safety in test > safety in flight

TEST-FUCHS

Test Equipment for Airbus A400M

WWW.TEST-FUCHS.COM

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Water Separator System >WSS1-20SK<
Bonding Tester
A400M Tools

Hydraulic Servicing Trolley
>HST21DSKA< (Diesel Driven)
>HST21ESKA< (Electrically Driven)

HST21DSKA and HST21ESKA are part of the HST21 FAMILY.

> Designed for the use on the following aircraft types (in mineral oil and Skydrol version):

- AIRBUS A400M
- PANAVIA TORNADO
- EUROFIGHTER TYPHOON
- BAE SYSTEMS NIMROD
- BOEING SENTRY
- VICKERS VC10
- LOCKHEED TRISTAR
- BOMBARDIER GLOBAL EXPRESS (ASTOR)
- MCDONNELL DOUGLAS F18

> Is adaptable for other aircraft types as well.

BRIEF TECHNICAL DESCRIPTION OF THE HST21DSKA / HST21ESKA

> Worldwide operation

Temperature: -32 to +55°C, Altitude: 0 to 3,048m (10,000ft)
Ex-proofed to "Fire Standard E10, Hangars Zone 2"

> General details

Size:	Length: approx. 4,950mm, Height: 1,930mm, Width: 1,900mm
Maintainability:	Large access doors supported by gas-filled struts and careful design ensure easy accessibility to all components.
Calibration:	(1 year) Is carried out by using an automatic calibration unit.
Control System:	Performed by an industrial PC and measuring system.
Self-test:	Is built in and indicates errors on the display unit.
Modem:	Allows remote factory test, troubleshooting and correction.
Shutdown:	Performed automatically, or with emergency button when required.
Brakes:	Parking brakes are applied automatically upon tow-bar release.
Airtransportability:	All required standards are conformed with.

> Operation

The HST21DSKA / HST21ESKA is user friendly suitable for hydraulics engineers, operated through a touch screen display in manual or automatic mode, which shows all parameters and warning messages.

> Hydraulical parameters

Two hyd. circuits:	each producing 110lpm at 210bar
Hyd. oil:	Skydrol LD4/LD5, filter class 5, NAS 1638
Flushing manifolds:	Fluid sampling points and oil de-aeration are provided.
Aircraft reservoirs:	Can be drained or replenished with the HST21DSKA / HST21ESKA via return hoses. The 18m long hyd. hoses are mounted on a power driven reel.

> Pneumatical parameters

Pressurisation of aircraft reservoir with built-in pneumatic supply possible.

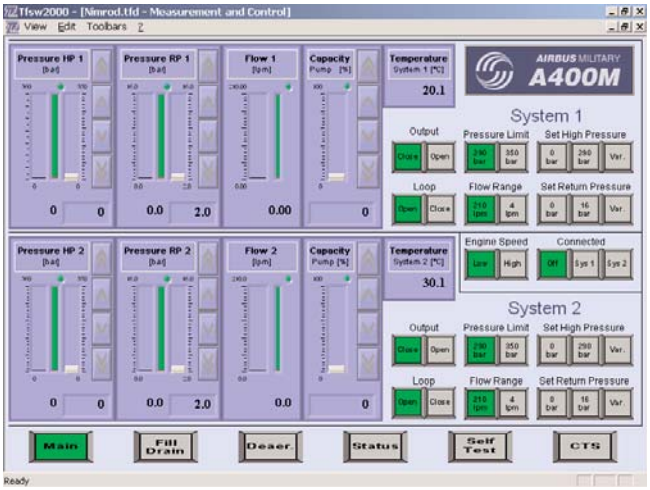
> Power -supply (HST21DSKA)

The hydraulic system is powered by a robust DEUTZ commercial diesel producing 152kW at 2,200rpm with a max. of 80dB at 1m.

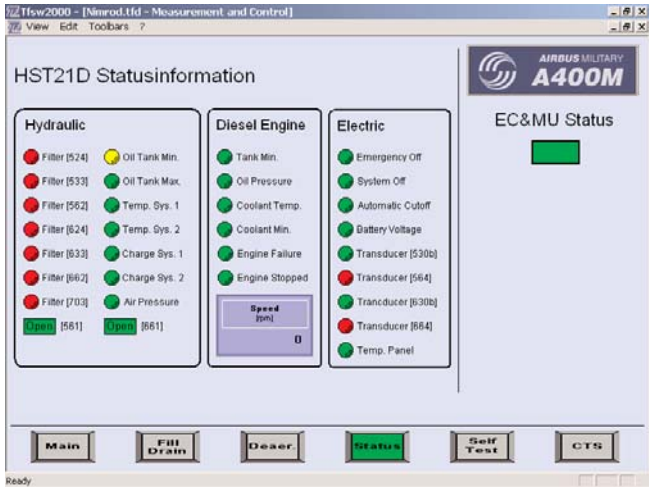
> Power supply (HST21ESKA)

The hydraulic system is powered by a commercial electric motor producing 132kW. The required electrical mains power is 3/PE AC 50Hz with a line fuse of 250A, via a 15m connection cable.

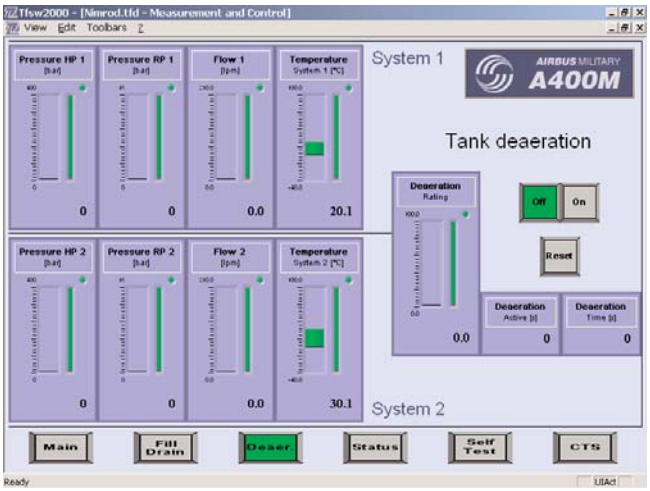
BRIEF DESCRIPTION OF THE OPERATING SYSTEM



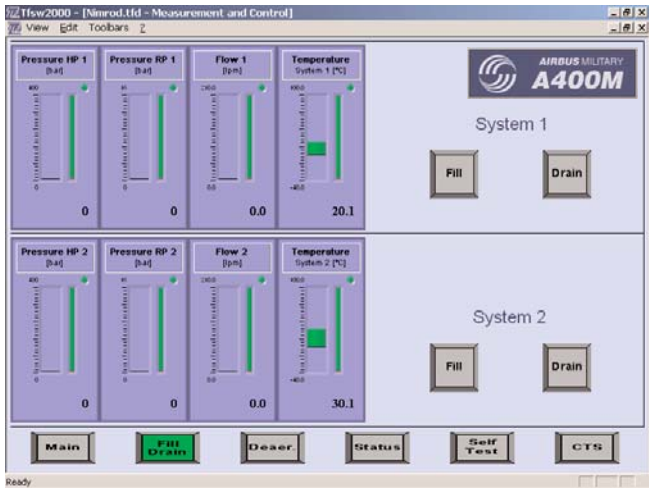
Main operating window



Status window



De-aeration window



Aircraft reservoir drain/replenish window

- The operating system is operated by inputting the values required directly on the touch screen or by using a keyboard if required.
- Operating windows can be saved and re-activated as is usual with a windows operating system.
- The operating windows are arranged in a logical operating sequence.
- Warning messages appear in the foreground of the window being used.
- Values for a particular aircraft type e.g. flow, pressure, temperature quantities etc. can be pre-set to avoid operator mistakes.
- Where required test sequences can be programmed via the touch screen without software changes being made.
- Software changes are not required when adapting to different aircraft types.
- Test values can be recorded and downloaded onto digital media.
- Operator skill level requirements are normal for a hydraulics engineer.

Oxygen and nitrogen trolley

>ONT1<

This equipment is developed to pressurize the AIRBUS A400M oxygen system with nitrogen for leakage and pressure tests in accordance with ATA Chapter 35.

It is possible to adapt this trolley for other aircraft types.

- The vacuum pump is driven by nitrogen, thus making it independent of electrical or compressed air supply
- Operating temperature -30 to +50 °C
- Maximum towing speed is 25 km/h (15 mph)
- A portable flow tester and ultrasonic leakage detector for ease of testing
- The equipment can operate in an unsheltered environment

GENERAL INFORMATION

- Three oxygen bottles and one nitrogen bottle are provided
- A compressed air driven pressure intensifier can be used when refilling the bottles from a source with lower pressure
- If required bottles can be removed separately
- Output is effected via a 10 m stainless steel hose mounted on a spring loaded drum
- Earthing cable with copper clamp approx. 15m with spring loaded drum
- Simple maintenance by means of a GRP cover fitted with a gas filled strut
- The parking brakes on the front axle are operated by lowering or lifting to the vertical position
- The operating panel is covered when not in use by a shutter

TECHNICAL DATA

Oxygen circuit:

Input pressure:	50 - 300 bar (725 - 4350 psi)
Output pressure:	0 - 150 bar (0 - 2176 psi) 192 bar (2785 psi)
Storage capacity: (3 bottles per 50 l)	150 l at 300 bar (40 USgal at 4350 psi)
Safety valve:	310 bar (4500 psi)

Nitrogen circuit:

Input pressure :	50 - 200 bar (725 - 2900 psi)
Output pressure:	0 - 10,5 bar (0 - 152 psi)
Storage capacity: (1 bottle)	50 l at 200 bar (13 USgal at 2900 psi)
Safety valve :	210 bar (3046 psi)

Pressure intensifier (for filling the unit):

Input pressure :	max. 300 bar (4350 psi)
Output pressure:	300 bar (4350 psi)
Working pressure: (Compressed air)	6 - 10 bar (87 - 145 psi)

Vacuum circuit:

Working pressure:	6 bar (87 psi) (Nitrogen)
Vacuum:	0.5 - 1 bar abs. (7.3 - 14.5 psi) 0 - 22.000 ft
Suction capacity:	33.6 Nl/min (0.9 USgal/min)

Measurements:

Pressure:	0 - 400 bar ± 4 bar (0 - 5800 psi ± 58 psi)
	0 - 250 bar ± 2.5 bar (0 - 3626 psi ± 36 psi)
	0 - 14 bar ± 0.1 bar (0 - 203 psi ± 1.5 psi)
Altimeter:	0 - 22.000 ft ± 100 ft
Flow:	0.2 - 5 lpm ± 0.2 lpm (0.05 - 1.3 USgpm ± 0.05 USgpm)

Dimensions and weight (tow bar vertical):

Length:	2890 mm	(9.5 ft)
Width:	1190 mm	(3.9 ft)
Height:	1420 mm	(4.7 ft)
Weight:	950 kg	(2094 lb)

OPTIONS

Many options are possible for adaption,
e.g.adaption to other aircraft types, to different touch-screens etc.

Technical data are subject to change!

Mobile Air Conditioner Diesel Motor Powered

>BKG8D<

The test stand is developed to air condition (cooling and heating) the AIRBUS A400M while on ground

It is possible to adapt this test stand for other aircraft types

- The fitted touch panel enables easy and user friendly control of the equipment
- The screw compressor requires little maintenance
- Continuous operation of the equipment is possible
- The device is provided with a high performance cooling capacity
- Pipes conveying air are thermally insulated
- The fitted diesel generator set operates in accordance with the EU emission standard IIIA

GENERAL INFORMATION

> Doors and coverings can be opened easily thus enabling easy access for maintenance

> The turntable steering ensures high maneuverability of the unit

> The parking brake is fitted at the rear axle

> Fork lift access points and tie down points are provided for transportation

TECHNICAL DATA

> Hydraulic / pneumatic parameters:

Adjustable air volume:
3000 or 6000m³/h
(105,944 or 211,888ft³/h)
(can be adjusted variably)

Supply pressure:
max. 10kPa (1.45psi)

Adjustable outlet temperature:
5 to 50°C (41 to 122°F)

Nominal cooling capacity:
150kW

Refrigerant:
R134a

Max. heating capacity:
75kW
(temperature is limited to 70°C)

> Diesel generator set:

Tank capacity:	400l
Diesel consumption at 75% engine load:	appr. 38.5lph

> Medium:

Ambient air

> Conditions of service:

Ambient temperature:	-25 to +49°C (-13 to 120.2°F)
Storage temperature:	-35 to +60°C (-31 to 159.8°F)
Altitude:	up to 1,000m above MSL (3,280ft)
Rel. air humidity:	10 to 100% (non-condensing)
Towing speed:	max. 10km/h (6.2mph)

> Dimensions and weight:

Length:	approx. 6,600mm	(252.0in),
	(tow bar stowed in vertical position)	
Width:	approx. 2,400mm	(94.5in)
Height:	approx. 2,500mm	(98.4in)
Weight:	approx. 6,400kg	(14.330lb)

OPTIONS

Various options are available to meet our customers' requirements,
e.g.: Appointed as power generator for other devices, operation without diesel generator with external power supply

>BKG8D<

Technical data are subject to change!

