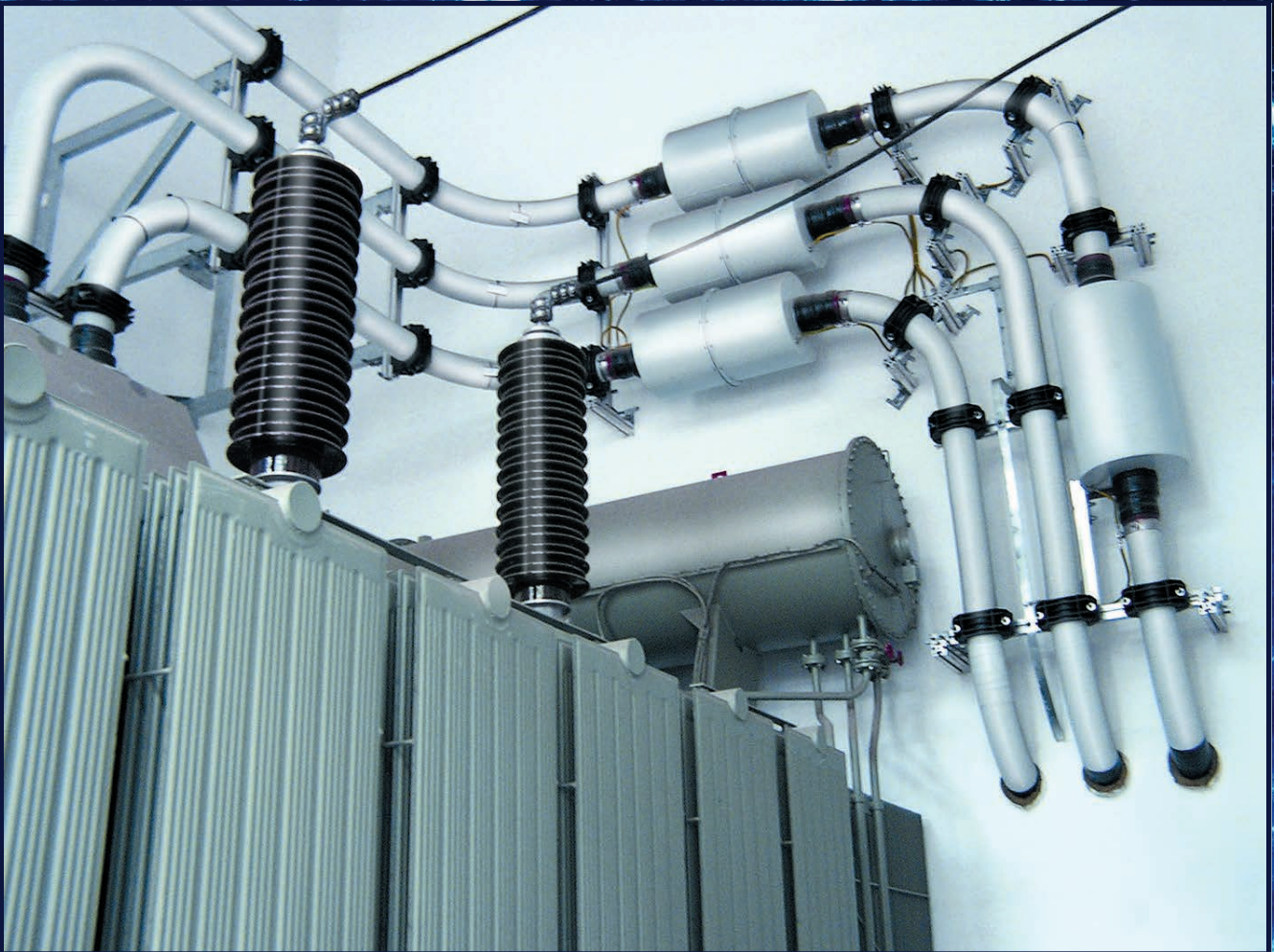


# ISOBUS MR

## Single Phase Cast Resin Insulated Busbar System



# ISOBUS MR

## ERIP Insulated Busbar System for Medium Voltage Application

The ISOBUS MR system is designed to provide a value added solution for primary and secondary distribution up to 40,5 kV and 7000 A. It is a single phase insulated system avoiding phase to phase short circuits for indoor and outdoor applications.

### ERIP Insulation Property

Epoxy Resin Impregnated Paper is used as the main component achieving a long term, reliable medium voltage insulation being used more than 40 years. The material allows an operating conductor temperature of 90°C. It can be used in an ambient temperature range of -50°C up to + 55°C at least. Design, manufacture and installation processes ensure a maintenance-free service life of more than 20 years.

