Product training DSP-HW 2

Who can train?

Qualified electrician

Who can be trained?

Any electrotechnical layperson who is trusted to work responsibly with the test device. (**Note:** country-specific requirements may differ!)

What is needed for the training?

- Beamer / TV for the presentation
- Operating instructions DSP-HW 2 for each participant (PDF-Download)
- DSP-HW 2 for demonstration
- Tietzsch Demo Set or the like for practical training

Duration of the training approx. 40 minutes.

Briefing
Tietzsch DSP-HW2

SCHNEIDER MESSTECHNIK

Briefing voltage warning device DSP-HW 2

Content

- Hazards of Electric Current
- Protective measures
- Dangers at the place of use
- Field of application of the voltage warning device DSP-HW2
- Operation
- Practical exercise

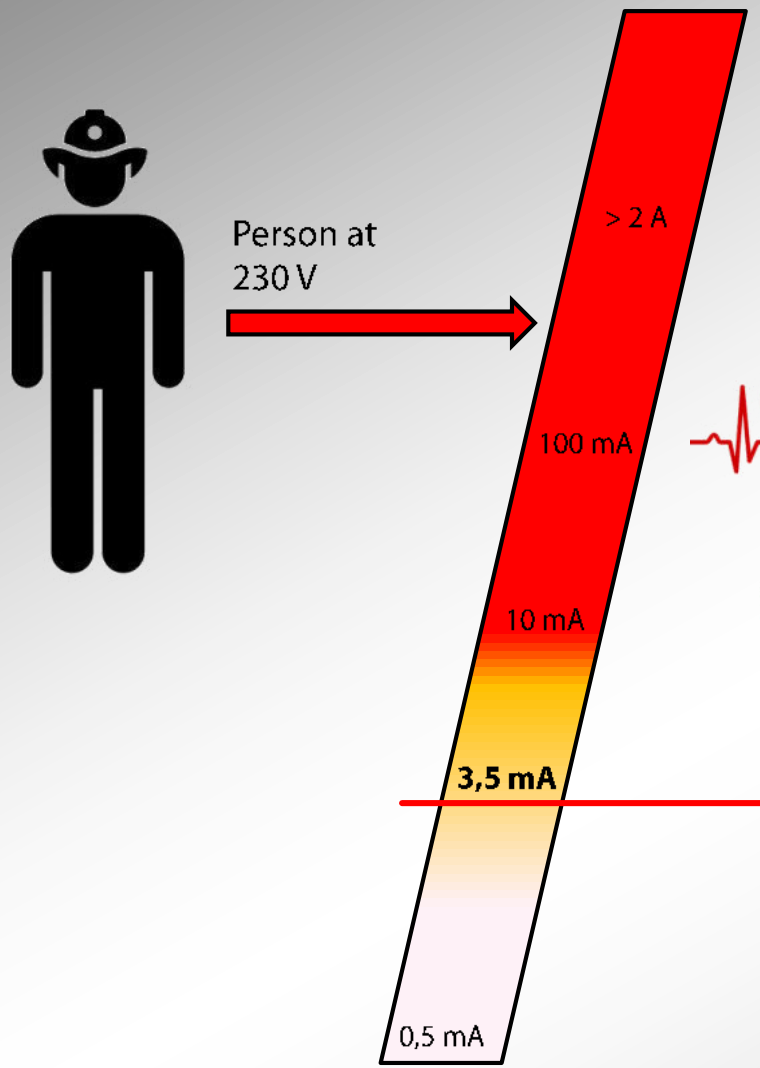
Hazards of Electric Current

Invisible danger!
Electric current is not visible or audible

Accidents at work with electricity have a 15 times higher risk of fatal outcome

Milliseconds are enough to cause serious injuries

Hazards of Electric Current



Internal combustion / cell destruction

Ventricular fibrillation / cardiac arrest

Letting go limit / cramping

Deadly Hazard Limit

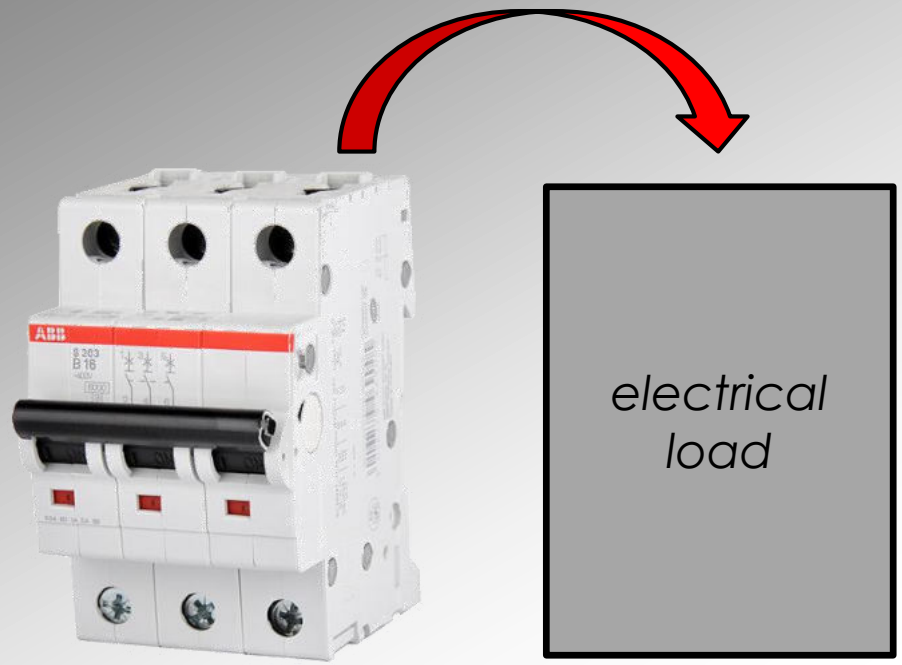
Stimulus threshold / perception

Hazards of Electric Current

Electric current = deadly danger!

Even apparently harmless perfusion can lead to ventricular fibrillation even after hours.
Every electrical accident must be examined by a doctor!

Protective measures



pic ABB

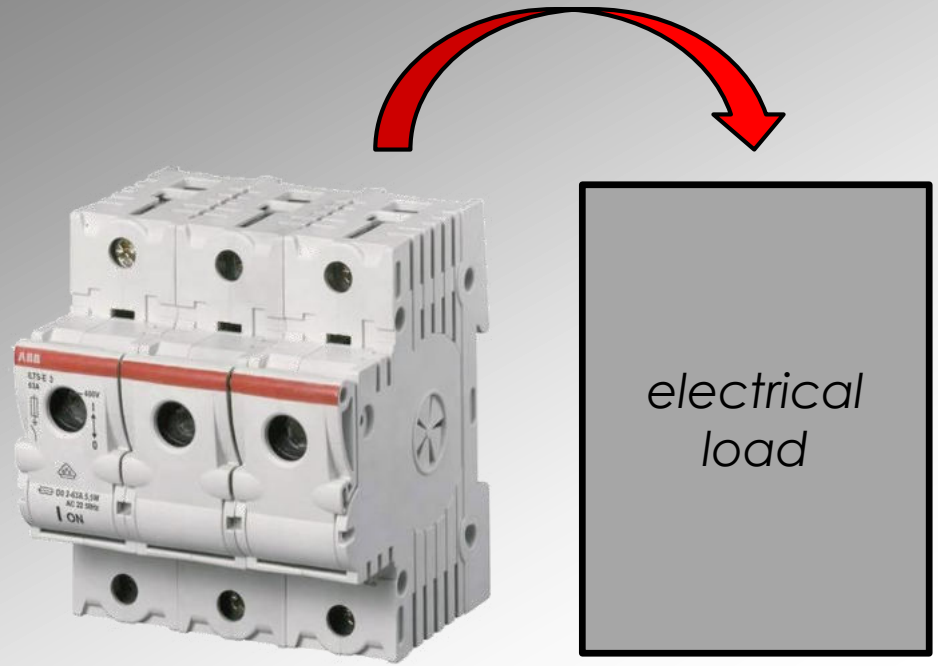
Circuit breaker

Protects against excessive currents (> 16 A)

Flows to large current, the circuit breaker will switch the power off.

The protective effect is **not** personal protection!
It only serves to protect the electrical system.

Protective measures



pic ABB

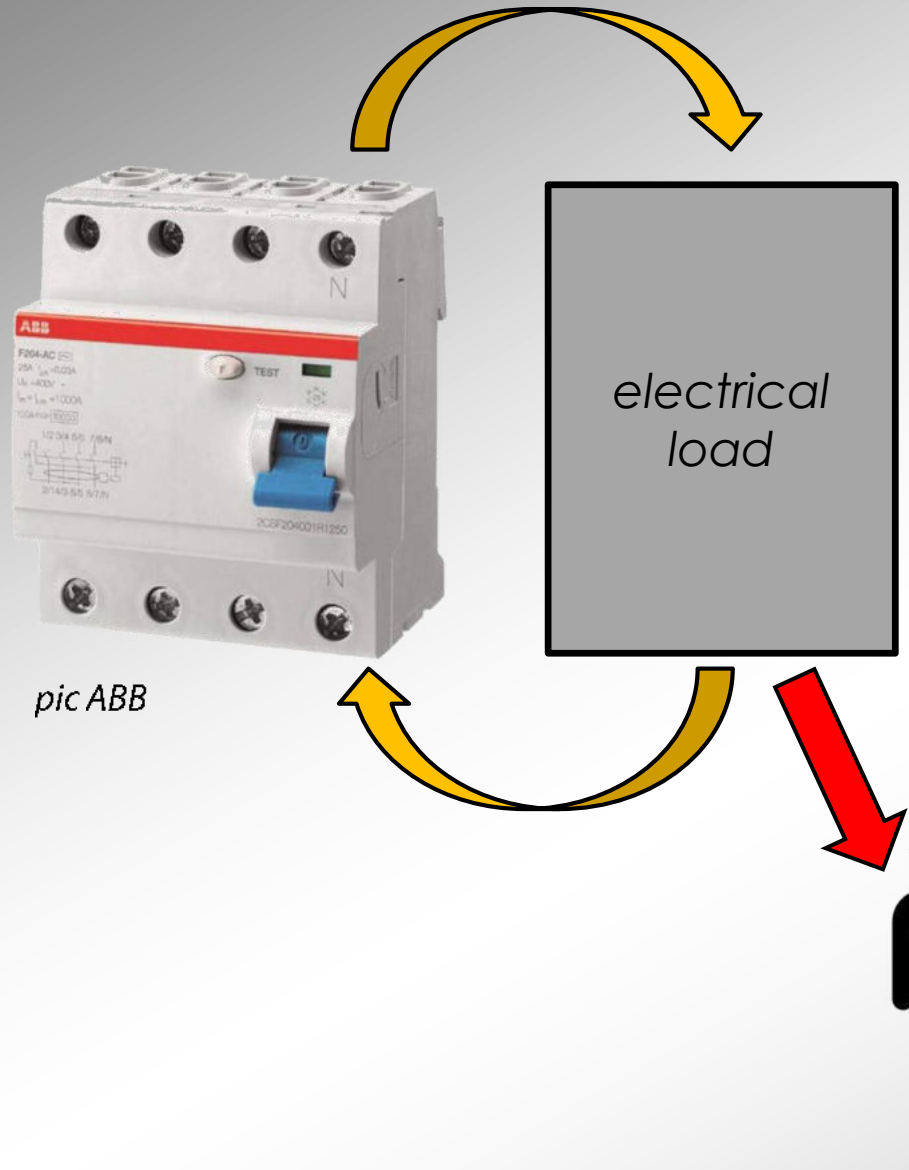
Switch disconnector with fuse

Protects against excessive currents (> 16 A)