Calibration Transfer Standard

>CTS1<

For autocalibration of the “Hydraulic Servicing Trolley <HST21D> and <HST21E>.

Calibration of pressure and flow with comparison (reference) - sensors.

Adjustment of flow set-values via flow control valves.

- Instructions via monitor of the <HST21D/E> to carry out all necessary activities (e.g. identification, installation, printing)
- Controlling and recording of measuring data via PLC installed in the <CTS1> and connected as “Master” with the control- and measuring computer of the <HST21D/E>
- Temperature sensors to compensate different medium temperatures between <HST21D/E> and <CTS1>
- Self test before starting the calibration to find malfunctions of the test device <CTS1> or connection faults (e.g. operating voltage, line break, pressure, flow)

TECHNICAL DATA

> Operating conditions:

Ambient temperature
+18°C to +28°C

Humidity of air:
0-90 % rel. humidity
(non-condensing)

Pressure:
800 to 1200 mbar A
(800 mbar = 1950 m NN)

Operating temperature (Fluid):
+40°C to +65°C (70°C)

Electrical supply:
by <HST21D>

Hydraulic supply
by <HST21D>

> Measurements:

Flow:	0.02-4lpm
	accuracy: 0.25 % f.s.
Flow:	4-210lpm
	accuracy: 0.25 % f.s.
Pressure:	0-16bar
	accuracy: 0.125 % f.s.
Pressure:	0-400 bar
	accuracy: 0.125 % f.s.
Temperature :	0-50°C
(Ambience)	accuracy: +/-1 °C.
Temperature :	40-65 °C
(Fluid)	accuracy: +/- 0.25°C.

> Dimensions and weight:

Depth:	600mm
Width:	600mm
Height:	1.200mm
Weight:	approx. 235kg

Technical data are subject to change!

Electrical module for A400M cargo door and ramp operation

>MCDR1<

The Test Set <MCDR1> EADS CASA Part No: PrOOO0523620100A is designed to manually test and operate the A400M Cargo Door and Loading Ramp.

> The following functions can be carried out on the test set using the respective switches or buttons:
- Activating the hydraulic supply
- Releasing and locking the cargo door drive
- Opening and closing the cargo door
- Releasing and locking the ramp drive
- Extending and retracting the ramp

> The following operational status of the cargo door and ramp are indicated on the control panel:
- Hydraulic pressure indication
- Ramp pressure 1
- Ramp pressure 2
- Ramp pressure 3

GENERAL INFORMATION

> The Test Set <MCDR1> is equipped with Cable Harness to connect to the various UUT connections and to provide electrical power to the Test Set.

> EADS CASA P/N: PROO005236201A

TECHNICAL DATA

> **Electric Supply (Requirements):**

- Connection: 1/N/PE AC 50Hz 230V
- Power: 0,29kVA
- Nominal current: 1A
- Connection:: via cable with EURO earth contact shockproof plug

> **Electric Parameters:**

- Power consumption per solenoid:
  28VDC / 700mA
- Max. power consumption:
  6 Solenoids (4.2ADC) at the same time

> **Dimensions and Weight:**

- Length:	approx 250mm	(approx 0.8ft)
- Width:	approx 180mm	(approx 0.6ft)
- Height:	approx 85mm	(approx 0.3ft)
- Weight:	approx 6.2kg	(approx 13.7lb)

OPTIONS

A wide range of options is available to fulfil our customers requirements.
e.g.: Adaption for different aircraft types, etc.

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Bleeding Tool Set

>BTS1<

This rig is developed to bleed hydraulic components at stations 15 and 35 of the Airbus A400M in the final assembly line.

It can be used for other aircraft types when suitable adapted, in accordance with ATA Chapter 29.

- The rig can be used for any application using HYJET Type V
- The flow in the pressure and return lines can be regulated by throttle valves
- Two pressure gauges indicate the pressure in the pressure and return line
- A sight glass in the return line enables HYJET Type V to be observed

GENERAL INFORMATION

- Storage space is provided to enable various accessories e.g. test hoses and connecting hoses, adapters etc. to be stored.
- A drip tray enables leaked medium to be captured, which can be drained via a drain cock
- The rig is fitted with lifting rings and fork lift points and thus can be transported by crane, forklift truck or moved on its castors for short distances
- The use of stainless steel and anodised control consoles make the rig resistant to the test medium and cleaning fluids
- All components are permanently identified with their part number

Control Console with throttle valves, pressure gauges and the sight glass

TECHNICAL DATA

Dimensions and weight:

Length:	1.325mm (4,3ft)
Width:	950mm (3,1ft)
Height:	1.040mm (3,4ft)
Weight:	330kg (728lb)

Medium:

HYJET Type V

Measurement range:

Pressure: 0 - 400bar (0 to 5800 psi)
(inside the pressure line)

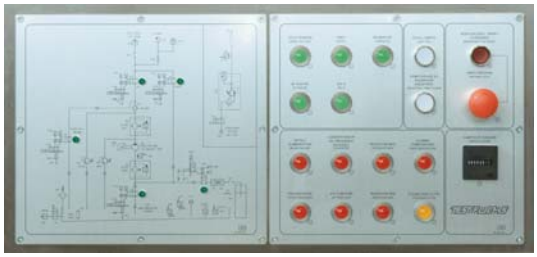
Pressure: 0 - 40bar (0 to 580 psi)
(inside the return line)

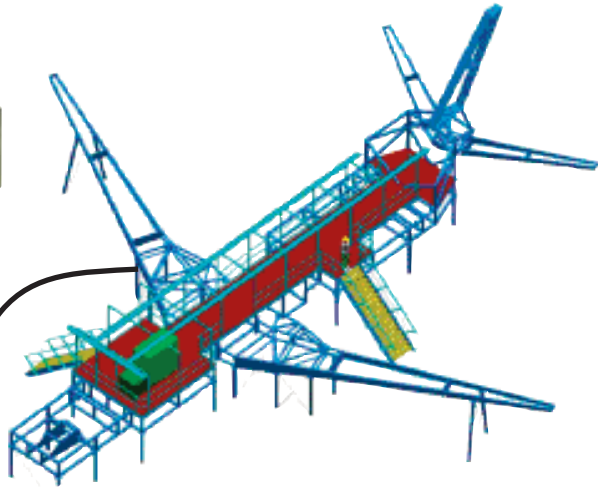
Technical data are subject to change!

Hydraulic - Simulation For IRON BIRD A400M

>GTFB400M<

(GROUPES DE TRANSFERT DE FLUIDE DU BANC GENERAL A400M)





Originally designed for the IRON BIRD A400M.

Can be adapted for other A/C-types.

- For controlled filling/draining of hydraulic systems of the A400M
- Easy manual operation
- Interface for external control and measuring data acquisition
- Stainless steel construction for medium Skydrol

GENERAL FUNCTIONAL DESCRIPTION

> The <GTFB400M> serves for simulation of consumers in closed hydraulic systems of the IRON BIRD A400M. These are among others steering setting of the front wheel, the front gear, the main gear, the doors and ramps, the brake system, the safety brake unit and the lifting and kneeling at loading of the gear.

> The integration in the system is done via connection of a hydraulic hose and via control line to the main computer.

MISCELLANEOUS

> Control via external interface possible

TECHNICAL DATA

> **Hydraulic parameter:**

Main reservoir:	Capacity: 350l	(92.5gal)
Pressure:	0 to 7bar	(0 to 101psi)
Flow:	10 to 70lpm	(2.6 to 18.5gpm)
1. Filter degree:	10µ Filter	
2. Filter degree:	3µ Filter	

> **Mains supply:**

3/N/PE AC 50Hz 400V
Nominal current: 9.5A

> **Medium:**

Skydrol 5

> **Measurements:**

Temperature:	0 to 100°C (0 to 212°F)	±0.5K
Pressure:	0 to 16bar (0 to 232psi)	±1%
Flow:	1 to 80lpm	±1%

> **Dimensions and weight:**

Length:	1,980mm	(6.5ft)
Width:	1,150mm	(3.8ft)
Height:	1,610mm	(6.3ft)
Weight:	1,000kg	(2,205lb)

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for different aircraft types, etc.

Technical data are subject to change!

Engine Driven Hydraulics Pumps Loading System

>HPLS400<

The loading system is developed for use with the AIRBUS A400M engine (TP400-D6) test stand.

It is possible to adapt this loading system for other aircraft engines.

- The equipment supplies the engine driven pump with hydraulic oil.
- The pump can be loaded by controlling the flow.
- Cooling of hydraulic oil is ensured.
- The return pressure of hydraulic oil is controlled.

MISCELLANEOUS

- The system is operated and controlled using an external control unit.
- The temperature is controlled by the engine test stand.
- The test bench has an ergonomic and compact design.
- The test bench can be transported by fork lift truck or by crane.

TECHNICAL DATA

Electrical connected loads:

Power supply:
3/N/PE AC 50Hz 400V
Nominal current: 25A

"Control unit supply":
2/DC/24V
Nominal current: 1.4A

Hydraulical parameters:

Input pressure:	max. 250bar	(3,626psi)
Flow:	max. 250lpm	(66USgpm)
Main reservoir:	60l	(15.9USgal)
Filtration level:	3µ filter	

Compressed air supply:

Pressure:	4.5 to 10bar	(65.3 to 145psi)
Flow:	220lpm	(58USgpm)
Nominal diameter:	3/8"	

Cooling water supply:

Pressure:	3 to 16bar	(43.5 to 232psi)
Flow:	20lpm	(5.3USgpm)
Nominal diameter:	1 1/4"	

Medium:

SKYDROL Type IV and V

Control range:

Temperature:	0 to 100°C (32 to 212°F) (required values can be set manually or from the engine test stand)
Flow:	10 to 250lpm (2.6 to 66USgpm) (required values can be set manually or from the engine test stand)

Measurement range:

Pressure:	0 to 400bar (0 to 5,802psi)	±0.5%
Flow:	10 to 250lpm (2.6 to 66USgpm)	±1%
Temperature:	0 to 100°C (32 to 212°F)	±1.5°C (±2.7°F)

Dimensions and weight:

"TEST BENCH <HPLS400+1>":

Width:	1,970mm	(6.5ft)
Depth:	1,130mm	(3.7ft)
Height:	1,280mm	(4.2ft)
Weight:	830kg	(1,830lb)

"CONTROL UNIT <HPLS400+2>":

Width:	250mm	(0.8ft)
Depth:	330mm	(1.1ft)
Height:	125mm	(0.4ft)
Weight:	4.8kg	(10.6lb)

Technical data are subject to change!

Mobile hydraulic testing unit
>MHPA400M<

This equipment is developed to carry out all hydraulic testing requirements for the A400M Fuselage Hydraulic Circuits.

It is possible to adapt this equipment for other aircraft types.

