

# SOLA-TECS C

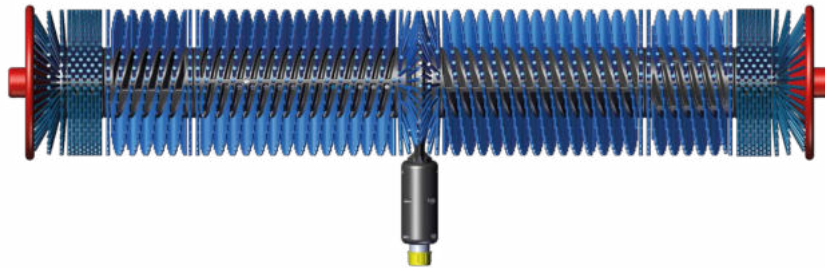
## Operating Instructions

CY 2010 ...  
SN 0139 ...  
C400 | C600 | C800 | C1000  
BA 0303788 R03 2021-05

Operating instructions for the  
Sola-Tecs C cleaning system.

en




C400 | C600 | C800 | C1000



MADE  
IN  
GERMANY

Cleantecs

## Table of Contents

 <b>Basics</b> .....	<b>5</b>
Overview of the cleaner components .....	6
Included with the cleaner .....	7
Accessories required for operation .....	8
Cleaner tool kit .....	9
How does the Sola-Tecs C work .....	10
Components and their function .....	11
Intended Use .....	13
Requirements for the photovoltaic surfaces to be cleaned .....	13
Requirements for the system user .....	13
Space requirement for the Sola-Tecs C .....	13
Requirements for the high pressure cleaner .....	13
Requirements for the lance .....	14
Performance limits for operation .....	14
Performance data in normal operation .....	14
EC Declaration of Conformity .....	15
 <b>Safety Principles</b> .....	<b>17</b>
For your safety .....	18
 <b>Working Safely</b> .....	<b>20</b>
<b>Working Safely</b> .....	<b>21</b>
Selecting a safe starting point .....	21
Observing hazards in the working area .....	21
Determining the safety of the modules to be cleaned .....	21
Safety when cleaning .....	22
Checking and preparing high-pressure equipment .....	22
Checking lances for damage .....	22

 <b>Commissioning</b> .....	<b>23</b>
<b>Preparation for mounting the cleaner</b> .....	<b>24</b>
Removing the transport cap.....	24
Checking the gearbox.....	24
Checking the high-pressure filter.....	24
<b>Mounting cleaner on the lance</b> .....	<b>25</b>
Flushing the system.....	25
Attaching and aligning.....	26
Screwing on the telescopic lance and the modular pole.....	27
 <b>Working</b> .....	<b>28</b>
<b>Working with the cleaner</b> .....	<b>29</b>
Placing the cleaner at the starting point.....	29
Cleaning with the Sola-Tecs C.....	32
 <b>Transport and Storage</b> .....	<b>33</b>
<b>Transporting and Storing the Cleaner</b> .....	<b>34</b>
Preparing for transport.....	34
Preparing for storage.....	35
 <b>Disposal</b> .....	<b>36</b>
<b>What happens with the waste?</b> .....	<b>37</b>
Packaging.....	37
Gear housing, planetary gear and brush roller.....	37
Gearbox shaft, gearbox cover and connection nipple.....	37



It's **IMPORTANT**, that you  
**READ THE OPERATING INSTRUCTIONS CAREFULLY**  
**BEFORE USE** and  
**KEEP FOR FUTURE REFERENCE.**

The operating instructions are intended for...

