HENSEL

PASSION FOR POWER.

Assembly instruction

Mi Power Distribution Boards up to 630 A

Power switchgear and controlgear assemblies (PSC) in accordance with IEC 61439-2

Download at www.hensel-electric.de/61439

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Mi Power Distribution Boards up to 630 A

- **in accordance with IEC 61439-2**
- **combinable enclosure system**
- **degree of protection IP 65**
- **made from polycarbonate**
- **protection class II, ⧈**

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Info **Hensel specialist consultant on-site at www.hensel-electric.de**

Standard-conforming rating of power switchgear and controlgear assemblies according to IEC 61439-2

The new IEC 61439 - the standard for the construction of switchgear assemblies - brings changes that affect the planning of a switchgear assembly. In addition, new tasks and responsibilities are awaiting the manufacturer of a switchgear assembly.

Decisive for the optimal functioning of a switchgear assembly under operating conditions is the correct rating of the interface characteristics of the assembly. For this purpose, the assembly is considered as **BLACK-BOX** with four interface characteristics which shall ensure compatibility with the ratings of the circuits to which it is connected and the installation conditions and shall be declared by the assembly manufacturer using the criteria identified below.

Assembly considered as BLACK BOX with the four interface characteristics according to IEC 61439-2

Installation and ambient conditions

- For the protected outdoor installation
- Degree of protection IP 65
- Combinable enclosure system, extendable in all directions
- 6 enclosure sizes in a grid of 150 mm
- EMC compliant busbar system
- Wall-mounting or floor-standing

Operation and maintainance

- Electrical functions intended to be operated by electrotechnical skilled or unskilled persons
- Protection class II up to a rated current of 630 A
- Flexible by standardised and tested kits
- Spacious connection areas

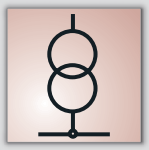
BLACK BOX
with 4 interfaces

Mi Power Distribution Board (PSC)

Combinable enclosure system, insulation-enclosed, total insulated, degree of protection IP 65, for the assembly of power switchgear and controlgear assemblies (PSC) up to 630 A in accordance with IEC 61439-2.

The requirements for all installed electrical functions within the assembly have been proved compliance with the applicable requirements of IEC 61439-2.

I_{nc} and RDF must be specified in the documentation.



Connection to the electrical network

- Electric circuit / final circuit
- Circuit-breaker up to 630 A
- Switch disconnector up to 630 A
- Fuse switch disconnector up to 630 A
- Bus-mounted fuse base up to 63 A
- Connecton with cable from above / from below
- Connection: conductors from copper / aluminium
- Optional connection of CEE sockets according to EN 60309 and sockets with earthing contact

Circuits and consumers

- Rated voltage U_n = 690 V a.c. / 1000 V d.c.
- Rated current I_N up to 630 A
- Circuit-breaker up to 630 A
- Switch disconnector up to 630 A
- Fuse switch disconnector up to 630 A
- 5-conductor system
- Connecton with cable from above / from below

Requirements for special installations or locations according to IEC 60364-7-729

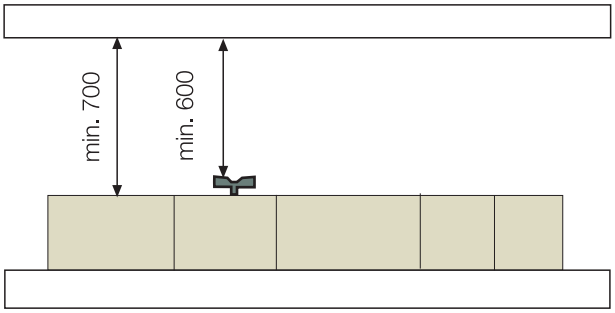
Requirements for gangway width

IEC 60364-7-729

Low-voltage electrical installations - Part 7-729: Requirements for special installations or locations - Operating or maintenance gangways (IEC 60364-7-729:2007, modified);
German implementation HD 60364-7-729:2009

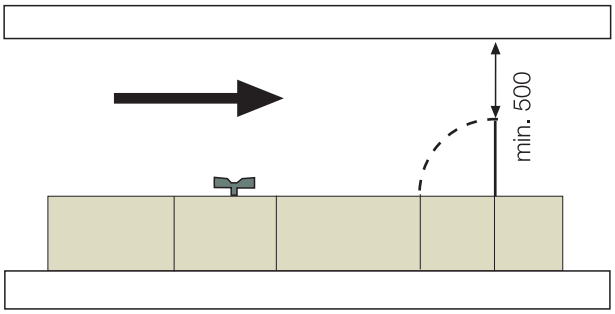
Installation site

Switchgear assemblies must be set up so that the minimum aisle widths are not exceeded.



Aisle width

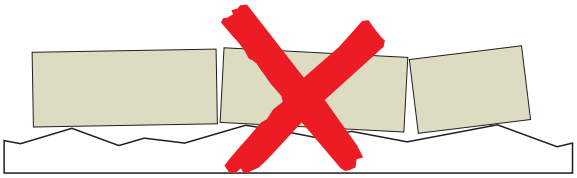
The aisle width in front of switchgear assemblies with drives, e.g. switches, must be at least 600 mm.



Building evacuation route

For distribution boards with lids or doors opening against the direction of evacuation, aisle widths must have a minimum of 500 mm.

Switchgear assemblies must be set up torsion-free, assembled and fixed.



Country-specific requirements have to be observed!

Requirements of German standard DIN VDE 0100 Part 737 for compliance with IP degree of protection

1. Requirement
Protection against ingress of water for all electrical equipment (devices) with the appropriate encapsulation (2nd characteristic numeral)

1.1. Minimum requirement for electrical equipment:

Note for outdoor installation:

„Protected outdoors“
Electrical equipment has to be protected from precipitation (like rain, snow or hail) as well as from direct sunlight.

„Non-protected outdoors“
Electrical equipment can be exposed to precipitation or direct sunlight.
With both assembly sites the climatic effects on the installed equipment must be observed, for example, high or low ambient temperatures or condensation.

1.2. Minimum requirements for electrical equipment, that must withstand higher environmental stresses:

degree of protection IP X 4

with **non-direct** jets of water within occasional cleaning procedures, e.g. agriculture

degree of protection IP X 5

with **non-direct** jets of water within operational cleaning procedures, e.g. carwash

degree of protection IP X 5 and additional consultation with the manufacturer:

with **direct** jets of water within occasional cleaning procedures of enclosures, e.g. butcher's shop

Country-specific requirements have to be observed!

2. Requirement of German Standard DIN VDE 0100 Part 737

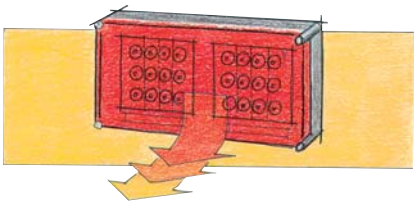
4.1 Electrical equipment must be selected taking into account the external influences to which they may be exposed. Proper operation and the effectiveness of the required degrees of protection must be assured.

Note: Data from the manufacturer!

How does condensed water occur in enclosures with a high degree of protection?

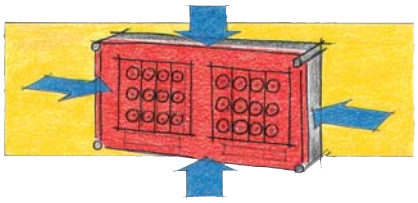
Condensed water only forms in enclosures with a higher degree of protection than IP 54 due to temperature difference from inside to outside. Humidity can not evaporate because of the high degree of protection of the enclosure.

System switched on.



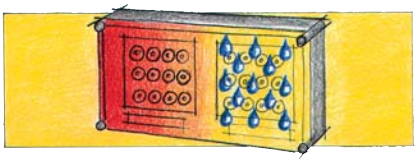
The internal temperature is higher than the external temperature due to the power dissipation of the built-in devices.

System switched on.



The warm air inside the enclosure attempts to accumulate moisture. This comes from outside through the seal as the enclosures are not gas-tight.

