2011/65/EU EU Directive (WEEE) 2012/19/EU

Design changes which affect the technical data stated in the operation manual and the intended use, i.e. which significantly change the device, render this declaration of conformity invalid.

This declaration becomes responsible for the manufacturer

ELMED Dr. Ing. Mense GmbH, Heiligenhaus

Issued by

Heiligenhaus, 16.05.2019

Stefan Schneider Managing Director **10. TECHNICAL DATA**

Energy supply

| Power supply | Lithium-ion battery pack in separate housing Easy to change 14.4 V / 3450 mAh protective circuit Temperature sensor gold-plated spring contacts |
|------------------------------------|---|
| Power consumption (load-dependent) | approx. 0.12 A (max. 1.0 A) |
| Test duration | 4 h - 25 h |

Test voltage

| Test voltage level | 1.0 – 35.0 kV, adjustable in steps of 0.05 kV (up to 10 kV) 0.1 kV (from 10 kV) |
|----------------------------|--|
| Voltage waveform | unipolar high voltage pulses |
| Period duration | approx. 25 µs (depending on the load) |
| Pulse repetition frequency | 25 Hz – 100 Hz (depending on the test voltage) |

Dimensions and weights

| V | |
|----------------------------------|---------|
| Length | 280 mm |
| Height | 170 mm |
| Width | 120 mm |
| Length of the high voltage cable | 1.5 m |
| Weight incl. handle | 2.72 kg |
| Weight of the battery pack | 0.32 kg |

Protection class and permissible ambient temperature

| Protection class housing & handle | according to IP 52 |
|-----------------------------------|----------------------------------|
| Permissible ambient temperature | 0 °C to +50 °C |
| | (heating time constant > 10 K/h) |

11. BATTERY

11.1 Battery pack for power supply

- Lithium-ion battery pack, easily exchangeable
- 14.4 V / 3450 mAh
- incl. protective circuit and NTC
- Contact to the device via gold-plated spring contacts

To protect the lithium-ion battery pack against short circuits, the electrical connections (gold-plated contact domes) are recessed.

Short circuits during transport and storage must be prevented.



Accessory part "protective cap for spare battery pack" to avoid short circuits during transport is available separately!



Care should be taken when storing the battery pack in conjunction with other accessories such as brush electrodes!

Battery capacity indicator

The current charge status of the battery used in the test device is permanently indi-cated on the display by the battery symbol **D**. After switching on the test device, a self-test is carried out to check the charge status.

11.2 Battery charger

A special charger is available for recharging the device batteries. The charger is designed exclusively for charging the ELMED lithium-ion battery pack. It has a mains voltage input with automatic wide range (110 - 240 V~) and a special charging plug with gold-plated spring contacts.

For details of the functions and technical data, refer to the charger's manual.

Connecting the battery to the charger

- 1. Remove the battery pack from the control unit at the bottom of the housing. To do this, press the clips of the battery pack together with two fingers.
- 2. Connect the charger to the battery pack with the charging plug (reverse polarity protection on the plug).
- 3. After testing or charging, the battery shall be put back into the test device.