PASSION FOR POWER.

Product information as at: 6/2011

Safe product solutions for Photovoltaic plants conforming to standards

Grid, on-grid and off-grid systems

- PV Generator junction boxes
- Battery distributors
- Solar inverter collectors

For all application areas of the new standard
IEC 60 364-7-712 (Draft)
The photovoltaic market is going to grow significantly in coming years as more and more investors and home owners are betting on solar power’s high margin electricity. With our ENYSUN distribution board systems for photovoltaic plants conforming to standards, we support you in accessing this market. ENYSUN is a high value, modular system, which generates additional sales potential for you on the growing photovoltaic market. Profit from a system which offers you clear competitive advantages on the market and which you can always rely on.

Solar powered by Hensel

Founded in 1931, Hensel is now part of an international group of companies doing business around the world. It has its headquarters in Lennestadt, Germany and subsidiaries in the most important international markets to provide an international presence and assure that the company is never far away.

Successfully mastering the future means cooperation in dialog for Hensel. The exchange with market partners and the consistent focus on practical challenges is a transfer that provides valuable inspiration for further development of products and services.

Where environmental influences, dust and moisture demand particularly demanding installation technology, Hensel enables safe energy distribution with innovative solutions. The program of modern installation and distribution systems for national and international applications have made HENSEL a market leader in tapping, fusing and distributing electrical energy in the low voltage sector.

Hensel guarantees its customers continually high standard of quality with decades of production expertise and a quality management system strictly in adherence with the DIN EN ISO 9001-2008 standard at all its factories.
Photovoltaic solutions from Hensel

Standardised and pre-fabricated
- Our ENYSUN product solutions provide a number of advantages when selecting and installing photovoltaic systems. The distributors are prefabricated making them quick and easy to connect. The PV generator junction boxes only need to be connected on site. With plug-in connectors compatible to MC4 they are easy to connect to PV strings and solar inverters. The new solar inverter collectors are pre-fabricated enclosure sets, which can be individually adapted on site.

Busbars, overvoltage protection devices and terminals are already installed.

Proven and tested Hensel quality
- All ENYSUN distribution system products fulfill the IEC 60 364-7-712 standard. The general fulfilment of this standard demonstrates Hensel ENYSUN product series’ high quality. Using high quality materials means that you can always count on them functioning perfectly. ENYSUN distributors are totally insulated, impact resistant, dust proof and water-proof (degree of protection IP 65), UV resistant and resistant to corrosion from rain, ice and snow.

Cable entry and ventilation
- The formation of condensation water in closed boxes cannot be prevented in outdoor applications! Combi climate glands in boxes with a high degree of protection prevent accumulations of condensation resulting from large temperature fluctuations caused by changing weather, intense solar radiation etc.

Your advantage:
Cable entry and ventilation in one.
These application areas for PV systems are now specified by the new IEC 60 364-7-712 (Draft):

## Grid-connected PV systems

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*Source: SMA Solar Technology AG
Source: Kostal*
These application areas for PV systems are now specified by the new IEC 60 364-7-712 (Draft):

- DC
- AC

Electrical installation

Stand-alone PV systems

- Stand-alone PV systems
  - OFF-GRID system
  - PV system with energy storage, not connected to the public power supply system
    - “PV system for supply to an installation which is not connected to a system for distribution of electricity to the public (stand alone)”
  
- PV generator

PV generator junction boxes

- Solar inverters
  - Source: Kostal

- Solar inverter collectors

Energy storage

- Energy storage work
  - in PV system for consumer-oriented production as an alternative to a system for distribution of electricity to the public
  - and for decentralized supply to an electrical installation without a public supply network is available (off-grid system).

- e.g. Battery

- Battery distributors

- Stand-alone solar inverters
  - Source: SMA Solar Technology AG

ENYSUN distributors of Hensel for DC and AC areas in PV systems work safely and in conformity to the new standard (Draft) in all application areas.
System description
Enclosure system

Ambient conditions

- Ambient temperature:
  - for empty enclosures: -25°C up to +70°C
  - for distribution boards according to IEC 60 439: -5°C up to +35°C, max. +40°C
- Relative humidity: 50% at 40°C, 100% at 25°C

Application area

The enclosures are suitable for the outdoor installation - harsh environment and/or outdoor. However the climatic influences and effects on the equipment are to be considered.

Insulation

Insulated enclosures (Protection class II)

Impact strength

Degree of protection against mechanical load IK 08 (5 Joule) in accordance with IEC 62 262

Protection against foreign solid objects and direct contact

Dust-proof
Degree of protection IP 65

Protection against ingress of water with harmful effects

Protected against water jets
Degree of protection IP 65

Electrical parameters

- Rated current: 400 A
- Rated insulation voltage: AC 690 V, DC 1000 V*, IEC 60 664
* the rated insulation voltage is possibly reduced by the installed equipment technology

Material:

Thermoplastic

Burning behaviour

Glow wire test 960°C in accordance with IEC 60 695-2-11 flame-retardant, self-extinguishing

UV resistance

The Material is examined and therefore qualified for outdoor installation (harsh environment and/or outdoor) during direct sun radiation

Chemical resistance

Resistance against acid 10% and lye 10%, petrol and mineral oil

Toxic behaviour

Silicone- and halogen-free

Resistance to corrosion

Resistant against weather-related demand such as rains, ice and snow.
Formation of condensed water in enclosures

How does condensed water occur in enclosures with a high degree of protection?
The internal temperature is higher than the external temperature due to the power dissipation of the built-in devices.

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

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.

In which areas does condensed water occur?

The boxes are suitable for outdoor installation. The materials used in Mi System enclosures are generally UV resistant meaning that the mechanical stability shall remain after UV exposure.

Direct solar radiation as well as power dissipation within a box can overheat the interior of the box. Exterior temperatures that are too low e.g. under -5°C can also influence the functioning of the equipment. Therefore climatic influence on the equipment needs to be taken into consideration.

The top of the box should be protected with a cover to protect against damage created by weather conditions such as rain, ice and snow.

Possible impact from chemical influences also needs to be taken into consideration when selecting an installation location, as well as IP degree of protection and climate impact.

Additional measures might be necessary such as ventilation (note degree of protection) to assure that the maximum ambient temperature allowed is not exceeded for the installed equipment as well as to prevent condensation from forming. Hensel combi climate glands (KBM) can be used in outdoor installations for cable entries and ventilation as well (see accessories).

Formation of condensed water and retaliatory actions

The problem of condensed water forming only occurs in enclosures with a high degree of protection ≥ IP 54 since the temperature adjustment that is carried out from inside to outside is too low due to the high density of the enclosure and its material.

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.

Ambient conditions:
Degree of protection: IP 65
Stainless steel external brackets, optional: Combi climate glands to reduce condensation formation in outdoor installations, order separately, see accessories.
EMC compliant busbar
The busbar system comes standard with N/PEN conductors in the phase conductor area. The N busbars have the same current carrying capacity as the phase conductor. These busbars are appropriate for:
- Harmonics created by the solar inverter.
- Unbalanced loads (Unbalanced load limit 4.6 kVA allowed by power supply companies) created by power supply companies.

Overvoltage protection
The exposed sequence of photovoltaic generators on roofs or in fields make lightning and overvoltage protection an important part of protecting investments. A direct lightning strike in the PV generator can destroy the module and/or the inverter (primary damage). As photovoltaic (PV) systems are required have a connection to the building's electrical installation, lightning damage to the PV generator could damage the entire plant (secondary damage).

Many liability insurers call upon the VdS-Merkblatt 2010 directive, the “Risk oriented lightning and surge protection directive to prevent damage,” which requires lightning and surge protection for PV systems above 10 kWp.

Protection measures
In principal it must be assured that no direct lightning strike is possible in the PV generator. The necessary protection can be provided using “isolated lightning protection” products from numerous manufacturers and isolated outgoing cables when necessary.

Should an external lightning protection facility be available, then a type 1 lightning current arrester for the AC power supply is to be installed on the building’s main distribution board.

Should no lightning protection be available then a type 2 surge arrester should be sufficient under certain circumstances.

Inverter protection
To protect the inverter, both the DC input and the AC output need to be protected. If the inverter is installed at a distance of \( > 5 \text{ m} \) to the building’s main distribution board, then a type 2 for AC wire overvoltage protection device shall be used to prevent surge damage, e.g. from switching overvoltages from the mains.

Type 2 surge protection devices are especially designed for string conductors from the DC inputs. The monitoring elements need to be specifically designed for direct voltage. Personnel need to be able to safely exchange the protection modules even with insulation faults in the plant.

It is of the utmost importance to integrate the individual lightning and overvoltage protection concept into the photovoltaic plant protection solution. Lighting and overvoltage protection experts can answer any questions in this area.
PV generator junction boxes

Electrical data:
Rated voltage: **DC 1,000 V**
Rated current: up to 400 A
Protective measure: **Total insulation**

Connection:
Ready for connection with plug-in connectors

Ambient conditions:
UV resistant
Degree of protection: **IP 65**
Stainless steel external brackets optional: Combi climate glands to reduce condensation formation in outdoor installations.
(Order separately, see accessories).
How to choose the correct overload protection for PV generator

**PV panel technology**

- Crystalline panels
- Thin-film panels

**Blocking diode**

- **Is string overload protection required?**
  - **NO**
  - **YES**

**String overload protection**

- **Is DC generator disconnect switch required?**
  - **NO**
  - **YES**

**DC generator disconnect switch**

- **Is DC generator disconnect switch required?**
  - **NO**
  - **YES**

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1. **Manufacturer's instructions must be checked!**
   
   If thin-film panels are not reverse current proof, blocking diodes must be used. The manufacturer indicates the number of parallel strings, for which no blocking diodes are needed.

2. **Please check, if overload protection is needed, see the requirements of IEC 60364-7-712 Part 712.433.1**
   
   **IEC 60364-7-712 Part 712.433.1**
   
   Overload protection may be omitted to PV string and PV array cables when the continuous current-carrying capacity of the cable is equal to or greater than 1.25 times I_{SC STC} at any location.
   
   \[ I_{SC STC} = \text{Short Circuit Current Under Standard Test Condition} \]

3. **Please check, if additionally a DC generator disconnect switch must be used. This can be integrated already in the solar inverter! See the requirements of IEC 60364-7-712 Part 712.536.2.2.5!**

   **IEC 60364-7-712 Part 712.536.2.2.5**
   
   A switch disconnector shall be provided on the DC side of the PV inverter.
DC surge arrester for PV plants (SPD) - Required protection device in PV generator junction boxes

1. Is DC surge arrester required?
   - NO
   - YES

2. Is DC surge arrester required?
   - NO
   - YES

3. Is DC surge arrester required?
   - NO
   - YES

4. Is DC surge arrester required?
   - NO
   - YES

Please check, if a surge protection device (SPD) is necessary.

- If DC lines are wired from one lightning protection zone into another, a surge protection device (SPD) must be installed in the proximity of the feed-through for cables.
- If an outside lightning protection is installed, then also an internal overvoltage protection is necessary.
PV generator junction boxes with surge arrester or DC generator disconnect switch

- current per PV string: **DC 30 A max.**
- rated voltage: DC 1000 V (Uoc src)
- protection class: II 
- suitable for outdoor installation, UV resistant
- ready for connection
- with stainless steel mounting plate for wall and post installations
- with transparent door
- material: thermoplastic
- colour: grey, RAL 7035
- degree of protection: IP 65

**KV PV 1211 DC Surge arrester**

1 x DC type 2 surge arrester
- rated current: DC 30 A
- plug-in connectors compatible to MC4
- 1 x PV string for
- 1 x inverter input
- connection cable length: outgoing cable 2 x 500 mm
- rated connecting capacity PE: 1.5 - 16 mm², copper

**KV PV 2211 DC Generator disconnect switch**

1 x DC generator disconnect switch
- rated current: DC 30 A
- utilization category: DC-21A
- plug-in connectors compatible to MC4
- 1 x PV string for
- 1 x inverter input
- connection cable length: outgoing cable 2 x 500 mm

**KV PV 2411 DC Surge arrester and DC Generator disconnect switch**

1 x DC type 2 surge arrester
1 x DC generator disconnect switch
- rated current: DC 30 A
- utilization category: DC-21A
- plug-in connectors compatible to MC4
- 1 x PV string for
- 1 x inverter input
- connection cable length: outgoing cable 2 x 500 mm
- rated connecting capacity PE: 1.5-16 mm², Cu

**KV PV 1411 DC/AC Surge arrester**

1 x DC type 2 surge arrester
- rated current: DC 30 A
- plug-in connectors compatible to MC4
- 1 x PV string for
- 1 x inverter input
- connection cable length: outgoing cable 2 x 500 mm
1 x AC type 2 surge arrester
2 terminals per L/N/PE: 6 mm², copper

* Utilization category for switch disconnectors:
  DC-21A = Switching ohmic loads inclusively moderate overload

**Customised solutions? Contact us!**

See check list in the appendix!
PV generator junction boxes
with surge arrester or DC generator disconnect switch

Installation of KV PV ... generator junction box
Possible in standard wall and post mounting.

