safety in test > safety in flight

TESTFUCHS

Bonding Tester

WWW.TEST-FUCHS.COM

Bonding Tests

Complex aircraft structures

- can be struck by lightning
- are exposed to high temperature differences
- are exposed to external electromagnetic fields and electrostatic charging
- have to be suitably treated to minimize or prevent damage
- are liable to corrosion due to environmental variations

For your passengers' safety - NDT conductivity tests ensure structural and electrical integrity!

ENVIRONMENTAL CHALLENGES

In the age of digital **fly by wire** control systems it has become more important than ever to ensure flight safety by performing accurate regular inspections. The control system must work at all times.

Aircraft are exposed to a large number of environmental challenges: lightning strikes, electromagnetic fields (radar, wireless and television, cosmic radiation), bird strikes, storm, hail, rain, humidity, rapid extreme pressure and temperature changes which result in vibration and shock loading. All this has an adverse effect on aircraft life and performance.

ELECTROSTATIC CHARGES

Electrostatic charges are generally created by passing through clouds or dusty low level air (helicopters). To prevent unintentional electrical discharge between aircraft components, all parts inluding the antennas should be conductively connected to one another in order to prevent navigation and communication systems malfunction.

TEMPERATURE CHANGES

At ground level an aircraft generally experiences higher temperatures and humidities than when operating at high altitudes. A temperature drop of -50°C is commonplace. Temperature and pressure differences cause **water condensation** which collects in seams, low points and also in the lower cargo areas, where it even freezes.

LIGHTNING STRIKES

Most aircraft are struck by lightning on average once a year! The main points of impact are the aircraft nose, wing tips, engines, vertical and horizontal tail tips, and the landing gear.

Although an aircraft is similar to a Faraday cage, lightning strikes (**lightning current**) creates electromagnetic fields, which cause high voltages when they are coupled through openings into the wiring and equipment. This can have serious consequences such as power supply interruption, malfunction of the computers or total shut-down of certain equipment or systems. Composite structures can be damaged by lightning current flow via components like flaps, valves, joints, pipe connections or equipment connector plugs.

CORROSION

Corrosion is created where salt, moisture or corrosive fluids like skydrol come in contact with connections and cables. The resulting oxides reduce the conductivity, thus increasing the conductive connector resistances. As a result, in case of system failure, this will mean non or slow operation of the safety circuit breaker which can even result in a fire. Corroded structural connections can lead to enormous damage when subjected to a lightning strike. Unfortunately, this form of corrosion is not always visible to the naked eye.

AIRBUS CERTIFIED

TEST-FUCHS Bonding Testers are certified on AIRBUS aircraft

EASY TO USE

TEST-FUCHS has developed and launched practical test equipment to meet the stringent safety critical requirements of bonding testing. The TEST-FUCHS Bonding Test Systems have been certified by AIRBUS on the use of AIRBUS Aircraft and are deployed sucessfully worldwide.

Bonding Test Systems are used in aircraft production and in line maintenance. The equipment is very easy to use and battery operated. For automatic measurements the user can store test sequences.

- Tests are easily performed by a single operator.
- All instruments are battery operated and compact for easy use in difficult access points.
- It is not required to remove parts or loosen screw connections.

Types of test equipment:

> **Bonding Tester**

> **Loop Resistance Tester**

> **Anti Static Paint Tester**

Quality for your electrical interconnections!

PREVENT AND LIMIT DAMAGES

- All equipment and its wiring must be screened and grounded in order to protect the flight critical aircraft components and systems from damage. As the grounding of an aircraft cannot be performed in the normal way, the whole aircraft structure itself is used as ground.
- In addition special methods and materials are used during manufacture to prevent corrosion as far as possible. Critical areas are protected by using special sealing material and paint.
- The fuel tanks must have a redundant electrical bonding to ensure prevention of the possibility of an explosion if normal bonding fails i.e. failsafe.
- A continuous good electricity conductivity of the aircraft structure, especially of the outer skin, minimises or protects it from damage by lightning strikes or electrostatic discharges. Structures made of fiber composites together with ascociated equipment and wires are especially prone to damage.
- It is very important that junctions, screw connections, connectors, earthing cables, cable ducts, etc. are tested for conductivity, but they are often very difficult to access.
- By testing the resistance of screens, equipment, structural components etc. it is possible to detect compliance to regulations during manufacturing processes, or if the connections, despite ageing, meet the requirements.
- The performance of these measures in the manufacture and in service phases is normally subject to stringent quality control.

CALIBRATION

TEST-FUCHS recommends yearly calibration of the test systems to safeguard the system specification compliance.

Calibration can be performed at the customer's premises or in one of the TEST-FUCHS locations close to you.

FUNCTION OF BONDING TESTERS

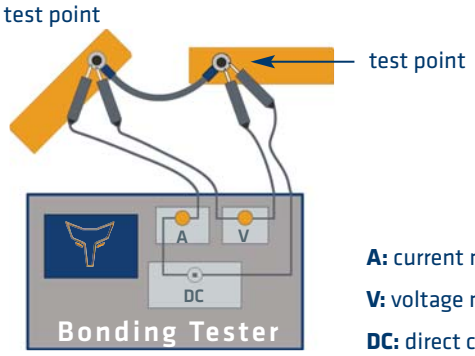
All conductive aircraft components are electrically connected to one another. These connections must have a minimal electrical resistance to prevent damage in cases of lightning strike or residual current in the aircraft systems.

Test points are the screening, screw connections, earthing straps, and pipes including connections. A test current (e.g. 10A) is fed into the measurement point. Based on the voltage drop the contact resistance is calculated.

TEST-FUCHS Bonding Testers are designed to perform accurate and easy resistance measurements, especially on extremely low impedance units under test (UUT).

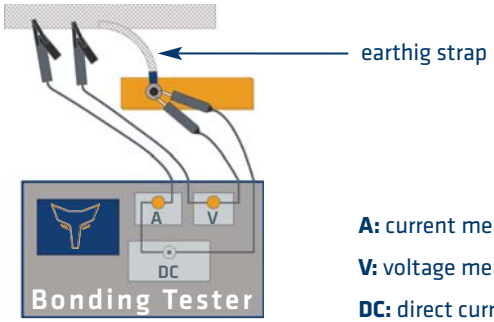
MEASURING PRINCIPLE

Point to point measurement:



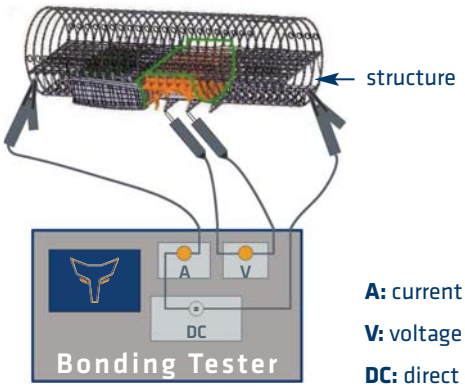
A: current measurement
V: voltage measurement
DC: direct current supply

Point to structure measurement:



A: current measurement
V: voltage measurement
DC: direct current supply

Return current measurement:



A: current measurement
V: voltage measurement
DC: direct current supply

Used Test Currents:

10A DC	normally
0 - 150A DC	for tests between wings and fuselage
0,1A DC	for sensitive UUTs

Typical Connection Resistance:

1-100mΩ

Operational Methods:

Bonding Testers use the so called four-wire system method (the KELVIN Method). Thus all the transition and cable resistances will be compensated to ensure that the test results are correct.

Testing Times:

These are dependent on the type of bonding tester used.

Test Cables:

Individual test cables match any testing requirements. The customer chooses the appropriate length and end connections depending on the area of application.

There are A, B and AB cables. For a full four-wire measurement test either an A and a B cable or a combined AB cable are required.

Bonding Tester >MVP10L-FS<

The Bonding Tester >MVP10L-FS< is used for fast and simple inspection of bonding connections. Test currents of up to 10A are injected and the contact resistance is measured using the 4 wire test method.

- > Especially light and ergonomic design
- > Easy to read large display
- > Battery powered, rechargeable in situ or removed
- > Has a galvanically isolated interface for remote control or data exchange
- > Measurement current up to 10A with impulse current testing, automatic field switching and automatic polarity reversal
- > Automatic 4 wire identification
- > Can be hand carried, shoulder strap carried or operated placed on a suitable surface
- > Optional: usage of test sequences
- > Optional: adapter for bluetooth communication

<MVP10L-FS>
(TEST-FUCHS item no. 151020009)

TECHNICAL DATA

Power supply:	To charge the battery 1/N/PE AC 50Hz 230V ± 10%
Battery life:	up to 2000 measurements /charging
Battery:	2 x 7.2V Li-Ion
Charging time:	6 hours
Test current:	0.1A; 1A; 10A
Test voltage:	max. 8V
Pulse duration:	1sec, 3sec
Measurement mode:	2 or 4 wire measurement
Resolution:	from 1µΩ on

Accuracy:	± 0.2% of full scale and ± 0.2% of reading
Measurement range:	1mΩ, 10mΩ, 100mΩ, 600mΩ 1Ω, 6Ω, 10Ω, 60Ω, 600Ω, 6kΩ, 60kΩ 600kΩ for each measurement current
Measured value storage:	1000 measurements
Dimensions:	approx 25 x 13 x 16cm
Weight of equipment:	approx 2.8kg

INCLUDED IN STANDARD SCOPE OF DELIVERY:

Battery package
2 Batteries "SWIT S-8970")
(TEST-FUCHS item no. 106220138)

Power supply unit incl. powercable for battery charging „S306287"
(TEST-FUCHS item no. 103070362)

Shoulder strap „1472"
(TEST-FUCHS item no. 106330923)

NOTE:

The required measurement cables are not included in the standard scope of delivery.

