

# P1202-4 / P1302-4 set

## EFT/Burst Field Coupling



### Short description

The field sources, which are included in the probe set EFT/Burst field coupling, generate electric and magnetic EFT/Burst pulse fields. With these fields, ICs are defined and reproducibly pulsed to determine their immunity against EFT/Burst pulse fields.

The reason for this is the EFT/Burst immunity of PC boards and electrical devices. The immunity is tested (IEC 61000-4-4). During the tests, electric and magnetic fields are generated by coupled EFT/Burst interference into the PC boards. These fields affect the PC board surface and penetrate the IC casings. If fields penetrate the ICs, disturbance events will be generated. The IC interference via magnetic or electrical fields is a significant source of interference path in addition to the conducted coupling of EFT/Burst interference above the ICs.

From the probe set, knowledge will be gained of the IC EMC behaviour and this can be streamlined into the development of the PC board. Expensive redesigns are avoided and development costs are reduced.

Furthermore, the use of the test methods for the determination of IC EMC parameters enables the IC producer to develop ICs more efficiently.

The test set-up needs the ICE1 test system and external devices. The field sources are powered by an EFT/Burst generator (IEC 61000-4-4). The delivery includes the HV FI-FI 1m RF cable (Fischer connector-Fischer connector). On request, the RF cable with the connections Fischer socket-SHV socket (HV FI-SHV 1m) can be ordered.

### Scope of delivery

- 1x P1202-4, EFT/Burst Magnetic Field Source
- 1x P1202-4 50R, EFT/Burst Magnetic Field Source
- 1x P1302-4, EFT/Burst E-Field Source
- 1x P1302-4 50R, EFT/Burst E-Field Source
- 1x D70 h03, Spacer Ring, 3 mm
- 1x D70 h10, Spacer Ring, 10 mm
- 2x SMA-SMB 1 m, SMA-SMB Measuring Cable
- 1x HV FI-SHV 1 m, High-Voltage Cable Fischer-SHV
- 1x P1202-4 / P1302-4 case, System Case
- 1x P1202-4 / P1302-4 m, P1202-4 / P1302-4 Set User Manual