Post-mounted installation of generator junction box KV PV ... close to the inverter

Connection to solar inverter only with DC surge arrester
Connection to solar inverter only with DC generator disconnect switch
Connection to solar inverter with combination DC generator disconnect switch and DC surge arrester
Connection to solar inverter with DC and AC surge arrester
PV generator junction boxes with surge arrester

- current per PV string: **DC 30 A max.**
- rated voltage: DC 1000 V (Uoc src)
- protection class: II
- suitable for outdoor installation, UV resistant
- ready for connection
- with stainless steel external brackets

**Mi PV 1111**

1 x PV string for 1 x inverter input
- 1 x DC type 2 surge arrester
- rated current: DC 30 A
- plug-in connectors compatible to MC4
- rated connecting capacity PE: 1.5 - 16 mm², copper

**Mi PV 1122**

2 x PV string for 2 x inverter input
- 2 x DC type 2 surge arrester
- rated current: DC 30 A
- plug-in connectors compatible to MC4
- rated connecting capacity PE: 1.5 - 16 mm², copper

**Mi PV 1133**

3 x PV string for 3 x inverter input
- 3 x DC type 2 surge arrester
- rated current: DC 30 A
- plug-in connectors compatible to MC4
- rated connecting capacity PE: 1.5 - 16 mm², copper

- lid fasteners for tool operation
- material: thermoplastic
- colour: grey, RAL 7032
- degree of protection: IP 65

**Contact us!**

See check list in the appendix!
PV generator junction boxes with surge arrester

- Current per PV string: **DC 15 A max.**
- Rated voltage: DC 1000 V (Uoc src)
- Protection class: II
- Suitable for outdoor installation, UV resistant
- Ready for connection
- With stainless steel external brackets
- Lid fasteners for tool operation
- Material: thermoplastic
- Colour: grey, RAL 7032
- Degree of protection: IP 65

**Mi PV 1121** 2 x PV string for 1 x inverter input

- 1 x DC type 2 surge arrester
- Rated current: DC 30 A
- Plug-in connectors compatible to MC4
- Rated connecting capacity PE: 1.5 - 16 mm², copper

**Mi PV 1242** 4 x PV string for 2 x inverter input

- 2 x DC type 2 surge arrester
- Rated current: DC 30 A
- Plug-in connectors compatible to MC4
- Rated connecting capacity PE: 1.5 - 16 mm², copper

**Mi PV 1263** 6 x PV string for 3 x inverter input

- 3 x DC type 2 surge arrester
- Rated current: DC 30 A
- Plug-in connectors compatible to MC4
- Rated connecting capacity PE: 1.5 - 16 mm², copper

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*Customised solutions? Contact us!*  
See check list in the appendix!
PV generator junction boxes
with surge arrester and DC generator disconnect switch

- current per PV string: **DC 30 A max.**
- rated voltage: DC 1000 V (Uoc src)
- protection class: II
- suitable for outdoor installation, UV resistant
- ready for connection
- with stainless steel external brackets
- lid fasteners for tool operation
- material: thermoplastic
- colour: grey, RAL 7032
- degree of protection: IP 65

**Mi PV 2111** 1 x PV string for 1 x inverter input

1 x DC type 2 surge arrester
1 x DC generator disconnect switch
rated current: DC 30 A
*utilization category: DC-21A
plug-in connectors compatible to MC4
rated connecting capacity PE:
1.5 - 16 mm², copper

**Mi PV 2222** 2 x PV string for 2 x inverter input

2 x DC type 2 surge arrester
2 x DC generator disconnect switch
rated current: DC 30 A
*utilization category: DC-21A
plug-in connectors compatible to MC4
rated connecting capacity PE:
1.5 - 16 mm², copper

**Mi PV 2233** 3 x PV string for 3 x inverter input

3 x DC type 2 surge arrester
3 x DC generator disconnect switch
rated current: DC 30 A
*utilization category: DC-21A
plug-in connectors compatible to MC4
rated connecting capacity PE:
1.5 - 16 mm², copper

* Utilization category for switch disconnectors:
  DC-21A = Switching ohmic loads inclusively moderate overload
PV generator junction boxes
with surge arrester and DC generator disconnect switch

- current per PV string: **DC 15 A max.**
- rated voltage: DC 1000 V (U_{oc, src})
- protection class: II
- suitable for outdoor installation, UV resistant
- ready for connection
- with stainless steel external brackets

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<td>1 x DC generator disconnect switch</td>
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<tr>
<td></td>
<td>rated current: DC 30 A</td>
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<td></td>
<td>*utilization category: DC-21A</td>
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<td></td>
<td>plug-in connectors compatible to MC4</td>
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<td></td>
<td>rated connecting capacity PE:</td>
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<td>1.5 - 16 mm², copper</td>
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<td>Mi PV 2242</td>
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<td>2 x DC generator disconnect switch</td>
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<td>rated current: DC 30 A</td>
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<tr>
<td></td>
<td>*utilization category: DC-21A</td>
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<td>plug-in connectors compatible to MC4</td>
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<tr>
<td></td>
<td>rated connecting capacity PE:</td>
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</tr>
<tr>
<td></td>
<td>1.5 - 16 mm², copper</td>
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<td>rated current: DC 30 A</td>
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<td>*utilization category: DC-21A</td>
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<td>plug-in connectors compatible to MC4</td>
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<tr>
<td></td>
<td>rated connecting capacity PE:</td>
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<tr>
<td></td>
<td>1.5 - 16 mm², copper</td>
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</table>

* Utilization category for switch disconnectors:
DC-21A = Switching ohmic loads inclusively moderate overload

Customised solutions? Contact us!
See check list in the appendix!
PV generator junction boxes
with string overload protection and DC generator disconnect switch

- Current per PV string: **DC 10 A max.**
- Rated voltage: DC 1000 V (Uoc src)
- Protection class: II
- Suitable for outdoor installation, UV resistant
- Ready for connection
- With stainless steel external brackets

### Mi PV 3311
6 x PV string for 1 x inverter input

- 6 holder for fuses each + and —
  - Connection: 1.5 - 16 mm²
- 2 x DC generator disconnect switch
- Rated current: 2 x DC 30 A
- Utilization category: DC-21A
- Connection: 6 - 35 mm², Cu
- Included cable entry
- 12 x ASM 16, 2 x ASM 25

### Mi PV 3321
6 x PV string for 1 x inverter input

- 6 holder for fuses each + and —
  - Connection: 1.5 - 16 mm²
- **1 x DC type 2 surge arrester**
  - Rated connecting capacity PE: 1.5 - 35 mm², Cu
- 2 x DC generator disconnect switch
- Rated current: 2 x DC 30 A
- Utilization category: DC-21A
- Connection: 6 - 35 mm², Cu
- Included cable entry
- 12 x ASM 16, 3 x ASM 25

* Utilization category for switch disconnectors: DC-21A = Switching ohmic loads inclusively moderate overload

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New features:
- Lid fasteners for tool operation
- Material: thermoplastic
- Colour: grey, RAL 7032
- Degree of protection: IP 65

See check list in the appendix!
PV generator junction boxes
with string overload protection and DC generator disconnect switch

- current per PV string: **DC 10 A max.**
- rated voltage: DC 1000 V (Uoc src)
- protection class: II
- suitable for outdoor installation,
  UV resistant
- ready for connection
- with stainless steel external brackets
- lid fasteners for tool operation
- material: thermoplastic
- colour: grey, RAL 7032
- degree of protection: IP 65

**Mi PV 3611 12 x PV string for 1 x inverter input**

- 12 holder for fuses each + and —
- connection: 1,5-16 mm²
- 1 x DC generator disconnect switch
- connection: M10 (max. 1x120 mm² per pole)
- rated current: DC 125 A
- included cable entry
- 12 x ASM 16, 12 x ASM 20, 2 x ASM 25

**Mi PV 3621 12 x PV string for 1 x inverter input**

- 12 holder for fuses each + and —
- connection: 1,5-16 mm²
- **1 x DC type 2 surge arrester**
- rated connecting capacity PE:
  1,5 - 35 mm², Cu
- 1 x DC generator disconnect switch
- connection: M10 (max. 1x120 mm² per pole)
- rated current: DC 125 A
- included cable entry
- 12 x ASM 16, 12 x ASM 20, 3 x ASM 25

**Mi PV 3931 24 x PV string for 1 x inverter input**

- 24 holder for fuses each + and —
- connection: 1,5-16 mm²
- 1 x DC generator disconnect switch
- connection: M10 (max. 1x120 mm² per pole)
- rated current: DC 250 A
- included cable entry
- 24 x ASM 16, 24 x ASM 20, 2 x ASM 40

**Mi PV 3941 24 x PV string for 1 x inverter input**

- 24 holder for fuses each + and —
- connection: 1,5-16 mm²
- **1 x DC type 2 surge arrester**
- rated connecting capacity PE:
  1,5 - 35 mm², Cu
- 1 x DC generator disconnect switch
- connection: M10 (max. 1x120 mm² per pole)
- rated current: DC 250 A
- included cable entry
- 24 x ASM 16, 25 x ASM 20, 2 x ASM 40

Customised solutions? Contact us!
See check list in the appendix!
PV generator junction boxes
with string overload protection and ready for string monitoring

- current per PV string: **DC 15 A max.**
- rated voltage: DC 1000 V (Uoc src)
- protection class: II
- suitable for outdoor installation, UV resistant
- ready for installation of devices for string monitoring
- with stainless steel external brackets
- lid fasteners for tool operation
- material: thermoplastic
- colour: grey, RAL 7032
- degree of protection: IP 65

### Mi PV 3781 8 x PV string for 1 x inverter input

- 8 holder for fuses each + and – connection: 1,5–16 mm²
- rated current: DC 120 A
- outgoing: 10-70 mm², Cu
- included cable entry
- 18 x ASM 16, 2 x ASM 32

### Mi PV 3791 8 x PV string for 1 x inverter input

- 8 holder for fuses each + and – connection: 1,5–16 mm²
- 1 x DC Surge arrester Type 2
- rated connecting capacity PE: 1,5–16 mm², Cu
- rated current: DC 120 A
- outgoing: 10-70 mm², Cu
- included cable entry
- 18 x ASM 16, 1 x ASM 25, 2 x ASM 32

Examples:
PV generator junction boxes
with string overload protection and DC generator disconnect switch

- Current per PV string: **DC 120 A max.**
  - By using fuse links 160 A
- Rated voltage: DC 1000 V (U_{oc STC})
- Protection class: II
- Suitable for outdoor installation, UV resistant
- Ready for connection
- With stainless steel external brackets
- Lid fasteners for tool operation
- Material: thermoplastic
- Colour: grey, RAL 7032
- Degree of protection: IP 65

**Mi PV 3731** 3 x PV string for 1 x inverter input

- 3 fuse bases each HRC 1, + and –
  - Connection: M 10
  - (max. 1 x 120 mm² per pole)
- 1 x DC Generator disconnect switch
  - Connection: M 10
  - (max. 2 x 150 mm² per pole)
- Rated current: DC 400 A
- Included cable entry
- 6 x ASM 32, 2 x ASM 50

**Mi PV 3741** 3 x PV string for 1 x inverter input

- 3 fuse bases each HRC 1, + and –
  - Connection: M 10
  - (max. 1 x 120 mm² per pole)
- 1 x DC Surge arrester Type 2
  - Rated connecting capacity PE: 1,5–35 mm², Cu
- 1 x DC Generator disconnect switch
  - Connection: M 10
  - (max. 2 x 150 mm² per pole)
- Rated current: DC 400 A
- Included cable entry
- 1 x ASM 20, 6 x ASM 32, 2 x ASM 50

Customised solutions? Contact us!
See check list in the appendix!
PV generator junction boxes with blocking diodes and DC generator disconnect switch

- current per PV string: **DC 1.5 A max.**
- rated voltage: DC 1000 V (Uoc src)
- protection class: II
- suitable for outdoor installation, UV resistant
- ready for connection
- with stainless steel external brackets

**Mi PV 4311** 12 x PV string for 1 x inverter input

- 12 blocking diodes + and
- 12 terminal blocks —
- connection: 1.5-6 mm²
- 1 x DC generator disconnect switch
- rated current: DC 30 A
- *utilization category: DC-21A
- connection: 1.5-6 mm²
- included cable entry
- 12 x ASM 16, 14 x ASM 20

**Mi PV 4321** 12 x PV string for 1 x inverter input

- 12 blocking diodes + and
- 12 terminal blocks —
- connection: 1.5-6 mm²
- 1 x DC type 2 surge arrester
- rated connecting capacity PE: 1.5 - 16 mm², Cu
- 1 x DC generator disconnect switch
- rated current: DC 30 A
- *utilization category: DC-21A
- connection: 1.5-6 mm²
- included cable entry
- 12 x ASM 16, 15 x ASM 20

**Mi PV 4631** 24 x PV string for 1 x inverter input

- 24 blocking diodes + and
- 24 terminal blocks —
- connection: 1.5-6 mm²
- 1 x DC generator disconnect switch
- rated current: DC 63 A
- *utilization category: DC-21A
- connection: 1.5-35 mm²
- included cable entry
- 24 x ASM 16, 24 x ASM 20, 2 x ASM 25

**Mi PV 4641** 24 x PV string for 1 x inverter input

- 24 blocking diodes + and
- 24 terminal blocks —
- connection: 1.5-6 mm²
- 1 x DC type 2 surge arrester
- rated connecting capacity PE: 1.5 - 16 mm², Cu
- 1 x DC generator disconnect switch
- rated current: DC 63 A
- *utilization category: DC-21A
- connection: 1.5-35 mm²
- included cable entry
- 24 x ASM 16, 24 x ASM 20, 3 x ASM 25

* Delivery date of PV generator junction boxes with blocking diodes on request.

* Utilization category for switch disconnectors:
  DC-21A = Switching ohmic loads inclusively moderate overload

Customised solutions? Contact us!

See check list in the appendix!
Standardised and individual solutions for generator junction boxes
Ready for connection in accordance with IEC 60 364-7-712.

