

How to establish the
minimum test conditions
for measurements with
MI 3295

MI 3295S Limits

- **Earth resistance measurement:**

Maximum resistance of the R_C circuit is 2 k Ω

Maximum test current is **7,5 A**

- **Step & Touch measurement:**

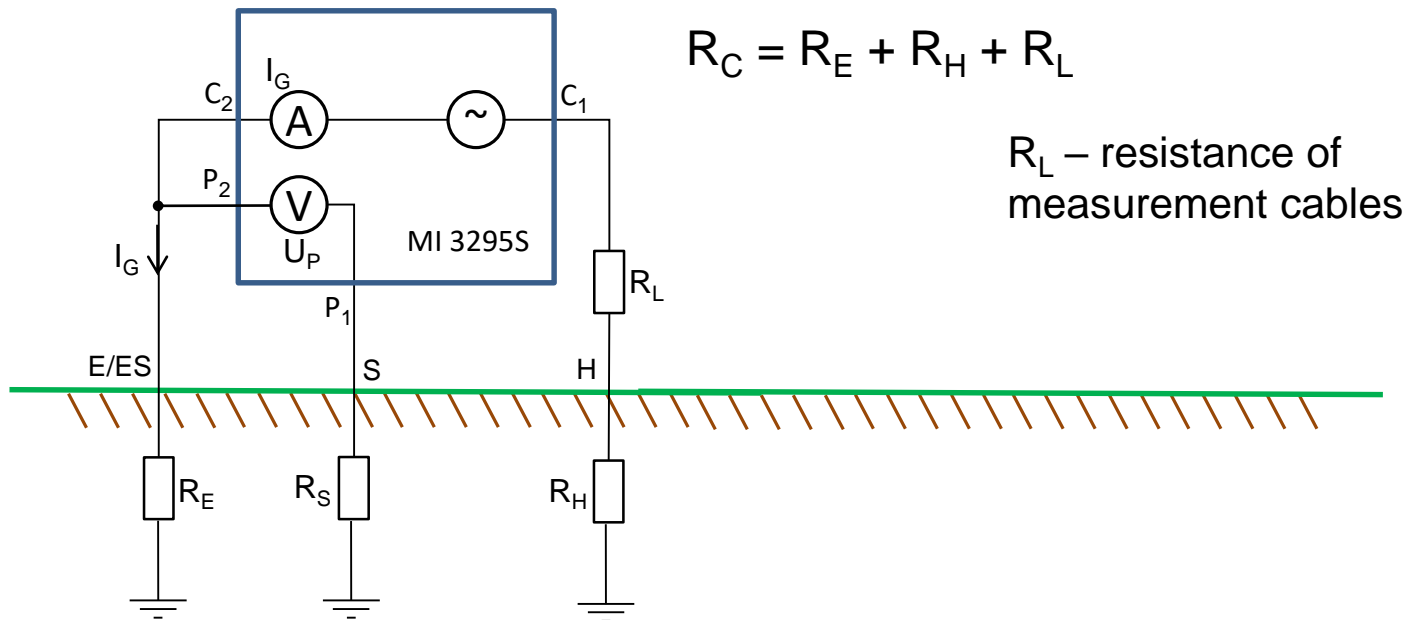
The minimum test current for the is 0,2 A

