

PvSpin

Cleaning device for solar modules

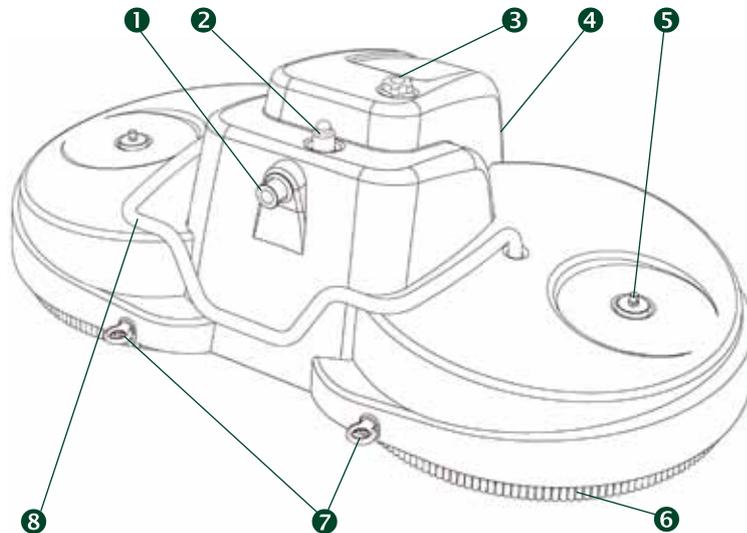
PvSpin is a cleaning device for a material-protecting cleaning of the surfaces of solar modules. Soiled solar modules only gain reduced yields in many cases. If the module surfaces are cleaned using the cleaning device PvSpin, the generation of power can be increased, which in turn results in higher yields. PvSpin is driven by a powerful water hydraulic axial piston engine.



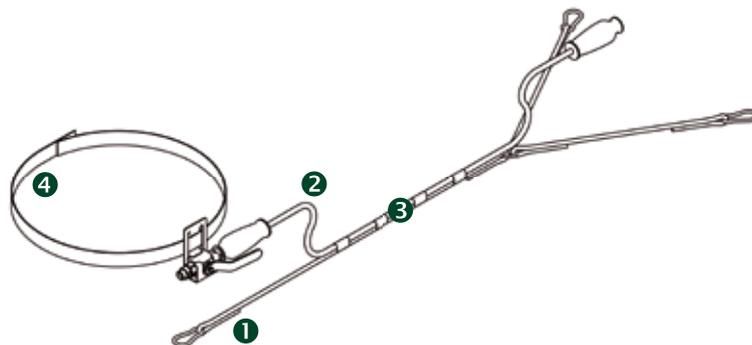
1. Intended use of the cleaning device

Please use PvSpin exclusively for cleaning the surfaces of solar modules. PvSpin is not suitable for the cleaning of floor coverings or as a sweeping device. The device is not suitable as a permanently installed cleaning device. By all means, read the safety instructions before putting the cleaning device into operation and pay regard to the warranty conditions by the module producer.

2. Technical manual



- 1 Hose connector for high pressure hose (1/2" external thread)
- 2 Fine filter (5 µm)
- 3 Bypass valve with star knob
- 4 Ear for hauling rope
- 5 Water nozzles
- 6 Cleaning brushes
- 7 Ears for the fastening of the safety rope
- 8 Handle



We recommend a synchronous guidance of the high-pressure hose and the safety rope (see item 3):

- 1 Safety rope
- 2 High-pressure hose
- 3 Connection of the safety rope to the high-pressure hose
- 4 Belt

3. Safety instructions

Before every use, the cleaning device and all accessories have to be checked in order to make sure that they are perfectly intact and will work properly. Do not use the device if a connecting cable or any part of the device is damaged. During operation, the device must be monitored permanently.



Warning
Risk of falling!

There is always a risk of falling when working on the roof. Stepping onto modules leads to a great danger of slipping. Compliance with legally defined accident prevention procedures is mandatory when working on roofs. According to the procedures for the prevention of accidents, a safety harness or a safety scaffold must be used.

Never step on solar modules!



Warning!
Risk of injury!

Fingers can be hurt by rotating parts, especially by the disc brushes.

Never touch rotating parts!



Warning!
Risk of injury!

There is a risk that people get hurt or even killed by objects falling off the roof.

The cleaning device must be secured with a safety line to a stable point on the roof to make sure that it cannot fall off the roof. The danger area on the ground must be sealed off to protect passers-by from objects falling off the roof.



Warning!
Risk of breakage!

Do not step on the solar plant in order not to damage the modules.

Never step on solar modules!



Warning!
Danger of damage!

Soiled brushes can damage the module surfaces.

Keep the brushes clean from dirt and sand.



Warning!
Risk of electric shock!

When a solar plant is exposed to light, electric cables and solar plant components carry a permanent electrical voltage. Touching conductive components can result in electric shock. Electric energy at aerial lines can lead to severe injuries or even death.