Flows to large current, the fuse will switch the power off.

The protective effect is **not** personal protection!
It only serves to protect the electrical system.

Protective measures



pic ABB

Fi circuit breaker / RCD circuit breaker also called personal protection switch

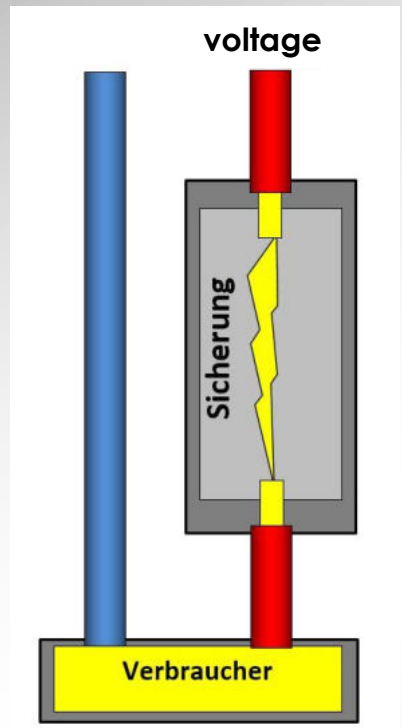
Protects against residual currents (> 30 mA)

If a "wrong" current flows off, the circuit breaker switches off the voltage.

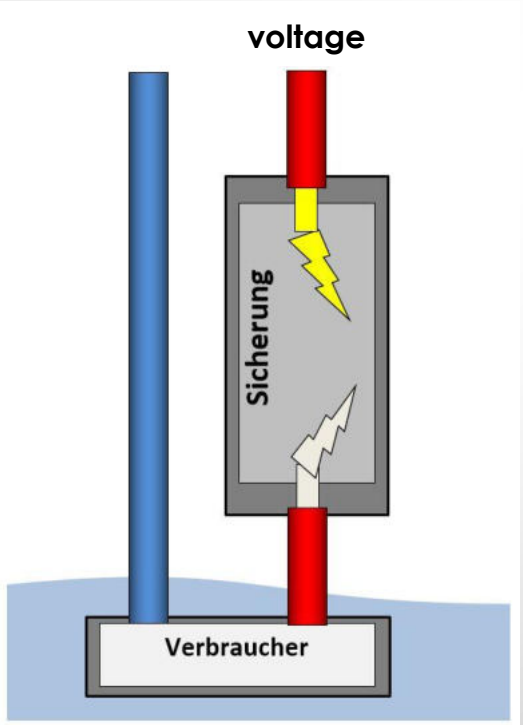
Protective measures

ATTANTION!

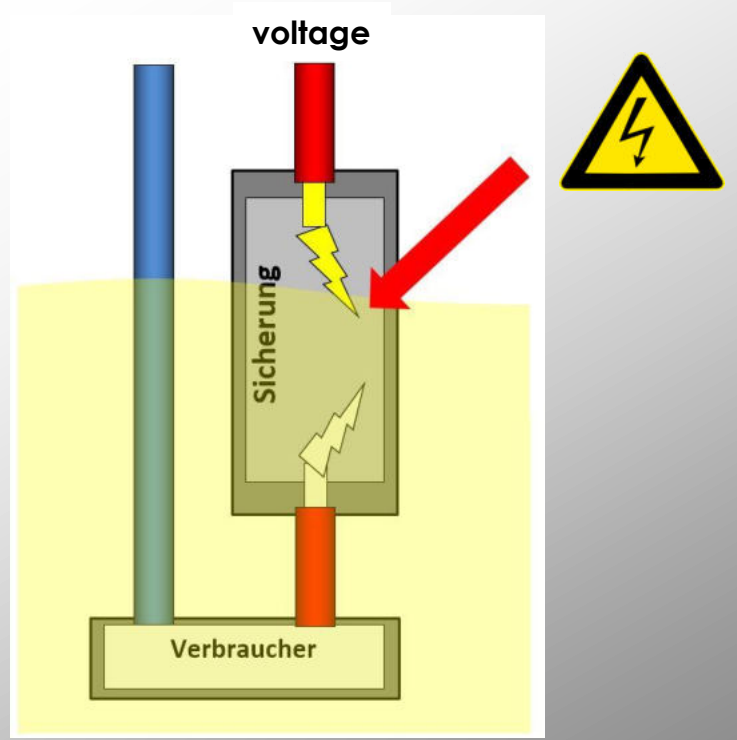
In the case of flooded electrical systems, **all** protective measures can be ineffective and bypassed!



Normal operation



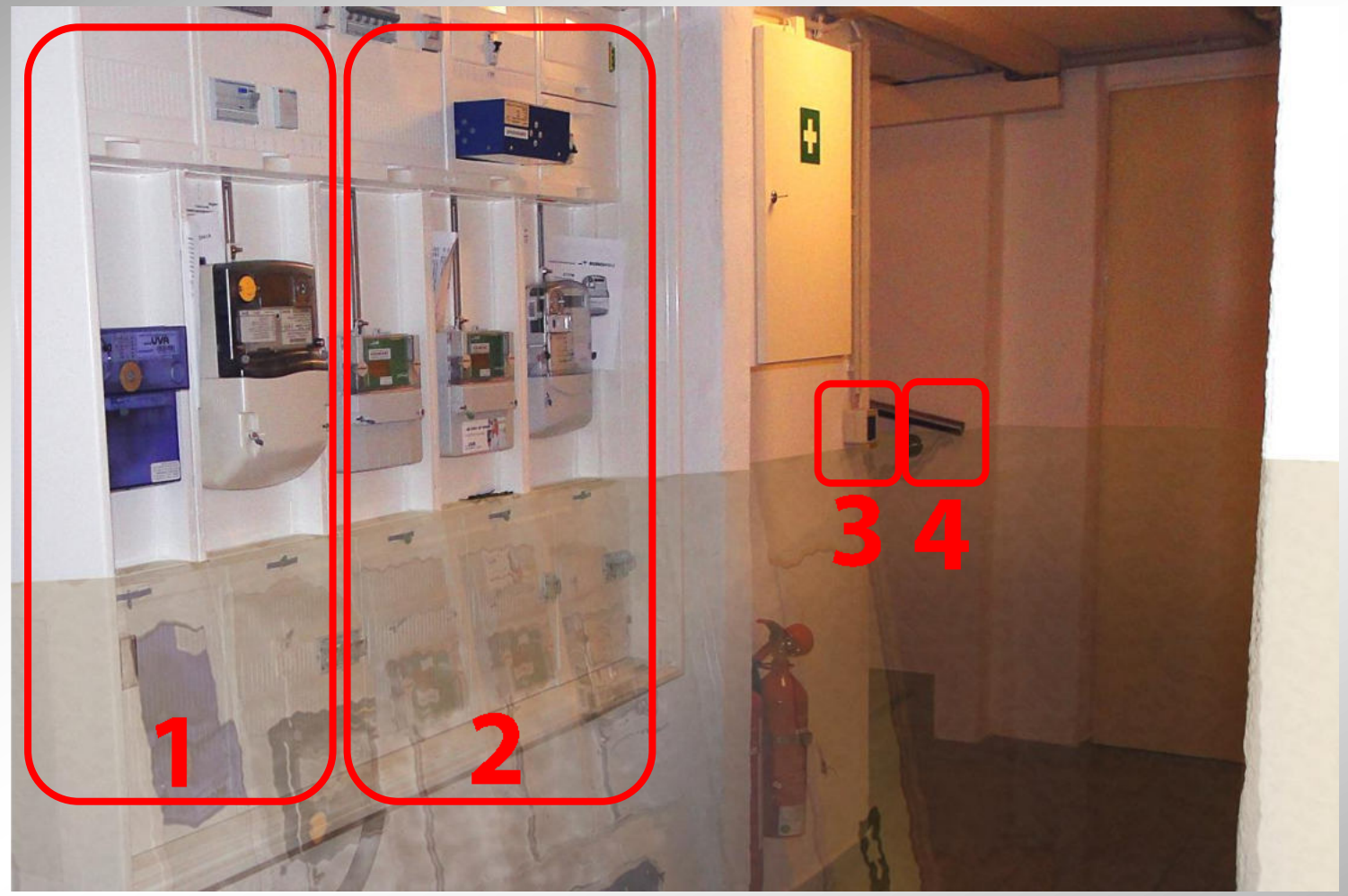
Consumer in the water, fuse may trip.



