



User Manual

P1 set

Mini Burst Field Generators



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Nöthnitzer Hang 31
01728 Bannewitz

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1. Declaration of Conformity

Manufacturer:

Langer EMV-Technik GmbH
Nöthnitzer Hang 31
01728 Bannewitz
Germany



Langer EMV-Technik GmbH hereby affirms, that the product specified below

P1 set, Mini Burst Field Generators
with P 11, P 12, and P 21

agrees with the regulations of EC guidelines:

- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU
- Restriction of certain Hazardous Substances 2011/65/EU

Applied standards and technical specifications:

- DIN EN IEC 61000-6-1:2019-11 (EMC immunity)
- DIN EN IEC 61000-6-3:2022-06 (EMC emission)
- DIN EN 61010-1:2020-03 (Safety)
- DIN EN IEC 63000:2019-05 (Restriction of hazardous substances)

Person authorized to compile the technical file:

Katja Langer

Bannewitz, 2025-09-08

Signature:

A handwritten signature in black ink, appearing to be 'K. Langer', written over a horizontal line.

K. Langer, Managing Director

2. General Instructions

2.1. Storing the User Manual

This user manual provides the basis for the safe and efficient use of the P1 set. It must be kept handy and easily accessible for the user.

2.2. Reading and Understanding the Manual

Read and understand the manual and observe the instructions carefully before using the P1 set. Please consult Langer EMV-Technik GmbH if you have any questions or comments.

2.3. Local Safety and Accident Prevention Regulations

The applicable local general safety and accident prevention regulations must be adhered to.

2.4. Images

Images in this manual facilitate a better understanding, but can deviate from the actual execution.

2.5. Limitations of Liability

The Langer EMV-Technik GmbH is not liable for personal injury or damage to material, if

- the instructions in this user manual were not followed.
- the product has been used by persons who are not qualified in the field of EMC and are not suitable to work under the influence of interference voltage and electromagnetic ESD fields.
- the product was not used as intended.
- the product was arbitrarily modified or technically altered.
- spare parts or accessories were used, that were not authorized by Langer EMV-Technik GmbH.

2.6. Errors and Omissions

The information in this user manual has been checked very carefully and found to be correct to the best of our knowledge; however, Langer EMV-Technik GmbH can assume no responsibility for spelling, typographical or proofreading errors.

2.7. Copyright

The content of this user manual is protected by copyright and may only be used in connection with the P1 set. This user manual may not be used for other purposes without the prior consent of Langer EMV-Technik GmbH.

3. Scope of Delivery

Item.	Designation	Type	Quantity.
01	Mini Burst Field Generator / red	P 11	1
02	Mini Burst Field Generator / yellow	P 12	1
03	Mini Burst Field Generator / blue	P 21	1
04	Case		1
05	Quick guide		1
06	User manual	P1 set	1

Important: The scope of delivery may differ from the listed scope of delivery depending on the order.

