

Assembly instructions

Junction box set MC4 for PV modules

**EN MA263**

The assembly instructions are valid for:

Product	Type	Product	Type
Junction box with socket MC4	PV-JB/TB-BT4-UR	Junction box with plug MC4	PV-JB/TB-ST4-UR

Safety instructions

Importance of the assembly instructions

NOT following the assembly and safety instructions could result in life-threatening injuries due to electric shock, electric arcs, fire, or failure of the system.

- Follow the entire assembly instructions.
- Use and install the product only according to this assembly instructions and the technical data.
- Safely store the assembly instructions and pass them on to subsequent users.

Intended use

The junction box electrically connects the PV module to the other components in DC circuits of a PV array.

Requirements for personnel

Only an electrician or electrically instructed person may assemble, install, and commission the system.

- An electrician is a person with appropriate professional training, knowledge, and experience to identify and avoid the dangers that may originate from electricity. An electrician is able to choose and use suitable personal protective equipment. The qualified electrician is qualified to select and use suitable personal protective equipment (PPE).
- An electrically instructed person is a person who is instructed or supervised by an electrician and can identify and avoid the dangers that may originate from electricity.

Prerequisites for installation and assembly

- NEVER use obviously damaged junction boxes.
- ONLY tools, materials and procedures approved by Stäubli shall be used.

Safe assembly and mounting

Live parts can remain energized after isolation or disconnection.

- ONLY install the junction box when the PV module is de-energized.

Mating and disconnecting

- ALWAYS de-energize the PV system before mating and disconnecting the connectors.
- NEVER disconnect the connectors under load.
- NEVER connect male or female part of Stäubli connector with connectors of other manufacturers.
- NEVER mate contaminated connectors.

Do NOT modify or repair junction box

- Mount the junction box only once.
- Do NOT modify the junction box after assembly.
- Replace defective junction box.

Warnings and symbols

Danger



Type and source of danger
Consequences of non-compliance
Measures to prevent/avert danger

The signal word «Danger» indicates an imminently hazardous situation, which if not avoided, **will result in death or serious injury.**

Warning



Type and source of danger
Consequences of non-compliance
Measures to prevent/avert danger

The signal word «Warning» indicates a potentially hazardous situation, which, if not avoided, could result in **death or serious injury.**

Caution



Type and source of danger
Consequences of non-compliance
Measures to prevent/avert danger

The signal word «Caution» indicates a potentially hazardous situation, which, if not avoided, could result in **minor or moderate injury.**

Note

NOTE

Notes provide additional information to protect against possible product damage.