Fuse in the water is bridged, the water is under voltage

Dangers at the place of use

Example of different sources of danger



1: House feed

2: Solar feed

3: Light switch

4: Banister in the water

Dangers at the place of use

Conductive objects that protrude into the water:

- Banisters

- Support or carrier

Dangers at the place of use

Flooded electrical installation and devices such as:

- Sockets
- Light switch
- Extension and multiple sockets
- Washing machines / dryers
- Freezers

Dangers at the place of use

Flooded feeds:

- House connection box (1)
- PV / solar systems(2)
- Storage batteries (3)

1

2

3

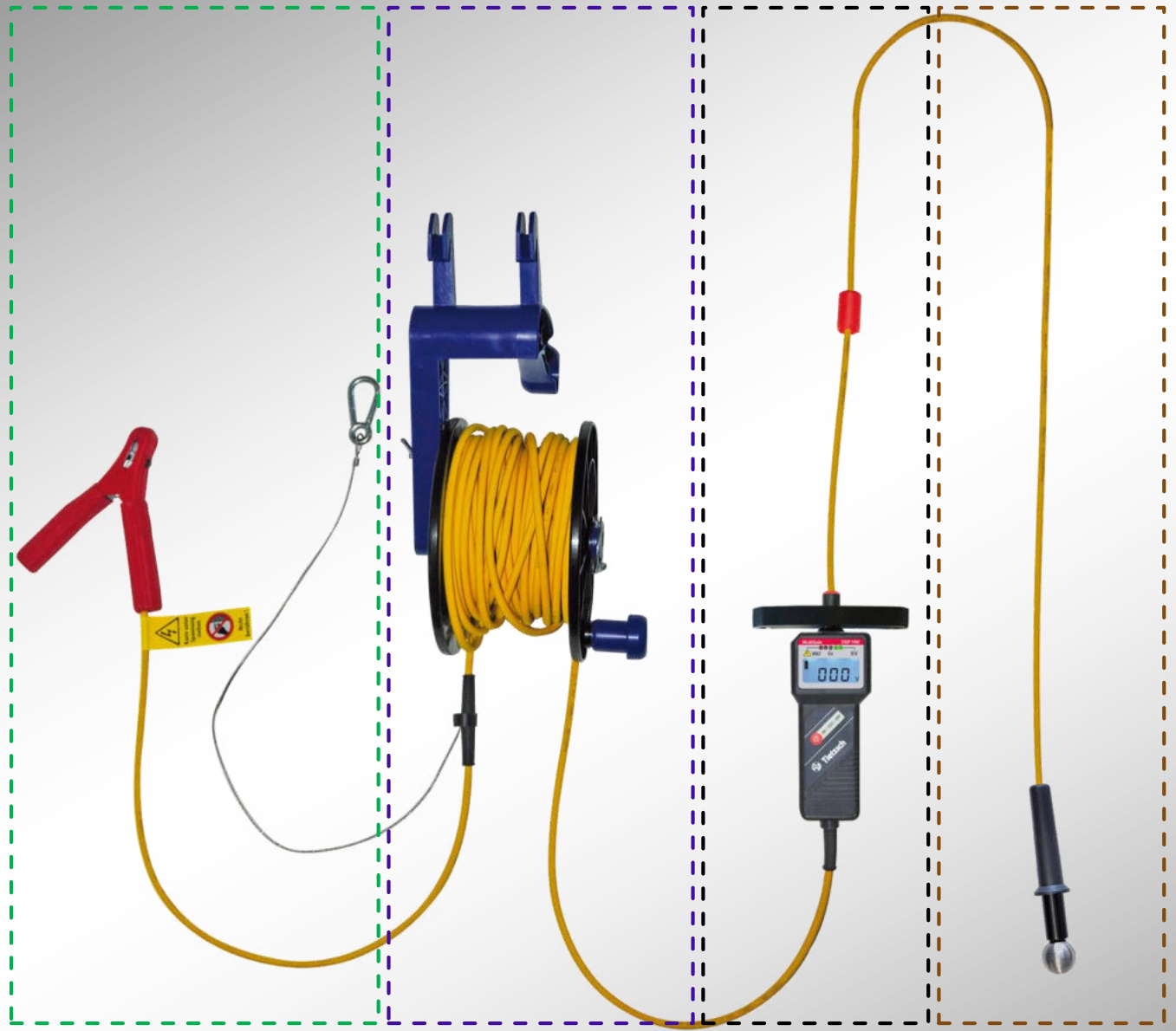
Dangers at the place of use

The "source of error" can be several meters away from the workplace and still spread deadly voltage in the water!

The "source of error" can be outside the user's field of vision!

Dangerous voltage can be passed on through banisters and the like!

DSP-HW 2



ground connection

cable reel with 30m cable

display unit

handgrip with ball electrode

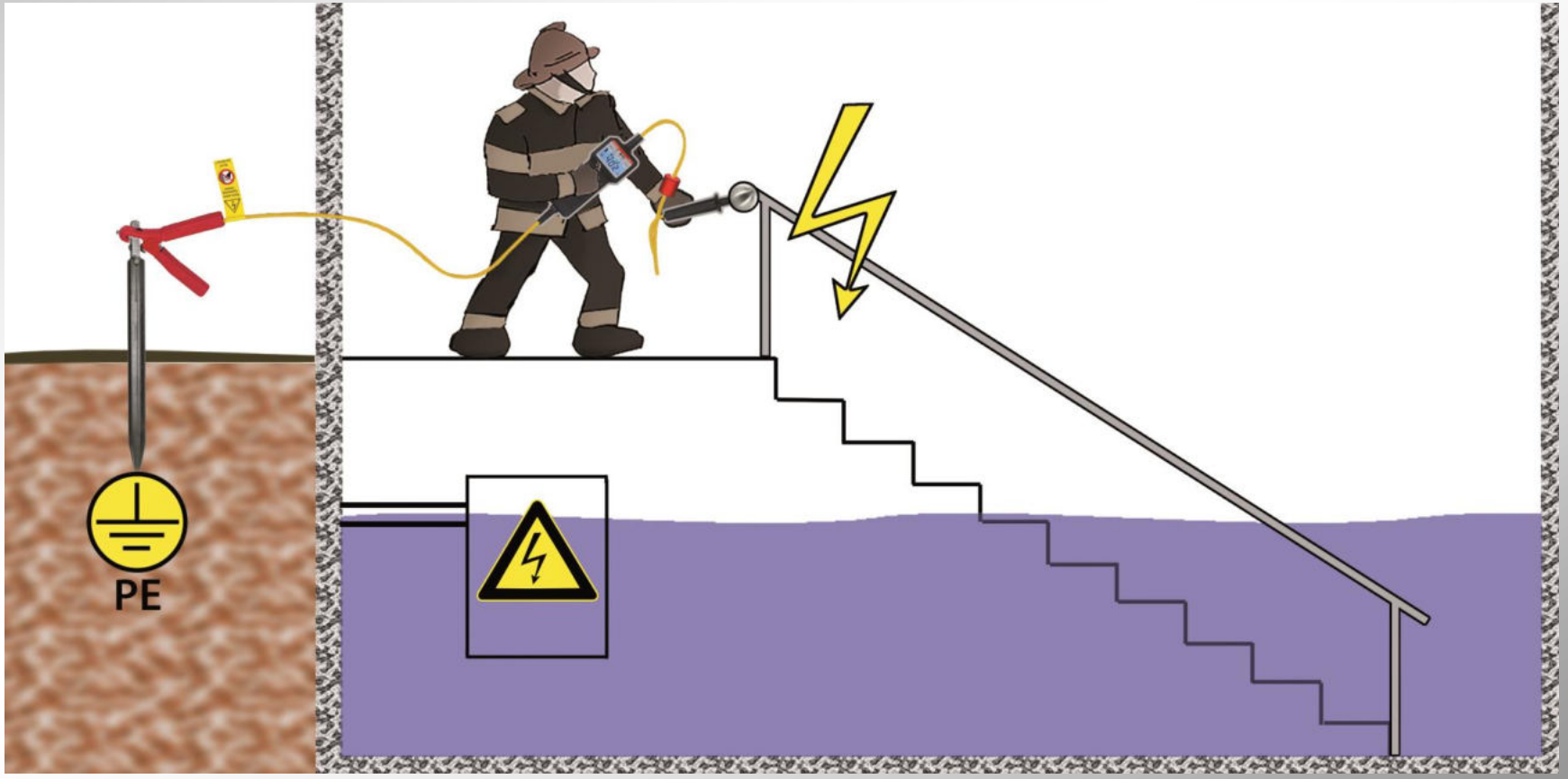
Field of application of the DSP-HW2

The DSP-HW 2 is a voltage warning device for voltages from 12 V AC / DC up to 1000 V AC / 1500 V DC.

It is specially designed for testing voltage in water or similar conductive liquids.
In addition, objects protruding into the water can be checked for voltage with the DSP-HW 2.

