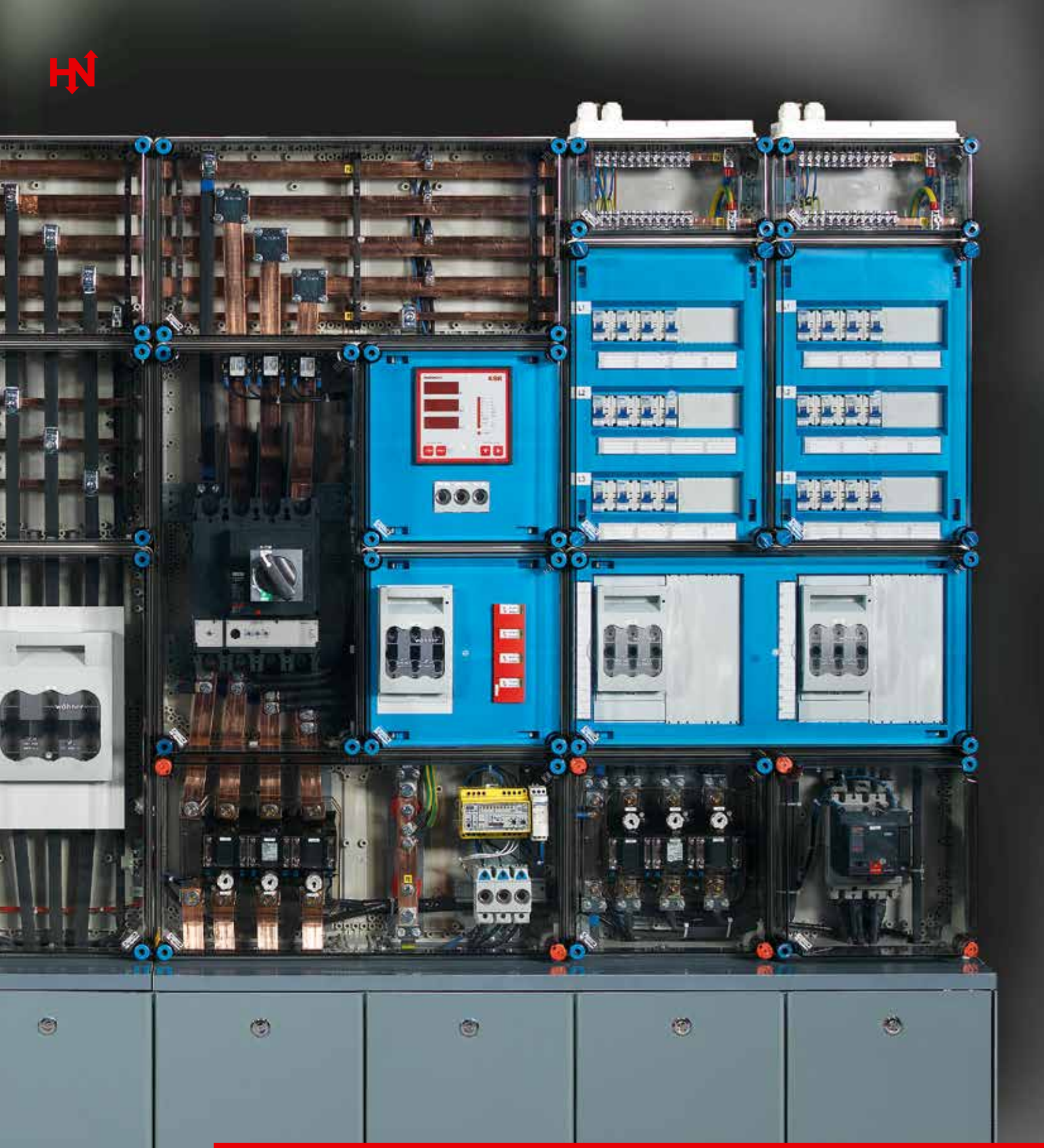


Energy switchgear assembly

POWER DISTRIBUTION BOARDS UP TO 1600 A

according to IEC 61439 Protection Class II up to 1600 A

www.hensel-electric.de/en-ae/

HENSEL

POWER DISTRIBUTION BOARDS UP TO 1600 A INSULATED ENCLOSURES

Safe due to the highest material quality.

Standardised and ready for connection thanks to HENSEL expertise.

Energy switchgear assembly

POWER DISTRIBUTION BOARDS UP TO 1600 A

according to IEC 61439 Protection Class II

HENSEL

Power distribution boards

MORE THAN 90 YEARS OF EXPERIENCE – YOUR ELECTRICAL ENERGY POWERS US

Electrical energy flows everywhere. It provides light, heat and movement. As a family-owned company operating worldwide, we guarantee the safe distribution of electrical energy in industry, commerce and infrastructure.

With over 1,000 employees, 640 of them in Germany, 14 subsidiaries in Germany and abroad, we have been operating successfully in the market for over 90 years. We work enthusiastically to take our products and services to the next level. Solutions for photovoltaics and e-mobility are becoming increasingly important. In this way, we are making an active contribution to the energy transition and working towards a safer electric future.

Please scan the QR code or see our website www.hensel-electric.de for more detailed information.

FAMILY COMPANY

SINCE 1931

International presence

HENSEL guarantees local support and a high degree of availability thanks to its 4 locations in Germany, 10 locations own by HENSEL and 60 international partners.

MORE THAN 60 INTERNATIONAL PARTNERS

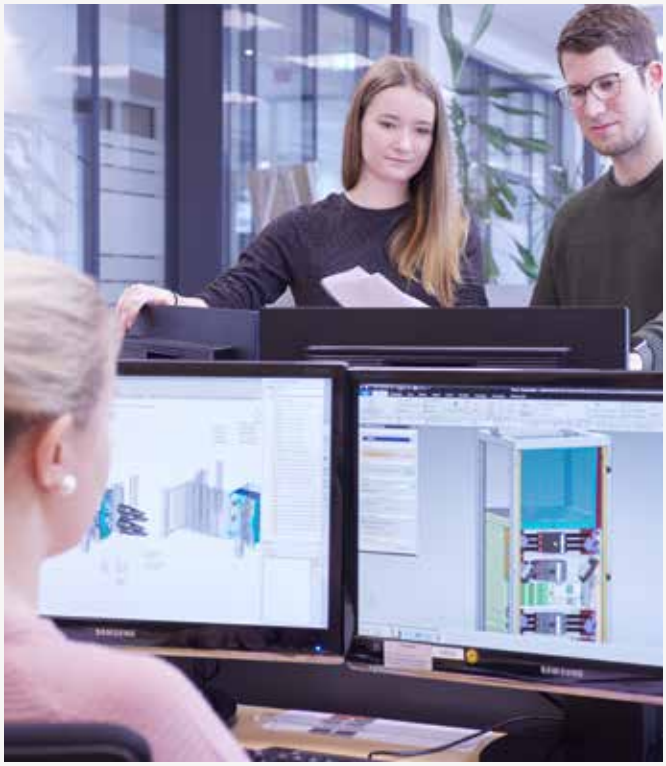
ELECTRICAL INSTALLATION AND DISTRIBUTION SYSTEMS

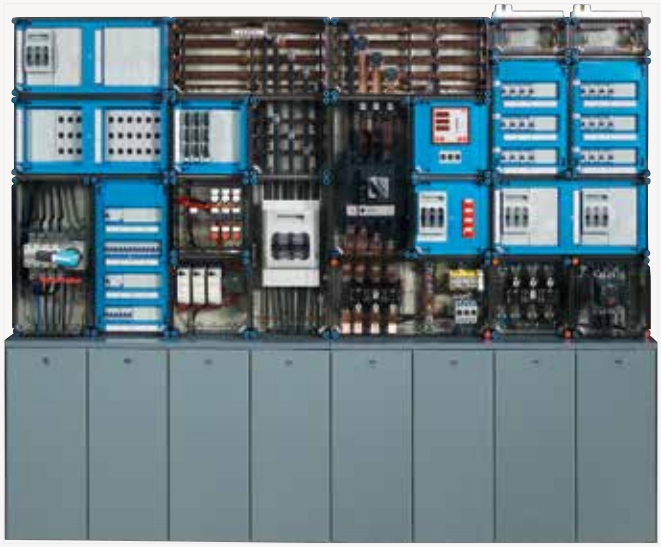
1000 EMPLOYEES

13 SUBSIDIARIES NATIONALLY AND INTERNATIONALLY

LOW-VOLTAGE SWITCHGEAR ASSEMBLIES UP TO 1600 A

For more than 50 years, HENSEL has been building high-quality low-voltage switchgear assemblies for industrial, commercial and other functional buildings as well as photovoltaic systems.





Development and manufacturing

We develop and design our products taking into account the latest manufacturing processes and utilising state-of-the-art equipment.