# P1202-4 / P1302-4 set

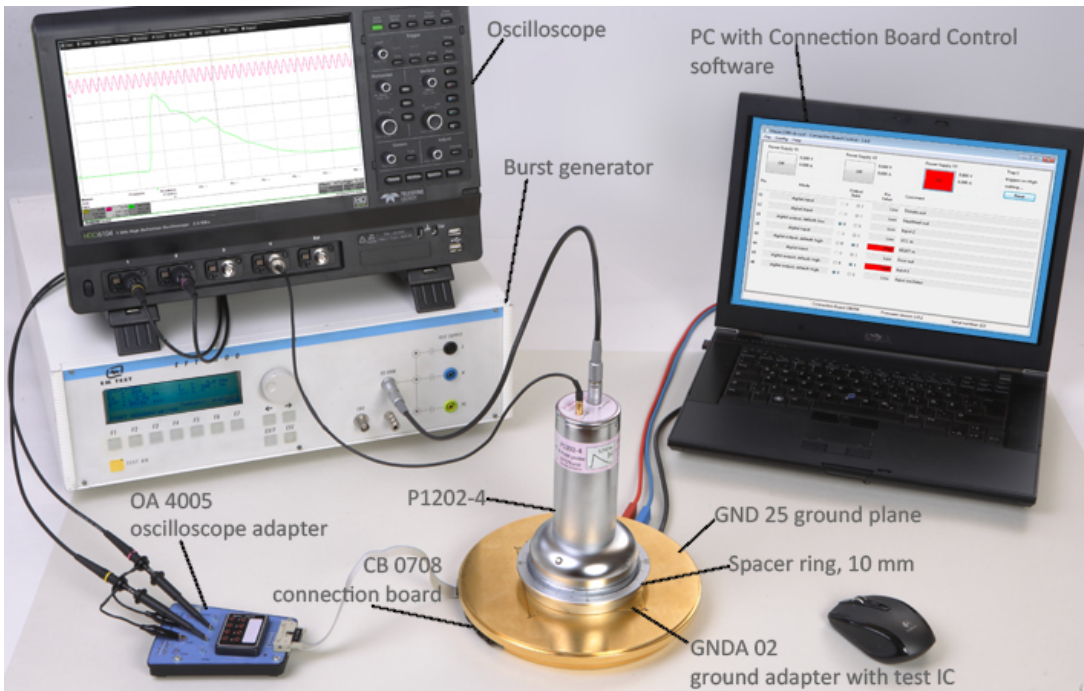
EFT/Burst Field Coupling



In a test IC burst E-field is coupled in with the E-field source P1302-4.



Test set-up with P1202-4 / P1302-4 set; EFT / Burst field coupling and ICE1 IC Test Environment. (ICE1 is not included in delivery)

