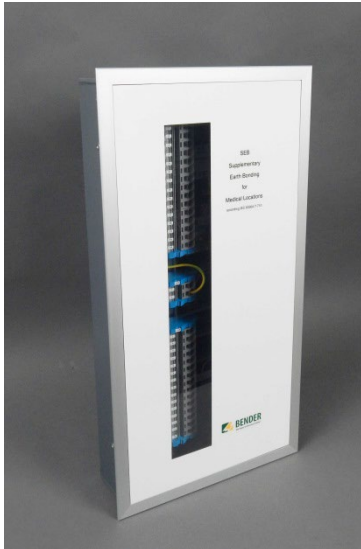


Supplementary Equipotential Bonding

SEB30, SEB60

for medical locations of group 1 and 2, according IEC / HD 60364-7-710



SEB30 (B22302201)

Brief Description

- Equipotential bonding of all conductive parts in a patients - environment according IEC 60364-7-710
- For testing purpose each circuit can be tested without removing the actual conductor
- Reserved space for clamp on current meters
- To accommodate up to 16 mm² solid conductors or up to 25 mm² fine stranded conductors
- Direct push in of the conductor, no screws
- Easy wiring, no crimping tools or torque wrenches for wiring required
- No retightening of the conductor/terminal during inspection
- Tin-plated bus bar, none corrosive
- Self-adhesive label with a wiring list for clear conductor identification
- Wall box with bezel frame or surface mounted enclosure

Application

In medical locations it is necessary to guarantee the safety of the medical personnel and in particular of the patients who may come into contact with electro-medical devices. Therefore in each medically used location or room of group 1 and 2 an individual supplementary equipotential bonding (SEB) should be installed between all conductive parts and the patient environment.

The safety of electrical systems in medical locations is subject of IEC / HD 60364-7-710 which applies to hospitals, clinics, medical and dental studios and in all those environments, wherever they may be in which electro-medical devices with parts applied to the patient are used. The prescriptions also apply to premises for aesthetic use.

Description

The function of the equipotential bonding bus bar is to galvanically connect all the conductive parts and extraneous conductive parts present or which could enter in the patient environment. In this way, if a conductive part malfunction occurs, all the conductive parts will have the same potential and the patient, who may be in contact with two or more conductive parts, is not subject to hazardous currents.

Equipment to be connected to the SEB:

Electrical equipment

- All conductive parts and the extraneous conductive parts that are located in the patient environment, or which may enter it during use
- Equipotential receptacles
- Operating lights
- Operating tables
- Electrical booms and pendants

None electrical equipment

- Metal screens to reduce EMC fields
- Conductive grids and screens of the floor
- Water piping, metal drains,
- Medical gas piping and booms/pendants
- Metal and supporting fixtures

Metal furniture units and metal parts of furnishing do not have to be connected to the SEB.

The screen of the IT-System transformer and the protective earth conductor of the branch circuits shall be connected via the shortest way to the PE inside the Isolated Power System (IPS).

Specialties

The supplementary equipotential bonding must be easily accessible for regular inspection.

