TOMMATECH GmbH

GERMAN-based company

FLEXIBLE PANEL

Installation and User Manual



Garching - Munich Production Center / Germany



Antalya Production Center / Türkiye



WARNING:

The information in the installation guide is provided for general information purposes only. All electrical and mechanical connections must be carried out in accordance with the user manual(s) of the relevant product(s) after the necessary safety precautions have been taken. TommaTech GmbH cannot be held liable, directly or indirectly, for any damage and/or loss arising from any use or as a consequence thereof.

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MEET OUR FLEXIBLE PANEL!

Thank you for choosing your TommaTech Flexible Panel!

We are pleased that you chose TommaTech on your journey toward sustainable energy solutions. With our innovative technology, we aim to deliver a cleaner and more efficient energy experience.

This manual contains all the information you need to maximize the performance of your product and ensure safe use. Please read the instructions carefully and follow the correct steps during installation and use.

- Remember, correct use extends the life of your product and increases your energy efficiency.
- TommaTech cannot be held liable for damage resulting from incorrect installation or improper use.

WARNINGS

- Do not use different models of photovoltaic panels in the same system. This may negatively affect system performance.
- If you are using a charge controller (if purchased separately), make sure the selected controller is compatible with TommaTech panels.
- Do not modify the electrical connections of the panels. Opening or removing the junction box in particular can be dangerous and may damage the internal structure of the panel.
- Cutting or drilling the solar panel may damage it.
- Sewing fabric, zippers or similar materials onto the solar panel may damage it.

- Do not bend the solar panel cables or apply excessive force to them. Damage to the cables may cause electrical problems and hazards.
- Do not expose the solar panel to direct sunlight or any other light source during installation.
- The solar panel generates current when exposed to light, and the connector ends become electrically live.
- Maintenance, installation and removal of the solar panel must always be performed on dry surfaces.
- Use only tools with insulated handles during work.
- Do not use the solar panel in areas containing flammable or explosive materials.
- Store the solar panel in its original packaging until installation.
- Make sure the installation location of the solar panel does not pose mechanical or electrical risks.
- Never use a solar panel that has been damaged during transport, installation or use.
- Do not apply protective paint, varnish or similar coatings on the solar panel. For cleaning, only pure water is recommended; avoid detergents or chemical cleaning agents.
- Make sure the solar panel is installed according to the ‘Installation and Mounting’ steps below.

* Any procedure carried out outside the instructions in the “Flexible Panel Installation and User Manual” may damage the flexible panel and void the warranty.

INSTALLATION GUIDE

Read all instructions carefully before starting installation. Any procedure carried out outside the methods specified in the manual may damage the panel and void the warranty.

The manual covers four mounting methods;

1-Special double-sided tape 2-Silicone bonding 3-Grommet (screw) fastening 4-Spring snap fastening

PRE-INSTALLATION PREPARATION

Preparing the Mounting Surface

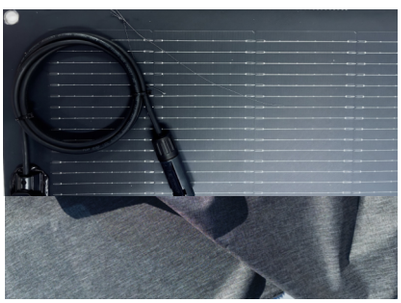
- The surface on which you will install the solar panel must be smooth, dry, clean and free of dust.
- Place the solar panel on a fixed base where there is no risk of bending.
- The mounting area is recommended to be resistant to UV rays, salt, moisture and impact.



It is recommended that the solar panel mounting surface be clean.



It is not recommended that the solar panel mounting surface be dirty.



It is not recommended that the solar panel mounting surface be wrinkled fabric.

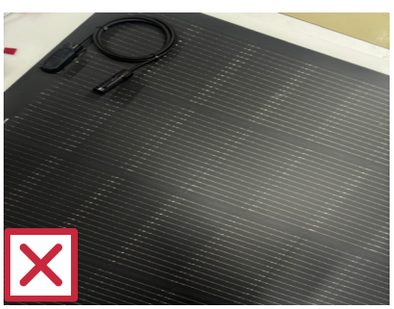
Positioning the Panel

- Place the solar panel at an angle that receives direct sunlight to provide maximum yield.
- Identify trees, buildings or other obstacles that may cast shade and choose a location where the panel will not be shaded.
- Leave enough space in the installation area to be able to reach each of the panels.
- Solar panel installation must always be done on a fixed and safe surface. Installations on unstable or moving surfaces may carry risks such as the panel coming loose due to wind, connection cables being torn off, and damage to the panel cells.