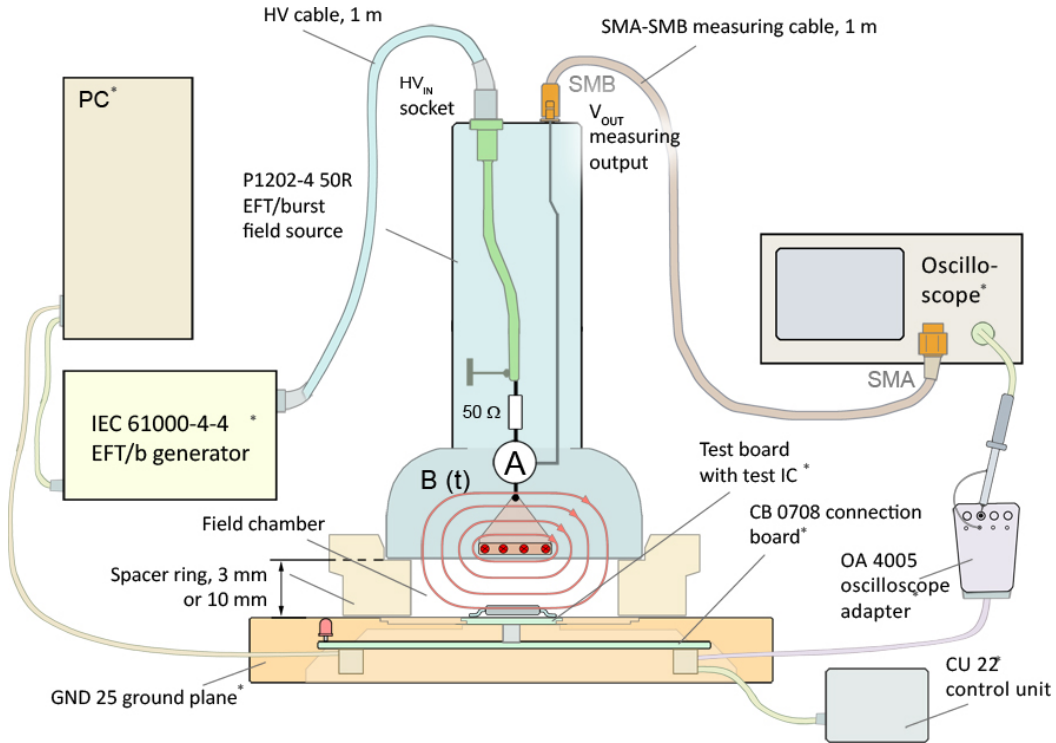


# P1202-4 / P1302-4 set

## EFT/Burst Field Coupling



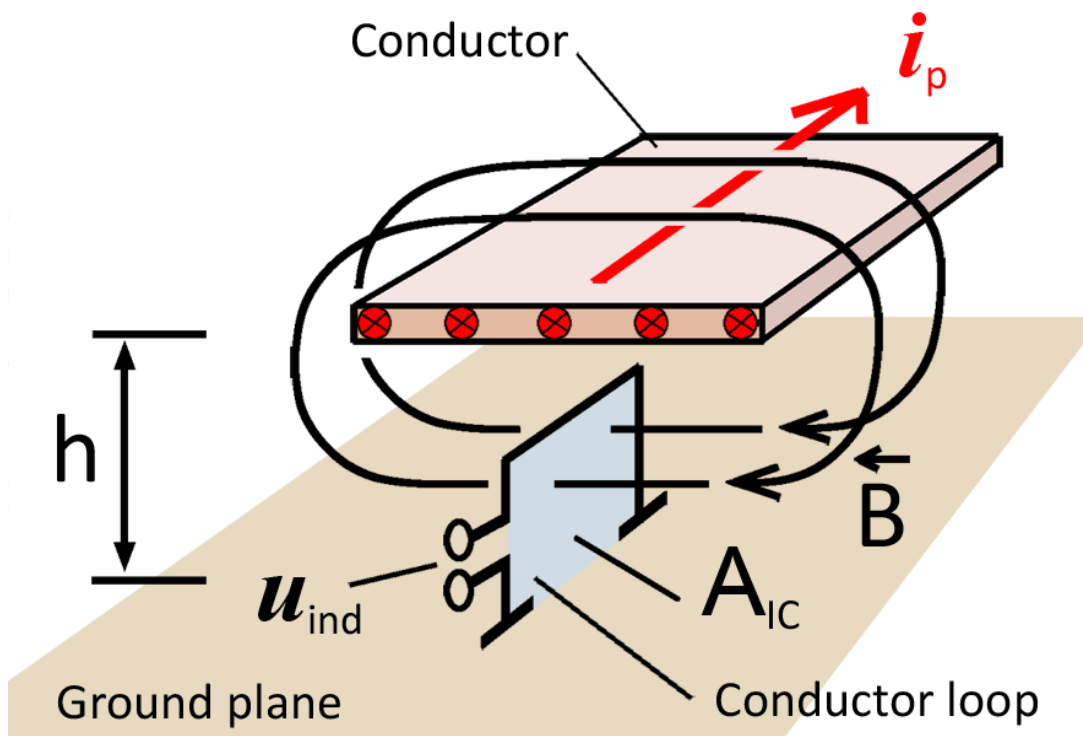
Layout and function of the measurement set-up for EFT / Burst field coupling