User Manual

General information

The KENO connection switchgear is a combination of equipment from different manufacturers for use in isolated and grounded photovoltaic installations. Different numbers of photovoltaic chains can be connected to the KENO connection switchgear, depending on the version that is selected. The switchgear and its components may be operated only in accordance with the recommendations contained in this manual. Modifications and use of third party products and components are only allowed if they are recommended or approved by KENO. After completing the installation of the connection switchgear in the existing system/installation, inspect and assess the risks associated with the operation of the components. Failure-free and safe operation of the components of the connection switchgear can only be guaranteed if it is properly transported, stored, set up, assembled, installed, commissioned, operated and maintained. Do not allow the ambient conditions to exceed acceptable limits. Follow the instructions in the associated documentation. If they are not observed, there is a risk of electric shock or property damage.

1. Security

NOTE: The KENO connection switchgear may only be connected and maintained by authorized persons qualified in electrical engineering.

- Improper installation may cause a fire hazard!
- Observe the regulations of the country of application during installation.
- Wear personal protective equipment during any work on the connection switchboard.
- During startup and maintenance work, observe the five safety principles according to DIN EN 50110-1.

In general, these rules should be applied in the order listed:

1. Disconnect from voltage.
2. Secure against restart.
3. Check for lack of voltage.
4. Ground and short circuit.
5. Cover or cordon off adjacent live parts.

After completion of the work, the steps taken must be lifted in reverse order.

DANGER: Hazardous contact voltage

There are two different voltage sources. The connection cables of a photovoltaic system can be live even when the isolating switch is open or after a ground fault.

- Do not touch any live parts.
- The photovoltaic system must be de-energized before any work is done.
- Before doing any work on the connection switchgear, disconnect the inverter from the voltage and make sure that there is no reverse voltage coming from it.
- Never connect or disconnect connection cables under load!
- Never open the fuse links under load!

NOTE: Risk of burns

Components and cables that are part of the connection switchgear can be very hot under load (> 50°C).

2. Transportation

- Secure the generator connection switchgear for transportation.
- Inspect the delivery for shipping damage. Any damage to the packaging indicates the possibility of damage to the connection switchboard. If the switchboard has visible damage, do not use it, failure may then occur.
- Any transport damage that occurs must be reported immediately and the manufacturer or supplier and the transport company must be informed immediately. The claim must be accompanied by photographs clearly documenting the damage to the packaging/delivery.
- Upon receipt of delivery, check for completeness immediately. Any deficiencies should be reported immediately to the supplier or manufacturer.

3. Installation

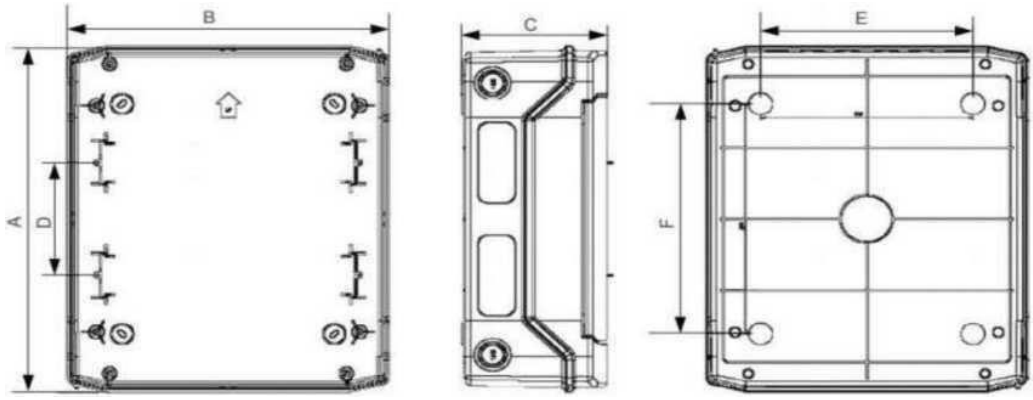
- Always inspect the connection switchboard for external signs of damage before installation. Do not use a damaged connection switchboard.
- The place where the connection switchboard will be installed should always be shaded. Avoid areas exposed to high temperatures such as from direct sunlight.
- The connection switchboard should be installed in an area that provides protection from wind and weather. Ensure sufficient protection from moisture, snow and storms.
- The connection switchboard should be installed under a canopy.
- The connection switchboard should always be mounted vertically.
- Do not mount the connection switchboard upside down.
- Do not mount the switchboard directly on flammable surfaces.
- Sufficient air circulation must be provided around the switchgear enclosure. For this purpose, sufficient clearance - 200mm on each side, e.g. from tin shields protecting from adverse weather conditions and sunlight - must be maintained.

3.1 Enclosure assembly

All the necessary hardware for installation and operation are included with the finished product. Use only these parts.

Installation method:

1. Pay attention to the distances of the holes in the housing
2. Mark the drill hole locations on the wall.
3. Drill holes at the marked locations.
4. Place the appropriate dowels in the holes.
5. Loosen the four cover screws and remove the cover.
6. Screw the generator connection switchgear with the appropriate screws and washers, if any, which are supplied with the switchgear.
7. Torque the main cover to 1.2 Nm to ensure IP65 tightness.



Dimensions

Type	Dimensions [mm]					
	A	B	C	D	E	F
PHS 4T	201	128	120	—	—	140
PHS 6T	201	165	118	—	63	140
PHS 8T	201	202	120	—	100	140
PHS 12T	259	319	144	—	210	130
PHS 18T	259	428	144	—	259	130
PHS 24T	384	319	144	125	210	255
PHS 36T	535	319	144	125	210	380
PHS 48T	664	319	144	125	210	505

4. Seven-string installation

Do not make electrical connections to the generator junction box until it is firmly installed.

4.1. Incorrect insulation

NOTE: Risk of fatal electric shock.

- Use only cables that conform to the wiring regulations in terms of voltage, current, insulation material, load capacity, etc.

4.2. Performing grounding and equipotential bonding

Make an equalizing connection using the appropriate cable cross-section in accordance with: - SPD protection devices of class I/II, type 1/2:

Minimum 16 mm2

- SPD protective device class II, type 2 safety devices:

Minimum 6 mm2

Procedure:

1. Insert the cable into the enclosure through the cable gland.
2. Connect the cable to the appropriate connection point or directly to the protective devices.
3. Tighten the cable gland to ensure the proper degree of protection.

4.3 Connecting photovoltaic chains.

Only connect or disconnect cables when they are not under voltage. KENO connection switchboards always use either STAUBLI or AMPHENOL MC connectors. Always use the same connectors installed in the connection switchboard to connect the chains to the connection switchboard.

Procedure:

1. Pull off the appropriate amount of insulation.

WIRE SECTION [mm2]	LENGTH [mm]
4	6-7.5
6	6-7.5
10	6-7.5

2. Crimp the connector on the cable using a suitable tool, e.g. ZPVMC4
3. Insert the crimped connector into the appropriate connector - when done correctly you should hear a characteristic click.
4. Pull on the joined parts of the connector to check the correct connection.
5. Tighten the choke.
6. Check the polarity of the photovoltaic chains.
7. Connect the crimped connectors to the described inputs/outputs.

5. Dismantling

1. Disconnect the voltage.
2. Remove the main cover by unscrewing the appropriate screws.
3. Depending on the design version of the connection switchboard, disconnect all the wires connected to it.
4. Loosen the mounting screws and remove the connection switchboard from the wall.
5. Close the connection switchboard.