All operations with electrical equipment must be carried out exclusively by expert staff.

Sufficient safety distances to all electric plant components and to all aerial lines have to be maintained!

4. Handling

Information on water quality and the utilization of detergents



Warning!

Danger of damage!

Inappropriate detergents can damage the modules that are supposed to be cleaned.
Only use detergents that have been approved by the module producer.
The warranty conditions by the module producer must be observed!



Warning!

Danger to the environment!

Processed water or detergents can endanger the environment.
Any uncontrolled release of sewage into the environment or into the canalization must be avoided.
Observe the legal regulations!



Warning!

Danger of damage!

Hot water can damage the water hydraulic axial piston engine.
The water temperature must not be higher than 50 °C.

Module cleansing using soft brushes (like the ones that are part of PvSpin) and pure water without addition of any detergents is tolerated by most module producers.



Please note:

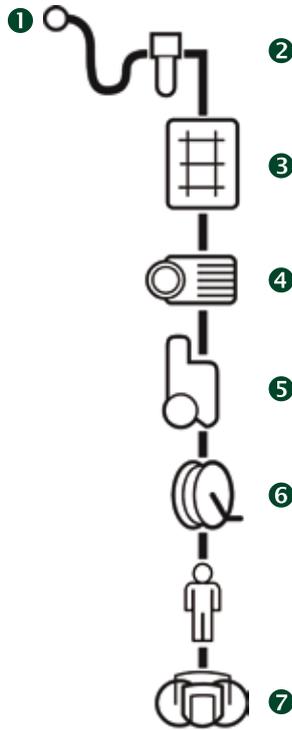
The warranty conditions by the module producer must be observed!



Please note:

With high external temperatures, it is recommendable to pre-heat the water in order to avoid stresses within the glass caused by temperature differences. The warranty conditions by the module producer must be observed!

System set-up



We recommend our customers to set up the system as follows:

- ❶ Water inflow and connection of the components: Standard hose with a nominal width of ½", longer hoses with a nominal width of ¾". Adapter kits for standard water taps:
Recommended if the device is used at different operating sites.
- ❷ Water filtering system: Flow rate capacity of 2 m³/h for the preparation of water that is suitable for cleaning.
- ❸ Buffer tank: To avoid dry running in the high-pressure pump of the high pressure cleaning device. If there is no sufficient water pressure or flow rate on site, we recommend the utilization of a standard pallet tank with a capacity of 1000 l. In order to safeguard an uninterrupted cleaning operation, the tank can be filled with a sufficient quantity of water during the preparation phase. If you use rain water, please make sure that it is sufficiently pre-filtered.
- ❹ Pump: Between the tank and the high-pressure cleaner with a minimum flow rate of 2000 l/h. If a self-priming high pressure cleaner is used, no pump ❹ is required.
- ❺ Standard high-pressure cleaner, possibly heatable. Pay regard to the safety information of the high-pressure cleaner!
- ❻ Hose reel with crank including rotary water feed-through.
- ❼ Inlet to the cleaning device: DN8 high pressure hose; With extension, if required. Connection M 22x1.5.

Handling

Read the safety information carefully before you start working with PvSpin. Make sure that a sufficiently big area on the ground is safely sealed off and that the workers on the roof are sufficiently secured. Please set up the system according to the recommended system set-up.

The handling of the PvSpin device is also shown in a video at www.youtube.com/user/SchletterGmbH.



Important information

The assistance of a second person is highly recommended in the following cases:

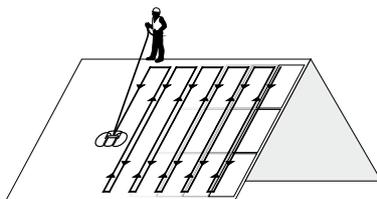
- For the guidance of the loose part of the hose on the roof.
- On very flat roofs, the PvSpin is pulled downwards with the attached rope by a second operator who is standing on the ground.

In the roof edge area, maximum precaution is required.

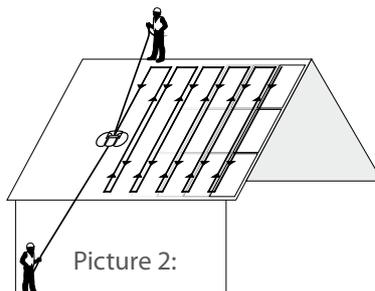
1. PvSpin has to be operated from the ridge (picture 1). All components listed under "system set-up" remain on the ground, whereas the operator with the PvSpin cleaning device is standing on the roof ridge.