into ICs (example, magnetic field source P1202-4)



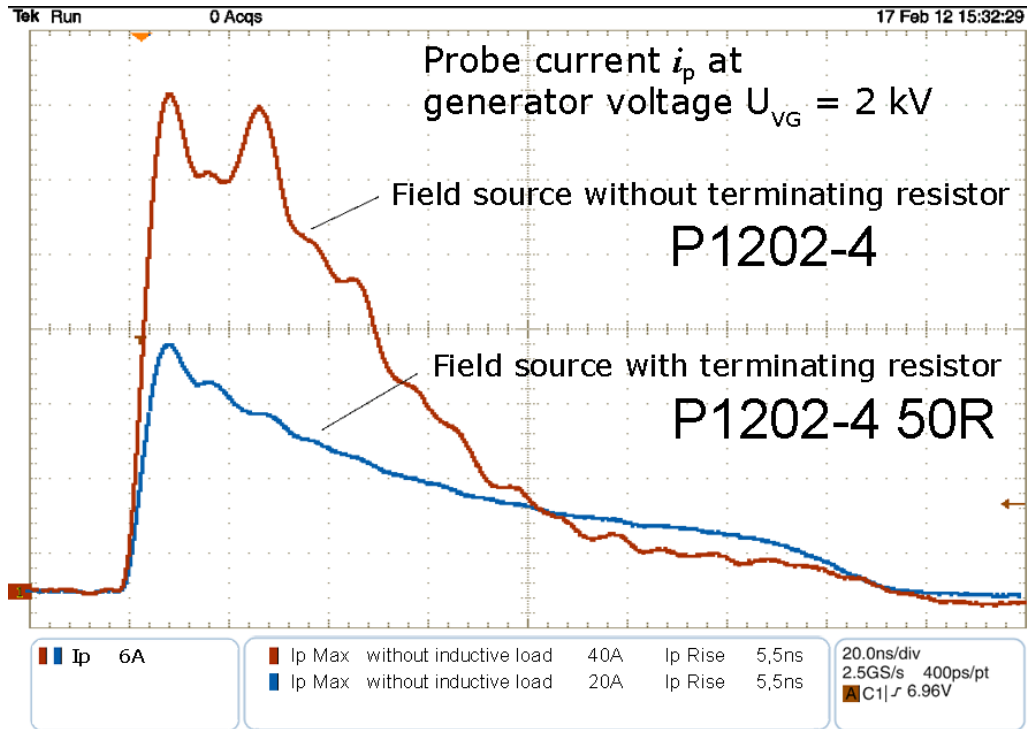
EFT/Burst Field Coupling P1202-4 / P1302-4 set Scope of delivery includes a case and user manual for the set (not pictured).