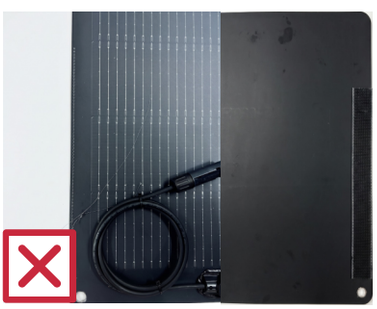
- Do not sew fabric, zippers or similar materials onto the solar panel. This may damage the panel.



It is recommended to place the solar panel at an angle that receives direct sunlight.



It is not recommended to place the solar panel where it will be partially or fully shaded.



It is not recommended to apply any hook-and-loop or stitching on the edges of the solar panel.

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1-MOUNTING METHODS

1.1 Mounting with Special Double-Sided Tape

An alternative to silicone, it is a surface-friendly bonding method. Offering high UV resistance and strong adhesion, the special tape causes far less damage to the application surface than silicone in the event of any dismounting, providing a safer option for the customer.

How to Apply?

- Clean the surface with isopropyl alcohol or similar to remove oil/dust; wait for it to dry completely.
- Remove the protective film from the tape.
- Position the panel carefully and apply even, firm pressure over the entire surface (these tapes are pressure-activated).
- Wait for the period recommended by the manufacturer to reach full bond strength (usually 24–72 hours).

Proper Use and Points to Note

- Surface cleanliness and application pressure are critical for adhesion; insufficient pressure weakens the bond.
- Adhesion performance decreases at low temperatures; follow the application temperature recommended by the manufacturer.
- After the tape has been applied to the area, it must not come into contact with liquids for the first 24 hours.

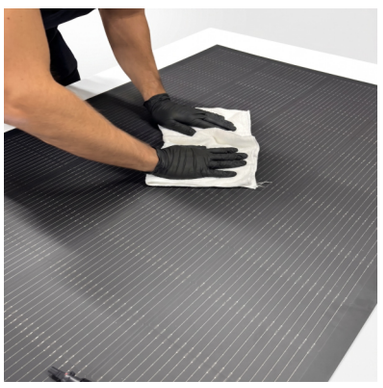
Installation Photos



The protective tape film must be removed carefully.



The solar panel to be mounted must be applied onto the designated suitable surface.



The solar panel must be adhered to the designated suitable surface by applying pressure.

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1.2-Mounting with Grommets (Screws)

This is a method of fastening the panel directly and securely to the surface with screws, using the grommet holes at the corners of the solar panel. It is a practical and safe mounting solution in areas where drilling the surface is not a concern.

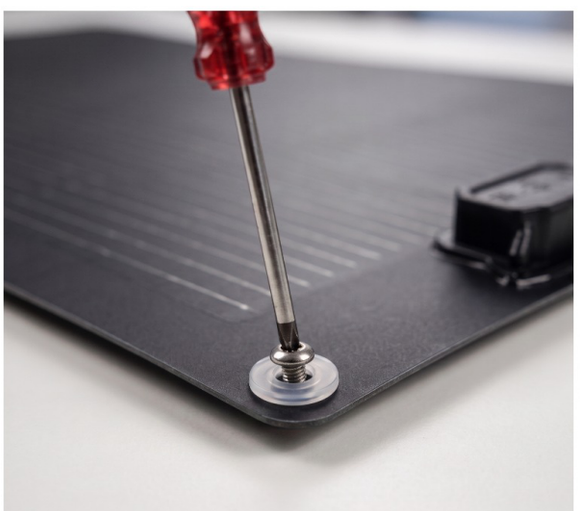
How to Apply?

- Align the grommet holes at the corners of the solar panel with the surface and mark the hole positions.
- A stainless steel washer must always be used together with the stainless steel screw; this distributes the load and prevents the grommet from tearing.
- Screw only through the grommet holes; never drill through the body of the solar panel.
- Fasten the screws without causing tension or deformation in the solar panel (by applying a tightening torque of 8-12 N.m).
- On surfaces such as boats/caravans, prevent water ingress by sealing the screw holes.