Product: Mi PV 1263
Property: Poco Furniture Store, Herne, Germany
Area of application: Outdoor installation
Details: Total power 300 kWp, 40 inverters
Requirements: High degree of protection IP 65: dust-proof and water-protected, high impact strength, temperature and UV resistance, corrosion resistance

Product: Customised solution
Subject: Kiefer-Glas-Solar
Area of application: Indoor installation
Unique features: DC collector with six strands at one inverter input
Strand fuse, type 2 surge arrester and 63 A generator disconnect switch
NEW
ENYSUN
Battery distributors for Off-Grid systems

Connection:
Delivery with the necessary cable entries

Electrical data:
Rated voltage: < DC 120 V
Rated current: up to DC 400 A

Ambient conditions:
Protective measure: Total insulation
Degree of protection: IP 65
Stainless steel external brackets
Off-grid systems (stand-alone grid) with AC-coupling

1.a PV Generator
2.a PV Generator junction box
3.a Inverter (DC / AC)
4. Inverter collector
5.a AC distribution board
1.b Battery
2.b Battery distributor
3.b Inverter for Off-grid systems (DC / AC)
4. Inverter collector
5.b AC main distribution box with control system
Battery distributors with disconnect switch and protective devices for outgoing circuits to solar inverters

- Current per inverter: DC 125 A max.
- Rated voltage: DC 120 V
- Protection class: II
- With stainless steel external brackets
- In accordance with IEC 61 439-1/-2 and EN 50 272-2
- Lid fasteners for tool operation
- Material: thermoplastic
- Colour: grey, RAL 7032
- Degree of protection: IP 65

### Mi PV 3301
1 x battery on 1 x inverter

- Ready for connection.
- 1 x fuse switch disconnector HRC 00, 2-pole
- Rated current: DC125 A
- Connection: M8 (max. 1 x 70 mm² per pole)
- Included cable entry 4 x ASM 40

### Mi PV 3802
1 x battery on 2 x inverter

- Complete enclosure set, not assembled
- Busbar rated current: 400 A, 2-pole
- Prospective short circuit current I_{sp} = 70 kA
- 1 x fuse base HRC 2, 2-pole
- Rated current: 400 A
- Connection: M10 (max. 2 x 70 mm² per pole)
- Outgoing cables can be changed to top or bottom
- 2 x fuse switch disconnectors HRC 00, 2-pole
- Rated current: DC 125 A
- Connection: 4-70 mm², Cu
- Outgoing cables can be changed to top or bottom
- Included cable entry 8 x ASM 40

### Mi PV 3903
1 x battery on 3 x inverter

- Complete enclosure set, not assembled
- Busbar rated current: 400 A, 2-pole
- Prospective short circuit current I_{sp} = 70 kA
- 1 x fuse base HRC 2, 2-pole
- Rated current: 400 A
- Connection: M10 (max. 2 x 70 mm² per pole)
- Outgoing cables can be changed to top or bottom
- 3 x fuse switch disconnector HRC 00, 2-pole
- Rated current: DC 125 A
- Connection: 4-70 mm², Cu
- Outgoing cables can be changed to top or bottom
- Included cable entry 10 x ASM 40

Contact us! See check list in the appendix!
Off-grid system (stand-alone grid) with DC-coupling

1.a PV Generator

2.a PV Generator junction box

3.a Charger (DC / DC)

3.b Inverter for Off-grid systems (DC / AC)

1.b Battery

2.b Battery distributor

AC 230/400 V

consumer circuits
Battery distributors
with protective devices for outgoing circuits to solar inverters

- current per inverter: DC 80 A max.
- rated voltage: DC 120 V
- protection class: II
- with stainless steel external brackets
- in accordance with IEC 61 439-1/-2 and EN 50 272-2
- lid fasteners for tool operation
- material: thermoplastic
- colour: grey, RAL 7032
- degree of protection: IP 65

Mi PV 3101
1 x battery on
1 x inverter

- ready for connection,
- 1 x fuse switch disconnector HRC 00, 2-pole
- rated current: DC 80 A
- connection from above: M8 (max. 1 x 35 mm² per pole)
- connection from below: M8 (max. 1 x 35 mm² per pole for battery and charger)
- included cable entry
- 2 x ASM 25, 4 x ASM 32

Mi PV 3302
1 x battery on
3 x inverter

- ready for connection,
- 2 x fuse switch disconnector HRC 00, 3-pole
- rated current: DC 80 A
- connection from above: M8 (max. 1 x 35 mm² per pole)
- connection from below: M8 (max. 1 x 35 mm² per pole for battery and charger)
- included cable entry
- 2 x ASM 25, 8 x ASM 32
Solar inverter collectors

**Ambient conditions:**
- UV resistant
- Degree of protection: IP 65
- Protective measure: Total insulation
- Stainless steel external brackets optional: Combi climate glands to reduce condensation formation in outdoor installations.
  (order separately, see accessories).

**Electrical data:**
- Rated voltage: AC 230/400 V
- 1~ Inverters up to 11 kW
- 3~ Inverters up to 33 kW
- Optional with surge arrester

**Complete set:**
- Pre-fabricated and tested solar inverter collector solutions
Photovoltaic installations need special ratings. Why are special solutions needed for PV plants? The rating of photovoltaic installations differs significantly from normal building installations in that the installed devices are subject to a continuous load.

**Protective device selection**

Protective device selection and rating to protect cables related to the current resp. the load of the consumer.

Select protective devices in the form of a fuse or miniature circuit breaker.

Due to the low simultaneity factor, the installed distribution board is often dimensioned according to the number of modules.

**Power distribution in buildings**

**Power distribution in photovoltaic plants**

Protective device selection and rating to protect cables related to the current resp. load of the solar inverter on the AC side.

Select protective devices in the form of a fuse or miniature circuit breaker.

PV plants have a simultaneity factor of 1!

Which is why the distribution boards in PV plants have to be dimensioned differently and not simply according to the number of modules.

In consumption plants, power dissipation fluctuates depending on the number of consumers switched on at any one time.

**Low average effective power dissipation**

Constant high loads lead to high average power dissipation during the energy production phase.

Power dissipation therefore needs to be reduced to the point where the maximum temperature for devices is not exceeded.
Hensel solar inverter collectors correct dimensioned and tested: e.g. circuit-breaker box

High power dissipation levels can lead to exceeding the maximum permitted temperature for devices meaning that protection devices can trip even when beneath rated current levels. Photovoltaic installations require a special way of thinking about device dimensioning and selection! The equipment of a circuit breaker box can be inferred from the following table.

Table: Rating of solar inverter collector

<table>
<thead>
<tr>
<th>Solar inverter</th>
<th>Miniature circuit breaker</th>
<th>Cable</th>
<th>Glands</th>
<th>Flange</th>
</tr>
</thead>
<tbody>
<tr>
<td>1~ solar inverter</td>
<td>max. operating current</td>
<td>rated current</td>
<td>max. quantity</td>
<td>minimum cable cross section</td>
</tr>
<tr>
<td>2.8 kW</td>
<td>12 A</td>
<td>16 A</td>
<td>6 per row</td>
<td>3 x 2.5 mm$^2$</td>
</tr>
<tr>
<td>3.7 kW</td>
<td>16 A</td>
<td>20 A</td>
<td>5 per row</td>
<td>3 x 2.5 mm$^2$</td>
</tr>
<tr>
<td>4.8 kW</td>
<td>21 A</td>
<td>25 A</td>
<td>4 per row</td>
<td>3 x 4 mm$^2$</td>
</tr>
<tr>
<td>6.4 kW</td>
<td>28 A</td>
<td>32 A</td>
<td>3 per row</td>
<td>3 x 6 mm$^2$</td>
</tr>
</tbody>
</table>

2~ solar inverter | max. operating current | rated current | max. quantity | minimum cable cross section | minimum outside diameter | |
| 8.4 kW | 12 A | 16 A | 6 per row | 5 x 2.5 mm$^2$ | 13.5 mm | M 25 |
| 11.1 kW | 16 A | 20 A | 5 per row | 5 x 2.5 mm$^2$ | 13.5 mm | M 25 |
| 14.4 kW | 21 A | 25 A | 4 per row | 5 x 4 mm$^2$ | 15.5 mm | M 32 |
| 19.3 kW | 28 A | 32 A | 3 per row | 5 x 6 mm$^2$ | 18 mm | M 32 |

Wiring of the busbar and connection at the switch disconnector:

- **1. Assessing simultaneity and load capacity**
- Devices spaced apart allow a better radiation of the power dissipation.
- Additional slots assure increased air circulation in the enclosure.
- The larger enclosure increases the dissipated power loss.

- **2. Standard assembly aid**
- Installation devices are to be properly installed automatically with the help of positioning aids on the DIN rails.
- At the same time the miniature circuit breaker is in the proper position relative to the cover plate.

Values are valid for max. ambient temperature of 35° C
Solar inverter collectors
with circuit-breaker boxes

- for inverters up to 6.4 kW, 1~
- rated operating current: AC 28 A per inverter
- rated voltage: AC 230/400 V
- suitable for outdoor installation, UV resistant
- with stainless steel external brackets
- in accordance with IEC 60 439-1
- busbar rated current: 250 A
- busbar system: 5-pole
- material: thermoplastic
- colour: grey, RAL 7032
- protection class: II
- degree of protection: IP 65

### Mi PV 6111
**Rated power 70 kW,**
connection of 1~ inverters

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete enclosure set, not assembled</td>
<td></td>
</tr>
<tr>
<td>Order cable entries separately</td>
<td></td>
</tr>
<tr>
<td>Feeding:</td>
<td></td>
</tr>
<tr>
<td>Maximum 18x 1~ inverters</td>
<td></td>
</tr>
<tr>
<td>Maximum quantity and ratings of MCBs according to table &quot;Rating of solar inverter collectors&quot;</td>
<td></td>
</tr>
<tr>
<td>Terminals for outgoing cables: 1.5-16 mm², copper</td>
<td></td>
</tr>
<tr>
<td>18 terminals per PE+N</td>
<td></td>
</tr>
<tr>
<td>Lid fastener for manual operation</td>
<td></td>
</tr>
<tr>
<td>Outgoing:</td>
<td></td>
</tr>
<tr>
<td>Switch disconnector, 3-pole with knife links</td>
<td></td>
</tr>
<tr>
<td>1 terminal per PE+N</td>
<td></td>
</tr>
<tr>
<td>PE and N terminals for copper conductors</td>
<td></td>
</tr>
<tr>
<td>Maximum back up fuse: 100 A</td>
<td></td>
</tr>
<tr>
<td>Outgoing cable can be above or below terminals for outgoing cables: max. 35 mm², copper</td>
<td></td>
</tr>
<tr>
<td>Lid fasteners for tool operation</td>
<td></td>
</tr>
</tbody>
</table>

### Mi PV 6211
**Rated power 70 kW,**
connection of 1~ inverters

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete enclosure set, not assembled</td>
<td></td>
</tr>
<tr>
<td>Order cable entries separately</td>
<td></td>
</tr>
<tr>
<td>Feeding:</td>
<td></td>
</tr>
<tr>
<td>Maximum 18x 1~ inverters</td>
<td></td>
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<tr>
<td>Maximum quantity and ratings of MCBs according to table &quot;Rating of solar inverter collectors&quot;</td>
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<tr>
<td>Terminals for outgoing cables: 1.5-16 mm², copper</td>
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<tr>
<td>18 terminals per PE+N</td>
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</tr>
<tr>
<td>Lid fastener for manual operation</td>
<td></td>
</tr>
<tr>
<td>Outgoing:</td>
<td></td>
</tr>
<tr>
<td>Switch disconnector, 3-pole with knife links</td>
<td></td>
</tr>
<tr>
<td>1 terminal per PE+N</td>
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</tr>
<tr>
<td>PE and N terminals for copper conductors</td>
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</tr>
<tr>
<td>Maximum back up fuse: 100 A</td>
<td></td>
</tr>
<tr>
<td>Outgoing cable can be above or below terminals for outgoing cables: max. 35 mm², copper</td>
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</tr>
<tr>
<td>Lid fasteners for tool operation</td>
<td></td>
</tr>
<tr>
<td>Overvoltage protection:</td>
<td></td>
</tr>
<tr>
<td>1 x AC type 2 surge arrester with connection directly on the busbar in the outgoing cable box</td>
<td></td>
</tr>
</tbody>
</table>
Solar inverter collectors
with circuit-breaker boxes

- for inverters up to 19.3 kW, 3–
- rated operating current: AC 28 A per inverter
- rated voltage: AC 230/400 V
- suitable for outdoor installation, UV resistant
- with stainless steel external brackets
- in accordance with IEC 60 439-1
- busbar rated current: 250 A
- busbar system: 5-pole
- material: thermoplastic
- colour: grey, RAL 7032
- protection class: II
- degree of protection: IP 65

Mi PV 6311
Rated power 70 kW,
connection of 3– inverters

complete enclosure set, not assembled
order cable entries separately

Feeding:
max. 6x 3– inverters
maximum quantity and ratings of
MCBs according to table "Rating of
solar inverter collectors"
terminals for outgoing cables:
1.5–16 mm², copper
12 terminals per PE+N
lid fastener for manual operation

Outgoing:
switch disconnector, 3 pole with knife links
1 terminal per PE+N
PE and N terminals for copper conductors
maximum back up fuse: 100 A
outgoing cable can be above or below
terminals for outgoing cables:
max. 35 mm², copper
lid fasteners for tool operation

Overvoltage protection:
1 x AC type 2 surge arrester
with connection directly on the busbar in
the outgoing cable box

Mi PV 6411
Rated power 70 kW,
connection of 3– inverters

complete enclosure set, not assembled
order cable entries separately

Feeding:
max. 6x 3– inverters
maximum quantity and ratings of
MCBs according to table "Rating of
solar inverter collectors"
terminals for outgoing cables:
1.5–16 mm², copper
12 terminals per PE+N
lid fastener for manual operation

Outgoing:
switch disconnector, 3 pole with knife links
1 terminal per PE+N
PE and N terminals for copper conductors
maximum back up fuse: 100 A
outgoing cable can be above or below
terminals for outgoing cables:
max. 35 mm², copper
lid fasteners for tool operation

Overvoltage protection:
1 x AC type 2 surge arrester
with connection directly on the busbar in
the outgoing cable box

Leading inverter manufacturers recommend
using MCBs as load disconnection devices.

