

## Functional equipotential bonding (FEB)

Large shielding measures with shielding materials are no electrical equipment but „new conductive parts“ according to IEV 826-03-03 or IEV 195-06-11 and thereby a new method of DIN VDE 0100-100:2009-06. By connecting the material(s) to the potential equalization they are inherent part of the electrical system. Generally accepted rules of technology have to be respected.

**The state of the technology differentiates between protective equipotential bonding and functional equipotential bonding (FEB).** The protective equipotential bonding (green/yellow cable) is a protective measure and ensures that, in the event of a fault, sufficient fault current flows to operate the disconnection device (e.g. line circuit breaker). **The functional equipotential bonding (transparent cable) has the function to „reduce the emission of low-frequency electrical fields“, i.e. prevents from leaking electrical field.**

- **Grounding/earthing measures are only permitted in TN-S, TT and IT networks. Grounding measures must never be executed in network forms with combined PEN-wiring!**
- **A leakage/fault circuit breaker with  $\leq 30$  mA must be installed!**
- **DIN EN 62305-3 (VDE 185-305-3:2006-10) applies to buildings with outer lightning protection system.**

### Proper grounding sequence

**1** The FEB-balancing circuit has to be connected **directly to the FEB-busbar with a 4 mm<sup>2</sup> cable** in the electric circuit distributor (fuse box).

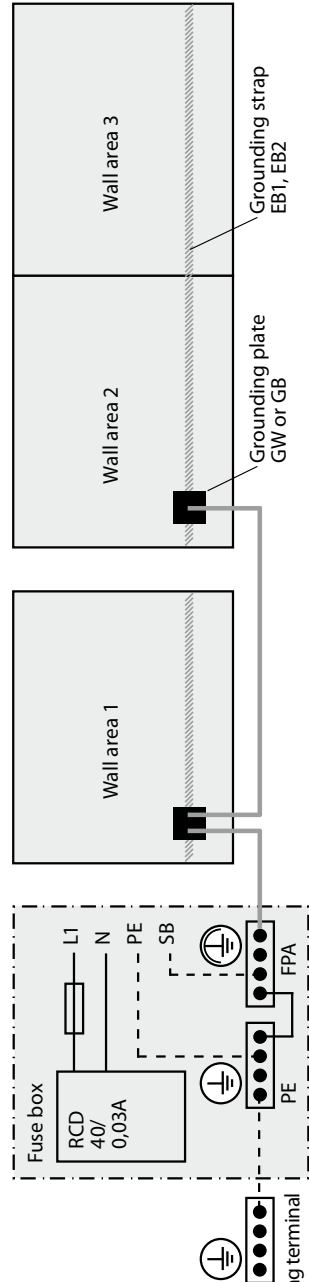
**2** In exceptional cases, the FEB-balancing circuit can be connected to a „**suitable protective earth conductor or balancing line**“. This exemption clause is important to make earthing possible without the need for making modifications to the fuse box.

**3** Grounding with a **2,5 mm<sup>2</sup> cable at a protective conductor** in the electric installation.

**4** Grounding with our **grounding plug GP** by screwing in the power socket. Our grounding plug must be installed by a licenced electrician!

**5** Metallic pipe systems or detached grounding rods which are not included in the potential equalization of the building are of limited suitability. It is nevertheless possible to use them in network forms with combined PEN-wiring. Please be sure to follow all local laws and standards.

Installation of a functional equipotential bonding is as follows:



Main earthing terminal

Paints

Sheet products

Fabrics

Textile products

Canopies

Grounding

Measurement

Electro

Prices

69

## New grounding components



YSHIELD® GW

### What is new?

**Covering caps:** White covering caps have been added to many new grounding plates. The covers are looking better and serve as protection against an accidental unplug of the cables.

**Improved connectors:** The new 4mm gold plugs are fixed very firm and contact safe in the tight 3.8 mm connectors.

**Flat design:** Instead the previous height of 14 mm the new grounding plates are 6 mm high only and with the covering caps 8 mm only.

## GW - Grounding plate Wall



YSHIELD® GW

**Grounding plate for shielding paints, nettings, fleeces, etc. for interior use. Quadratic design for mounting next to an electrical outlet.**

Per serie of connected areas there is one GW required. 3 connection sockets.