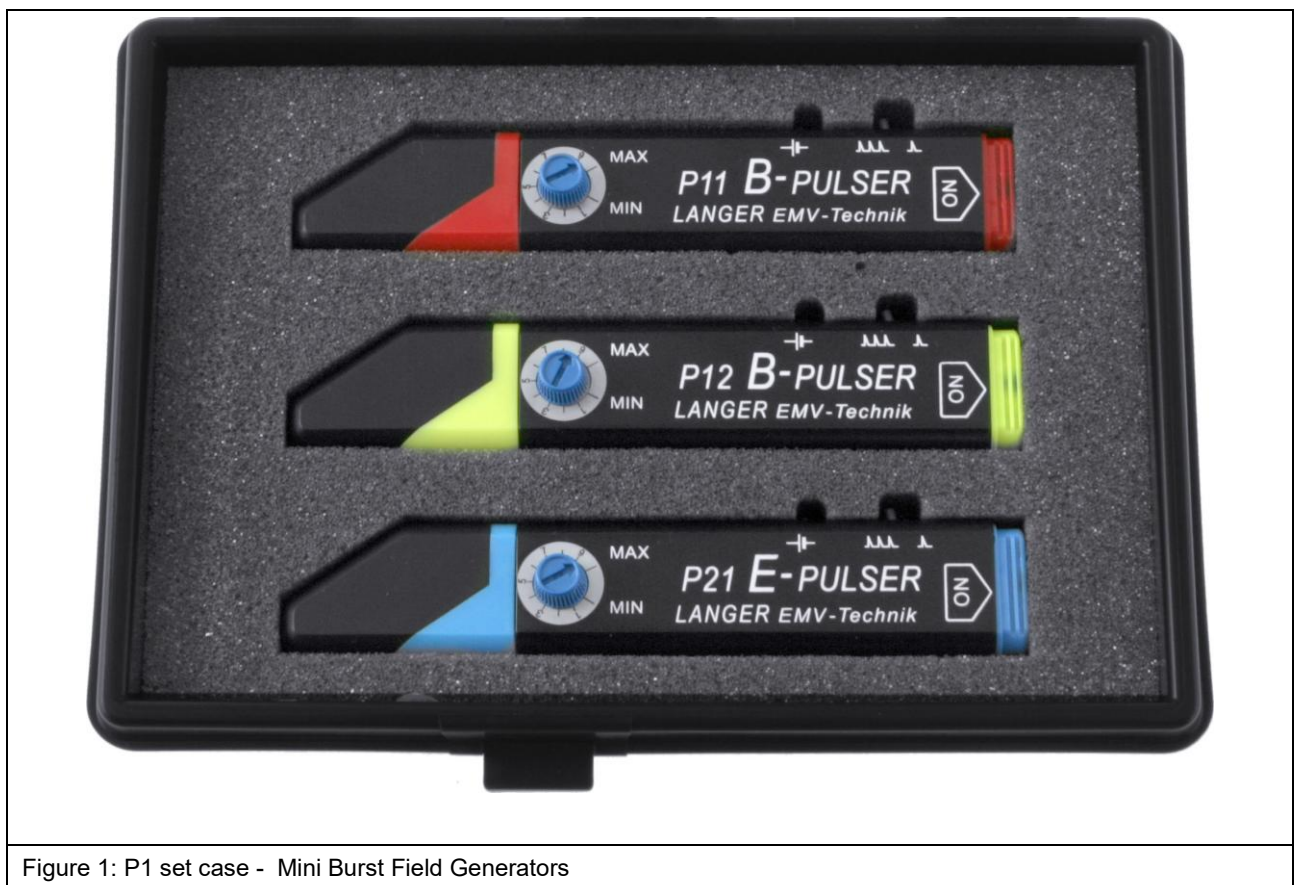


Figure 1: P1 set case - Mini Burst Field Generators

4. Technical Data

Dimensions of the Mini Burst Field Generator (W x H x D)	(118 x 13 x 24) mm
Weight (incl. Battery)	30 g
Supply voltage - Battery	AAA, 1.5 V
Pulse parameters	refer to paragraph 7.4
Pulse sequence	Single pulse / 5 kHz switchable
Polarity	switchable
Standards used as a basis for CE mark test :	Emission: EN 50 081-1 / -2 Immunity: EN 50 082-1 / -2
Table1: Technical parameters P1 set	

5. Safety Instructions

If you use a Langer EMV-Technik GmbH product, please observe the following safety instructions to protect yourself against electric shock or the risk of injury.

The use of the device must be carried out by personnel who are competent in the field of EMC and suitable for this work under the influence of interference voltages and burst fields (electrical and magnetic).

- The operating and safety instructions of all devices used must be observed.
- Damaged or defective devices must not be used.
- Before operating a measuring station with a product of Langer EMV-Technik GmbH, carry out a visual inspection. Damaged connecting cables must be replaced before operation.
- The product of Langer EMV-Technik GmbH may only be used for applications for which it is intended. Any other use is not permitted.
- Damaged or defective mini burst field generators are not to be used.
- Mini burst field generators in operation generate electric or magnetic pulse fields in their environment due to their function.
- The devices must be used by personnel who are competent in the field of EMC and who are suitable for working under the influence of electric and magnetic burst fields. Excluded persons are e.g. pacemaker wearers.
- Do not leave a Langer EMC technology product unmonitored during operation.
- The pulse fields fed into the module can lead to destruction due to their function if they are too strong (latch-up).
- Protection offers: gradual increase of the disturbance variable, abort in case of functional error, interruption of the power supply of the DUT in the latch-up case.
- **Attention!**
- When operating the E-Pulser P21/blue mini burst field generator in residential, business and commercial areas as well as in small companies, excessively high interference emissions may occur due to its function.
- - It is the user's responsibility to take measures to ensure that products installed outside the operational EMC environment are not impaired in their intended function (in particular by emitted interference).
- - This can be done by:
 - Maintaining an appropriate safety distance
 - Using shielded or shielding rooms