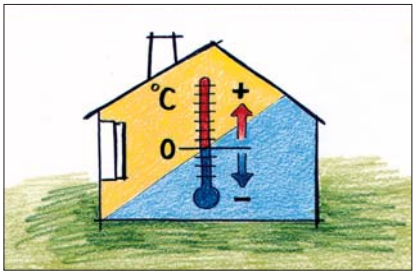
System switched off.



The internal temperature is reduced by cooling down the system e.g. by switching off the loads. The cooler air emits moisture which is collected as condensed water on the cooling inner surfaces.

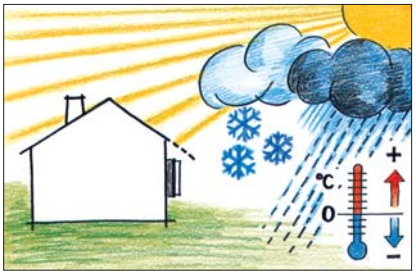
How does condensed water occur in enclosures with a high degree of protection?

Formation of condensed water for **indoor installations:**



In areas where high levels of air humidity and large temperature fluctuations are expected e.g. in laundry rooms, kitchens., car washes etc.

Formation of condensed water in **protected outdoor installations** (protected against weather influences) **or unprotected outdoor** installations:



Here condensed water can be formed dependent on the weather, high air humidity, direct sunlight and temperature differences compared to the wall.

The **modular design** in a basic grid of 150 mm allows free design of the outer form. The enclosures can be combined in all directions. Combinable in all directions to follow given requirements on site.

Different enclosure depths allow the installation of equipment of different heights (Fig. 1).
With an extension frame the depth of the enclosure sizes 4 and 8 can be extended by 85 mm (Fig. 2).

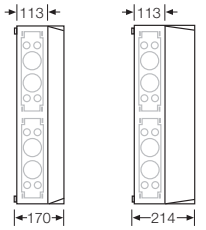


Fig. 1

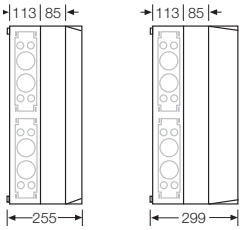
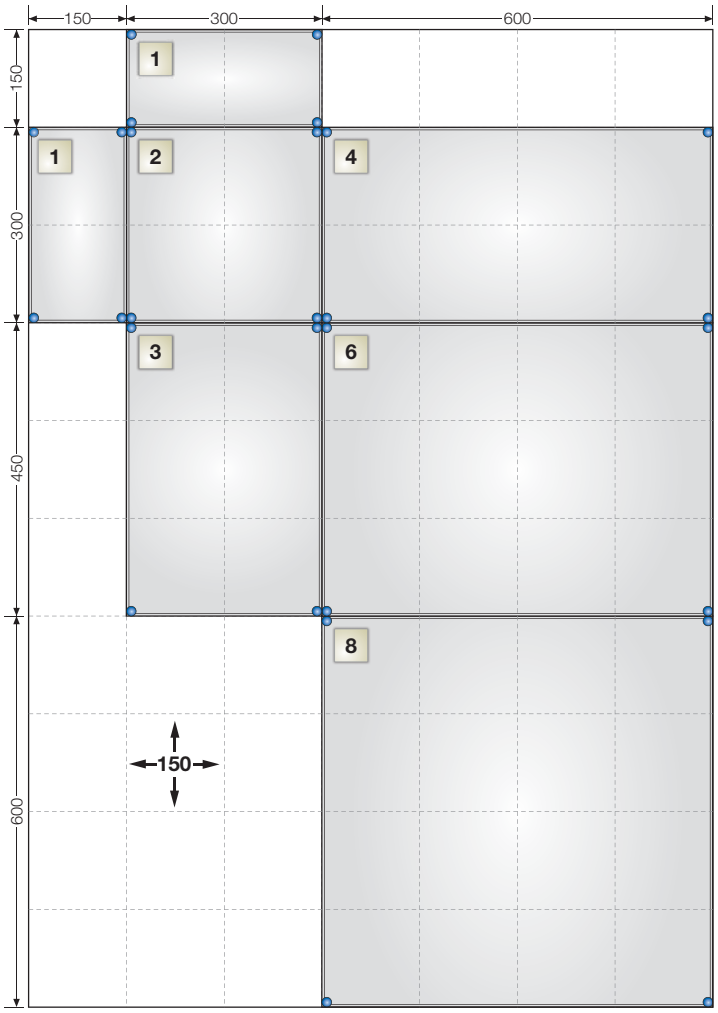


Fig. 2

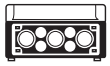


Enclosure walls with metric knockouts

Wall 1
1 x M 20
1 x M 32/40

Wall 2
2 x M 20
10 x M 25
1 x M 32/40

Wall 3
4 x M 25
3 x M 40/50

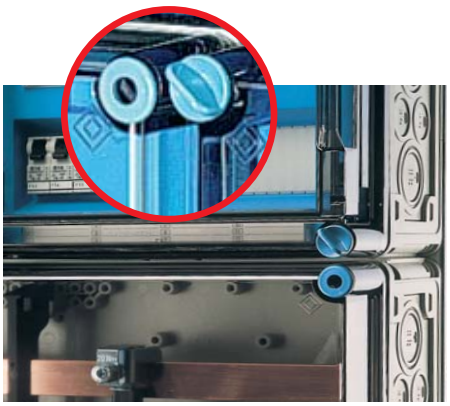


Wall 4
1 x M 20
4 x M 25
1 x M 32/40
3 x M 40/50

Wall 5
8 x M 32
4 x M 40/50

Wall 6
4 x M 20
20 x M 25
2 x M 32/40

Access and operation
Clear separation of the operation areas for unskilled persons and areas to which only electrotechnical skilled persons have access.



- Depending on the electrical function operate the cover manually (for unskilled persons) or with tool (for skilled persons)

- Lid lock prevents unauthorised opening of the cover

- A hinged lid for simple operation of equipment

Lid hinges
Mi ZS 20

For operating installation device within a large area.

The lid keeps permanantly connected to the box.
When assembling several boxes, the insertion can only be carried out for the external boxes.

Usable in Mi boxes:

Back-stop of lids	Position of box: vertical				Position of box: horizontal			
	left	right	top	buttom	left	right	top	bottom
Size 1:	●	●	●	●	●	●	●	●
Size 2:	●	●	●	●	●	●	●	●
Size 3:	●	●	●	-	-	-	●	●
Size 4:	●	●	●	-	-	-	●	●

Heavy-duty hinge joints
Mi ZS 40

For operating installation device within a large area.

The lid keeps permanantly connected to the box.

Wall connectors or flanges are necessary for assembly.

Lid is fastened with plastic screw to secure the total insulation ⧈.

Hinge for lids
Mi ZS 60

For large-area operation of installation deice within enclosures with extension frames.

The lid keeps permanantly connected to the box.

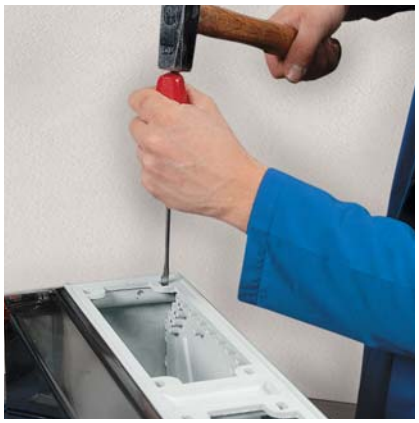
Assembly of Mi distribution boards according to assembly draft

Pre-assembled and tested enclosures with electrical functions

Knock out of box walls for electrical connection and cable entry

Box walls are knocked out for the electrical connection within the distribution board.

For the assembly of the enclosures, the appropriate openings of the wedge joints are knocked out as well.



Assembly of boxes

For sealing the boxes in position, a self-adhesive gasket is stuck to the box wall (applies to closed box walls, too).

The box assembly is carried out by a wedge connection.

To increase stability, press wall clamps onto the box fins.