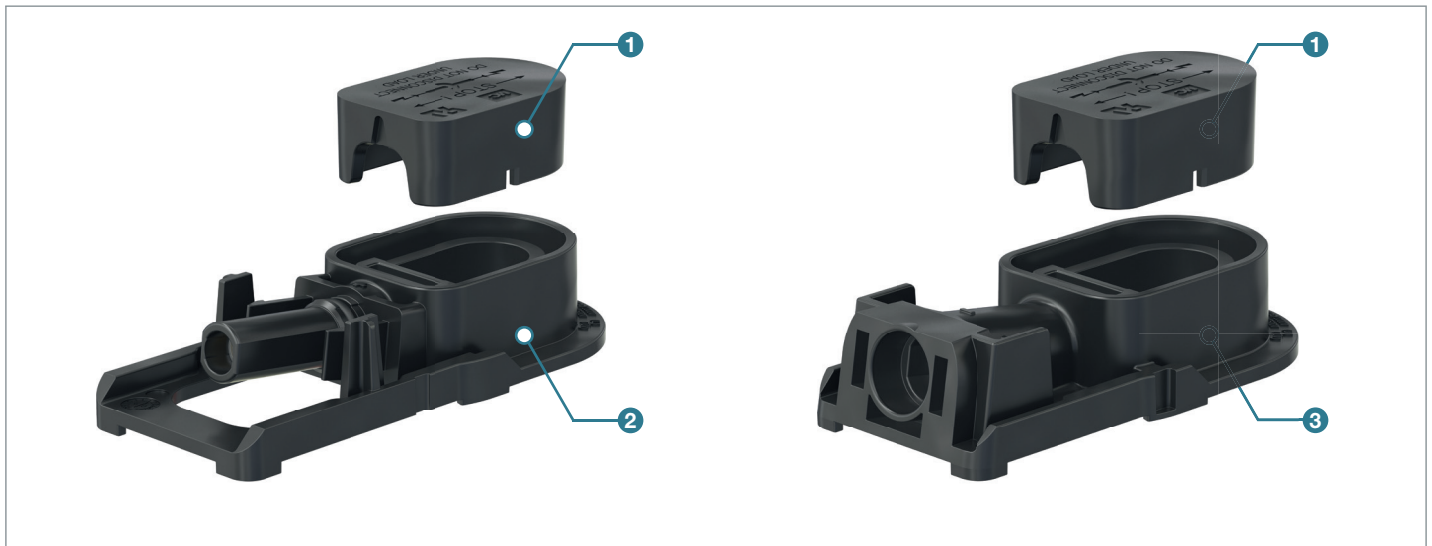
Symbols



The symbol «Observe instruction manual» refers to further assembly instructions.

1. Product overview

Product



- 1 Lid
 2 Junction box with socket
 3 Junction box with plug

Required material and tools

Material	Scope of delivery
Adhesive tape «3M™ Acrylic foam double sided adhesive tape 2204»	yes
Cleaning agent (isopropyl alcohol, acetone or methyl ethyl ketone)	–
Primer «DOWSIL™ 1200 OS Primer»	–
Adhesive and sealant «DOWSIL™ 7091»	–
Potting compound «DOWSIL™ 3-4207 Dielectric Tough Gel Kit»	–

NOTE

The listed materials have been certified for sealing and potting. If other materials are used, a separate validation must be performed.

NOTE

Note the manufacturer's specifications, whose materials are not shown in the scope of delivery.

Tool	Scope of delivery
Cartridge gun	–
Double cartridge gun	–
Cutting tool for metal	–
Lint-free work gloves	–
Lint-free cleaning cloths	–

Optional accessories

Tool	Type	Scope of delivery
Sealing cap for female cable coupler	PV-BVK4	–
Sealing cap for male cable coupler	PV-SVK4	–

2. Assembly of the junction box

Preparing the adhesive bond

Clean, dry and degreased adhesive surfaces are required for a long-lasting adhesive connection between junction box and PV module.

Material	Cleaning agent (isopropyl alcohol, acetone or methyl ethyl ketone)
	Primer (DOWSIL™ 1200 OS Primer)
	Adhesive tape (3M™ Acrylic foam double sided adhesive tape 2204)
Tool	Lint-free work gloves
	Lint-free cleaning cloths

NOTE

Follow the adhesive and sealant manufacturer's instructions for preparing the bonding surfaces.

1. Wet cleaning cloth with cleaning agent.
2. Clean the flat undersides of the junction boxes with the moistened cleaning cloth.



3. Allow flat undersides of junction boxes to dry.
4. Clean the adhesive surface of the PV module.
5. Allow the adhesive surface of the PV module to dry.
6. Treat flat undersides of junction boxes with a thin layer of the primer.

NOTE

Wipe off excess primer from the surface - e.g. white, chalky substance.

7. Allow the primer to dry.

NOTE

Follow the primer manufacturer's specifications on the drying time of the primer.

8. Apply adhesive tape to the flat undersides of the junction boxes.



NOTE

Do not yet remove adhesive foil.

Preparing the electrical connection

The junction box set MC4 for PV module electrically connects the PV module to the other components in DC circuits of a PV array. This means that welding or soldering work on the PV module is also necessary.

NOTE

Follow the PV module manufacturer's specifications for placing the junction boxes and making the electrical connection to the PV module.

NOTE

Note that the high temperatures during welding or soldering can damage the insulation material.

NOTE

Contact strips with a width of 5 mm can be contacted with the junction box set MC4 for PV modules.

The contact strips of the PV module and the junction box contacts must be located exactly on top of each other when making the electrical connection. The contact strips must also be clean, dry and degreased to make a proper connection.

Tool	Cutting tool for metal
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1. Cut the PV module contact strips to a length of **12 mm**.
2. Align the PV module contact strip exactly with the contact of the junction box to optimally prepare the electrical contact.

Processing the adhesive bond

The junction box and the PV module make a permanent connection which also protects the electrical connection from moisture and contamination. To do this, a secure adhesive connection is necessary.

Material	Adhesive and sealant (DOWSIL™ 7091)
Tool	Cartridge gun
	lint-free work gloves

NOTE

Follow the processing instructions of the adhesive and sealant manufacturer.