- Tests:
  - Pressure test using Exxon HYJET V
  - Flushing
  - Particle measurement
  - Purging using compressed air
- Fully automatic test sequences
- Outflow air is filtered to a high standard using three filtration levels
- Particle measurement is carried out using 15 particle measurement trolleys, which can be positioned close to the measuring points
- The equipment is easy to use due to the self-propelled main trolley and compact test trolleys

MISCELLANEOUS

- A modem is fitted to allow maintenance/updates to the software for remote maintenance
- Calibration is carried out autonomously by the software
- A radio controlled remote control panel
- Ergonomic and compact design of the complete test equipment

TECHNICAL DATA

Hydraulic parameters:

Circulating/supply circuit:

Pressure:	max. 15 bar	(218 psi)
Supply rate:	0 - 180 lpm	(0 - 48 USgpm)

Filling/testing circuit:

Pressure:	max. 240 bar	(3481 psi)
Supply rate:	0 - 140 lpm	(0 - 37 USgpm)

High pressure circuit:

Pressure:	0 - 250 bar	(0 - 3626 psi)
Flow:	0 - 100 lpm	(0 - 26 USgpm)

Low pressure circuit:

Pressure:	0 - 100 bar	(0 - 1450 psi)
Flow:	0 - 100 lpm	(0 - 26 USgpm)

Suction circuit:

Pressure:	0 - 16 bar	(0 - 232 psi)
Flow:	0 - 100 lpm	(0 - 26 USgpm)

Pneumatic parameters:

Unit component “Pressure station”:
5 - 10 bar (72.5 - 145 psi)

Trolley supply:
5 - 10 bar (72.5 - 145 psi)

Medium:

Exxon HYJET V

Electric parameters:

Unit component “Pressure station”:
3/N/PE AC 50 Hz 400 V

Power:	145.5 kVA
Nominal current:	210 A
Back-up fuse:	250 A

Trolleys:
1/N/PE AC 50 Hz 230 V
Earthed sockets

Back-up fuse:	16 A

Measurement range:

Pressure:	0 - 6 bar	(87 psi)
(27 meas.)	0 - 40 bar	(580 psi)
	0 - 100 bar	(1450 psi)
	0 - 250 bar	(3626 psi)
	± 0.5 % o.r.	
Temperature:	0 - 100 °C	(0 - 212 °F)
(24 meas.)	± 1 °C	
Flow:	0 - 20 lpm	(5.3 USgpm)
(16 meas.)	0 - 100 lpm	(26.4 USgpm)
	± 0.5 % o.r.	
Humidity:	0 - 100 % rel. humidity	
	± 5 % rel. humidity	

DIMENSIONS AND WEIGHTS

> Unit component „MAIN TROLLEY”:

Length:	4500 mm	(14.8 ft)
Width:	2490 mm	(8.2 ft)
Height:	1950 mm	(6.4 ft)
Weight:	6800 kg	(14990 lb)

> Unit component „TEST TROLLEY 1>”:

Length:	900 mm	(3.0 ft)
Width:	960 mm	(3.1 ft)
Height:	960 mm	(3.1 ft)
Weight:	240 kg	(529 lb)

> Unit component „PARTICLE MEASURING TROLLEY 1”:

Length:	1600 mm	(5.2 ft)
Width:	980 mm	(3.2 ft)
Height:	1080 mm	(3.5 ft)
Weight:	415 kg	(915 lb)

> Unit component „PRESSURE STATION”:

Compressor:

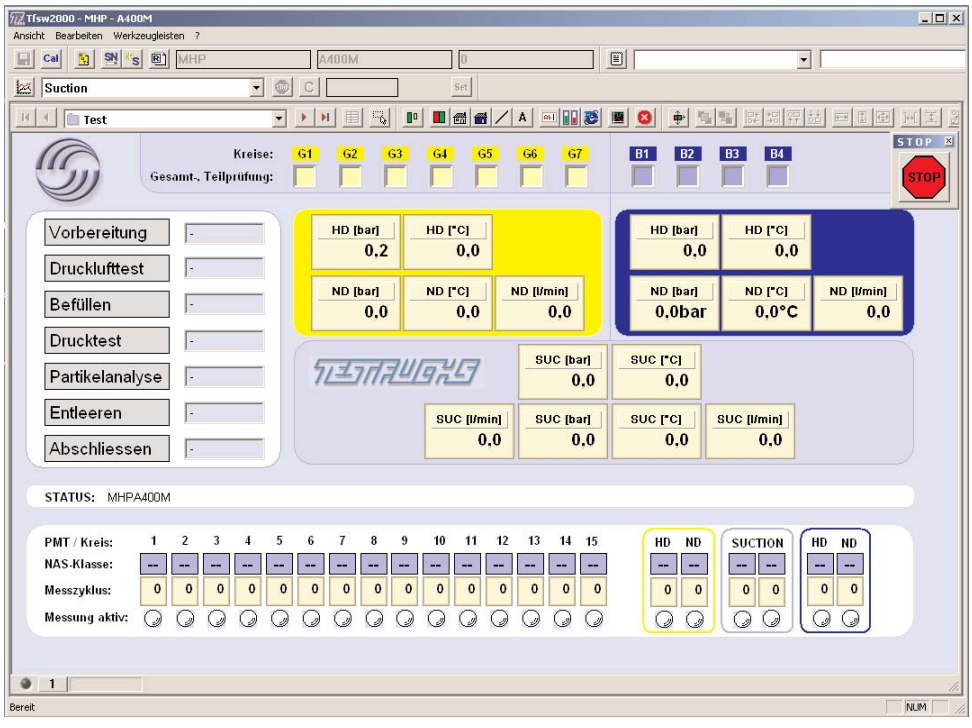
Length:	1250 mm	(4.1 ft)
Width:	700 mm	(2.3 ft)
Height:	900 mm	(3.0 ft)
Weight:	280 kg	(617 lb)

Pressure reservoir:

Diameter:	1300 mm	(4.3 ft)
Height:	2400 mm	(7.9 ft)
Weight:	1100 kg	(2425 lb)

Switch cabinet:

Length:	1200 mm	(3.9 ft)
Width:	500 mm	(1.6 ft)
Height:	2200 mm	(7.2 ft)
Weight:	270 kg	(595 lb)



User interface

Pressure reservoir

Electrostatic cleaner

Switch cabinet

Compressor

15 particle measuring trolleys

6 test trolleys

OPTIONS

Many options are possible for adaption,
e.g. adaption to other aircraft types, to different touch-screens etc.

Technical data are subject to change!

Particle measuring system for A400M

>PMA400M<

This equipment is developed to test the hydraulic pipe work in the fuselage (section 13-18) of the A400M. Tests are carried out i.a.w. ATA Chapter 29 and 27.

It is possible to adapt this equipment for other aircraft types.

- Tests:
  Pressure test using air
  Filling the system with Exxon Hyjet V
  Hydraulic pressurization test
  Hydraulic particle analysis
- Tests can be carried out partially or fully automatic
- The equipment is mobile to ensure that it can be positioned where required

GENERAL INFORMATION

- A modem is fitted to the equipment, enabling the software to be maintained at the factory
- Calibration is carried out autonomously by the software
- A SIMATIC touch panel is used to control the equipment
- A cable drum and motor driven hose drums are mounted
- The equipment can be transported by fork lift truck

TECHNICAL DATA

Hydraulic parameters:

Flow:	max. 100lpm (26.4USgpm) at 85bar (1.233psi)
	max. 50lpm (13.2USgpm) at 250bar (2.626psi)

Pneumatic parameters:

Input:	min. 6bar (87psi) max. 10bar (145psi)

Medium:

Exxon Hyjet V

Electrical parameters:

3/N/PE AC 50Hz 400V

Nominal current:	60A
Power:	41.5kVA
Back-up fuse:	63A

Measurement range:

Pressure: (4-off)	0 - 250bar ± 0.5% (0 - 3626psi ± 0.5%) 0 - 16bar ± 0.5% (0 - 232psi ± 0.5%)
Temperature: (3-off)	0 - 100°C ± 1°C (32 - 212°F ±1.8°F)
Flow:	0 - 100l/min ± 0.5% (0 - 26.4USgpm ± 0.5%)

Particle measurement is carried out i.a.w. AS4059 or. NAS1638

Dimensions and weight:

Length:	4.980mm	(14.8ft)
Width:	1.500mm	(5.2ft)
Height:	1.600mm	(5.6ft)
Weight:	3.000kg	(7.716lb)

OPTIONS

Many options are possible for adaption,
e.g.adaption to other aircraft types, to different touch-screens etc.

Technical data are subject to change!

Test System for Cargo Hold and Tunable Vibration Absorber System

>TS-CH-TVAS1<

Designed as electrical power supply and in order to perform CAN-bus simulation for the Tunable Vibration Absorber System of AIRBUS A400M.

In addition this test system serves to perform functional tests on different consumers in the cargo hold of AIRBUS A400M.

Can be adapted for other aircraft types.

- Ergonomic, compact design
- Integrated, hinged touch panel
- Integrated, extendable drawer for keyboard and mouse
- Connection via CEE plug (16A) with 10m cable

MISCELLANEOUS

> This test bench serves to perform functional tests on different consumers in the **cargo hold (CH)** and for testing electric installation of **Tunable Vibration Absorbers (TVAS)**.

> Functions of the following systems are tested - inside the **cargo hold (CH)**:
- lockings and guideways of cargo hold floors (roller restraint system)
- crane inside the cargo hold
- miscellaneous consumers (miscellaneous equipment)

> By reduction of structure vibrations the **Tunable Vibration Absorbers System (TVAS)** reduces the noise level (caused by propellers) inside the cargo hold.

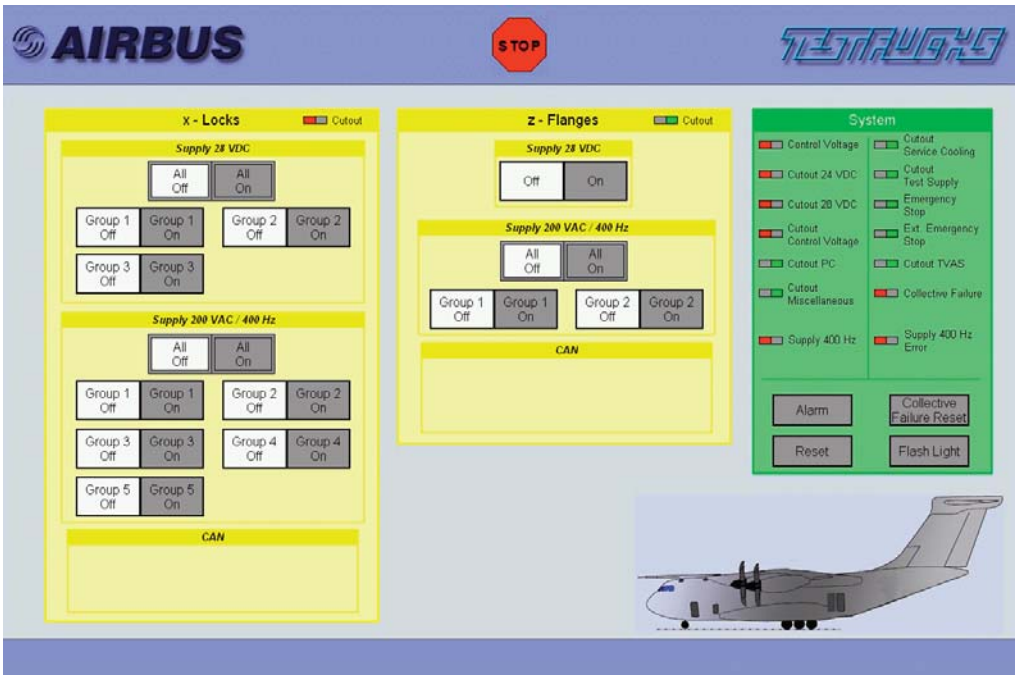
TECHNICAL DATA

> **Electrical connected loads:**

Main supply:	3/N/PE AC 50Hz 400V
Power:	10.2kVA
Nominal current:	15A
Back-up fuse:	16A

> **Dimensions and weight:**

Width:	700mm	(2.3ft)
Depth:	800mm	(2.6ft)
Height:	2050mm	(6.7ft)
Weight:	300kg	(660lb)



By using individual buttons, 28VDC resp. 200VAC/400Hz commands are transferred to hydraulic consumers in the **Cargo Hold (CH)** and to the **Tunable Vibration Absorbers System (TVAS)** of A400M.

User interface

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for other aircraft types, different cable length, etc.

Technical data are subject to change!

Test System for the Door Ramp Actuation System

>TS-DRAS1<

Designed as electrical valve control for the Door Ramp Actuation System (DRAS) of AIRBUS A400M.

Can be adapted for other aircraft types.

- Ergonomic, compact design
- Integrated, hinged touch panel
- Integrated, extendable drawer for keyboard and mouse
- Connection cia CEE plug (16 A) with 10 m cable

MISCELLANEOUS

- The test bench serves to perform functional tests at the Door Ramp Actuation System (DRAS).
- A400M DRAS is used for moving the ramp (latching/locking), the gate of the cargo hold (down-latching, down-locking, up-latching), for moving stabilizer struts, ramp toes and air deflectors.
- Ramp and gate at the rear end of the aircraft allow access to the cargo hold. Access is required for passengers or for loading/unloading of cargo.
- Stabilizer struts prevent the aircraft from tilting during loading/unloading.
- Ramp toes are designed as bypass during loading/unloading of vehicles and passengers. Furthermore for loading/unloading of pallets and platforms from floors of trucks.
- The air deflector opens a guard door for parachutists.

