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Technical description CONTAINEX photovoltaic module

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Content

1 General

The following description refers to the design of new photovoltaic modules. Compatible with CONTAINEX CLASSIC Line and PLUS Line.

1.1 Basic features

Type	20‘
Length	6,055 mm
Width	2,435 mm
Height	260 mm
Weight	565 kg
Forklift pocket distance	2,050 mm
Clear opening of fork lift pockets	352 x 85 mm
Gradient	5 % on both sides

1.2 Construction

	Photovoltaic module
Frame	made of cold rolled, welded steel profiles, 4 corners, welded
Longitudinal and short end beam	3 mm
Cross beam	U-profile 4 mm
Fork lift pockets	two fork lift pockets on the long side
	Clear opening of fork lift pockets: 352 x 85 mm
	fork lift pocket distance in centre: 2,050 mm
Corner	made of cold-rolled, welded steel profiles
	4 mm
CEE recess	2.5 mm – recessed into the short end beam

2 Electrical installation

2.1 Technical data

- Technically installed total operating performance: 2.55 kWp
- 6 nos. PV panels: 425 Wp each
- External power connection (In/Out): CEE connection 32A / 400V / 5-pin
- Frequency: 50 Hz
- Type of protection (PV panel, inverter, distribution box): min. IP65
- Micro inverter conformity: EN 50549-1:2019, VDE-AR-N 4105:2018, VFR2019, IEC/EN 62109-1/-2, IEC/EN 61000-6-1/-2/-3/-4, IEC/EN 61000-3-2/-3

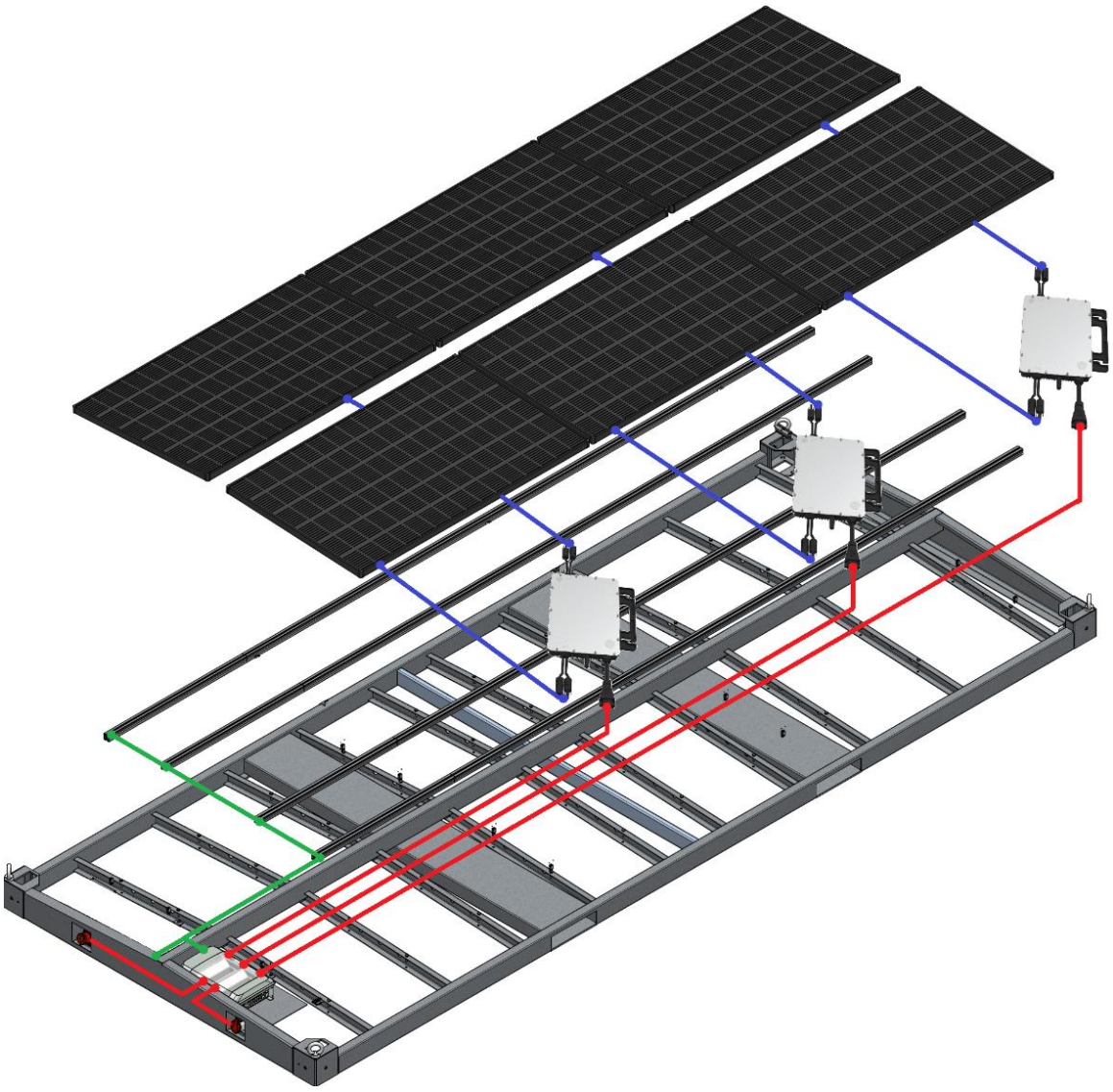
Mode of operation: surplus feed into the public power grid system!