All prefabrication is carried out in-house – metalworking, plastics production and copper processing.
Our production facilities enable us to ensure consistent product quality.

We use fully automated processes to manufacture our products. **Low-voltage switchgear assemblies are manufactured on a project-specific basis according to customer requirements.**

Technology

In order to ensure a reliable power supply, N(PEN) conductors can be designed with the same or higher current-carrying capacity than the phase conductors, especially in networks with a high level of harmonic contens.

In order to minimise disruptive, low-frequency magnetic fields in Mi switchgear, N(PEN) conductors can be arranged in the area of the phase conductors in an EMC-friendly manner. Stray currents that flow via unintended routes can be avoided by designing the network system appropriately, e.g. with the central earthing point (CEP) system, even within the switchgear.

More information about these products:
hensel-electric.de

QUALITY STANDARDS

Hensel plays a key role in the development of national and international standards for low-voltage switchgear assemblies.

Our innovative switchgear and distribution systems have been developed by us and are constantly kept at the cutting edge of technology. Our technical expertise and active involvement in standardisation committees give our customers a clear technical advantage!

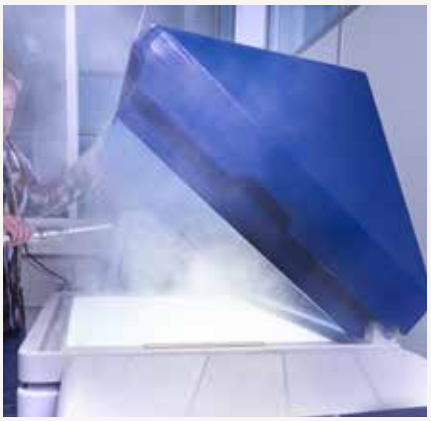
Our in-house switchgear production facilities offer a high degree of flexibility and ensure a reliable quality standard from qualified experts who have specialised for many years.

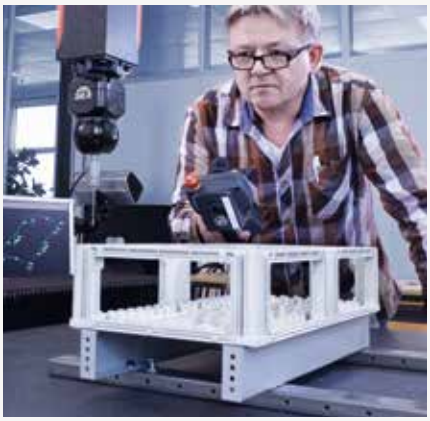
HENSEL MEETS THE HIGHEST REQUIREMENTS OF DIN ISO EN 9001 AT ALL OF ITS PRODUCTION SITES.

TESTED QUALITY

The market advantage we give ourselves and our partners is built on the firm foundation of consistently high quality standards: Hensel meets the highest requirements of DIN ISO EN 9001 at all of its production sites.

It is our claim and promise to do our utmost not only to ensure the high quality levels of our products in the future, but also to expand them further.

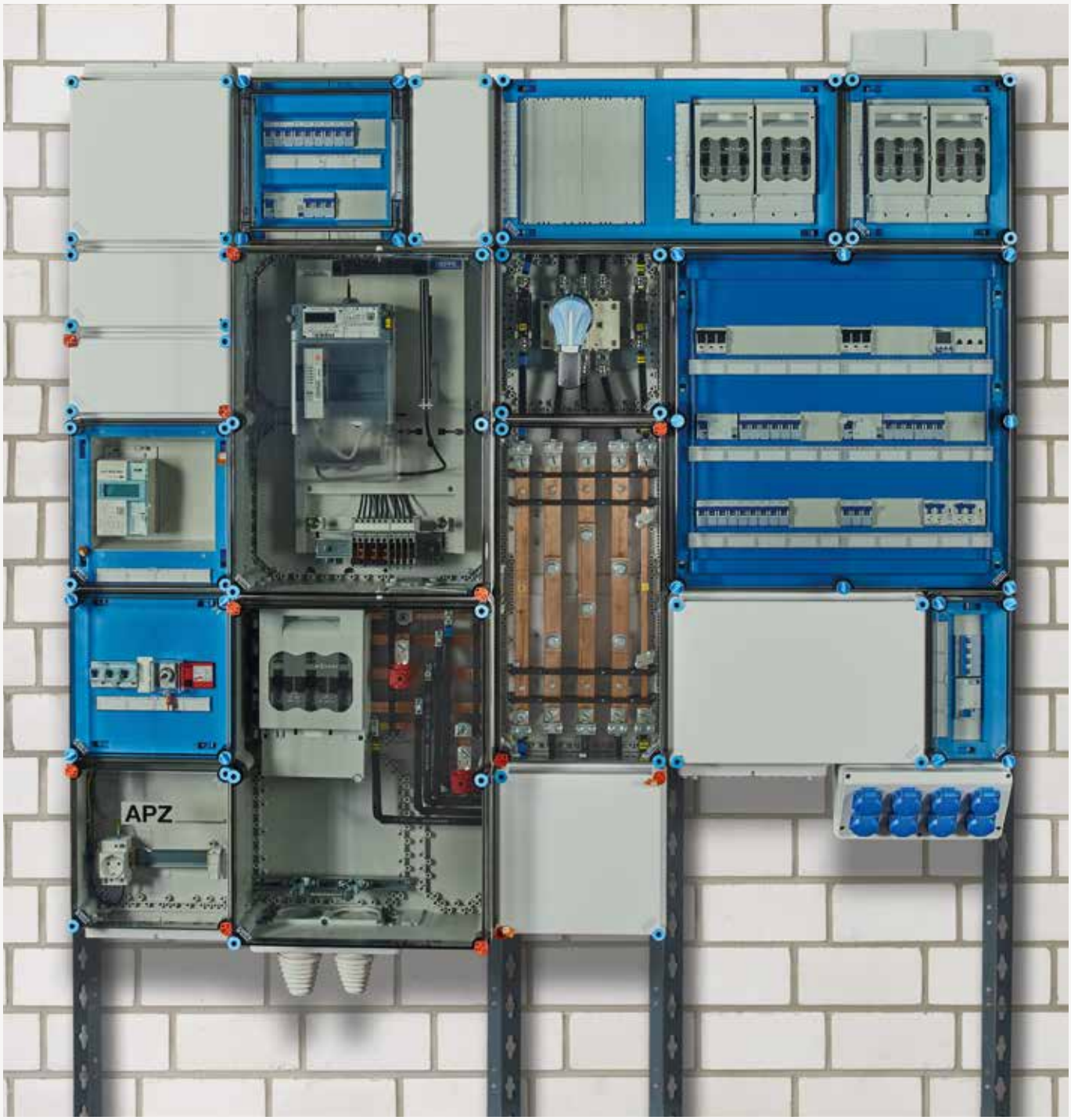




Ready for connection, double insulated, low-voltage switchgear in box-type design as a

POWER SWITCHGEAR COMBINATION (PSC) IN ACCORDANCE WITH IEC 61439

The requirements of all assemblies installed in the switchgear have been verified in accordance with the requirements of IEC 61439 Part 2. I_{nc} and RDF (Rated Diversity Factor) are specified in the documentation.



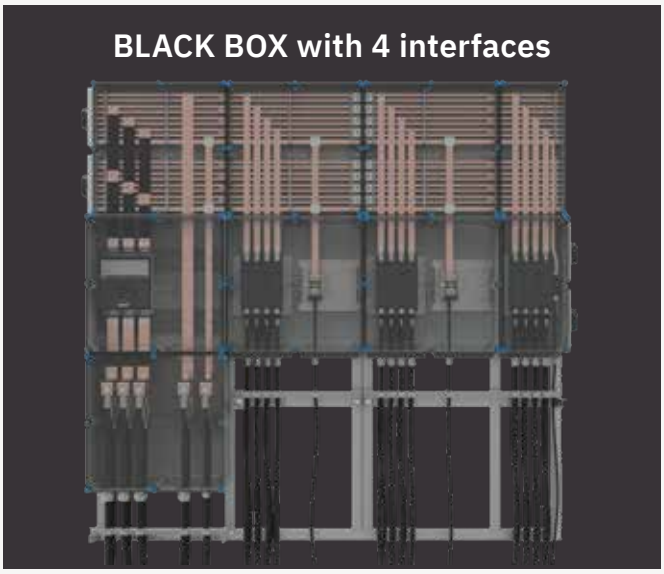
Switchgear combinations with 4 interfaces in accordance with IEC 61439-2

Installation/environmental conditions

+ For protected outdoor installation
+ IP 65
+ Base grid: 150 mm
+ EMC-compliant with N/PEN conductor in the area of the phase conductors (standard)
+ Expandable in all directions
+ Available as wall-mounted or floor-standing distributor

Operation and maintenance

+ Protection Class II up to 1600 A rated current
+ Very flexible due to standardised and tested assemblies
+ Designed with generous connection spaces
+ Practical equipment for transport and installation
+ Operation by electrical specialist