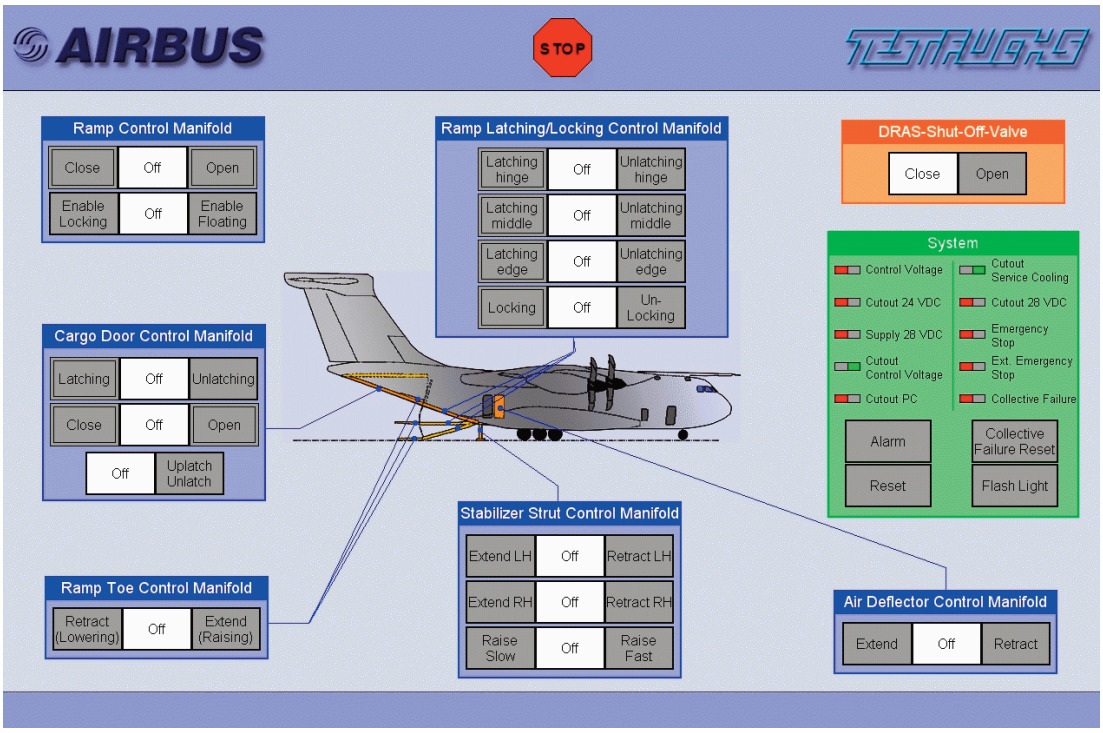
TECHNICAL DATA

Electrical connected loads:

Mains connection:	3/N/PE AC 50 Hz 400 V
Power:	10.2 kVA
Nominal current:	6.6 A
Back-up fuse:	16 A

Dimensions and weight:

Width:	600 mm	(2.0 ft)
Depth:	700 mm	(2.3 ft)
Height:	1250 mm	(4.1 ft)
Weight:	150 kg	(330 lb)



By using individual buttons, 28 VDC commands are transferred to hydraulic consumers of A400M to test individual settings.

User interface

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for different aircraft types, different cable length, etc.

Technical data are subject to change!

VFG Cooling system
>VCS400<

The cooling system is developed for use with the AIRBUS A400M engine (TP400-D6) test stand and is designed to cool lube oil of the Variable Frequency Generator.

It is possible tu adapt this system for other aircraft types.

- The return oil temperature is measured
- The return oil temperature is controlled by adjusting the cooling water flow
- A cooler bypass is provided to enable low temperature tests of oil to be carried out (down to -40°C)

MISCELLANEOUS

- The system is operated and controlled using an external control unit
- The equipment is of an ergonomic and compact design
- The test bench can be moved by fork lift truck or crane

TECHNICAL DATA

Hydraulic parameters:

Input pressure:	max. 20 bar	(290 psi)
Flow:	max. 25 lpm	(6.6 US gpm)

Compressed air supply:

Pressure:	4 - 10 bar	(58 - 145 psi)
Flow:	220 lpm	(58 US gpm)
Nominal diameter:	3/8”	

Cooling water supply:

Pressure:	0 - 16 bar	(0 - 232 psi)
Flow:	max. 20 lpm	(5.3 US gpm)
Nominal diameter:	3/4”	

Medium:

MIL-L-23699, MIL-L-7808

Electrical parameters:

Power supply:
1/N/PE AC 50 Hz 230 V
Nominal current: approx. 3 A

“Control unit” supply:
2/DC/24 V
Nominal current: approx. 2 A

Control range:

Temperature:	0 - 100 °C	(32 - 212 °F)
	(Internal or external values can be set manually)	

Measurement range:

Pressure:	0 - 25 bar	± 0.5 %
	(0 - 363 psi)	
Temperature:	0 - 100 °C	± 1.5 °C
	(32 - 212 °F)	(± 2.7 °F)

Dimensions and weight:

TEST BENCH:

Width:	1430 mm	(4.7 ft)
Depth:	590 mm	(1.9 ft)
Height:	880 mm	(2.9 ft)
Weight:	270 kg	(595 lb)

CONTROL UNIT:

Width:	250 mm	(0.8 ft)
Depth:	330 mm	(1.1 ft)
Height:	125 mm	(0.4 ft)
Weight:	4.5 kg	(9.9 lb)

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for different aircraft types, etc.

Technical data are subject to change!

Electrical And Hydraulical Test Equipment Tact 5

>EHP400T5<

Figure of a similar equipment

Developed for providing an electrical and hydraulical supply for testing the electrical and hydraulical systems of the tail fin of the A400M

> The following tests can be carried out on the vertical fin:
  - Bonding test
  - Loop resistance measurement
  - Antenna test
  - Angular movements of the rudder
  - Pressure test by compressed air or hydraulic oil
  - Filling, draining and purging of the hydraulic system
  - Particle measurement

GENERAL INFORMATION

- Fully automatic test sequence ensures significant time saving
- All castors, cables and hoses in the power unit are resistant to Skydrol
- Controlled shutdown is carried out when errors or failures occur
- Good accessibility is ensured for maintenance and service
- Test results can be saved in test reports formatted by the user
- Calibration is carried out by software
- All measurements are shown on the monitor as well as warning and error messages

TECHNICAL DATA

> Hydraulic parameters:

Main tank:
Volume: 300l
Leakage warning, safety valve, cleaning access, temperature monitoring

Medium: SKYDROL LD4
SKYDROL 5

Circulating and supply circuits:
Internal gear pump
Output 145l/min

High pressure circuits:
Three separate circuits
Axial piston pump
Output: 5 to 75l/min at max. 350bar

Return circuits:
Pressure transducer 0 to 100bar

> Electrical supply (requirements):

Mains supply:	3/N/PE AC 50Hz 400V
Nominal current:	225A
Power:	max. 156kVA
Back-up fuse:	250A

> Pneumatical supply (requirements):

Pressure:	8bar

> Dimensions and weight:

Power unit:

Width:	approx. 5170mm (17ft)
Depth:	approx. 2150mm (7.1ft)
Height:	approx. 2250mm (7.4ft)

Rack no.1:

Width:	approx. 610mm (2ft)
Depth:	approx. 640mm (2.1ft)
Height:	approx. 1730mm (5.68ft)

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TECHNICAL DATA

> **Measurement range:**

Temperature sensors:

(9-off):	0 to 100°C (32 to 212°F)
	±1K (1.8°F) absolute
(1-off):	-20 to +80°C (-4 to 176°F)
	±1K (1.8°F) absolute

Pressure sensors:

(2-off):	0 to 10bar (0 to 145psi)
	±0.5%m.v.
(3-off):	0 to 100bar (0 to 1450psi)
	±0.5%m.v.
(4-off):	0 to 500bar (0 to 7251psi)
	±0.5%m.v.
(1-off):	1 to 500bar (15 to 7251psi)
	±0.5%m.v.
(1-off):	800 to 1.200mbar (11.6 to 17.4psi)
	±0.5%m.v.

Flowmeters:

(3-off)	0 to 80l/min (0 to 21gpm)
	±1% o.f.s.

Angular measurement:

(1-off)	0 to 360l°
	±0.02° absolute

Humidity:

(1-off)	0 to 100%
	±5% o.f.s.

m.v. .... measurement value
o.f.s. .... of full scale

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for different aircraft types, etc.

>EHP400T5<

Technical data are subject to change!

Cable test equipment

>KPG4<

The cable test equipment is developed for testing installed cable looms in the A400M.

It is possible to adapt the cable tester for use on other aircraft types very easily thus reducing lead time to a minimum.

- The test equipment is for rapid testing from connector to connector (end to end test).
- The testing time is reduced to one minute only in comparison to the complex manual cable testing method.
- Insulation, electric strength and continuity tests can be carried out.
- There is a wide-range of adapter cables for connecting the test equipment to various cable looms.
  Additional adapters can be produced for use with the test equipment as required.

RANGE OF APPLICATION

- Cable loom installed in the A400M Fuselage
- Cable looms in general
- Individual cables

GENERAL INFORMATION

- The control unit is a produced by CK Technologies and contains stimuli and measuring circuits, the required relay boards and connector sockets.
- Operation of the equipment is carried out using a Tablet PC which together with its docking station and carrying harness can be stowed in the test equipment when not in use.
- The test program instructs the user as to which adapter cable is to be attached to the cable under test.
- A test program is provided for each cable thus enabling every cable in the cable loom to be tested individually.
- Due to the compact design and mobility, the test equipment can be used in every situation.
- The adapter cables have identification labels and stowed in storage cabinets.

TECHNICAL DATA

Technical data of CKT control unit:

Test points:
200

Continuity test:
0.05 to 50 V
100 uA to 2A

Resistance testing:
2 wire
0.1 to 500 kOhm

Insulation test rate:
0.25 to 1300 VDC
5 mA limited
up to 1000 MOhm

Proof voltage:
3 to 750 VAC 50 Hz

Continuity test rate:
3000 Tests/minute

Insulation test rate:
1000 Tests/minute

Electrical supply:

Mains connection:	1/N/PE AC 50 Hz 230 V
Nominal capacity:	0.23 kVA
Nominal current:	1 A

Dimensions and weight:

Length:	850 mm (2.8 ft) (incl. cable holder)
Depth:	1100 mm (3.6 ft) (incl. cable drum)
Height:	1570 mm (5.2 ft) (incl. warning light)
Weight:	160 kg (352.7 lb)

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for other aircraft types, different cable lengths, etc.

Technical data are subject to change!

Servicing Trolley for Flaps and Thrust Reversers

>SFTR1<

The equipment is developed to provide a controled movement of Flap and Thrust Reverser Actuators during servicing and adjustment in accordance with the ATA chapter 29.

It is used in the civil aviation field for AIRBUS and BOEING aircraft.

It can be adapted for use on other aircraft types.

The equipment is fitted with:

- An Axial Piston pump which enables the maximum flow of 15 l/min to be quickly achieved.
- An Air Cooled Heat Exchanger is used for cooling of the hydraulic oil in the <SFTR1>.
- Temperature is controlled by a cut off thermostat.
- Simple manual regulation of maximum pressure and flow.
- Needle valves for hose pressure relief.
- Oil Level Float Switch to monitor oil level and to indicate a minimum oil level.

GENERAL INFORMATION

> A compact design ensures easy transportation and fixed and steerable castors are provided for manoeuvrability during use.

> Stainless steel framework protects against Skydrol and corrosion.

TECHNICAL DATA

> Current supply:

Power:	approx. 7.5 kW
Voltage:	3/N/PE AC 50 Hz 400 V
Supply cable:	10 m long (33 ft)

> Performance data:

Pressure:	max. 230 bar (3336 psi)
Axial piston pump:	max. 15 l/min at 230 bar (max. 4 USgpm at 3336 psi)
Reservoir capacity:	140 l (37 USgal)

> Medium:

Skydrol 500 B4

> Output hoses:

2-off:	each 6 m (19.7 ft)

> Measurement range:

Pressure:	0 - 400 bar ± 1 % o.f.s.	(0 - 5800 psi)

> Operation conditions:

Ambient temperature	+5 to +35 °C (+41 to +95 °F)
Storage temperature:	0 to +60 °C (+32 to +140 °F)
Humidity:	10 - 95 % rel. humidity
Altitude:	up to 1000 m above SL (up to 3280 ft above SL)
Protection class:	IP55

> Dimensions and weight

Length:	1000 mm	(3.3 ft)
Width:	900 mm	(3.0 ft)
Height:	1210 mm	(4.0 ft)
Weight:	300 kg	(660 lb)

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for different aircraft types, etc.