A compliance check with the regulations of the respective network operator must be carried out in advance by the customer or system operator.

2.2 Fittings

- 6x PV-panel 425Wp each
- 3x Hoymiles micro inverter
- Two PV panels are connected per micro inverter (max. 90V DC)
- Independent MPPT (Maximum Power Point Tracking) and monitoring ensure higher energy output and easier maintenance
- Sub 1G wireless solution for more stable communication with the Hoymiles Gateway DTU
- Sub-distribution in IP66 protection class in industrial quality for installations in harsh environments and unprotected outdoor areas
- Sub-distribution with ventilation system to avoid condensation in the distribution box housing
- Analysis and monitoring via S-Miles Cloud via app or web

2.3 Schematic layout



Picture 1: schematic layout

2.4 Important information for operation, installation and commissioning

- Installation and commissioning of the photovoltaic modules may only be carried out by a licenced specialist electrical company
- A compliance check with the regulations of the respective network operator must be carried out in advance by the customer or system operator
- The manufacturer's operating and maintenance instructions for PV panels and inverters must be observed!
- Max. 3 PV modules per connection
- Limited operation in TN-S and TN-C-S system
- If there is a TT system at the installation site, the installation of an additional residual current protective device (DC-insensitive / preferably type "B") at the feed point must be ensured
- Photovoltaic module is not suitable for isolated operation!
- Operation only up to 2,000m above sea level!

- Stepping onto the photovoltaic panels is strictly prohibited, as damage may occur!
- Flammable materials must not be stored in the area of the PV modules
- Operation with a backup power supply (emergency generator) or energy storage systems (battery) is not permitted
- The metal construction of the PV module must be included in the equipotential bonding
- During the initial installation, the country set-up of the inverter must be set to the relevant country
- When the 230V AC input voltage is selected on the inverter, it only becomes active after 300 seconds!

2.4.1 Lightning and surge protection

If the PV modules are used in areas with increased lightning activity and technical measures for external lightning protection must be provided for a PV module (or an arrangement of multiple PV modules) at the installation site, due to national regulations or other special requirements, a lightning protection specialist must be commissioned to do this.

2.4.2 Safety information

The PE rail in the sub-distribution is electrically connected to an earthing bolt with a PE cable 1x6mm^2 inside the short end beam and must not be removed (torque 10-15 Nm). A further PE cable is electrically connected from the sub-distribution to the fixing profiles.

After installing the PV module and at least once per year, the function of the protective measures must be checked by a professional electrician (country-specific legal regulations must be observed)!