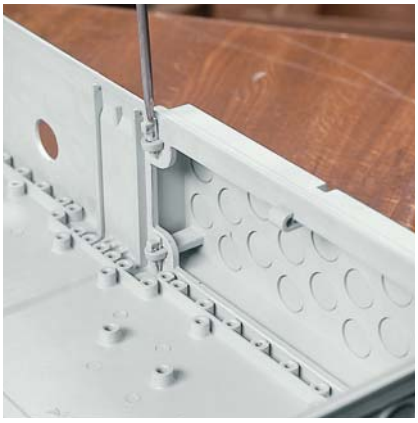
Use a wall separator for subdividing 300 mm box walls into two 150 mm walls for flange or box mounting.

Connections of cables
Connect cables strain-relieved and pressure-relieved.

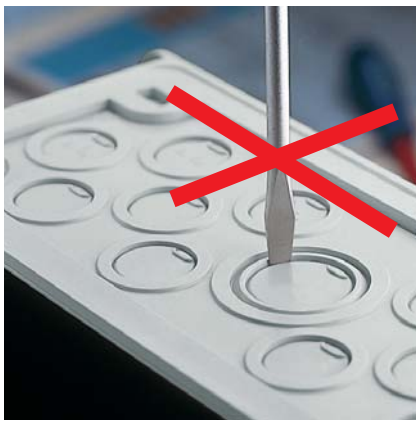
Cable entry
Close knockouts/openings for the cable entry according to the specified degree of protection.

Right:
Covering of cable entry with cable entry cover

Flanges
Attach flanges by means of 4 wedge links and 1 clamp to the box wall.



Cable entry
Knock out the appropriate cable entries within flanges or box walls with screwdriver.



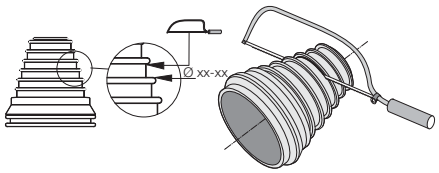
Cable glands
Insert cable gland into the appropriate knockout and fasten with lock nut.

Assembly of cable insertion

Knock out the respective box wall and saw out the upper box fin next to the wedge fastening.

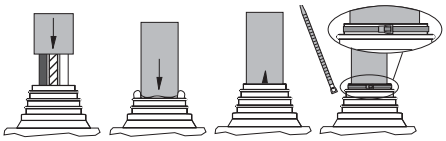
Screw mount the cable insertion and insert the rubber entries.

Adjust stepped grommet on the cable diameter.



Insert cable and fix it with cable ties.

Insert the cable into the box from the front.



Installation of extension frame

Fix attachments for extension frame in base of enclosure.

Right:
Place extension frame on base of enclosure.

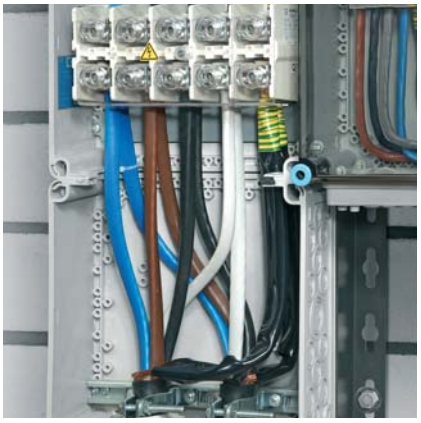
Fix extension frame with screws onto base of enclosure.

Box fin

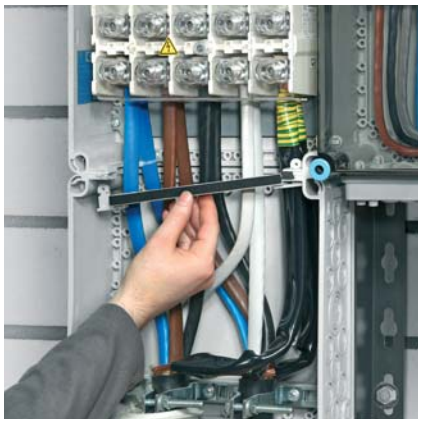
Mount removable box fin between two boxes to provide an easier wiring across two boxes.

Saw out box fin in side wall.

Insert cabels across two boxes and connect them.

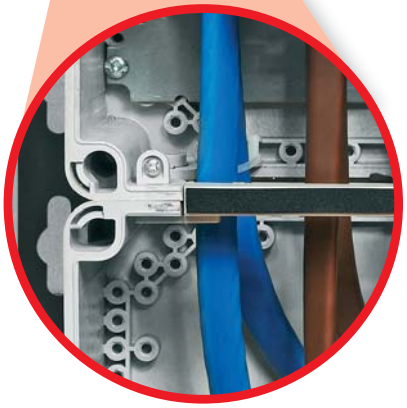


Insert box fin into the openings for the box connection and mount with screws.

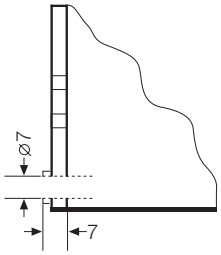


The box fin Mi GS 30 provides for a mechanical connection between two boxes.

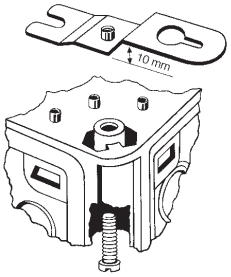
Degree of protection IP 65 is maintained.

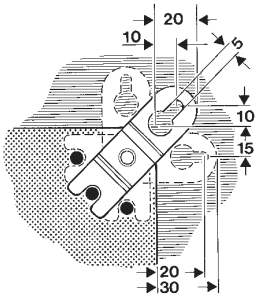


Wall mounting
directly through the
base of the box



External brackets
for external box fixing
Mi AL 40 (4 brackets)

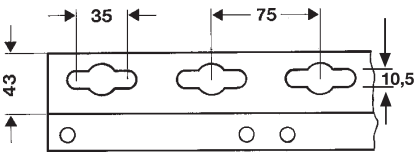




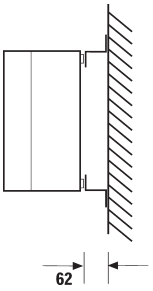
Mounting profile
for wall-mounted installation
of Mi-Distribution boards,
steel profile, 1950 mm long,
dividable in the grid
of 150 mm.
Mi MS 2

Note:
Please fix mounting profile
in vertical position to enable
a cable routing behind the
assembly.

For cutting the required
profile length fix mounting
profile e.g. with a clamp to
a desk.

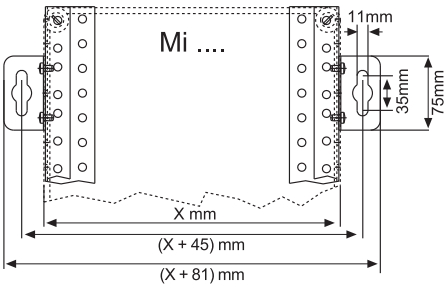


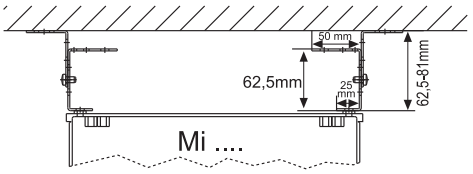
Fixing matrix of
mounting profile

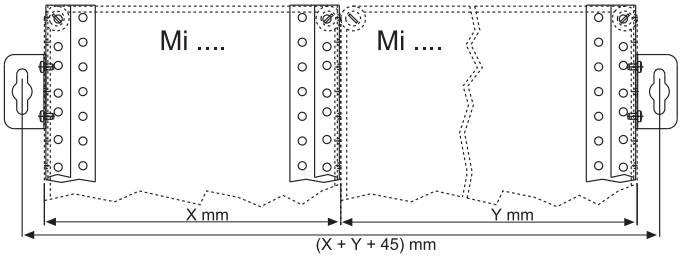


Transport
Regarding transportation its
recommendable to protect the
assembly against deflection.
For that please screw the
assembly to a solid timber.