NOTE

The following steps must be carried out within five minutes due to the quick drying time of the adhesive and sealant.

Note the following points when applying the adhesive and sealant:

- The application must NOT have any breaks and air pockets.
 - The application must be uniform and with a thickness of **3 mm**.
 - The application must NOT make contact with the contact strips.
1. Remove the adhesive foil of the adhesive tape.
 2. Apply the adhesive and sealant in wavy lines on the flat underside of the junction box with plug.



3. Apply the adhesive and sealant in wavy lines on the flat underside of the junction box with socket.



4. Immediately attach junction boxes vertically to the prepared surface on the PV module before a skin forms on the adhesive and sealant.

NOTE

The adhesive and sealant sets within approx. 10–15 minutes (at room temperature and 50 % relative humidity).

NOTE

Follow the PV module manufacturer's specifications for placing the junction boxes and making the electrical connection to the PV module.

5. Allow the adhesive and sealant to harden.

NOTE

Note the adhesive and sealant manufacturer's instructions for the duration of the hardening phase in your working environment.

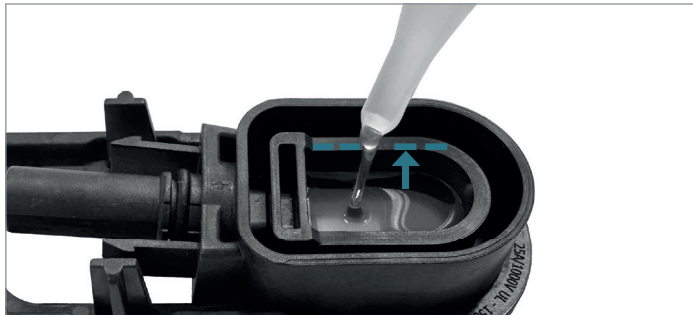
Draining the electrical connection of the junction boxes

To protect the electrical connection from moisture and contamination, it must be drained.

Material	Potting compound (DOWSIL™ 3-4207 Dielectric Tough Gel Kit)
Tool	Double cartridge gun
	Lint-free work gloves

Prerequisite: The junction box was adhered to the PV module and electrically contacted.

1. Fill the electrical connection space of the junction boxes with the potting compound at the edges.



NOTE

The overflow chambers catch excess potting compound that occurs when attaching the lid.

- ▶ **Figure 1 “Sectional view of the drained junction box with socket”**

2. Immediately attach the junction box lid.



NOTE

The potting compound hardens quickly and can make it difficult or impossible to attach the lid.

3. Allow the potting compound to harden.

NOTE

Follow the potting compound manufacturer’s instructions for the duration of the hardening phase in your working environment.

Contacting the PV module to the cable harness of the PV system

After a function check of the PV module, the connector system MC4 can be connected to the junction boxes.

⚠ DANGER

Risk of death due to electric shock!

During operation of the PV system, life-threatening voltages are generated that lead to electric shock when touched.

- ▶ De-energize the PV system before mating and disconnecting the connectors.

NOTE

Attach sealing caps to the inputs of the junction boxes if you do not connect connectors immediately after the function check.

- ▶ **Attaching the sealing caps**

NOTE

Follow the specifications of the cable manufacturer.

- Guide the cable out of the junction box at least **20 mm** without bending the cable gland.
- Guide the cable out of the junction box in a downward direction so that no moisture can collect at the cable gland.
- Route the cable tension-free to avoid mechanical tensile stress on the connection.