The electrical feed of the individual PV module may only be carried out via an overcurrent protective device. This overcurrent protective device is not included in the scope of delivery and must be sourced and installed separately on site. The maximum permissible value of the nominal current IN of the overcurrent device at the feed point of the PV module is 32 A gL or 32 A gG.

The PV modules can be electrically connected to one another using the existing CEE plugs/sockets and the connecting cables available as accessories. The CEE plugs/sockets and the connecting cables in the PV module are not protected against overcurrent and electric shock. This protection must be provided by the additional overcurrent protective device installed at the feed point.

When determining the number of PV modules (PV module + cabin connections) that can be electrically connected, the expected continuous current in the connecting cables must be taken into account. This depends, among other things, on the maximum power consumption to be expected in the individual cabins and PV modules, the expected simultaneity factors and the expected ambient air temperature. If necessary, more than one feed point with corresponding overcurrent protective devices must be provided for a PV module + modular building setup.

When installing the PV modules in the immediate vicinity of the sea, the special atmospheric requirements (salinity and humidity of the air) that exist there must be taken into account when determining the test intervals of the recurring test by the operator.

The electrical equipment of the PV modules is designed for minimal vibration stress. In case of higher loads, corresponding measures (or checks of the plug or screw connections) must be taken into account depending on the national technical regulations.

If the PV modules are used in areas with a risk of earthquakes, the national regulations apply and the equipment must be adapted accordingly.

The selection of the external connection cables for the PV modules must be adapted to the national technical regulations.

2.5 Procedure for the customer/system operator before and after hiring or buying the photovoltaic module

2.5.1 Before hiring/buying:

- Clarification of the technical requirements
- Clarification of any official approval and reporting requirements
- Clarification of the requirements of the relevant network operator

2.5.2 After hiring/buying:

- Installation and commissioning of the photovoltatic modules by a licensed professional electrician in coordination with the network oeprator

2.6 Maintenance, servicing and repair

All maintenance, servicing and repair work must only be carried out when the PV module is without power!

The manufacturer's instructions for the system components must be observed!

Cleaning with a high-pressure cleaner is FORBIDDEN.

When removing snow and ice, care should be taken not to damage the frame, the surfaces of the PV panels and the panel frames.

According to the applicable national standards, electrical systems must be inspected and checked before commissioning and after every significant change (initial test or periodic test). This on-site testing after installation is the full responsibility of the operator of the photovoltaic modules.

Repairs and the replacement of damaged or defective photovoltaic panels or other system components must only be carried out by a professional electrician. The system data from the inverter must be documented using a test log. The front and back of the photovoltaic panels must be checked for damage at regular intervals.

2.7 Electrical coupling

The connection from cabin to PV module can be done in both directions:

- Option 1: First to the cabin and then to the PV module
- Option 2: First to the PV module and then to the cabin
  (or 2 to 3 PV modules in a row and then to the cabin)

Picture 2: The input and output of the PV module are mirrored to the cabin below

- Connection via CEE connecting cable
  These must be ordered separately
- Max. 3 PV modules per connection!

3 Paint

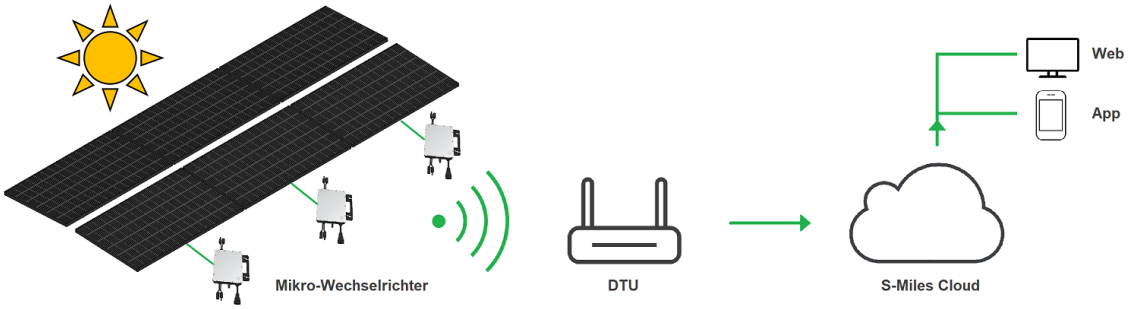
Paint system with high weather and aging durability, suitable for city and industry atmosphere.