### Medium Voltage Application - Connections between:

Generator – Transformer                      Transformer – Switchgear  
 Generator - Switchgear                      Transformer – Reactor  
 Generator - Reactor                              Switchgear – Switchgear

### Design Principal Busbar Element (Fig. 1)

The conductor either consists of copper (E-Cu) or aluminum (E-AlMgSi) depending on the current rating massive or tube material. Wall thickness is at least 10 mm for copper and 15 mm for aluminum. The insulation is made of crepe paper wound around the conductor and the same process is used to manufacture the connection tube. At both ends of each busbar element and the connection tube capacitive grading layers are embedded to ensure harmonized stepping down of the voltage level at the busbar ends. A concentric earth layer consisting of copper mesh on the outside ensures touch safety during operation. Above the copper mesh another paper layer is wrapped as final mechanical protection. A shrinking sleeve is used to obtain a vacuum-tight housing around the complete busbar element and the connection tube with the insulation paper wrapping and copper mesh. In a next step the busbar elements and the connection tubes are moved into a kiln where each element is connected to the epoxy cast resin system at one end and to the vacuum system on the other end. The complete resin process is performed under temperature control in the kiln and requires several days. As result a void-free epoxy cast resin impregnated paper insulation is achieved.

### Connection Tube – Connection of Busbar Elements (Fig. 2)

ISOBUS MR is a modular system. The maximum busbar length is determined by the kiln dimensions, maximum transport dimensions and handling conditions at site. A busbar system usually consists of several busbar elements and connection tubes. During installation these elements are connected with flexible connectors. Each connection is covered with a connection tube guaranteeing touch safety of the complete system including all connections. Besides that the flexible connections allow to compensate tolerances during installation as well as thermal effects of expanding and shortening in axial direction during operation.

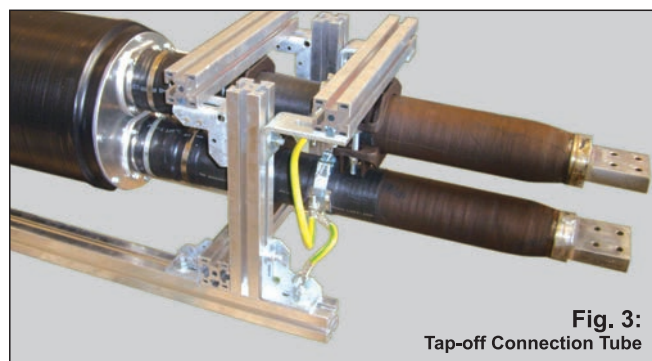
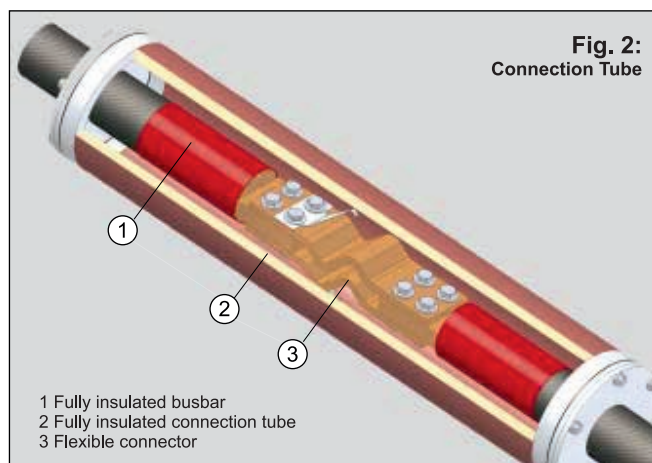
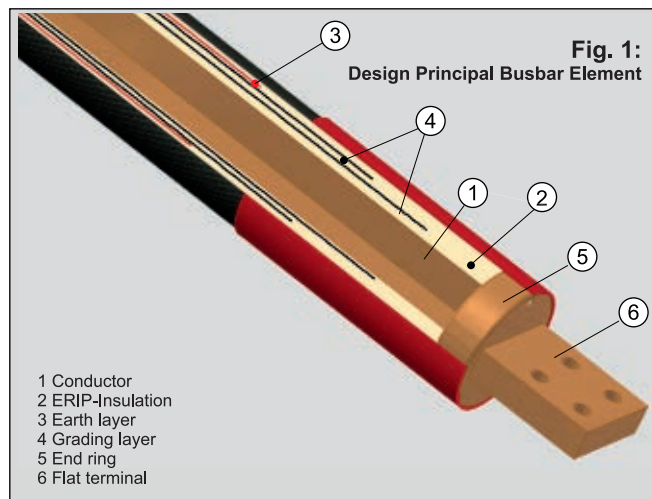
**Figure 3** shows a special solution of a connection tube called Tap-off connection tube. It is possible to split the current coming in with one busbar line and going out with two separated busbar lines.