Sample installation

Customised solutions?
Contact us!
See check list in the appendix!
Solar inverter collectors
with circuit-breaker box

- for inverters up to 6.4 kW, 1-
- rated operating current: AC 28 A per inverter
- rated voltage: AC 230/400 V
- suitable for outdoor installation, UV resistant
- with stainless steel external brackets
- in accordance with IEC 60 439-1
- busbar rated current: 250 A
- busbar system: 5-pole
- material: thermoplastic
- colour: grey, RAL 7032
- protection class: II
- degree of protection: IP 65

Mi PV 6123 Rated power 140 kW, connection of 1~ inverters

| Feeding: | maximum 36x 1~ inverters |
| maximum quantity and ratings of MCBs according to table "Rating of solar inverter collectors" |
| terminals for outgoing cables: 1.5-16 mm², copper |
| 36 terminals per PE+N |
| lid fastener for manual operation |
| Outgoing: | switch disconnector, 3 pole with knife links |
| M 10 connection |
| maximum back up fuse: 250 A |
| outgoing cable can be above or below lid fasteners for tool operation |

Mi PV 6223 Rated power 140 kW, connection of 1~ inverters

| Feeding: | maximum 36x 1~ inverters |
| maximum quantity and ratings of MCBs according to table "Rating of solar inverter collectors" |
| terminals for outgoing cables: 1.5-16 mm², copper |
| 36 terminals per PE+N |
| lid fastener for manual operation |
| Outgoing: | switch disconnector, 3 pole with knife links |
| M 10 connection |
| maximum back up fuse: 250 A |
| outgoing cable can be above or below lid fasteners for tool operation |
| Overvoltage protection: | 1 x AC type 2 surge arrester |
| with connection via HRC 00 fuse switch disconnector |

Leading inverter manufacturers recommend using MCBs as load disconnection devices.

Customised solutions? Contact us!

See check list in the appendix!
Solar inverter collectors
with circuit-breaker box

- for inverters up to 19.3 kW, 3–
- rated operating current: AC 28 A per inverter
- rated voltage: AC 230/400 V
- suitable for outdoor installation, UV resistant
- with stainless steel external brackets
- in accordance with IEC 60 439-1
- busbar rated current: 250 A
- busbar system: 5-pole
- material: thermoplastic
- colour: grey, RAL 7032
- protection class: II
- degree of protection: IP 65

**Mi PV 6323**
Rated power 140 kW,
connection of 3– inverters

- complete enclosure set, not assembled
- order cable entries separately

**Feeding:**
- maximum 12x 3– inverters
- maximum quantity and ratings of MCBs according to table "Rating of solar inverter collectors"
- terminals for outgoing cables:
  - 1.5-16 mm², copper
  - 24 terminals per PE+N
- Lid fastener for manual operation

**Outgoing:**
- switch disconnector, 3 pole with knife links
- M 10 connection
- maximum back-up fuse: 250 A
- outgoing cable can be above or below lid fasteners for tool operation

**Mi PV 6423**
Rated power 140 kW,
connection of 3– inverters

- complete enclosure set, not assembled
- order cable entries separately

**Feeding:**
- maximum 12x 3– inverters
- maximum quantity and ratings of MCBs according to table "Rating of solar inverter collectors"
- terminals for outgoing cables:
  - 1.5-16 mm², copper
  - 24 terminals per PE+N
- Lid fastener for manual operation

**Outgoing:**
- switch disconnector, 3 pole with knife links
- M 10 connection
- maximum back-up fuse: 250 A
- outgoing cable can be above or below lid fasteners for tool operation

**Overvoltage protection:**
- 1 x AC type 2 surge arrester
- with connection via HRC 00 fuse switch disconnector

Customised solutions?
Contact us!
See check list in the appendix!
Solar inverter collectors with neozed fuse bases 63 A

- for inverters up to 7 kW, 1~/
- rated operating current: AC 30 A per inverter by using fuse links 63 A
- rated voltage: AC 230/400 V
- suitable for outdoor installation, UV resistant
- with stainless steel external brackets
- in accordance with IEC 60 439-1

<table>
<thead>
<tr>
<th>Mi PV 5112</th>
<th>Rated power 70 kW, connection of 1~ inverters</th>
</tr>
</thead>
<tbody>
<tr>
<td>complete enclosure set, not assembled order cable entries separately</td>
<td></td>
</tr>
<tr>
<td><strong>Feeding:</strong></td>
<td></td>
</tr>
<tr>
<td>5 x 63 A, 3-pole D 02, E 18, gauge sleeve system terminals for incoming cables: 4-35 mm², copper terminals for outgoing cables: 1.5-16 mm², copper 15 terminals per PE+N</td>
<td></td>
</tr>
<tr>
<td>lid fastener for manual operation</td>
<td></td>
</tr>
<tr>
<td><strong>Outgoing:</strong></td>
<td></td>
</tr>
<tr>
<td>switch disconnector, 3 pole with knife links 1 terminal per PE+N PE and N terminals for copper conductors maximum back-up fuse: 125 A outgoing cable can be above or below terminals for outgoing cables: max. 35 mm², copper</td>
<td></td>
</tr>
<tr>
<td>lid fasteners for tool operation</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mi PV 5212</th>
<th>Rated power 70 kW, connection of 1~ inverters</th>
</tr>
</thead>
<tbody>
<tr>
<td>complete enclosure set, not assembled order cable entries separately</td>
<td></td>
</tr>
<tr>
<td><strong>Feeding:</strong></td>
<td></td>
</tr>
<tr>
<td>5 x 63 A, 3-pole D 02, E 18, gauge sleeve system terminals for incoming cables: 4-35 mm², copper terminals for outgoing cables: 1.5-16 mm², copper 15 terminals per PE+N</td>
<td></td>
</tr>
<tr>
<td>lid fastener for manual operation</td>
<td></td>
</tr>
<tr>
<td><strong>Outgoing:</strong></td>
<td></td>
</tr>
<tr>
<td>switch disconnector, 3 pole with knife links 1 terminal per PE+N PE and N terminals for copper conductors maximum back-up fuse: 125 A outgoing cable can be above or below terminals for outgoing cables: max. 35 mm², copper</td>
<td></td>
</tr>
<tr>
<td>lid fasteners for tool operation</td>
<td></td>
</tr>
</tbody>
</table>

**Overvoltage protection:**
1 x AC type 2 surge arrester with connection directly on the busbar in the outgoing cable box
Solar inverter collectors with neozed fuse bases 63 A

- for inverters up to 21 kW, 3–
- rated operating current: AC 30 A per inverter by using fuse links 63 A
- rated voltage: AC 230/400 V
- suitable for outdoor installation, UV resistant
- with stainless steel external brackets
- in accordance with IEC 60 439-1

Mi PV 5312
Rated power 70 kW, connection of 3– inverters

- complete enclosure set, not assembled
- order cable entries separately

**Feeding:**
5 x 63 A, 3-pole D 02, E 18,
- gauge sleeve system
- terminals for incoming cables: 4-35 mm², copper
- terminals for outgoing cables: 1.5-16 mm², copper
- 5 terminals per PE+N
- lid fastener for manual operation

**Outgoing:**
- switch disconnector, 3 pole with knife links
- 1 terminal per PE+N
- PE and N terminals for copper conductors
- maximum back-up fuse: 125 A
- outgoing cable can be above or below terminals for outgoing cables:
- max. 35 mm², copper
- lid fasteners for tool operation

**Overvoltage protection:**
1 x AC type 2 surge arrester
- with connection directly on the busbar in the outgoing cable box

Mi PV 5412
Rated power 70 kW, connection of 3– inverters

- complete enclosure set, not assembled
- order cable entries separately

**Feeding:**
5 x 63 A, 3-pole D 02, E 18,
- gauge sleeve system
- terminals for incoming cables: 4-35 mm², copper
- terminals for outgoing cables: 1.5-16 mm², copper
- 5 terminals per PE+N
- lid fastener for manual operation

**Outgoing:**
- switch disconnector, 3 pole with knife links
- 1 terminal per PE+N
- PE and N terminals for copper conductors
- maximum back-up fuse: 125 A
- outgoing cable can be above or below terminals for outgoing cables:
- max. 35 mm², copper
- lid fasteners for tool operation

**Overvoltage protection:**
1 x AC type 2 surge arrester
- with connection directly on the busbar in the outgoing cable box

Customised solutions?
Contact us!
See check list in the appendix!
Solar inverter collectors with neozed fuse bases 63 A

- for inverters up to 7 kW, 1~
- rated operating current: AC 30 A per inverter by using fuse links 63 A
- rated voltage: AC 230/400 V
- suitable for outdoor installation, UV resistant
- with stainless steel external brackets
- in accordance with IEC 60 439-1

**Mi PV 5124**

<table>
<thead>
<tr>
<th>Rated power 140 kW, connection of 1~ inverters</th>
</tr>
</thead>
<tbody>
<tr>
<td>complete enclosure set, not assembled order cable entries separately</td>
</tr>
<tr>
<td><strong>Feeding:</strong></td>
</tr>
<tr>
<td>12 x 63 A, 3-pole D 02, E 18, gauge sleeve system terminals for incoming cables: 4-35 mm², copper terminals for outgoing cables: 1.5-16 mm², copper 36 terminals per PE+N lid fastener for manual operation</td>
</tr>
<tr>
<td><strong>Outgoing:</strong></td>
</tr>
<tr>
<td>switch disconnector, 3 pole with knife links M 10 connection maximum back-up fuse: 250 A outgoing cable can be above or below lid fasteners for tool operation</td>
</tr>
</tbody>
</table>

**Mi PV 5224**

<table>
<thead>
<tr>
<th>Rated power 140 kW, connection of 1~ inverters</th>
</tr>
</thead>
<tbody>
<tr>
<td>complete enclosure set, not assembled order cable entries separately</td>
</tr>
<tr>
<td><strong>Feeding:</strong></td>
</tr>
<tr>
<td>12 x 63 A, 3-pole D 02, E 18, gauge sleeve system terminals for incoming cables: 4-35 mm², copper terminals for outgoing cables: 1.5-16 mm², copper 36 terminals per PE+N lid fastener for manual operation</td>
</tr>
<tr>
<td><strong>Outgoing:</strong></td>
</tr>
<tr>
<td>switch disconnector, 3 pole with knife links M 10 connection maximum back-up fuse: 250 A outgoing cable can be above or below lid fasteners for tool operation</td>
</tr>
<tr>
<td><strong>Overvoltage protection:</strong></td>
</tr>
<tr>
<td>1 x AC type 2 surge arrester with connection via neozed fuse base</td>
</tr>
</tbody>
</table>

Customised solutions? Contact us!
See check list in the appendix!
Solar inverter collectors with neozed fuse bases 63 A

- for inverters up to 21 kW, 1–
- rated operating current: AC 30 A per inverter by using fuse links 63 A
- rated voltage: AC 230/400 V
- suitable for outdoor installation,
  UV resistant
- with stainless steel external brackets
- in accordance with IEC 60 439-1

<table>
<thead>
<tr>
<th>Mi PV 5324</th>
<th>Rated power 140 kW, connection of 3– inverters</th>
</tr>
</thead>
<tbody>
<tr>
<td>complete enclosure set, not assembled order cable entries separately</td>
<td></td>
</tr>
<tr>
<td>Feeding:</td>
<td></td>
</tr>
<tr>
<td>12 x 63 A, 3-pole D 02, E 18, gauge sleeve system terminals for incoming cables: 4-35 mm², copper</td>
<td></td>
</tr>
<tr>
<td>terminals for outgoing cables: 1.5-16 mm², copper</td>
<td></td>
</tr>
<tr>
<td>12 terminals per PE+N</td>
<td></td>
</tr>
<tr>
<td>lid fastener for manual operation</td>
<td></td>
</tr>
<tr>
<td>Outgoing:</td>
<td></td>
</tr>
<tr>
<td>switch disconnector; 3 pole with knife links</td>
<td></td>
</tr>
<tr>
<td>M 10 connection</td>
<td></td>
</tr>
<tr>
<td>maximum back-up fuse: 250 A</td>
<td></td>
</tr>
<tr>
<td>outgoing cable can be above or below</td>
<td></td>
</tr>
<tr>
<td>lid fasteners for tool operation</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mi PV 5424</th>
<th>Rated power 140 kW, connection of 3– inverters</th>
</tr>
</thead>
<tbody>
<tr>
<td>complete enclosure set, not assembled order cable entries separately</td>
<td></td>
</tr>
<tr>
<td>Feeding:</td>
<td></td>
</tr>
<tr>
<td>11 x 63 A, 3-pole D 02, E 18, gauge sleeve system terminals for incoming cables: 4-35 mm², copper</td>
<td></td>
</tr>
<tr>
<td>terminals for outgoing cables: 1.5-16 mm², copper</td>
<td></td>
</tr>
<tr>
<td>12 terminals per PE+N</td>
<td></td>
</tr>
<tr>
<td>lid fastener for manual operation</td>
<td></td>
</tr>
<tr>
<td>Outgoing:</td>
<td></td>
</tr>
<tr>
<td>switch disconnector, 3 pole with knife links</td>
<td></td>
</tr>
<tr>
<td>M 10 connection</td>
<td></td>
</tr>
<tr>
<td>maximum back-up fuse: 250 A</td>
<td></td>
</tr>
<tr>
<td>outgoing cable can be above or below</td>
<td></td>
</tr>
<tr>
<td>lid fasteners for tool operation</td>
<td></td>
</tr>
<tr>
<td>Overvoltage protection:</td>
<td></td>
</tr>
<tr>
<td>1 x AC type 2 surge arrester with connection via neozed fuse base</td>
<td></td>
</tr>
</tbody>
</table>

Customised solutions? Contact us!
See check list in the appendix!
Solar inverter collectors
with switch disconnectors for D 02 fuses 63 A

- for inverters up to 11 kW, 1–
- rated operating current: AC 48 A per inverter by using fuse links 63 A
- rated voltage: AC 230/400 V
- suitable for outdoor installation,
  UV resistant
- with stainless steel external brackets
- in accordance with IEC 60 439-1