Optional Accessories for Bonding Tester >MVP10L-FS<

Transport case "EXPLORER" (TEST-FUCHS item no. 107101335)

Very robust, stackable
Lined with foam

Storage compartment for:	- Bonding Tester <MVP10L-FS>
	- Accessories
	- Documentation
Dimensions:	approx 58 x 44 x 16cm
Weight:	approx 5kg

Battery Package (2 Batteries „SWIT S-8970" (TEST-FUCHS item no. 106220138)

Manufacturer:	SWIT
Model:	S-8970
Output voltage:	7.2V
Power:	47.5Wh

Intermediate charging possible (no memory effect)
The equipment is fitted with 2 batteries

External Charger for 2 Batteries incl. Power Cable (TEST-FUCHS item no. 106220111)

Manufacturer:	SWIT
Model:	SC-3602F
Input:	AC 100 - 240V; 50 / 60Hz
Output:	DC 7 - 8.4V; 1.8A

Possible to charge 2 batteries at the same time

Recommended Standard Measurement Cables for Bonding Tester >MVP10L-FS<

NOTE:
For operation, at least one measurement cable A and one measurement cable B are required (otherwise, no closed circuit possible). The measurement cables are each delivered in a labeled cable bag.

PKL668-9 (Measurement cable B) (TEST-FUCHS item no. 103240297)

The measurement cable is suitable for a fast bonding testing on stiff UUTs.

Type:	Test pin with spring mounted test prod
Max current:	max. 10A
Cable length:	3m
Test pin handle:	ø 30 x 170mm
Test prod:	ø 6 x 95mm

PKL668-12 (Measurement cable A) (TEST-FUCHS item no. 103240298)

The measurement cable is suitable for the ground connection at the UUT.
Each current and voltage poles are connected fixed with the structure.

Type:	Ground connection cable with 2 alligator clips
Max current:	max. 10A
Cable length:	5m
Safety tapper:	2 x XKK-1001

FURTHER MEASUREMENT CABLES

PKL668-2 (Measurement cable A+B) (TEST-FUCHS item no. 103240198)

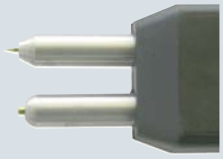
The measurement cable is suitable for testing single screw connections. When placing the test prod on a measurement point, make sure all four contact points sit well. The measurement is carried out single-handed.

Type:	4 wire test pin for miniature UUTs (screw head)
Max current:	max. 10A
Cable length:	2.5m
Test pin handle:	ø 16 x 70mm
Test prod:	ø 8 x 12mm

PKL668-3 (Measurement cable A+B) (TEST-FUCHS item no. 103240316)

This measurement cable is suitable for connection testing of pressed metallic screens. The measurement is carried out single-handed.

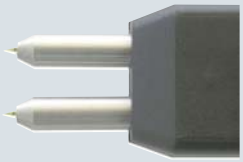
Type:	4 wire test prod, spring mounted (sharp / blunt)
Max current:	max. 10A
Cable length:	2.5m
Test pin handle:	30 x 22 x 145mm
Test prod:	ø 7 x 22mm



PKL668-4 (Measurement cable A+B) (TEST-FUCHS item no. 103240296)

The measurement cable is suitable for general applications, where contact point to be measured is less than 12mm wide. The measurement is carried out single-handed.

Type:	4 wire test prod, spring mounted (sharp / sharp)
Max current:	max. 10A
Cable length:	2.5m
Test pin handle:	30 x 22 x 145mm
Test prod:	ø 7 x 22mm



PKL668-14 (Measurement cable A) (TEST-FUCHS item no. 103240310)

This measurement cable is suitable for a fast bonding testing on stiff UUTs.

Type:	Test pin with spring mounted test prod
Max current:	max. 10A
Cable length:	3m
Test pin handle:	ø 30 x 170mm
Test prod:	ø 6 x 95mm

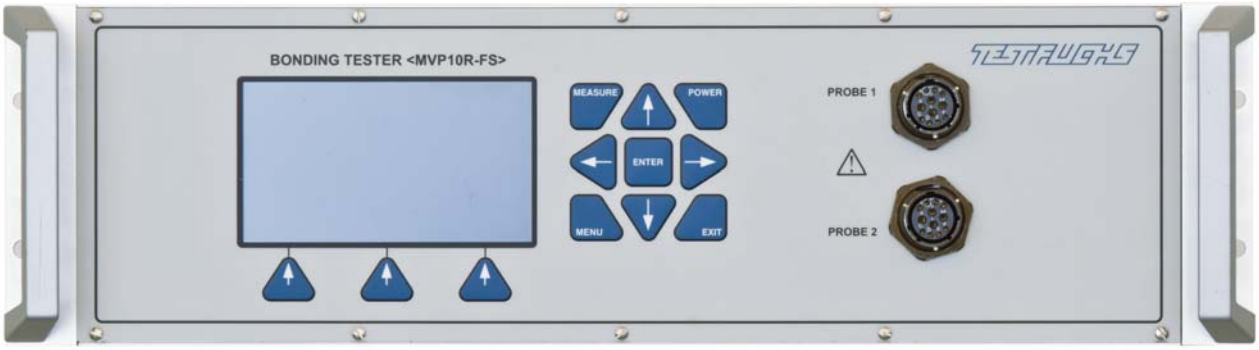
PKL668-45 (Measurement cable B) (TEST-FUCHS item no. 103240903)

This measuring cable is suitable for general applications.
For the measurement, pressure peaks, clamps etc. can be connected etc. by means of normal straps with 4mm banana sockets of the measuring cable.

Type:	Cable with banana sockets
Current load rating:	max. 10A
Cable length:	5m

FURTHER MODELS, SPECIAL MODELS OR OTHER CABLE LENGTHS ARE AVAILABLE ON REQUEST!

Bonding Tester
>MVP10R-FS<



<MVP10R-FS>
(TEST-FUCHS item no. 151020024)

Developed for fast and simple inspection of bonding.

Test currents of up to 10A are injected and the contact resistance is measured using the 4 wire test method.

The 19" rack design enables the tester to be incorporated into a special to type test system.

- Easy to read large display
- Has a galvanically isolated interface for remote control or data exchange
- Measurement current up to 10A with impulse current testing, automatic field switching and automatic polarity reversal
- Automatic 4 wire identification
- Two off connector sockets are fitted to the front and rear of the equipment

TECHNICAL DATA

> Electrical supply (requirements):

Power connection:	1/N/PE AC 50Hz 230
Nominal current:	0.7A

> Performance:

Test current:	0.1A; 1A; 10A
Test voltage:	max. 8V
Pulse duration:	1sec, 3sec
Meas. mode:	2 or 4 wire measurement
Resolution:	from 1µΩ on

> Measurement ranges:

Measurement ranges:	1mΩ, 10mΩ, 100mΩ, 600mΩ 1Ω, 6Ω, 10Ω, 60Ω, 600Ω, 6kΩ, 60kΩ, 600kΩ for each measurement current
Accuracy:	± 0.2% of full scale and ± 0.2% of reading

> Dimensions and weight:

Length:	approx. 45cm
Width:	approx. 25cm
Height:	approx. 13cm
Weight:	approx. 5.4kg

INCLUDED IN STANDARD SCOPE OF DELIVERY:

Power cable
(TEST-FUCHS item no. 103240028)

OPTIONAL ACCESSORIES:

19“ Housing
(TEST-FUCHS item no. 107100466)

NOTE:

The required measurement cables are not included in the standard scope of delivery. All accessories are in the brochures of the “BONDING TESTER <MVP10L-FS>”.

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Test Equipment, Bonding Tester

>PA-MVP11<

<PA-MVP11>
(TEST-FUCHS item no. 150020029)

Developed for inspection of bondings using a test current of up to 200A continuous current.

Suitable for use with all common aircraft types.

- Display and operating elements in an easy to use manner
- Compact design
- GRP - carrying case for safe transport

TECHNICAL DATA

> **Electrical supply:**

Mains supply:	1/N/PE AC 50Hz 230V
Nominal current:	7A
Preliminary fuse:	16A

> **Measurement range:**

Current measurement:
Digital amperemeter

Measurement range:	0 to 200A
Fault tolerance:	Cl. 0.5

Voltage drop measurement:
Digital voltmeter

Measurement range:	0 to 2,000mV
Fault tolerance:	Cl. 0.1

> **Electrical parameters:**

Output current:	0 to 200A DC

> **Dimensions and weight:**

Width:	approx. 63cm	
Height:	approx. 49cm	
Depth:	approx. 39cm	
Weight:	approx. 53kg	(incl. test cable)

STANDARD ACCESSORIES

- 2 measuring lines, each 10m (32.8ft) with alligator clip
- 2 test lines, each 10m (32.8ft) for 200A
- 1 power cable
- 2 safety tapper
- 5 cable bags

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.