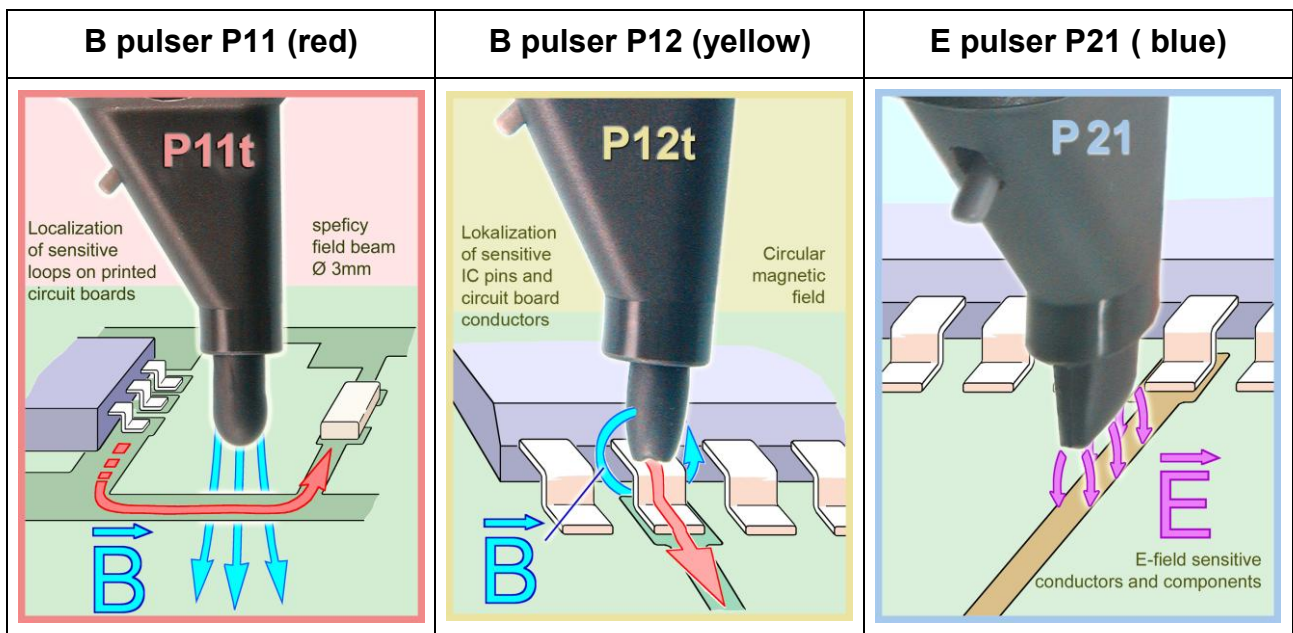
- **Attention!**

No liability can be accepted for the destruction of test specimens!

6. Disturbance Mechanisms

- Electronic modules have differing disturbance immunities, related to their Layout and IC-sensitivity.
- Weak spots, which can be exactly pinpointed, are the cause of burst and ESD-sensitivity. The formation of the weak spots is largely dependent upon the GND/Vcc-geometry and type/manufacturer of the installed IC's.
- Magnetic or electrical pulse fields are the essential physical quantities, which have an effect upon the flat modules.
- As a rule, a weak spot is either only magnetically or only electrically sensitive.
- From a practical point of view, both types of weak spots are relevant. For example, electrical fields can occur, during disturbance events, which influence electrically-sensitive weak spots. The currents, which are driven by the electrical field produce magnetic fields, which, in turn, influence magnetically-sensitive weak spots.
- The disturbance effects of both mechanisms overlay one another and are difficult to separate.
- Both types of weak spots require different EMC measures, due to their differing physical mechanisms.
- The localization of the weak spots and separation according to type takes place with the E- or B-field sources of the Mini Burst Field Generators.