<table>
<thead>
<tr>
<th>Mi PV 5123</th>
<th>Rated power 140 kW, connection of 1~ inverters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>complete enclosure set, not assembled</td>
</tr>
<tr>
<td></td>
<td>order cable entries separately</td>
</tr>
<tr>
<td>Feeding:</td>
<td>6 x 63 A, 3-pole D 02, E 18, 1 or 3-pole switching</td>
</tr>
<tr>
<td></td>
<td>terminals for outgoing cables:</td>
</tr>
<tr>
<td></td>
<td>1.5-16 mm², copper</td>
</tr>
<tr>
<td></td>
<td>18 terminals per PE+N</td>
</tr>
<tr>
<td></td>
<td>lid fastener for manual operation</td>
</tr>
<tr>
<td>Outgoing:</td>
<td>switch disconnector, 3 pole with knife link</td>
</tr>
<tr>
<td></td>
<td>M 10 connection</td>
</tr>
<tr>
<td></td>
<td>maximum back-up fuse: 250 A</td>
</tr>
<tr>
<td></td>
<td>outgoing cable can be above or below</td>
</tr>
<tr>
<td></td>
<td>lid fasteners for tool operation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mi PV 5223</th>
<th>Rate power 140 kW, connection of 1~ inverters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>complete enclosure set, not assembled</td>
</tr>
<tr>
<td></td>
<td>order cable entry separately</td>
</tr>
<tr>
<td>Feeding:</td>
<td>6 x 63 A, 3-pole D 02, E 18, 1 or 3-pole switching</td>
</tr>
<tr>
<td></td>
<td>terminals for outgoing cables:</td>
</tr>
<tr>
<td></td>
<td>1.5-16 mm², Cu</td>
</tr>
<tr>
<td></td>
<td>18 terminals per PE+N</td>
</tr>
<tr>
<td></td>
<td>lid fastener for manual operation</td>
</tr>
<tr>
<td>Outgoing:</td>
<td>switch disconnector, 3 pole with knife links</td>
</tr>
<tr>
<td></td>
<td>M 10 connection</td>
</tr>
<tr>
<td></td>
<td>maximum back-up fuse: 250 A</td>
</tr>
<tr>
<td></td>
<td>outgoing cable can be above or below</td>
</tr>
<tr>
<td></td>
<td>lid fasteners for tool operation</td>
</tr>
<tr>
<td>Overvoltage protection:</td>
<td>1 x AC type 2 surge arrester with connection via neozed fuse element</td>
</tr>
</tbody>
</table>

Leading inverter manufacturers recommend using switch disconnectors as disconnection devices.

Customised solutions? Contact us!
See check list in the appendix!
Solar inverter collectors with switch disconnectors for D 02 fuses 63 A

- for inverters up to 33 kW, 3–
- rated operating current: AC 48 A per inverter by using fuse links 63 A
- rated voltage: AC 230/400 V
- suitable for outdoor installation, UV resistant
- with stainless steel external brackets
- in accordance with IEC 60 439-1

<table>
<thead>
<tr>
<th>Mi PV 5323</th>
<th>Rated power 140 kW, connection of 3– inverters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>complete enclosure set, not assembled</td>
</tr>
<tr>
<td></td>
<td>order cable entry separately</td>
</tr>
<tr>
<td>Feeding:</td>
<td>6 x 63 A, 3-pole D 02, E 18, 1 or 3-pole switching terms. for outgoing cables: 1.5-16 mm², Cu</td>
</tr>
<tr>
<td></td>
<td>6 terminals per PE+N</td>
</tr>
<tr>
<td></td>
<td>lid fastener for manual operation</td>
</tr>
<tr>
<td>Outgoing:</td>
<td>switch disconnector, 3 pole with knife links</td>
</tr>
<tr>
<td></td>
<td>M 10 connection</td>
</tr>
<tr>
<td></td>
<td>maximum back-up fuse: 250 A</td>
</tr>
<tr>
<td></td>
<td>outgoing cable can be above or below</td>
</tr>
<tr>
<td></td>
<td>lid fasteners for tool operation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mi PV 5423</th>
<th>Rated power 140 kW, connection of 3– inverters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>complete enclosure set, not assembled</td>
</tr>
<tr>
<td></td>
<td>order cable entry separately</td>
</tr>
<tr>
<td>Feeding:</td>
<td>6 x 63 A, 3-pole D 02, E 18, 1 or 3-pole switching terms. for outgoing cables: 1.5-16 mm², Cu</td>
</tr>
<tr>
<td></td>
<td>6 terminals per PE+N</td>
</tr>
<tr>
<td></td>
<td>lid fastener for manual operation</td>
</tr>
<tr>
<td>Outgoing:</td>
<td>switch disconnector, 3 pole with knife links</td>
</tr>
<tr>
<td></td>
<td>M 10 connection</td>
</tr>
<tr>
<td></td>
<td>maximum back-up fuse: 250 A</td>
</tr>
<tr>
<td></td>
<td>outgoing cable can be above or below</td>
</tr>
<tr>
<td></td>
<td>lid fasteners for tool operation</td>
</tr>
<tr>
<td>Overvoltage protection:</td>
<td>1 x AC type 2 surge arrester</td>
</tr>
<tr>
<td></td>
<td>with connection via neozed fuse element</td>
</tr>
</tbody>
</table>

- busbar rated current: 250 A
- busbar system: 5-pole
- material: thermoplastic
- colour: grey, RAL 7032
- protection class: II
- degree of protection: IP 54

Customised solutions? Contact us!
See check list in the appendix!
Solar inverter collectors
Extension boxes

- suitable for outdoor installation, UV resistant
- material: thermoplastic
- colour: grey, RAL 7032
- protection class: II
- degree of protection: IP 65

Mi PV 5511 PV terminal box

- extension set, ready for connection
- number of terminals per PE+N
  - 12 x 1.5-16 mm², Cu
  - 1 x 4-35 mm², Cu
- with wall gasket,
- with 100 A wiring between PE+N terminals and busbars
- separately order flange for cable entry

Mi PV 5611 Surge protection device box (SPD)

- extension set, ready for connection with wall gasket
- with pre-assembled connection cables with blanking strip for unused DIN rail openings
- 1 modular AC type 2 surge arrester for 3-phase TN
- rated voltage: AC 230/400 V
- protection level ≤ 1.0 kV
- defect display through red marking

**Connection:**
- for 70 kW solar inverter collector
- outgoing cable box directly on the busbar
- order busbar terminals for direct connection separately
- at 140 kW solar inverter collectors via neozed fuse element or HRC 00 fuse switch disconnector

Mi PV 1318 Circuit-breaker box

- 18 modules, 3 x 6 x 18 mm
- 3-row
- for installation of DIN rail equipment in accordance with DIN 43 880
- maximum quantity and ratings of MCBs and flange selection according to table "Rating of PV solar inverter collectors"
- without PE and N terminal with blanking strips for unused DIN rail openings
- lid fastener for manual operation

Box walls with metric cable entries:

<table>
<thead>
<tr>
<th>Wall 1</th>
<th>Wall 2</th>
<th>Wall 3</th>
<th>Wall 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x M 20</td>
<td>2 x M 20</td>
<td>4 x M 25</td>
<td>1 x M 20</td>
</tr>
<tr>
<td>1 x M 32/40</td>
<td>10 x M 25</td>
<td>3 x M 40/50</td>
<td>1 x M 32/40</td>
</tr>
<tr>
<td>1 x M 32/40</td>
<td>1 x M 32/40</td>
<td>3 x M 40/50</td>
<td></td>
</tr>
</tbody>
</table>

Customised solutions? Contact us!
See check list in the appendix!
Solar inverter collectors
Extension boxes

- suitable for outdoor installation, UV resistant
- material: thermoplastic
- colour: grey, RAL 7032
- protection class: II
- degree of protection: IP 65

### Mi PV 3266
**Fuse box with switch disconnector for D 02 fuses, 63 A**

- 3 x 63 A, 3-pole, D 02, E 18,
- 1- or 3-pole switching terminals for outgoing cables:
  - 1.5 - 16 mm², copper
- 3 terminals per PE+N
- rated voltage: AC 400 V
- busbar rated current: 250 A
- busbar system: 5-pole
- lid fastener for manual operation
- order busbar connector Mi SV 25 separately for combination

### Mi 0101
**Empty box, box size 1**

- maximum installation depth with built-in mounting plate 146 mm
- with built-in DIN rail 135 mm

### Mi 3235
**Fuse box with neozed fuse bases 63 A**

- 5 x 63 A, 3-pole
- D0 2, E 18, gauge sleeve system terminals for incoming cables:
  - 4-35 mm², copper
- terminals for outgoing cables:
  - 1.5-16 mm², copper
- 5 terminals per PE+N
- rated voltage: AC 400 V
- busbars rated current: 250 A
- busbar system: 5-pole
- lid fastener for manual operation
- order busbar connector Mi SV 25 separately for combination

---

Customised solutions? Contact us!

See Hensel main catalogue for further extension boxes!
Installation variations of a complete set

Wiring from the same direction

Wiring from different directions

Extension of a complete set

Mi PV 6211 (70 kW) complete set
Extension:
Mi PV 1318 circuit breaker box, Mi PV 5511 PV terminal box,
Mi WD 2 wall gasket and Mi FM 32 flange

Extension of terminal compartment for the 70 mm² connection

Mi PV 6211 (70 kW) complete set
Extension:
Mi 010X empty box, Mi WD 2 wall gasket and
terminal for direct busbar connection KS 70 F
Assembly of a complete set
Every photovoltaic object has its own topology. The challenges can often be met with pre-fabricated solutions. Individually engineered solar inverter collectors are also not a problem, even as part of metering in adherence to regulations of power supply companies.

**Product:** Customised solution Enysun

**Subject:** Hannes management company, Herten, Germany

**Area of application:** Indoor installation

**Details:** Total power 450 kWp, 8 inverters

**Unique features:** 8 central inverters via RCD and screw-type fuse bases

**Product:** Customised solution Enysun

**Subject:** Solarpark Edertal II

**Area of application:** Outdoor installation

**Details:** Total power 1200 kWp, 151 inverters, delivery directly into mid-voltage grids

**Unique features:** Inverter collector with mains disconnect switch in polyester outdoor cabinet

**Product:** Mi PV 5324 Enysun

**Subject:** Frankfurt Trade Fair, Frankfurt/Main, Germany

**Area of application:** Outdoor installation

**Details:** Total power 490 kWp, 45 inverters
See Hensel main catalogue for further accessories!
Empty boxes
Box walls without knockouts

- suitable for outdoor installation, UV resistant
- rated voltage: DC 1000 V
- protection class: II
- degree of protection: IP 66
- material: thermoplastic
- colour: black, RAL 9011

<table>
<thead>
<tr>
<th>KF PV 0100</th>
<th>Wall surface can be drilled individually for cable entry max. M 20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mounting width: 59 mm</td>
</tr>
<tr>
<td></td>
<td>Mounting height: 66 mm</td>
</tr>
<tr>
<td></td>
<td>Max. installation depth: 37 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KF PV 0200</th>
<th>Wall surface can be drilled individually for cable entry max. M 20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mounting width: 69 mm</td>
</tr>
<tr>
<td></td>
<td>Mounting height: 76 mm</td>
</tr>
<tr>
<td></td>
<td>Max. installation depth: 42 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KF PV 0300</th>
<th>Wall surface can be drilled individually for cable entry max. M 32</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mounting width: 114 mm</td>
</tr>
<tr>
<td></td>
<td>Mounting height: 94 mm</td>
</tr>
<tr>
<td></td>
<td>Max. installation depth: 52 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KF PV 0400</th>
<th>Wall surface can be drilled individually for cable entry max. M 32</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mounting width: 141 mm</td>
</tr>
<tr>
<td></td>
<td>Mounting height: 99 mm</td>
</tr>
<tr>
<td></td>
<td>Max. installation depth: 64 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KF PV 0500</th>
<th>Wall surface can be drilled individually for cable entry max. M 40</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mounting width: 173 mm</td>
</tr>
<tr>
<td></td>
<td>Mounting height: 133 mm</td>
</tr>
<tr>
<td></td>
<td>Max. installation depth: 97 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KF PV 0600</th>
<th>Wall surface can be drilled individually for cable entry max. M 50</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mounting width: 230 mm</td>
</tr>
<tr>
<td></td>
<td>Mounting height: 180 mm</td>
</tr>
<tr>
<td></td>
<td>Max. installation depth: 95 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KF PV 0700</th>
<th>Wall surface can be drilled individually for cable entry max. M 50</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mounting width: 280 mm</td>
</tr>
<tr>
<td></td>
<td>Mounting height: 180 mm</td>
</tr>
<tr>
<td></td>
<td>Max. installation depth: 88 mm</td>
</tr>
<tr>
<td>Model</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>TSD 02</td>
<td>DIN rail</td>
</tr>
<tr>
<td></td>
<td>max. installation depth 32 mm</td>
</tr>
<tr>
<td></td>
<td>for cable junction boxes D x020, D x120, KF x020, KD x020</td>
</tr>
<tr>
<td></td>
<td>and empty box KF PV 0100, top hat profile 15 mm</td>
</tr>
<tr>
<td></td>
<td>with fixing screws</td>
</tr>
<tr>
<td>TSD 04</td>
<td>DIN rail</td>
</tr>
<tr>
<td></td>
<td>max. installation depth 40 mm</td>
</tr>
<tr>
<td></td>
<td>for cable junction boxes D x040, KF x040, KD x040</td>
</tr>
<tr>
<td></td>
<td>and empty box KF PV 0200, top hat profile 15 mm</td>
</tr>
<tr>
<td></td>
<td>with fixing screws</td>
</tr>
<tr>
<td>TSK 06</td>
<td>DIN rail</td>
</tr>
<tr>
<td></td>
<td>max. installation depth 44.5 mm</td>
</tr>
<tr>
<td></td>
<td>for cable junction boxes K x060, KF x060, KD x060</td>
</tr>
<tr>
<td></td>
<td>and empty box KF PV 0300, top hat profile 15 mm</td>
</tr>
<tr>
<td></td>
<td>with fixing screws</td>
</tr>
<tr>
<td>TSK 10</td>
<td>DIN rail</td>
</tr>
<tr>
<td></td>
<td>max. installation depth 56.5 mm</td>
</tr>
<tr>
<td></td>
<td>for cable junction boxes K x100, KF x100, KD x100</td>
</tr>
<tr>
<td></td>
<td>and empty box KF PV 0400, top hat profile 15 mm</td>
</tr>
<tr>
<td></td>
<td>with fixing screws</td>
</tr>
<tr>
<td>TSK 25</td>
<td>DIN rail</td>
</tr>
<tr>
<td></td>
<td>max. installation depth 71.5 mm</td>
</tr>
<tr>
<td></td>
<td>for cable junction boxes K x250, KF x250, K x350, KF x350, KD x250, KD x350</td>
</tr>
<tr>
<td></td>
<td>and empty boxes KF PV 0500, KF PV 0600</td>
</tr>
<tr>
<td></td>
<td>top hat profile 15 mm</td>
</tr>
<tr>
<td></td>
<td>with fixing screws</td>
</tr>
<tr>
<td>TSK 35</td>
<td>DIN rail</td>
</tr>
<tr>
<td></td>
<td>max. installation depth 80.5 mm</td>
</tr>
<tr>
<td></td>
<td>for cable junction boxes K x350, KF x350, KD x350</td>
</tr>
<tr>
<td></td>
<td>and empty box KF PV 0600, top hat profile 15 mm</td>
</tr>
<tr>
<td></td>
<td>with fixing screws</td>
</tr>
<tr>
<td>TSK 50</td>
<td>DIN rail</td>
</tr>
<tr>
<td></td>
<td>max. installation depth 80.5 mm</td>
</tr>
<tr>
<td></td>
<td>for cable junction boxes K x500, KF x500</td>
</tr>
<tr>
<td></td>
<td>and empty box KF PV 0700, top hat profile 15 mm</td>
</tr>
<tr>
<td></td>
<td>with fixing screws</td>
</tr>
<tr>
<td>DK AL 2</td>
<td>External brackets</td>
</tr>
<tr>
<td></td>
<td>for external wall fixing of cable junction boxes type D, K, KF, KX, KD</td>
</tr>
<tr>
<td></td>
<td>and empty box KF PV</td>
</tr>
<tr>
<td></td>
<td>external brackets: 2 items</td>
</tr>
<tr>
<td></td>
<td>material: V2A stainless steel</td>
</tr>
</tbody>
</table>
KV small-type distribution boards  
Box walls without knockouts