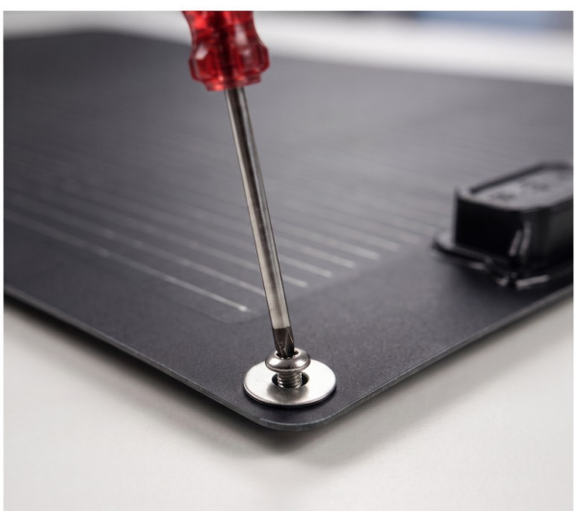
Proper Use and Points to Note

- Preferred especially on hard surfaces where drilling is not a concern, such as caravans, yachts and industrial roofs.
- The solar panel body must not be drilled; drilling voids the warranty.
- The solar panel cables must not touch the screw line or the screw heads.

Installation Photos



Installation with Plastic Washer



Installation with Metal Washer

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1.3-Mounting with Spring Snap Fasteners

A corrosion-resistant system that allows solar panels to be integrated so that they can be attached and removed on fabric surfaces such as tents, awnings and tarpaulins.



Spring Snap Fastener Image



Spring Snap Fastener Installed Image

How to Apply?

- The solar panel is placed on the fabric surface to be used and is fastened at the specified connection points around the panel.
- The upper snap fastener parts on the panel were applied at the factory during production. The user must not drill holes in the panel, add new snap fasteners, remove the existing ones or change their positions.
- The solar panel is locked to the surface by pressing the snap fasteners, allowing it to be attached and removed.
- To remove, carefully open the snap fasteners and take the solar panel off without damaging it.

Proper Use and Points to Note

- Suitable for tents, awnings, tarpaulins, military/field applications and mobile installations requiring frequent attaching and removing.
- Snap fastener points must fall on the edge/frame area of the solar panel, not on the active cell area.
- The panel must be mounted on a surface that is taut and supported enough that it will not flutter freely, vibrate or flex repeatedly during use.

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1.3.1 Installing and Using the Fastening Tool

A hole of a suitable diameter, through which the lower snap fastener part can pass and which matches the size of the tool, is drilled in the textile surface.



Marking the Area Where the Mounting Tool Will Be Attached



Drilling the Marked Area

The upper part of the tool is rotated and removed using the snap fastener tightening tool. The lower part is placed into the hole drilled in the textile surface.



Image of the Snap Fastener Placed on the Textile Surface from the Back



Spring Snap Fastener Fitted to the Fabric

The removed part is rotated with the help of the snap fastener tightening tool and fixed in place on the lower tool. After installation, make sure the tool remains completely fixed on the textile product. Care must be taken that there is no play or looseness in the part.



Reattaching the Removed Part with the Special Bit

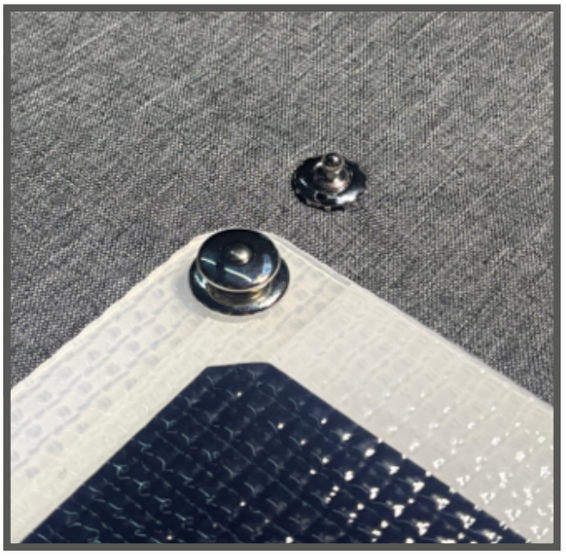


Fixed Spring Snap Fastener with Lower Part Installation Completed

* Any procedure carried out outside the instructions in the “Flexible Panel Installation and User Manual” may damage the flexible panel and void the warranty.

1.3.2 Mounting with Spring Snap Fasteners

The upper snap fastener part on the flexible solar panel is carefully aligned and placed onto the lower snap fastener part on the textile surface, and the parts are locked by snapping them together.