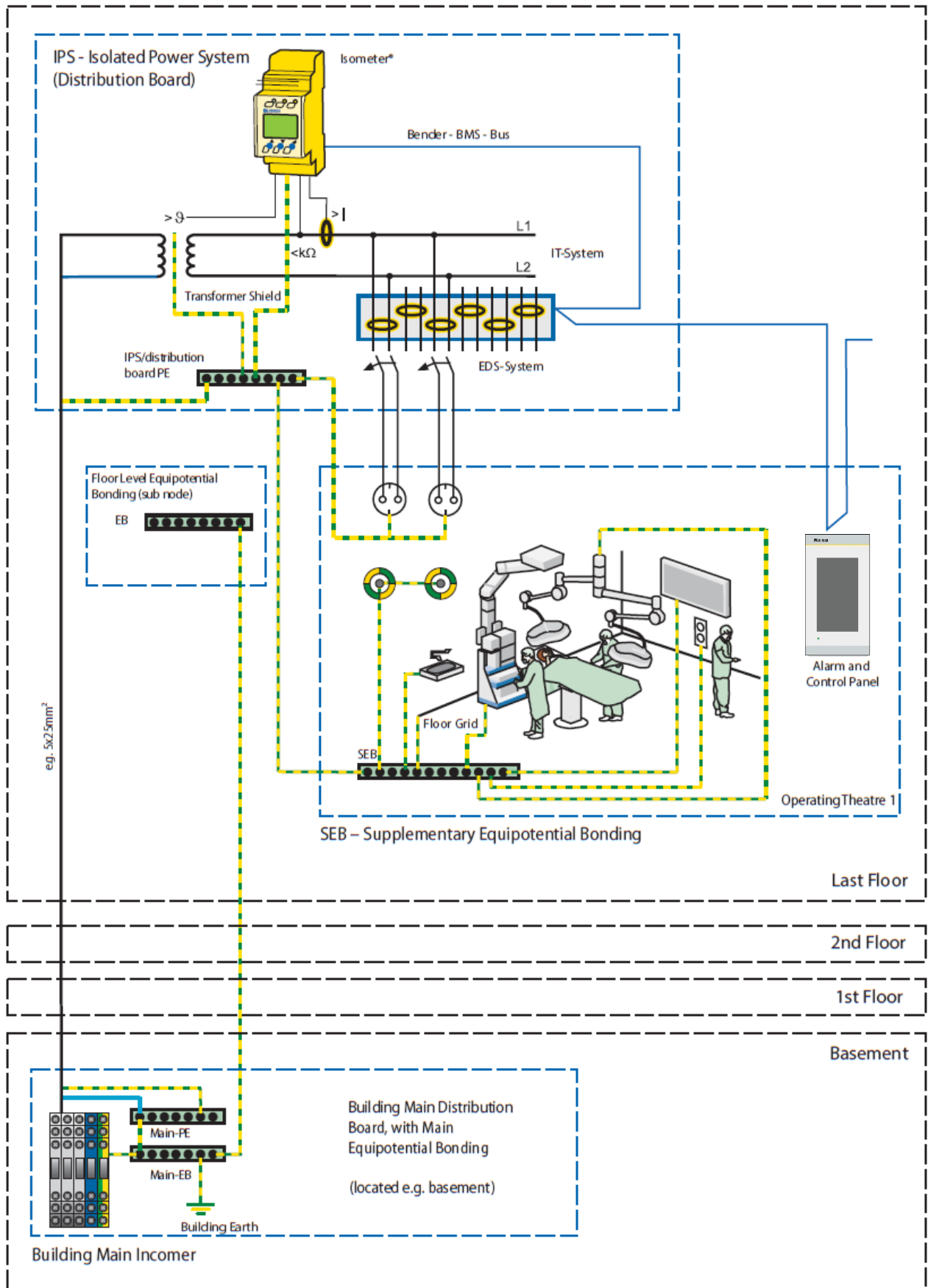
New cage-clamp terminal technology is used for easy wiring. Solid conductors can directly be pushed in the terminal without any tools, no crimping of lugs, no torque wrench required and no retightening during regular inspection necessary.

For measuring purpose each individual terminal can easily be disconnected from the bus bar without removing the conductor.

Each conductor can be clearly identifiable in terms of function and origin (it is therefore advised to identify them at both ends) in order to facilitate testing.

A permanent applied list identifying the connected earth conductors is placed inside the SEB enclosure.

Typical Equipotential Earth Bonding Arrangement



Additional notes to IEC / HD 60364-7-710

The standard IEC / HD 60364-7-710:2012 is describing the requirements for additional protection by using supplementary protective equipotential bonding.

Referring to section 710.415.2.1 and 710.415.2.2 in each medical location of group 1 and group 2, supplementary protective equipotential bonding shall be installed.

The supplementary protective bonding conductors shall be connected to the equipotential bonding bus bar for the purpose of equalizing potential differences between the following parts, which are located or which may be moved into the "patient environment":

- protective conductors;
- extraneous-conductive-parts;
- screening against electrical interference fields, if installed;
- connection to conductive floor grids, if installed;
(If, due to floor grid connection to the supplementary equipotential bonding, an earth loop is formed, the connection may be disregarded.)
- metal screens of isolating transformers, via the shortest way to protective earthing conductor.

A sufficient number of supplementary equipotential bonding connection points for the connection of medical equipment (ME) shall be available in group 2 and are recommended in group 1 (see also 710.30).

Fixed conductive non-electrical patient supports such as operating theatre tables, physiotherapy couches and dental chairs should be connected to the equipotential bonding conductor unless they are intended to be isolated from earth.

Further on the standard defines two different resistive values for group 1 and group 2 rooms.

In medical locations the resistance of the

- protective conductors, including the resistance of the connections, between the terminals for the protective conductor of socket-outlets and of
- fixed equipment or any
- extraneous-conductive-parts and the
- equipotential bonding bus bar,

shall not exceed 0,7 ohm in rooms of group 1

shall not exceed 0,2 ohm in rooms of group 2

This resistive value can also be determined by the use of a suitable cross-sectional area of the conductor.

Note that national regulations ensuring equivalent safety may apply.

The resistive values do not apply for installations according to VDE 0100-710, section 710.415.2.2.

Referring to section 710.415.2.101 the standard is giving further advices to the equipotential bonding.

The supplementary equipotential bonding shall be located in close proximity in or near the medical location and it shall be connected to the main protective earth conductor. The conductor shall have a cross section equivalent to the larger cross section of the conductors connected with the supplementary equipotential bonding. (Note: Most commonly the conductor has a cross section between 6mm² and 16mm² and the connection from the SEB to the PE of the switchgear is 16mm².)