U profiles for constructing a mounting frame

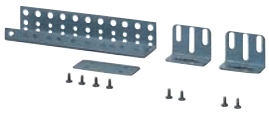




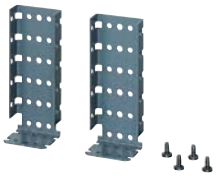


Mounting profile

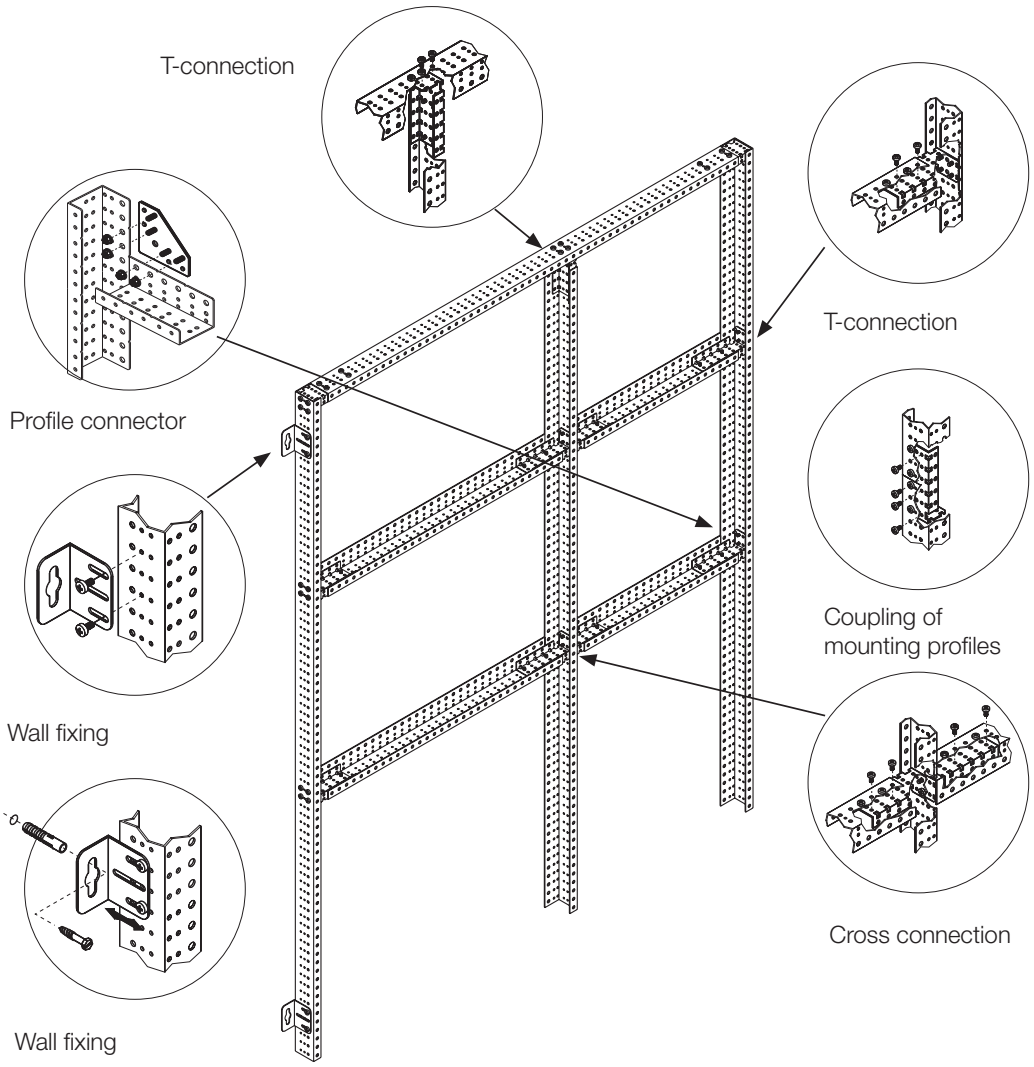
To stabilize larger distributions boards for the transport and assembly on site.


MX 0101


MX 0112

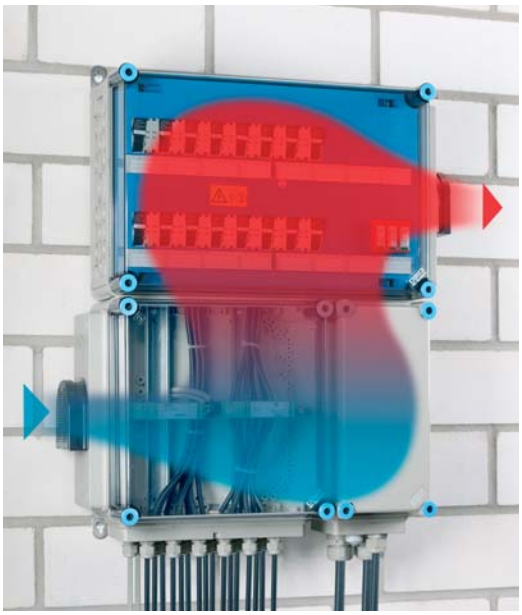

MX 0105


MX 0111



Ventilation flange
Mi BF 44

For ventilation of Mi distribution boards in the event of extremely high internal temperatures or a risk of water condensation. For vertical installation on box walls, degree of protection IP 44.

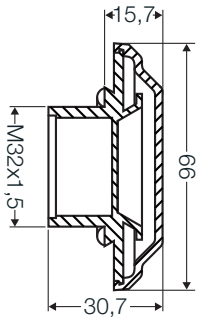


Mi BF 44

Pressure compensation element BM 32

for the reduction of condensation by pressure compensation in power distribution systems.

BM 32



Combi climate glands KBM / KBS ...
for reduction of condensation by pressure compensation

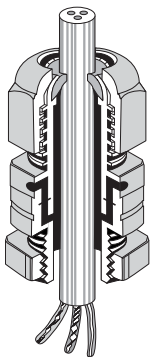
Via an inserted climate membrane they ensure pressure compensation between enclosure interior and ambient air.

Ingress of water through the calbe gland is prevented.

The degree of protection of the enclosure is obtained!

KBM ...

KBS ...



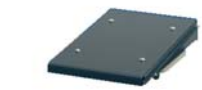
Canopy for the unprotected installation outdoors

Knock out box wall and assemble flange with pre-mounted canopy to the box.

In case of box assembly connect trusses with stop plate.

Mount canopy and/or canopy end plate

Hint:
Insert canopy end plate under the canopy until it hits backstop.



Mi DB 15

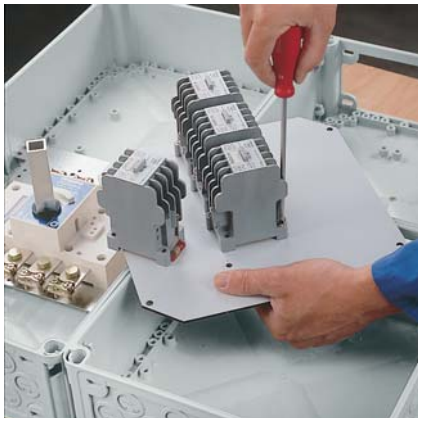
Mi DB 30

Mi DB 01

Device installation on mounting plates or DIN rails

Fasten installation devices on mounting plates with self-threading screws.

Screw mounting plate onto base of box.



Mount DIN rails direktly onto base of boxes or on spacers Mi DS .. in heights of 25 or 50 mm.

Installaton of equipment in cover plates

Pre-drill the sections at the corners and saw out with piercing saw. Use saw blades with rough teeth for plastics.

Screw support for the protection cover Mi EP .. onto base of box.

Attach protection cover.

Close unused equipment openings in protection covers with attached blanking strips.

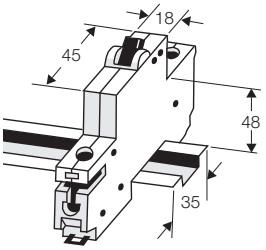
Device installation in circuit breaker boxes

Circuit breaker boxes can be fitted with any DIN rail equipment, if per row (12 modules 12x18 mm) the assigned backup fuse won‘t exceed 80 A.