Connection to the electrical network

+ Circuit-breakers up to 1600 A
+ Switch disconnectors up to 1600 A
+ Fuse switch disconnectors up to 630 A
+ Main busbar systems up to In: 1600 A
+ N/PEN conductors with the same current carrying capacity as the phase conductors (standard)
+ Connection with cable at the top or the bottom

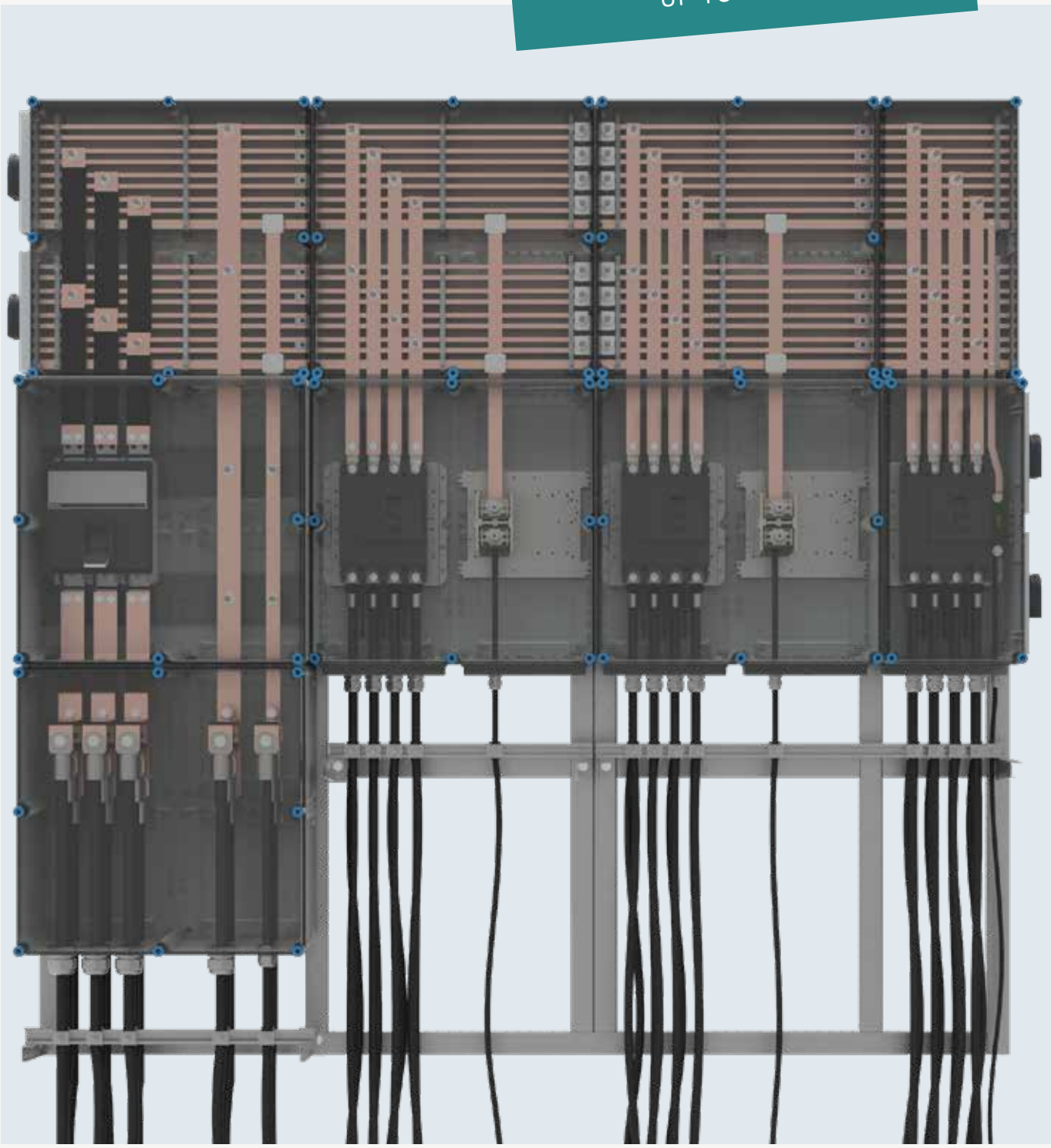
Circuits and consumers

+ Circuit-breakers up to 1600 A
+ Switch disconnectors up to 1600 A
+ Fuse switch disconnectors up to 630 A
+ Bus-mounted fuse bases up to 63 A
+ CEE sockets in accordance with EN 60309 and earthed sockets in accordance with DIN 49440-1 can be fitted
+ Connection with cable at the top or the bottom

MODULAR ENCLOSURE SYSTEM

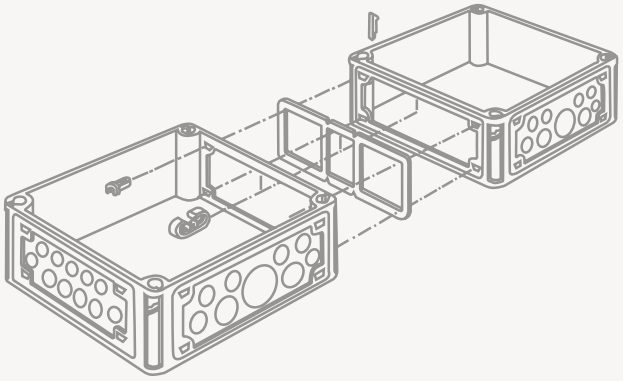
for the installation of power switchgear combination (PSC) in accordance with IEC 61439

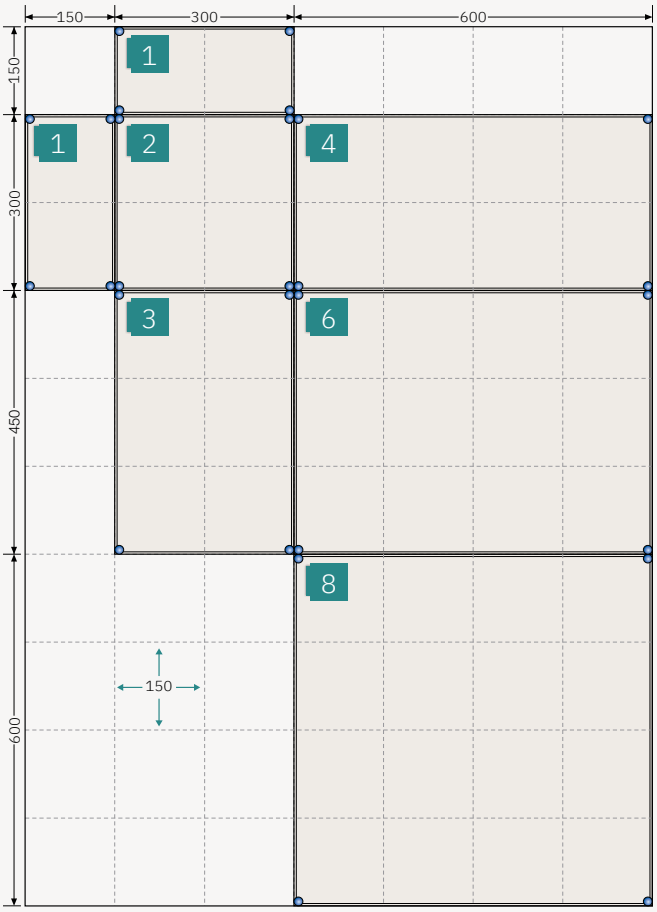
POWER DISTRIBUTION BOARDS
UP TO 1600 A

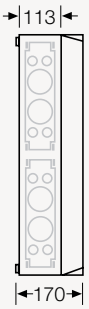


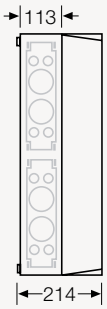
Can be combined in all directions

+ Six box sizes can be freely combined in all directions and can also be used as individual enclosure.
+ The combinable enclosure system is ideally suited for the quick and easy construction of power switchgear assemblies (PSC) up to 1600 A
+ **6 box sizes:**
  1_ 150 x 300 mm
  2_ 300 x 300 mm
  3_ 450 x 300 mm
  4_ 600 x 300 mm
  6_ 600 x 450 mm
  8_ 600 x 600 mm

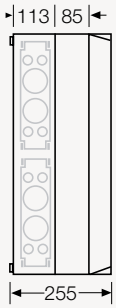


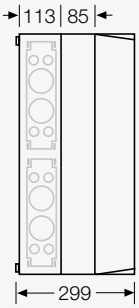






Enclosure depths
Different enclosure depths allow the installation of deeper devices.