### Scope of delivery

Grounding plate 75 x 75 x 6 mm, covering cap 80 x 80 x 8 mm, 4 screws, 4 dowels, 3 solder plugs; Cable is not included, we recommend our pre-assembled cables GC.

## GB - Grounding plate Baseboard



YSHIELD® GB

**Grounding plate for shielding paints, nettings, fleeces, etc. for interior use. Slim design for mounting in the baseboard area.**

Per serie of connected areas there is one GB required. 4 connection sockets.

### Scope of delivery

Grounding plate 150 x 30 x 6 mm, covering cap 155 x 35 x 8 mm, 3 screws, 3 dowels, 4 solder plugs; Cable is not included, we recommend our pre-assembled cables GC.

## GE - Grounding plate Exterior



YSHIELD® GE

**Grounding plate for shielding paints for exterior use. The cover cap is glued waterproof on the underground.**

Per serie of connected areas there are two GE required. 1 connection point for cables up to 6 mm<sup>2</sup>.

### Scope of delivery

Grounding plate 75 x 75 x 6 mm, covering cap 85 x 85 x 8 mm, seal adhesive, 4 screws, 4 dowels, 1 cable lug, cable is not included.

## GT - Grounding plate Tube



YSHIELD® GT

**Grounding plate for earthed installations (e.g. heating tubes).**

Stable construction compared with strip earth bands. 3 connection sockets.

### Scope of delivery

Grounding plate 80 x 46 x 6 mm, covering cap 85 x 60 x 8 mm, 2 worm drive clamps 12 to 25 mm, 3 solder plugs; Cable is not included, we recommend our pre-assembled cables GC.

## GM - Grounding plate Magnet



YSHIELD® GM

**Grounding plate for canopies, fabrics, fleeces, nettings, etc. The both plates are bound together from two strong magnets.**

You don't need a hole in the material, if you tripping on the cable thin fabrics like Silver-Tulle don't tear. 4 connection sockets.

### Scope of delivery

2 grounding plates 28 x 28 x 6/3 mm, 4 solder plugs; Cable is not included, we recommend our pre-assembled cables GC.

## GS - Grounding plate Screw



YSHIELD® GS

**Grounding plate for canopies, fabrics, fleeces, nettings, etc. The both plates are screwed together.**

On this you have to make a hole in the material. 4 connection sockets.

### Scope of delivery

2 grounding plates 28 x 28 x 6/3 mm, 4 solder plugs; Cable is not included, we recommend our pre-assembled cables GC.

## GV - Grounding plate Velcro



YSHIELD® GV

**Grounding plate with a silvered Velcro fastener "hook".**

All our groundable products (canopied, floor mats, blanket, sleeping bag, bedding, etc.) have stitched on 2-4 pieces of a silvered Velcro fastener "loop". Press GV on it, ready. 3 connection sockets.

### Scope of delivery

Grounding plate 34 x 28 mm with 5 cm silvered Velcro fastener "hook", 3 solder plugs. Cable is not included, we recommend our pre-assembled cables GC.

## GP - Grounding plug



YSHIELD® GP

**Grounding plug for CEE-7/4 and CEE-7/7 socket-outlets. For German and French Schuko systems.**

The plug can just be loose pushed in, but should be better screwed together with the socket cover. 4 connection sockets.

### Scope of delivery

Grounding plug 38 x 26 mm, covering cap 55 x 42 x 8 mm, 2 screws for standard socket outlets, 4 solder plugs; Cable is not included, we recommend our pre-assembled cables GC.

## GD - Grounding plug



YSHIELD® GD

**Grounding plug for CEE-7/4 and CEE-7/7 socket-outlets. For German and French Schuko systems.**

The plug becomes mechanically fixed due to the locking latch and can thus only be removed by using a screwdriver.

### Scope of delivery

Grounding plug with CEE-plug and 4 mm plug, cable length 5 m;

## GC - Grounding cables



YSHIELD® GC-500

**Grounding cables to connect our grounding components.**

With soldered 4 mm gold plugs on both sides. This cables provide a protection against unplugging together with the cover caps.

### Scope of delivery

Cable 2.5 mm transparent, highly flexible; Available lengths:

- GC-20 (20 cm)
- GC-100 (1 m)
- GC-200 (2 m)
- GC-500 (5 m)
- GC-1000 (10 m)

## MCL - Grounding set



YSHIELD® MCL



YSHIELD® MCL

**Grounding set for our magnetic shielding film MCL61.**

The MCL61 surface is electrically insulated. Whilst screwing down the cable lug, the chopper disks will perforate the polyester film and arrange electrical contact thereby.

