

A correction factor (K_f) should be applied for determining the fuse rated current working at different temperatures. Please confirm the final fuse selection with the qualified design institutes and fuse manufacturer. The maximum series fuse rating value on the products' datasheet provided by Trina Solar should be used for reference only.

7 PV MODULE MAINTENANCE

7.1 VISUAL INSPECTION AND REPLACEMENT

The modules must be inspected and maintained regularly, which is the responsibility of the users. The circuit breaker should be disconnected before the inspection. If the modules are damaged, such as broken glass, broken cables, and damaged junction boxes, it may cause functional and safety failures. If the module is damaged, replace the damaged module with a new module of the same type. Do not touch the live part of the cable or connector.

It is recommended to perform a preventive inspection every six months, and do not replace components of modules without authorization. If electrical or mechanical performance inspection or maintenance is required, it is recommended that qualified professionals should perform the operation to avoid electric shock or personal injury.

The vegetation should be cut regularly to avoid shading and thus affecting the module's performance.

Check if the mounting hardware is tightened correctly in place.

Check whether all string fuses in each non-grounded pole are working properly.

Please cover the front surface of modules with an opaque material during repairing. Modules exposed to sunlight can generate high voltage, which is extremely dangerous.

Trina Solar PV modules are equipped with bypass diodes in the junction box to minimize module heating and current losses.



Before cleaning, make sure to wear PPE, such as insulated protective gloves, protective glasses, hard hats, safety insulated shoes, etc.

When using scaffolding, make sure that the scaffolding is in a stable position or with anti-dumping measures, and that the installer should wear a safety belt in accordance with local building codes.

Do not stand on the modules or trackers for cleaning work.

Do not try to open the junction box to change the diodes even if they fail.

If the module is damaged (broken glass or scratches on the back sheet), it needs to be replaced.

It is necessary to wear cut-resistant gloves and other personal protective equipment for special installations.

Make sure to isolate the impacted array string to prevent the current generation before attempting to remove the module.

Use the relevant disconnect tool provided by the supplier to disconnect the connector of the affected module.

Check the open circuit voltage of the array string and verify that the open circuit voltage of other strings connected in parallel are within a range of 10V difference.

Turn the circuit breaker on again after checking.

Please also pay attention to other safety precautions listed at the beginning of this manual.

7.2 CONNECTOR AND CABLE INSPECTION

Inspect all cables to verify that they are firmly connected, avoid direct sunlight, and keep them away from water areas.

It is recommended to check the connectors, torque of bolts, and the general condition of wiring at least once a year. Also, check that mounting hardware is fastened in place. Loose connections will result in damage to the array.

7.3 CLEANING

This manual covers the requirements for the cleaning procedures of Trina Solar PV modules. Professional installers should read these guidelines carefully and strictly follow these instructions. Failure to follow these instructions may result in death, injury, or property damage. Damages induced by inappropriate cleaning procedures will void Trina Solar warranty.

The amount of electricity generated by a solar module is proportional to the amount of light captured. A module with shaded cells generate less energy, and therefore, it is essential to keep PV modules clean. The dirt such as bird droppings, leaves, dust is usually need to be cleaned.

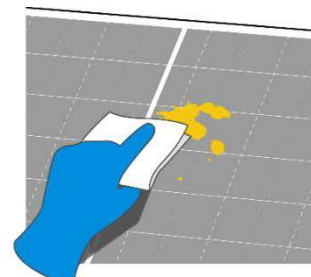
When cleaning the modules, make sure that the temperature difference between the water and the module is in the range of -5°C to 10°C .

Use a dry or wet, soft and clean cloth, sponge, or soft bristled brush to wipe the photovoltaic module. Please make sure that the cleaning tools do not wear out glass, EPDM, silicon, aluminum alloys or steel.

If there is greasy dirt or other substances which are difficult to clean, conventional household glass cleaning agents can be used. Pay attention not to use alkaline and strong acidic solvents, including hydrofluoric acid, alkali, acetone.

