The new GEOS industrial and outdoor enclosures
Perfect Solution for harsh conditions
GEOS - Industrial and Outdoor Enclosure
High quality materials and an innovative design make the new GEOS series a universal solution and longlasting enclosure for indoor and outdoor applications. The UV and weather resistance of the high-quality polycarbonate and the new and innovative „Drain Protect“ seal system guarantee optimal protection against most environmental influences, as well as rain, cold and heat. Even in tough conditions caused by aggressive atmospheres, oils, greases or mechanical stresses, you can rely on the GEOS enclosure. Certifications for the most varied applications give the user confidence at all times.
GEOS Safety
- Empty enclosures with comprehensive certifications according to
  IEC 61439
  UL 50
  UL 50E
  CSA 22.2
- UV and corrosion resistant
- High impact resistance

GEOS Variety
- 3 Base sizes
- 2 Enclosure heights
- Grey or transparent cover
- Different cover closure systems
- 10 Variants

GEOS Application
- Control, energy and communications technology
- Faster, cleaner, and easier to process than polyester or steel enclosures
- Suitable for indoor and outdoor installation
- Optimised for industrial and outdoor applications
GEOS Sealing principle

- Unique enclosure design with lasting protection against moisture ingress
- Diverts moisture, e.g. rain or snow, to the backside of the enclosure
- Overlapping cover
- Drainage channels along the sides of the enclosure
Elastomer seal

Optimum protection of the seal against environmental influences

Unrestricted use in the most varied environments

Optimised for outdoor applications
- Functional installation system with mounting bracket (1)
- Tool-less installation of the mounting bracket in 25 mm location points (2)
- Universally usable for mounting plates (3) and standard rails (4)
- Different installation heights possible in the assembly bracket (5)
- Subsequent insertion of pre-assembled modules (6)
- Partition walls (7)
**GEOS | The Difference**

**All-round protection through "Drain Protect"**
- Lasting protection against moisture

**Customised solutions**
- Drilling and milling
- Customised printing
- Wiring
- Customised packaging

**Optimised box dimensions**
- Flexible assembly of the enclosures with flange plates and heavy-duty industrial plug-in connectors. For universal use in different applications

**Protection against condensate water**
- Preparation for BEL Air M40 ventilation elements IP65 protection class

**Mounting plug in the cover**
- Base for installing components, e.g. PCB and mounting plates, standard rails, support systems

**Lockable with lead seal**
- Protects against unauthorised access

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**ITC Electrical Components**
**www.itcproducts.com**
**sales@itcproducts.com**
**Tel: 416-663-7223**
Varied closure systems
+ Free choice between screw closure and quick-release closure

Mounting outside the sealing area
+ UL-compliant installation
+ Installation of preassembled enclosure

Plastic enclosure
+ For fast and easy machining with low weight
+ Extremely durable: No corrosion after mechanical processing

Optional external fastening
+ Installation of assembled enclosures
+ Available in 2 heights (10 mm or 40 mm)
+ Clearance from wall for optimum laying of cables

Three-point mounting
+ Easy installation via keyhole mounting

Cover variants
+ Grey or transparent
+ Suitable for 1,000 V AC / 1,500 DC without additional measures
GEOS 3030

- Outer dimensions: 300 x 300 x 180 / 226 mm
- Installation height - Interior: 152 / 198 mm
- Functional surface - Cover: 234 x 234 mm
- Functional surface - Side: 212 x 102 / 148 mm

GEOS 3040

- Outer dimensions: 300 x 400 x 180 / 226 mm
- Installation height - Interior: 152 / 198 mm
- Functional surface - Cover: 234 x 334 mm
- Functional surface - Side: 212 x 102 / 148 mm
  312 x 102 / 148 mm

GEOS 4050

- Outer dimensions: 400 x 500 x 226 mm
- Installation height - Interior: 198 mm
- Functional surface - Cover: 334 x 434 mm
- Functional surface - Side: 312 x 148 mm
  2 surfaces, each 181 x 148 mm
Enclosure height