### Scope of delivery

10 x screw, 10 x dowel, 10 x chopper disk, 10 x cable lug 1.5-2.5 mm<sup>2</sup>

## EB1 - Grounding strap



YSHIELD® EB1

### Self-adhesive grounding strap with conductive glue for application under and over nettings, fleeces.

On basis of our fleece HNV80. To electrically connect the limited width of the materials. The strap sticks relatively poor on difficult undergrounds (e.g. plasterboards), they have to be pretreated with a primer.

#### Technical data

- Adhesive force 3 N/cm
- Self-adhesive
- Corrosion resistant
- Width 2 cm
- Thickness 0.1 mm
- Length 10 m

## EB2 - Grounding strap



YSHIELD® EB2

### Self-adhesive grounding strap with non-conductive glue for application under shielding paints.

On basis of our netting HNG80. To bridge cracks in the underground. The strap sticks very well even on difficult undergrounds when painting over.

#### Technical data

- Adhesive force 10 N/cm
- Self-adhesive
- Corrosion resistant
- Width 2 cm
- Thickness 0.2 mm
- Length 10 m

## EB3 - Grounding strap



YSHIELD® EB3

### Self-adhesive fleece with conductive glue. Identical with EB1, but width of 10 cm.

Application like grounding straps EB1 or EB2 if a higher discharge capacity is needed, or as self-adhesive fleece for small-area shielding of slots, notches, openings, cables, etc.. On basis of our fleece HNV80 with 80 dB, see the corresponding catalog page!

#### Technical data

- Adhesive force 3 N/cm
- Self-adhesive
- Corrosion resistant
- Width 10 cm
- Thickness 0.15 mm
- Length: by the linear meter

## ELB - Perforated stainless steel tape



YSHIELD® ELB

### Grounding tape for stainless steel gauzes under plaster or at drywall constructions.

To connect the single elements, this steel tape is fixed often as possible across the single elements on the underground, especially on the overlapping locations.

#### Technical data

- Resistant to corrosion
- Delivered in a convenient unwinding box
- Length 10 m
- Width 1.4 cm
- Thickness 0.7 mm
- Hole spacing 16 mm
- Hole diameter 6 mm;



## GR-40 - Grounding rod



**Stainless steel grounding rod 40 cm for groundable fabric products.**

This grounding rod is suitable for portable products (canopies Bxx, earthing-products Exx, etc.). It is not allowed to ground stationary shielding products (paints, nettings, fleeces, wallpapers, etc.) with this plug.

**We recommend this grounding rod especially for our earthing-products Exx.**

**Therewith you achieve a more real and natural earth contact.**

### Scope of delivery

Stainless steel rod 40 cm with connection plate, heat shrink tubing with a glue inside to seal the connections waterproof after mounting; Cable is not included, we recommend our pre-assembled cable GC-1000 (10 meters).

## GR-50, GR-100 - Grounding rods



**Stainless steel grounding rod to connect other grounding components.**

In many countries without the network types TT or TNS a ground connection is hardly possible. This rod is hammered in the grounding earth outside a house. Stainless steel rod (t-form) in 2 lengths: GR-50 with a length of 50 cm (only recommended for mobile applications) and GR-100 with a

length of 100 cm (for permanent mounting). 2 connection points (socket for cables GC, M6 screw for own grounding cables).

### Scope of delivery

Stainless steel rod, heat shrink tubing with a glue inside to seal the connections waterproof after mounting, cable lug; Cable is not included, we recommend our pre-assembled cables GC.

## GX - Grounding plugs

### OUR RECOMMENDATION



**Grounding plugs for groundable fabric products like earthing-products, canopies, sleeping bag, bedding, etc.**

This plugs are suitable for portable products (canopies Bxx, earthing-products Exx, etc.). It is not allowed to ground stationary shielding products (paints, nettings, fleeces, wallpapers, etc.) with this plugs.

**Subsequent you find the corresponding plug types for all countries.** Please consider that in many countries some types are used simultaneously. If you are not sure, we recommend our set GX-W with all plug types and an adapter.

### GX-W (Set for all countries)



Set with a basis and eight plug-on adapters: Type B, D, EF, G, I, J, L, M.