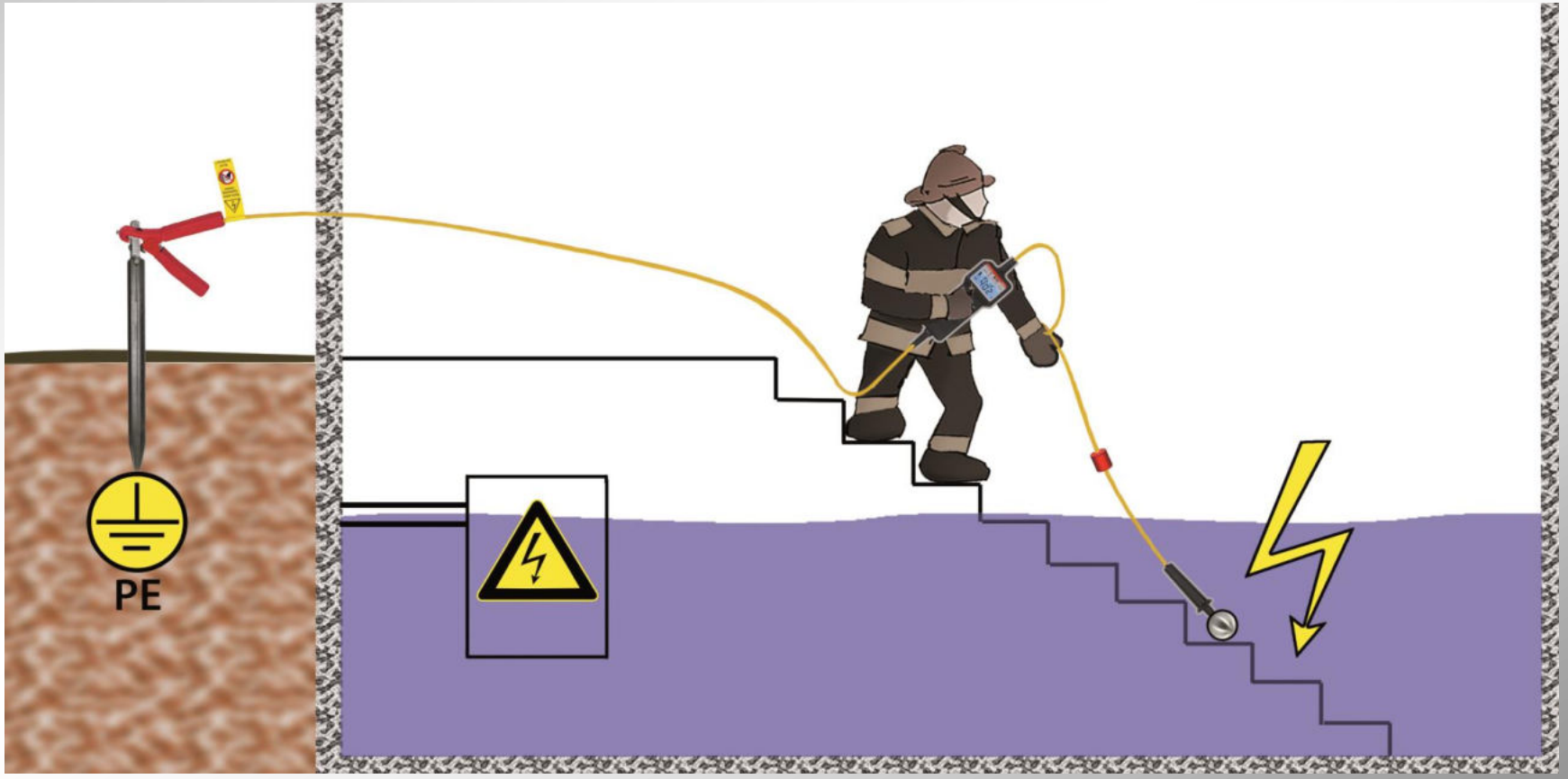
Field of application of the DSP-HW2

- Testing of metallic banisters or other conductive objects



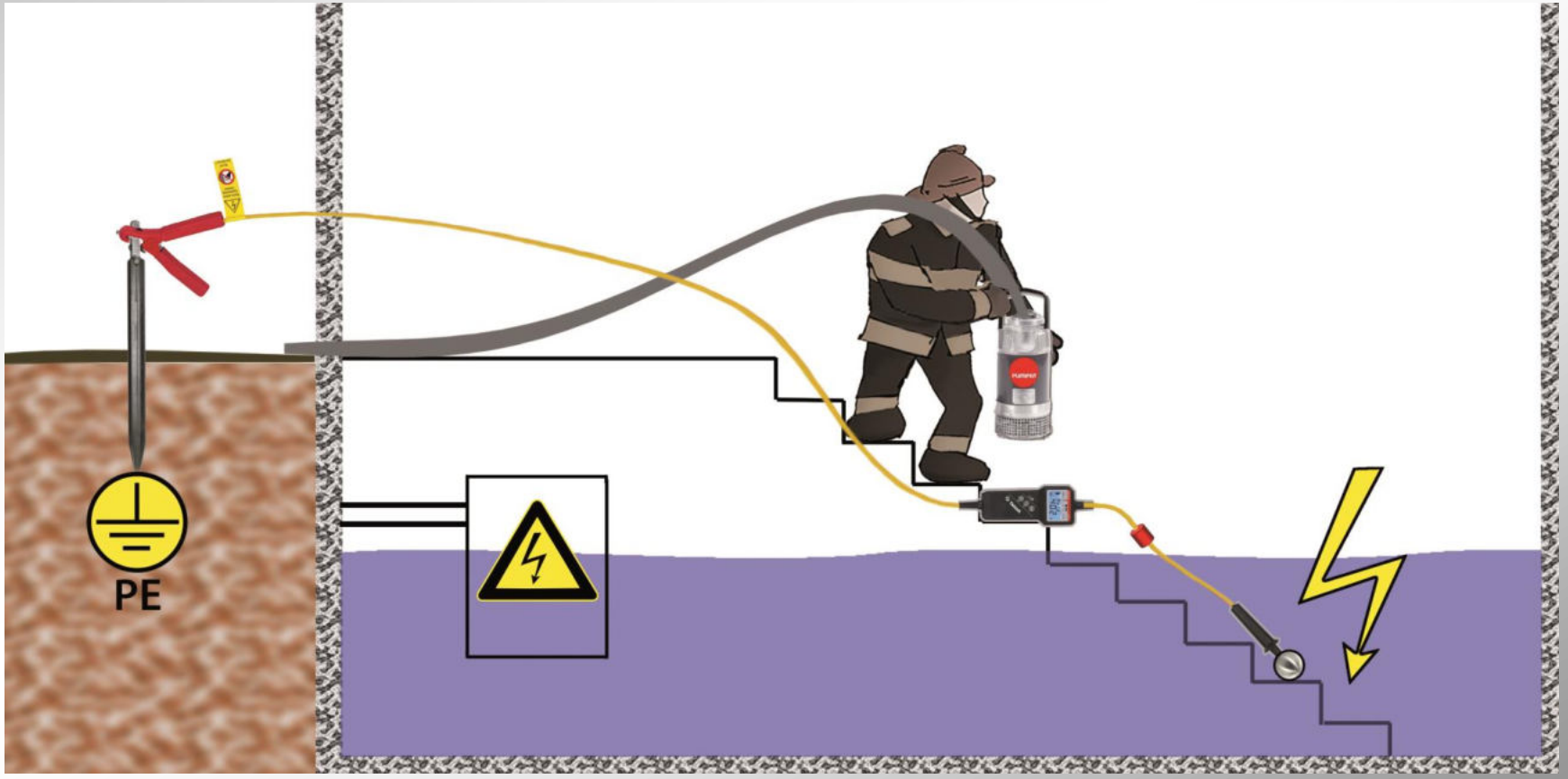
Field of application of the DSP-HW2

- Testing of flooded areas



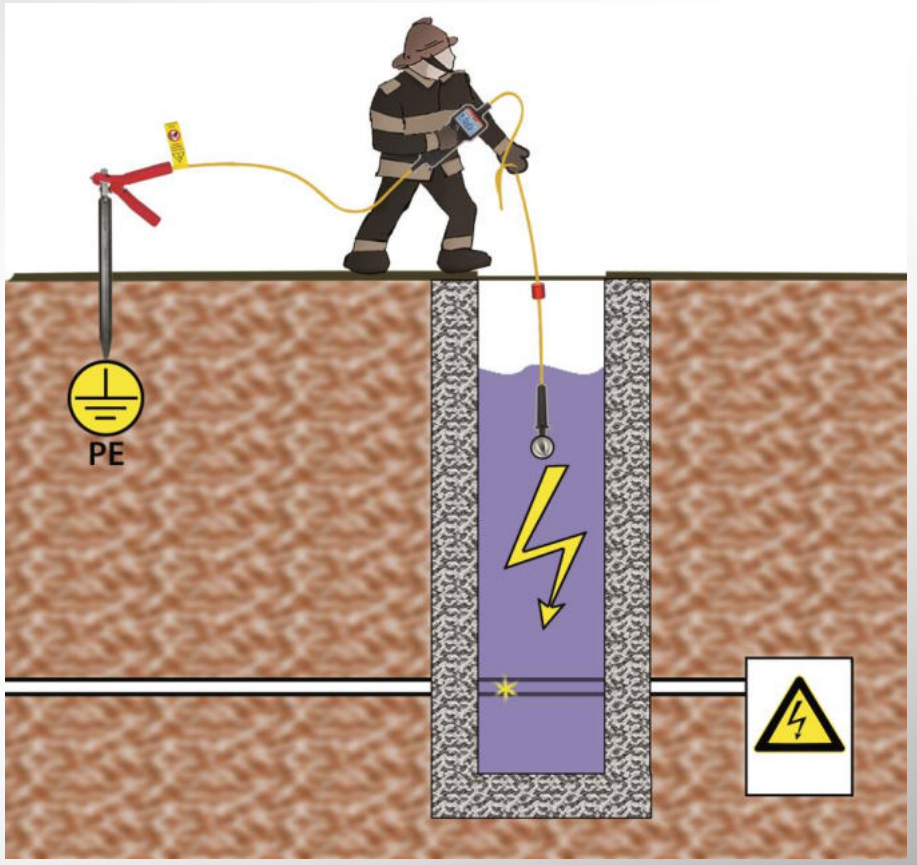
Field of application of the DSP-HW2

- Check while installing / removing pumps



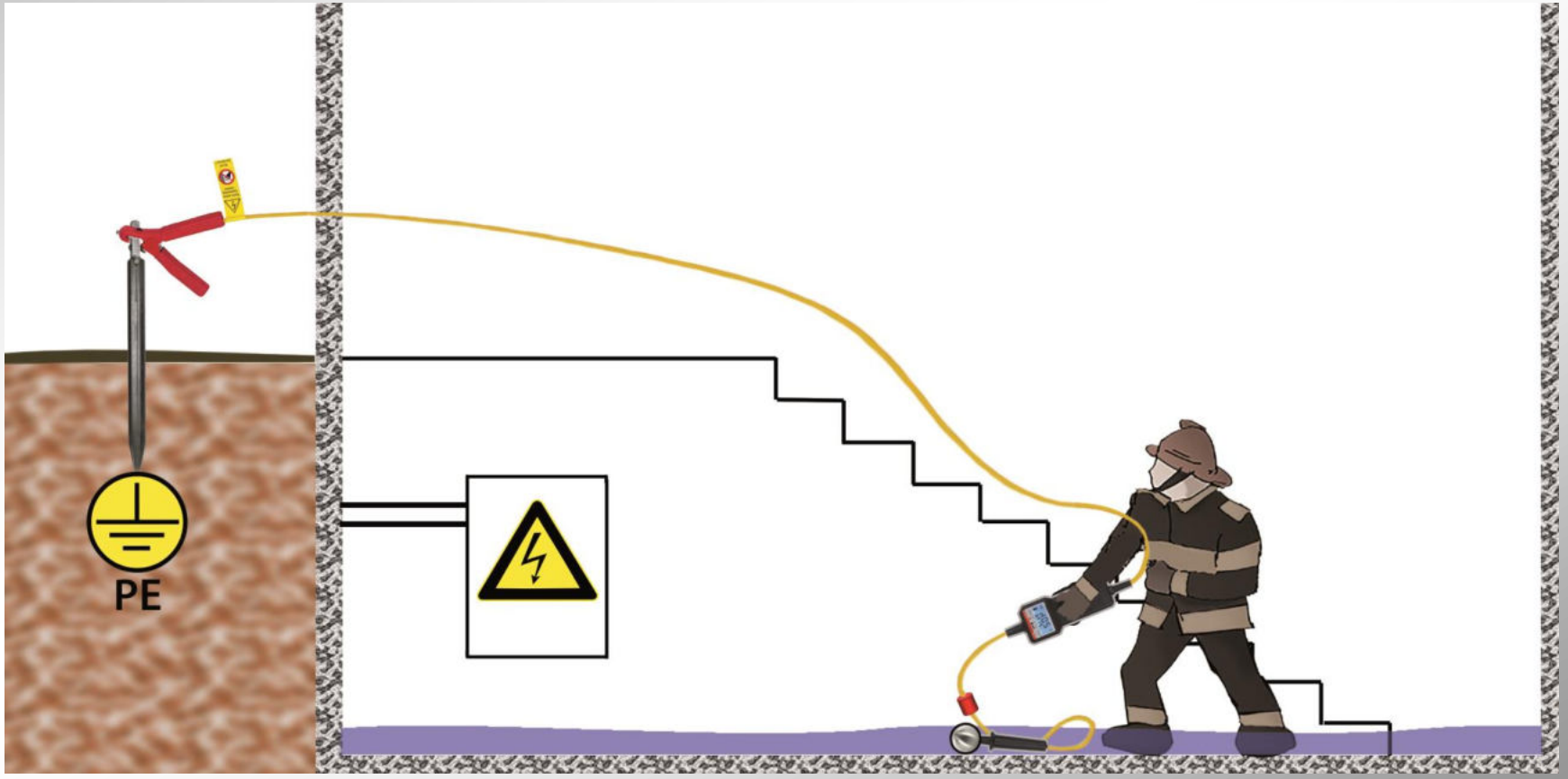
Field of application of the DSP-HW2

- Checking flooded maintenance shafts



Field of application of the DSP-HW2

- Test after the water level has dropped to a few centimeter



Operation

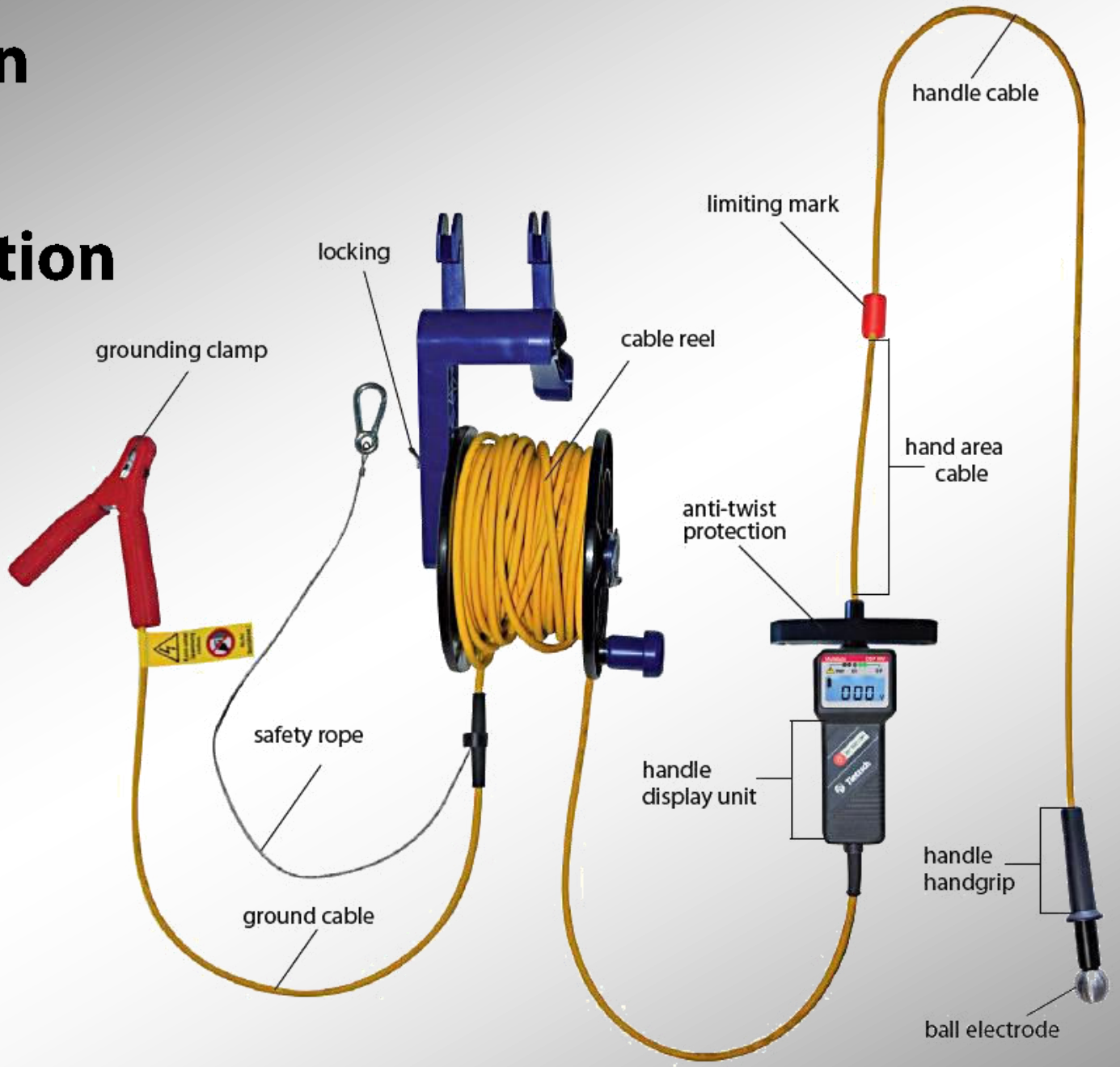
Authorized users

The following must be fulfilled:

- Manufacturer training by a qualified electrician
- Authorization by manager
- Written documentation

Operation

Construction



Operation

Safety precautions

Do not touch water or parts protruding into the water (e.g. railings)! These parts can be live! Do not touch the water even after it has been determined to be de-energized! Dangers can arise at any time due to changing water levels

Do not enter flooded areas, even after it has been determined that there is no voltage! The water can suddenly become live due to changing water levels.

Operation

Safety precautions

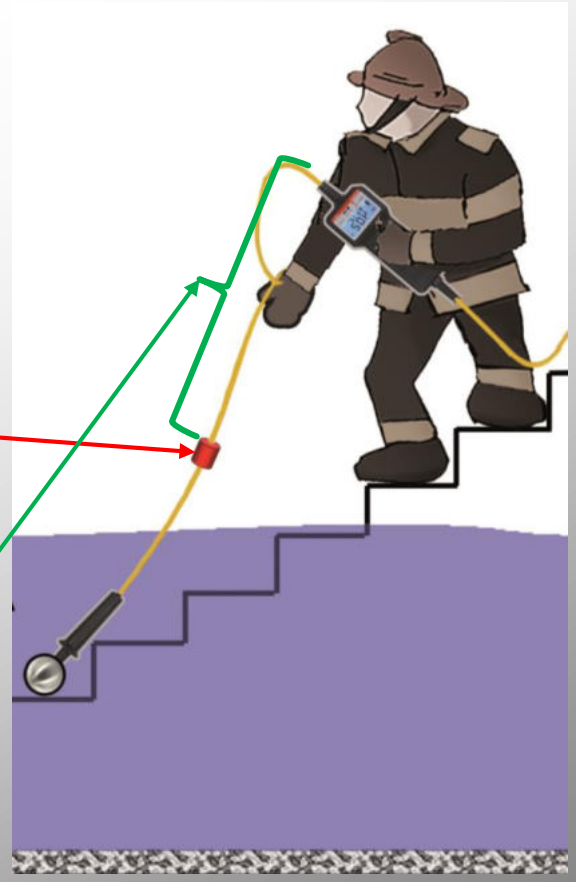
Only hold the display part by **the handle** so as not to obscure the display…

Operation

Safety precautions

…When testing with the grip line and ball electrode, the grip line may only be brought into the water up to the **red limit mark**.

The handle line may only be touched in the **hand area** between the red limit mark and the display part.



Operation

Safety precautions

The grounding clamp for the earth connection can be live during the test!
The risk of electric shock is prevented by the protective elements in the device.

Operation

Safety precautions

Voltage testers must be dry and clean.
Only the handle with the ball electrode and the handle line up to the red limit mark may be led into the water.
The display unit is waterproof. If this falls into the water, it must be brought back on the still dry grounding line and the display part must then be dried off.
The water must not be touched!

The battery compartment must be closed before use.
Unauthorized persons are not allowed to disassemble the display part, with the exception of the battery compartment.

Operation

Safety precautions

Before testing the absence of voltage, the cable must be connected to an earth electrode and secured against inadvertent disconnection…

Operation

Safety precautions

... Incorrect earthing on unearthed masts, downpipes, banisters, etc. can prevent the display of absence of voltage (green) and dangerous voltage (red).
It is essential to check the earth with the self-test.