PE and N terminals for copper conductors (installed)

Note to Mi Circuit breaker boxes:
Spare equipment openings in protection covers are to be covered with blanking strips to prevent accidental contact (blanking strips are enclosed for 50 % of equipment openings)

Dimension of 1 module:
1 Module = 18 mm



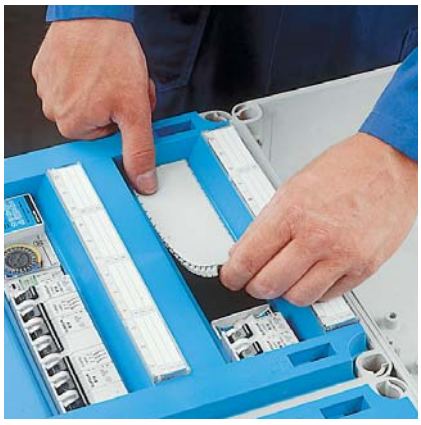
Dimensions according to DIN 43880 for DIN rail mounted device

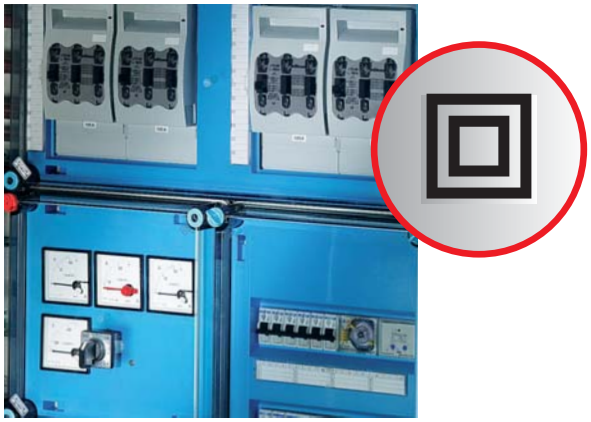
Protection covers

Cover unused equipment openings with blanking strips to prevent accidental contact.

Provide for total protection against access to hazardous parts for accessible devices and busbar-mounted equipment.

Protection class II, ⧈
(Total insulation)





EMV gerechte Sammelschienensysteme

EMC compliant busbar system

As standard with N/PEN conductors:
- with the same current carrying capacity as phase conductors
- most favourable for EMC comliance in the area of phase conductors

Rated values for voltages

rated voltage	U_n = 690 V a.c.
rated insulation voltage	U_i = 690 V a.c., 1000 V d.c.

Rated values of currents

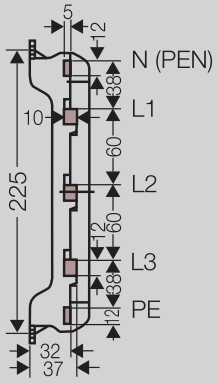
Busbars	250 A	400 A	630 A
rated busbar current	250 A	400 A	630 A
rated short-time withstand current	I_{cw} = 15 kA / 1 s	I_{cw} = 15 kA / 1 s	I_{cw} = 21 kA / 1 s
rated peak withstand current resistance	I_{PK} = 30 KA	I_{PK} = 30 kA	I_{PK} = 45 kA

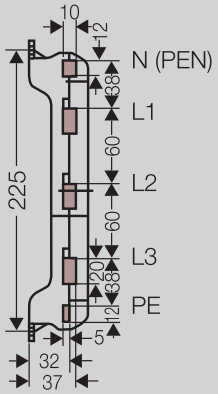
Power dissipation of busbar system

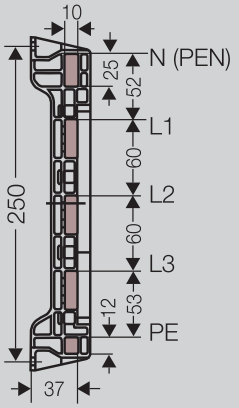
busbar system 5-pole length: 1 meter	42.7 W/m	63.8 W/m	102.3 W/m

Position of busbars

For containing short-circuit resistance the distance between busbar supports must not exceed 300 mm.



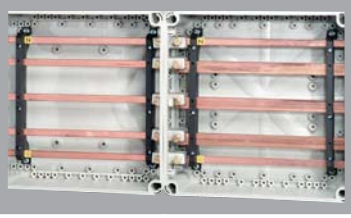




Equipment for busbar supports

	Mi ST 25	Mi ST 41	Mi ST 63
L1, L2, L3	12x10 mm	20x10 mm	30x10 mm
N	12x5 mm	12x10 mm	25x10 mm
PE	12x5 mm	12x5 mm	12x10 mm

Possible combinations of busbars with different rated currents

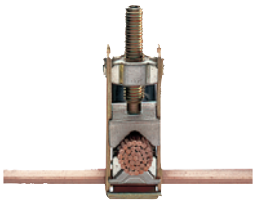
Busbar connector	Rated current of busbars	Rated current of busbars	
			
Mi SV 25	250 A	250 A	
Mi SV 25	250 A	400 A	
Mi SV 45	400 A	400 A	
Mi SV 45	630 A	630 A	

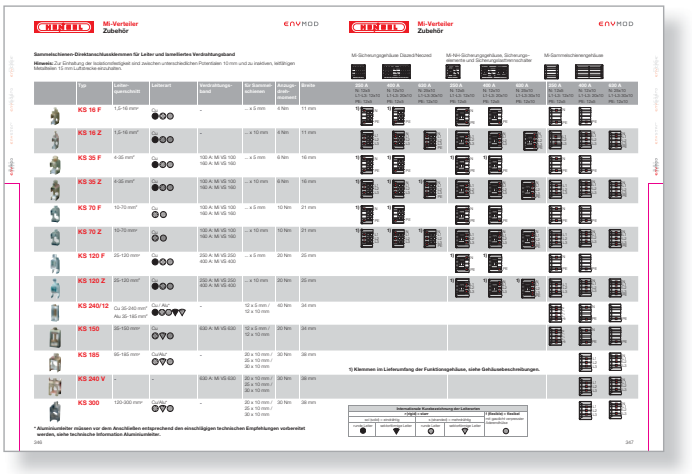
Hint:

Busbar systems 250 A and 400 A must not be combined with 630 A-busbar systems!

Direct connection of conductors to busbars

Capacity of terminals for direct busbar connection see HENSEL Catalogue.



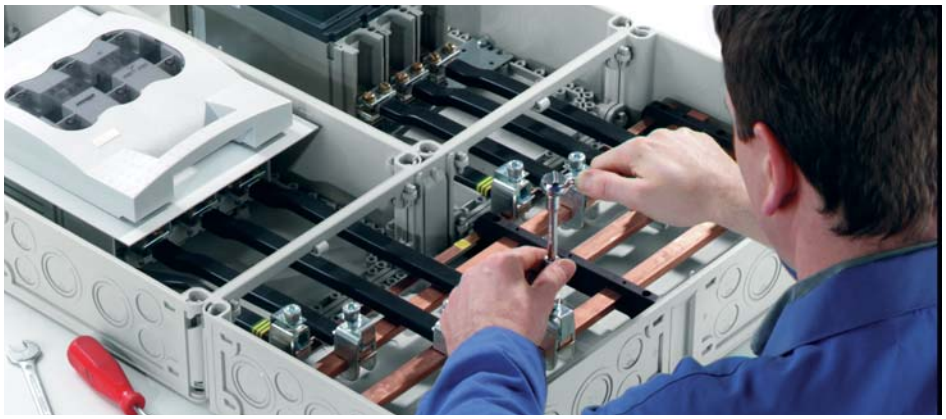


Wiring

Assignment of terminals for direct busbar connection to cross sections and enclosures with electrical functions.

Electrical connection 100 A up to 630 A from busbars to electrical equipment.

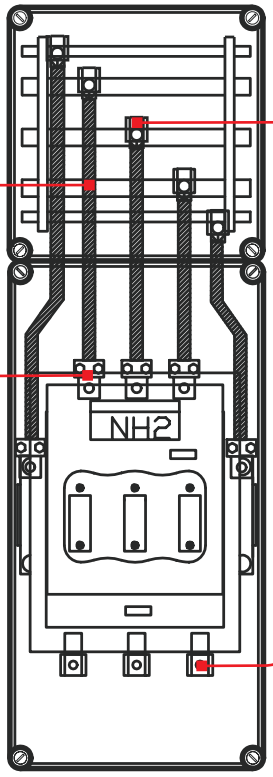
Wiring strip from laminated copper, insulated, supplied length 2 meters.



Wiring strip
Mi VS ...