Technical data are subject to change!

Water Separator System
>WSS1-20SK<

Reliable separation of water from the hydraulic medium.

Intended application for Skydrol.

- Max. water content after separation: 40ppm
- No deletion of medium additives
- Leak oil free quick disconnect couplings
- Automatic control
- Frothing in the oil does not affect the fill level measurement
- Robust construction with cover

TECHNICAL DATA

> Hydraulical parameters:

Input pressure:
max. 16bar (230psi)

Flow:
max. 20lpm (5.3USgpm)

Pressure-/vacuum tank:
Capacity: 48l (12.7USgal)

Heater in the tank:
8 x 750W

2 filter steps:
6µ, Coalescer-Filter

Vacuum pump:
Ex-proof, 0.37kW
Nominal suction capacity: 16m³/h (565ft³/h)

Heat exchanger:
4 x 10kW

Inlet pump:
Flow: max. 20lpm (5.3USgpm)

Outlet pump:
Flow: max. 23lpm (6.1USgpm)

Cooler in the vacuum line:
40W
Flow quantity: 0.09kg/s (0.2lb/s)

> Electrical supply:

Mains connection:	3/N/PE AC 50Hz 415V
Nominal current:	16A
Power:	11kVA

> Measurement range:

Temperature:	0 to 150°C (0 to 300°F)	±0.2%
Pressure:	0 to 1.6bar abs. (0 to 23psi abs.)	±1%
Load cell:	0 to 2kN (0 to 450lbf)	±0.5%
Humidity in oil:	0 to 100%	±0.25%

> Dimensions and weight:

Width:	1,100mm	(3.6ft)
Depth:	1,200mm	(3.9ft)
Height:	1,410mm	(4.6ft)
Weight:	approx. 700kg	(1,540lb)

OPTIONS

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

Technical data are subject to change!

REASONS FOR BONDING TESTS?

Aircraft are very complex electrically and structurally:

They

> can be struck by lightning

> are exposed to external fields and electrostatic charging

> are exposed to large temperature differences

> are liable to corrosion due to large environmental variations

> have to be suitably treated to minimize or prevent damage

Due to the above factors it is essential that NDT Conductivity Testing is carried out to ensure structural and electrical integrity!

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 inspection. The control system must always work.

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 of which have an adverse effect on aircraft life and performance.

Aircraft are struck by lightning on average once a year! The main points of impact are, due to aircraft geometry, the aircraft nose, wing tips, engines, vertical and horizontal tail tips, and during the start and landing phases, the landing gear.

Aircraft although similar to a Faraday cage differ in that lightning strikes **(lightning current)** create electromagnetic fields, which, when coupled through openings into the wiring and equipment, cause high voltages. This can have serious consequences such as power supply interruption, malfunction of the computers or total shutdown of certain equipments and/or systems. Additional damage can occur to composite structures by lightning current flow via components e.g. flaps, valves, joints, pipe connections and equipment connector plugs.

Electrostatic charges are generally created by flight through clouds by aircraft and in dust laden low level air by 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. Bonding is affected by:
Rain and sea air (contains salt) which have a corrosive influence on externally mounted wiring and connectors.

High air pressure and temperature differences, e.g. an aircraft starts in the tropics at high ground temperatures and at 10.000 m is exposed to temperatures of -50°C. These factors cause **water condensation** which collects in seams and low points and also in the lower cargo areas where it even freezes.

Corrosion is created where salt, moisture or corrosive fluids e.g. skydrol etc. 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 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.

DAMAGE LIMITATION AND PREVENTION

Equipments and their 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 itself is used as ground.

In addition special methods and materials are used during manufacture to prevent corrosion as far as is 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 naturally subject to stringent quality control.

TESTING

TEST-FUCHS has developed and launched convenient test equipment to meet stringent safety critical requirements of bonding testing.

The tests can be easily carried out by a single operator and it is not required to remove parts or loosen screw connections. All equipments are battery operated, easy to use and compact to ensure easy use in difficult to access points.

Three different types of equipment are offered for testing the following test requirements:

> Bonding Tester

> Loop Resistance Tester

> Anti Static Paint Tester

CALIBRATION

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

> Calibration can also be carried out by the customer if he has the necessary competence, equipment and experience. If required, TEST-FUCHS can provide the necessary training and technical information.

> Our experience shows however that most of customers prefer TEST-FUCHS to carry out calibration.

Our calibration record can be seen in the following list.

- 1960 - Establishment of its own calibration laboratory
  Calibration in accordance with instructions of AQAP at the time
- 1996 - Introduction of the ISO 9001
  Calibration in accordance with ISO 9001 Standard
- 2004 - Accreditation as DKD Calibration Laboratory
  Calibration in accordance with DIN EN ISO/IEC 17 025
  Registration no: DKD-K-39301

> Calibration can be carried out at the Customer's premises or on our premises.

> Calibration carried out on our premises depending on urgency takes, 3 to 5 working days, at the Customer's, normally 2 to 3 weeks.

> To reduce the Customer's maintenance staff's workload we can perform the following maintenance tasks:

- Function testing
- Electrical safety testing to BGV A3
- Integrity testing
- Preventive maintenance

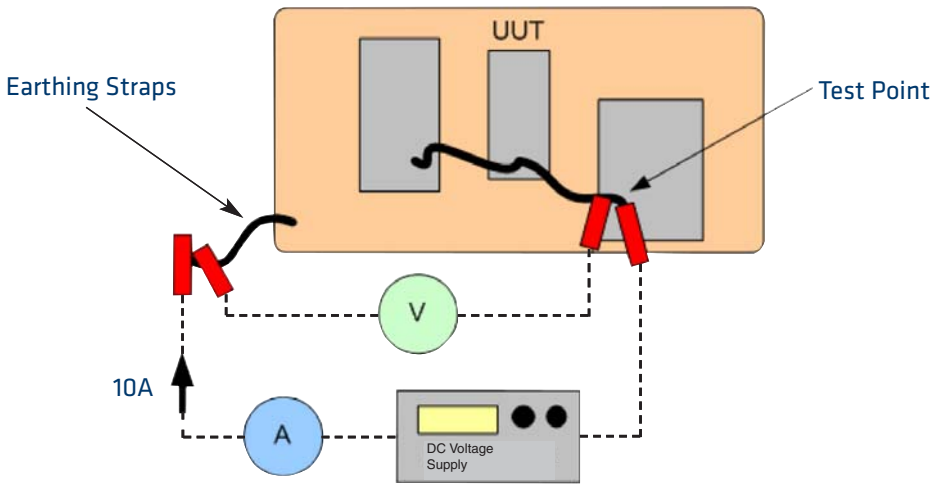
BONDING TESTER - FUNCTION

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 enable resistance measurements to be easily and accurately measured, especially on extremelly low impedance UUTs.

Measuring principle:



Used Test Currents:

10ADC	Normally
100 - 150ADC	For tests between wings and fuselage
0,1ADC	For sensitive UUTs

Typical Connection Resistance:

1-100mΩ

Operational Methods:

The Bonding Testers use the so called 4 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 dependant on the type of bonding tester used.

TEST-FUCHS has developed test cables to match any testing requirements. The customer can choose the appropriate length and end connections depending on the area of application.
There are A, B and AB cables available. E.g. for a full 4 wire measurement test either an A and a B cable are required or a combined AB cable.

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

<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 measurement /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 measurement
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 a measurement cable A and a measurement cable B are required.
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)

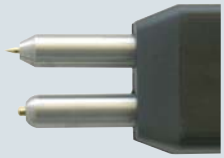
The measurement cable is suitable for testing single screw connections. When placing the test prod on a measurement point, make sure all four contact points sit well. The measurement is carried out single-handed.

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.

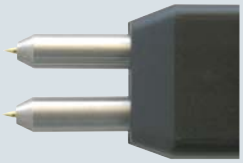
Type:	4 wire test prod, spring mounted (sharp / blunt)
Max current:	max. 10A
Cable length:	2.5m
Test pin handle:	30 x 22 x 145mm
Test prod:	ø 7 x 22mm



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

SPECIAL MODELS OR OTHER CABLE LENGTHS ARE AVAILABLE ON REQUEST!

Bonding Tester >MVP10R-FS<

The Bonding Tester <MVP10R-FS< is designed 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

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

TECHNICAL DATA

Power connection:	1/N/PE AC 50Hz 230V
Nominal current:	0.7A
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
Dimensions:	approx 45 x 25 x 13 cm
Weight of equipment:	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>".

Test Equipment, Bonding Tester

>PA-MVP11<

The Bonding Tester >PA-MVP11< can be used for inspection of bondings using a test current of up to 200A continuous current.

- > Usable on all aircraft types
- > Display and operating controls are laid out in an easy to use manner
- > A GRP - carrying case is provided to ensure the tester is not damaged during the transport
- > The tester is compactly designed

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

TECHNICAL DATA

Current measurement with digital ammeter:	
Range:	0 - 200A
Tolerance:	Cl. 0.5
Voltage drop measurement digital voltmeter:	
Range:	0 - 2000mV
Tolerance:	Cl. 0.1
Output current:	0 - 200ADC
Power connection:	1/N/PE AC 50Hz 230V
Back-up fuse:	16A
Nominal current:	7A
Dimensions:	approx 63 x 49 x 39cm
Weight incl. test cable:	approx 53kg

INCLUDED IN STANDARD SCOPE OF DELIVERY:

2 Measurement cables with alligator clip (each 10m)
2 Test cables for 200A (each 10m)
1 Power cable
2 Safety tapper
5 Cable bags

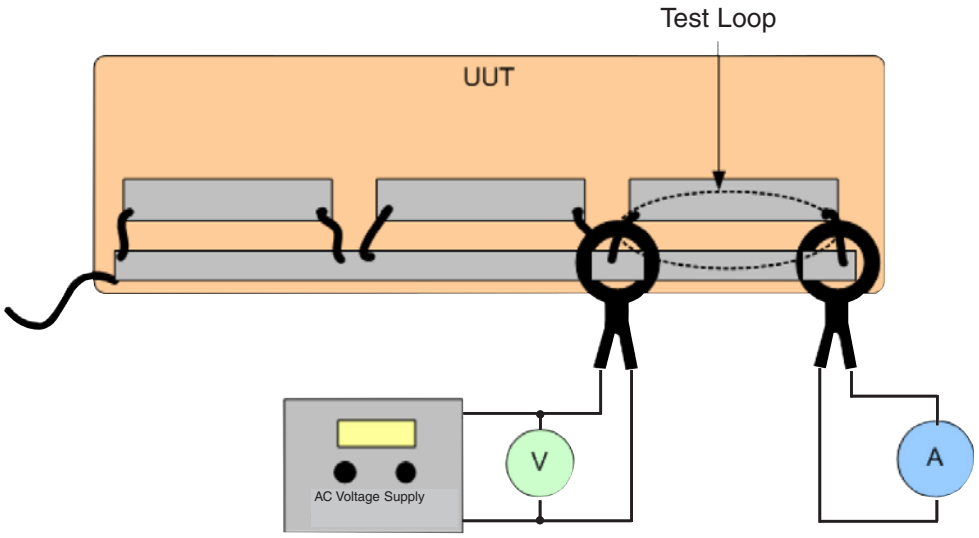
LOOP RESISTANCE TESTER - FUNCTION

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 (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.

TEST-FUCHS Loop Resistance Testers are designed to enable loop resistance measurements to be easily and accurately carried out.

MEASURING PRINCIPLE:



Typical Loop Resistance:

2-100 mΩ

Operational Method:

Transformatorprincple with supply and measurement Clamps

Supply Frequency:

1 kHz oder 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 applied voltage together with the measured current, phase selective, when calculated gives the measured impedance. As the loops are not always accessible, special to type or adaptable measurement Clamps could be required.

TEST-FUCHS has developed impedance measurement Clamps for test purposes. A unique feature (not available on the market) is the combination of supply and current measurement Clamps, which are screened from one another.

As an alternative more economical solution, split standard Clamps can be supplied.