Principles of field coupling into conductor loop of a test IC. The P1202-4 field source's conductor generates the test magnetic field  $B$  from the EFT/Burst generator's current  $i_p$ .



Current characteristic of the field source with terminating resistor (P1202-4 50R) and without a terminating resistor (P1202-4). The field source without a terminating resistor (P1202-4) generates twice as much test current.

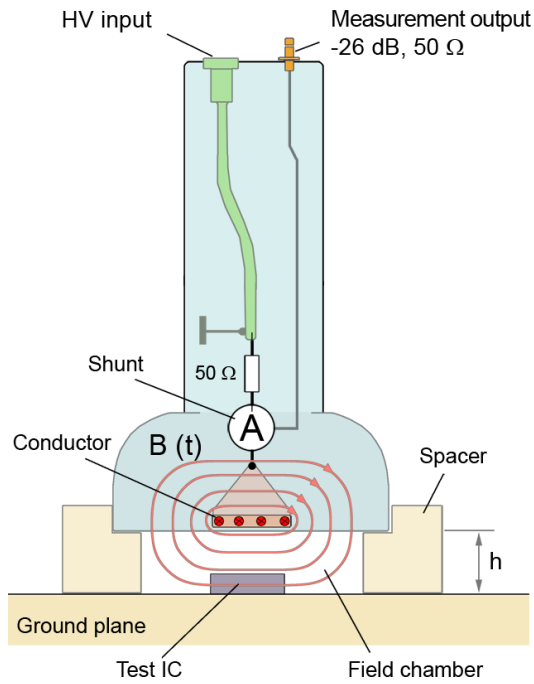


# P1202-4 / P1302-4 set

EFT/Burst Field Coupling

Layout and function of the magnetic field source P1202-4 with an internal terminating resistor of  $50\ \Omega$ . The fields orientation  $B(t)$  to the IC mimics the field orientation during intended use.

P1202-4 50R EFT/burst H-field source

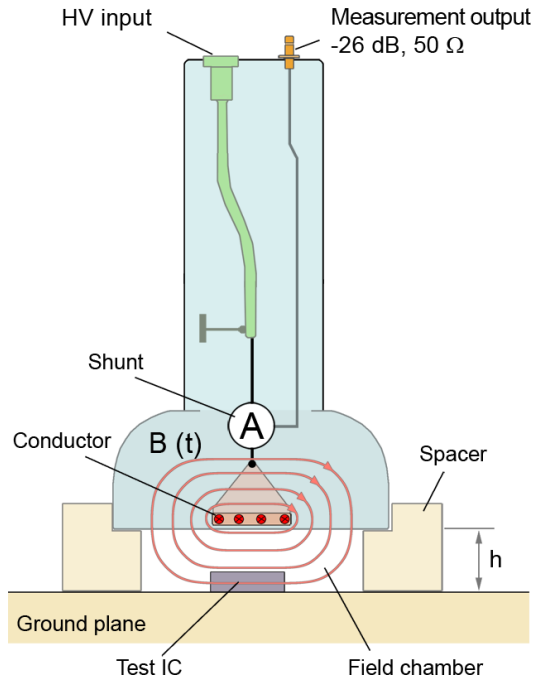


# P1202-4 / P1302-4 set

EFT/Burst Field Coupling

Layout and function of the magnetic field source P1202-4 without an internal terminating resistor of  $50 \Omega$ . The fields orientation  $B(t)$  to the IC mimics the field orientation during intended use.