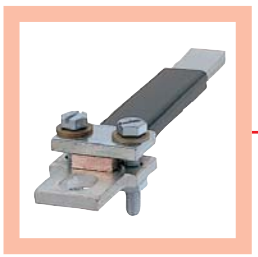
Connection of wiring strip Mi VS ... with terminal for direct busbar connection KS ...

Terminals for direct connection on busbars



Direct connection of wiring strip Mi VS ... to electrical equipment with flat contact M 10 with wiring supply terminal for direct connection of laminated copper wiring strip Mi VA ...

Terminal for connection of wiring strips Mi VA ...



Connection of cables to devices with flat contact M 10 with terminal for direct connection DA 240.

Terminal for direct connection DA 240

Example:
Wiring with wiring strip Mi VS 400, terminals for direct connection on busbars and wiring strip connection terminals VA 400.

Wiring Strip
Strip at the connection point by a suitable length.

Right:
First bend forward wiring strip by 180° and then 90° to the side.

Wiring strip

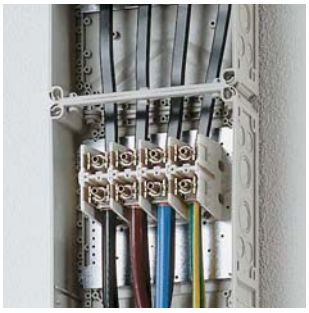
In order to adjust differences in height, bend a step.

Insulation cover for busbars
Attach cover for insulating busbars if necessary.

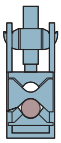
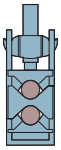
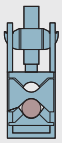
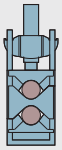
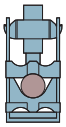
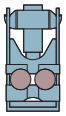
Mi SA 1210

Mi SA 3010

Wiring
Terminals for incoming cables, FIXCONNECT® plug-in terminals



2-5-pole, for copper and aluminum conductors, to be assembled in Mi empty boxes sizes 2 to 8, pre-mounted on mounting plate 300 x 300 mm, with fixing screws.

Terminal for incoming cables	Mi VE 120, 4-pole Mi VE 125, 5-pole		Mi VE 240, 4-pole Mi VE 245, 5-pole		Mi VE 302, 2-pole Mi VE 303, 3-pole Mi VE 304, 4-pole	
Rated connecting capacity	150 mm²		240 mm²		300 mm²	
Current carrying capacity	250 A		400 A		630 A	
Tightening torque	20 Nm		40 Nm		50 Nm	
Clamping units per pole	2	4	2	4	2	4
						
Type of conductor copper/aluminum sol (round) ●	16-50	16-50	25-50	25-50	-	35-70
Type of conductor copper/aluminum s (round), f (flexible)	16-150	16-70	25-240	25-120	150-300	35-185
Type of conductor copper/aluminum sol (sector) ▼	50-150	50-70	50-185	50-120	150-185	95-185
Type of conductor copper s (sector)	35-150	35-70	35-240	35-120	150-240	95-185
Type of conductor aluminum s (sector)	50-120	35-50	95-185	50-95	150-240	95-185
Outgoing Cu-strip	Mi VS 100 up to Mi VS 630		Mi VS 100 up to Mi VS 630		Mi VS 630	
	Prior to connection, aluminum conductors must be prepared according to the appropriate technical recommendations, see technical information Aluminum conductors.					

N and PE-FIXCONNECT® plug-in terminal

Rated connecting capacity of PE and N terminals

Clamping unit	Corresponding cross-sections / copper			
	max. number	from - to max.	max. number	from - to max.
Screw-type terminal 25 mm² 	1	25 mm², s	1	25 mm², f
	1	16 mm², s	1	16 mm², f
	1	10 mm², sol	1	10 mm², f
	3	6 mm², sol	1	6 mm², f
	3	4 mm², sol	1	4 mm², f
	4	2.5 mm², sol	1	2.5 mm², f
	4	1.5 mm², sol	1	1.5 mm², f
	Tested as connecting terminal for several conductors of the same cross-sections for using in one circuit			
Plug-in terminal 4 mm² 	1	1.5 - 4 mm², sol	1	1.5 - 4 mm², f Without end ferrule; clamping unit has to be opened with a tool when conductor is inserted.

Current carrying capacity of N bar: 75 A All terminals are secured against self-loosening.

Connnection of aluminum conductors

I. Chemical basics

The special conducting characteristics of aluminum can be seen in the fact that the surface of an aluminum conductor is immediately covered in a **non-conducting oxide layer** upon exposure to oxygen.

This characteristic leads to an increase in the temporary resistance between the aluminum conductors and the terminal body.

This can lead to terminal overheating and in the worst case fire.

Despite these special conditions. aluminum conductors can be connected if the terminal used is appropriate and the following conditions are taken into consideration when connecting.

II. Special terminal requirements for the connection of aluminum conductors

The suitability of terminal for connections with aluminum conductors needs to be evaluated and confirmed by the terminal manufacturer.

1. These terminals will thus meet the requirements for an aligned **electrochemical voltage sequence**. A disintegration of the base material (aluminum) will be prevented.
2. The terminal has an appropriate shape and surface to penetrate the grease layer or a very thin oxide layer on the aluminum conductor upon connection.

III. Appropriate preparation and handling of aluminum conductors

The non-insulated conductor ends need to have the oxide layer carefully scraped clean using a knife for example. In doing so no files, sand paper or brushes may be used.

Immediately after removing the oxide layer, the conductor end needs to be rubbed with an acid and alkali free grease such as technical vaseline and then immediately connected to the terminal. This in turn prevents oxygen from forming a non-conducting oxide layer.

Due to the flow tendency in aluminum the terminals need to be tightened before start up and after the first **200 operating hours** (note the appropriate torque).

The steps listed above need to be repeated if the conductor is removed and re-connected. I.e. the conductor has to be scraped again, greased and immediately connected, because it will be connected at a different position.

Routine tests for power switchgear and controlgear assemblies
Routine verification / inspection

Routine test protocol in accordance with IEC 61439-1

Serial No.	Type of testing*	Content of routine test	IEC 61439 Section	Result of routine test	Test engineer
1	S	Degree of protection of cabinets /enclosures (sealings, protection covers)	11.2	i. O.	

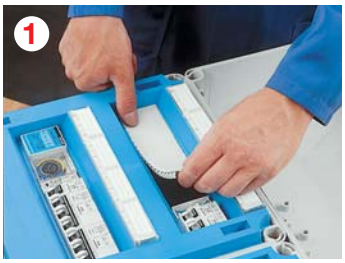
Serial No.	Type of testing*	Content of routine test	IEC 61439 Section	Result of routine test	Test engineer
4	S	Incorporation of built-in components	11.5	i. O.	
7	P	Mechanical operation (actuating elements lockings)	11.8	i. O.	

Serial No.	Type of testing*	Content of routine test	IEC 61439 Section	Result of routine test	Test engineer
2	S/P	Creepage and clearance distances	11.3	i. O.	
5	S/P	Internal electrical circuits and connections	11.6	i. O.	
6	S	Terminals for external conductors	11.7	i. O.	
8	P	Dielectric properties	11.9	>200 MΩ	

The guide to design and assemble in accordance with EN 61439
for ENYSTAR distribution boards up to 250 A and Mi Power distribution boards up to 630 A can be downloaded:

www.hensel-electric.de/61439

Serial No.	Type of testing*	Content of routine test	IEC 61439 Section	Result of routine test	Test engineer
3	S/P	Protection against electric shock and integrity of protective circuits	11.4	i. O.	
9	P	Wiring, operational performance and function	11.10	i. O.	



The manufacturer must specify measures that must be implemented to maintain the designated degree of protection.

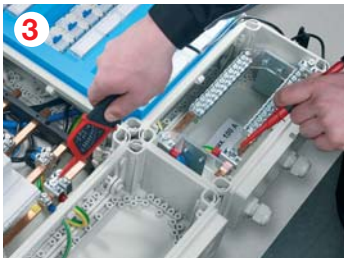
Check that seals and covers were installed according to the manufacturer's instructions.

The effectiveness of mechanical actuating elements, interlocks and locks including those associated with removable parts shall be checked.

The clearances between different potentials should be greater than the values in Table 1 of the standard. We recommend a minimum distance of 10 mm.