Mini Burst Field Generators - Color mapped types



7. Design and Mode of Operation

7.1.Design

The MINI burst field generator consists of a battery-operated disturbance quantity generator, which feeds an E- or B-field source. Upon activation of the generator, either a single pulse or a continual pulse sequence is given off, depending on the setting. (**Fehler! V erweisquelle konnte nicht gefunden werden.**):

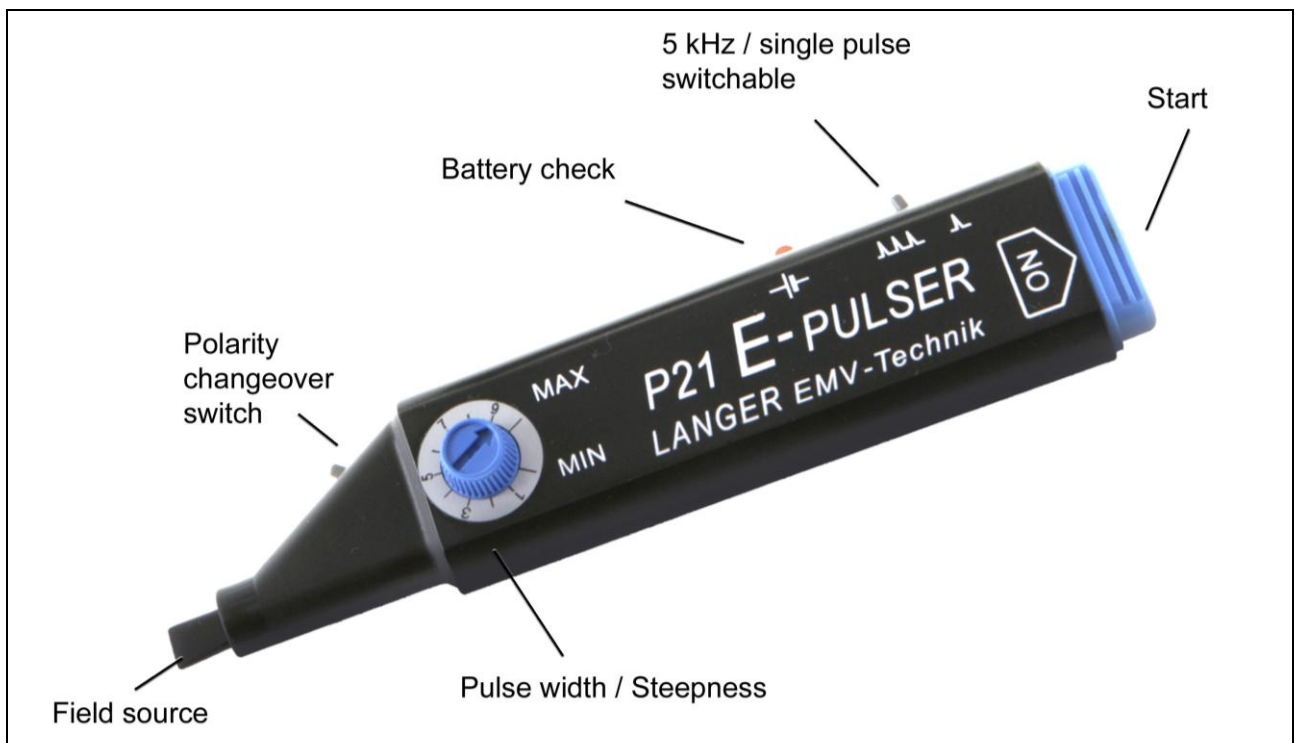


Figure 2: Design Mini Burst Field Generator

Note: The tips of the mini burst field generators are sensitive to mechanical stress.

7.2.Operation

„ON“-Pushbotton:	The device is only active with the button pressed (no closed-circuit current).
Single pulse:	A pulse is triggered each time the ON pushbutton is pressed.
Pulse sequence:	Pulses are produced at a repetition frequency of approx. 5 kHz as long as the ON pushbutton is pressed.
Intensity:B field	Max: wide pulse / Min narrow pulse
Intensity:E field	Max: steep edge - high steepness Min: steep edge - reduced steepness
Polarity:	The polarity of the disturbance can be switched over.
LED:	„Voltage monitoring“ The battery has to be changed if the LED comes on permanently

7.3. Battery Change

by pulling off the rear sealing cap in the direction of the arrow:

- Plus pole (+) of battery on the cap side
- Replace the cap in the reverse order



Figure 3: Changing the battery of the Mini Burst Field Generator

7.4.Setting the Pulse Parameters

7.4.1.Adjustability of the Pulse Parameters: B pulser P11 (red) and P12 (yellow)

POLARITY:

The direction of the magnetic pulse field can be adjusted with the „Polarity“ button.