Upper Snap Fastener Part on the Flexible Panel

Lower Snap Fastener Part on the Textile Surface

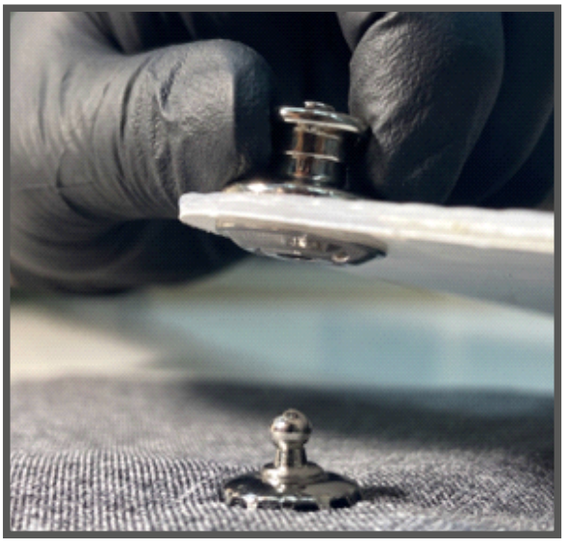


Aligning and Placing the Upper Snap Fastener Part on the Panel onto the Lower Snap Fastener Part on the Textile Surface

When removing the panel from the textile surface, the panel must be held steady with one hand and the upper snap fastener part must be pulled in a controlled manner perpendicular to the surface. Excessive force must be avoided during the process to avoid damaging the panel.



Locking the Snap Fastener Parts on the Panel and Textile Surface by Snapping Them Together



Holding the Panel Steady While Removing and Pulling the Upper Snap Fastener Part Perpendicular to the Surface

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CONNECTION DIAGRAMS

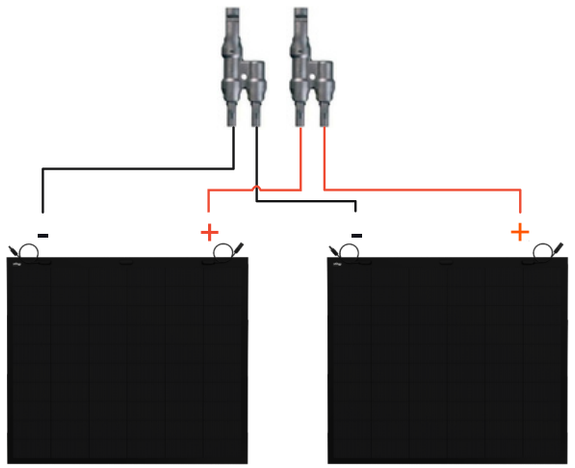
What Is a Series Connection in Electrical Circuits?

In an electrical circuit, the connection formed when the positive and negative terminals of solar panels are connected to each other and the two remaining free terminals are connected to a generator is called a series connection. In other words, it is the process of connecting the (+) terminal to the (–) terminal, and connecting the remaining free (+) and (–) terminals to the source.

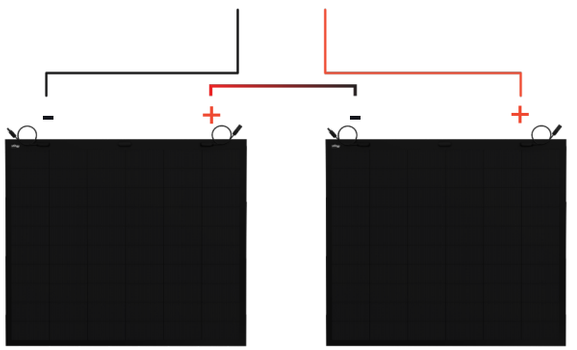
What Is a Parallel Connection in Electrical Circuits?

In an electrical circuit, the connection formed when the same terminals of solar panels are connected to each other and the two remaining free terminals are connected to a generator is called a parallel connection. In other words, it is the process of joining the (+) terminal to the (+) terminal and the (–) terminal to the (–) terminal, making each a single terminal, and connecting them to the source.