- Flexible assembly of the side walls with sealing elements for cable entry
- Optimised for installation of flange plate and heavy plug-in connectors.
- Suitable for installing the BEL Air M40 ventilation elements to prevent condensate water
Certifications

For certifications Spelsberg operates an in-house testing laboratory at its headquarters in Schalksmühle, Germany. The laboratory and devices are not just VDE-certified, they are also UL-certified, thus enabling the necessary inspections for the international use of series products and special solutions to be conducted in-house. Such a facility is especially important when developing customised solutions together with our customers.
The aim is to help our customers make their products market ready as fast as possible. The testing laboratory has state-of-the-art equipment and is continuously developed further.

UL and VDE conduct an annual audit as part of the Client Test Data Program to assure that work continues to be carried out at a consistently high standard.

- Impact testing UL Impact
- Impact testing IK Level
- Climatic chambers
- Dust protection testing
- Protection against water - sprayed water testing
- UL and VDE certified
- Cover tensile testing
Services

We are happy to develop individual solutions with our customers and offer a processing service. That's how we create special, unique enclosures that stand out from the crowd.

Expressive designs, drilling and milling, wiring or packing. A plain, standard enclosure thus transforms into a distinctive one as desired.

Processing service

- Individual fastening points (Ultrasonic welding)
- Through openings
- Thread
- Engraving
- EMC coatings
Print Service
- Hot embossing
- Screen, pad, digital printing and laser marking
- Patterned films
- Membrane keyboards

Assembly service
- Assembly
- Wiring
- Testing

Packing service
- production-oriented
  - loosely and separately packed
- ready-to-ship
  - assembled goods
  - shrink-wrapped and customer-specific labelling
The ventilation element - Air

The BEL Air ventilation element prevents condensation, while maintaining the high IP65 protection rating. Any condensate occurring is transported out of the enclosure immediately via air exchange. The continuous and high rate of air exchange allows the interior air to mix constantly with the environmental air and transports the moisture outwards.

Air exchange also takes place in environments with almost constant air humidity and temperature, as the air in the interior of the enclosure heats up, due to the components. Due to the permanent pressure equalisation, all the enclosure parts, such as the seal, are relieved of pressure permanently. More information on the formation of condensate water on page 37.
Mounting option BEL Air 40

- M32/40 knockouts at ground level
- The wall clearance is suitable for installing BEL Air M40 ventilation elements at ground level
- Option of mounting on the sides of the enclosure

Advantages

- Prevention of condensation while maintaining the high IP 65 protection rating
- High air exchange rate
- 100% Pressure equalisation
- 100% Protection against foreign bodies
- Maintenance-free

Recommended quantity

- GEOS 3030 1 Set = 2 pieces
- GEOS 3040 1 Set = 2 pieces
- GEOS 4050 2 Sets = 4 pieces
<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS-L 3030-18-o</td>
<td>Empty enclosure - Industrial Quality, suitable for installation in harsh environments and in unprotected outdoor areas, Box: glass-fibre reinforced polycarbonate, grey, similar to RAL 7035, Cover: polycarbonate</td>
<td>700 433 01</td>
</tr>
<tr>
<td>GEOS-L 3030-18-to</td>
<td>Empty enclosure - Industrial Quality, suitable for installation in harsh environments and in unprotected outdoor areas, Box: glass-fibre reinforced polycarbonate, grey, similar to RAL 7035, Cover: polycarbonate</td>
<td>701 433 01</td>
</tr>
<tr>
<td>GEOS-L 3030-22-o</td>
<td>Empty enclosure - Industrial Quality, suitable for installation in harsh environments and in unprotected outdoor areas, Box: glass-fibre reinforced polycarbonate, grey, similar to RAL 7035, Cover: polycarbonate</td>
<td>700 733 01</td>
</tr>
<tr>
<td>GEOS-L 3030-22-to</td>
<td>Empty enclosure - Industrial Quality, suitable for installation in harsh environments and in unprotected outdoor areas, Box: glass-fibre reinforced polycarbonate, grey, similar to RAL 7035, Cover: polycarbonate</td>
<td>701 733 01</td>
</tr>
</tbody>
</table>
## GEOS-L 3040-18
300 x 400 x 180 mm