Maximum resistance of the R_C circuit is 275 Ω

Maximum test current is >55 A

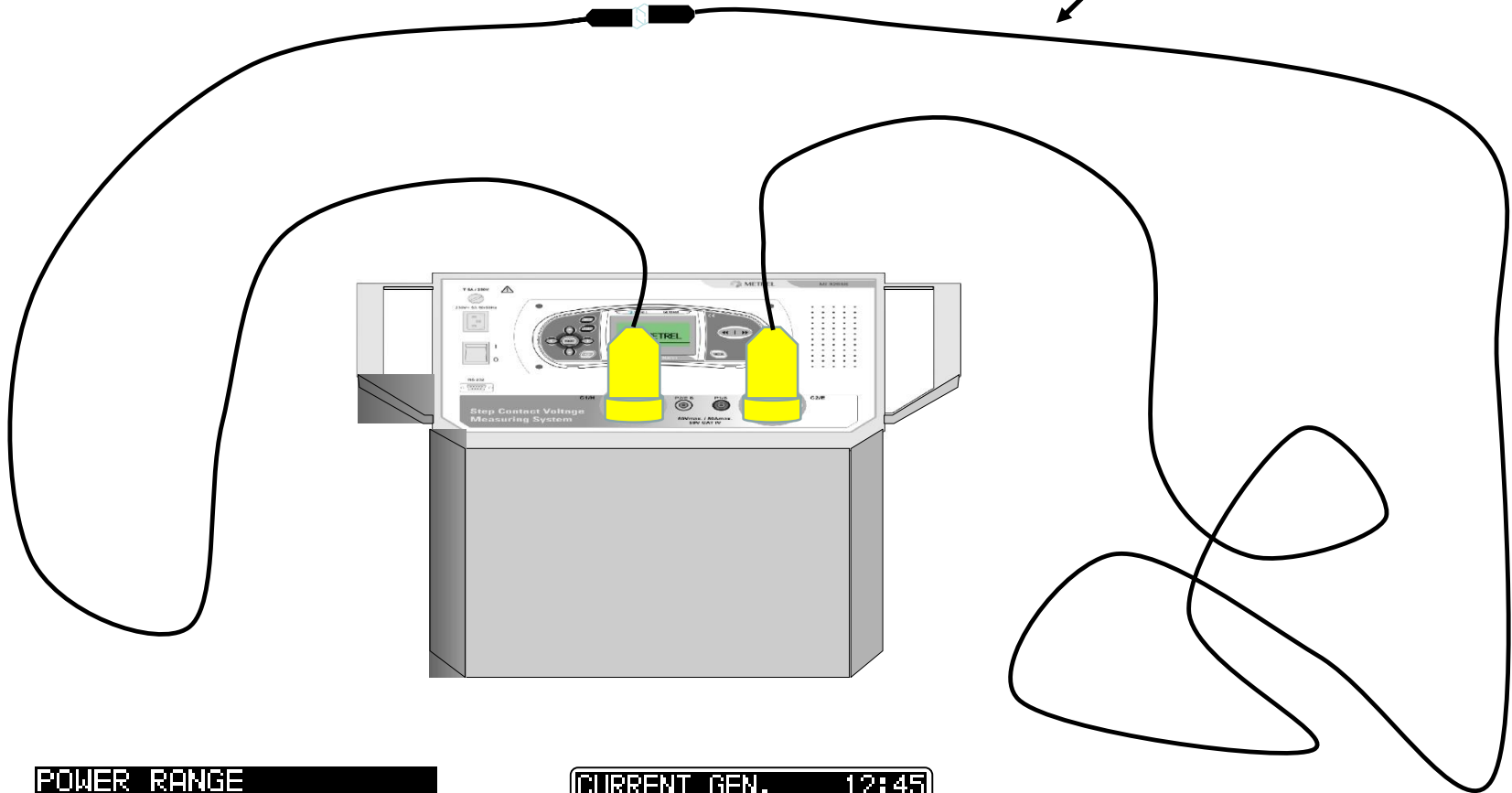
Procedure

- Check the generator and cables
- Check the earth resistance R_H of auxiliary probe
- Check the contact at E/ES point

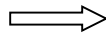


1. Check the generator and cables

The 50 m cable must be off the reel!



POWER RANGE
100%
75%
50%

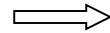
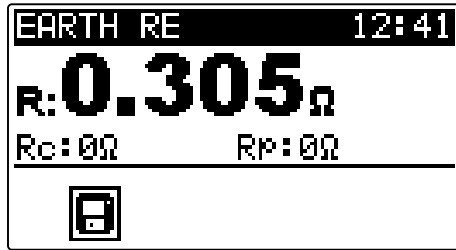


CURRENT GEN.	12:45
I: 32.5 A	FREE: 96.8%

With 100% power more than 50 A will be generated.