- suitable for outdoor installation, UV resistant
- for the installation of DIN rail equipment, top hat profile 35 mm
- with cable entry cover
- with transparent door
- protective cover can be cut out

KV PC 8104 IP 65
4.5 modules, 1 x 4.5 x 18 mm
1-row
insulated box for photovoltaic plants up to AC 690 V / DC 1000 V

KV PC 8109 IP 65
9 modules, 1 x 9 x 18 mm
1-row
insulated box for photovoltaic plants up to AC 690 V / DC 1000 V

KV ES 3 Locking device
for small-type distribution boards 3 - 9 modules
for KV 9325, KV 9363
with profile cylinder lock
with 2 keys

KV EB 04 Cable entry cover
for small-type distribution boards with 4.5 modules
for replacement purposes (1 cable entry cover included with supply of the board)

KV EB 09 Cable entry cover
for small-type distribution boards with 9 modules
for KV 9325, KV 9363
for replacement purposes (1 cable entry cover included with supply of the board)

KV BP 04 Mounting plate
for wall and post installation
for outdoor box installation with KV XX04 and KV PC XX04
assembly kit containing 1 stainless steel plate, screws and fixing brackets
post diameter at least 40 mm

KV BP 09 Mounting plate
for wall and post installation
for outdoor box installation with KV XX09 and KV PC XX09
assembly kit containing 1 stainless steel plate, screws and fixing brackets
post diameter at least 40 mm
## Accessories

**for solar inverter collectors**

### Terminals for direct busbar connection

For solid (sol), stranded (s), flexible (f) copper conductors with gas-tight crimped end sleeve and for laminated wiring strip

<table>
<thead>
<tr>
<th>Type</th>
<th>for busbars width</th>
<th>conductor cross section</th>
<th>wiring strip</th>
<th>tightening torque</th>
<th>busbar rated current 250 A</th>
<th>busbar rated current 250 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>KS 16 F</td>
<td>... x 5 mm 11 mm</td>
<td>1.5-16 mm² Cu</td>
<td></td>
<td>4 Nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KS 16 Z</td>
<td>... x 10 mm 11 mm</td>
<td>1.5-16 mm² Cu</td>
<td></td>
<td>4 Nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KS 35 F</td>
<td>... x 5 mm 16 mm</td>
<td>4-35 mm² Cu</td>
<td>100 A: Mi VS 100</td>
<td>6 Nm</td>
<td>160 A: Mi VS 160</td>
<td></td>
</tr>
<tr>
<td>KS 35 Z</td>
<td>... x 10 mm 16 mm</td>
<td>4-35 mm² Cu</td>
<td>100 A: Mi VS 100</td>
<td>6 Nm</td>
<td>160 A: Mi VS 160</td>
<td></td>
</tr>
<tr>
<td>KS 70 F</td>
<td>... x 5 mm 21 mm</td>
<td>10-70 mm² Cu</td>
<td>100 A: Mi VS 100</td>
<td>10 Nm</td>
<td>160 A: Mi VS 160</td>
<td></td>
</tr>
<tr>
<td>KS 70 Z</td>
<td>... x 10 mm 21 mm</td>
<td>10-70 mm² Cu</td>
<td>100 A: Mi VS 100</td>
<td>10 Nm</td>
<td>160 A: Mi VS 160</td>
<td></td>
</tr>
<tr>
<td>KS 120 F</td>
<td>... x 5 mm 25 mm</td>
<td>25-120 mm² Cu</td>
<td>250 A: Mi VS 250</td>
<td>20 Nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KS 120 Z</td>
<td>... x 10 mm 25 mm</td>
<td>25-120 mm² Cu</td>
<td>250 A: Mi VS 250</td>
<td>20 Nm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### DA 240 Terminal for direct connection

- up to 400 A
- for mounting onto switchgear with flat contact M10
- with insulating cover
- rated connecting capacity:
  - 35-70 mm² s (round), Cu/Alu
  - 50-185 mm² s (sector), Cu/Alu
  - 35-50 mm² sol, Cu/Alu
  - 70-240 mm² sol (sector), Cu/Alu
- tightening torque terminal: 22.0 Nm

Prior to connection, aluminium conductors must be prepared according to the relevant technical recommendations.

Further accessories and terminals (e.g. for aluminum cables) see Hensel main catalogue!
### Accessories for solar inverter collectors

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
</table>
| **MS NH 00** | HRC bus-mounted fuse switch disconnector | 3-pole  
for retrofitting on busbars  
busbar thickness 10 mm and centreline spacing of busbars 60 mm  
rated current: 125 A  
rated voltage: AC 690 V  
terminal connection 5-70 mm² Cu |
| **Mi RS 18** | D0 2-bus-mounted fuse base | 63 A, E 18, D0 2, Neozed, width: 36 mm  
3-pole  
rated voltage: AC 400 V  
with cover  
busbar thickness 10 mm and centreline spacing of busbars 60 mm  
for replacement in Mi-HRC fuse boxes, neozed  
rated connecting capacity: sol/s/f 1,5 - 25 mm² Cu |
| **Mi BA** | Blanking cover | for sealing protection covers with cut-outs for bus-mounted fuse bases  
in Mi-screw-type fuse boxes, diazed or neozed  
width: 108 mm |
| **Mi BA 6** | Blanking cover | for sealing protection covers  
in Mi-HRC fuse boxes  
width: 108 mm |
| **Mi WD 2** | Wall gasket | for the assembly of Mi boxes  
box walls 150 or 300 mm  
consisting of 1 seal, 4 wedge links, 1 bracket |
| **Mi SV 25** | Busbar connector | 5-pole  
busbar rated current 250 A  
with wall gasket  
for the assembly of Mi boxes containing busbars  
tightening torque for terminal 6.0 Nm  
Busbars 250 A and 400 A can only be connected with busbar connector Mi SV 25.  
Connecting of busbars with different rated current only under care and attention of the corresponding short circuit and overload standards. |
| **Mi BE** | Fixing spares | for the assembly of Mi boxes  
when converting existing installations  
consisting of 4 wedge links and 5 wedges |
| **AS 12** | Blanking strip | for the covering of spare equipment openings, for material thickness up to 3 mm  
12 modules 18 mm each  
divisible every 9 mm  
colour grey, similar RAL 7035 |
**Accessories for solar inverter collectors**

- **Mi FP 15 Flange**
  - with fixing wedges and seal
  - box wall 150 mm
  - useable mounting area

- **Mi FM 15 Flange**
  - with fixing wedges and seal
  - box wall 150 mm
  - knockouts: 3 x M 20, 1 x M 32/40/50

- **Mi FP 20 Flange**
  - with fixing wedges and seal
  - box wall 300 mm
  - without knockouts

- **Mi FM 20 Flange**
  - with fixing wedges and seal
  - box wall 300 mm
  - knockouts: 15 x M 16, 15 x M 20

- **Mi FM 25 Flange**
  - with fixing wedges and seal
  - box wall 300 mm
  - knockouts: 19 x M 16/25

- **Mi FM 32 Flange**
  - with fixing wedges and seal
  - box wall 300 mm
  - knockouts: 8 x M 25/32, 1 x M 25/32/40

- **Mi FM 40 Flange**
  - with fixing wedges and seal
  - box wall 300 mm
  - knockouts: 2 x M 25/32, 5 x M 32/40

- **Mi FM 50 Flange**
  - with fixing wedges and seal
  - box wall 300 mm
  - knockouts: 2 x M 20, 4 x M 32/40/50

- **Mi FM 60 Flange**
  - with fixing wedges and seal
  - box wall 300 mm
  - knockouts: 3 x M 40/50/63

- **Mi FP 20 Flange**
  - with fixing wedges and seal
  - box wall 300 mm
  - without knockouts

- **Mi FP 15 Flange**
  - with fixing wedges and seal
  - box wall 150 mm
  - without knockouts

- **Mi FM 25 Flange**
  - with fixing wedges and seal
  - box wall 300 mm
  - knockouts: 19 x M 16/25

- **Mi FM 32 Flange**
  - with fixing wedges and seal
  - box wall 300 mm
  - knockouts: 8 x M 25/32, 1 x M 25/32/40

- **Mi FM 40 Flange**
  - with fixing wedges and seal
  - box wall 300 mm
  - knockouts: 2 x M 25/32, 5 x M 32/40

- **Mi FM 50 Flange**
  - with fixing wedges and seal
  - box wall 300 mm
  - knockouts: 2 x M 20, 4 x M 32/40/50

- **Mi FM 60 Flange**
  - with fixing wedges and seal
  - box wall 300 mm
  - knockouts: 3 x M 40/50/63
### Mi FP 38 Flange
- with fixing wedges and seal
- cable entry via integrated elastic membranes
- degree of protection: IP 65
- box wall 300 mm
- sealing range:
  - 29 x Ø 7-12 mm
  - 4 x Ø 7-14 mm
  - 4 x Ø 11-20 mm
  - 1 x Ø 16-29 mm

### Mi FP 70 Flange
- with fixing wedges and seal
- using 1 cable entry
- max. 72 mm external diameter
- degree of protection: IP 65
- box wall 300 mm
- sealing range: Ø 30-72 mm

### Mi FP 72 Flange
- with fixing wedges and seal
- for 2 cables
- max. 72 mm external diameter
- degree of protection: IP 65
- box wall 300 mm
- sealing range: 2 x Ø 30-72 mm

### Mi FM 63 Flange
- with fixing wedges and seal
- with extended cable arrangement space
- degree of protection: IP 65
- box wall 300 mm
- knockouts:
  - 3 x M 40/50/63

### Mi FP 82 Cable insert
- for 2 cables
- max. 72 mm external diameter
- degree of protection IP 54 only with additional strain and pressure relief (e.g. Mi ZE 62)
- divisible for cable insertion from the front
- box wall 300 mm
- sealing range: 2 x Ø each 30-72 mm

### Mi ZE 62 Cable strain relief
- for 2 cables with max. 60 mm external diameter
- with fixing rail 284 mm long
- to be used only in connection with cable insertion Mi FP 82
- cannot be installed in Mi 6856

### Mi BF 20 Ventilation flange
- for ventilation of Mi-Distribution boards
- in the event of extremely high internal temperatures or a risk of water condensation
- for vertical installation on the lateral box walls
- degree of protection IP 23
**Mi ZE 62 Cable strain relief**
for 2 cables with max. 60 mm external diameter
with fixing rail 284 mm long
to be used only in connection with cable insertion Mi FP 82
cannot be installed in Mi 6856

---

### Accessories

- **Mi DB 15** Canopy
  - for box wall 150 mm
  - width 150 mm
  - depth 245 mm
  - with fastening material

- **Mi DB 30** Canopy
  - for box wall 150 mm
  - width 300 mm
  - depth 245 mm
  - with fastening material

- **Mi DB 01** End plate for canopy
  - for canopy width 150 mm and 300 mm

---

**Example:**
PV outdoor application with Mi distribution board protected by canopy.
Accessories

- for indoor (normal environment and/or protected outdoor) and outdoor installation (harsh environment and/or outdoor)
- with strain relief and locknut
- material: thermoplastic
- degree of protection: IP 65
- colour: grey, RAL 7035