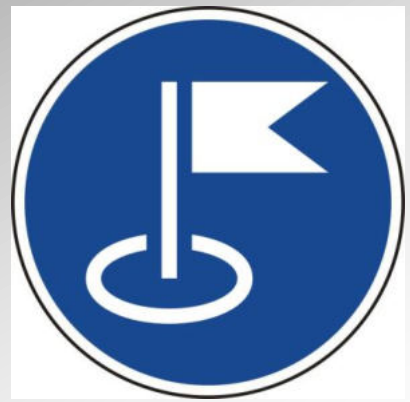
Operation

Safety precautions

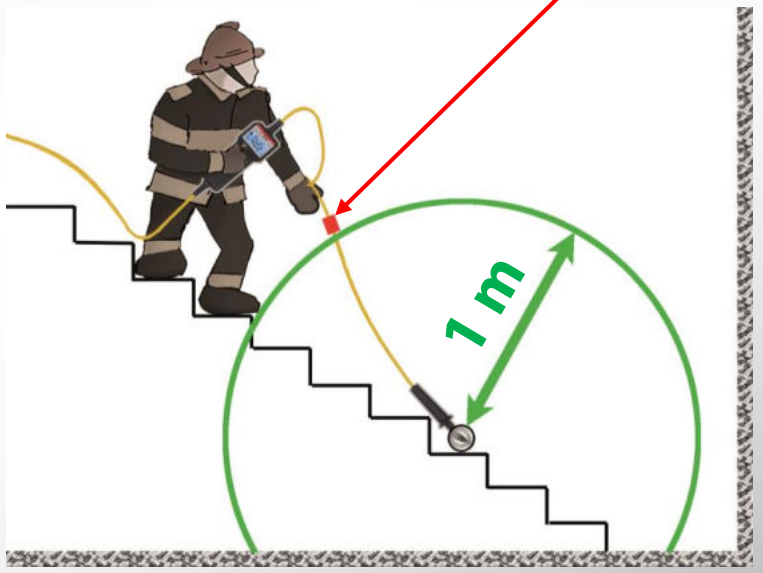
The voltage specifications on the DSP-HW 2 are nominal values. The voltage warning device may only be used in systems up to a maximum of 1000 V AC / 1500 V DC.
The permitted temperature range for use is - 15 ° C to + 55 ° C.
The permissible duty cycle is 2 minutes at 1000 V AC / 1500 V DC.
When no voltage is detected the DSP-HW 2 switches itself off after approx. 20 minutes.

Operation

Safety precautions

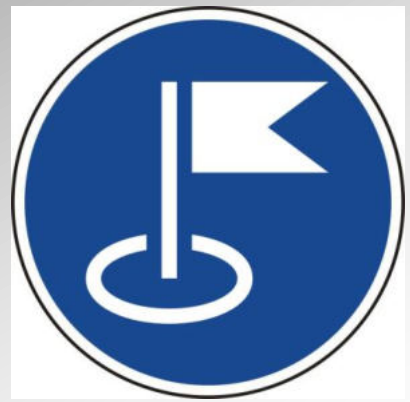


The test of the voltage in the water is only carried out locally.
The test radius around the ball electrode is **1 m** and is indicated by the **red limit mark** on the test lead.



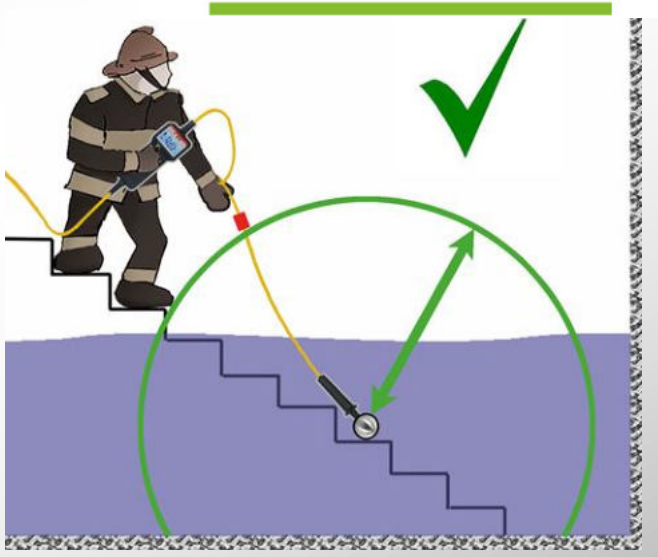
Operation

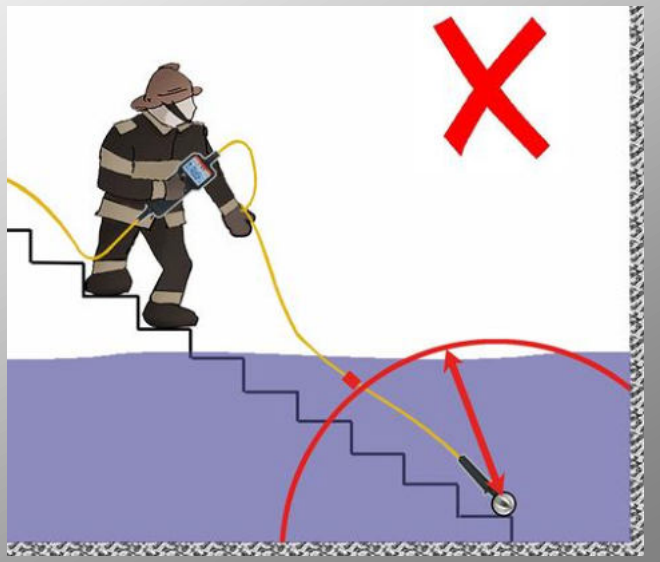
Safety precautions



The voltage is checked **1m** around the ball electrode.
Any further work may only be carried out at this measuring point.

If the ball electrode is too far away, the area around the emergency worker is not checked! It must always be checked near the place of use!





Operation

Safety precautions

Only authorized persons are allowed to work with this product.

No special protective equipment for work is prescribed by the manufacturer.

The tester has to be stored in a clean and dry environment.

Before use… check for damage.

Operation

Inform energy supplier / electricity network operator

Before work on a flooded area, the responsible energy supplier / electricity network operator must be informed and the flooded area must be switched off / deactivated.

Attantion! This allows the electrical hazard in flooded area nevertheless not be ruled out! Solar systems, energy storage systems or improper connections (e.g. extension cable from the neighbor) can still conduct voltage into the water.

Before using a submersible pump or the like, it is therefore essential to check with the voltage warning device. The flooded area must not be entered!

Operation

Unwind the grounding line

losen the lock

unwind twice

middle is marked

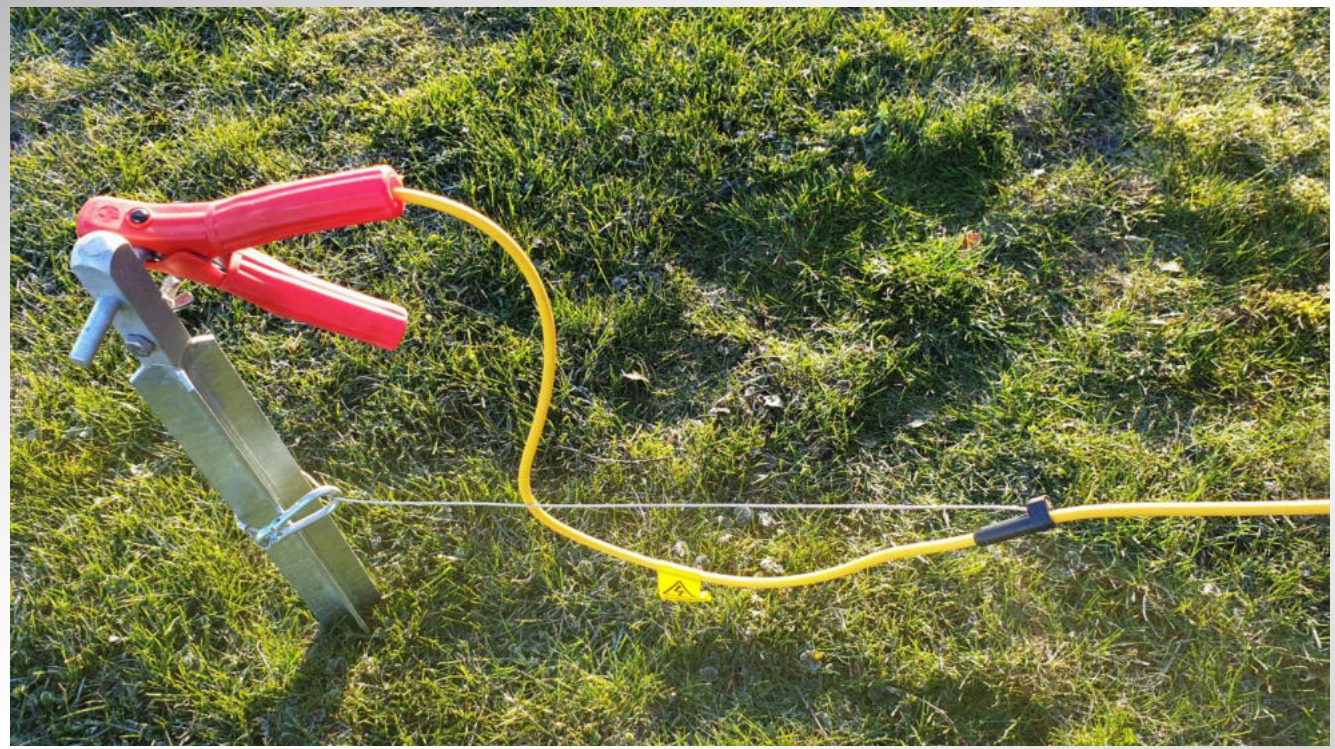
Operation

Establish ground connection

- heating pipes made of copper
- equipotential bonding bars
- lightning rod
- protective conductor
- earthing stakes driven into the moist soil
- lampposts (unpainted)

Bedienung

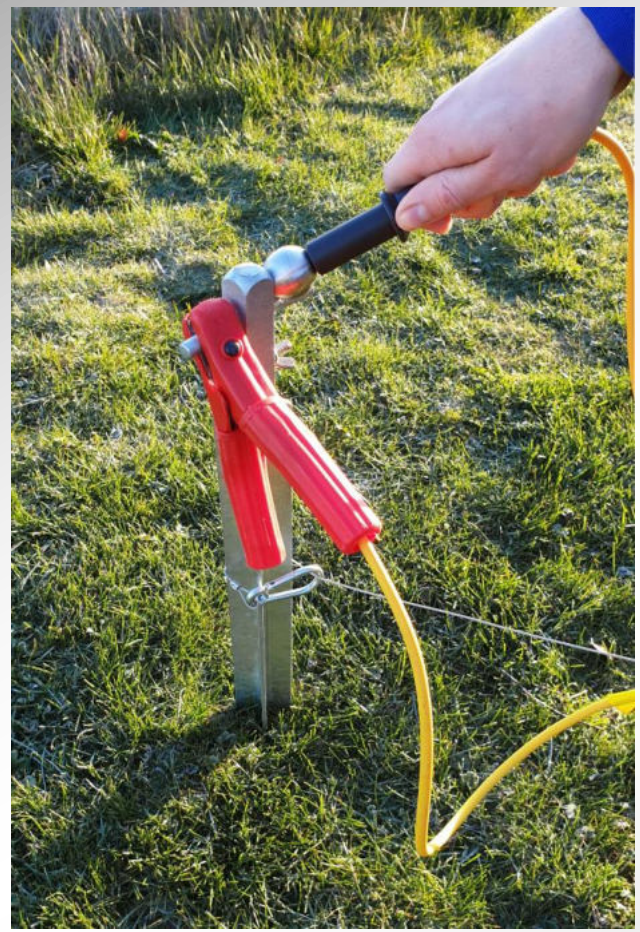
Secure earthing



To secure the clamp against inadvertent removal, the safety rope must be attached to an earthing spike, carrier or mast.