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Loop Resistance Testers

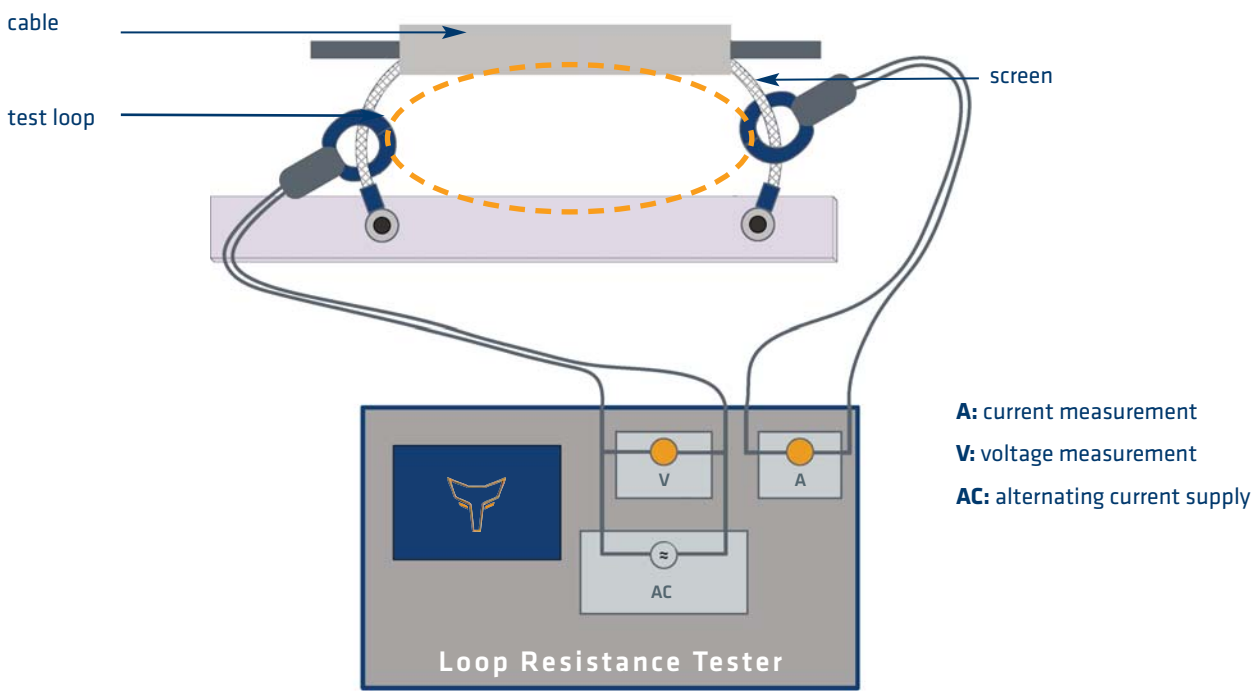
Electrical cables are screened at both ends and designed to form an electrical loop in which the current flows through the cable and back through the screen.

As a result, a magnetic field appears which is eliminated by the voltage build-up. If the loop resistance is kept at a minimum, then the maximum level of safety has been reached.

The loop resistance of non-electrical loops like pipes and flaps with multiple ground connections can also be measured in this way.

The loop resistance is tested accurately with easy to use equipment.

MEASURING PRINCIPLE



Typical Loop Resistance:

2-100 mΩ

Operational Method:

Transformator-principle with supply and measurement clamps

Supply Frequency:

1 kHz or 2kHz (special design)

The supply clamp induces a current flow in the bonding loop to be tested. A second clamp measures the current in the loop. The measured impedance is the applied voltage calculated together with the measured current. As the loops are not always easily accessible, special or adapted measurement clamps can be necessary.

TEST-FUCHS has developed impedance measurement clamps for such test purposes. A unique feature, until now not available on the market, is one single clamp that combines a supply and a current measurement clamp. Both functions are screened from one another.

As an alternative, more economic solution, split standard clamps can be used.

Clamps are available with a variety of openings and the cable lengths can of course be supplied in accordance with the customer's requirements.

Loop Resistance Tester >IM2-FS<

The Loop Resistance Tester >IM2-FS< is designed for fast and simple checking of loop impedance.

- > Especially light and practical design
- > Very large, easy to read display
- > Battery powered, rechargeable in situ or removed
- > Has a galvanically isolated interface for remote control or data exchange
- > Automatic residual current compensation
- > Range is switched automatically
- > Used in conjunction with combined or separate measurement clamps
- > Search mode for rapid location of faulty connections
- > Including self test unit for function control of the test equipment and the measuring clamps

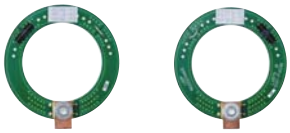
<IM2-FS>
(TEST-FUCHS item no. 150020605)

TECHNICAL DATA

Power operation:	1/N/PE AC 50Hz 230V ± 10%	Output current:	max 1A
Battery:	14.4V Li-Ion		
Charging time:	6 hours	Meas. frequency:	1kHz ± 10Hz
Measurement range:	depends on clamps e.g. 20mΩ, 200mΩ (optionally 400mΩ possible)	Accuracy:	depends on clamps (e.g. <IMZ7> ±5% o.m.v., but not less than ±2mΩ)
Data storage:	90 measured values	Dimensions:	approx 25 x 28 x 16cm
Max. resolution:	0.1mΩ	Weight of equipment:	approx 5kg
Output voltage:	max 70V		

INCLUDED IN STANDARD SCOPE OF DELIVERY:

1 Battery "SWIT S-8080S"
(TEST-FUCHS item no. 106220098)



Self test UUT
- L1673-16/000/000 100mΩ
(TEST-FUCHS item no. 106375848)
- L1673-6/000/000 10mΩ
(TEST-FUCHS item no. 106375838)
- not calibrated

Shoulder strap "1472"
(TEST-FUCHS item no. 106330923)

Measurement cable set "S307073"
with two banana plugs and test prods for Search Mode
(TEST-FUCHS item no. 103191770)

Power supply unit incl. power cable for charging "S306287"
(TEST-FUCHS item no. 103070362)

NOTE:
Measurement clamps are not included in the standard scope of delivery and have to be ordered in accordance with customer requirements.

Optional Accessories for Loop Resistance Tester >IM2-FS<

Transport case "FREIGHTAINER PLUS" (TEST-FUCHS item no. 107101334)

Very robust, provided with transport rollers
Lined with foam
Storage
compartment for: - Loop Resistance Tester <IM2-FS>
- Charger
- 2 batteries
- Cable bags
Dimensions: approx 60 x 45 x 18 cm
Weight: approx 9kg

Battery (TEST-FUCHS item no: 106220098)

Manufacturer: SWIT
Model: S-8080S
Output voltage: 14.4V
Power: 88Wh
Intermediate charging possible
(no memory effect)
Diagnostic display

Charger for battery incl. Power Cable (TEST-FUCHS item no: 106220099)

Manufacturer: SWIT
Model: SC-302S
Input: AC 100 - 240V; 50 / 60Hz
Output: DC 14 - 20V; 1.9A
Possible to charge 2 batteries at the same time

Recommended Standard Measurement Clamps for Loop Resistance Tester >IM2-FS<

Note:
For operation at least one Combined Measurement Clamp or two Single Measurement Clamps are required.
The Measurement Clamps are delivered in labeled cable bags.

IMPEDANCE MEASUREMENT CLAMP <IMZ7>

(TEST-FUCHS item no. 150020514)

- > Symmetric design
- > Capable of being used on cables in a confined area of up to approx 26mm dia
- > Spring loaded to closed (operating) position
- > Combined supply and current measurement clamps
- > Symmetric windings for high repeatability
- > "Measure" button

TECHNICAL DATA

Frequency:	for test equipments with 1 or 2kHz
Resistance range:	20mΩ, 200mΩ
UUT diameter:	max. 26mm
Accuracy:	± 5% o.m.v. but not less than 2mΩ
Repeatability of UUT variations position in clamp opening:	± 2% of full scale ± 0.5mΩ

Overall dimension (without cable):	Width:	approx. 58mm
	Depth:	approx. 31mm
	Height:	approx. 120mm
Jaws opening:	approx. 31mm	
Weight:	approx. 500g	
Cable length:	3m	

SUPPLY CLAMP <IMZ5>
(TEST-FUCHS item no. 150020064)

CURRENT MEASUREMENT CLAMP <SMZ5>
(TEST-FUCHS item no. 150020065)

SET CONSISTS OF <IMZ5> + <SMZ5>
(TEST-FUCHS item no. 150020607)

- Modified Fluke i800
- An IMZ5 Supply Clamp and a SMZ5 Current Measurement Clamp are required for testing
- Capable of being used on cables and metal rails of up to approx 55mm dia
- Spring loaded to closed (operating) position
- Modified Split Standard Clamps
- An integrated "Measure" button is fitted to the Supply Clamp
- Both Clamps have arrows showing the current direction

SUPPLY CLAMP IMZ5

CURRENT MEASUREMENT CLAMP SMZ5

TECHNICAL DATA

Frequency:	for test equipments with 1 or 2kHz
Resistance range:	20mΩ, 200mΩ
UUT diameter:	max. 55mm
Accuracy:	± 5% of full scale ± 4 digit
Repeatability of UUT variations position in clamp opening:	± 3% of full scale ± 1mΩ

Overall dimension : (without cable)	Width:	approx 106mm
	Depth:	approx 40mm
	Height:	approx 230mm
Jaws opening:	approx 55mm	
Weight:	approx 1.6kg	
Cable length:	3m	

SUPPLY CLAMP <IMZ6>

(TEST-FUCHS item no. 150020590)

CURRENT MEASUREMENT CLAMP <SMZ6>

(TEST-FUCHS item no. 150020589)

SET CONSISTS OF <IMZ6> + <SMZ6>

(TEST-FUCHS item no. 150020591)

- Modified Fluke i200
- For measurement both one Supply and one Current Measuring Clamps are required
- Capable of being used on cables and metal rails of up to approx 20mm dia
- Spring loaded to closed (operating) position
- Modified Split Standard Clamps
- An integrated "Measure" button is fitted to the Supply Clamps
- Both Clamps have arrows showing the current direction