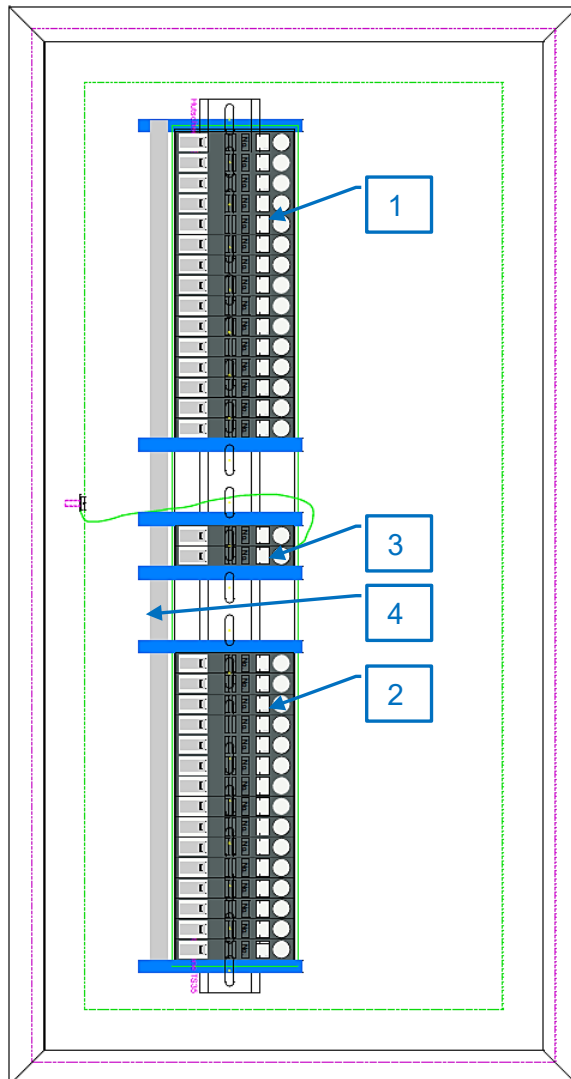
Connections shall be so arranged that they are accessible, labeled, clearly visible and that they can easily be disconnected individually.

It is recommended to use star-shaped or tree-shaped wiring and to avoid "earth-loops".

For rooms used for intra cardiac procedures special national requirements to isolate the equipotential bonding bus bar may apply.

For further information on earthing arrangements and protective conductors refer to IEC 60364-5-54 Low-voltage electrical installations - Part 5-54: Selection and erection of electrical equipment.

Typical Elevation Drawing



SEB30, internal layout
Vertical mounting arrangement,
horizontal mounting on request.

Legend

1. Terminal block A for installed electrical equipment (e.g. OP-Table, Pendants, Earth Jacks, ...)
2. Terminal block B None Electrical Equipment (e.g. Metal framework, Floor, Pipes, Sink, ...)
3. Terminal for main equipotential bonding or PE of Isolated Power System
4. Bus bar 3x10mm, copper, tin-plated

Technical Data

Enclosure

Type UPB	flush mounted wall box with bezel frame
Front and bezel	anodized aluminum
Type AP enclosure	surface mounted anodized aluminum

IP-rating	IP54
Protection class	earthed/grounded (SK1)
Max. ambient temperature	45°C

Cable entry UPB type	top and bottom
Cable entry AP type	rear side

Mechanical

Mounting UPB	flush mounted
Mounting AP	surface mounted

Dimensions

SEB30	
Bezel frame	W x H 333 x 633 mm
Wall box	W x H x D 307 x 607 x 90 mm
Wall cut out	W x H 310 x 610 mm
SEB30-AP	
Enclosure	W x H x D 350 x 650 x 90 mm
SEB60	
Bezel frame	W x H 633 x 633 mm
Wall box	W x H x D 607 x 607 x 90 mm
Wall cut out	W x H 610 x 610 mm
SEB30-AP	
Enclosure	W x H x D 650 x 650 x 90 mm

Weights

SEB30 / -AP	approx. 7.7kg / 10kg
SEB60 / -AP	approx. 13.7kg / 15kg

Electrical

SEB30 (UPB and AP type)	
Terminal block incoming	1pc
Terminal block A	15pcs
Terminal block B	15pcs
Terminal Cross section	0.5 ... 25mm ²
Bus bar	3x10mm

SEB60 (UPB and AP type)

Terminal block incoming	1pc
Terminal block A	2x15pcs
Terminal block B	2x15pcs
Terminal Cross section	0.5 ... 25mm ²
Bus bar, copper, tin-plated	2 pcs. 3x10mm

Ordering

SEB30, UPB type, Article No.	BF22302201
SEB30-AP, AP type, Article No.	BF22302203
SEB60, UPB type, Article No.	BF22302202
SEB60-AP, AP type, Article No.	BF22302204

Other layouts or horizontal mounting on request.

Front View



SEB30 (Art# BF22302201)

Inside View



SEB60 (Art# BF22302202)