Operation

Self-test



press and hold button ⏻

all LEDs lights up
all LCD-segments light up

release button ⏻, ready for self-test

contact ball electrode to ground potential

test ok

ready for voltage testing

Operation

Display

LEDs off

Standby

green LEDs flash

No voltage present, water has ground potential.

red LEDs lights up

Voltage present!

(> 25 V AC / 40 V DC)

Operation

green LEDs flash

nevertheless

Even after detected no voltage:

Do not touch water!

Dangers can **suddenly** arise from rising water levels or waves!

Operation

Check banisters(or similar conductive objects)

Only grasp the handle of the handgrip and the handle of the display unit!

Use the ball electrode to touch the banisters.

Operation

Check banisters

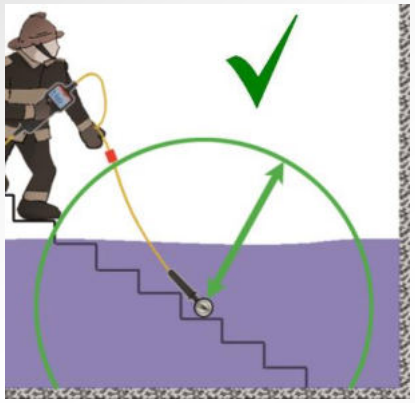
No voltage detected
Do not touch the banisters!
The banister may not protrude into the water or it may not be conductive.

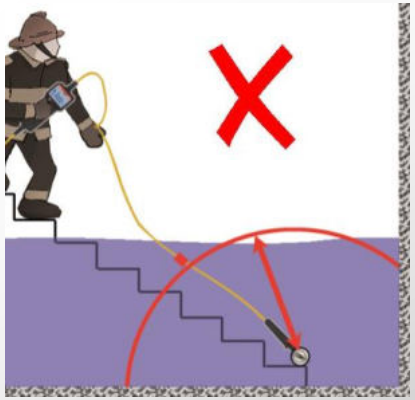
No voltage (ground potential)
Do not touch the banisters!
Approach the water and carry out further tests in the water.

Danger! Voltage!
Do not touch the banisters!
Leave the danger area immediately!
Do not use a pump!
Immediately stop all work in the danger area.

Operation

Test water (or similar conductive fluids)





Wasser nicht berühren!

Handgriff mit Kugelelektrode ins Wasser lassen

1m Prüfradius und rote Grenzmarke beachten

Operation

Test the water

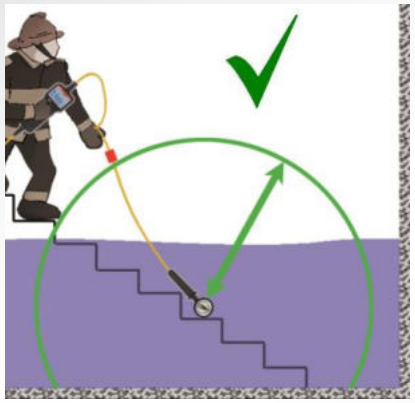
Betriebsbereitschaft prüfen!
Do not touch the water!
Check the ground connection!

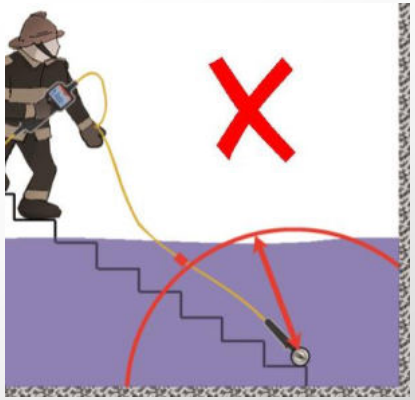
No voltage (ground potential)
Start work **at this point**, taking care **not to step into the water**.

Danger! Voltage!
Do not touch the water!
Leave the danger area immediately!
Do not use a pump!
Immediately stop all work in the danger area.

Operation

Test water and setup pump





Do not touch the water!

Lower the handle with the ball electrode into the water and place diplay unit in field of view.

Note 1m test radius and red limiting mark

Operation

Setup pump

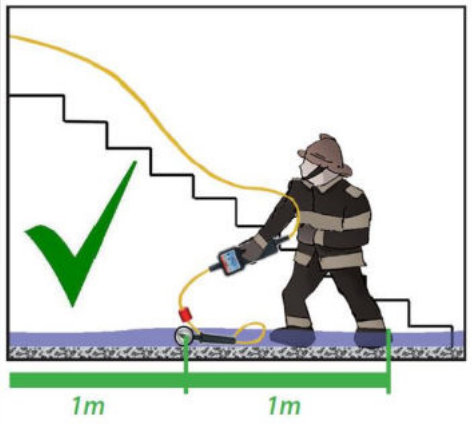
Operational readiness to check!
Do not touch the water!
Check the ground connection!

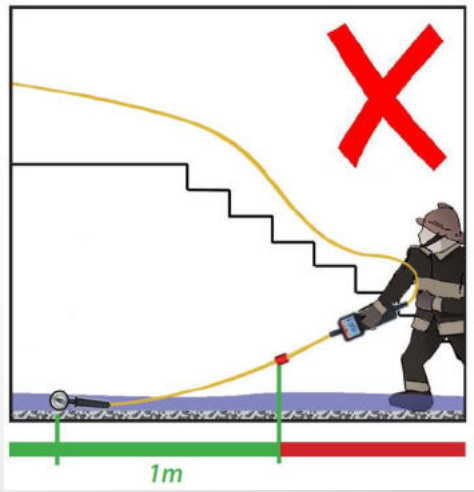
No voltage (ground potential)
Do not enter the water!
Insert the pump at this point while **observing the green LEDs**.

Danger! Voltage!
Do not touch the water!
Leave the danger area immediately!
Do not use a pump!
Immediately stop all work in the danger area.

Operation

Absorption of residual water





Only after the water level has dropped to a **few centimeters** and further pumping is no longer possible may the working method be used.

Put the handle with the ball electrode into the water and observe the test radius!

Operation

Residual water

No voltage detected
Work can be carried out in the area.

No voltage (ground potential)
Work can be carried out in the area.

Danger! Voltage!
Do not touch anything!
- not even other people!
Take small steps to the stairs and jump out of the water with both legs at the same time.

Operation

Summary

Standby

No voltage

Voltage present

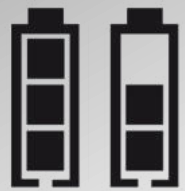
red = Voltage present!
Abort work and leave the danger area immediately!

green = No voltage. Do not touch the water even after it has been determined to be free of voltage!

Generally do not touch any conductive objects!

Operation

Battery indication and battery replacement



indication of battery status

If there is only one bar left, we recommend replacing the battery

battery empty - you still can perform a few tests

The battery compartment is on the back of the display unit.
A 9V block battery (6LR61) is required.

Operation

Maintenance / Storage

Always keep the DSP-HW 2 in a dry, clean condition. We recommend a bag for safe storage.

Check at least **once a year:**

- Battery condition
- Functionality with integrated self-test

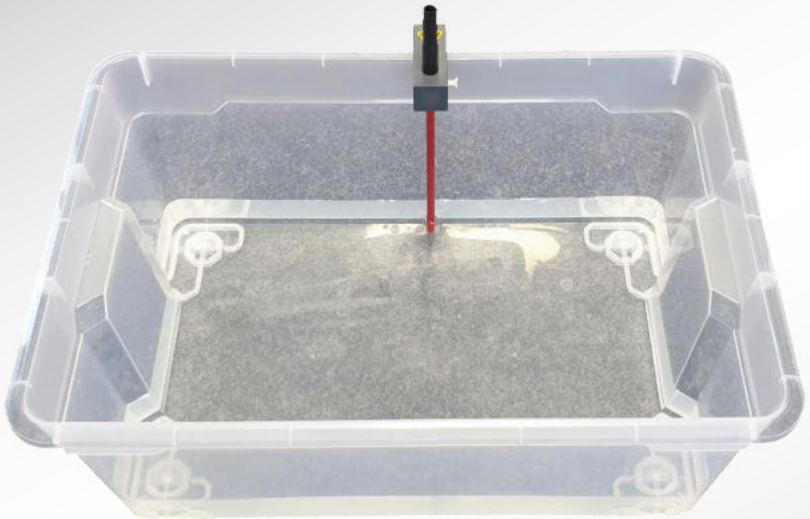
Practical exercise

Tietzsch Demo-Set

We recommend our demo set for practical exercises.
This is equipped with a connection plug with an RCD protective plug (FI protection) for a more secure connection.
Different scenarios can be simulated with the demo set.