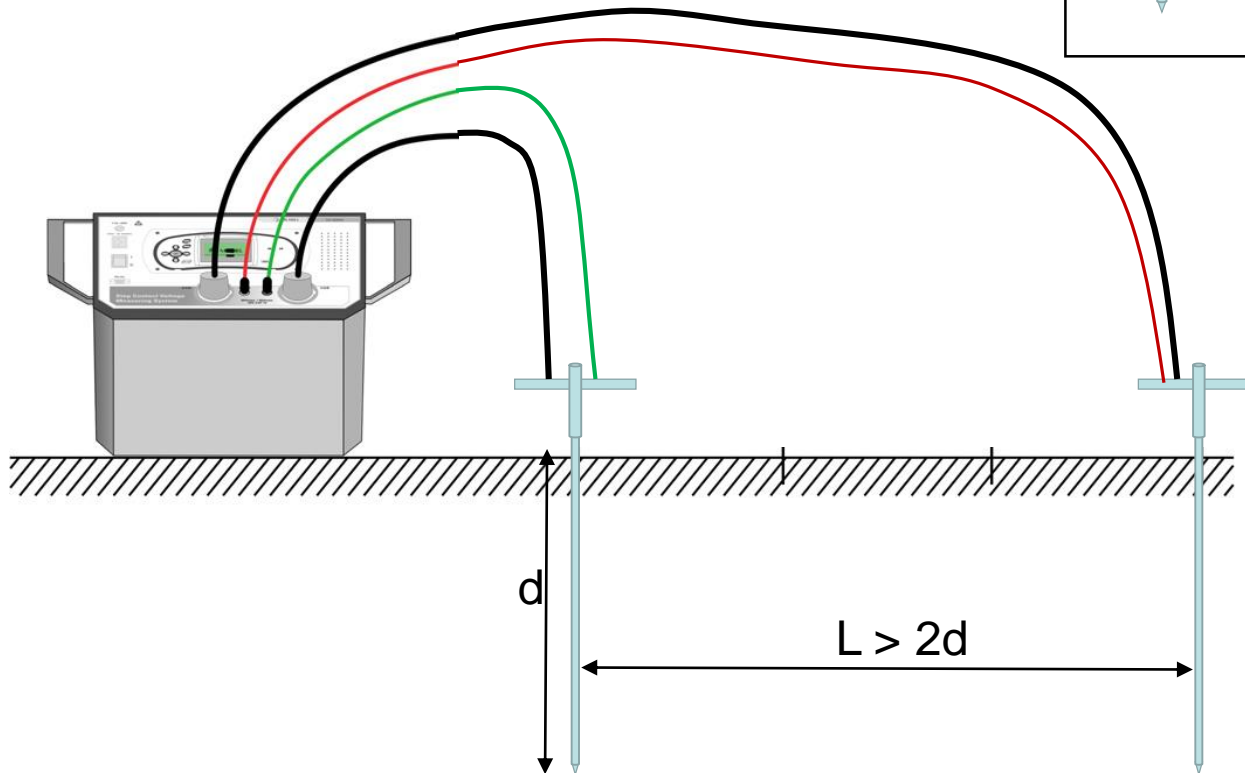
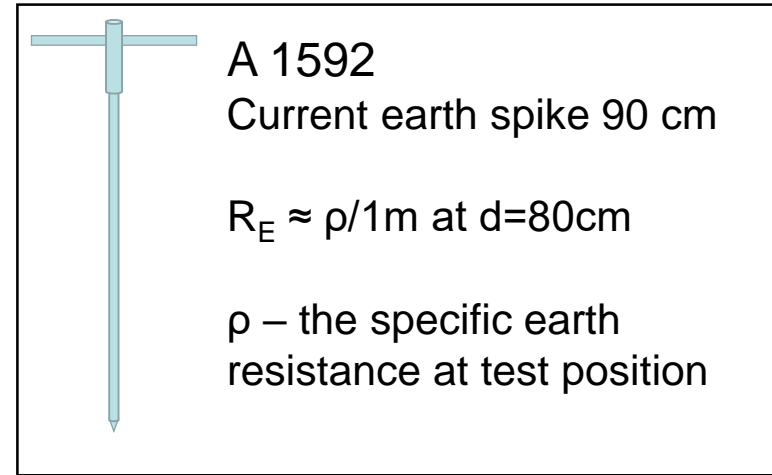
2. Check the earth resistance R_H of auxiliary probe