<table>
<thead>
<tr>
<th>Cable glands</th>
<th>ISO thread</th>
<th>Sealing range</th>
<th>Bore-hole</th>
<th>Wall thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>AKM 12</td>
<td>M 12 x 1,5</td>
<td>Ø 3-6,5 mm</td>
<td>Ø 12,5 mm</td>
<td>bis 3 mm</td>
</tr>
<tr>
<td>AKM 16</td>
<td>M 16 x 1,5</td>
<td>Ø 5-10 mm</td>
<td>Ø 16,5 mm</td>
<td>bis 3 mm</td>
</tr>
<tr>
<td>AKM 20</td>
<td>M 20 x 1,5</td>
<td>Ø 6,5-13,5 mm</td>
<td>Ø 20,5 mm</td>
<td>bis 3 mm</td>
</tr>
<tr>
<td>AKM 25</td>
<td>M 25 x 1,5</td>
<td>Ø 10-17 mm</td>
<td>Ø 25,5 mm</td>
<td>bis 3 mm</td>
</tr>
<tr>
<td>AKM 32</td>
<td>M 32 x 1,5</td>
<td>Ø 14-21 mm</td>
<td>Ø 32,5 mm</td>
<td>bis 3 mm</td>
</tr>
<tr>
<td>AKM 40</td>
<td>M 40 x 1,5</td>
<td>Ø 20-28 mm</td>
<td>Ø 40,5 mm</td>
<td>bis 3 mm</td>
</tr>
<tr>
<td>AKM 50</td>
<td>M 50 x 1,5</td>
<td>Ø 25-35 mm</td>
<td>Ø 50,5 mm</td>
<td>bis 3 mm</td>
</tr>
<tr>
<td>AKM 63</td>
<td>M 63 x 1,5</td>
<td>Ø 35-48 mm</td>
<td>Ø 63,5 mm</td>
<td>bis 3 mm</td>
</tr>
</tbody>
</table>

- indoor (normal environment and/or protected outdoor) and outdoor installation (harsh environment and/or outdoor)
- with strain relief and locknut
- material: thermoplastic
- degree of protection: IP 66 / IP 67
- colour: black, RAL 9005

<table>
<thead>
<tr>
<th>Cable glands</th>
<th>ISO thread</th>
<th>Sealing range</th>
<th>Bore-hole</th>
<th>Wall thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASS 12</td>
<td>M 12 x 1,5</td>
<td>Ø 2-5 mm</td>
<td>Ø 12,5 mm</td>
<td>bis 3 mm</td>
</tr>
<tr>
<td>ASS 16</td>
<td>M 16 x 1,5</td>
<td>Ø 3-10 mm</td>
<td>Ø 16,5 mm</td>
<td>bis 3 mm</td>
</tr>
<tr>
<td>ASS 20</td>
<td>M 20 x 1,5</td>
<td>Ø 5-13,5 mm</td>
<td>Ø 20,5 mm</td>
<td>bis 3 mm</td>
</tr>
<tr>
<td>ASS 25</td>
<td>M 25 x 1,5</td>
<td>Ø 8-17 mm</td>
<td>Ø 25,5 mm</td>
<td>bis 3 mm</td>
</tr>
<tr>
<td>ASS 32</td>
<td>M 32 x 1,5</td>
<td>Ø 12-21 mm</td>
<td>Ø 32,5 mm</td>
<td>bis 3 mm</td>
</tr>
<tr>
<td>ASS 40</td>
<td>M 40 x 1,5</td>
<td>Ø 16-28,5 mm</td>
<td>Ø 40,5 mm</td>
<td>bis 3 mm</td>
</tr>
<tr>
<td>ASS 50</td>
<td>M 50 x 1,5</td>
<td>Ø 21-35 mm</td>
<td>Ø 50,5 mm</td>
<td>bis 3 mm</td>
</tr>
<tr>
<td>ASS 63</td>
<td>M 63 x 1,5</td>
<td>Ø 27-48 mm</td>
<td>Ø 63,5 mm</td>
<td>bis 3 mm</td>
</tr>
</tbody>
</table>
For adherence to the requested degree of protection the ventilation of the enclosure is effected via a special combi climate gland.

Via an inserted, breathable membrane combi climate glands ensure pressure compensation between enclosure interior and ambient air.

For indoor (normal environment and/or protected outdoor) and outdoor installation (harsh environment and/or outdoor)

- with strain relief and locknut
- material: thermoplastic
- degree of protection: IP 66 / IP 67
- colour KBM: grey, RAL 7032
- colour KBS: schwarz, RAL 9005

### Combi climate gland

<table>
<thead>
<tr>
<th>KBM 20</th>
<th>ISO thread</th>
<th>sealing range</th>
<th>bore-hole</th>
<th>wall thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 20  x  1,5</td>
<td>Ø 6-13 mm</td>
<td>Ø 20,5 mm</td>
<td>up to 3,5 mm</td>
<td></td>
</tr>
</tbody>
</table>

In order not to exceed leakage limit of 0.07 bar with pressure compensation, **one combi climate gland M20 must be used per 6 litres (6000 cm³)** of enclosure volume.

Example: enclosure size 27 cm x 27 cm x 17 cm = 12393 cm³ = 12.393 litres.

Number of necessary KB. 20 (M20) ≥ 3 pieces.

<table>
<thead>
<tr>
<th>KBM 25</th>
<th>ISO thread</th>
<th>sealing range</th>
<th>bore-hole</th>
<th>wall thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 25  x  1,5</td>
<td>Ø 9-17 mm</td>
<td>Ø 25,5 mm</td>
<td>up to 3,5 mm</td>
<td></td>
</tr>
</tbody>
</table>

In order not to exceed leakage limit of 0.07 bar with pressure compensation, **one combi climate gland M25 must be used per 11 litres (11000 cm³)** of enclosure volume.

Example: enclosure size 27 cm x 27 cm x 17 cm = 12393 cm³ = 12.393 litres.

Number of necessary KB. 25 (M25) ≥ 2 pieces.

<table>
<thead>
<tr>
<th>KBM 32</th>
<th>ISO thread</th>
<th>sealing range</th>
<th>bore-hole</th>
<th>wall thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 32  x  1,5</td>
<td>Ø 13-21 mm</td>
<td>Ø 32,5 mm</td>
<td>up to 3,5 mm</td>
<td></td>
</tr>
</tbody>
</table>

In order not to exceed leakage limit of 0.07 bar with pressure compensation, **one combi climate gland M32 must be used per 13 litres (13000 cm³)** of enclosure volume.

Example: enclosure size 27 cm x 27 cm x 17 cm = 12393 cm³ = 12.393 litres.

Number of necessary KB. 32 (M32) ≥ 1 piece.

### Sealing plug

**VSB 13**

diameter: 13 mm

for sealing combi climate glands M20 or M25, which are not used for cable entry

material: thermoplastic

colour: red, RAL 3000

**VSB 21**

diameter: 21 mm

for sealing combi climate glands M25 or M32, which are not used for cable entry

material: thermoplastic

colour: red, RAL 3000

The ingress of humidity from outside is prevented by this membrane.

In the consequence accumulated water dries by air exchange away or reduces itself in the course of time. At the same time the degree of protection of the enclosure is obtained (up to IP 67)!

---

When using different gland sizes the values for the enclosure volumes of the used combi climate glands can be added on. If the quantity of the necessary climate glands for pressure compensation is larger, than the number of necessary cable glands for cable entry, the unused climate glands can be sealed with sealing plugs.
### Accessories

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mi PL 2</td>
<td>Sealing caps</td>
<td>2 sealing caps for converting the lid fasteners</td>
</tr>
<tr>
<td>Mi SR 4</td>
<td>Conversion set</td>
<td>4 fastening covers for converting lid fasteners for manual operation to tool operation</td>
</tr>
<tr>
<td>Mi SN 4</td>
<td>Conversion set</td>
<td>4 manual actuators for converting lid fasteners from tool operation to manual operation</td>
</tr>
<tr>
<td>Mi DV 01</td>
<td>Locking device insertion</td>
<td>only in connection with Mi PL 2, Mi SR 4 or Mi SN 4</td>
</tr>
<tr>
<td>Mi ZS 11</td>
<td>Lid lock</td>
<td>locking device I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Is being used instead of fasteners for hand or tool operation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in order to prevent unauthorised opening of the lids</td>
</tr>
<tr>
<td></td>
<td></td>
<td>consisting of: cylinder lock, key, locking device insertion, dust cover</td>
</tr>
<tr>
<td>Mi ZS 12</td>
<td>Lid lock</td>
<td>locking device II</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Is being used instead of fasteners for hand or tool operation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in order to prevent unauthorised opening of the lids</td>
</tr>
<tr>
<td></td>
<td></td>
<td>consisting of: cylinder lock, key, locking device insertion, dust cover</td>
</tr>
<tr>
<td>Mi DR 04</td>
<td>Lid fastener for tool operation</td>
<td>triangle 8 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>is used instead of fasteners for hand- or tool operation, in order to make unauthorized</td>
</tr>
<tr>
<td></td>
<td></td>
<td>opening of lids more difficult</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 locking devices with triangle 8 mm and key</td>
</tr>
<tr>
<td>Mi SA 2</td>
<td>Dust protection cover</td>
<td>for 2 lid fittings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for box sizes 1 to 4</td>
</tr>
</tbody>
</table>
**Mi AL 40**  Stainless steel external brackets
- for external box fixing with Mi enclosures
- set consisting of 4 fixing brackets, 4 screws

**Mi MS 2**  Mounting profile
- for wall-mounted assembly of Mi-distribution boards
  - up to 900x1200 mm
  - with 8 screws M6 x 16 for box fixing
  - sendzimir galvanised steel profile with structured powder coating
  - colour RAL 7032 grey
  - length 1950 mm
Technical data
### Operating and ambient conditions

| Application area | KF PV-, KV PC-, KV PV ..., Mi PV enclosures and cable glands are suitable for the outdoor installation - harsh environment and / or outdoor. However the climatic influences and effects on the equipment are to be considered.  

1) Supplementing references regarding outdoor installation - harsh environment and / or outdoor:
   - The materials used for the Mi System are basically UV resistant, so that the mechanical resistance of the boxes is maintained during UV effect. Depending on the intensity of the UV effect e.g. transparent lids can become intransparent.
   - The top side of the boxes should be protected by a cover against weather influences such as rains, ice and snow.
   - Further on, also chemical influences have to be considered with the selection of the installation place - apart from the IP rating and climatic effects.
   - In order to keep the maximum permissible ambient temperature of the installed equipment as well as for the prevention from condensation additional measures as ventilation and/or heating may be necessary.

2) “Halogen-free” in accordance with IEC 754-2 “Common test methods for cables - Determination of the amount of halogen acid gas”.

2) Toxic behaviour

<table>
<thead>
<tr>
<th>Ambient temperature</th>
<th>Cable glands</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Average value over 24 hours</td>
<td></td>
</tr>
<tr>
<td>- Maximum value</td>
<td></td>
</tr>
<tr>
<td>- Minimum value</td>
<td></td>
</tr>
<tr>
<td>+ 35°C</td>
<td></td>
</tr>
<tr>
<td>+ 40°C</td>
<td></td>
</tr>
<tr>
<td>+ 5°C</td>
<td></td>
</tr>
<tr>
<td>+ 55°C</td>
<td></td>
</tr>
<tr>
<td>+ 70°C</td>
<td></td>
</tr>
<tr>
<td>+ 75°C</td>
<td></td>
</tr>
<tr>
<td>50% at 40°C</td>
<td></td>
</tr>
<tr>
<td>100% at 25°C</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relative humidity</th>
<th>Demands</th>
</tr>
</thead>
<tbody>
<tr>
<td>- short-time</td>
<td></td>
</tr>
<tr>
<td>50% at 40°C</td>
<td></td>
</tr>
<tr>
<td>100% at 25°C</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fire protection</th>
<th>Minimum requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>in the event of internal faults</td>
<td>Demand placed on electrical devices from standards and laws</td>
</tr>
<tr>
<td>- Glow wire test in accordance with IEC 60 695-2-11:</td>
<td></td>
</tr>
<tr>
<td>- 650°C for boxes and cable glands</td>
<td></td>
</tr>
<tr>
<td>- 850°C for conducting components</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fire protection</th>
<th>Minimum requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>in the event of specific risks or hazards</td>
<td>Demand placed on electrical installations and devices in areas and facilities subject to fire risk, e.g. DIN VDE 0100 Part 482, official regulations, VdS directives</td>
</tr>
<tr>
<td>- Glow wire test in accordance with IEC 60 695-2-11:</td>
<td></td>
</tr>
<tr>
<td>- 850°C for boxes and cable glands</td>
<td></td>
</tr>
<tr>
<td>- 850°C for cavity wall installation</td>
<td></td>
</tr>
<tr>
<td>- Use of fire resistant cables</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Burning behaviour</th>
<th>Degree of protection against mechanical load</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Glow wire test IEC 60 695-2-11</td>
<td></td>
</tr>
<tr>
<td>- UL Subject 94</td>
<td></td>
</tr>
<tr>
<td>960°C V-2 flame-retardant self-extinguishing</td>
<td></td>
</tr>
<tr>
<td>750°C V-2 flame-retardant self-extinguishing</td>
<td></td>
</tr>
<tr>
<td>960°C V-2 flame-retardant self-extinguishing</td>
<td></td>
</tr>
<tr>
<td>IK 08 (5 Joule)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Toxic behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>halogen-free 2)</td>
</tr>
<tr>
<td>silicone-free</td>
</tr>
</tbody>
</table>

1) “Halogen-free” in accordance with IEC 754-2 “Common test methods for cables - Determination of the amount of halogen acid gas”.