SUPPLY CLAMP IMZ6

CURRENT MEASUREMENT CLAMP SMZ6

TECHNICAL DATA

Frequency:	for test equipment with 1 or 2kHz
Resistance range:	20mΩ, 200mΩ
UUT diameter:	max. 20mm
Accuracy:	± 5% of full scale ± 4 digit
Repeatability of UUT variations position in clamp opening:	± 3% of full scale ± 1mΩ

Overall dimension: (without cable)	Width:	approx. 50mm
	Depth:	approx. 30mm
	Height:	approx. 135mm
Jaws opening:	approx. 21mm	
Weight:	approx. 700g	
Cable length:	3m	

IMPEDANCE MEASUREMENT CLAMP <IMZ8>

(TEST-FUCHS item no. 150020608)

- Symmetric design
- Capable of being used on cables in a confined area of up to approx 36mm dia
- Spring loaded to closed (operating) position
- Combined Supply and Current Measurement Clamps
- Symmetric windings for high repeatability
- "Measure" button

TECHNICAL DATA

Frequency:	for test equipment with 1 or 2kHz
Resistance range:	20mΩ, 200mΩ
UUT diameter:	max. 36mm
Accuracy:	± 5% of full scale ± 4 digit
Repeatability of UUT variations-position in clamp opening:	± 3% of full scale ± 1mΩ

Overall dimension: (without cable)	Width:	approx. 72mm
	Depth:	approx. 31mm
	Height:	approx. 134mm
Jaws opening:	approx. 40mm	
Weight:	approx. 700g	
Cable length:	3m	

IMPEDANCE MEASUREMENT CLAMP <IMZ9>

(TEST-FUCHS item no. 150020613)

- Symmetric design
- Capable of being used on cables in a confined area of up to approx 70mm dia
- Spring loaded to closed (operating) position
- Combined Supply and Current Measurement Clamp
- Symmetric windings for high repeatability
- "Measure" button

TECHNICAL DATA

Frequency:	for test equipment with 1 or 2kHz
Resistance range:	20mΩ, 200mΩ
UUT diameter:	max. 66mm
Accuracy:	± 5% of full scale ± 4 digit
Repeatability of UUT variations-position in clamp opening:	± 3% of full scale ± 1mΩ

Overall dimension: (without cable)	Width:	approx 106mm
	Depth:	approx 40mm
	Height:	approx 190mm
Jaws opening:	approx 70mm	
Weight:	approx 850g	
Cable length:	3m	

SPECIAL TO TYPE MODELS ARE AVAILABLE ON REQUEST!

Antistatic Paint Testers

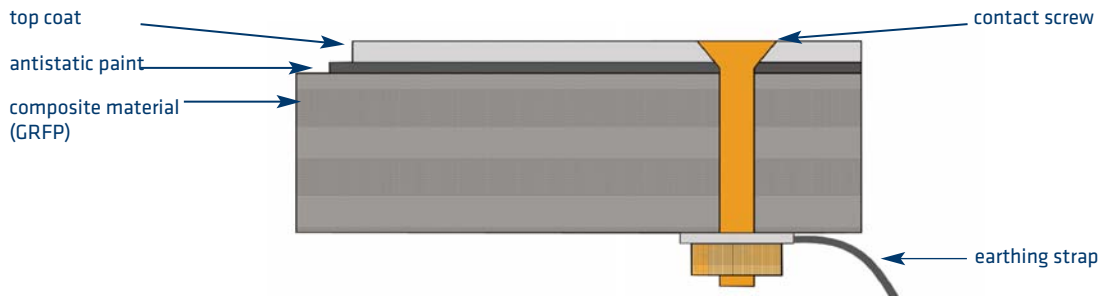
To dissipate electrostatic charges, all outer non-conductive surfaces of the aircraft are painted with a conductive coating (antistatic paint). On top of this coat there is a layer of non-conductive, anti-corrosion paint.

The antistatic paint must be tested for conductivity as well as its adhesion without damaging the coatings.

These measurements are carried out with special flexible measuring heads, matching the aircraft's contours. The measuring heads are used in combination with the TEST-FUCHS Antistatic Paint Tester <IA2>.

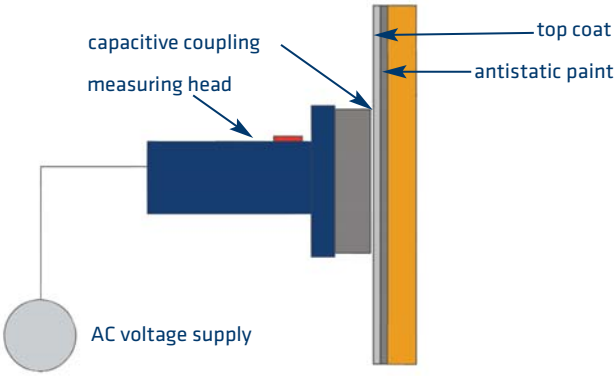
The Antistatic Paint Tester enables quick, easy and accurate testing of the surface and volume resistances of the aircraft's exterior surfaces.

COMPOSITION OF ANTISTATIC PAINT



Measurement mode S 1:

Measurement of surface resistance through insulating layers:

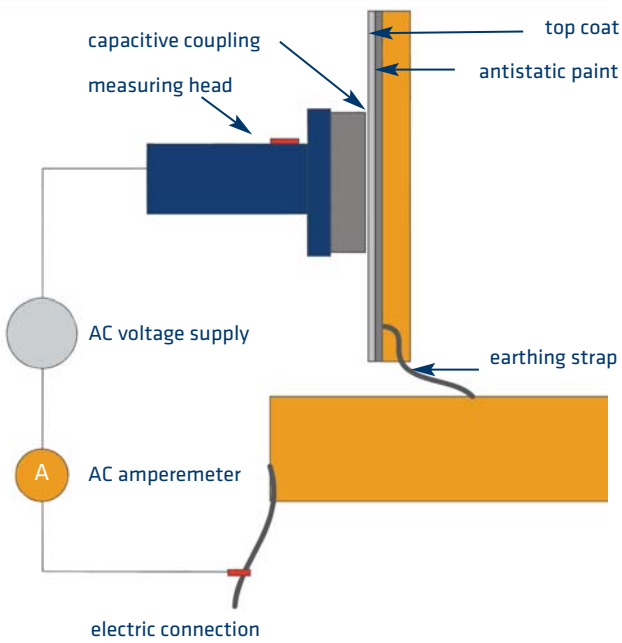


Typical measured values:
20 kOhm to 2 MOhm (volume resistance)

Measurement frequency:
20 kHz

Measurement mode B 1:

Measurement of resistance from the measurement point of the structure connection (volume resistance):



There are flexible measuring heads for various contours of different aircraft!

Anti Static Paint Tester

>IA2<

>IA2<
(TEST-FUCHS item no. 150020606)

The Anti Static Paint Tester is designed for fast and simple testing of conductive layers and their bonding.

- Light, practicable test equipment
- Battery powered, rechargeable in situ or removed
- Measurement of surface resistance through insulated layers (Mode S1)
- Measurement of contact resistance (Mode B1) to the structure connection through insulated layers
- Automatic field switching

GENERAL INFORMATION

- Has a galvanically isolated interface for remote control or data exchange
- Specific measuring heads conforming to curved surfaces
- Visual and acoustic signals for over/under limit values
- Incl. self test unit for function control of the test equipment and the measuring heads

TECHNICAL DATA

General informations:

Power operation with power supply:	1/N/PE AC 50Hz 230V ± 10%
Battery life:	> 200 measurements
Battery:	7.2V Li-Ion
Charging time:	6 hours
Measurement mode:	S1: Surface-Surface B1: Surface-Structure
Measurement range S1:	depends on sensor
Measurement range B1:	depends on sensor
Measuring frequency:	20kHz
Accuracy:	± 10% of reading ± 2 digit

Dimensions and weight:

Length:	approx. 25cm
Width:	approx. 13cm
Height:	approx. 16cm
Weight:	2.5kg

INCLUDED IN STANDARD SCOPE OF DELIVERY:

1 Battery "S307149"
(TEST-FUCHS item no. 106220110)

1 Self test plate B1
<S306294>
(TEST-FUCHS item no. 103230133)
not calibrated

Shoulder strap "1472"
(TEST-FUCHS item no. 106330923)

1 Bonding cable PKL320-1
length: 5m
(TEST-FUCHS item no. 103240311)

Power supply unit incl. power cable for charging "S306287"
(TEST-FUCHS item no. 103070362)

NOTE:

The required measuring head is not included in the standard scope of delivery.

>IA2<

Optional Accessories For Antistatic Paint Tester >IA2<

Transport case "EXPLORER" (TEST-FUCHS item no. 107101335)

Very robust, stackable
Lined with foam

Storage compartment for:	- Anti-Static Paint Tester <IA2>
	- Accessories
	- Documentation
Dimensions:	58 x 44 x 16cm
Weight:	approx. 5kg

Battery (TEST-FUCHS item no. 106220110)

Manufacturer:	SWIT
Model:	S-8970
Output voltage:	7.2V
Power:	47.5Wh

Intermediate charging possible (no memory effect)
The equipment is fitted with one battery

External charger for 2 batteries incl. power cable (TEST-FUCHS item no. 106220111)

Manufacturer:	SWIT
Model:	SC-3602F
Input:	AC 100 to 240V; 50 / 60Hz
Output:	DC 7 to 8.4V; 1.8A

Possible to charge 2 batteries at the same time

Recommended Standard Measuring Head For Anti Static Paint Tester >IA2<

<IATP3> Specially optimized for use in Measurement Mode B1 (TEST-FUCHS item no. 150020603)

Dimensions:	Ø 76 x 130mm
Connecting cable	3m
Measurement range:	B1: 20kΩ bis 2MΩ
Accuracy:	±10% ±2 digit of reading
MAX-LED at head	YES
Measurement button:	YES
Max. paint thickness:	1mm
Test surface:	Max. radius 200mm
Contact pressure:	0.2 to 2kg (2 to 20N) alternative
Special feature:	Skydrol resistent

BONDING CABLES

Bonding Cable Extension 5m PKL320-2
(TEST-FUCHS item no. 103240318)

Measuring Head Cable Extension 10m PKL320-3
(TEST-FUCHS item no. 103240319)

NOTE:

Other measuring heads and special designs are available on request!