### GX-B (Type B, NEMA-5)



American Samoa, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, **Canada**, Cayman Islands, Colombia, Costa Rica, Cuba, Curaçao, Dominican Republic, Ecuador, El Salvador, French Polynesia, Guam, Guatemala, Guyana, Haiti, Honduras, Jamaica, **Japan**, Jordan, Lebanon, Liberia, Mexico, Micronesia, Montserrat, Nicaragua, Niger, Palau, Panama, Peru, Philippines, Puerto Rico, **Saudi Arabia**, **Taiwan**, Thailand, Trinidad &

Tobago, Turkmenistan, **United States**, Venezuela.

**GX-D (Type D, IA6A3)**



Bangladesh, Bhutan, Botswana, Chad, Congo, Dominica, French Guiana, Ghana, Guadeloupe, Guyana, **India**, Iraq, Jordan, Lebanon, Libya, Macau, Madagascar, Maldives, Martinique, **Monaco**, Myanmar, Namibia, Nepal, Niger, Nigeria, Pakistan, Qatar, Senegal, Sierra Leone, Sri Lanka, Sudan, Tanzania, **United Arab Emirates**, Yemen, Zambia, Zimbabwe.

**GX-EF (Type EF, CEE 7/7)**



Afghanistan, Albania, Algeria, American Samoa, Andorra, Armenia, Aruba, **Austria**, Azerbaijan, Belarus, **Belgium**, Benin, Bhutan, Bosnia and Herzegovina, **Bulgaria**, Burkina Faso, Burundi, Cameroon, Cape Verde, Chad, Comoros, Congo, **Croatia**, **Czech Republic**, **Denmark**, Djibouti, Egypt, Equatorial Guinea, **Estonia**, Ethiopia, **Finland**, **France**, French Guiana, French Polynesia, Georgia, **Germany**, **Greece**, Greenland, Guadeloupe, Guinea, **Hungary**, Iceland, Indonesia, Iran, **Italy**, Jordan, Kazakhstan, Kosovo, Kyrgyzstan, Laos, Latvia, Liberia, Libya, Lithuania, Luxembourg, Macau, Macedonia, Madagascar, Mali, Martinique, Moldova, **Monaco**, Mongolia, Montenegro, Morocco, Mozambique,

Myanmar, **Netherlands**, New Caledonia, Niger, North Korea, **Norway**, Portugal, Romania, **Russia**, Senegal, Serbia, Slovakia, Slovenia, South Africa, South Korea, **Spain**, Suriname, Sweden, Syria, Tajikistan, Thailand, Tunisia, Turkey, Turkmenistan, Ukraine, Uruguay.

**GX-G (Type G, BS 1363)**



Bahrain, Bangladesh, Belize, Bhutan, Botswana, Brunei, Cyprus, Dominica, Falkland Islands, Gambia, Ghana, Gibraltar, Grenada, Guernsey, Guyana, **Hong Kong**, Indonesia, Iraq, Ireland, Isle of Man, Jersey, Jordan, Kenya, Kuwait, Lebanon, Macau, Malawi, Malaysia, Maldives, Malta, Mauritius, Myanmar, Nigeria, Oman, Pakistan, Qatar, **Saudi Arabia**, Seychelles, Sierra Leone, Singapore, Solomon Islands, Sri Lanka, Tanzania, Uganda, **United Arab Emirates**, **United Kingdom**, Vanuatu, Vietnam, Yemen, Zambia, Zimbabwe.

**GX-I (Type I, AS/NZS 3112, GB 1002, IRAM 2073)**



American Samoa, **Australia**, **China**, Cook Islands, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea, Samoa, Solomon Islands, Tajikistan, Tonga, Tuvalu, Uruguay, Vanuatu.

**GX-J (Type J, SEV 1011)**



Jordan, Liechtenstein, Madagascar, Maldives, Rwanda, **Switzerland**.

**GX-L (Type L, CEI 23-50)**



Chile, Eritrea, Ethiopia, **Italy**, Libya, Maldives, San Marino, Syria, Uruguay.

**GX-M (Type M, BS 546)**



Bhutan, Botswana, **India**, **Israel**, Lesotho, Macau, Malaysia, Mozambique, Namibia, Nepal, Pakistan, South Africa, Sri Lanka, Swaziland.

Paints

Sheet products

Fabrics

Textile products

Canopies

Grounding

Measurement

Electro

Prices