For modules that are installed horizontally (0° tilt angle), they should be cleaned more frequently, as they do not have "self-cleaning" function as those installed at 10° or larger tilt angles.

The back surface of the monofacial module usually does not need to be cleaned. When cleaning the back of the bifacial module, avoid any sharp objects that may cause damage or penetrate the base material. The other cleaning requirements are the same as the front-side.



Cleaning activities create risk of damaging the modules and array components, as well as increasing the potential electric shock hazard.

Do not clean the modules during the hottest time of the day to avoid thermal stress on the modules.

Cracked or broken modules represent an electric shock hazard due to leakage currents, and the risk of shock is increased when modules are wet. Before cleaning, thoroughly inspect modules for cracks, damage, and loose connections.

During the daylight, the voltage and current present in the array are sufficient to cause a fatal electric shock.

Please make sure that the array has been disconnected from other active components before starting the cleaning.

Wear suitable protective clothing (clothes, insulating gloves, etc.) when cleaning the modules.

Do not immerse the module, partially or totally, in water or any other cleaning solutions.

Do not use such as lubricants and organic solvents to clean the connectors.

Do not clean modules under the weather conditions of wind more than 4 class (in Beaufort scale), heavy rain or heavy snow.

When cleaning the modules, it is forbidden to step on the modules, forbidden the injection of water to the backside of the modules or cables. Please ensure that the connectors are clean and dry to prevent electric shock and fire hazards.

Do not use steam cleaner.

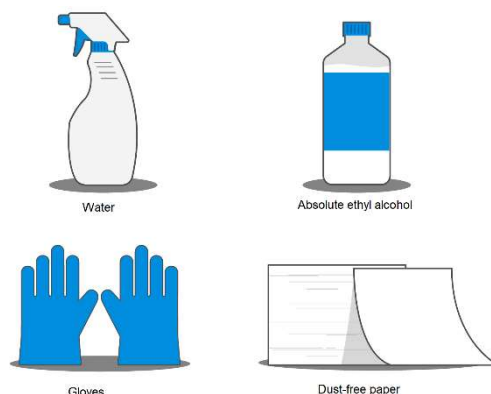
For detailed requirements regarding cleaning, please refer to *White Paper for PV Modules Operation and Maintenance*, available from <https://www.trinasolar.com/en-glb/resources/downloads>.

CLEANING METHODS

Method A: Compressed water

Requirement for water quality:

- PH: 6~8;
- Water hardness-Calcium carbonate concentration : ≤ 600 mg/L
- Recommend to use soft water to wash.
- The recommended maximum water pressure is 4 MPa (40 bar)



Method B: Compressed Air

Trina Solar recommends using this method to clean the soft dirt (like dust) on modules. This technique can be applied as long as the method is efficient enough to clean the modules considering the on-site conditions.

Method C: Wet cleaning

If excessive soiling is present on the module surface, a non-conductive brush, sponge, or other mild agitating method may be used with caution.

Please make sure that any brushes or agitating tools are constructed with non-conductive materials to minimize risk of electric shock and that they are not abrasive to the glass or the aluminum frame.

If grease is present, an environmentally friendly cleaning agent may be used with caution.

Method D: Cleaning robot

If a cleaning robot is used for dry cleaning, the brush material is required to be soft plastic material, and the glass surface and aluminum alloy frame of the module will not be scratched during the cleaning process and after cleaning. The weight of the cleaning robot should not be too large. If the cleaning robot is improperly used, and the resulting module damage and power attenuation are not covered by Trina Solar's warranty.

TROUBLE SHOOTING

If your PV system does not work normally after installation, please inform your installer immediately. It is recommended to perform preventive inspections every six months, and do not change the components of the modules without authorization. If electrical or mechanical performance inspection or maintenance is required, they should be operated by qualified professionals to avoid any electric shock or personal injury.