Sola-Tecs C from 2010 and later  
Serial number 0139

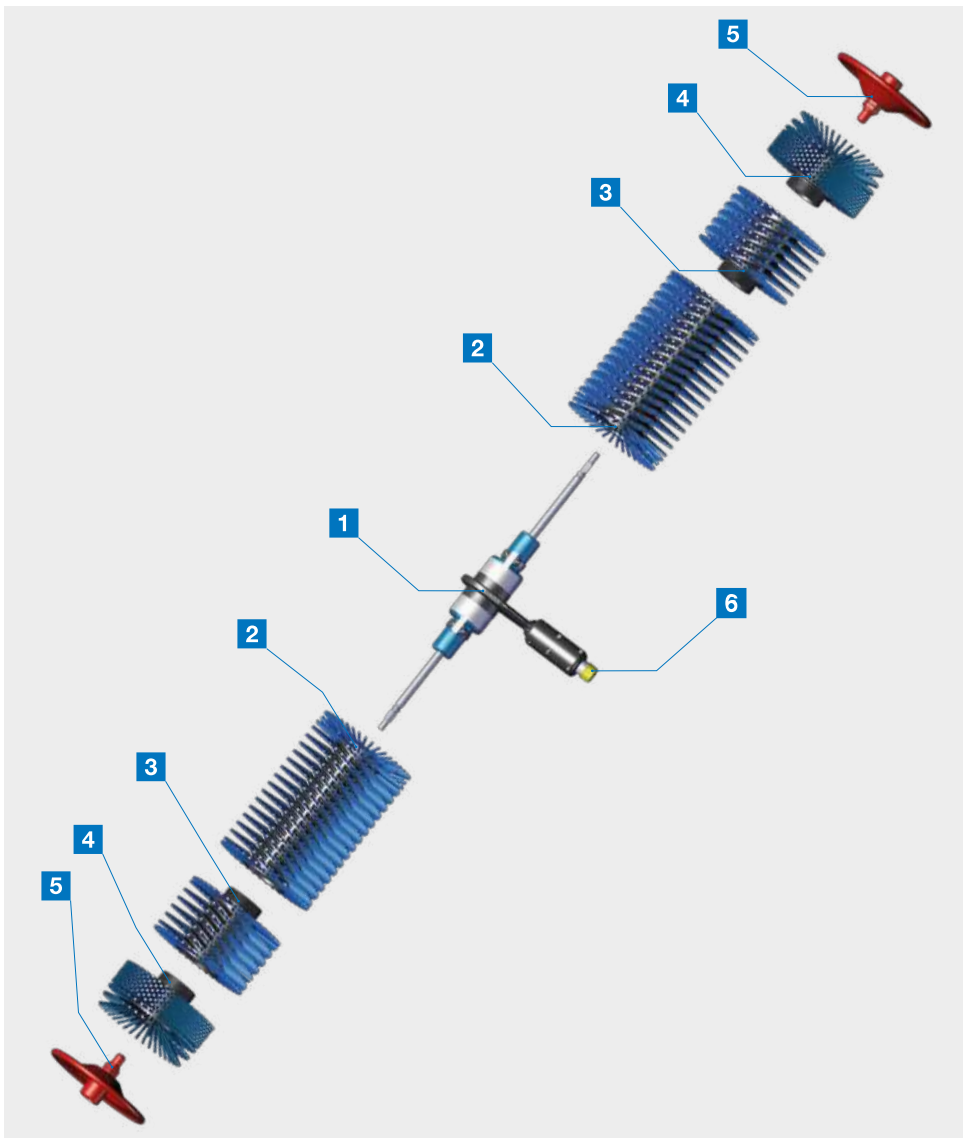


## Components and functions of the Sola-Tecs C system

Here you will find information about:  
Components of the cleaner, tools for maintenance,  
accessories important for operation



Overview of the cleaner components



Included with the cleaner



- 1 Basic unit Sola-Tecs C
- 2 Brush roller 4F 240 R + L
- 3 Brush roller 4F 100 R + L
- 4 Brush roller 4F Cover R + L
- 2 3 4 Brush set C400
- Brush set C600
- Brush set C800
- Brush set C1000
- 5 Transport cap
- 6 Screw cap



### Accessories required for operation

The Sola-Tecs C belongs to a cleaning system. The accessories listed here are required for operation.



- 1 Splash guard C400
- Splash guard C600
- Splash guard C800
- Splash guard C1000
- 2 Telescopic lance SOLA-LITE VCTE 12
- Telescopic lance SOLA-LITE VCTE 15
- Modular pole SOLA-LITE VCMO 1.8
- 3 High pressure cleaner with high pressure hose NW8 (picture is an example)
- 4 Lance bow, internal
- Lance bow, external





**Cleaner tool kit**

Socket wrench size 8



Hexagon socket size 2.5





### How does the Sola-Tecs C work

The SOLA-TECS C system consists of a gearbox with a water turbine drive and brush rollers for cleaning. The working width of the brush rollers can be adjusted.