INTENSITY: The pulse width can be adjusted with the „Intensity“ controller.

Adjustment of the Intensity:

Setting	Impulse width
MAX	approx. 8 ns
MIN	approx. 2 ns

The scale is divided into ten parts, for orientation.

Narrow pulses (setting MIN, approx. 2 ns) influence sensitive IC's.

Insensitive IC's are not influenced by these pulses.

Wide pulses (setting MAX, approx. 8 ns) influence sensitive and insensitive IC's.

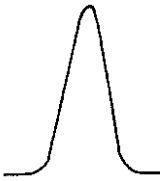
Pulse parameter		Setting	Quantity	Value	Unit
	Pulse width	MIN MAX	T T	approx. 2 approx. 8	ns ns
	Amplitude (voltage induction in a loop)		\hat{u}	max 20	V
	Repeating frequency	Pulse sequence	f	5	kHz

Table 2: Pulse parameter B pulser

7.4.2. Adjustability of the Pulse Parameters: E pulser P11 (blue)

POLARITY: The direction of the steep edge can be adjusted with the „Polarity“ button.

INTENSITY: The pulse width / height can be adjusted with the „Intensity“ controller.

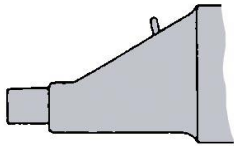
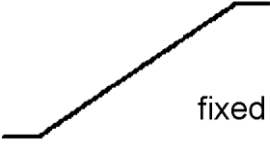
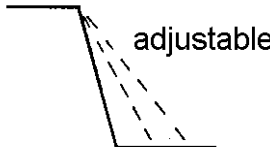
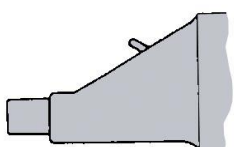
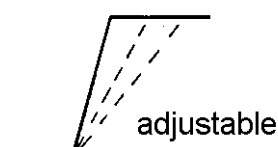
Pulse parameters	Change of the electric field strength	
Polarity	Positive edge	Negative edge
Switch position 	FLAT: Constant approx. 1kV/mm μ s 	STEEP: MAX setting: approx. 1kV/mm ns 
Switch position 	STEEP: MAX setting: approx. 1kV/mm ns 	
Repetition frequency	5 kHz	

Table 3: Pulse parameter E pulser

STEEP 1kV/mm ns	- only fast IC (digital technology) - high-resistance and low-resistance structures
FLAT 1kV/mm μ s	- slow and fast IC - high-resistance structures

The STEEP edge can be adjusted with the „Intensity“ controller. The maximum value of the field strength change $E=1$ kV/mm ns corresponds to the MAX setting and can be reduced with the controller. This allows the evaluation of the susceptibility of weak spots and / or the sensitivity of the IC concerned. The scale is divided into ten parts for a better orientation.




8. Use

The Mini burst field generators facilitate the development-accompanying analysis of the disturbance immunity of flat modules.

The field source of the generator produces ESD/burst-similar pulse-shaped fields, which are limited to a few square millimeters. The mini burst field generators are guided by hand, with their field-producing points (field source) close to the surface of the unit under test (flat module). This makes it possible to precisely influence GND/Vcc- structures, individual tracks, and IC's on the flat module, in order to determine the presence of weak spots by means of function failures.

By means of the adjustable intensity of the disturbance quantity, one can compare the weak spots with one another and evaluate the effectiveness of the EMC-measures.

The separation of magnetic disturbance (B-pulser P11, red) and electrical disturbance (E-pulser P21, blue) makes it possible to differentiate between magnetic and electrical weak spots. With the sensitivity tester (P12, yellow) the sensitivity of IC-inputs and tracks can be tested.

<p>B-pulser type P11 Weak spot tester RED</p>	<p>- produces a limited, radial magnetic field at its tip, for the localization of B-field-sensitive circuit areas.</p>	
<p>B-pulser type P12 Sensitivity tester GELB</p>	<p>- produces a circular, magnetic field, which allows single tracks or IC-pins to be covered. - serves to determine sensitive IC-pins and tracks.</p>	
<p>E-pulser type P21 Weak spot tester BLUE</p>	<p>- produces a limited, radial electrical field at its tip, for the localization of E-field-sensitive circuit areas.</p>	

Regulation testing cannot be carried out with the mini burst field generators.