PARALLEL CONNECTION



SERIES CONNECTION



Electrical Properties	200W	Parallel Connection	Series Connection
Maximum Power (Pmax) [Wp]	200	400	500
Maximum Power Voltage (Vmp) [V]	30.67	30.67	61.34
Maximum Power Current (Imp) [A]	6.62	13.24	6.62
Open Circuit Voltage (Voc) [V]	34.60	34.60	69.2
Short Circuit Current (Isc) [A]	6.96	13.92	6.96

Electrical Properties	250W	Parallel Connection	Series Connection
Maximum Power (Pmax) [Wp]	250	500	500
Maximum Power Voltage (Vmp) [V]	38.34	38.34	76.68
Maximum Power Current (Imp) [A]	6.62	13.24	6.62
Open Circuit Voltage (Voc) [V]	43.26	43.26	86.52
Short Circuit Current (Isc) [A]	6.96	13.92	6.96

Electrical Properties	280W	Parallel Connection	Series Connection
Maximum Power (Pmax) [Wp]	280	560	560
Maximum Power Voltage (Vmp) [V]	42.17	42.17	84.34
Maximum Power Current (Imp) [A]	6.62	13.24	6.62
Open Circuit Voltage (Voc) [V]	47.58	47.58	95.16
Short Circuit Current (Isc) [A]	6.96	13.92	6.96

* The parallel and series connection values stated above are calculated for 2 panels and are provided for informational purposes only.

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MAINTENANCE AND INSPECTION AFTER INSTALLATION

- Regularly clean dirt, dust or residue on the photovoltaic panels. Do not clean with chemicals.
- Do not use hard materials that could scratch the photovoltaic panel surface.
- Check the electrical connections at regular intervals and tighten any that have come loose.
- Protect the photovoltaic panel against extreme temperature, moisture and mechanical impact to prevent damage.
- Never step on the photovoltaic panel to avoid damaging it.



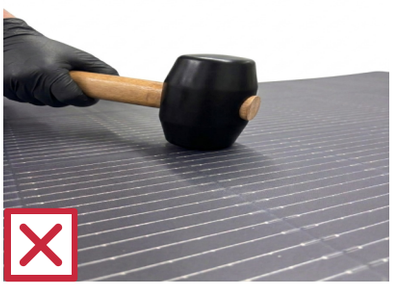
It is recommended to clean the panel only with pure water.



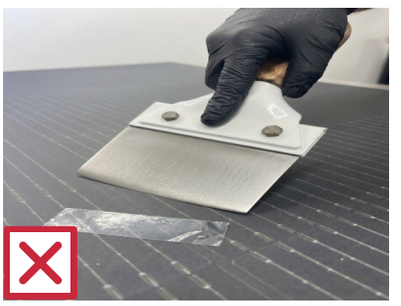
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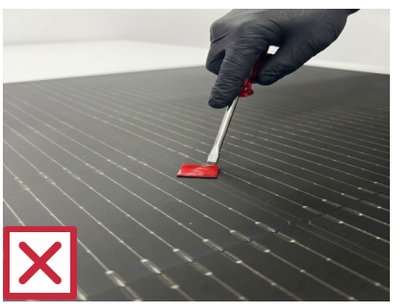
Never step on the panel.



Protect the panel against mechanical impact.



Avoid contact of the panel with foreign objects.



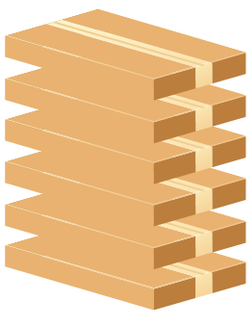
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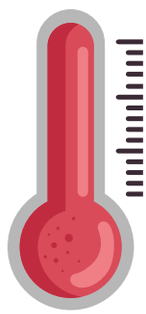
STORAGE GUIDE

- Store the panels on a flat surface so that they are not exposed to bending or flexing.
- Do not place heavy objects on the panels and avoid stacking too many panels on top of each other.
- Store the panels at a temperature between 10-25 °C, without exposing them to moisture or extreme hot or cold weather conditions.
- The surface of panels exposed to direct sunlight for a long time may be damaged, so store them in a shaded place.
- Do not store in environments containing solvents, acids or other chemicals that could damage the panel surface.
- If possible, protect the panels from external factors by storing them in their original packaging.
- Place the panels horizontally to prevent the risk of bending or cracking.

Store the panel surface in a way that protects it against scratches, punctures or impacts.



It is recommended to stack a maximum of 6 panels on top of each other.



Storage at a temperature between 10-25°C is recommended.



It is recommended not to store in environments containing chemicals.

WARRANTY COVERAGE

The warranty period starts from the date of the sales invoice issued to the customer. The warranty period of the products is 2 years.