Technical data are subject to change!

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Bonding And Loop Resistance Tester

>BLRT2-XX-X<

<BLRT2>
TEST-FUCHS part no. 151020031

AIRBUS CERTIFIED

The equipment is developed as multifunctional bonding tester. It is especially used in aircraft manufacturing. It can be used on all aircraft types. It is capable of performing various tests depending on used accessories.

The test capability ranges from simple 4-wire bonding tests to loop resistance testing using current clamps with or without current measuring clamps up to special tests e.g. ESN tests (electrical structure network) or bonding test of multiple connected earth connections.

- All testing features can be selected and combined independently. Options can also be retrofitted at a later stage
- The tester is housed in a light and practical case with handle ensuring easy handling by the user
- The high capacity accumulator ensures that the equipment can be used for long periods of time
- A wide range of accessories is available for this tester

GENERAL INFORMATION

- Large display for good readability
- User friendly software for easy operator use
- Multi-function tester with selectable standard and special functions
- Clamps and cables are coded
- USB interface
- Memory capacity for 1,000 measuring values (including date and time)
- PC-Software for data processing is available
- Including self test unit for function control of the test equipment and the measuring clamps

TECHNICAL DATA

> Electrical supply (requirements):

Mains charger adapter:	1/N/PE AC 50Hz
Accumulator:	2 x Li-Ion 7.2V 47.5Wh

> Functions:

Measuring functions:	see "FUNCTIONS"
Ranges:	see "OPTIONS"
Accuracy:	see "OPTIONS"

> Output values:

Output voltage DC:	max. 7VDC
Output current DC:	max. 10ADC
Output voltage AC:	max. 40VAC
Output power AC:	max. 30W

> Measurement range:

Functions:	Measurement ranges and tolerances are listed in the item "FUNCTIONS"	
Battery voltage:	Range:	0 to 10V
	Tolerance:	0.5% of reading

> Interface:

Interface:	USB (Mini USB)
Memory capacity:	min. 1,000 measuring values

> Operating conditions (operation):

Temperature:	-15°C to +50°C (+5°F to +122°F) does not apply to all measuring functions
	+10°C to +50°C (+50°F to +122°F) for "Single Clamp Measurement"
Rel. humidity:	max. 95% relative humidity (non-condensing)

> Operating conditions (storage):

Temperature:	-20°C to +70°C (-4°F to 158°F)
Rel. humidity:	max. 95% relative humidity (non-condensing)

> Dimensions and weight:

Width:	approx. 250mm (9.8in)
Depth:	approx. 170mm (6.7in)
Height:	approx. 170mm (6.7in)
Weight:	approx. 3.2kg (7.1lb)

>BLRT2<

FUNCTIONS

BONDING TESTER (OPTION B)
(TEST-FUCHS part no. 151020036)

> Technical description

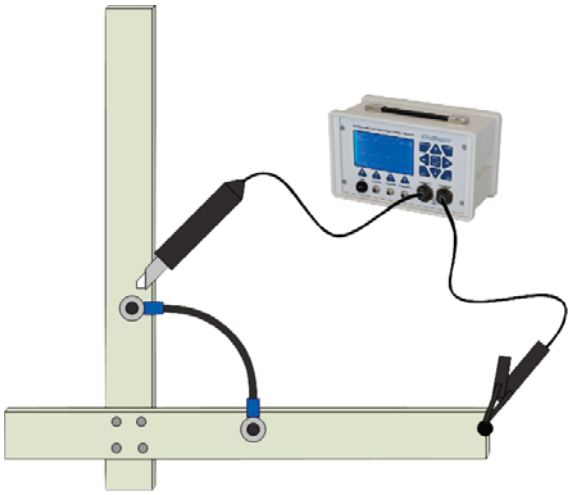
Bonding Tester with 10A, 1A and 0.1A test current. It works as a Kelvin Resistance Meter.

The bonding tester measures the resistive connection between two measuring points.

During the bonding test an increased test current is injected in the unit under test by means of test probes or terminals. The voltage drop is recorded on two test points. The contact resistance between voltage test points is calculated by means of current and voltage values.

This measuring method only works when the total measurement current flows through the unit under test.

Schematic diagram of the test set-up



BONDING TEST FOR MULTIPLE CROSSED CONNECTIONS (UP TO 20A) (OPTION C)
(TEST-FUCHS part no. 151020037)

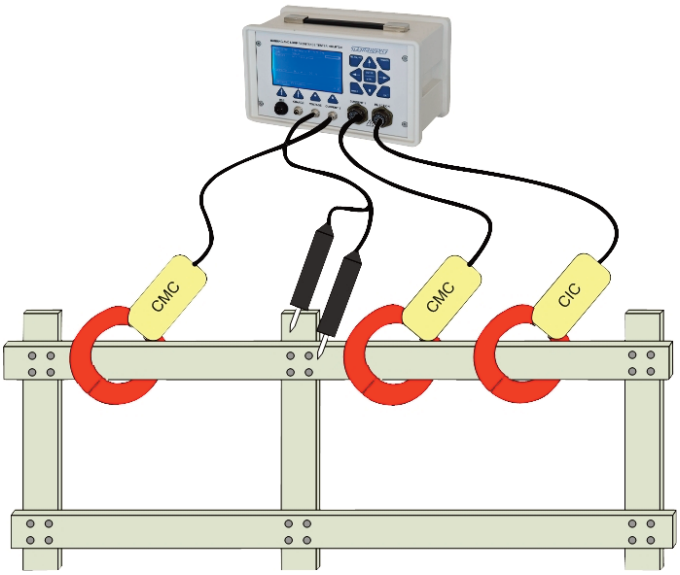
> Technical description

This bonding test is carried out when the injected test current can flow through different paths and there is a physical access to the unit under test.

The test current is injected by means of a "Current Injection Clamp" (CIC). Here a loop resistance is necessary. The "Current Measurement Clamp" (CMC) measures this test current. The voltage drop at the UUT is measured by means of a pair of voltage test probes. The injected current which is not flowing through the unit under test is measured by means of an additional "Current Measurement Clamp" (CMC) and is taken into account at the calculation.

The contact resistance is determined by means of measured currents and voltage drop.

Schematic diagram of the test set-up



>BLRT2<

FUNCTIONS

HIGH CURRENT / LOW FREQUENCY MICRO-OHMMETER (OPTION E)

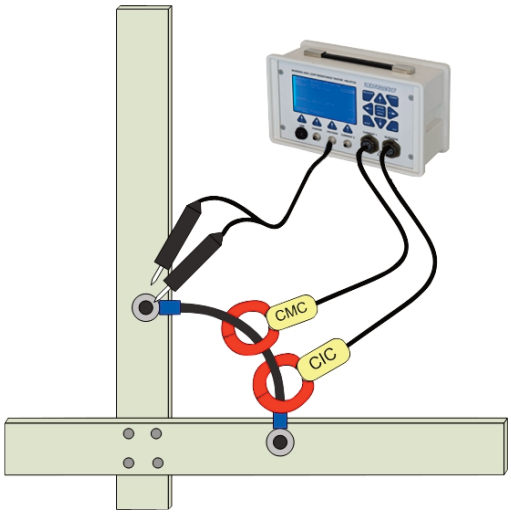
(TEST-FUCHS part no. 151020038)

> Technical description

The "High Current / Low Frequency Test" (up to 150A and with different frequencies) is used to evaluate the quality of the connections.

The very high test current with low frequency is injected by means of a "Current Injection Clamp" (CIC) For this purpose a loop resistance is necessary. A "Current Measurement Clamp" (CMC) measures this test current. The voltage drop at the UUT is measured by a pair of voltage test probes. The contact resistance is determined by means of test current and voltage drop.

Schematic diagram of the test set-up



LOOP RESISTANCE TEST (OPTION L, M, N)

(TEST-FUCHS part no. 151020039 for option L - 1,000Hz)
(TEST-FUCHS part no. 151020040 for option M - 2,000Hz)
(TEST-FUCHS part no. 151020041 for option N - 100 to 200Hz)

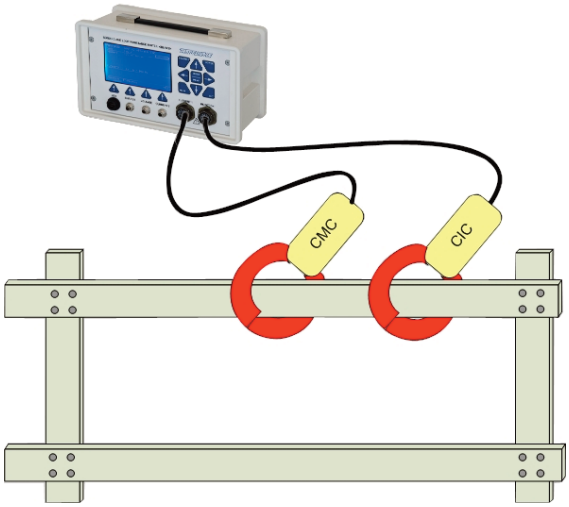
> Technical description

The "Loop Resistance Test" measures the overall resistance of a bonding loop. It is used for example when a metal tube has multiple connections to structure.