Measurements at regulation testing sites are necessary for the determination of regulation disturbance immunity values. Experience, however, makes it possible to make estimates

In order to achieve the level of disturbance immunity, as defined in regulations, during developmental examinations, it is advisable to make comparative measurements with regulation disturbance quantities on a random basis.

9. Execution of Tests

9.1. Starting up the Mini Burst Field Generators

Single pulses / pulse sequences are triggered by pressing the ON pushbutton.
(Please refer to Point **Fehler! Verweisquelle konnte nicht gefunden werden.** for operation and Point 7.4 for setting the pulse parameters)

Functional check using the „Voltage monitoring“ LED

- Flashes briefly if the „ON“ pushbutton is pressed - system is operational

- Steady light: batteries are empty.

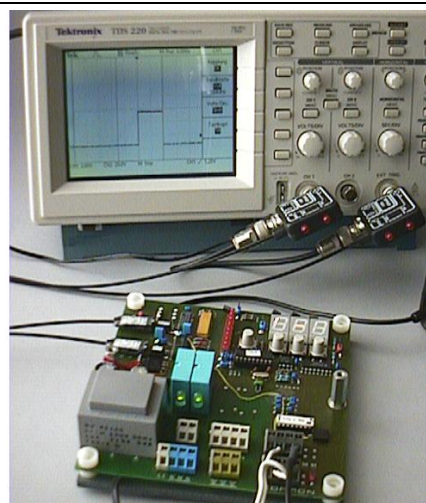


Figure 4: Functional check at the Mini Burst Field Generator

9.2. Preparation

Attention!

Make sure that internal functional faults are visible from outside. The unit under test may be destroyed by an increase to coupling if the faults are not visible outside. Take the following measures as necessary:



Monitoring of representative signals with EMC sensors
(connect EMC sensor to counter via optical fiber)

Special test software

Visible reaction of the UUT to the input procedure

Figure 5: Test set-up

9.3. Search for Weak Spots

The search for weak spots is carried out in two parts, for example, first the magnetically (B-pulser/red) and then the electrically (E-pulser/blue) sensitive weak spots are sought out.

Procedure:

- Set the maximum intensity (MAX), pulse sequence 5 kHz.
- Begin examining the surface of the UUT, with approx. 5 cm separation.
- Hold pulser vertically, so that the field stream contacts the surface of the module.
- Switch the polarity over and repeat the process.
- Gradually approach the surface of the UUT, repeat procedure.
- If function failures occur, reduce intensity. Pinpoint weak spots by further approach of the surface of the module (track runs/components).
- If no function failures have yet occurred, place the pulser vertically on the surface of the UUT and examine the surface.
- The highest level of resolution and disturbance is reached, when the pulser is placed on the surface of the UUT (flat module) with the appropriate intensity setting.

Susceptibility of the Module:

- The denser the GND system is in an area of the module the less susceptible this area is.
- Large surface areas normally react to pulse disturbances if the module has a weak GND system (pulser separation 3 cm).
- Weak spots are mostly concentrated in small areas of modules which have a strong GND system (place pulser on the surface).
- Signal track loops, with low impedance drivers (standard output of digital IC's) are especially sensitive to magnetic fields. -B-pulser/red
- High-resistance signal line structures (quartzes, pull-up's) are especially susceptible to E-fields. - E-pulser/blue