You can use MI 3295S or any other earth resistance meter



$$R_h = R/2$$

if same probes are used

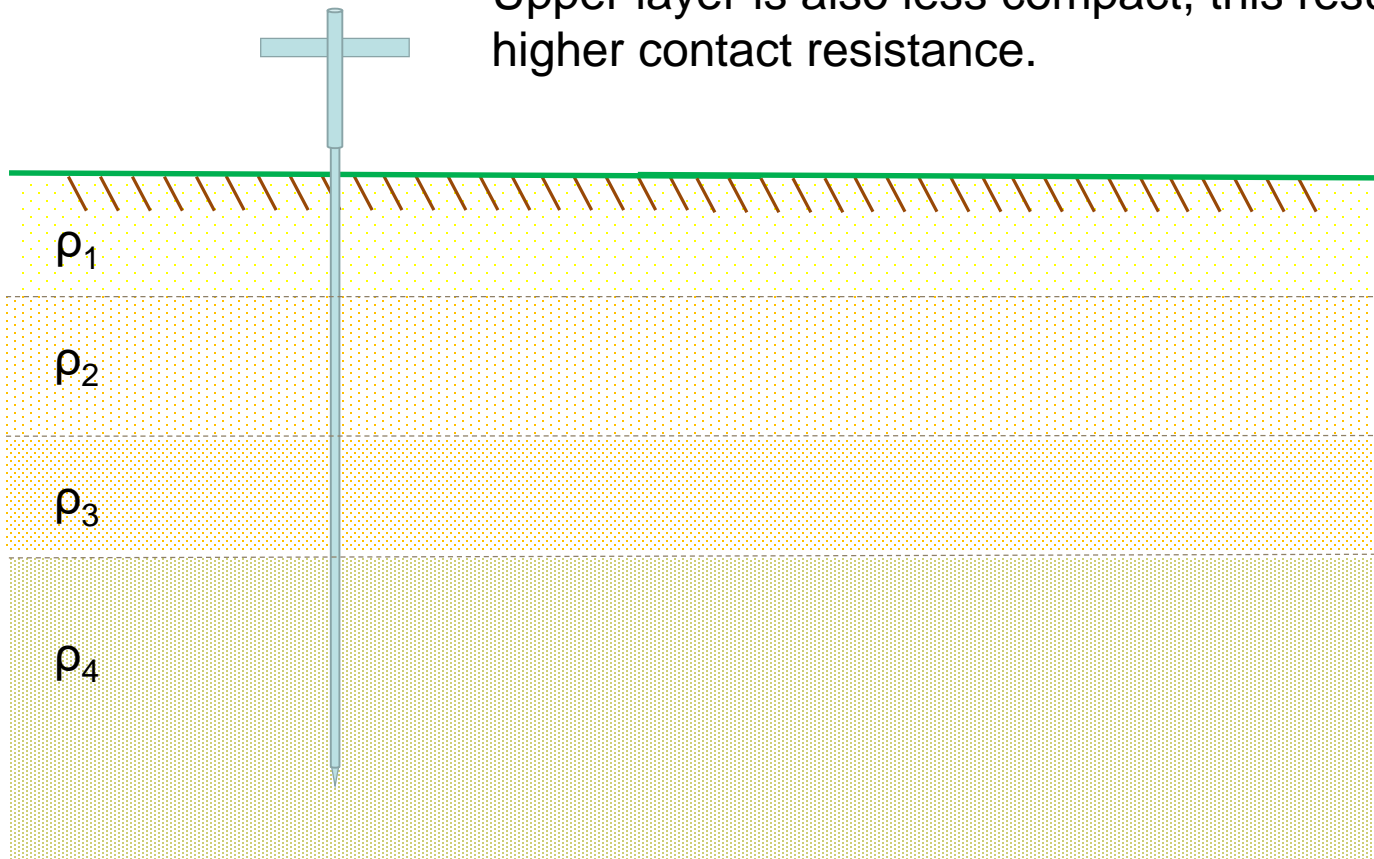


$$R_h = R(\rho) + R_{\text{contact}}$$

In very dry environment the upper soil level has, because of low humidity, very high earth resistance. Therefore longer earth probes have to be used to reach the layers with higher humidity and therefore lower resistivity.