2) **Toxic behaviour:**

- **Halogen-free**
- **Silicone-free**
### Technical Data

#### Cable Cross Section

<table>
<thead>
<tr>
<th>Cable cross section</th>
<th>NYM</th>
<th>NYY</th>
<th>NYCY</th>
<th>NYCWY</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm²</td>
<td>mm Ø</td>
<td>mm Ø</td>
<td>mm Ø</td>
<td>mm Ø</td>
</tr>
<tr>
<td>1x4</td>
<td>8</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1x6</td>
<td>8,5</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1x10</td>
<td>9,5</td>
<td>10,5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1x16</td>
<td>11</td>
<td>12</td>
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<tr>
<td>1x25</td>
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<td>14</td>
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<td></td>
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<tr>
<td>1x50</td>
<td></td>
<td>16,5</td>
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<tr>
<td>1x185</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>1x240</td>
<td></td>
<td>28</td>
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</tr>
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<td></td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2x1,5</td>
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<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2x2,5</td>
<td>11</td>
<td>13</td>
<td></td>
<td></td>
</tr>
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<td>2x4</td>
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<tr>
<td>3x50</td>
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<tr>
<td>3x70</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3x95/50</td>
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<td>37-41</td>
<td>40</td>
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</tr>
<tr>
<td>3x120/70</td>
<td></td>
<td>42</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>3x150/70</td>
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<td>47</td>
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</tr>
<tr>
<td>3x185/95</td>
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<td>52</td>
<td>48-54</td>
<td></td>
</tr>
<tr>
<td>3x240/120</td>
<td></td>
<td>57-63</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>3x300/150</td>
<td></td>
<td>63-69</td>
<td>70</td>
<td></td>
</tr>
</tbody>
</table>

#### Outside Diameter of Conventional Cable Cross Sections

The outside diameters are average values of different products.

#### Assignment of Cable Outside Diameters to Cable Entries (Glands, Grommets etc.)

<table>
<thead>
<tr>
<th>min. mm Ø</th>
<th>Outside diameters of cables max. mm Ø</th>
<th>Cable entry metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>6</td>
<td>ASM/AKM/ASS 12</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>ASM/AKM/ASS 16</td>
</tr>
<tr>
<td>6,5</td>
<td>13,5</td>
<td>ASM/AKM/ASS 20</td>
</tr>
<tr>
<td>11</td>
<td>17</td>
<td>ASM/AKM/ASS 25</td>
</tr>
<tr>
<td>15</td>
<td>21</td>
<td>ASM/AKM/ASS 32</td>
</tr>
<tr>
<td>19</td>
<td>28</td>
<td>ASM/AKM/ASS 40</td>
</tr>
<tr>
<td>27</td>
<td>35</td>
<td>ASM/AKM/ASS 50</td>
</tr>
<tr>
<td>35</td>
<td>48</td>
<td>ASM/AKM/ASS 63</td>
</tr>
<tr>
<td>4,8</td>
<td>11</td>
<td>ESM 16</td>
</tr>
<tr>
<td>6</td>
<td>13</td>
<td>ESM 20</td>
</tr>
<tr>
<td>9</td>
<td>17</td>
<td>ESM 25</td>
</tr>
<tr>
<td>9</td>
<td>23</td>
<td>ESM 32</td>
</tr>
<tr>
<td>13</td>
<td>30</td>
<td>ESM 40</td>
</tr>
<tr>
<td>3,5</td>
<td>12</td>
<td>STM 16</td>
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<tr>
<td>5</td>
<td>16</td>
<td>STM 20</td>
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<td>21</td>
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<td>7x6</td>
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<td>EDR 35</td>
</tr>
<tr>
<td>7x7</td>
<td>27</td>
<td>EDR 40</td>
</tr>
</tbody>
</table>

### Outside Diameter of Conventional Cable Cross Sections

The outside diameters are average values of different products.
### Material properties

<table>
<thead>
<tr>
<th>Material properties</th>
<th>material</th>
<th>Glow-wire test</th>
<th>UL Subject 94</th>
<th>Chemical resistance</th>
<th>Acid 10 %</th>
<th>Lye 10 %</th>
<th>Alcohol</th>
<th>Petrol (MAK)</th>
<th>Benzene (MAK)</th>
<th>Mineral oil</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lid of Mi distribution boards door of KV Small-type distribution boards</strong></td>
<td>PC (polycarbonate)</td>
<td>960° C</td>
<td>V-2</td>
<td>-40° C / +120° C</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Bottom parts of Mi distribution boards and KV small-type distribution boards</strong></td>
<td>PC-GFS (polycarbonate)</td>
<td>960° C</td>
<td>V-0</td>
<td>-40° C / +120° C</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><strong>Mi ... KV ...</strong></td>
<td>PUR (polyurethane)</td>
<td>—</td>
<td>—</td>
<td>-25° C / +80° C</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td><strong>Mi FP 38 KV ...</strong></td>
<td>TPE (thermoplastic elastomer)</td>
<td>750° C</td>
<td>V-0</td>
<td>-40° C / +100° C</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>AKM ..</strong></td>
<td>PA (polyamide)</td>
<td>960° C</td>
<td>V-0</td>
<td>-40° C / +100° C</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>ASS .., KBM .., KBS ..</strong></td>
<td>PA (polyamide)</td>
<td>960° C</td>
<td>V-2</td>
<td>-40° C / +100° C</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>AKM .., ASS ..</strong></td>
<td>PA (polyamide)</td>
<td>750° C</td>
<td>V-2</td>
<td>-40° C / +100° C</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>AKM .., ASS ..</strong></td>
<td>CR/NBR (polychloroprene - nitrile rubber)</td>
<td>—</td>
<td>—</td>
<td>-20° C / +100° C</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>—</td>
<td>0</td>
</tr>
<tr>
<td><strong>ASS ..</strong></td>
<td>TPE (Evoprene)</td>
<td>—</td>
<td>—</td>
<td>-20° C / +100° C</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td><strong>ASS ..</strong></td>
<td>CR (chloroprene rubber)</td>
<td>—</td>
<td>—</td>
<td>-30° C / +100° C</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>—</td>
<td>0</td>
</tr>
<tr>
<td><strong>KBM .., KBS ..</strong></td>
<td>EPDM ethylene propylene diene monomer rubber</td>
<td>—</td>
<td>—</td>
<td>-40° C / +130° C</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

(+ = resistance; 0 = partially resistance; — = not resistant)

1) The specifications on chemical resistance are a general guide. In individual cases it may be necessary to check resistance in combination with other chemicals and ambient conditions (temperature, concentration, etc.)

2) (MAK) - Maximum allowable concentration (work place)
Type-tested switchgear assemblies are switchgear and controlgear assemblies which are assembled and wired according to manufacturer data without essential deviations from the original type or system.

To meet these requirements for Hensel Mi Distribution boards, the following must be noted:

1. The switchgear must consist of the type-tested enclosures documented in this list.
2. The wiring of the equipment must be carried out with the cross-sections and conductor types indicated in Table “Rating of insulated conductors in switchgear assemblies”, Index Technics.
3. Once the switchgear is completed, a routine test must be carried out in accordance with this standard.
4. The test must be certified with a test report.
5. The switchgear must be provided with a manufacturer’s identification mark.

Compliance with important data such as:
- limit of temperature rise
- dielectric strength
- short-circuit withstand capacity
- short-circuit withstand capacity of the PE conductor
- IP degrees of protection
- creepage distances and clearances
is verified by type tests for this system.

- IEC 60 439-1
  Low voltage switchgear and control gear assemblies

- IEC 60 999
  Safety requirements for screw-type and screwless-type clamping units for electrical copper conductors

- DIN EN 50 262
  Metric threaded cable glands for electrical installations

- IEC 60 269
  Low voltage fuses

- DIN 43 880
  Built-in equipment for electrical installations; overall dimensions and related mounting dimensions

- IEC 60 529
  Degrees of protection provided by enclosures (IP-Code)

- IEC 60 364-712
  Electrical installations of buildings
  Requirements for special installations or locations – Solar photovoltaic (PV) power supply systems
Check list for PV generator junction boxes

Gustav Hensel GmbH & Co. KG ∙ Industrial Electrical Power Distribution Systems
Altenhundem ∙ Gustav-Hensel-Straße 6 ∙ D-57368 Lennestadt ∙ Germany ∙ www.hensel-electric.de
Phone: +49 (0) 27 23/609-423 ∙ Fax: +49 (0) 27 23/609-371 ∙ E-Mail: enysun@hensel-electric.de ∙ www.enysun.eu

<table>
<thead>
<tr>
<th>Contractor:</th>
<th>Project:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td></td>
</tr>
<tr>
<td>Address:</td>
<td></td>
</tr>
<tr>
<td>Tel. (for any questions):</td>
<td></td>
</tr>
</tbody>
</table>

- rated voltage: DC 1000 V (U_{DC \ STC})
- protection class II
- suitable for outdoor installation, UV resistant
- ready for connection
- with external stainless steel bracket
- lid fasteners for tool operation
- material: thermoplastic
- colour: grey, RAL 7032
- degree of protection IP 65

Number of boxes:              pieces

<table>
<thead>
<tr>
<th>Number of strings per box:</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Current per string:</td>
<td>15 A</td>
<td>30 A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection of strings coming from PV modules:</td>
<td>Multi Contact MC4-compatible</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable cross-section:</td>
<td></td>
<td>mm²</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Solar inverter feeding (MPP tracker): 1

| Connection of conductors going to inverter: | Multi Contact MC4-compatible | |
| Cable cross-section:                        | mm² | |

Overvoltage protection: no

DC generator disconnect switch: yes

String overload protection: yes

Blocking diodes: yes

Earthing

| Cable type and diameter: | NYY 1 x 16 mm² | |
| Cable entry:             | Cable glands | Combi climate glands | also for additional ventilation | |

Notes:

Checklist on the Internet at www.enysun.eu as editable PDF file.
Check list for solar inverter collectors

☐ Request/offer    ☐ Order    Date: __________________________

**Gustav Hensel** GmbH & Co. KG · Industrial Electrical Power Distribution Systems
Altenhundem · Gustav-Hensel-Straße 6 · D-57368 Lennestadt · Germany · www.hensel-electric.de
Phone: +49 (0) 2723/609-423 · Fax: +49 (0) 2723/609-371 · E-Mail: enysun@hensel-electric.de · www.enysun.eu

**Contractor:**
Name: __________________________________________
Address: _________________________________________
Tel. (for any questions): ____________________________

- protection class II
- suitable for outdoor installation, UV resistant
- with external stainless steel bracket
- material: thermoplastic
- colour: grey, RAL 7032

**Rated voltage:**
☐ AC 230/400 V    ☐ ________________

**Inverter**
Manufacturer/type: _______________________________________
Quantity: (pieces) ________________
Output: (kW) ________________
Current: (A) ________________
Solar inverter connection: 1~/3~/
☐ / ☐   ☐ / ☐   ☐ / ☐   ☐ / ☐

**Cable going to inverter:**
Type of cable: _______________________________________
Number of conductors: _________________________________
Cross-section: _______________________________________
Conductor material: _______________________________________
RCD (residual current protective): ☐ yes    ☐ no    ☐ type A    ☐ type B
Wire protection to solar inverter: ☐ MCB    ☐ fuse element    ☐ fuse switch disconnector

**Cable going to distribution board:**
Type of cable: _______________________________________
Number of conductors: _________________________________
Cross-section: _______________________________________
Conductor material: _______________________________________
Overvoltage protection: ☐ no    ☐ type 1    ☐ type 2    ☐ floating remote indication
Cable entry: ☐ with strain relief    ☐ without strain relief
Installation site: ☐ unprotected outdoors    ☐ protected outdoors
☐ indoors
Degree of protection: ☐ IP 65    ☐ IP 54    ☐ IP 23

**Notes:**
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Checklist on the Internet at www.enysun.eu as editable PDF file.
Erklärung der EG-Konformität

Das Produkt, The product

Bezeichnung/Name: ENYSUN
Typen/Types: Mi PV...., KV PV...., KV PC...., KF PV....
Hersteller: Gustav Hensel GmbH & Co. KG
Gustav-Hensel-Straße 6
57368 Lennestadt
Beschreibung: Generatoranschlusskästen und Wechselrichtersammler für PV-Anlagen
Description: Generator junction boxes and solar inverter collectors for PV plants

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:
EN 60 439-1
IEC 60 439-1

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


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, Association for testing and certification of low voltage equipment. 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: 2010
Year of affixing CE-Marking

Ausstellungsdatum: 01.01.2011
Date of issue

Gustav Hensel GmbH & Co. KG
R. Cater
- Technische Geschäftsleitung -
- Technical Managing Director -
### Foreign partnerships
- Angola
- Egypt
- Mozambique
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- Argentina
- USA
- Europe
- Austria
- Belgium
- Bulgaria
- Croatia
- Czech Republic
- Denmark
- Estonia
- Finland
- France
- Greece
- Great Britain
- Hungary
- Ireland
- Italy
- Israel
- Serbia and Montenegro
- Latvia
- Lithuania
- Luxembourg
- Netherlands
- Norway
- Poland
- Portugal
- Romania
- Russia
- Spain
- Sweden
- Switzerland
- Slovakia
- Turkey
- Ukraine
- Middle East
- Regional Office
- Middle East (Dubai), United Arab Emirates
- Bahrain
- Iran
- Oman
- Qatar
- Kuwait
- Saudi Arabia
- Ozeanien
- Australia
- New Zealand

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- Hensel Hungaria
  - Villamossági Kft
  - Hungary
- Hensel Polska Sp. z o. o.
  - Poland
- Hensel Elektro GmbH
  - Russia
- Hensel Electric India Pvt. Ltd
  - India
- Hensel Electric Turkey Ltd.
  - Turkey
- Hensel (Qingdao) Electrical Installation and Distribution Systems Co. Ltd
  - People's Republic of China
Here comes the sun!

Photovoltaic plants installed quickly, in adherence with standards, and safely.

ENYSUN is here at last. Now there is no longer any problem selecting and installing photovoltaic plants safely. Hensel has the professional solution. ENYSUN, the safe photovoltaic distributors that comply with the standards, the plant is quickly, easily and safely installed, from the roof to the mains supply. Clear competitive advantages for you - from Hensel.

www.enysun.eu