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty enclosure - <strong>Industrial Quality</strong>, suitable for installation in harsh environments and in unprotected outdoor areas, Box: glass-fibre reinforced polycarbonate, grey, similar to RAL 7035, Cover: polycarbonate</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GEOS-L 3040-18-o</th>
<th>700 434 01</th>
</tr>
</thead>
<tbody>
<tr>
<td>with grey cover</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GEOS-L 3040-18-to</th>
<th>701 434 01</th>
</tr>
</thead>
<tbody>
<tr>
<td>with transparent cover</td>
<td></td>
</tr>
</tbody>
</table>
## GEOS-L 4050-22

400 x 500 x 226 mm

Empty enclosure - Industrial Quality, suitable for installation in harsh environments and in unprotected outdoor areas, Box: glass-fibre reinforced polycarbonate, grey, similar to RAL 7035, Cover: polycarbonate

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS-L 4050-22-o with grey cover</td>
<td>700 745 01</td>
</tr>
<tr>
<td>GEOS-L 4050-22-to with transparent cover</td>
<td>701 745 01</td>
</tr>
</tbody>
</table>

### Cover:
- o = smooth side walls, grey cover
- to = smooth side walls, transparent cover

### Enclosure height:
- 18 = 180 mm
- 22 = 226 mm

### Enclosure size:
- 3030 = 300 x 300 mm
- 3040 = 300 x 400 mm
- 4050 = 400 x 500 mm

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Subject to technical changes.
### Mounting plate
**Insulating material**

Mounting plate made from insulating material, incl. fixing screws for floor mounting. Optional mounting by means of mounting bracket in various heights possible

<table>
<thead>
<tr>
<th>Description</th>
<th>GEOS</th>
<th>Dimensions</th>
<th>Enclosure type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS MPI-3030</td>
<td>250 x 250 x 5 mm</td>
<td>GEOS 3030-18 /-22</td>
<td>700 003 01</td>
<td></td>
</tr>
<tr>
<td>GEOS MPI-3040</td>
<td>250 x 350 x 5 mm</td>
<td>GEOS 3040-18 /-22</td>
<td>700 004 01</td>
<td></td>
</tr>
<tr>
<td>GEOS MPI-4050</td>
<td>250 x 450 x 5 mm</td>
<td>GEOS 4050-22</td>
<td>700 005 01</td>
<td></td>
</tr>
</tbody>
</table>

### Mounting plate
**Stainless steel**

Mounting plate made from stainless steel, incl. fixing screws for floor mounting. Optional mounting by means of mounting bracket in various heights possible

<table>
<thead>
<tr>
<th>Description</th>
<th>GEOS</th>
<th>Dimensions</th>
<th>Enclosure type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS MPS-3030</td>
<td>250 x 250 x 2 mm</td>
<td>GEOS 3030-18 /-22</td>
<td>720 013 01</td>
<td></td>
</tr>
<tr>
<td>GEOS MPS-3040</td>
<td>250 x 350 x 2 mm</td>
<td>GEOS 3040-18 /-22</td>
<td>720 014 01</td>
<td></td>
</tr>
<tr>
<td>GEOS MPS-4050</td>
<td>250 x 450 x 2 mm</td>
<td>GEOS 4050-22</td>
<td>720 015 01</td>
<td></td>
</tr>
</tbody>
</table>

### Mounting- and cover plate

Mounting and cover plate for empty enclosures, made from insulating material, incl. fixing screws, for individual use, e.g. to install indicator and switching elements, material thickness 4 mm