Measurement 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 contol of the test equipment and the measuring clamps

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

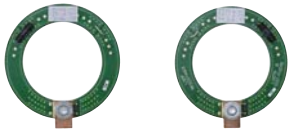
TECHNICAL DATA

Power operation:	1/N/PE AC 50Hz 230V ± 10%
Battery:	14.4V Li-Ion
Charging time:	6 hours
Measurement range:	depends on Clamps e.g. 20mΩ, 200mΩ
Data storage:	90 measured values
Max. resolution:	0.1mΩ

Output voltage:	max 70V
Output current:	max 1A
Measurement frequency:	1kHz ± 10Hz
Accuracy:	± 5% of full scale ± 4 digit
Dimensions:	approx 25 x 28 x 16cm
Weight of equipment:	approx 5kg

INCLUDED IN STANDARD SCOPE OF DELIVERY:

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



Self test UUT
- M882067 100mΩ
  (TEST-FUCHS item no. 103130581)
- M882071 10mΩ
  (TEST-FUCHS item no. 103130582)
- 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 roller
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 <IMZ1>

(TEST-FUCHS item no. 103130395)

- > Robust design, symmetric Clamps
- > Capable of being used with cables or metal rails up to a diameter of approx 70 mm
- > Spring loaded to closed (operating) position
- > Combined Supply and Measurement Clamps
- > Shielded cable
- > "Measure" button on the Electronic Unit

TECHNICAL DATA

Frequency:	for test equipments with 1 or 2kHz
Resistance range:	20mΩ, 200mΩ
UUT diameter:	max. 70mm
Accuracy:	± 5% of full scale ± 4 digit
Repetition accuracy of UUT variations position in clamp opening:	± 3% of full scale ± 1mΩ

Overall dimension (without cable):	Width:	approx 120mm
	Depth:	approx 40mm
	Height:	approx 260mm
Jaws opening:	approx 70mm	
Weight:	approx 1.6kg	
Cable length:	3m	

IMPEDANCE MEASUREMENT CLAMP <IMZ7>

(TEST-FUCHS item no. 150020514)

- > Symmetric design
- > Small measuring head
- > Capable of being used with 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 repetition accuracy
- > "Measure" button
- > Shielded cable

TECHNICAL DATA

Frequency:	for test equipments with 1 or 2kHz
Resistance range:	20mΩ, 200mΩ
UUT diameterr:	max. 26mm
Accuracy:	± 5% of full scale ± 4 digit
Repetition accuracy of UUT variations position in clamp opening:	± 2% of full scale ± 1mΩ

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

Further Measurement Clamps

IMPEDANCE MEASUREMENT CLAMP <IMZ2>

(TEST-FUCHS item no. 150020003)

- > Robust design non-circular measurement Clamps
- > The front face is narrower than the other parts of the jaws
- > Capable of being used on cables in a confined area of up to approx 50mm dia
- > Spring loaded to closed (operating) position
- > Combined Supply and Current Measurement Clamps
- > Shielded cable
- > "Measure" button on the Electronic Unit

TECHNICAL DATA

Frequency:	for test equipments with 1 or 2kHz
Resistance range:	20mΩ, 200mΩ
UUT diameter:	max. 50mm
Accuracy:	± 5% of full scale ± 4 digit
Repetition accuracy of UUT variations position in clamp opening:	± 3% of full scale ± 1mΩ

Overall dimension: (without cable)	Width:	approx 95mm
	Depth:	approx 50mm
	Height:	approx 255mm
Jaws opening:	approx 50mm	
Weight:	approx 1.8kg	
Cable length:	3m	

IMPEDANCE MEASUREMENT CLAMP <IMZ3>

(TEST-FUCHS item no. 150020004)

- > Robust design non-circular measurement Clamps
- > Jaws are narrower on the lower side
- > Capable of being used on cables in a confined area of up to approx 55mm dia
- > Spring loaded to closed (operating) position
- > Combined Supply and Current Measurement Clamps
- > Shielded cable
- > "Measure" button on the Electronic Unit

TECHNICAL DATA

Frequency:	for test equipments with 1 or 2kHz	Overall dimension: (without cable)	Width:	approx 105mm
Resistance range:	20mΩ, 200mΩ		Depth:	approx 40mm
UUT diameter:	max. 50mm		Height:	approx 270mm
Accuracy:	± 5% of full scale ± 4 digit	Jaws opening:	approx 55mm	
Repetition accuracy of UUT variations position in clamp opening:	± 3% of full scale ± 1mΩ	Weight:	approx 1.5kg	
		Cable length:	3m	

IMPEDANCE MEASUREMENT CLAMP <IMZ4>

(TEST-FUCHS item no. 103130444)

- > Robust design non-circular measurement Clamps
- > Especially narrow design with short handles
- > Capable of being used on cables in a confined area of up to approx 60 mm dia
- > Spring loaded to closed (operating) position
- > Combined Supply and Current Measurement Clamps
- > Shielded cable
- > "Measure" button at the Electronic Unit

TECHNICAL DATA

Frequency:	for test equipments with 1 or 2kHz
Resistance range:	10mΩ, 200mΩ
UUT diameter:	max. 60mm
Accuracy:	± 5% of full scale ± 4 digit
Repetition accuracy of UUT variations position in clamp opening:	± 5% of full scale ± 1mΩ

Overall dimension: (without cable)	Width:	approx 85mm
	Depth:	approx 37mm
	Height:	approx 175mm
Jaws opening:	approx 60mm	
Weight:	approx 1.5kg	
Cable length:	3m	

SUPPLY CLAMP <IMZ5>

(TEST-FUCHS item no. 150020064)

CURRENT MEASUREMENT CLAMP <SMZ5>

(TEST-FUCHS item no. 150020065)

SET CONSIST OF <IMZ5> + <SMZ5>

(TEST-FUCHS item no. 150020607)

- Modified LEM PR 1201ACI
- 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 integraged “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
Repetition accuracy 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 a Supply and a 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
Repetition accuracy 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 1.6kg	
Cable length:	3m	

IMPEDANCE MEASUREMENT CLAMP <IMZ8>

(TEST-FUCHS item no. 150020608)

- > Symmetric design
- > Small measurement head
- > 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 Repetition Accuracy
- > "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
Repetition accuracy 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 1.4kg	
Cable length:	3m	

IMPEDANCE MEASUREMENT CLAMP <IMZ9>

(TEST-FUCHS item no. 150020613)

- Symmetric design
- Small measurement head
- Capable of being used on cables in a confined area of up to approx 66mm dia
- Spring loaded to closed (operating) position
- Combined Supply and Current Measurement Clamp
- Symmetric windings for high Repetition Accuracy
- “Measure” button

TECHNICAI DATA

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

Overall dimension: (without cable)	Width:	approx 106mm
	Depth:	approx 38mm
	Height:	approx 160mm
Jaws opening:	approx 68mm	
Weight:	approx 850g	
Cable length:	3m	

SPECIAL TO TYPE MODELS ARE AVAILABLE ON REQUEST!

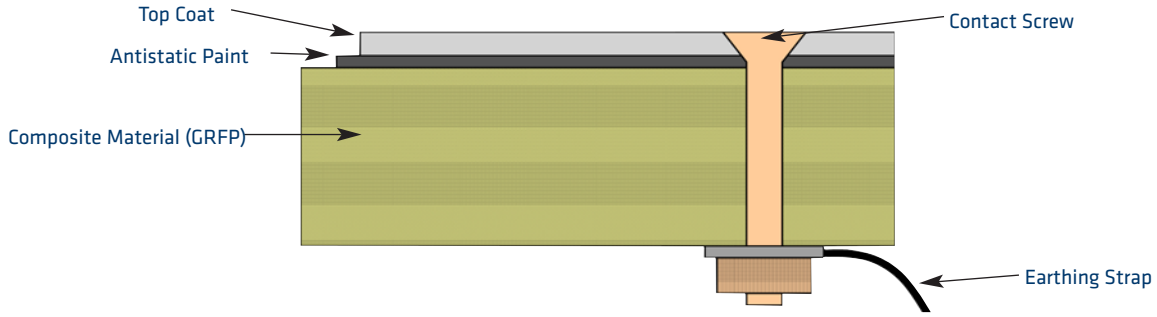
ANTISTATIC PAINT TESTING - FUNCTION

In order 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 a non-conductive, anti-corrosion paint is applied.

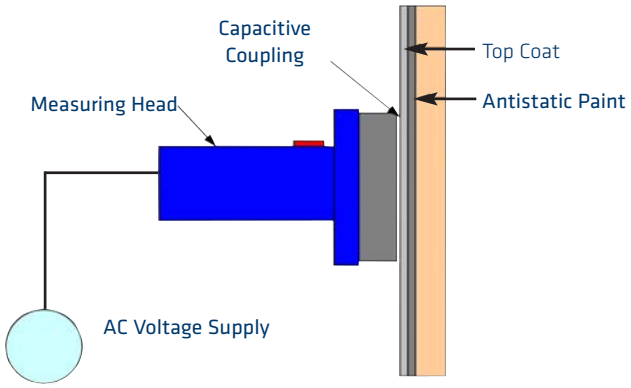
The antistatic paint must be tested for conductivity as well as its adhesion without damaging coatings. These measurements are carried out with special flexible (to match aircraft contours) measuring heads which are used in conjunction with Test-Fuchs Antistatic Paint Tester <IA2>.

TEST-FUCHS Antistatic Paint Tester enables quick, easy and accurate testing of the surfaces and volume resistances of aircraft exterior surfaces.

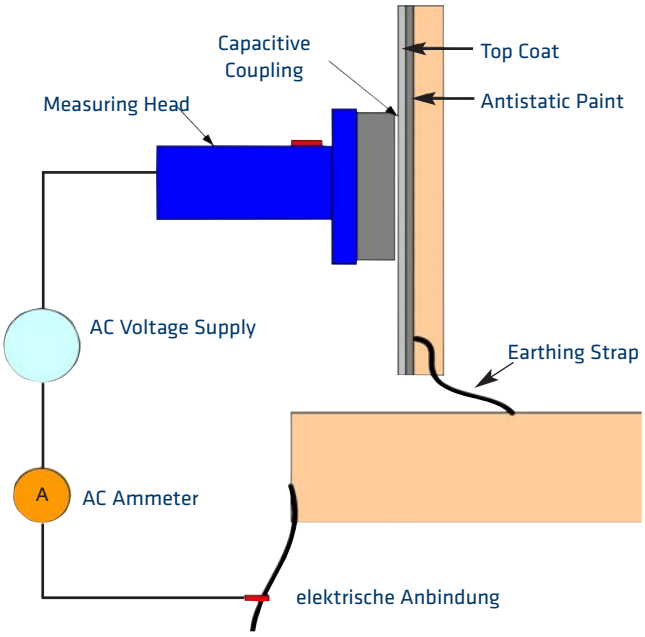
Composition of Antistatic Paint:



Measurement mode S1:
- Measurement of surface resistance through insulating layers:



Measurement mode B1:
- Measurement of resistance from the measurement point of the structure connection (volume resistance):



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

Measurement frequency:
20 kHz

TEST-FUCHS has developed Flexible Measuring Heads for Aircraft Contours.

Antistatic Paint Tester >IA2<

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

- > Light, practical, robust 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
- > 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
- > Including self test unit for function control of the test equipment and the measuring heads

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

TECHNICAL DATA

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 and B1: Surface-Structure
Measuring frequency:	20kHz
Accuracy:	± 10% of reading ± 2 digit
Measurement range S1:	Depends on sensor (see data sheet)
Measurement range B1:	Depends on sensor (see data sheet)
Dimensions:	approx 25 x 13 x 16cm
Weight:	approx 2.5kg

INCLUDED IN STANDARD SCOPE OF DELIVERY:

1 Battery„SWIT S-8970“
(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. powercable for charging „S306287“
(TEST-FUCHS item no. 103070362)

NOTE:

The required Measuring Head is not included in the standard scope of delivery but can be ordered separately, see next pages.

Optional Accessories

Antistatic Paint Tester >IA2<

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

Very robust, stackable
Lined with foam
Storage
compartment for: - Antistatic Paint Tester <IA2>
- Accessory
- Documentation
Dimensions: approx 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 - 240V; 50 / 60Hz
Output: DC 7 - 8.4V; 1.8A
Possible to charge 2 batteries at the same time

Recommended Standard Measuring Head for Antistatic 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 to 2MΩ
Accuracy:	±10% ±2 digit of reading
MAX-LED at head:	YES
Measurement button:	YES
Max. paint thickness:	1mm
Maximum radius of the test surface:	200mm
Contact pressure:	0.2 to 2kg (2 to 20N) alternative
Special feature:	Skydrol resistant

FURTHER MEASURING HEADS AND BONDING CABLES

<IATP1> For universal use in Measurement Mode B1 and S1 (TEST-FUCHS item no. 150020055)

Dimensions:	Ø 76 x 130mm
Connecting cable:	3m
Measurement range S1:	5kΩ to 10MΩ 112kΩ/sq to 470MΩ/sq
Measurement range B1:	5kΩ to 10MΩ
Accuracy:	±10% ±4 digit of reading
MAX-LED at head:	YES
Measurement button:	YES
Max. paint thickness:	0.5mm (50 kΩ to 1MΩ)
Maximum radius of the test surface:	200mm
Contact pressure:	1kg constant (10N) required

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

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

SPECIAL DESIGNS ARE AVAILABLE ON REQUEST!