### Routine Testing

After manufacturing each busbar element and each connection tube is routine tested in accordance with IEC 60137 in our own laboratory. Every manufactured component is subject to the following tests prior to delivery:

- Power frequency test
- Partial discharge test
- Capacitance measurement
- Tan delta measurement

TYP/TYPE:	ISOBUS MR
Application:	3,6 kV- 40,5 kV & up to 7000 A
Insulation:	Epoxy Resin Impregnated Paper - ERIP
Degree of protection:	IP40-IP54 Indoor IP54-IP68 Outdoor
Remark:	Capacitive grading device



### Connections to Other Electrical Equipment (Fig. 4 & 5)

The ISOBUS MR system can easily be connected with different types of electrical equipment available in today's market. In the design stage the busbar terminal or rather the flexible connector that connects the equipment will be designed accordingly. The following list shows the connection options at a glance:

- Connections to flat terminals according to DIN 42206 or customer specifications.
- Connections to round bolts.
- Connections to SF6 switchgear.
- Connections to switchgears and equipment of different manufacturers.
- Touch safe connections to transformers and to insulated switchgears using junction box.
- Plug connections (see Fig. 5).

### Fixation System (Fig. 6)

For mounting the busbar system an easy to assemble modular fixing system is included in the scope of delivery. It allows adjustments and compensation of tolerances during installation caused for example by building tolerances. Special in-house computer programs are used to calculate the technical requirements for the fixing system on the basis of the provided technical parameters like short circuit, weight and natural frequency for each project. The number and the design of the fixation parts are based on the parameters short circuit forces, weight and building parameters

### Indoor / Outdoor

ISOBUS busbar systems are available for indoor and outdoor applications. The indoor designs are available with IP40 up to IP54. As standard the indoor busbar system with shrinking sleeve surface is painted. The outdoor design is available up to IP68. All outdoor busbar elements and connection tubes are produced in the same way as the indoor elements and are installed in aluminum or stainless steel tubes filled with epoxy cast resin in a second process. Also these elements can be painted. In case of outdoor connections without protection box shrink sheds are installed to increase the creepage distance (see Fig. 7).

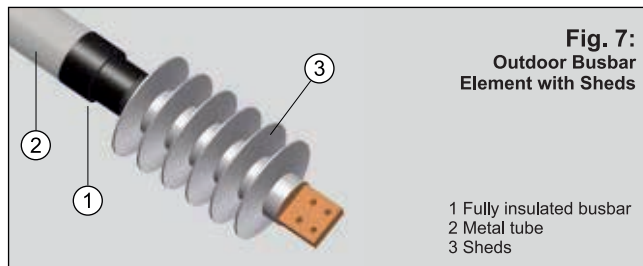
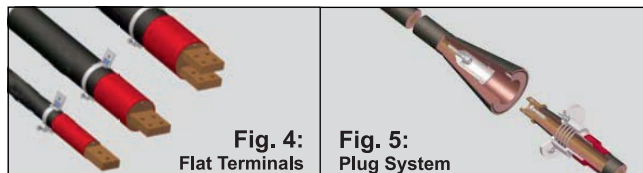
### Advantages of Single Phase Cast Resin Insulated Busbar Systems

#### Space and Time Saving Installation

- Value added solution supplied. ISOBUS MR and its fixation system are designed, manufactured, tested and delivered as a kit, complete with all necessary components and installation documents.
- Modular system components allow made to measure distribution solutions for medium voltage applications. Any three dimensional shape is possible.
- Compact outer dimensions, extremely small bending radii, close phase to phase distance allow maximum power in minimum space.
- Current rating per phase up to 7000 A is possible.
- Light weight system.
- Minimum impact on the surrounding building.
- Surrounding space in new buildings can be dimensioned smaller.
- No special tools required.

#### Safety and Reliability

- Touch safe under operational conditions due to embedded earth screen.
- Partial discharge free acc. to IEC 60 137 due to void free manufacture & high voltage routine testing of each element (see also chapter „Routine Testing“).
- No phase to phase short circuit due to complete encapsulation and insulation of each phase.
- No flashover due to embedded capacitive field control.
- Easily withstands ambient temperatures from -50°C to +55°C.