<table>
<thead>
<tr>
<th>Description</th>
<th>GEOS</th>
<th>Enclosure type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS-L EP-3030</td>
<td></td>
<td>GEOS-L 3030-18 /-22</td>
<td>721 013 01</td>
</tr>
<tr>
<td>GEOS-L EP-3040</td>
<td></td>
<td>GEOS-L 3040-18 /-22</td>
<td>721 014 01</td>
</tr>
<tr>
<td>GEOS-L EP-4050</td>
<td></td>
<td>GEOS-L 4050-22</td>
<td>721 015 01</td>
</tr>
</tbody>
</table>
### Partition wall

Partition wall made of plastic, incl. support, for dividing the enclosure

<table>
<thead>
<tr>
<th>GEOS-L TW 30-18</th>
<th>Enclosure side</th>
<th>Enclosure type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS-L TW 30-18</td>
<td>300 mm</td>
<td>GEOS 3030-18</td>
<td>721 032 01</td>
</tr>
<tr>
<td>GEOS-L TW 30-18</td>
<td>300 mm</td>
<td>GEOS 3040-18</td>
<td>721 032 01</td>
</tr>
<tr>
<td>GEOS-L TW 40-18</td>
<td>400 mm</td>
<td>GEOS 3040-18</td>
<td>721 034 01</td>
</tr>
<tr>
<td>GEOS-L TW 40-22</td>
<td>400 mm</td>
<td>GEOS 4050-22</td>
<td>721 036 01</td>
</tr>
<tr>
<td>GEOS-L TW 50-22</td>
<td>500 mm</td>
<td>GEOS 4050-22</td>
<td>721 036 01</td>
</tr>
</tbody>
</table>

### Mounting bracket

Mounting bracket set, for tool-less installation of standard rails 35 x 7.5 mm and assembly plates in various heights, Set = 4 pieces

<table>
<thead>
<tr>
<th>GEOS MH-18</th>
<th>Number of Mounting heights</th>
<th>Enclosure type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS MH-18</td>
<td>3</td>
<td>GEOS 3030-18</td>
<td>720 022 01</td>
</tr>
<tr>
<td>GEOS MH-18</td>
<td>3</td>
<td>GEOS 3040-18</td>
<td>720 022 01</td>
</tr>
<tr>
<td>GEOS MH-22</td>
<td>6</td>
<td>GEOS 3030-22</td>
<td>720 023 01</td>
</tr>
<tr>
<td>GEOS MH-22</td>
<td>6</td>
<td>GEOS 3040-22</td>
<td>720 023 01</td>
</tr>
<tr>
<td>GEOS MH-22</td>
<td>6</td>
<td>GEOS 4050-22</td>
<td>720 023 01</td>
</tr>
</tbody>
</table>

### Standard rails

Standard rails according to DIN EN 60715, 35 x 7.5 mm, 35 mm wide, incl. fixing screws for floor mounting. Optional mounting by means of mounting bracket in various heights possible

<table>
<thead>
<tr>
<th>GEOS NS35-250</th>
<th>Enclosure side</th>
<th>Length</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS NS35-250</td>
<td>300 mm</td>
<td>250 mm</td>
<td>720 031 01</td>
</tr>
<tr>
<td>GEOS NS35-350</td>
<td>400 mm</td>
<td>350 mm</td>
<td>720 032 01</td>
</tr>
<tr>
<td>GEOS NS35-450</td>
<td>500 mm</td>
<td>450 mm</td>
<td>720 033 01</td>
</tr>
</tbody>
</table>

Subject to technical changes.
### External fixing lugs

Set of external fixing lugs made of plastic, mounting at an angle of 0°, 45° or 90° possible, Colour: black, Set = 4 pieces