Practical exercise

Tietzsch Demo-Set



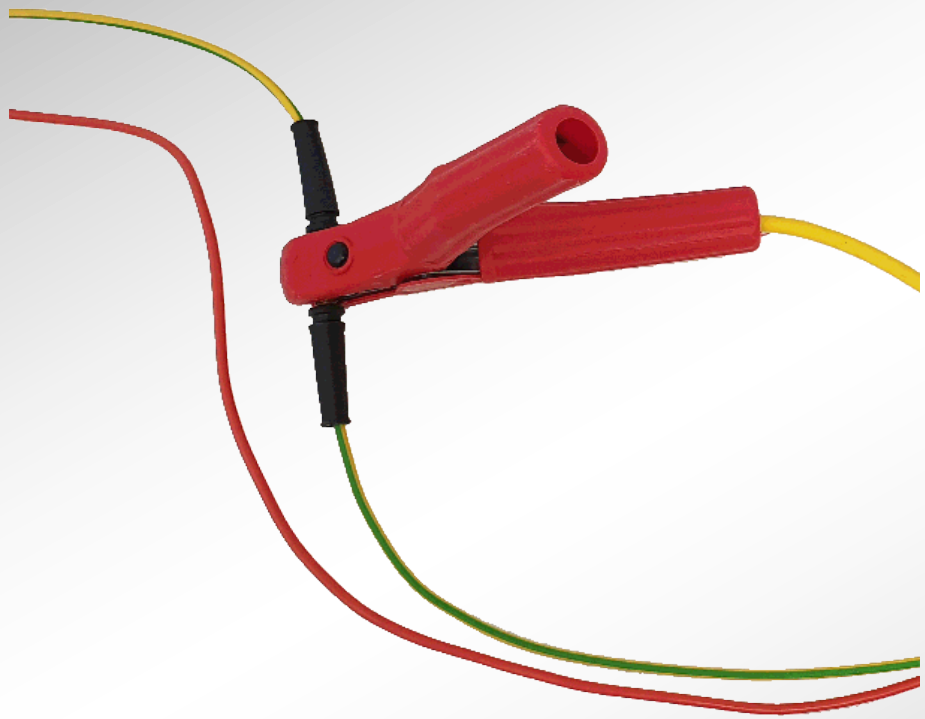
Fill the demo box approx. 5 cm high with tap water.

Hang the electrode on the edge.

Plug the RCD connection cable into the socket.

Practical exercise

Tietzsch Demo-Set



Connect the ground clamp to ground potential. For this purpose, the earth clamp can be clamped to the brass insert of the PE line. Alternatively, the grounding can also be done e.g. on copper pipes or with a grounding spike, etc.

Practical exercise

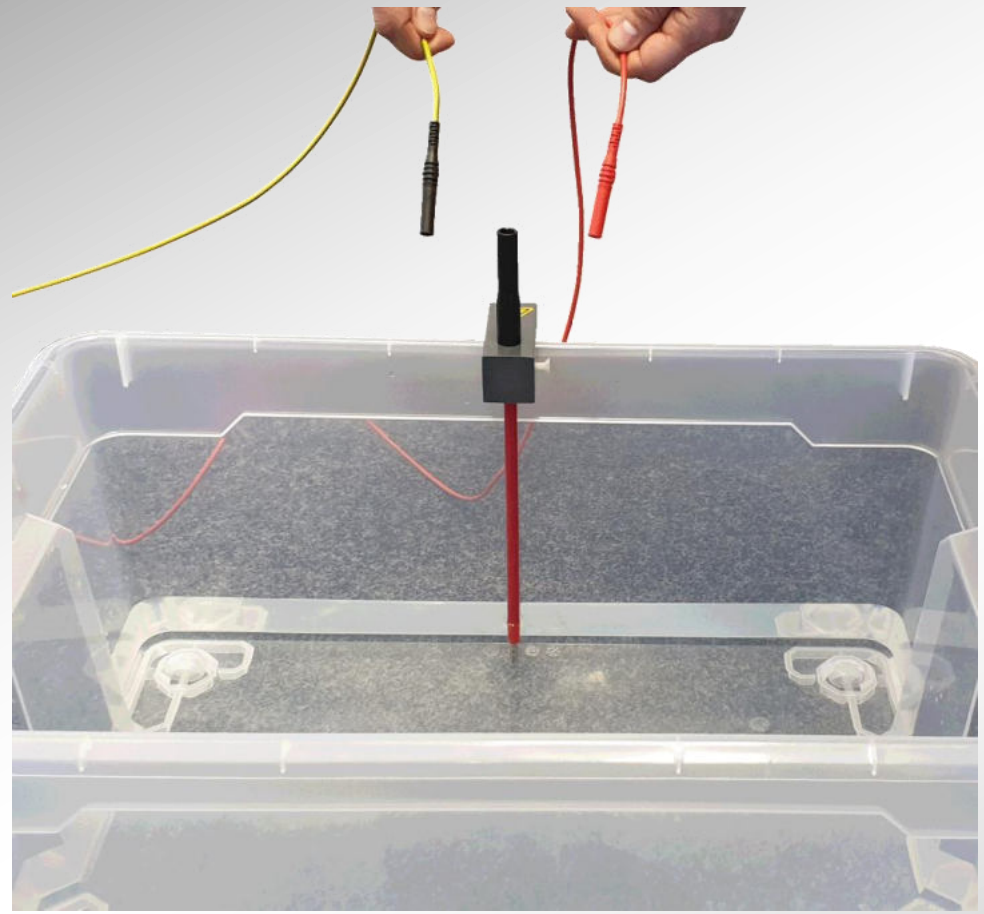
Tietzsch Demo-Set

Perform self-test

Contact the ball electrode to earth potential, e.g. spring contact of a socket (type F).
Alternatively: copper pipes, foundation earth electrodes, earthing spike

Practical exercise

Tietzsch Demo-Set



The following deployment scenarios can be simulated:

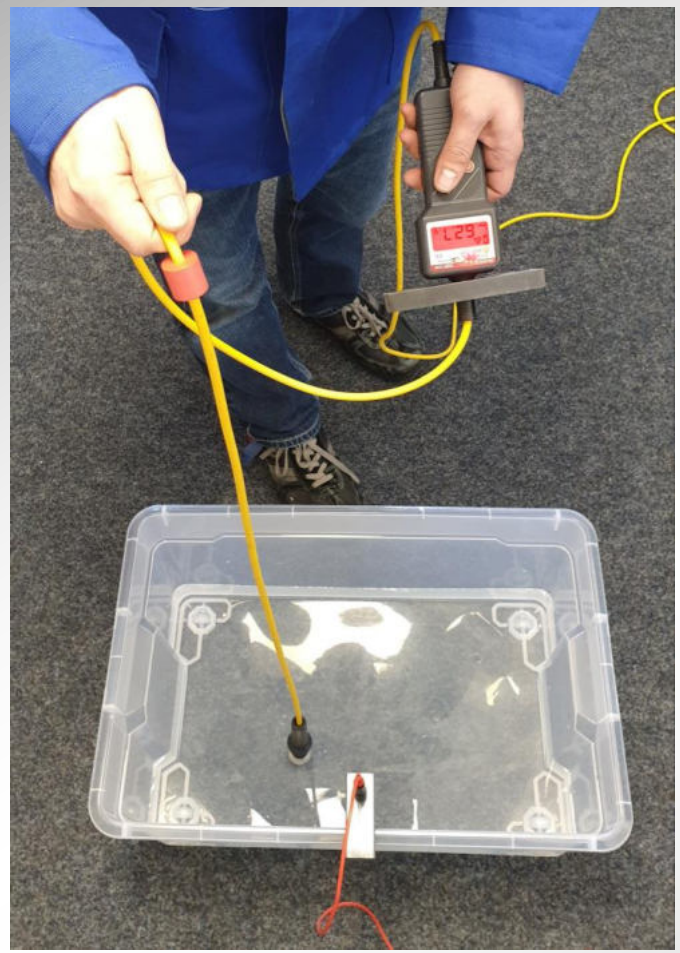
Voltage = red calbe (L1)

No voltage grounded = yellow-green cable

No voltage = no cable

Practical exercise

Tietzsch Demo-Set



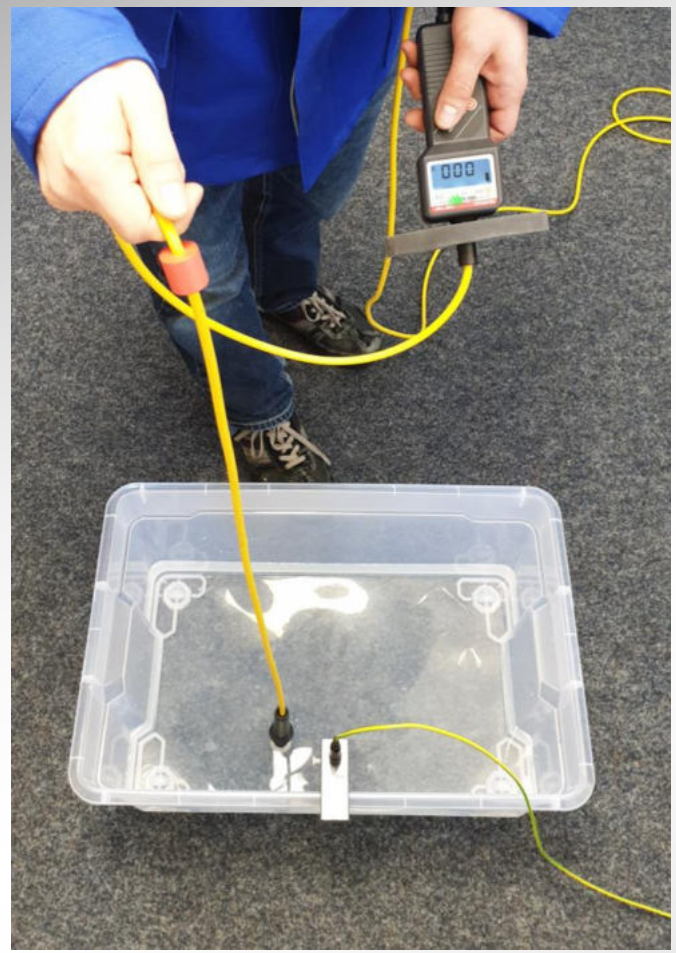
red cable connected

ATTENTION! Water is life!
Do not touch the water!

Put the handle with the ball electrode into the water and watch the display of the DSP-HW 2.

Practical exercise

Tietzsch Demo-Set



yellow-green cable connected

Put the handle with the ball electrode into the water and watch the display of the DSP-HW 2.

Practical exercise

Tietzsch Demo-Set

no cable connected

Put the handle with the ball electrode into the water and watch the display of the DSP-HW 2.