A lance is critical for operation. It is used as a handle and for carrying out cleaning work.

The energy is supplied by high-pressure water generated by a high-pressure cleaner. The high-pressure water is sprayed onto the turbine wheel via a ceramic nozzle. This converts the impacting energy into mechanical work.

After the drive work, the water is used to moisten and wash off the surface to be cleaned. The water used to operate

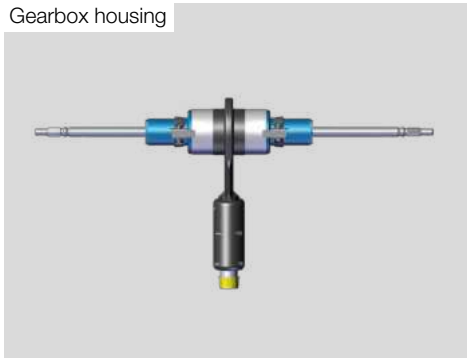
the cleaner must be ultrapure water. This water must be largely free from all minerals. The quality of the water can be determined with a TDS meter. The maximum conductivity of the water must not exceed 30  $\mu\text{S}/\text{cm}$  (20 ppm).

This is important in order not to create deposits on the cleaned surface and to avoid damage to the water turbine drive due to grinding effects.

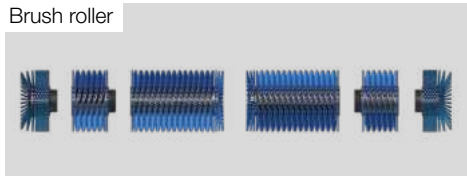
The cleaner can be operated by pulling or pushing. The thrust direction is preselected by rotating the cleaner 180° around the connection axis.



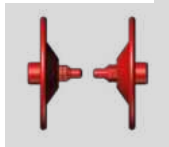
Gearbox housing



Brush roller



Transport caps



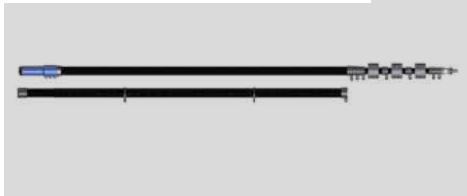
Lance bow



Splash guard



Telescopic lance and the modular pole



## Components and their function

**The gearbox housing** is the drive unit of the cleaner. All components necessary for the drive of the brush rollers are installed here. The brush rollers are mounted on the axles of the gearbox housing. The lance is mounted to the connection PIN.

**The brush roller** is the component of the cleaner that carries out the cleaning work. The individual elements have the widths 240 mm and 100 mm. A cover with bristles is mounted at the end.

**The transport caps** protect the brush roller from pressure marks. They are inserted into the end caps of the brush roller.

**The lance bow** increases the contact pressure of the brush roller on the cleaning surface. This increases the cleaning effect.

**The splash guard** protects the user from splashing water. It reduces water loss from spray water and increases the wash-off effect.

**The telescopic lance and the modular pole** is the handle of the cleaner. The cleaner is used with it.



## Intended Use

Here you will find the following information:  
What may the cleaner be used for, where  
may the cleaner be used, who may use the  
cleaner?



### Intended Use

The Sola-Tecs C system is designed for cleaning photovoltaic modules in the commercial sector. A high-pressure cleaner is required to drive the Sola-Tecs C. A lance with a suitable connection is required to guide the Sola-Tecs C system. The Sola-Tecs C system is designed to remove dirt from photovoltaic modules. It also washes the detached dirt off the photovoltaic module.

### Requirements for the photovoltaic surfaces to be cleaned

The photovoltaic modules to be cleaned must be firmly mounted on a mounting frame. The photovoltaic modules must be accessible without danger. The working area must be free of electrical hazards.

### Requirements for the system user

User: The user must be instructed by the operator on the assigned tasks and possible dangers in case of improper behaviour. The user may only carry out tasks that go beyond normal operation if this is indicated in this manual and the operator has expressly instructed them to do so.