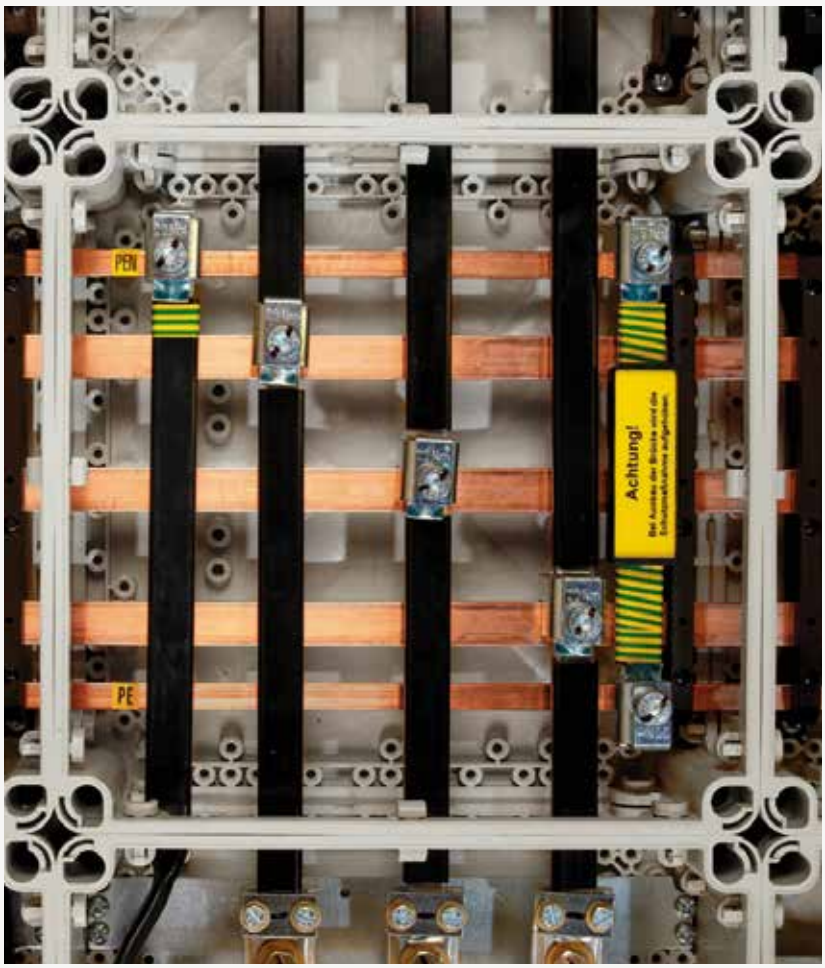




Extension frames
for box sizes 4, 6 and 8 increase the enclosure depth by 85 mm in each case.

More information about these products: hensel-electric.de

System benefits Mi 1600 A

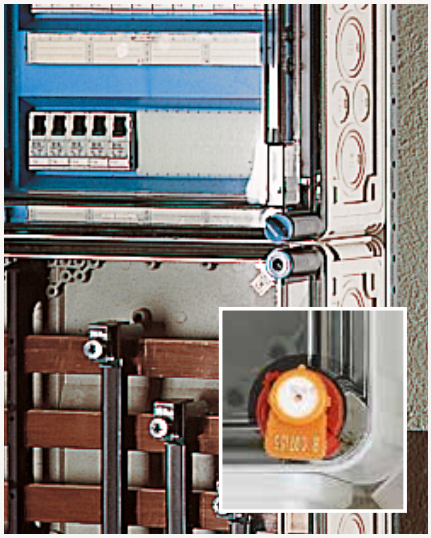


EMC-compliant busbar systems
ensure a reliable power supply.
With N/PEN conductor as standard:
+ with the same current-carrying capacity as the phase conductors

Contact hazard protection cover
ensures operating safety.
+ Operable devices and devices contacted on busbars have complete protection covers, which are also lead-sealable.

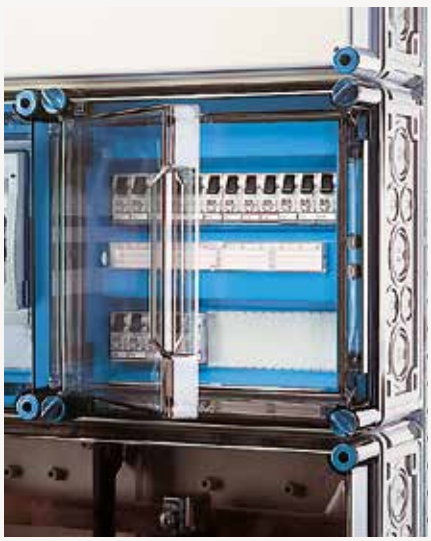
Detailed product information – designed with daily work in mind

Feed-ins
Feed-in up to 1600 A with current and voltage measurement.



Connection Box
The Connection Box is the ideal solution for installing sockets and control and signalling devices.

Housing cover actuation
Depending on the electrical function installed, it is equipped with a quick-release fastener for manual operation or tool operation, which can also be sealable on request.

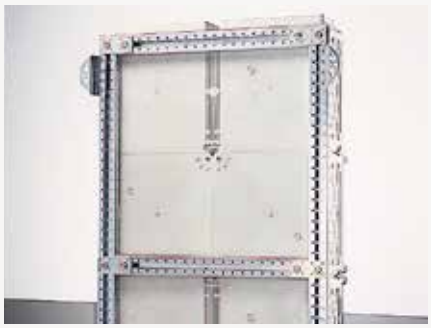


Closure
For customised locking, a fastener can be used with standard U-locks.

Hinged lid
A hinged lid makes it easy to operate appliances.

System benefits Mi 1600 A

Substructure panelling (height 750 mm) In addition to the galvanised mounting frame, large Mi 1600 switchgear can be equipped with a substructure cladding as a floor-standing distribution board. The 300 mm wide removable front panels are used to cover the cable entries and connection enclosure.

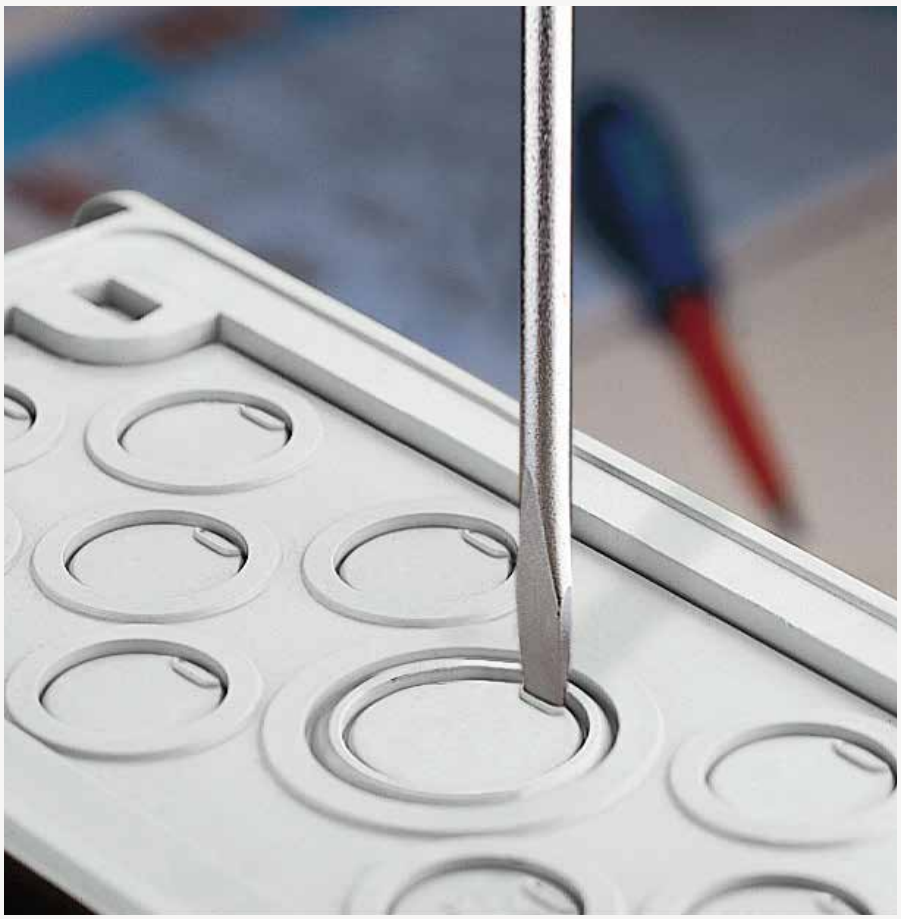


Mounting frame
Large switchgear can be installed with a stable mounting frame.

Wall mounting
Various components for wall mounting enable secure attachment to the building structure.

Outdoor applications
For outdoor applications, Mi switchgear can also be installed in cabinets made of glass fibre-reinforced polyester or powder-coated aluminium.

Detailed product information – designed with daily work in mind



Box wall with metric knockouts

Cable entry glands
Cable entry glands can be mounted directly into box walls all round.