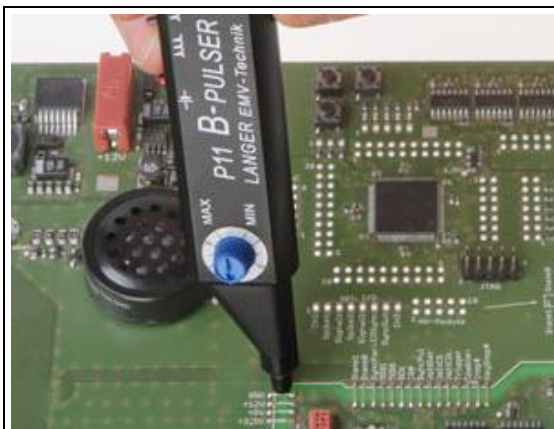


Figure 6: P11 - B-Field pulser

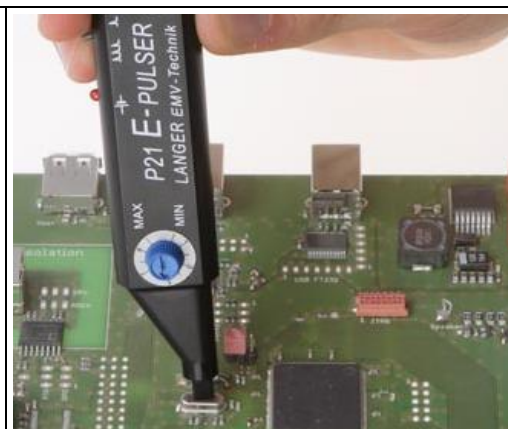


Figure 7: P21 - E-Field pulser

Single Pulses

- These pulses are used to determine edge-sensitive signal lines and components. One pulse is normally enough to trigger a functional fault.
- Example: RESET lines and components

9.4.Sensitivity Tester P12 / yellow

The sensitivity test can be carried out on IC-inputs, which are connected to a low impedance driver, GND or Vcc. The Sensitivity tester P12/yellow works like a B-pulser P11/red, except for the fact that the pulse magnetic field is formed radially. Track runs or IC-pins can be selectively grasped by the circular magnetic field.

Procedure

- The point of the sensitivity tester P12/yellow is placed on the track / IC-pin, which is to be examined.
- The notch of the pulser point must be placed upon the track / IC-Pin.
- The pulser is then activated. If function failures in the UUT occur, the intensity can be adjusted back to the function failure occurrence point.
- Sensitive tracks and IC-connections can be investigated and selectively protected with EMC-measures.

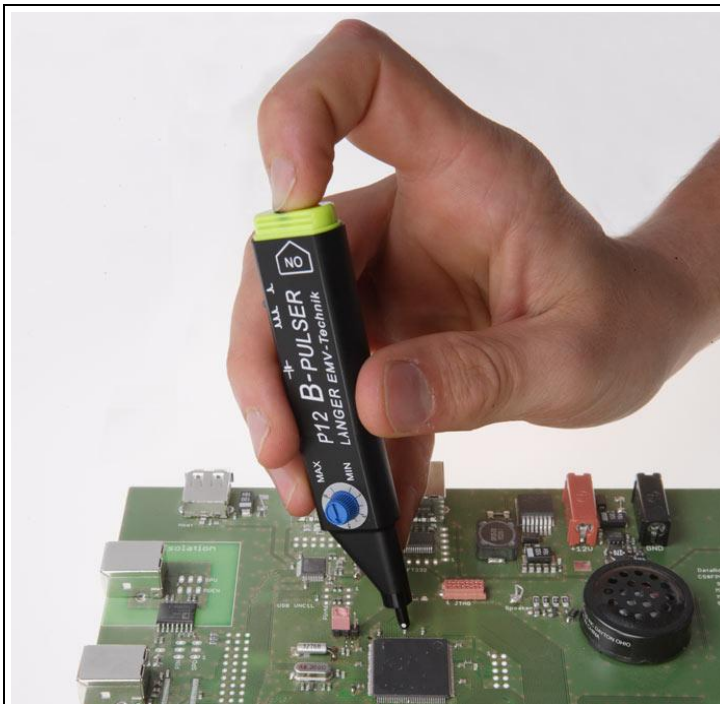


Figure 8: P12 - B-Field pulser

10. Information on Recycling and Disposal



DE 80567526

In accordance with the WEEE Directive 2012/19/EU (Waste of Electrical and Electronic Equipment), the following must be observed:

At the end of its service life, this product should be taken to a suitable disposal facility for recycling and disposal. Do not dispose of with household waste.

11. Customer Support

Please contact us if you have any queries, hints and suggestions.

You can reach us: Monday - Friday 8:00 am to 3:00 pm (CET)

Contact us at: Langer EMV-Technik GmbH
Rosentitzer Straße 73
01728 Bannewitz
Germany

Internet: www.langer-emv.com
email: sales@langer-emv.de

Phone: +49 (0) 351-430093-0
Fax: +49 (0) 351-430093-22

12. Warranty

Langer EMV-Technik GmbH will remedy any fault due to defective material or defective manufacture during the statutory warranty period either by repair or by delivery of spare parts.

This warranty is only granted on condition that:

- The information and instructions in the user manual have been observed.

The warranty will be forfeited if:

- An unauthorized repair is performed on the product.
- The product is modified.
- The product is not used for its intended purpose.
- The product is opened.

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