Bonding And Loop Resistance Tester

>BLRT2-XX-X<

<BLRT2>
TEST-FUCHS part no. 151020031

The equipment is developed as multi functional 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 for this tester is available

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

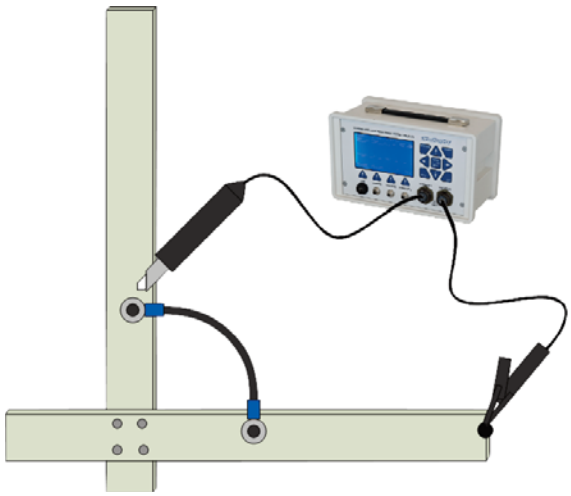
Bonding Tester with 10A, 1A and 0.1A test current. It works as a Kelvin Resistance Meter.

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)

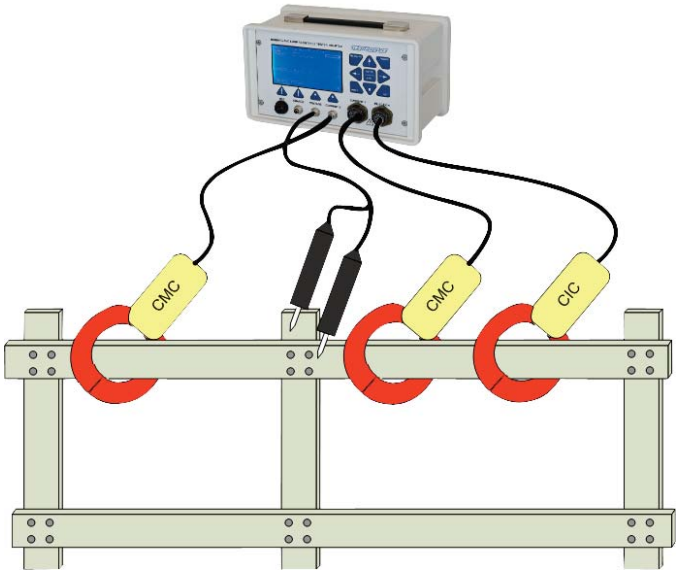
> Technical description

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)

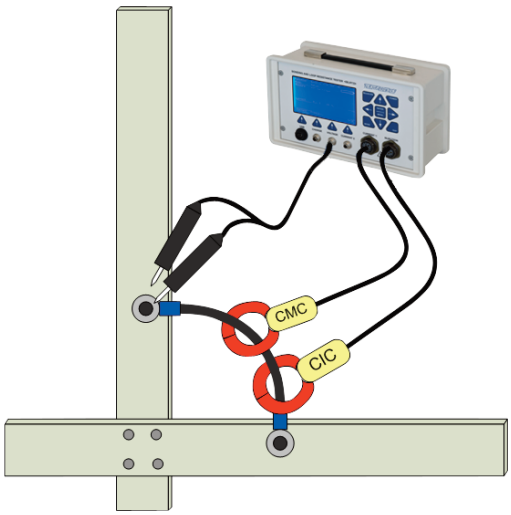
(TEST-FUCHS part no. 151020038)

> Technical description

The “High Current / Low Frequency Test” (up to 150A and with different frequencies) is used to evaluate the quality of the connections. A low frequency is used to limit damages to the composite material in case of a problem.

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)

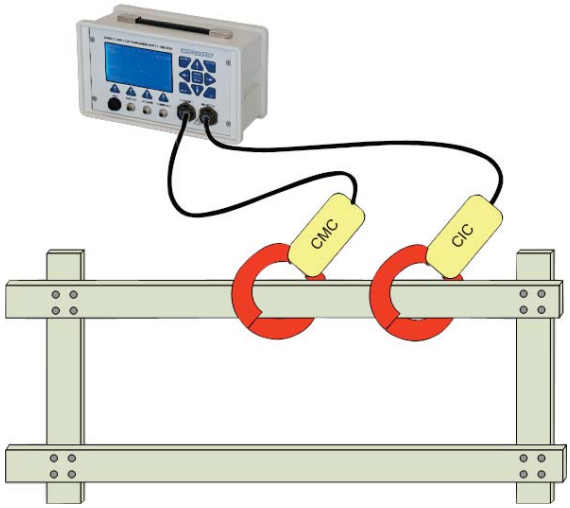
> Technical description

The “Loop Resistance Test” measures 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 ther is only one current loop.

Schematic diagram of the test set-up



>BLRT2<

FUNCTIONS

OVERBRAID TEST (OPTION O)

(TEST-FUCHS part no. 151020042)

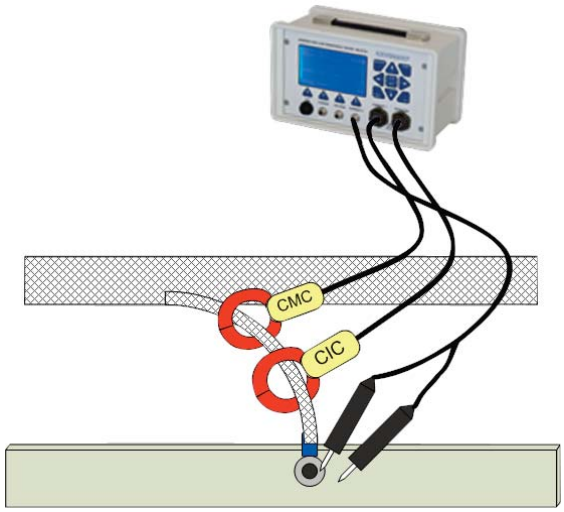
> Technical description

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

The test current 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. 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



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

(TEST-FUCHS part no. 151020043)

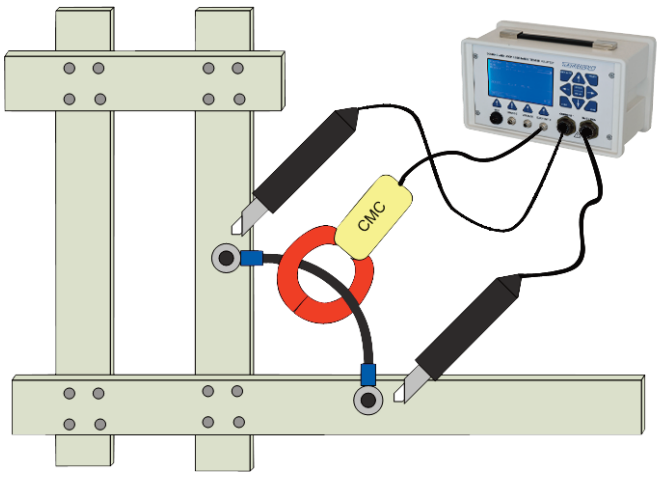
> Technical description

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 (and 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 set-up



>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)

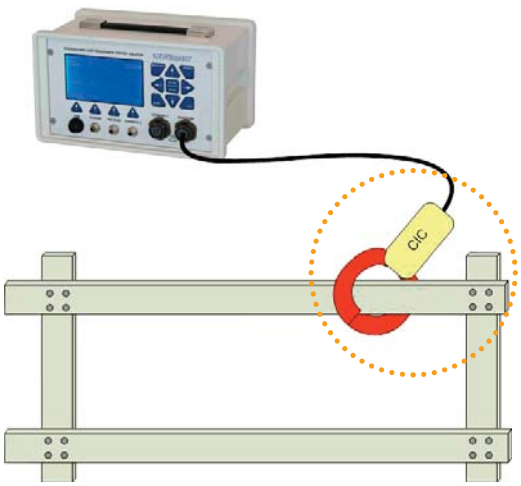
(TEST-FUCHS part no. 151020045)

> **Technical description**

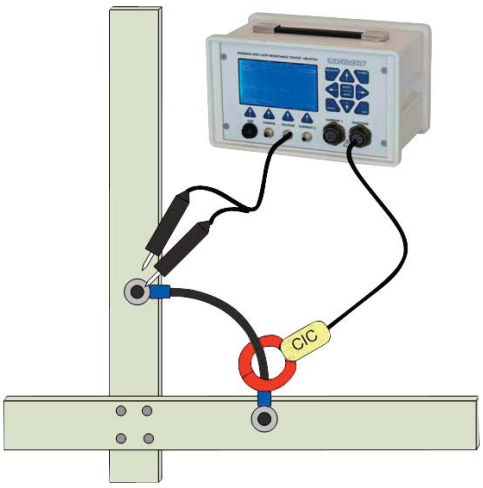
Single Clamp Measurement for the options E and N.

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

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FUNCTIONS

CAPACITIVE MEASUREMENT (OPTION Z)

(TEST-FUCHS part no. 151020046)

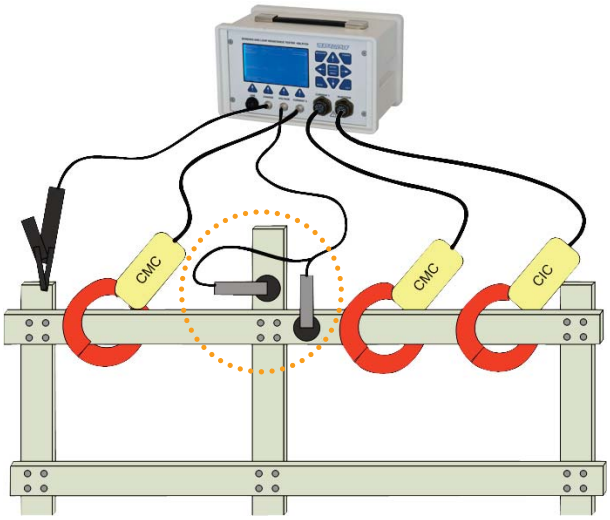
> Technical description

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.

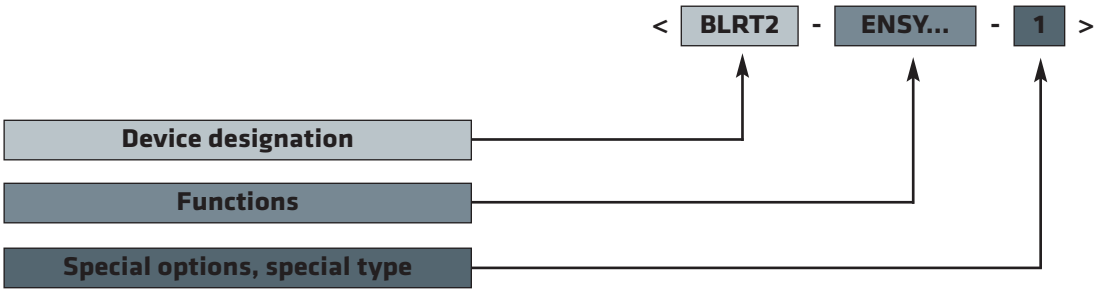
To avoid this extensive process it is possible to use capacitive voltage measurement instead of the voltage probes. This can replace one or both voltage measurements. This test method can only be used for AC measurements.