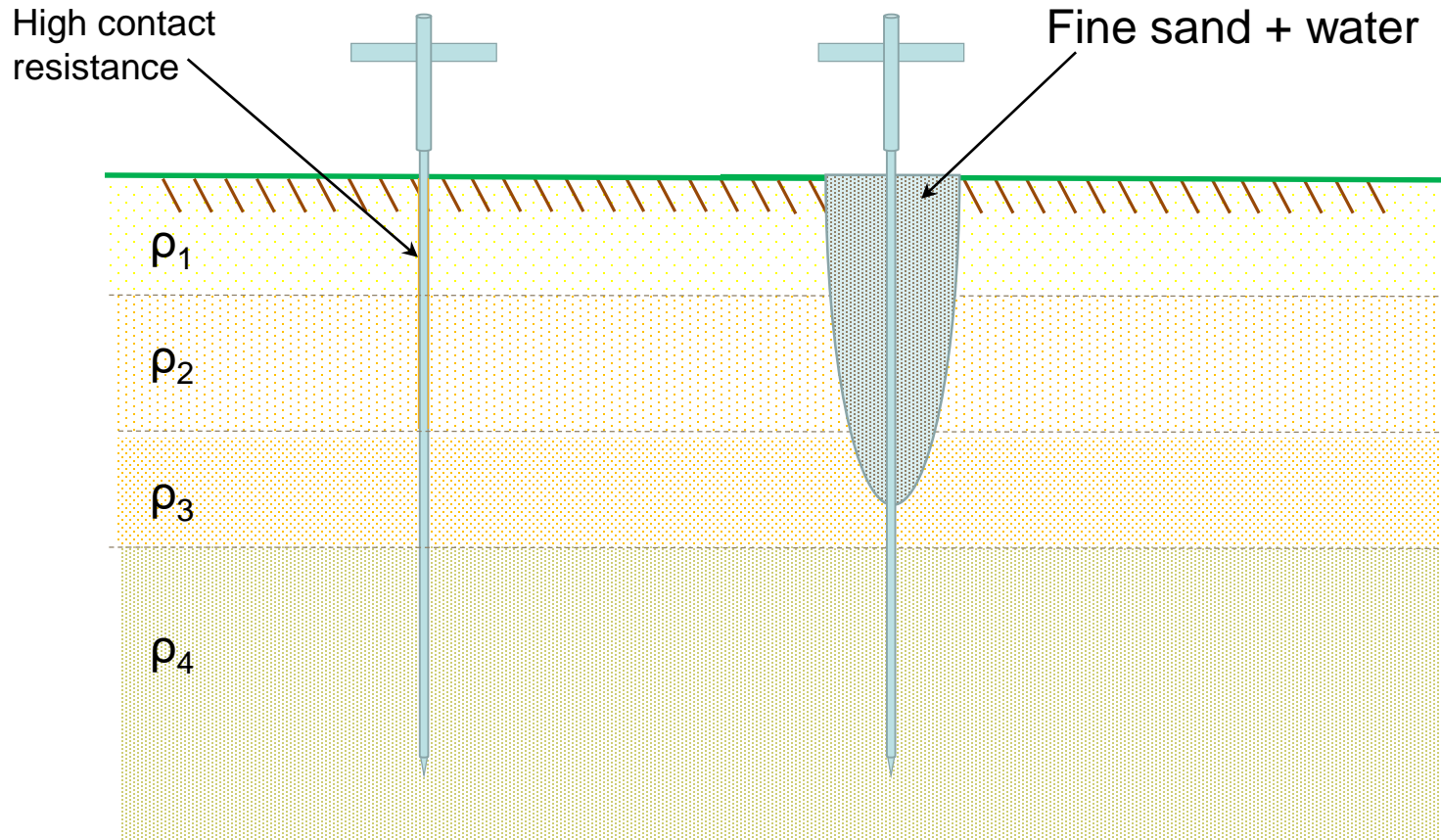
$$\rho_1 > \rho_2 > \rho_3 > \rho_4$$

Upper layer is also less compact, this results in higher contact resistance.