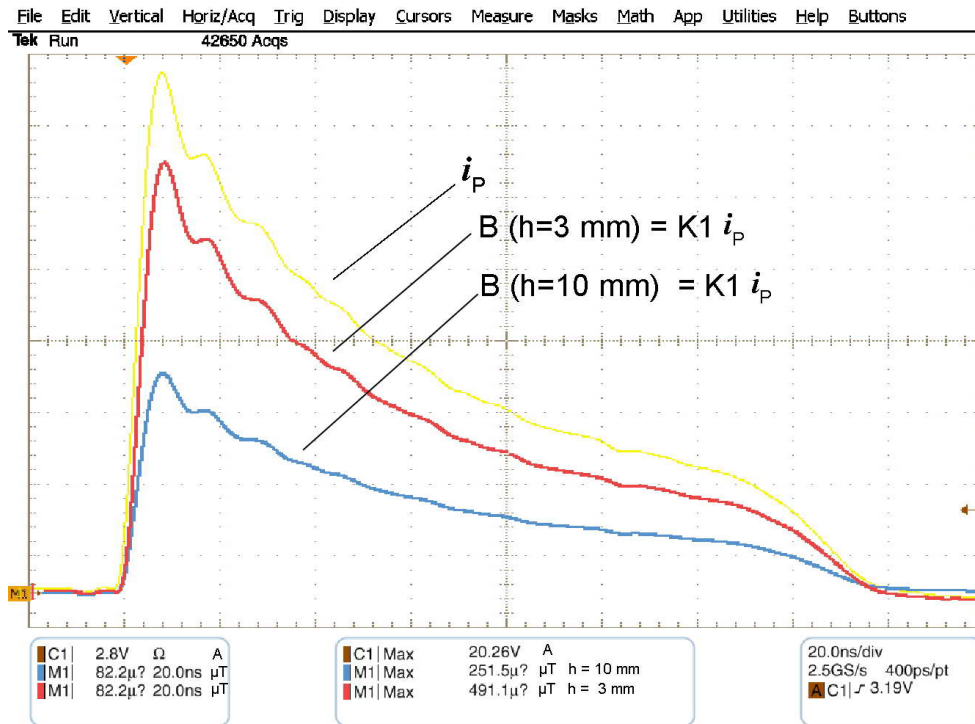
P1202-4 EFT/burst H-field source



# P1202-4 / P1302-4 set

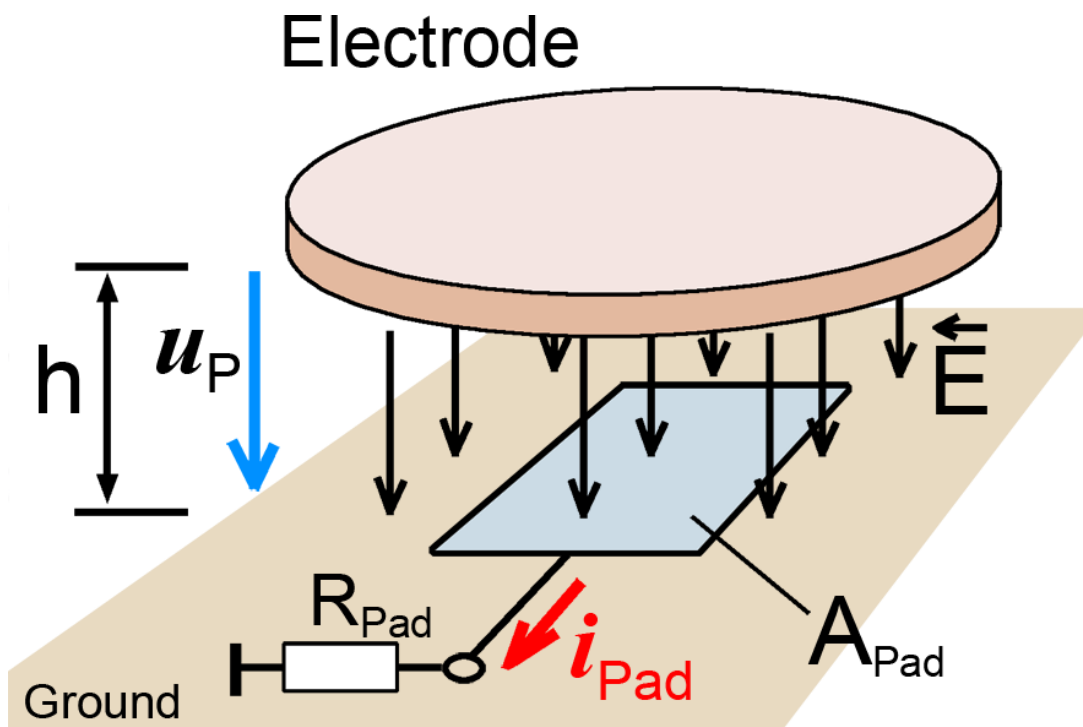
## EFT/Burst Field Coupling

The characteristics of the magnetic field generated by the P1202-4 field source in the field chamber in the location of the test IC with a 3 mm and 10 mm spacer. The field source is powered by the EFT generator with a current of 20 A ( $i_p$ ) and a voltage of 1000 V.

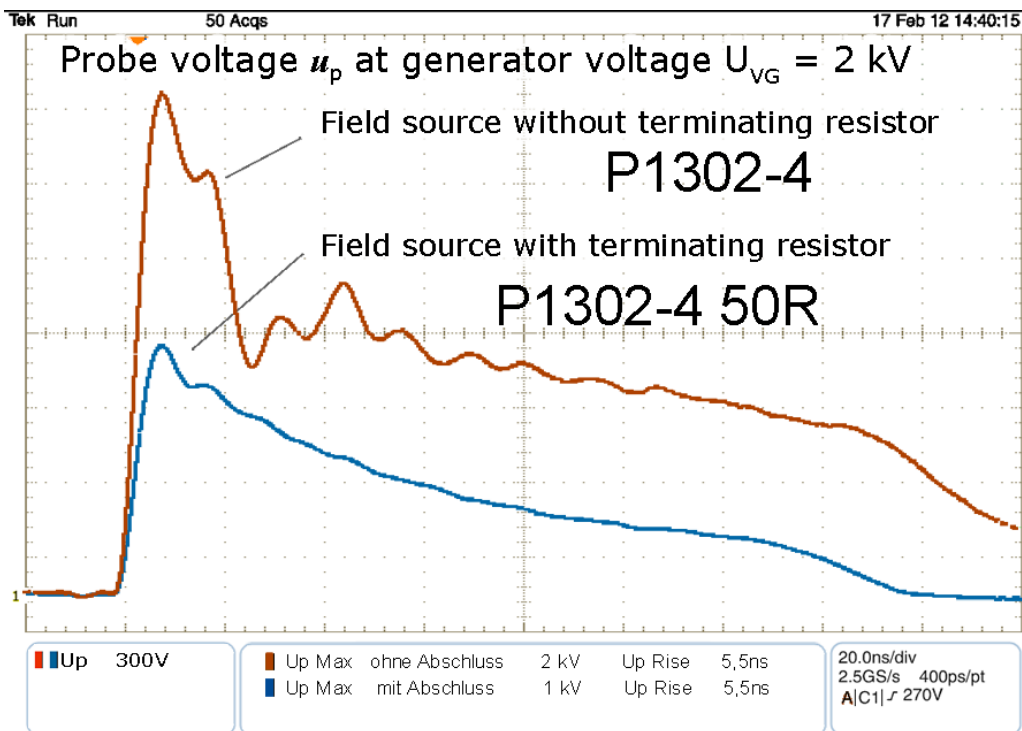




Principles of E-field coupling into conductor of a test IC. The P1302-4 field source's electrode generates the electric test field  $E$  from the EFT-generator voltage  $U_p$ . The test field must be orthogonally oriented to the ground plane.