Please note:

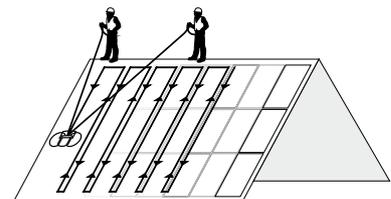
With bigger rafter lengths, you have to use a longer hose. In this case, it may be more difficult to guide the PvSpin, as the device only reacts to the actions of the operator with a certain delay. To facilitate the control of the cleaning device, it is recommendable to deploy a second operator. This operator can work while standing on the ground (picture 2) or on the ridge (picture 3), and helps to guide the device using the attached synthetic rope.



Picture 1:

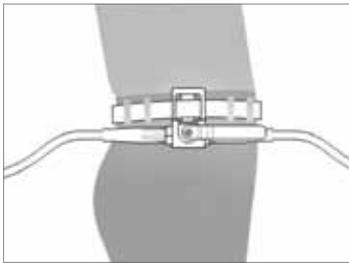


Picture 2:

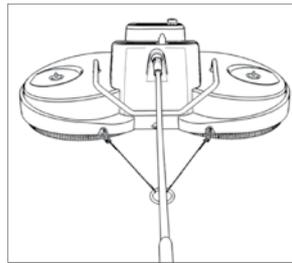


Picture 3:

2. Wetten the first module row with the hose in order to loosen the soiling. Thus, stubborn dirt can be removed gently and the brushes will not scrub on dry surfaces.
3. Connect the high-pressure hose (inlet and hose to the PvSpin) to the stopcock (picture 4). Connect the high-pressure hose to the hose connection ❶.
4. Fasten the safety rope to the ears ❷ intended for that purpose (picture 5).



Picture 4:



Picture 5:

5. Place the PvSpin on the first module row. Fasten the PvSpin with the safety rope to a stable point on the roof.
6. In order to safeguard smooth operation, the tube must be completely free of air. To evacuate the air from the hose, open the bypass valve ❸ completely before switching on the high pressure pump in order to avoid any unintended starting of the PvSpin. Thus, the complete water flow is first released through the water nozzles ❹.
7. Now, slowly turn down the bypass valve ❸ to start the device and to set the rotational speed. The cleaning brushes are driven by the water pressure.
8. Start the cleaning process by letting the PvSpin slide down slowly in a straight line at the verge from the ridge to the eaves. Always move the safety rope and the high-pressure hose synchronously (they should to be connected).



Warning!
Risk of falling!

The safety rope and the hose lead to a danger of stumbling.
Always lay down the safety rope and the hose diligently to make sure that you will not get entangled.

9. Pull back the PvSpin up the same track you let it slide down before.
10. Shift the device by one operation width to the next track and repeat the cleaning operation until you reach the other verge.



Warning!
Risk of injury!

There is a great danger that people get hurt or killed if objects fall off the roof.
Fasten the device at the roof using the safety rope.
A sufficiently big safety area on the ground has to be sealed off, so that even in the worst case nobody will get hurt by parts falling off the roof.

11. In the course of the cleaning, the water nozzles ❺ wetten the row that will be cleaned next in order to loosen the soiling so that it can be brushed off more easily. Thus, it is safeguarded that also encrusted dirt is brushed off gently and that the brush will never scrub on dry surfaces.

5. Maintenance and servicing

- Keep the brushes clean from dirt and sand. Soiled brushes can damage the module surfaces.
- Before every use, make sure that the high-pressure hose is not damaged. If the high-pressure hose is damaged, it has to be replaced immediately.
- Always make sure that the device is stored dry and safe from frost. Freezing water can damage the device.
- The integrated fine filter  has to be exchanged as soon as the soiling indicator shows red. Please pay regard to the information on operation and maintenance of the filter.
- Please do not forget to cover the pinion gear drives with a thin film of grease before each use (preferably use eco-friendly plumber's grease or the like)

6. Accessories, spare and wear parts



Important information

Only original spare and wear parts may be used. Original parts safeguard that the device can be operated safely and smoothly.

The following wear parts are available:

Item no.	Name
979000-349	Brush for PvSpin
979000-357	Sprocket for PvSpin
990000-288	5 µm replacement filter for PvSpin
189000-003	Sealing kit for filter element
979000-354	High-pressure hose for PvSpin, 20 m

Accessories

Item no.	Name
182020-000	PvSpin safety rope 22 m
182020-010	Hose with stopcock for PvSpin

Further spare parts and accessories on request:

7. Technical data

Item number	182019-001 PvSpin without accessories
Length	1100 mm
Width	520 mm
Weight	approx. 25 kg
Brush diameter	520 mm
Operating pressure	min. 130 bar max. 160 bar
Operating flow rate	min. 10 l/min. max. 25 l/min.

8. Declaration of conformity

The device meets the basic requirements of the Machinery Directive 2006/42/EG.

The declaration of conformity is available on the internet and can be looked up and downloaded there. www.schletter.eu (in the download area at solar mounting systems/conformity).

In the interest of product improvement, the producer reserves the right to modify the device and its functions without prior notice.