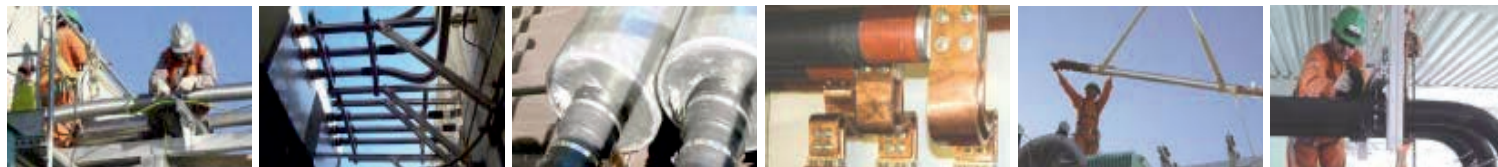
- Protection class up to IP68.
- Suitable for harsh environment conditions.
- Natural cooling.
- No halogens, no toxic gases in case of fire, self-extinguishing insulation.
- Very high dynamic and thermal short circuit capability.
- Lowest cost of ownership and operation in comparison to other solutions.

#### Busbar Project Process

Design work starts after receiving the basic information of the building(s) including the position and size of infrastructure being important to be considered for the busbar routing and the equipment connection points to be connected by the busbar system. In addition the information of the electrical requirements like nominal voltage, nominal current, short circuit current, peak current, frequency and ambient temperature need to be submitted. Based on all information the ISOBUS MR solution is engineered to provide the shortest and safest route between electrical equipment.

The scope of delivery of the ISOBUS MR Busbar System comprises the complete package of engineering services including all relevant calculations for mechanical strength, the production of the busbar system, all relevant accessory parts, the complete fixation system and the installation documentation.

Supervision respectively installation work will be offered on request.



## Tefelen Preissinger GmbH

We are a German company, located at Industriestrasse 12, 96120 Bischberg, with a very long product history and a deep experience regarding low and medium voltage cast resin insulated busbar systems.

### History

The product history started at Messwandler-Bau (MWB) in Bamberg in the late 1960s and early 1970s, where Mr. Norbert Preißinger († 2015) headed the engineering and construction department for busbar systems during the 1980s until he left the company in 1988.

In that year Mr. Preißinger founded his own engineering office for cast resin insulated busbar systems, which were produced by his former employer Messwandler-Bau (MWB).

After successfully running his engineering office for 11 years, Mr. Preissinger started his own production site under the company name pbp Preissinger GmbH & Co. KG in Bischberg in 1999. In 2009 the head office moved to a new office building in Breitenguessbach. In the years until 2012 the company grew to the size of 45 employees. In 2014 Preissinger doubled its production capacity by implementing a second production kiln for the cast resin impregnation process of the busbar elements and the connection tubes. Since its establishment in 1989 Preissinger has sold more than 2.000 busbar systems across the world.

On 16th August, 2016 pbp Preissinger GmbH & Co. KG was taken over by Tefelen Preissinger GmbH.

### Technology for Power Distribution, Power Generation and Electrical Energy

Tefelen Preissinger GmbH provides busbar solutions meeting the highest requirements of the global markets and in accordance with the customers' requirements.

Tefelen Preissinger GmbH keeps its reputation by high-quality products and its market position as a global leader by providing a complete range of cutting-edge products:

- > Medium Voltage Epoxy Cast Resin Insulated Busbar Systems ISOBUS MR up to 40,5 kV & 7.000 A
- > Medium Voltage Gas Insulated Busbar Systems ISOBUS MG up to 40,5 kV & 3.150 A
- > Wall Bushing Solutions ISOBUS MB up to 52 kV & 7.000 A

Compared to cable solutions and air insulated bus duct solutions the cast resin insulated busbar systems providing space saving solutions by the capability to carry higher currents and achieving smaller bending radii and the lost factor is much low. So the total cost of operation is significantly lower than for air insulated bus duct systems and cable solutions especially taking into account that the cast resin insulated busbar systems are maintenance free.

Our aim is providing efficient and perfect solutions for every customer application and any kind of specification. Based on our outstanding service and competence, we wish to establish a long-term business relationship with our business partners and clients.

The Tefelen Preissinger GmbH became a leading manufacturer of Medium Voltage Busbar System Solutions merging more than 30 years of experience. Numerous companies in more than 100 countries across Asia, North/South America, Europe, Africa and the Middle East put their trust in the innovative technology, provided by Tefelen Preissinger GmbH.

Tefelen Preissinger GmbH is committed to assisting customers with their unique needs by providing them with comprehensive, value-added solutions and professional service.

**Please do not hesitate to contact us.**

**For more information, visit [www.tefelen-preissinger.de](http://www.tefelen-preissinger.de)**

**Or contact us at: [info@tefelen-preissinger.de](mailto:info@tefelen-preissinger.de)**