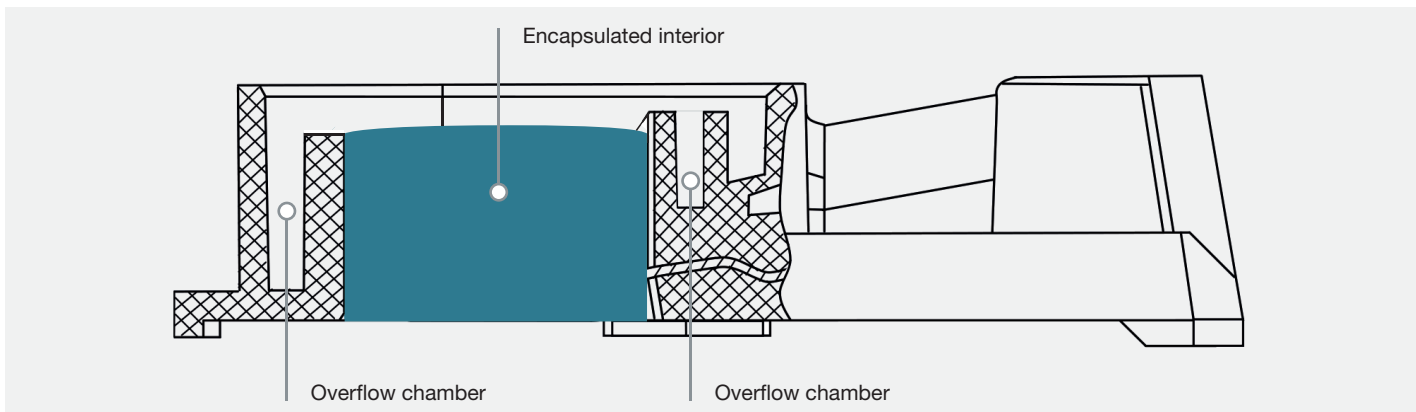


Figure 1: Sectional view of the drained junction box with socket

3. IP protection of the junction boxes

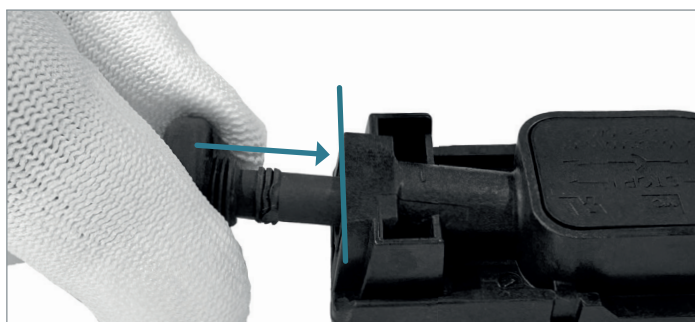
Attaching the sealing caps

It is necessary to attach the sealing caps to the junction boxes if connectors are not connected immediately after the functional check of the PV module.

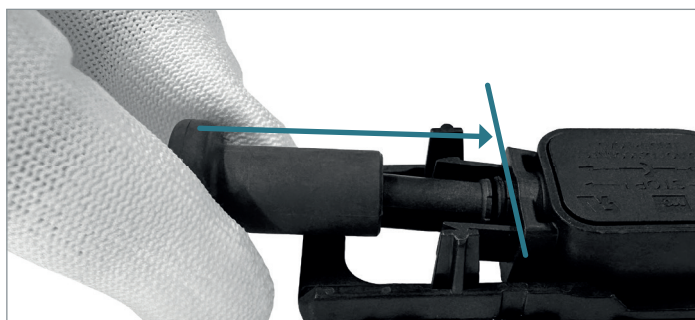
The sealing caps prevent dust, dirt and moisture from entering the junction box. The penetration of dust, dirt and moisture impairs the function of the junction box.

Material	Sealing cap for male cable coupler
	Sealing cap for female cable coupler
Tool	Lint-free gloves

1. Push the sealing cap for male cable coupler completely onto the junction box with plug.



2. Push the sealing cap for female cable coupler completely onto the junction box with socket.



4. Technical data

Connector system	MC4
Rated voltage	1000 V (IEC) 600 V (UL)
Rated current	25 A
Pulse test voltage	12 kV (IEC)
Test voltage for 1000 V	6 kV
Ambient temperature range	-40 °C ... +85 °C (IEC) -40 °C ... +40 °C (UL)
Upper limiting temperature	+105 °C (IEC)
Max. upper limiting temperature (MUT)	80 °C (UL)
Degree of protection (mated)	IP65/IP68 (1 h, 1 m)
Degree of protection (unmated)	IP2X
Safety class	Inside I, outside III
Pollution degree (mated) according to IEC 60664	3 (inside)
Contact material	Copper alloy, tin-plated
Insulation material	PA
Locking system of plug connectors	Snap-in
Flame class	UL94-V0
TÜV-Rheinland certified	IEC 62790:2020
TÜV Rheinland certificate number	R 60133378
UL certificate according to UL 3730:2014	E335016

NOTE

The rated voltage of the overall configuration is based on the rated voltage of the weakest component. This must be checked in the certificates.

5. Masthead

Manufacturer

Stäubli Electrical Connectors AG
Stockbrunnenrain 8
4123 Allschwil/Switzerland

Phone +41 61 306 55 55
Fax +41 61 306 55 56
E-mail ec.ch@staubli.com

www.staubli.com/electrical