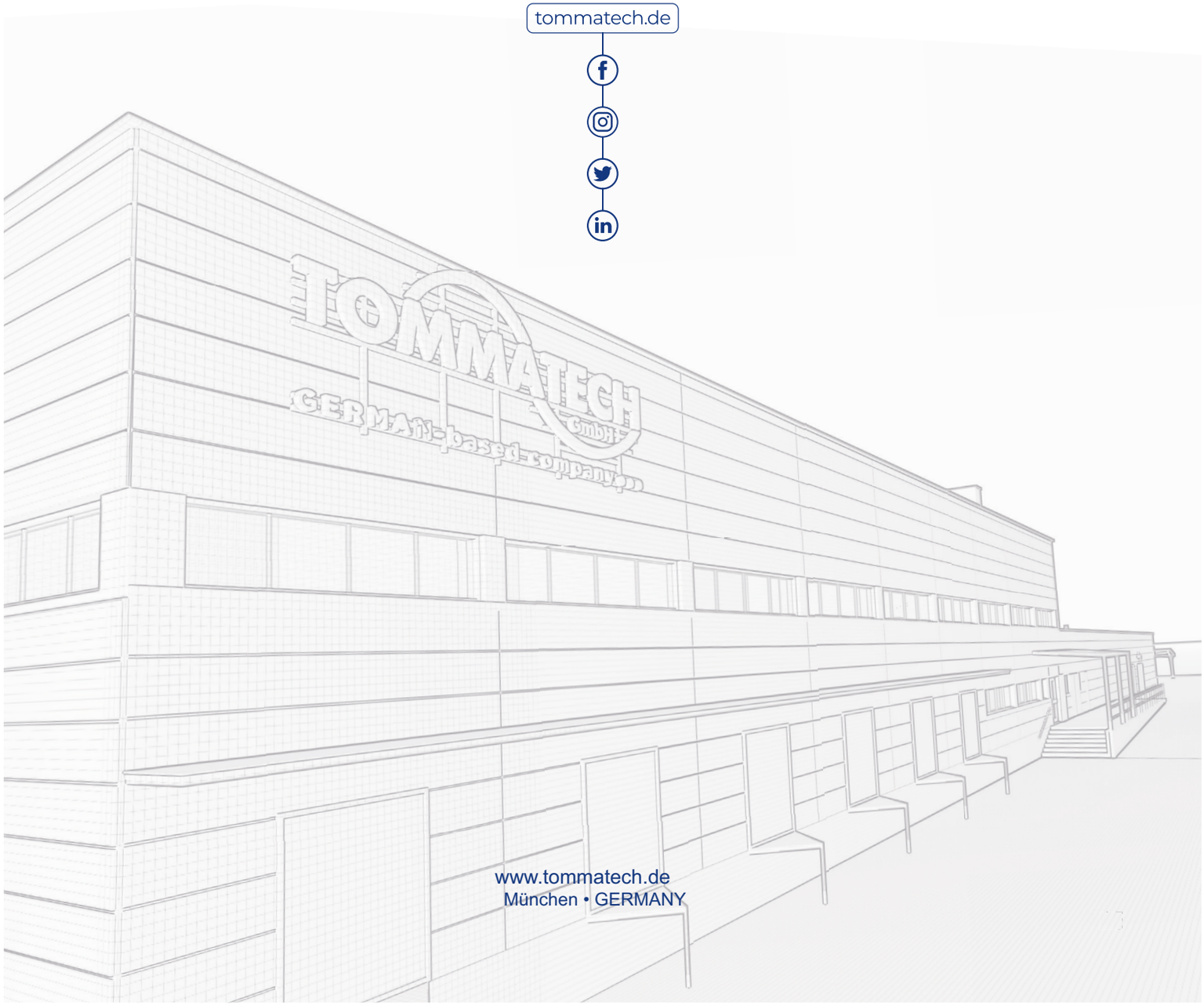
1- Providing, adding or replacing an additional PV module or repairing the photovoltaic panel does not extend the specified warranty period or provide a substitute warranty period.

2-TommaTech flexible panel warranty does not apply to photovoltaic panels exposed to the following conditions.

- Mechanical stress, excessive flexing or repeated flexing,
- Problems, defects and failures arising from improper or incorrect use or user errors, and damages caused by negligence or intent,
- Problems, defects and failures arising from the mounting, installation or application of the solar panel with other materials, equipment and devices,
- Problems, defects and failures arising from alterations, maintenance, procedures or modifications and incorrect installation, mounting and applications,
- Problems, defects and failures arising from installations and applications not in accordance with the manufacturer's instructions, user manuals and the labels on the photovoltaic panel,
- Problems, defects and failures arising from the transport of the solar panel and its storage under unsuitable conditions,
- Problems, defects and failures occurring because the installation site and region are not suitable for the characteristics of the photovoltaic panel.

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