Frame: ≥ 60 µm coating thickness

Painting is carried out by different production methods. These achieve shades similar to RAL tones. We do not accept liability for colour variations to RAL tones.

4 Monitoring of PV modules

Hoymiles micro inverters monitor the PV system at module level. The micro inverter data is collected via wireless transmission by the Data Transfer Unit and sent to the Hoymiles monitoring platform S-Miles Cloud.



Picture 3: Monitoring of PV modules

4.1 Commissioning process

The following is required:

- PV module
- DTU = Data Transfer Unit (configuration stick)
  This must be ordered separately
- WIFI connection
- Laptop

Step 1: Record the serial number of the inverters
The serial number is affixed to the back of the micro inverter.

1. Record all micro inverter serial numbers
   (alternatively, these can be requested from CONTAINEX, stating the serial number of the PV module)
2. Record the DTU serial number

Step 2: Assembly
Place the PV module in the desired location/in the sun (so that the micro inverters are supplied with power).
Step 3: Installation of DTU and access to S-Miles Cloud

The DTU is the interface between the micro inverters and the online tool (S-Miles Cloud).

- Installation according to the Hoymiles DTU user manual
- Request access data to S-Miles Cloud from CONTAINEX
  You will get an installer account
- Create the PV system in the S-Miles Cloud and complete country set-up
  Follow the S-Miles Cloud operating guide!

5 Handling / Transport

The photovoltaic module may only be transported by curtain-sided trucks. Local laws for securing loads must be observed.

The following handling instructions must be observed:

- The PV module may only be lifted individually using a fork lift (fork length at least 2,400 mm) or a crane with sufficient lifting capacity.
- M24 threads are prepared in the corners of the construction for handling with a crane. M24 ring bolts for lifting equipment (rope/chain, round sling) can be fitted into these.
- The angle between the lifting rope/chain and the horizontal line must be a minimum of 60°.
- The required rope/chain length for a 20' PV module is at least 6m, see figure 4 below
- Due to the construction and design, handling with a spreader is not possible!
- A maximum of 8 PV modules can be stacked on top of each other for storage and transport.
- 4 stacking cones (in the corners) must be used between the individual PV modules.

Figure 4

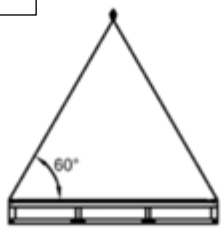
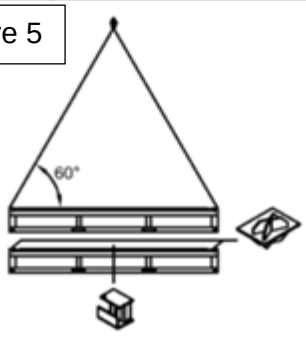


Figure 5



5.1 Installation on the cabin roof

Vertical connection with cabin (CLASSIC LINE and PLUS LINE)

- The cabin and the PV module are connected using a vertical connector in the corners
- 4 pcs. per 20' PV module <> cabin connection
- These must be ordered separately

Support wedges

- 2 pcs. support wedges (on the side rail 1 pc. per side - fig. 5)
- Different variations for CLASSIC Line and PLUS Line
- These must be ordered separately

6 Structural information

Characteristic snow load on the floor:

- sk=150 kg/m²
- sk=250 kg/m² (only cabins with optional payloads)

The following installation options are possible, in which the PV module can be placed on top of the cabin/modular building:

CLASSIC Line

- ground floor
- 2- storey
- 3- storey (only cabins with optional payloads)

PLUS Line

- ground floor
- 2- storey
- 3- storey