Voltage characteristic of the E-field source with a terminating resistor (P1302-4 50R) and without a terminating resistor (P1302-4) can supply the test IC with twice the current.

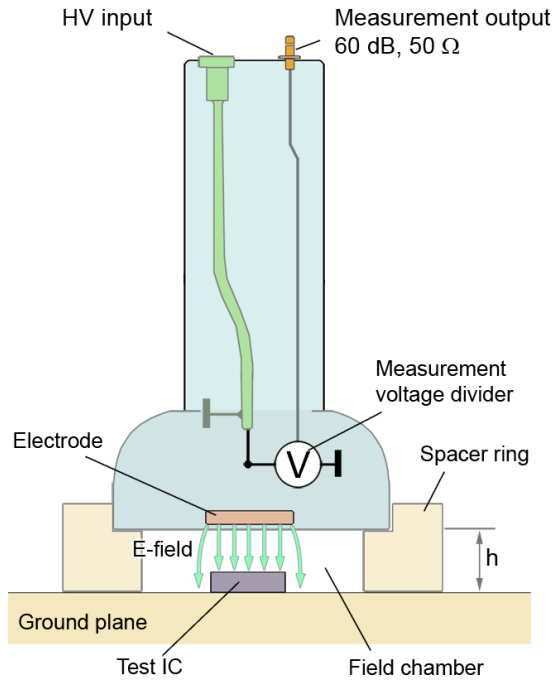


# P1202-4 / P1302-4 set

EFT/Burst Field Coupling

Layout and function of the E-field source P1302-4 without an internal terminating resistor of  $50 \Omega$ . The fields orientation  $E(t)$  to the IC mimics the field orientation during intended use.

P1302-4 EFT/burst E-field source

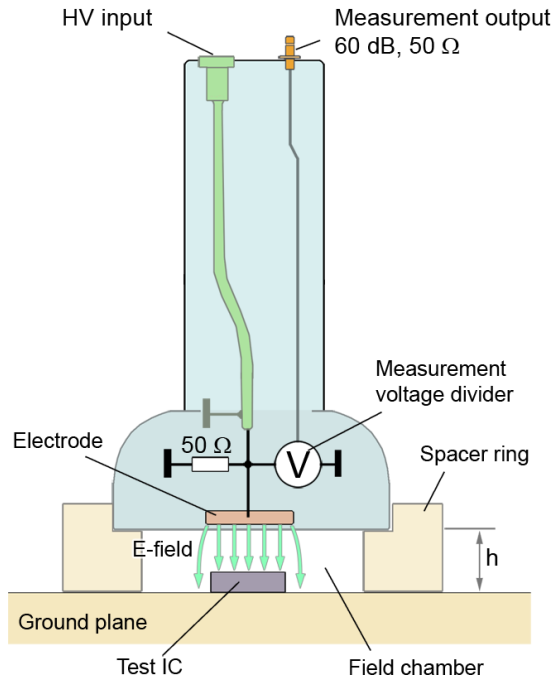


# P1202-4 / P1302-4 set

## EFT/Burst Field Coupling

Layout and function of the E-field source P1302-4 with an internal terminating resistor of 50 Ω. The fields orientation E(t) to the IC mimics the field orientation during intended use.

P1302-4 50R EFT/burst E-field source



Probe type	P1202-4 50R		P1202-4		P1302-4 50R	P1302-4
$U_{VG}$	$I_{pmax}$	$B_{max}$ $h = 3 \text{ mm}$	$I_{pmax}$	$B_{max}$ $h = 3 \text{ mm}$	$E_{max}$ $h = 3 \text{ mm}$	
4000 V	40 A	0.9 mT	80 A	1.9 mT	650 kV/m	1300 kV/m
8000 V	80 A	1.9 mT	160 A	3.9 mT	1300 kV/m	2600 kv/m