Conductors must be checked for consistency with circuit diagrams and bolted connections have to be checked at random.

A power-frequency withstand test shall be performed on all circuits in accordance with IEC 61439-1 Section 10.9.2 for a duration of 1 s. The test voltage for power switchgear and controlgear assemblies with a rated insulation voltage between 300-690 V a.c. is 1,890 V. The test values for different rated insulation voltages are given in Table 8 of IEC 61439-1.



The protective circuits shall be subjected to a test for integrity of electrical connection.

***Type of testing S:** visual inspection
Type of testing P: testing with mechanical or electrical test equipment

Power switchgear and controlgear assembly (PSC),
Verification according to IEC 61439-2 ☐

Distribution boards intended to be operated by ordinary persons (DBO),
Verification according to IEC 61439-3 ☐

Customer: ..... Order number: .....

Project: ..... Workshop: .....

Testing performed:

No.	Type of testing*	Content of routine test	IEC 61439 Section	Result of routine test	Inspector
1	S	Degree of protection of cabinets /enclosures (sealings, protection covers)	11.2		
2	S/P	Creepage and clearance distances	11.3		
3	S/P	Protection against electric shock and integrity of protective circuits	11.4		
4	S	Incorporation of built-in components	11.5		
5	S/P	Internal electrical circuits and connections	11.6		
6	S	Terminals for external conductors	11.7		
7	P	Mechanical operation (actuating elements, lockings)	11.8		
8	P	Dielectric properties	11.9	MΩ	
		A power-frequency withstand test shall be performed on all circuits in accordance with IEC 61439-1 Section 10.9.2 for a duration of 1 s. The test voltage for power switchgear and controlgear assemblies with a rated insulation voltage between 300-690 V a.c. is 1,890 V. The test values for different rated insulation voltages are given in Table 8 of IEC 61439-1.		Test voltage values V a.c.	
		Alternatively, for switchgear assemblies with a protective device in the power supply and a rated current up to 250 A applies: Measurement of the insulation resistance with an insulation tester at a voltage of at least 500 V d.c. The test is passed with an insulation resistance of at least 1000 Ω / V.		Insulation resistance Ω/V	
9	P	Wiring, operational performance and function	11.10		

S - Visual inspection

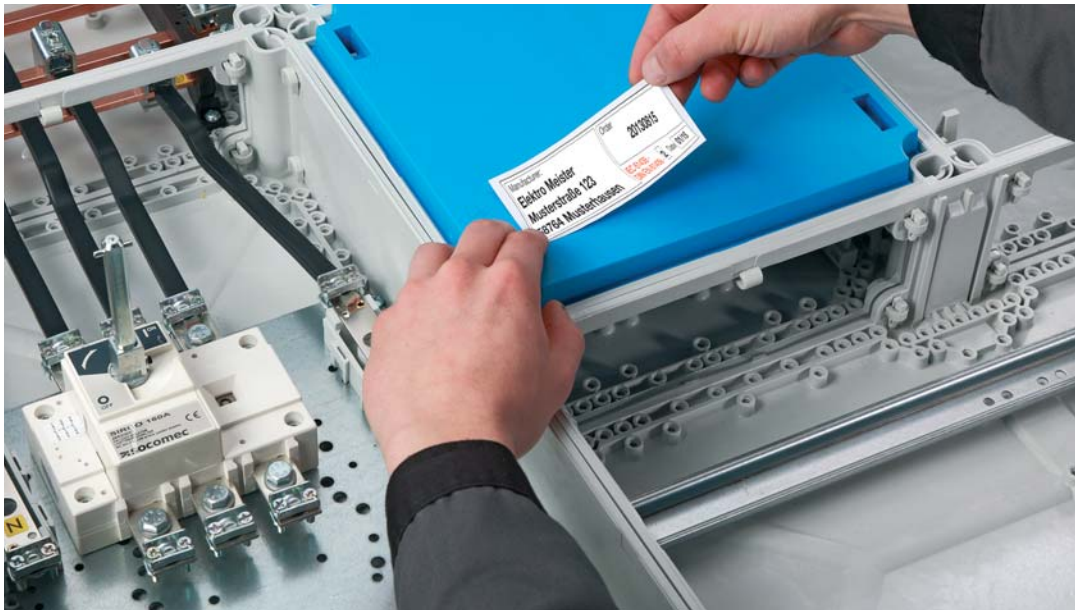
P - Testing with mechanical or electrical test equipment

Installer: ..... Inspector: .....

Date: ..... Date: .....

The company / panel builder that is responsible for the ready-for-use switchgear assembly is considered the manufacturer (EN 61439-1).
Upon completion and assessment of the switchgear assembly by means of a routine verification, a manufacturer's label must be affixed.
It must be legible when the system is connected.

HENSEL adds a manufacturer's marking to all circuit breaker boxes.



Manufacturer's marking

- Manufacturer's name or trademark
- Type, name or ID number
- Date of manufacture
- Applied Standard
  IEC 61439-2/-3 / EN 61439-2/-3

Example

System manufacturer

98 01 994

Installation note:

- Complete label.
- Affix visibly on the exterior of the assembly.
- Protect with enclosed protective film.

Manufacturer:	Order
Elektro Meister **Musterstraße 123** **58764 Musterhausen**	**20130815**
	IEC 61439 - EN 61439 - **2** Date **01/15**

HENSEL adds a manufacturer's marking to all circuit breaker boxes.

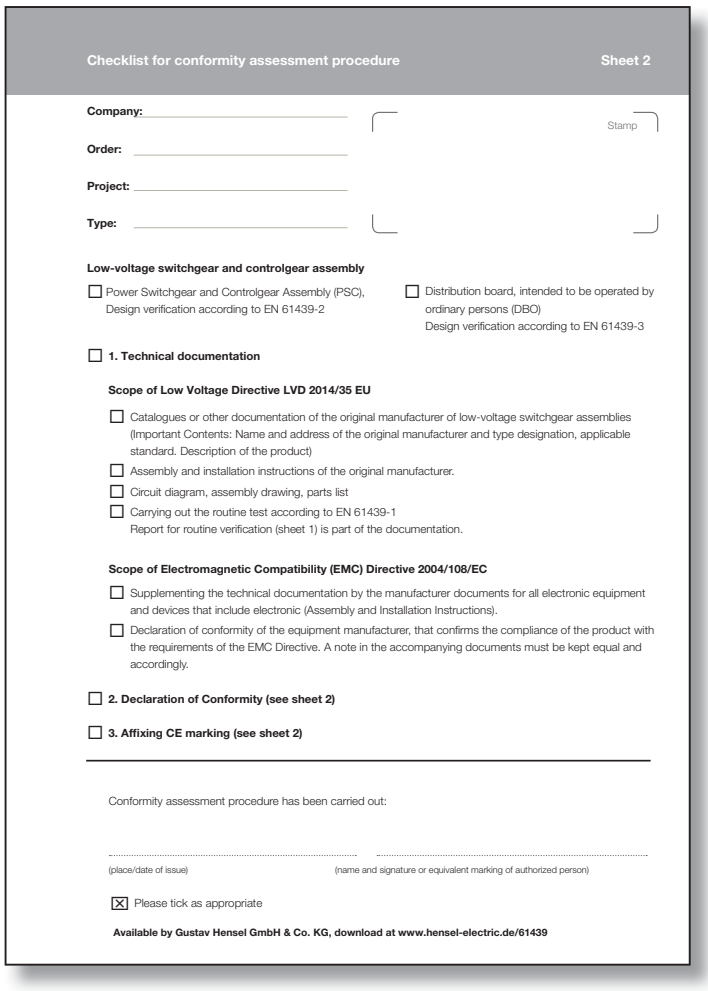
EU only

The manufacturer of a switchgear assembly finally performs a conformity assessment according to LVD2014/35EU.

CE Declaration of conformity

This can be done with the checklist for conformity assessment procedure (Sheet 2).