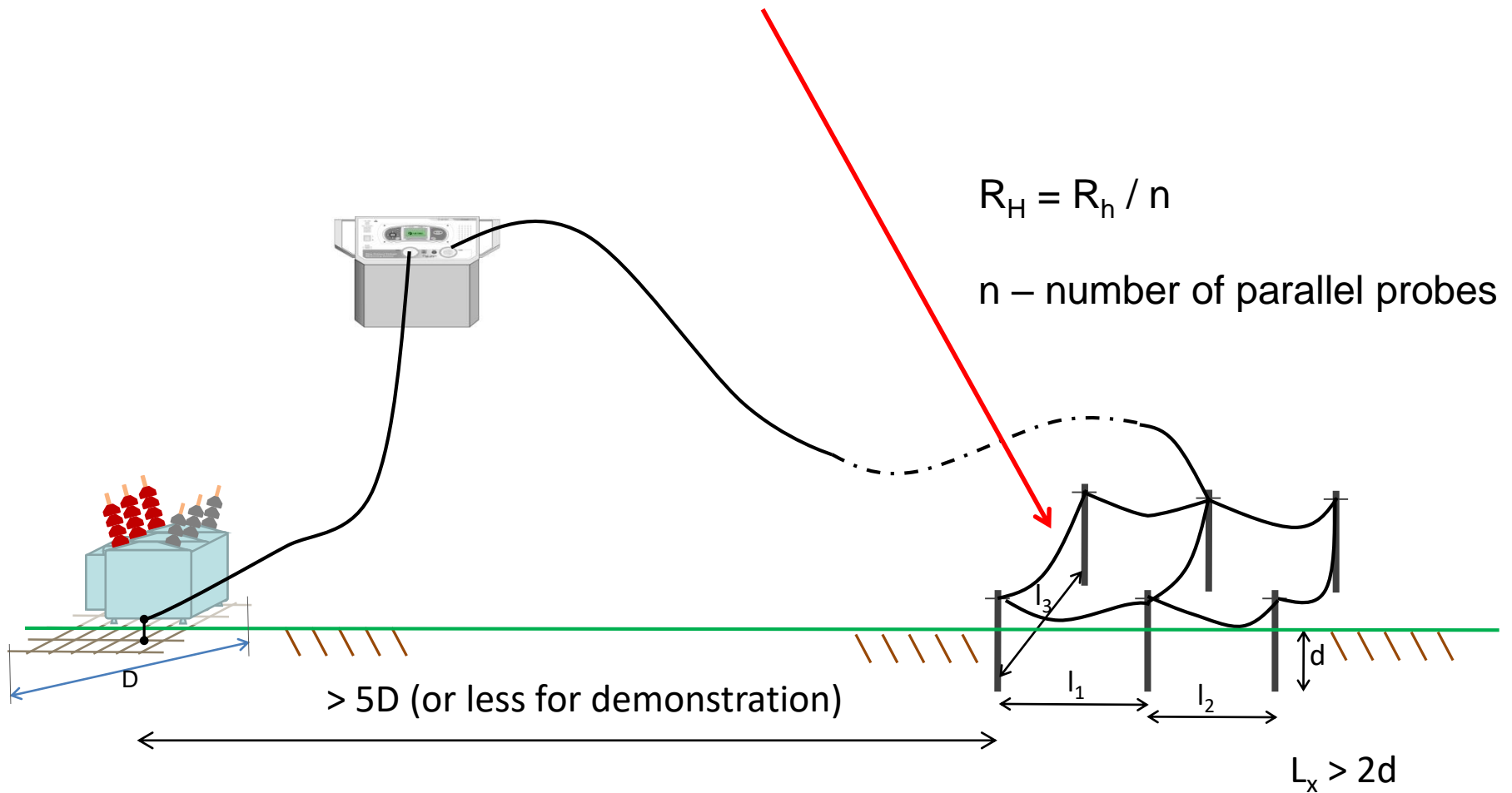


$$R_h = R(\rho) + R_{\text{contact}}$$

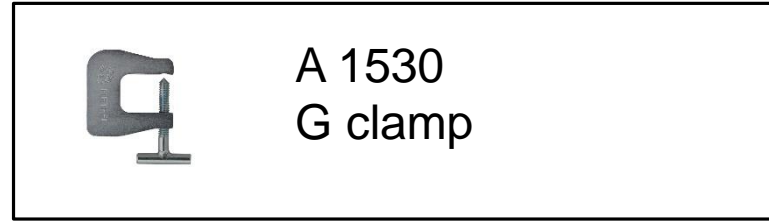
Contact resistance is between metal surface of the earth probe and the surrounding material. If this material is very rough (like gravel) then there is a lot of empty space between the probe surface and soil → this results in high contact resistance. With the time (can be years) these holes are fulfilled with small particles and the contact resistance decreases. But we don't have time to wait. Possible solution: For the test purposes, a pit is excavated, filled with fine sand and water.



For step & touch voltage measurement the R_{C_MAX} is 275Ω and if the minimum test current of 200mA can't be reached with one auxiliary probe, multiple probes connected in parallel have to be used .



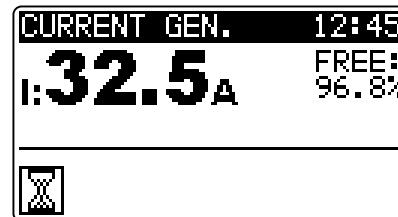
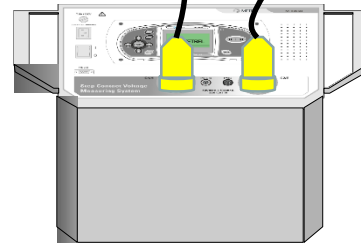
3. Check the contact at E/ES point



Only for
this check



E/ES contact point



Alternative solution for testing bigger meshes



DANGEROUS METHOD !!!

Only for authorized and qualified personnel!

There must be no active parallel transmission lines which can cause high open circuit voltages and high short circuit currents.

Additional safety measures should be taken: surge protection devices and dual guarding (on tested side guarding must be disconnected during the measurement)