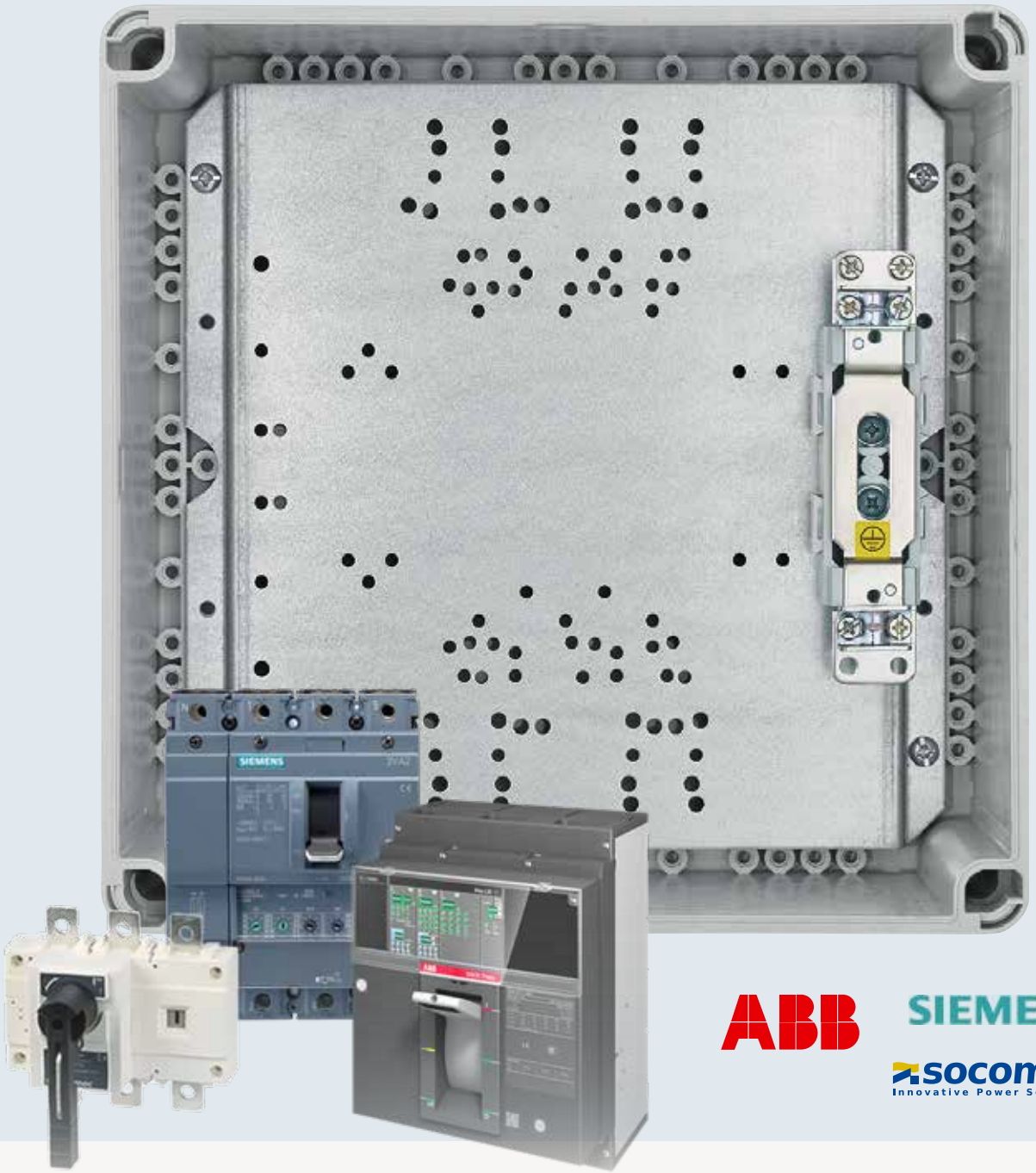
Flanges
+ Flanges with different pre-embossing or elastic sealing membranes can be fitted to any box wall using wedge connections, even at a later date.
+ Flanges with extended cable arrangement space offer more space for splicing the cables.

Generous connection space
Easily accessible and sufficient connection space, even with parallel cables. The separable cable insert allows cables to be inserted from the front.

TESTED SYSTEM FOR ALL COMMON DEVICES

A tested system with all data from the system manufacturer HENSEL

SEVERAL OPTIONS IN ONE SYSTEM



+ System enclosure with factory-assembled kits and accessories have been extensively tested by HENSEL.

+ The Mi-SYSTEM catalogue and the ENYGUIDE design tool provide all the necessary technical data for standard-compliant classification, e.g. power loss and maximum device size.

+ For individual appliances, HENSEL provides data on tested appliances from common manufacturers.

DEPENDENT ON THE SYSTEM

Electrical ratings

Electrical Rated values

Rated current: up to 1600 A
Rated insulation voltage: 690 V a.c., 1000 V d.c., VDE 0110
Rated short-time withstand current max. 36 kA / 1 s

System properties

Ambient Conditions

Ambient temperature

+ for distribution boxes according to IEC 61439:
  -5 °C to 35 °C, max. + 40 °C,
  Relative humidity: 50% at 40 °C,
  100% at 25 °C

+ for empty enclosures:
  - 25 °C bis + 70 °C
  The climatic infl uences and effects on the equipment are to be considered, see technical details /operating and ambient conditionsdevices.

Impact strength

Mechanical impact protection
IK 08 (5 Joules) according to IEC 50102

Application area

The enclosures are suitable for protected outdoor installation. However, the climatic influences and effects on the operating equipment must be taken into account.

Protection against foreign solid objects and direct contact

Dust-proof
Degree of protection IP **6**5

Insulation

Insulated enclosures
(Protection Class II)

Protection against ingress of water with harmful effects

Protected against water jets
Degree of protection IP 6**5**

DEPENDENT ON MATERIAL

Material properties: Polycarbonate

Burning behaviour

Glow wire test 960 °C in accordance with IEC 60695-2-11 self-extinguishing, flame retardant

Chemical resistance

Resistance against acids 10% and alkaline 10%, petrol and mineral oil

UV resistance

UV-resistant in accordance with IEC 61439-1 para. 10.2.4:
The material is tested for UV resistance.