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS ABL-10</td>
<td>720 020 01</td>
</tr>
<tr>
<td>GEOS ABL-40</td>
<td>720 021 01</td>
</tr>
<tr>
<td>Wall clearance</td>
<td></td>
</tr>
<tr>
<td>GEOS ABL-10</td>
<td>10 mm</td>
</tr>
<tr>
<td>GEOS ABL-40</td>
<td>40 mm</td>
</tr>
</tbody>
</table>

### Hole cutter

Hole cutter

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFR</td>
<td>195 995 01</td>
</tr>
<tr>
<td>Through opening: M16-32, Hole: 16.5–32.5 mm</td>
<td></td>
</tr>
</tbody>
</table>

You are welcome to use our processing and assembly services.

### Ventilation elements - Set

BEL Air ventilation elements set, for preventing condensate water formation in the enclosures, for vertical installation in the enclosure walls and GFL combi flange with appropriate knockout, at least two ventilation elements are required per enclosure

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEL Air M40</td>
<td>263 440 01</td>
</tr>
<tr>
<td>M40, Set = 2 pieces, Air exchange rate: 30 l/day / Set</td>
<td></td>
</tr>
</tbody>
</table>
**DLG Focus Test**

The **DLG Focus Test** is a reduced-scope utility value test for product differentiation and special highlighting of innovations in machines and technical products.

**UL EU**

The **UL EU** test symbols is a European safety mark indicating that the product has been tested and meets the relevant safety requirements of European standards.

**C UL US**

**c UL us** (Underwriters Laboratories) approved (American and Canadian approval).
Section for through openings
Protection type (IP-Code) according to DIN EN 60529 (VDE 0470-1)

Protection level (IK Code) according to DIN EN 50102 (VDE 0470-100)

Protection class II
Equipment with protective insulation according to DIN VDE 0100-410

Halogen-free enclosure, without halogens such as flourine, chlorine and bromine.

Protection against windblown dust and rain, splash water, water jets and corrosion.
Protection against damage due to external ice formation on the cabinet.

Rated voltage for use in AC voltage systems, maximum permissible nominal voltage of the electrical grid

Rated voltage for use in DC voltage systems, maximum permissible nominal voltage of the electrical grid

UL EU test symbols of conformity for electrotechnical products, which comply with and are certified according to European (EN) standards.

c UL us (Underwriters Laboratories) approved (American and Canadian approval).

DLG Focus Test for special innovations in machines and technical products - predominantly in agriculture and forestry applications.

Industrial Quality
Overview of the ambient conditions and mechanical properties of the GEOS enclosure system.

<table>
<thead>
<tr>
<th>Material</th>
<th>Use in the products:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polycarbonate, glass-fibre reinforced</td>
<td>GEOS Enclosure</td>
</tr>
<tr>
<td>Polycarbonate, transparent</td>
<td>GEOS Cover, transparent</td>
</tr>
<tr>
<td>Polycarbonate, grey</td>
<td>GEOS Cover, grey</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>Use in the products:</th>
</tr>
</thead>
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<td>Polycarbonate, glass-fibre reinforced</td>
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<tr>
<td>Polycarbonate, grey</td>
<td>GEOS Cover, grey</td>
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<th>Material</th>
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</tr>
<tr>
<td>Polycarbonate, transparent</td>
<td>GEOS Cover, transparent</td>
</tr>
<tr>
<td>Polycarbonate, grey</td>
<td>GEOS Cover, grey</td>
</tr>
</tbody>
</table>

The materials used by Spelsberg were subjected to a weathering test according to DIN 53 387 (replaced by DIN EN ISO 4892-2), a 1000 hour test at the “State Examination Office” in Dortmund. The materials used in IQ products showed good result here. The material also passed the UV resistance test according to UL 746 C, without any limitations.