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



>BLRT2<

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	10 ±1µOhm	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	5	1 x Current Injection Clamp 1 x Current Measurement Clamp or 1 x Combined Injection Measurement Clamp and 1 x Voltage probe	*(development is planned)*
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)*

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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)

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

Self Test Unit
(TEST-FUCHS part no. 106361013)

Manufacturer: TEST-FUCHS
Type: S854039 / L1708
Functions: E, S, N
not calibrated

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

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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:	4,000mm (157.5in)
Windings, primary:	180
Windings, measurement:	30
Supply max. 100Hz:	7.2V
Supply max. 200Hz:	15V
Supply max. 400Hz:	22V
Uloop max. 100Hz:	36mV
Uloop max. 200Hz:	75mV
Uloop max. 400Hz:	110mV

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:	4,000mm (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

>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:	4,000mm (157.5in)
Windings, primary:	180
Windings, measurement:	30
Supply max. 100Hz:	7.2V
Supply max. 200Hz:	15V
Supply max. 400Hz:	22V
Uloop max. 100Hz:	36mV
Uloop max. 200Hz:	75mV
Uloop max. 400Hz:	110mV
Integrated temperature sensor	
Automatic clamp-open detection	

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:	4,000mm (157.5in)
Windings, primary:	180
Windings, measurement:	30
Supply max. 100Hz:	16.5V
Supply max. 200Hz:	30V
Supply max. 400Hz:	37V
Uloop max. 100Hz:	825mV
Uloop max. 200Hz:	150mV
Uloop max. 400Hz:	185mV
Integrated temperature sensor	
Automatic clamp-open detection	

>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:	4,000mm (157.5in)
Windings, primary:	180
Windings, measurement:	30
Supply max. 100Hz:	16.5V
Supply max. 200Hz:	30V
Supply max. 400Hz:	37V
Uloop max. 100Hz:	825mV
Uloop max. 200Hz:	150mV
Uloop max. 400Hz:	185mV
Integrated temperature sensor	
Automatic clamp-open detection	

>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:	4,000mm (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:	4,000mm (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:	4,000mm (157.5in)
Proportion:	10mV/A AC and DC
Max. current measurement:	10A

Rogowski Current 1 <CMC4>
(TEST-FUCHS part no. 151020061)

At the moment this clamp is under development

Rogowski Current 2 <CMC5>
(TEST-FUCHS part no. 151020062)

At the moment this clamp is under development

>BLRT2<

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:	4,000mm (157.5in)
Windings, primary:	1,000
Max. current measurement:	150A

Small Combined Injection / Measurement Clamp <CIMC7>
(TEST-FUCHS part no. 151020052)

At the moment this clamp is under development

Middle Combined Injection / Measurement Clamp <CIMC8>
(TEST-FUCHS part no. 151020053)

At the moment this clamp is under development

Big Combined Injection / Measurement Clamp <CIMC9>
(TEST-FUCHS part no. 151020054)

At the moment this clamp is under development

>BLRT2<

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 4,000mm (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 4,000mm (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 4,000mm (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 4,000mm (157.5in)

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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 4,000mm (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 2,000mm (78.7in)

>BLRT2<

Cable Extension - Injection <PKL552-10>

(TEST-FUCHS part no. 103240644)

Cable extension between the test cables and the plug „INJECTION“ on the <BLRT2>

The cable length is 12m (472.4in)

Cable Extension - Current <PKL552-11>

(TEST-FUCHS part no. 103240645)

Cable extension between the test cables and the plug „CURRENT“ on the <BLRT2>

The cable length is 12m (472.4in)

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Bonding und Loop Resistance Tester für A350

>ESNBLRT2KIT<

>ESNBLRT2KIT<
(TEST-FUCHS Art-Nr. 150021129)

AIRBUS CERTIFIED

Entwickelt als multifunktionaler Bondingtester für den Einsatz am AIRBUS A350.

Folgende Optionen wurden bei dieser Type umgesetzt:

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

> Untergebracht in einem leichten und praktischen Gehäuse mit Tragegriff und ermöglicht somit auch ein problemloses Tragen des Prüfgerätes

> Durch eingebauten Hochleistungs-Akkumulator kann besonders lange geprüft werden

> Umfangreiches Zubehör gemäß Auflistung auf der Folgeseite

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LIEFERUMFANG

> Grundgerät

BLRT2
(TEST-FUCHS Art-Nr. 151020031)

> Standardlieferumfang

Battery Package
(2 Stk Akku „SWIT S-307149“)
(TEST-FUCHS Art-Nr. 106220138)

Power Supply Unit „S307164“
(TEST-FUCHS Art-Nr. 103070582)

Shoulder Strap Type „1472“
(TEST-FUCHS Art-Nr. 106330923)

Connecting Cable Mini USB B-A 2m
(TEST-FUCHS Art-Nr. 106331470)

> Optionen

High Current / Low Frequency Micro-Ohmmeter (Option E)
(TEST-FUCHS Art-Nr. 151020038)

Loop Resistance Test (Option N)
(TEST-FUCHS Art-Nr. 151020041)

Single Clamp Measurement (Option Y)
(TEST-FUCHS Art-Nr. 151020045)

> Weiteres Zubehör

Small Current Injection Clamp for Single Clamp and Clamp-Open Detection and Temperature Sensor <CIC5>
(TEST-FUCHS Art-Nr. 151020059)

Big Current Injection Clamp for Single Clamp and Clamp-Open Detection and Temperature Sensor <CIC8>
(TEST-FUCHS Art-Nr. 150020835)

Voltage Probes with Extended Tips <PKL552-6>
(TEST-FUCHS Art-Nr. 103240502)

Storage Case „EXPLORER 8.850-W“
(TEST-FUCHS Art-Nr. 150090174)

Standard Battery Charger
(TEST-FUCHS Art-Nr. 103230267)

Battery Package
(2 Stk Akku „SWIT S-307149“)
(TEST-FUCHS Art-Nr. 106220138)

Self Test Unit
(TEST-FUCHS Art-Nr. 106361013)

Eine genaue Beschreibung des Zubehörs und der Optionen kann der Produktmappe des „Bonding and Loop Resistance Tester >BLRT2-XX-X<“ entnommen werden.

>ESNBLRT2KIT<

Technische Änderungen vorbehalten!

A400M Tools

TAN	P/N	AGE Number	NSN	Description
150030028	98M24008074000	AJA24243074000	1730-41-002-6025	Safety Pin RAT
150030158	98M24008078000	AJA24003078000	1730-41-002-6024	RAT Lifting Device
150030029	98M24248063000	AJA24243063000	1730-41-002-2531	Device R/I RAT
150030030	98M24248084000	AJA24243084000	1730-41-002-2421	RAT Door Fixing Device
150030032	98M24248085000	AJA24243085000	4920-41-002-2420	Safety Cage RAT Test
150030036	98M27508060000	AJA27503060000	1730-41-002-2452	Rigging Tool Set
150030037	98M27508061000	AJA27503061000	1730-41-002-2447	STL Locking Adapter
150030038	98M27508107000	AJA27503107000	1730-41-002-2408	Stand Support Out-/Inboard Flap
150030039	98M27518089000	AJA27513089000	1730-41-002-2407	Stand Support Fairing
150030040	98M27508009000	AJA27543009000	5120-41-002-5196	Wing Tip Brake (WTB) Flap Maintenance Tool
150030045	98M29008111000	AJA29003111000	1730-41-002-2557	Hand Pump for CD Ramp Actuator
150030046	98M55308005000	AJA55303005000	1730-41-002-2526	Extractor VTP Attachment Bolts
150030047	98M27508083000	AJA27503083000	4920-41-002-2416	BSA Locking Tool
150030054	98M47008700000	AJA47008700000	1730-41-002-2547	Sling-R/I, PROBIGGS
150030055	98M47008703000	AJA47008703000	4920-41-002-2546	Tool Set Installation PROBIGGS
150030057	98M21503126000	AJA21503126000	1730-41-002-2533	Stand Support ACM HEX Plenum
150030053	98M57578442000	AJA57573442000	5120-41-002-4229	Extractor FWD Support-Beam Bolts
150030135	98M27408448000	AJA27403448000	1730-41-002-2548	Cap-Prot, THSA-Bearing
150030034	98M27208004000	AJA27203004000	1730-41-002-2554	Turn Barrel, Rudder
150030035	98M27208044000	AJA27203044000	1730-41-002-2552	Stand Support Rudder Actuator
150030033	98M27208002000	AJA27203002000	1730-41-002-2584	Device - R/I, Rudder Actuator
150030041	98M55308024000	AJA55303024000	1730-41-002-2453	Sling, R/I VTP
150030042	98M55308047000	AJA55303047000	1730-41-002-2419	Stand Support, VTP
150030043	98M55368018000	AJA55363018000	4920-41-002-2417	Device, VTP Bolt-Centering
150030130	98M24248445000	AJA24243445000	1730-41-002-2418	Cover RAT
150030129	98M25008444000	AJA25003444000	1730-41-002-3902	Protection Cover Bilge
150030128	98M47158706000	AJA47158706000	1730-41-002-2587	Cover OBIGGS Outlet
150030121	98M21008704000	AJA21008704000	1730-41-002-2579	Cover OBIGGS Air Inlet LH
150030122	98M21008705000	AJA21008705000	1730-41-002-2534	Cover OBIGGS Air Outlet LH
150030115	98M21008031000	AJA21003031000	1730-41-002-2529	Cover ECS Air Outlet LH
150030116	98M21008033000	AJA21003033000	1730-41-002-2448	Cover ECS Air Outlet RH
150030117	98M21008034000	AJA21003034000	1730-41-002-2422	Cover LH UBV Air Inlet
150030118	98M21008035000	AJA21003035000	1730-41-002-2415	Cover RH UBV Air Inlet
150030119	98M21008036000	AJA21003036000	1730-41-002-2577	Cover OBOGS AIR Inlet RH
150030120	98M21008037000	AJA21003037000	1730-41-002-2585	Cover OBOGS AIR Outlet RH
150030131	98M21008066000	AJA21003066000	1730-41-002-2576	Cover UBV Air Outlet
150030123	98M49008068000	AJA49003068000	1730-41-002-2536	Cover APU Exhaust
150030124	98M49008069000	AJA49003069000	1730-41-002-2535	Cover Air Intake APU
150030125	98M49008070000	AJA49003070000	1730-41-002-2532	Cover Vent Grid APU RH
150030126	98M49008071000	AJA49003071000	1730-41-002-2530	Cover Vent Grid APU on Top
150090237	M10TC0012002	AJE10104256000	1730-41-002-7008	Engine Ground Covers Kit
150090267	M10TC0012002-M1	AJE10104256000	TBD	Engine Ground Covers Kit (-M1)
150020711	NWAT1	AJE32514180000	4920-41-002-7358	Nose Wheel Alignment Tool
150030150	EFESTT1	AJE26214374000	4920-41-002-3466	Engine Fire Exting System Test Tool
150020713	WCS1	AJE32104529000	1680-41-002-5390	Weight on Wheel Condition Simulator
150090212	DRICD1	TBD	TBD	Device for R/I Cargo Door
150090265	HFK1	AJA29003453000	TBD	KIT FLUSH, HYD HDU
150030204	RTI400M	AJE24244895000	TBD	RAT GTT Hydraulic Service

AIRBUS A400M Test Equipment

safety in test > safety in flight

TEST-FUCHS

STTE

Special Tools

Safety Devices

Devices for Installing and Reinstalling

Lifting Devices

Safety Pins

Covers

SSE

Mobile Air Conditioner
>**BKG8D**<

Oxygen and Nitrogen Trolley
>**ONT1**<

Hydraulic Ground Power Unit
Diesel Motor Driven
>**HST21DSKA**<

Hydraulic Ground Power Unit
Electrically Driven
>**HST21ESKA**<

Test Equipment

Bleeding Tool Set
>**BTS1**<

Impedance Measuring Equipment
for Loop Resistance
>**IM2-FS**<

Weight on Wheel
Condition Simulator
>**WCS1**<

Electrical Module for Cargo Door
and Ramp Operation
>**MCDR1**<

Loop Through Trolleys for
>**MHPA400M**<

Test Equipment

Particle Count Trolleys for
>**MHPA400M**<

Test System for Cargo Hold and
Tunable Vibration Absorber System
>**TS-CH-TVAS1**<

Engine Fire Extinguishing
System Test Tool
>**EFESTT1**<

Earthing Test Set
>**MVP10L-24FS**<

Hydraulic Simulation for Iron Bird
>**GTFB400M**<

Hydraulic Pump Loading System
>**HPLS400**<

Test Equipment

Mobile Hydraulic Test System for Fuselage
>**MHPA400M**<

Electric and Hydraulic Test Stand for
Vertical Tail Tact 5
>**EHP400T5**<

Test System for
Door Ramp Actuation System
>**TS-DRAS1**<

Particle Measuring System
>**PMA400M**<

Cable Test Set
>**KPG4**<

VFG Cooling System
>**VCS400**<