Finally, the CE Declaration of Conformity (Sheet 3) can be created. Both forms are editable and are made available for download at **www. hensel-electric.de/61439.**



Checklist for conformity assessment procedure — Sheet 2

Company: _____ Stamp

Order: _____

Project: _____

Type: _____

Low-voltage switchgear and controlgear assembly

☐ Power Switchgear and Controlgear Assembly (PSC), Design verification according to EN 61439-2

☐ Distribution board, intended to be operated by ordinary persons (DBO) Design verification according to EN 61439-3

☐ **1. Technical documentation**

Scope of Low Voltage Directive LVD 2014/35 EU

☐ Catalogues or other documentation of the original manufacturer of low-voltage switchgear assemblies (Important Contents: Name and address of the original manufacturer and type designation, applicable standard. Description of the product)

☐ Assembly and installation instructions of the original manufacturer.

☐ Circuit diagram, assembly drawing, parts list

☐ Carrying out the routine test according to EN 61439-1
Report for routine verification (sheet 1) is part of the documentation.

Scope of Electromagnetic Compatibility (EMC) Directive 2004/108/EC

☐ Supplementing the technical documentation by the manufacturer documents for all electronic equipment and devices that include electronic (Assembly and Installation Instructions).

☐ Declaration of conformity of the equipment manufacturer, that confirms the compliance of the product with the requirements of the EMC Directive. A note in the accompanying documents must be kept equal and accordingly.

☐ **2. Declaration of Conformity (see sheet 2)**

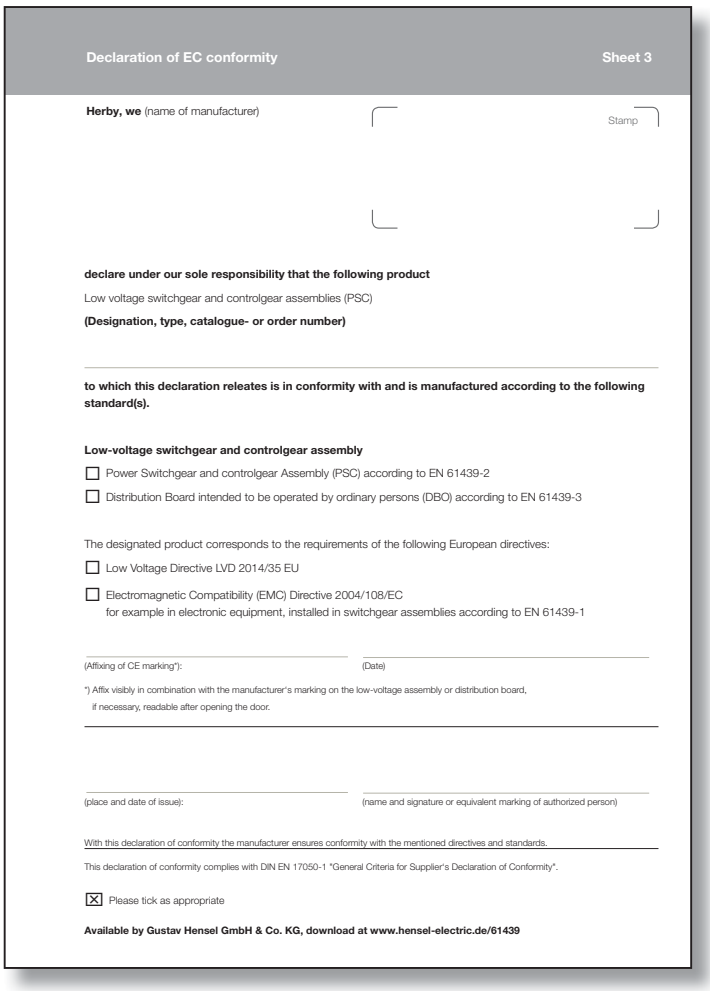
☐ **3. Affixing CE marking (see sheet 2)**

Conformity assessment procedure has been carried out:

(place/date of issue) (name and signature or equivalent marking of authorized person)

☒ Please tick as appropriate

Available by Gustav Hensel GmbH & Co. KG, download at www.hensel-electric.de/61439



Declaration of EC conformity — Sheet 3

Herby, we (name of manufacturer) Stamp

declare under our sole responsibility that the following product

Low voltage switchgear and controlgear assemblies (PSC)

(Designation, type, catalogue- or order number)

to which this declaration releates is in conformity with and is manufactured according to the following standard(s).

Low-voltage switchgear and controlgear assembly

☐ Power Switchgear and controlgear Assembly (PSC) according to EN 61439-2

☐ Distribution Board intended to be operated by ordinary persons (DBO) according to EN 61439-3

The designated product corresponds to the requirements of the following European directives:

☐ Low Voltage Directive LVD 2014/35 EU

☐ Electromagnetic Compatibility (EMC) Directive 2004/108/EC
for example in electronic equipment, installed in switchgear assemblies according to EN 61439-1

(Affixing of CE marking*): (Date)

*) Affix visibly in combination with the manufacturer's marking on the low-voltage assembly or distribution board, if necessary, readable after opening the door.

(place and date of issue): (name and signature or equivalent marking of authorized person)

With this declaration of conformity the manufacturer ensures conformity with the mentioned directives and standards.

This declaration of conformity complies with DIN EN 17050-1 "General Criteria for Supplier's Declaration of Conformity".

☒ Please tick as appropriate

Available by Gustav Hensel GmbH & Co. KG, download at www.hensel-electric.de/61439

CE marking

The laws for the safety of electrical equipment stipulate that a conformity assessment procedure has to be performed for assemblies as well. It is to prove that the assembly complies with the applicable regulations and conforms to the respectively valid safety standards.

Subsequently, a declaration of conformity must be created and the CE marking shall be affixed to the distributor.

Producing a new manufactured product from already existing manufactured goods, constitutes a manufacturer!

Affix CE marking

Manufacturer:	**Order** 20130815 CE
Elektro Meister Musterstraße 123 58764 Musterhausen	IEC 61439 - EN 61439 - 2 Date 01/15

Erklärung
der EG-Konformität
Declaration of EC-Conformity

Nr./No. **K 2010b**

Das Produkt,
The product

Typ / *Type:*	**Mi-Verteiler** ***Mi-Distributor*** **Typ / *type:* Mi ....**
Hersteller: *Manufacturer*	**Gustav Hensel GmbH & Co. KG** **Gustav-Hensel-Straße 6** **57368 Lennestadt**
Beschreibung: *Description:*	**Niederspannungs-Schaltgerätekombination „PSC“** ***Low-voltage switchgear and controlgear assemblies “PSC”***

auf das sich diese Erklärung bezieht, stimmt mit folgenden Normen oder normativen Dokumenten überein:
to which this declaration relates is in conformity with the following standard(s) or normative document(s):

Norm / *Standard:*	**DIN EN 61439-2** **IEC 61439-2** **EN 61439-2**

und entspricht den Bestimmungen der folgenden EG-Richtlinie(n):
and is in accordance with the provisions of the following EC-directive(s)

Niederspannungs-Richtlinie 2006/95/EG
Low voltage directive 2006/95/EC

EMV-Richtlinie (EMC) 2004/108/EG
Electromagnetic Compatibility (EMC) Directive 2004/108/EC

Diese Konformitätserklärung entspricht der Europäischen Norm EN 17050-1 „Allgemeine Anforderungen für Konformitätserklärungen von Anbietern“. Das Unternehmen Gustav Hensel GmbH & Co. KG ist Mitglied von ALPHA im VDE. Diese Erklärung gilt weltweit als Erklärung des Herstellers zur Übereinstimmung mit den oben genannten internationalen und nationalen Normen.

This Declaration of Conformity is suitable to the European Standard EN 17050-1 „General requirements for supplier‘s declaration of conformity“. The company Gustav Hensel GmbH & Co. KG is member of ALPHA at VDE. The declaration is world-wide valid as the manufacturer’s declaration of compliance with the requirements of the a.m. national and international standards.

Jahr der Anbringung der
CE-Kennzeichnung: **2012**
Year of affixing CE-Marking.

Ausstellungsdatum: **31.03.2015**
Date of issue:

Gustav Hensel GmbH & Co. KG

O. Gutzeit
- Technische Geschäftsleitung -
- *Technical Managing Director* -

Declaration of Conformity can be downloaded at:

www.hensel-electric.de/61439

Gustav Hensel GmbH & Co. KG
Industrial Electrical Power Distribution Systems

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