A "Current Injection Clamp" (CIC) injects alternating current into the current loop and the required voltage is measured. A "Current Measurement Clamp" (CMC) measures the injected current. The overall resistance of the current loop is calculated by means of voltage and current value.

For this method it is essential that there is only one current loop.

Schematic diagram of the test set-up



>BLRT2<

FUNCTIONS

OVERBRAID TEST (OPTION O)
(TEST-FUCHS part no. 151020042)

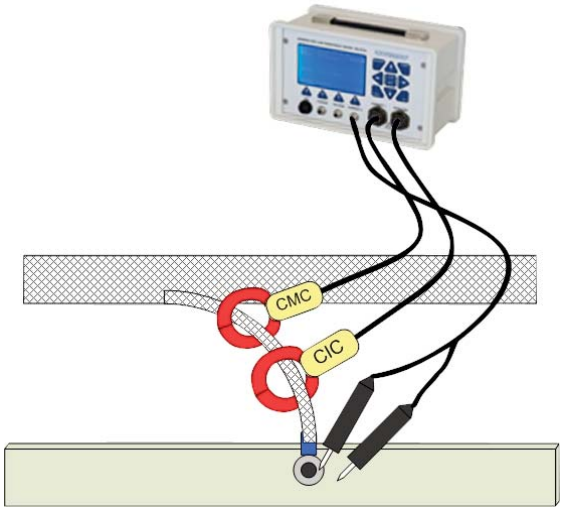
> Technical description

The Overbraid Test verifies whether bonding connections (e.g. of a shielding braid) are properly connected to the structure.

The test current of up to 10A is injected by means of the "Current Injection Clamp" (CIC). For this purpose a loop resistance is necessary. A "Current Measurement Clamp" (CMC) measures this test current. The voltage drop at the connection is measured by means of a pair of voltage test probes. The contact resistance is determined by means of test current and voltage drop.

This test method is similar to option E however lower currents are used in this case.

Schematic diagram of the test set-up



HIGH RESISTANCE LOOP TEST (OPTION P)
(TEST-FUCHS part no. 159060017)

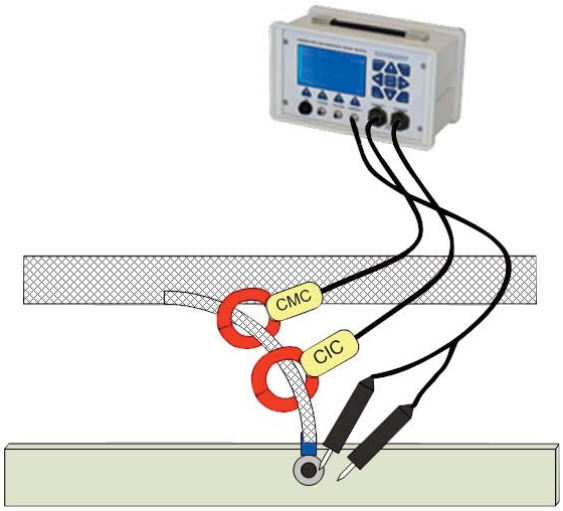
> Technical description

With this bonding test, the loop impedance and ohmic resistance are determined, also if these are rather high (< 4 Ohm). In addition the ohmic resistance on one connection can be determined by choice .

By means of the "Current Injection Clamp" (CIC), the test current is injected. For this purpose, a loop resistance is necessary. The required voltage is measured. A "Current Measurement Clamp" (CMC) measures the test current. The impedance and the ohmic resistance of the loop are calculated with these voltage and current values.

In addition, the voltage drop at the connection can be measured by means of a pair of voltage test probes. In this case the ohmic resistance of the connection is determined.

Schematic diagram of the test set-up



>BLRT2<

FUNCTIONS

MICRO-OHMMETER WITH SEPARATE CURRENT MEASUREMENT CLAMP (OPTION S)

(TEST-FUCHS part no. 151020043)

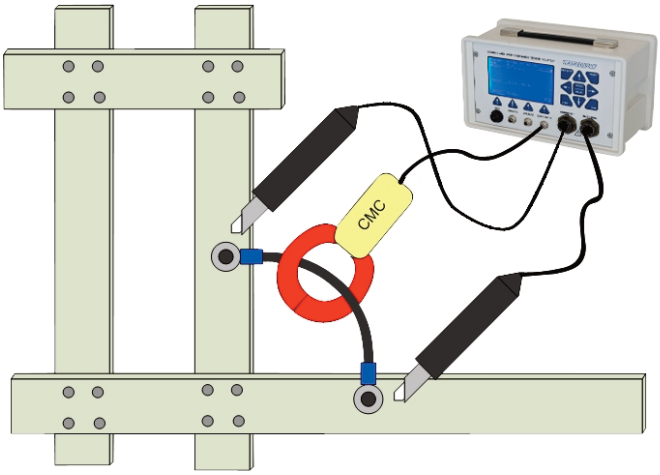
> Technical description

This bonding test is carried out when the injected test current can use different paths and there is a physical access to the unit under test (also for the current measuring clamp). When this is not the case, option C can be used instead.

This bonding test operates like a standard bonding test (option B), in addition the real UUT current is measured by means of a „Current Measurement Clamp".

The result is the contact resistance of the connection element which is located between the voltage probes and which is enclosed by the current probe.

Schematic diagram of the test-setup



>BLRT2<

FUNCTIONS

WIRELESS COMMUNICATION (OPTION V)
(TEST-FUCHS part no. 151020044)

> **Technical description**

Automatic wireless transfer of data between the <BLRT2> and a PC can be performed. For this purpose a RF USB stick is inserted into the PC.

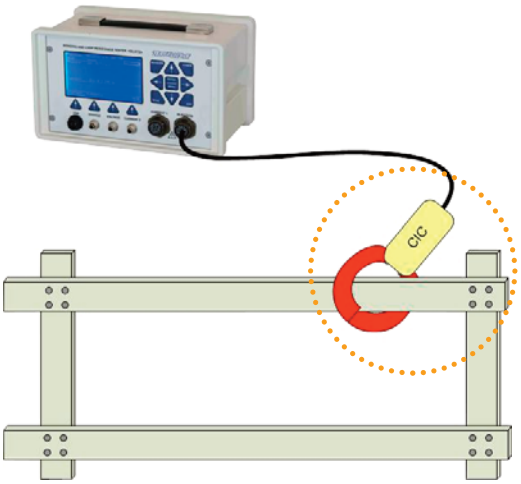
SINGLE CLAMP MEASUREMENT (OPTION Y)
(TEST-FUCHS part no. 151020045)

> **Technical description**

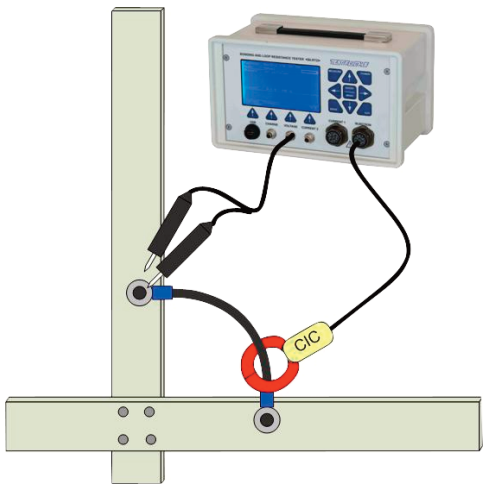
Single Clamp Measurement for the options E and N.

Many of the functions require one "Current Injection Clamp" (CIC) and one "Current Measurement Clamp" (CMC). When, due to space strictions, it is not possible to attach two clamps to the unit under test, the "Single Clamp Measurement" method can be used. In this case only one clamp is used (to inject the current). The injected current is calculated using the operating parameters. The advantage of this method is that measurements can easily be carried out and the number of clamps is reduced to one. The disadvantage is that the measurement accuracy is reduced by approx. +2% of reading (depends on the used function).

Schematic diagram of the test set-up



Loop Resistance
Test (Option L,M,N)
Single Clamp Measurement



High Current / Low Frequency
Test (Option E)
Single Clamp Measurement

>BLRT2<

FUNCTIONS

CAPACITIVE MEASUREMENT (OPTION Z)

(TEST-FUCHS part no. 151020046)

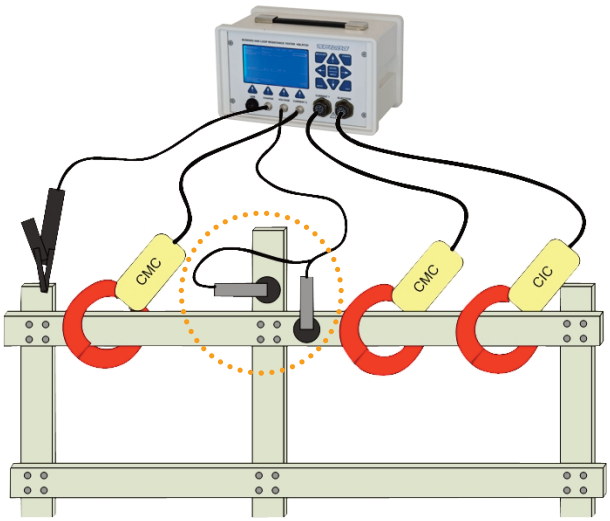
> Technical description

Voltage probes must have a conductive connection to the metal. Therefore it might be necessary to break through the varnish coating of the UUT which will require renewal after test completion.