When selecting the installation location, the climatic conditions and the occurrence of chemical influences should generally be examined in addition to the protection rating. Details of material properties and chemical resistance of the materials can be seen from the table, though these are simply guide values.
### Power loss details for individually mounted GEOS enclosure

<table>
<thead>
<tr>
<th>Type</th>
<th>Mounting</th>
<th>Inner dimensions</th>
<th>Enclosure height [W]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>ΔT= 10K</td>
</tr>
<tr>
<td>GEOS 3030-18</td>
<td></td>
<td>290 x 290 x 152.5 mm</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>75%</td>
</tr>
<tr>
<td>GEOS 3030-22</td>
<td></td>
<td>290 x 290 x 198.5 mm</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>75%</td>
</tr>
<tr>
<td>GEOS 3040-18</td>
<td>Vertical</td>
<td>290 x 390 x 152.5 mm</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>75%</td>
</tr>
<tr>
<td>GEOS 3040-22</td>
<td></td>
<td>290 x 390 x 198.5 mm</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>75%</td>
</tr>
<tr>
<td>GEOS 3040-18</td>
<td>Traverse</td>
<td>290 x 390 x 152.5 mm</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>75%</td>
</tr>
<tr>
<td>GEOS 3040-22</td>
<td></td>
<td>290 x 390 x 198.5 mm</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>75%</td>
</tr>
<tr>
<td>GEOS 4050-22</td>
<td>Vertical</td>
<td>390 x 490 x 198.5 mm</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Traverse</td>
<td>390 x 490 x 198.5 mm</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>75%</td>
</tr>
</tbody>
</table>

Permissible power loss $P_{\text{per}}$ in Watts per DIN VDE 0660-507 for individually-mounted empty installations with stipulated $\Delta T$. Power loss at 50% of the enclosure height and [75%] of the enclosure height.

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**For more technical information, you may please refer to our entire catalogue 2018-2019.**
Protection against high temperatures

Installed electrical appliances generate power loss during operation. The enclosures manufactured by Spelsberg are tested during the approval test for maximum power loss in the enclosure. Detailed tables on this topic are provided in the catalogue, taking into account the ambient temperature and type of installation.

Switchgear assemblies are designed for ambient temperatures of between -25 °C and +35 °C (24-hour average). A temporary increase in temperature to 40 °C is not a problem.

Even if, for example, iQ products from Spelsberg are suitable for temperatures of between -40 °C and +80 °C, the manufacturer’s instructions and the requirements of the relevant product safety standards, such as line current, fault circuit breakers or fuses, should be checked when designing the enclosure.

Solar radiation or other heat sources can cause additional increases in the internal temperature which are not permitted and must therefore be avoided.

Reliable operation of electrical equipment will no longer be under certain circumstances.

According to DIN VDE 0100-520,522.1.2 Cable and conductor systems, including accessories, may only be installed or moved under ambient temperatures which are within the limit values specified by the manufacturer or in the relevant product standard.

Protection against UV radiation

UV radiation can cause severe structural damage, even destruction, in a wide variety of plastics. Products made from the material polystyrene (PS) must therefore not be used outdoors. Spelsberg developed the IQ series products for this installation scenario. Materials used in these products have high resistance against UV radiation. In weathering tests according to DIN 53-387 (replaced by DIN EN ISO 4892-2) these materials demonstrated good results. These materials passed the weathering tests according to UL 746 C also without any limitations.

Protection against chemical influences

For installations in areas with increased levels of hazardous substances in the environment, the suitability may be correspondingly reduced. Information is available in the table “Material Characteristics”. IQ products are resistant to mineral oil, vegetable fats and animal fats.
Protection against condensate water

The more tightly sealed the equipment, for example junction boxes or distributor enclosures, the greater the likelihood of condensation forming. This is especially the case at locations, where highly fluctuating temperatures are expected. These effects are intensified by the power loss generated in the enclosures. Owing to the differences in temperature, a difference also arises in the pressure conditions, which causes the enclosure to draw in air when the temperature changes. The next time the temperature increases, the humidity in this air condenses on the cold surface of the enclosure, for example on the cover. This process is only reversible to a limited extent, so the water collects in the enclosure. Since this effect occurs regularly, even daily to an extent, a considerable volume of water may collect internally. If this enclosure has an increased protection rating, it will no longer discharge this water with the result that its seal actually has a negative impact. Thus, damage occurs.

