

Linear resistance measurement

WHAT DO YOU NEED ?

Check first your objectives and constraints.
Set your decision criteria.
Select the right price/performance solution.

	测试平台	集成的在线测量装置	集成的离线测量装置	分散测量装置
最适合的解决方案(★)				
决策标准				
可靠性		★	★	
与标准的一致性		★	★	
不确定性&风险管理		★	★	
用户友好		★	★	
在线测量		★		
数据处理		★	★	
价格				★
运营成本		★	★	
节省时间和原材料		★	★	

■ AESA delivers integrated, functional and accurate equipment / solutions.

Usually the equipment proposed on the market are by manufacturers specialised in instruments (micro-ohmmeter). To approach the wire industry, they propose accessories such as connection rule, temperature probe, Kelvin test leads,...). Their electrical specifications are related to the performance of the sole instrument, their dimensional specifications are simply the rule's clamping capacity e rule and none with a clear commitment on the specifications for the complete system.

The reliability of the measurement depends on the type of sample, uncertainties related to the connecting device or the operator skill. In our equipment, all components are integrated in a single housing to perfectly master the uncertainties.

Unlike most other manufacturers, AESA specifications apply to a complete measuring system, which matches the needs of our customers.

■ Beware reading datasheets

- Verify the overall specifications, R_{lin} [Ω/m at $20^{\circ}C$]
- Verify all the uncertainties are under control
- Verify the scope of guaranteed specifications

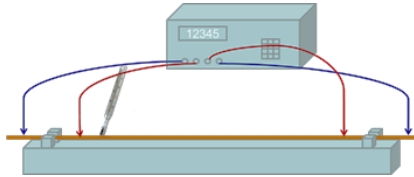

We are pleased to provide you some information that can help you taking the right decision.

■ Guaranteed vs mechanical specs

Equipment are able to measure over the guaranteed specifications with a relative accuracy. But it requires skill and a perfect master of the metrology (*comparison method as example*).

equipment	guaranteed specifications	max ability
8130 family	Cu 1800 mm^2 ($\cong 48\text{mm}$) Al 1200 mm^2 ($\cong 40\text{mm}$)	$\varnothing 58 \text{ mm}$
ResTest 80	630 mm^2 ($\cong 28\text{mm}$)	$\varnothing 52 \text{ mm}$
ResTest 50	50 mm^2 ($\cong 8\text{mm}$)	$\varnothing 10 \text{ mm}$

6 points to be verified for getting reliable results

独立的不确定度	IEC 60468	AESA	其他生产厂商
① 欧姆表 (Ω)	$\pm 0.15\%$	$\pm 0.03\%$	$\pm 0.03\% - 0.15\%$ 以上
② 长度 (m)	$\pm 0.05\%$	校准长度 (固定长度和软件修正误差)	通常没有规定 (在自适应系统中通常大于0.05%)
③ 温度 ($^{\circ}\text{C}$)	$\pm 0.1^{\circ}\text{C}$	$\pm 0.05^{\circ}\text{C}$ (集成的温度传感器及稳定装置)	通常没有规定 (现在通用温度传感器 $> 0.1^{\circ}\text{C}$, 而 1°C 的温度带来的电阻误差为0.4%)
④ 测量方法	4端	4端	4端
⑤ 电流分配	关键技术	夹具+压紧系统	不确定
⑥ 误差风险		设备控制风险 <ul style="list-style-type: none"> 带压力的夹具 LED显示器的监督界面 固化的集成系统 集成传感器 最终结果显示 打印和导出数据功能 	误差风险由技师的技能决定 <ul style="list-style-type: none"> 电流在导体中不均匀分布 接触不良的电压切割刀 电桥连接错误 测量的温度与样品温度的差值较大 最终结果计算错误 报告书写错误 电流反相/电动势抑制
线性电阻	总体精度		
R_{lin} (Ω/m at 20°C)	$\pm 0.20\%$	$\pm 0.10\%$ (总体精度)	不确定 (仪器的电气特性, 样品的机械尺寸)
结论		线缆电阻测量的可靠解决方案 	分立元件的可靠测量仪器  不适合对线缆电阻的测量