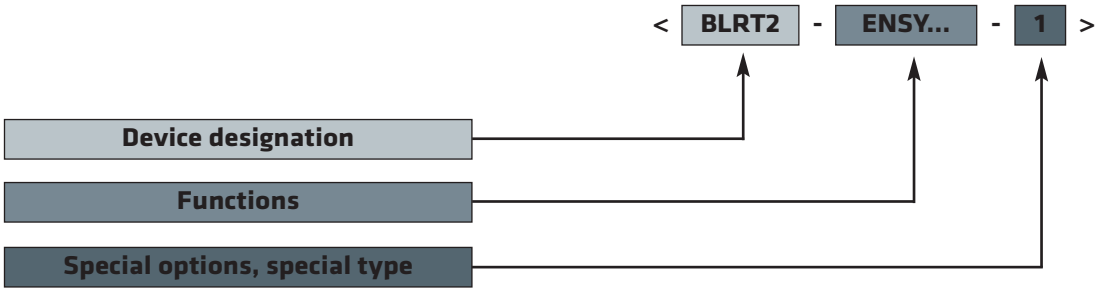
To avoid this extensive process it is possible to use capacitive voltage measurement instead of the voltage probes. This can replace one or both voltage measurements. This test method can only be used for AC measurements.

Due to the capacitive measurement system, the accuracy of measurements is reduced by approx. +3% (depending on the used function).

Schematic diagram of the sensor



TYPE KEY



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OPTIONS

Option	Function	TEST-FUCHS part no.	Measure-ment (mOhm)	Resolution (µOhm)	Adjustable current (A)	Frequency (Hz)	Standard accuracy (% of reading)	Required accessories	Remarks
B	Bonding Tester	151020036	2 to 1000 at 0.1A	1	0.1 1 10	DC	0.2% reading +0.2% final v.	2 x Kelvin Probe	*(available)* Standard Bonding
C	Bonding Test for Multiple Crossed Connections	151020037	0.01 to 100	1	10 20	1000	10 ±2µOhm	1 x Voltage Probe 1 x Current Injection Clamp 2 x Current Measurement Clamp	*(under development)*
E	High Current / Low Frequency Micro-Ohmmeter	151020038	Rc: 0.005 to 0.5 Zloop: 0.1 to 20	0.1	10 20 50 100 150	100 200	Rc: 10 ±1µOhm Zloop: 10±20µOhm	1 x Current Injection Clamp 1 x Current Measurement Clamp or 1 x Combined Injection Measurement Clamp and 1 x Voltage Probe	*(available)* e.g.: used for ESN Measurement
L	Loop Resistance Tester 1000Hz	151020039	1 to 200	10	1 10	1000	5 ±50µOhm	1 x Current Injection Clamp 1 x Current Measurement Clamp or 1 x Combined Injection Measurement Clamp	*(available)* Standard Loop Resi-stance Test
M	Loop Resistance Tester 2000Hz	151020040	1 to 200	10	1 10	2000	5 ±50µOhm	1 x Current Injection Clamp 1 x Current Measurement Clamp or 1 x Combined Injection Measurement Clamp	*(development is planned)*
N	Loop Resistance Tester 100Hz	151020041	0.1 to 20	1	0.1 1 10	100 200	10 ±20µOhm	1 x Current Injection Clamp 1 x Current Measurement Clamp or 1 x Combined Injection Measurement Clamp	*(available)* e.g.: used for ESN Measurement
O	Overbraid Test	151020042	Rc: 0.005 to 0.5 Zloop: 0.1 to 20	1	0.1 1 10	100 200	Rc: 10 ±1µOhm Zloop: 10 ±20µOhm	1 x Current Injection Clamp 1 x Current Measurement Clamp or 1 x Combined Injection Measurement Clamp and 1 x Voltage probe	*(available)*
P	High Loop Resistance Tester	159060017	Zloop: 1 to 4000 Rc: 0.01 to 4000	10 or 1000	max. 1	200	Zloop: 5 ±0.2µOhm Rc: ± 5 % reading or 0.2µOhm	1 x Current Injection Clamp 1 x Current Measurement Clamp or 1 x Combined Injection Measurement Clamp	*(available)*
S	Micro-Ohmmeter with separate Current Measu-rement Clamp	151020043	0.1 to 10	1	0.1 1 10	DC	10	2 x Kelvin Probe 1 x Current Measurement Clamp	*(available)* e.g.: used for ESN Measurement
V	Wireless communication	151020044				858MHz		RF USB Stick for Computer	RF 858MHz *(development is planned)*
Y	Single Clamp Measurement	151020045					additional 2%	only Current Injection Clamp required	*(available)* In combination with one of these options: E, L, M, N, O
Z	Capacitive Measurement	151020046					additional 3%		In combination with one of these options: E, O *(development is planned)*

Standard Accessories For Bonding And Loop Resistance Tester >BLRT2-XX-X<

Battery Package
(2 batteries "SWIT S-307149")
(TEST-FUCHS part no. 106220138)

Manufacturer:	SWIT
Type:	S-307149
Output voltage:	7.2V
Power:	47.5Wh
Current output:	min. 6A

Intermediate charging is possible
(no memory effect)

Power Supply Unit "S307164"
(TEST-FUCHS part no. 103070582)

Shoulder Strap
Type "1472"
(TEST-FUCHS part no. 106330923)

Connection Cable
Mini USB B-A 2m
(TEST-FUCHS part no. 106331470)

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Optional Accessories For Bonding And Loop Resistance Tester >BLRT2-XX-X<

Storage Case "EXPLORER 8.850-W"
(TEST-FUCHS part no. 150090174)

With wheels and extendable handle
Very solid and stackable
Inside coated with foam
Compartments for: - BONDING AND LOOP RESISTANCE TESTER <BLRT2-XX-X>
- Various accessories
- Technical documentation
Dimensions: approx. 650 x 500 x 250mm (approx. 25.6 x 19.7 x 9.8in)
Weight (empty): approx. 5kg (approx. 11.0lb)

Standard Battery Charger
(TEST-FUCHS part no. 103230267)

Manufacturer: TEST-FUCHS
Type: S274257
Input: AC 100 to 240V; 50 / 60Hz
Output: DC 7 to 8.4V; 1.8A
Loading time: approx. 4h (90%)
Two batteries can be charged at the same time

Extended Battery Charger
(TEST-FUCHS part no. 103070532)

Manufacturer: TEST-FUCHS
Type: S307139
Input: AC 100 to 240V; 50 / 60Hz
Output: DC 12 to 17V; 10A
Loading time: approx. 1.5h (90%)
Two batteries can be charged at the same time

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Self Test Unit
(TEST-FUCHS part no. 106375881)

Manufacturer:	TEST-FUCHS
Type:	L1708/000/000
Functions:	E, S, N
not calibrated	

Body Strap
Type „1-8151“
(TEST-FUCHS part no. 106331548)

>BLRT2<

Small Current Injection Clamp <CIC1>
(TEST-FUCHS part no. 151020047)

Manufacturer:	Fluke modified by TEST-FUCHS
Inner diameter:	21mm (0.8in)
Length:	135mm (5.3in)
Width of the clamp:	18mm (0.7in)
Width of the clamp housing:	28mm (1.1in)
Height:	48mm (1.9in)
Weight:	494g (1.1lb)
Cable length:	4m (157.5in)
Windings, primary:	180
Windings, measurement:	30
Supply max. 100Hz:	7.2V
Supply max. 200Hz:	13.5V
Supply max. 400Hz:	22V
Uloop max. 100Hz:	36mV
Uloop max. 200Hz:	67.5mV
Uloop max. 400Hz:	110mV
Uloop max. 1000Hz:	185mV
Uloop max. 2000Hz:	205mV
Clamp Open Detection:	not included
Integr. temperature sensor:	not included

Big Current Injection Clamp <CIC2>
(TEST-FUCHS part no. 151020049)

Manufacturer:	Metrel modified by TEST-FUCHS
Inner diameter:	55mm (2.2in)
Length:	170mm (6.7in)
Width of the clamp:	36mm (1.4in)
Width of the clamp housing:	36mm (1.4in)
Height:	97mm (3.8in)
Weight:	877g (1.9lb)
Cable length:	4m (157.5in)
Windings, primary:	180
Windings, measurement:	30
Supply max. 100Hz:	16.5V
Supply max. 200Hz:	30V
Supply max. 400Hz:	37V
Uloop max. 100Hz:	82.5mV
Uloop max. 200Hz:	150mV
Uloop max. 400Hz:	185mV
Clamp Open Detection:	not included
Integr. temperature sensor:	not included

>BLRT2<

Small Current Injection Clamp For Single Clamp And Clamp-Open Detection And Temperature Sensor <CIC5>

(TEST-FUCHS part no. 151020059)

Manufacturer:	Fluke modified by TEST-FUCHS
Inner diameter:	23mm (0.9in)
Length:	135mm (5.3in)
Width of the clamp (reduced):	13mm (0.5in)
Width of clamp housing:	28mm (1.1in)
Height:	48mm (1.9in)
Weight:	494g (1.1lb)
Cable length:	4m (157.5in)
Windings, primary:	180
Windings, measurement:	30
Supply max. 100Hz:	7.2V
Supply max. 200Hz:	13.5V
Supply max. 400Hz:	22V
Uloop max. 100Hz:	36mV
Uloop max. 200Hz:	67.5mV
Uloop max. 400Hz:	110mV
Clamp Open Detection:	included
Integr. temperature sensor:	included

Big Current Injection Clamp For Single Clamp And Clamp-Open Detection And Temperature Sensor <CIC6>

(TEST-FUCHS part no. 151020060)