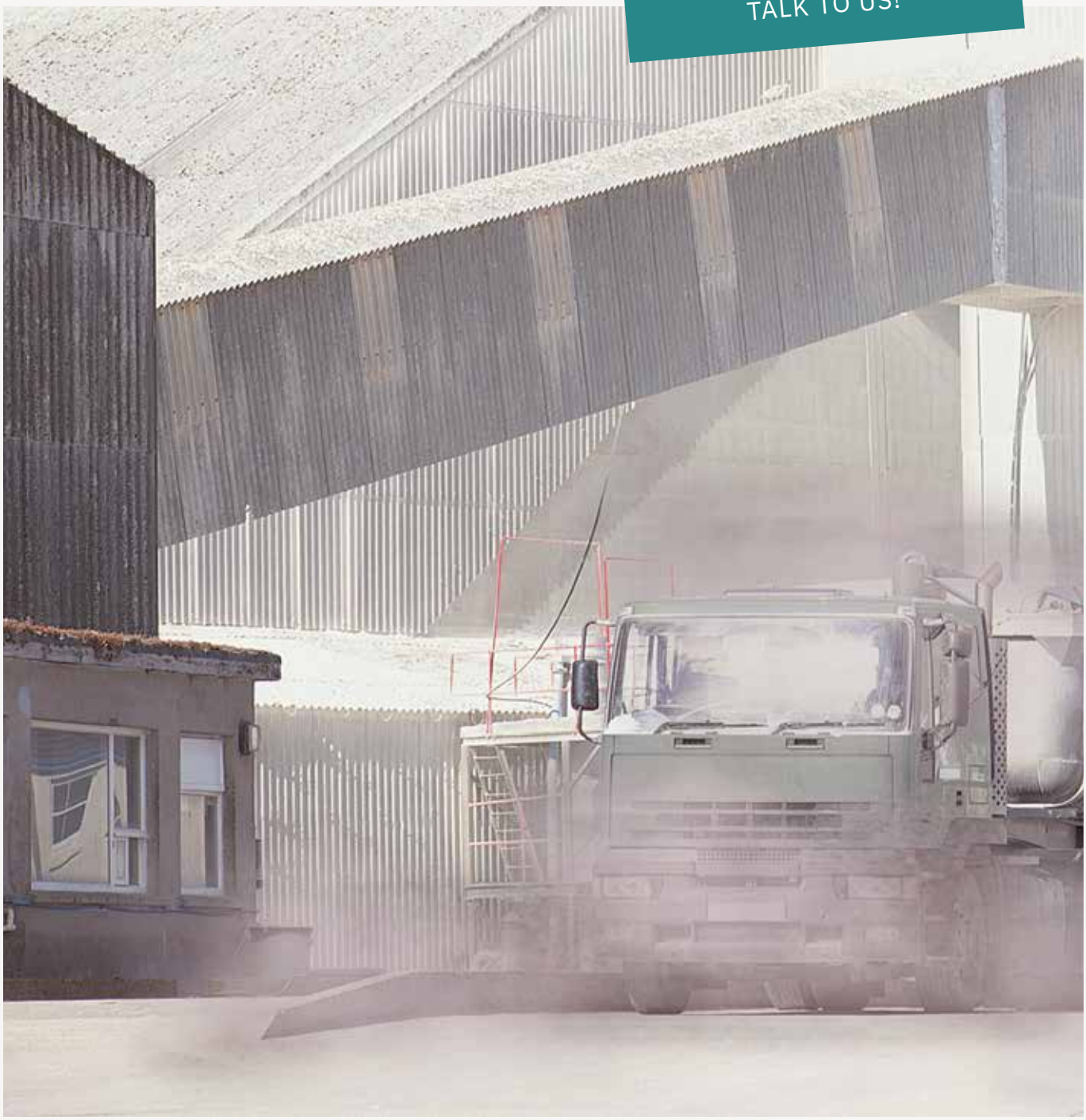
Toxic behaviour

Silicone- and halogen-free

A DISTRIBUTION SYSTEM MADE OF HIGH-QUALITY MATERIAL

Developed according to proven industry standards and ideal for demanding applications

INDIVIDUAL SOLUTIONS?
TALK TO US!

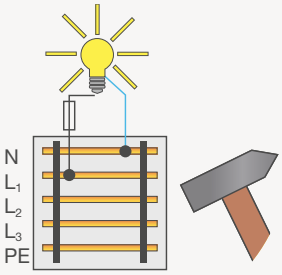


Mi distribution boards up to 1600 A

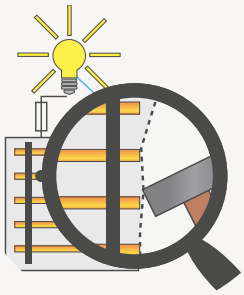
Mi distribution boards are made of thermoplastic materials that are characterised by extremely high mechanical impact strength and IK 08 hardness (5 joules).
This makes them ideal for use in areas where high mechanical loads must be expected.

+ stable
+ robust
+ corrosion-resistant
+ temperature-resistant

1 Before the impact

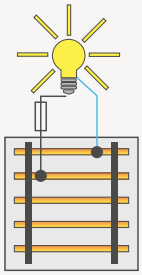


2 In the event of impact with live parts



Electrical safety
In the event of deformation, the thermoplastic enclosures offer maximum protection against the risk of electric shock: no short circuit can occur and protection against electric shock is maintained.

3 After the impact



Dimensional stability
Thermoplastic enclosures dampen and spring back to their original shape immediately.
Rigidity is maintained even at higher temperatures.

WHERE DUST AND MOISTURE ARE EVERYWHERE

The distribution boards in a zinc mining company are exposed to extreme levels of dust and dirt.

General power supply for keeping production processes in a mine up and running in combination with a generator.

Special challenges

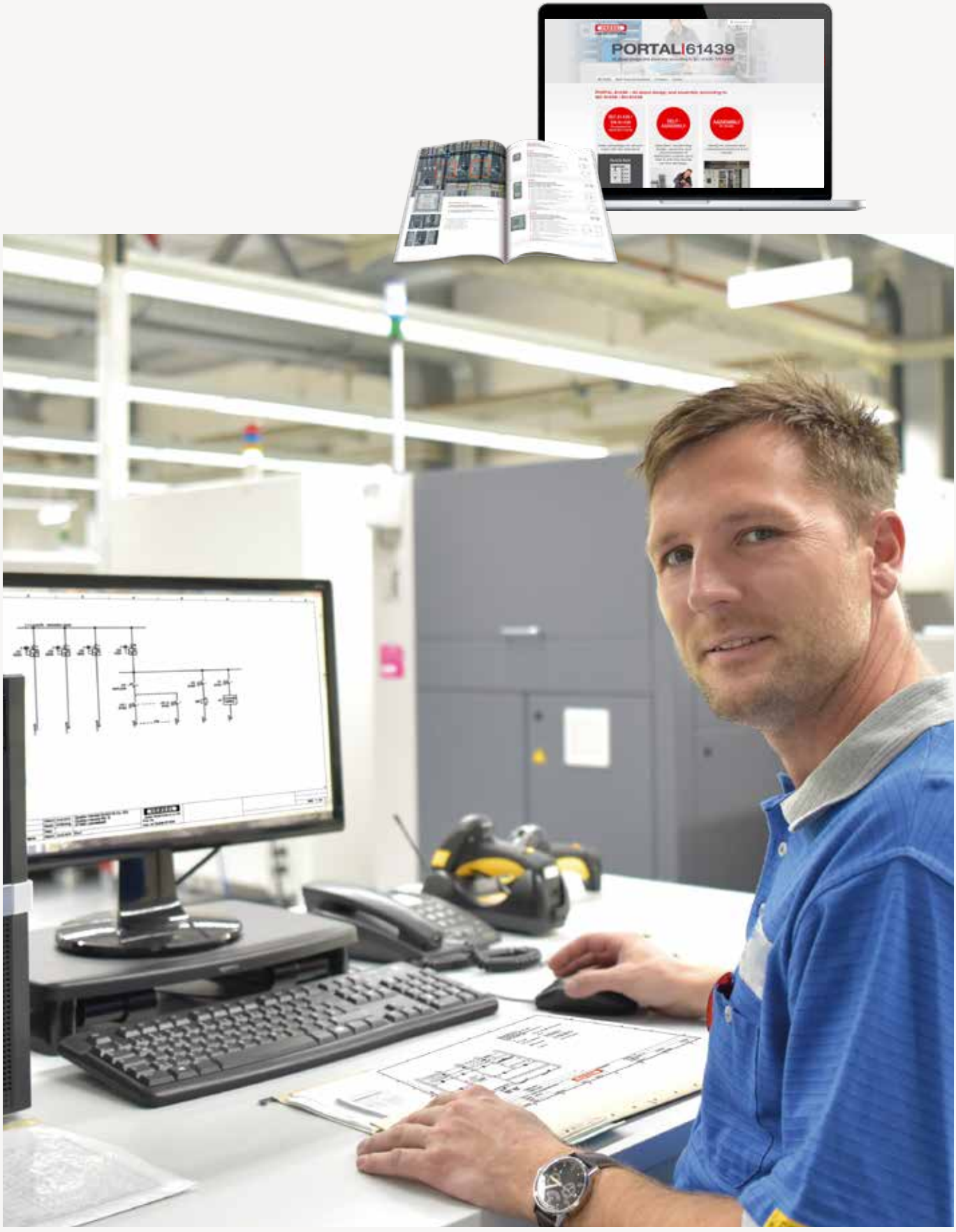
+ Dusty and damp conditions
+ Varying weather conditions, high temperature fluctuations
+ Hard to access electrical systems
+ Heavy mechanical stresses
+ Safe products

Our solution

+ High IP protection rating (up to IP 65) ensures protection against dust and moisture
+ High degree of protection against mechanical stress
+ Maintenance-free products thanks to their high quality
+ Electrical installation and distribution systems for protected and unprotected outdoor installation
+ Ventilation inserts to avoid condensation
+ Individual product solutions

WE DESIGN, BUILD, TEST, AND DELIVER...

Professional power distribution boards up to 1600 A



We work zealously every day to provide you with high-quality electrical installation and distribution systems and to give you a sense of perfection and security.

INDIVIDUAL SOLUTIONS? TALK TO US!

As an internationally active group of companies, we can support you with our competent partners abroad.

Our local branches ensure rapid attendance on site.
You benefit from our high levels of efficiency and fast, competent support.

COLLECTING THE PROJECT DATA

The user specifies the operational requirements and conditions for a low-voltage switchgear and controlgear assembly.

If there are special operating conditions that are not regulated in the standard, the applicable **special requirements** must also be fulfilled or **special agreements** must be made between the manufacturer of the switchgear and controlgear assembly and the user.

The correct dimensioning of the main interfaces in the switchgear is crucial for its function under operating conditions. For this purpose, the switchgear is regarded as a **'BLACK-BOX'** with four interfaces, for which the manufacturer of the switchgear combination defines the correct rated values when planning the system.