Under **DIN VDE 0100-520**, precautions must be taken with respect to drainage of water if water collects or condensation can occur within cable and conductor systems. Spelsberg junction boxes in the various product groups have breakout condensation openings on the rear of the enclosure or mounting surfaces. These should be opened in such a way that in the installed state they are on the underside of the enclosure and have a wall clearance of 2 mm, so that any condensation may drain off. This only applies under the condition that no increased demands are imposed with respect to protection against accidental contact or foreign bodies (> IP2X or dust protection).

If requirements for contact protection or foreign body protection are also imposed on the enclosure, for example IP3X, we recommend use of els ventilation seals. These seals come in the size M20, are fitted in the corresponding cable inlet openings on the underside and the side surfaces and offer splash water protection up to IPX4 when properly installed. We recommend an installation that allows the so-called "chimney effect".

**AK Air and BEL Air ventilation elements**

The Air ventilation element prevents condensate water, while maintaining the high IP6S protection rating. Any condensate occurring is transported out of the enclosure immediately via air exchange. The continuous and high rate of air exchange allows the interior air to mix constantly with the environmental air and transports the moisture outwards. Air exchange also takes place in environments with almost constant air humidity and temperature, as the air in the interior of the enclosure heats up, e.g. due to the components.

**Recommendation:** At least one complete air exchange is provided per day via the BEL Air. With one set, this is achieved with an enclosure volume of up to 35 dm³.

All enclosure parts, such as the seals, are permanently relieved of pressure through the constant pressure equalisation. The high air exchange rate guarantees a permanent exchange of the moist air with the surroundings. No appreciable pressure differences are required for this. However, with the pressure equalisation elements it is exactly these appreciable pressure differences that are required, at least temporarily, in order to achieve an air exchange. The Air ventilation elements therefore have a very large, open filter surface that guarantees a high air exchange without influencing the air flow. The constant pressure equalisation prevents pressure differences, thus ensuring that no mechanical forces can be exerted on the enclosure and seals.

**DIN EN 61439-1**

Section 8.2.2 of **DIN EN 61439-1** concerns the protection against contact with live parts and the prevention of penetration of solid foreign objects and water. In addition, it is stated that closed switchgear assemblies must be protected from condensate inside the enclosure, without changing the type of protection.
**Protection against plants and/or mould growth**

The plastics used in electrical installation are organic materials. The risk of harm from plants, algae or mould must therefore be considered. According to DIN VDE 0100-520, 522.9.1, if experience or empirical evidence shows that plants and/or mould growth can cause damage, the cable and conductor system must be selected accordingly or special protective measures must be provided.

**Comment:** A cable laying method that allows appropriate removal of such vegetation should be selected.

**Notes for outdoor installation**

The information on the type of protection and UV-resistance are often considered the only important aspects for outdoor installations. The protection rating tests carried out under DIN EN 60529 are used as comparative tests and for classification of properties. The tests are limited to a few minutes and cannot emulate exposure to rain / snow or cleaning with water jets. In addition, the local conditions may differ so greatly that a general exposure test cannot be defined. However, in outdoor installations, other factors such as absolute temperature, frequency of temperature change, air humidity and chemical influences in particular play an important role. In addition to impairments through UV-effects, in outdoor installations damage is expected to arise predominantly as a result of chemical influences. So, the outside areas in the vicinity of filling stations, chemical facilities, landfill sites, compressors, sewerage treatment plants etc. should be subjected to particularly critical investigations beforehand. To increase the service life of the enclosure, it is advantageous to install the enclosure in an area that is protected from weather influences.