Manufacturer:	Metrel modified by TEST-FUCHS
Inner diameter:	55mm (2.2in)
Length:	170mm (6.7in)
Width of the clamp (rear):	36mm (1.4in)
Width of the clamp (front):	25mm (1.0in)
Width of the clamp housing:	36mm (1.4in)
Height:	97mm (3.8in)
Weight:	877g (1.9lb)
Cable length:	4m (157.5in)
Windings, primary:	180
Windings, measurement:	30
Supply max. 100Hz:	16.5V
Supply max. 200Hz:	30V
Supply max. 400Hz:	37V
Uloop max. 100Hz:	82.5mV
Uloop max. 200Hz:	150mV
Uloop max. 400Hz:	185mV
Clamp Open Detection:	included
Integr. temperature sensor:	included

>BLRT2<

Big Current Injection Clamp For Single Clamp And Clamp-Open Detection And Temperature Sensor <CIC8>

(TEST-FUCHS part no. 150020835)

Manufacturer:	Metrel modified by TEST-FUCHS
Inner diameter:	55mm (2.2in)
Length:	170mm (6.7in)
Width of the clamp (rear):	36mm (1.4in)
Width of the clamp (front):	25mm (1.0in)
Width of the clamp housing:	36mm (1.4in)
Height:	97mm (3.8in)
Weight:	877g (1.9lb)
Cable length:	4m (157.5in)
Windings, primary:	180
Windings, measurement:	30
Supply max. 100Hz:	16.5V
Supply max. 200Hz:	30V
Supply max. 400Hz:	37V
Uloop max. 100Hz:	82.5mV
Uloop max. 200Hz:	150mV
Uloop max. 400Hz:	185mV
Clamp Open Detection:	included
Integr. temperature sensor:	included

>BLRT2<

Small Current Measurement Clamp <CMC1>
(TEST-FUCHS part no. 151020048)

Manufacturer:	Fluke modified by TEST-FUCHS
Inner diameter:	21mm (0.8in)
Length:	135mm (5.3in)
Width of the clamp:	18mm (0.7in)
Width of the clamp housing:	28mm (1.1in)
Height:	48mm (1.9in)
Weight:	494g (1.1lb)
Cable length:	4m (157.5in)
Windings, primary:	1,000
Max. current measurement:	150A

Big Current Measurement Clamp <CMC2>
(TEST-FUCHS part no. 151020050)

Manufacturer:	Metrel modified by TEST-FUCHS
Inner diameter:	55mm (2.2in)
Length:	170mm (6.7in)
Width of the clamp:	36mm (1.4in)
Width of the clamp housing:	36mm (1.4in)
Height:	97mm (3.8in)
Weight:	877g (1.9lb)
Cable length:	4m (157.5in)
Windings, primary:	1,000
Max. current measurement:	150A

>BLRT2<

Active DC Clamp <CMC3>
(TEST-FUCHS part no. 151020051)

Active, small AC and DC current measurement clamp

Supplied by the <BLRT2> thus batteries are not required

The switch and regulator that are fitted on the clamp are deactivated and have no influence on the operation

Manufacturer:	Fluke modified by TEST-FUCHS
Inner diameter:	20mm (0.8in)
Length:	180mm (7.1in)
Width of the clamp:	15mm (0.6in)
Width of the clamp housing:	25mm (1.0in)
Height:	70mm (2.8in)
Weight:	326g (0.7lb)
Cable length:	4m (157.5in)
Proportion:	10mV/A AC and DC
Max. current measurement:	10A

Small Current Measurement Clamp - Reduced Size <CMC6>
(TEST-FUCHS part no. 150090173)

Manufacturer:	Fluke modified by TEST-FUCHS
Inner diameter:	23mm (0.9in)
Length:	135mm (5.3in)
Width of clamp (reduced):	13mm (0.5in)
Width of clamp housing:	28mm (1.1in)
Height:	48mm (1.9in)
Height of a clamp arm (reduced):	8.5mm (0.3in)
Weight:	494g (1.1lb)
Cable length:	4m (157.5in)
Windings, primary:	1.000
Max. current measurement:	150A

>BLRT2<

Small Combined Injection / Measurement Clamp <CIMC7>

(TEST-FUCHS part no. 151020052)

Manufacturer:	TEST-FUCHS
Inner diameter:	26mm (1.0in)
Length:	175mm (6.9in)
Width of clamp:	31mm (1.2in)
Width of clamp housing:	31mm (1.2in)
Height:	62mm (2.4in)
Height of a clamp arm:	16mm (0.6in)
Weight:	494g (1.1lb)
Cable length:	4m (157.5in)
Windings, primary:	360
Max. current measurement:	
- Voltage measurement:	60
- Current measurement:	1100
Maximal supply 1 kHz:	30V
Maximal Uloop 1 kHz:	83.3mV
Clamp Open Detection:	not included
Integr. temperature sensor:	not included

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Kelvin Probes With Extended Tips Injection <PKL552-2>

(TEST-FUCHS part no. 103240488)

Hardened and spring-loaded Kelvin tips were developed by TEST-FUCHS

Design of these tips ensures their capability to test through varnished and anodized material

The tips are made of hardened steel and can be exchanged

The cable is designed for one current injection and one voltage metering

The plug has to be connected to the plug “INJECTION“ of the <BLRT2>

The cable length is 4m (157.5in)

Kelvin Probes With Extended Tips Current 1 <PKL552-3>

(TEST-FUCHS part no. 103240489)

Hardened and spring-loaded Kelvin tips were developed by TEST-FUCHS

Design of these tips ensures their capability to test through varnished and anodized material

The tips are made of hardened steel and can be exchanged

The cable is designed for one current injection and one voltage metering

The plug has to be connected to the plug “CURRENT 1“ of the <BLRT2>

The cable length is 4m (157.5in)

>BLRT2<

Kelvin Probes With Standard Tips Injection <PKL552-4>

(TEST-FUCHS part no. 103240490)

Standard Kelvin tips

Kelvin tips are required for injecting current and for voltage metering

The cable is designed for one current injection and one voltage metering

The plug has to be connected to the plug “INJECTION“ of the <BLRT2>

The cable length is 4m (157.5in)

Kelvin Probes With Standard Tips Current 1 <PKL552-5>

(TEST-FUCHS part no. 103240491)

Standard Kelvin tips

Kelvin tips are required for injecting current and for voltage metering

The cable is designed for one current injection and one voltage metering

The plug has to be connected to the plug “CURRENT 1“ of the <BLRT2>

The cable length is 4m (157.5in)

>BLRT2<

Voltage Probes With Extended Tips <PKL552-6>

(TEST-FUCHS part no. 103240502)

Two point voltage metering tips with hardened tips

Hardened tips were developed by TEST-FUCHS

Design of these tips ensures their capability to break through varnished and anodized material

The tips are made of hardened steel and can be exchanged

While using this cable, there is no need of any other voltage metering

The plug has to be connected to the plug "VOLTAGE" of the <BLRT2>

The cable length is 4m (157.5in)

Injection Probes With Banana Plug And Clips <PKL552-8>

(TEST-FUCHS part no. 103240517)

This cable is used if the test current is fed separately into the measuring point

The tips can be chosen. In the scope of delivery there are two measuring tips and two crocodile clips

Instead of the delivered measuring tips also other tips can be used if they are approved for 10A test current for three seconds

The cable length is 2m (78.7in)

FURTHER VERSIONS, OPTIONAL VERSIONS OR OTHER CABLE LENGTHS ARE AVAILABLE ON REQUEST.

>BLRT2<

Bonding And Loop Resistance Tester For A350

>ESNBLRT2KIT<

>ESNBLRT2KIT<
(TEST-FUCHS Art.-No. 150021129)

AIRBUS CERTIFIED

The equipment is developed as multifunctional bonding tester for AIRBUS A350.

The following options are realized for this type:

- High Current / Low Frequency Micro-Ohmmeter (Option E)
- Loop Resistance Test (Option N)
- Single Clamp Measurement (Option Y)

> The tester is housed in a light and practical case with handle for easy handling

> The high capacity accumulator ensures that the equipment can be used for long periods of time

> A wide range of accessories is offered according to the list on the following page

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SCOPE OF DELIVERY

> Basic device

BLRT2
(TEST-FUCHS Art-No. 151020031)

> Standard scope of delivery

Battery Package
(2 pcs Accu "SWIT S-307149")
(TEST-FUCHS Art-No. 106220138)

Power Supply Unit "S307164"
(TEST-FUCHS Art-No. 103070582)

Shoulder Strap Type "1472"
(TEST-FUCHS Art-No. 106330923)

Connecting Cable Mini USB B-A 2m
(TEST-FUCHS Art-No. 106331470)

> Options

High Current / Low Frequency Micro-Ohmmeter (Option E)
(TEST-FUCHS Art-No. 151020038)

Loop Resistance Test (Option N)
(TEST-FUCHS Art-No. 151020041)

Single Clamp Measurement (Option Y)
(TEST-FUCHS Art-No. 151020045)

> Additional accessories

Small Current Injection Clamp for Single Clamp and Clamp-Open Detection and Temperature Sensor <CIC5>
(TEST-FUCHS Art-No. 151020059)

Big Current Injection Clamp for Single Clamp and Clamp-Open Detection and Temperature Sensor <CIC8>
(TEST-FUCHS Art-No. 150020835)

Voltage Probes with Extended Tips <PKL552-6>
(TEST-FUCHS Art-No. 103240502)

Storage Case "EXPLORER 8.850-W"
(TEST-FUCHS Art-No. 150090174)

Standard Battery Charger
(TEST-FUCHS Art-No. 103230267)

Battery Package
(2 pcs Accu "SWIT S-307149")
(TEST-FUCHS Art-No. 106220138)

Self Test Unit
(TEST-FUCHS Art-No. 106361013)

An exact description of the accessories and the options can be taken of the product portfolio of the "Bonding and Loop Resistance Tester >BLRT2-XX-X<".

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