The design of the switchgear and controlgear assembly depends on the following points:

1.1 Installation and environmental conditions

1.2 Operation and maintenance

1.3 Connection to the electrical mains

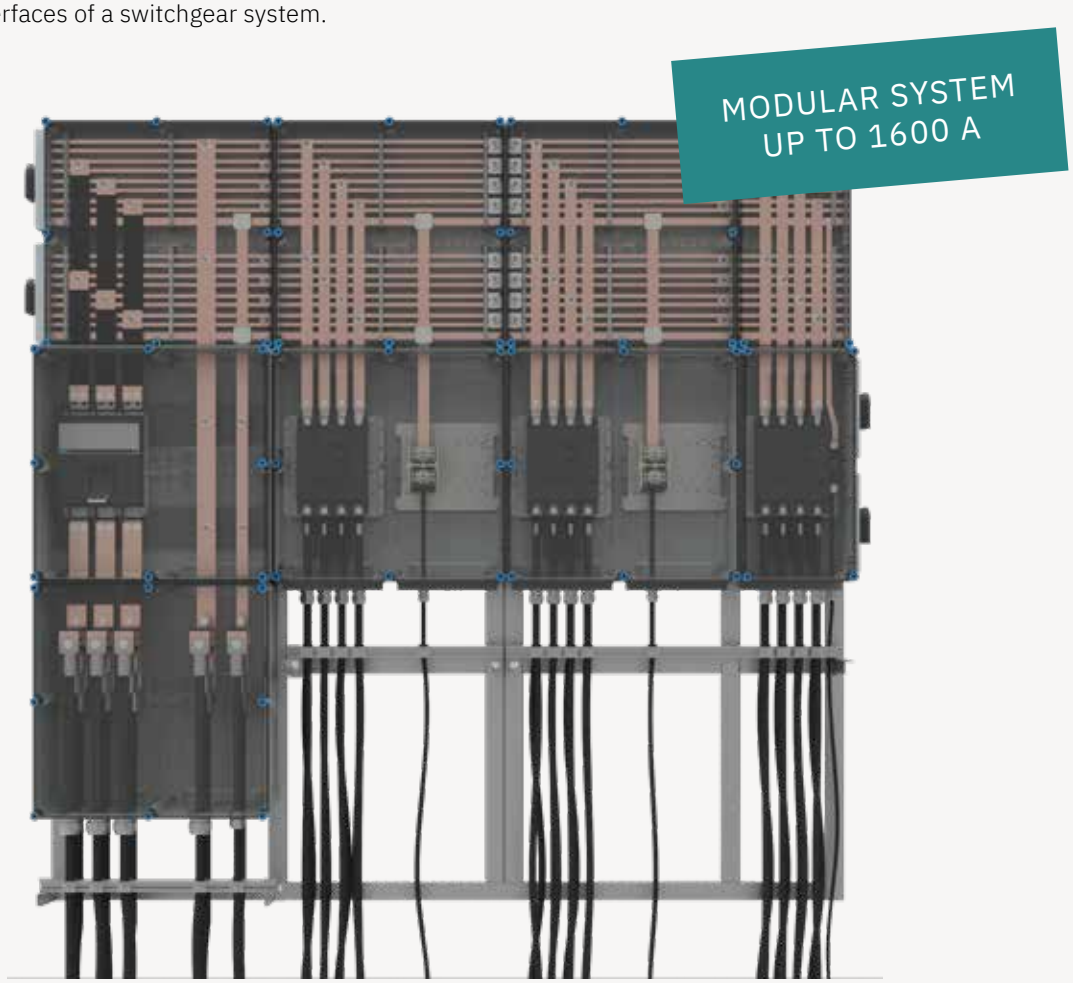
1.4 Circuits and consumers

HENSEL checklist for configuring switchgear and controlgear assemblies in accordance with IEC 61439

This editable checklist helps you to capture all the data for planning a switchgear system.

It takes into account the determination of the correct rated values for the four interfaces of a switchgear system.

The checklist for collecting project data for switchgear and controlgear assemblies in accordance with IEC 61439 can be downloaded quickly and easily.



EMC-compatible busbar system

With N/PEN conductors as standard:

+ With the same rated current as the phase conductors
+ Best EMC compatibility in phase conductors

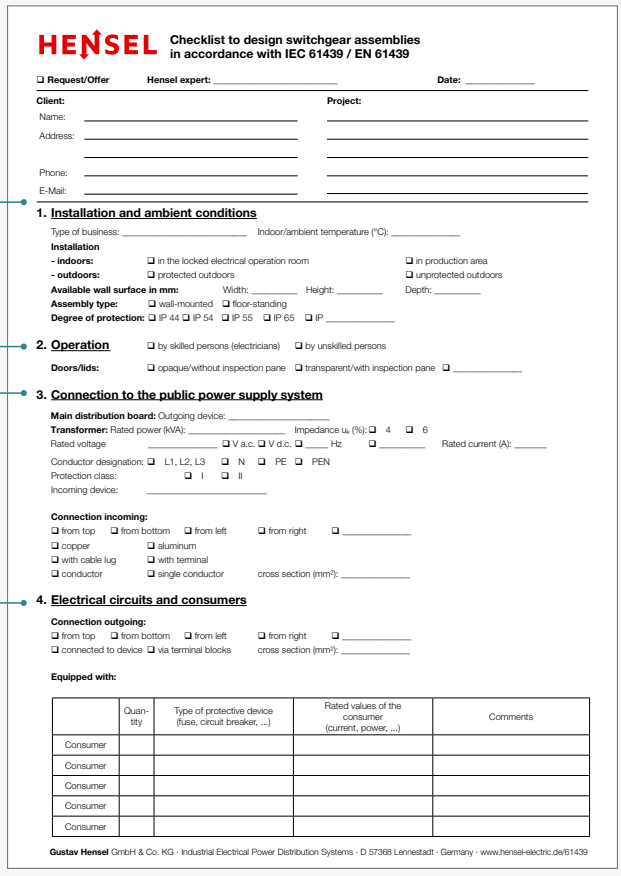
Rated values for voltage

Rated voltage	Un = 690 V a.c.
Rated insulation voltage	Ui = 690 V a.c., 1000 V d.c.
Overvoltage category	III
Degree of contamination	3

Rated values for current

Busbars	**250 A**	**400 A**	**630 A**	**1000 A**	**1600 A**
Rated current of busbar	250 A	400 A	630 A	1000 A	1600 A
Rated short-time withstand current	I_{cw} = 15 kA / 1 s	I_{cw} = 15 kA / 1 s	I_{cw} = 21 kA / 1 s	I_{cw} = 36 kA / 1 s	I_{cw} = 36 kA / 1 s
Ratedpeak withstand current	I_{pk} = 30 kA	I_{pk} = 30 kA	I_{pk} = 45 kA	I_{pk} = 75 kA	I_{pk} = 75 kA

+ Installation and environmental conditions
+ Operation and maintenance
+ Switchgear
+ Connection to the electrical network
+ Circuits and consumers



HENSEL **Checklist to design switchgear assemblies in accordance with IEC 61439 / EN 61439**

❑ Request/Offer Hensel expert: _____ Date: _____

Client: **Project:**

Name: _____

Address: _____

Phone: _____

E-Mail: _____

1. Installation and ambient conditions

Type of business: _____ Indoor/ambient temperature (°C): _____

Installation

- indoors: ❑ in the locked electrical operation room ❑ in production area

- outdoors: ❑ protected outdoors ❑ unprotected outdoors

Available wall surface in mm: Width: _____ Height: _____ Depth: _____

Assembly type: ❑ wall-mounted ❑ floor-standing

Degree of protection: ❑ IP 44 ❑ IP 54 ❑ IP 55 ❑ IP 65 ❑ IP _____

2. Operation ❑ by skilled persons (electricians) ❑ by unskilled persons

Doors/lids: ❑ opaque/without inspection pane ❑ transparent/with inspection pane ❑ _____

3. Connection to the public power supply system

Main distribution board: Outgoing device: _____

Transformer: Rated power (kVA): _____ Impedance u_k (%): ❑ 4 ❑ 6

Rated voltage _____ ❑ V a.c. ❑ V d.c. ❑ ____ Hz ❑ _____ Rated current (A): _____

Conductor designation: ❑ L1, L2, L3 ❑ N ❑ PE ❑ PEN

Protection class: ❑ I ❑ II

Incoming device: _____

Connection incoming:

❑ from top ❑ from bottom ❑ from left ❑ from right ❑ _____

❑ copper ❑ aluminum

❑ with cable lug ❑ with terminal

❑ conductor ❑ single conductor cross section (mm²): _____

4. Electrical circuits and consumers

Connection outgoing:

❑ from top ❑ from bottom ❑ from left ❑ from right ❑ _____

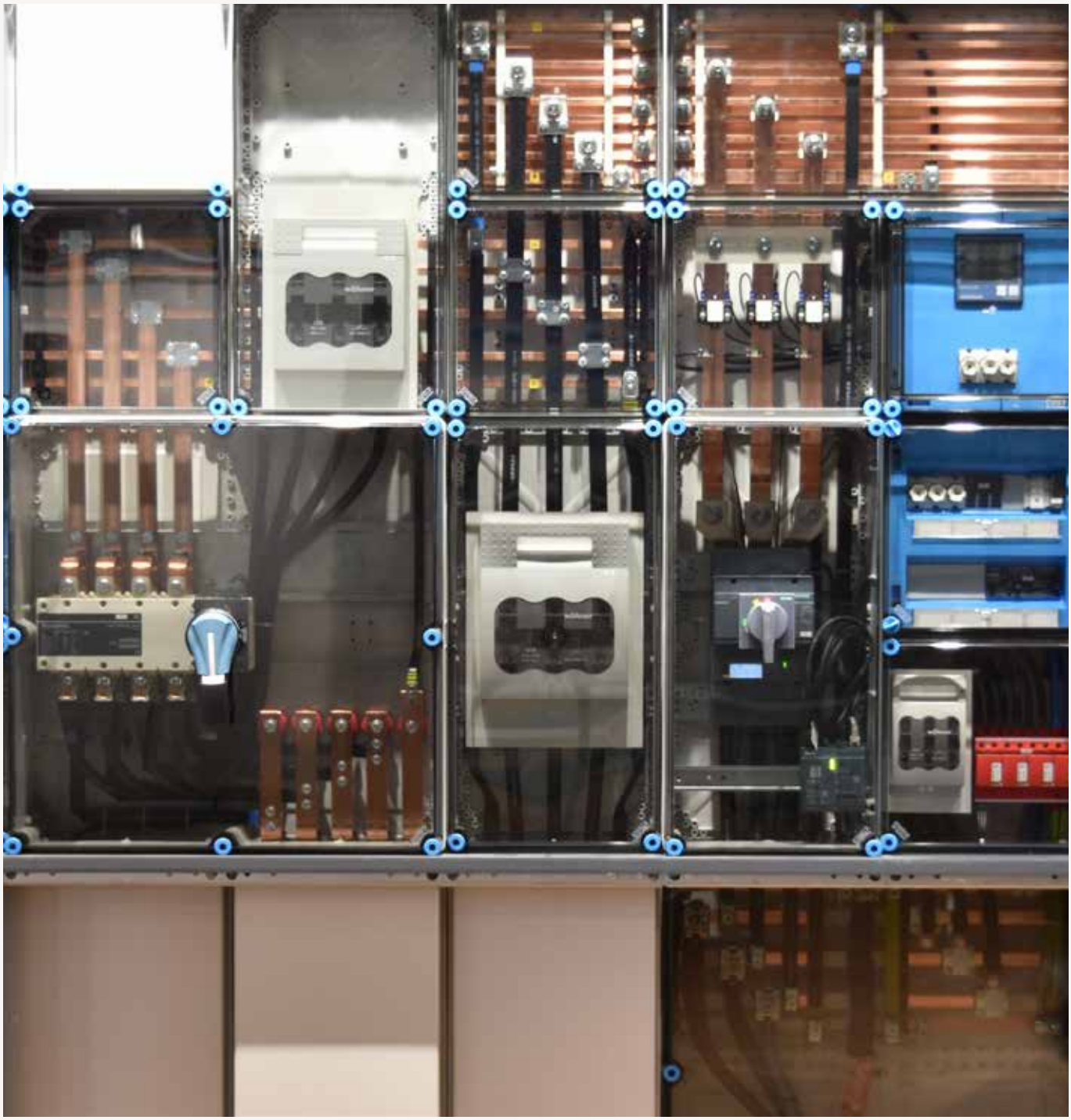
❑ connected to device ❑ via terminal blocks cross section (mm²): _____

Equipped with:

	Quantity	Type of protective device (fuse, circuit breaker, ...)	Rated values of the consumer (current, power, ...)	Comments
Consumer				
Consumer				
Consumer				
Consumer				
Consumer				

Gustav Hensel GmbH & Co. KG · Industrial Electrical Power Distribution Systems · D 57368 Lennestadt · Germany · www.hensel-electric.de/61439

BASICS
LOW VOLTAGE DIRECTIVE



BASICS OF IEC 61439

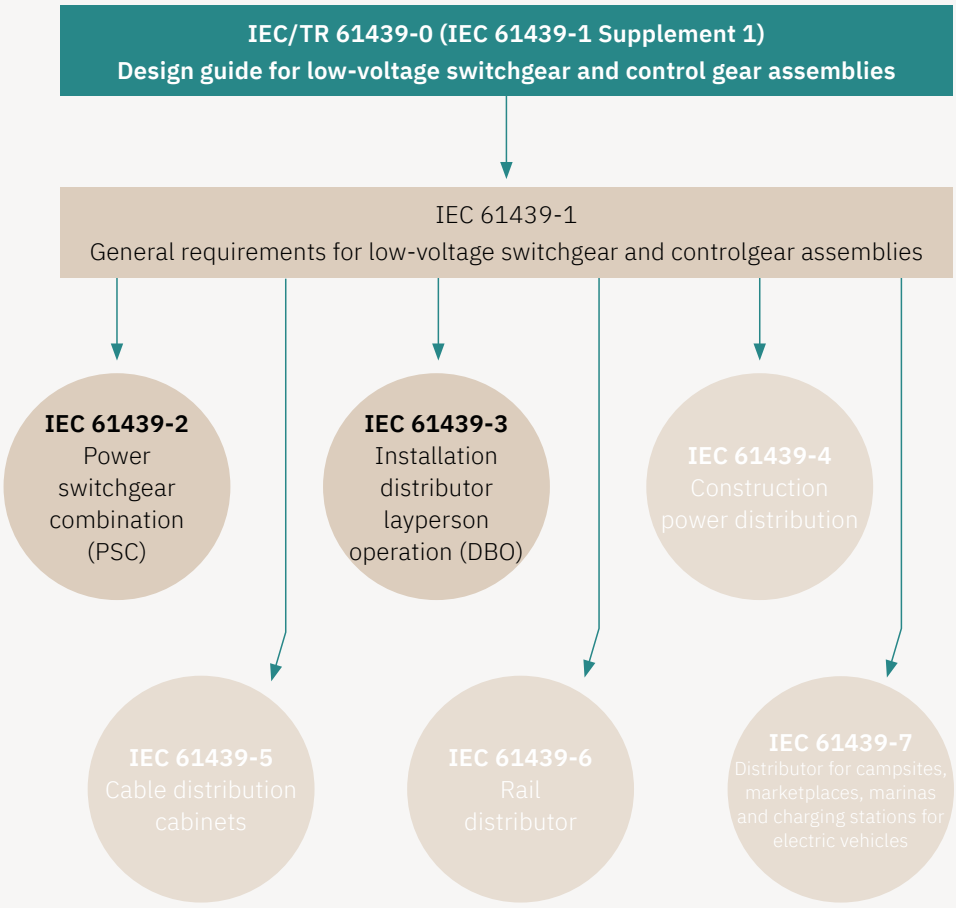
In the European Union, the ‘Low Voltage Directive’ 2014/35/EU is the legal basis for all electrical equipment between 50 and 1000 V a.c. or 75 and 1500 V d.c.

This directive pursues the protection objective that electrical equipment must not endanger the safety of people and livestock or the preservation of material assets and refers to the harmonised standards published in the Official Journal of the EU.

Compliance with this legal basis is confirmed by the Hensel EU Declaration of Conformity. The reference to IEC 61439 confirms that the basic requirements of the law are met.

If no harmonised standards are applied, Hensel is obliged to prove compliance with the above-mentioned protection objective by means of suitable measures.

Structure of IEC 61439



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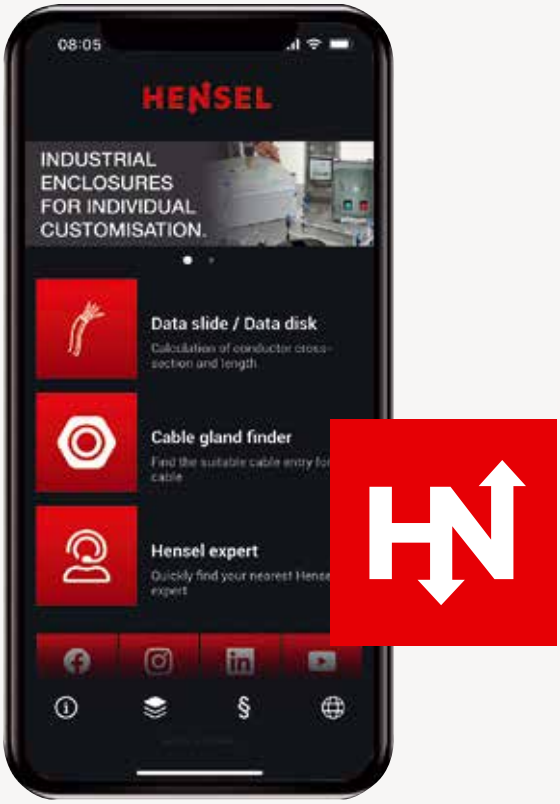

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