Qualified personnel: Due to their technical training, knowledge and experience as well as knowledge of the relevant standards and regulations, qualified

personnel are able to carry out the work assigned to them and to independently recognise possible dangers and avoid risks.

The following groups of people are not allowed to operate the Sola-Tecs C:

- ▶ Persons with limited physical, sensory or mental abilities.
- ▶ Children and young people under 18 years of age
- ▶ Persons who have not been trained

### Space requirement for the Sola-Tecs C

- ▶ The Sola-Tecs C requires a support surface of 0.16 metres x 1.0 metre.
- ▶ When cleaning, you need 5 m<sup>2</sup> of space around the user.
- ▶ There must be at least 1 m distance to the next obstacle in the working direction.
- ▶ To prevent accidents, a safety area of 20 metres around the user must be closed against access by others.

### Requirements for the high pressure cleaner

- ▶ The high-pressure cleaner must guarantee an operating pressure of 100-120 bar and a flow rate of at least 10 litres per minute.

**Requirements for the lance**

- ▶ The lance must be approved for a weight of at least 5 kilograms in extended operating state.
- ▶ The lance must have a non-twisting connection to the Sola-Tecs C. An adapter is required for the secure connection, which is available as an accessory.

**Performance limits for operation**

- ▶ The Sola-Tecs C may be operated at a maximum of 140 bar.
- ▶ The water temperature must not rise above 40 °C at its peak.

**Performance data in normal operation**

- ▶ The Sola-Tecs C generates approx. 700 revolutions per minute in the pressure range between 100-120 bar.
- ▶ In normal operation the Sola-Tecs C generates a noise level of 89 decibels.
- ▶ In the shortest version, the Sola-Tecs C generates a surface load of 553 Newton per square centimetre.



## EC Declaration of Conformity

Der Hersteller / Inverkehrbringer

TEV Jäger mbH  
Grundweg 10  
89250 Senden

erklärt hiermit, dass folgendes Produkt

Produktbezeichnung: Photovoltaikreiniger  
Modellbezeichnung: SOLA-TECS C  
Typbezeichnung: SOLA-TECS C400, C600, C800, C1000  
Seriennummer: 0139-xxxx  
Handelsbezeichnung: Solar,- Photovoltaikreiniger  
Baujahr: ab 2010  
Beschreibung:  
Angetriebene Rotationsbürste für die Reinigung und Pflege von Solar- und Photovoltaikanlagen.

Allen einschlägigen Bestimmungen der angewandten Rechtsvorschriften (nachfolgend) - einschließlich deren zum Zeitpunkt der Erklärung geltenden Änderungen - entspricht. Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller. Diese Erklärung bezieht sich nur auf die Maschine in dem Zustand, in dem sie in Verkehr gebracht wurde; vom Endnutzer nachträglich angebrachte Teile und/oder nachträglich vorgenommene Eingriffe bleiben unberücksichtigt.

Folgende Rechtsvorschriften wurden angewandt:  
Maschinenrichtlinie 2006/42/EG

Folgende harmonisierte Normen wurden angewandt:

EN 60335-2-79:2012	Sicherheit elektrischer Geräte für den Hausgebrauch und ähnliche Zwecke - Teil 2-79: Besondere Anforderungen für Hochdruckreiniger und Dampfreiniger (IEC 60335-2-79:2012 (modifiziert))
EN ISO 12100:2010	Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze - Risikobeurteilung und Risikominderung (ISO 12100:2010)
EN ISO 4413:2010	Fluidtechnik - Allgemeine Regeln und sicherheitstechnische Anforderungen an Hydraulikanlagen und deren Bauteile (ISO 4413:2010)

Name und Anschrift der Person, die bevollmächtigt ist, die technischen Unterlagen zusammenzustellen:  
Patrick Geiger

Ort: Senden  
Datum: 15.04.2019

(Unterschrift)  
Geschäftsführer

(Unterschrift)  
Bevollmächtigter







## General Safety Instructions

Important instructions for the safe use of the system and for establishing safe cleaning operations.



### For your safety

Important instructions for the safe use of the system. This allows you to protect yourself and other persons from dangerous situations and from injury.

#### **DANGER**



#### **Danger to life due to thunderstorms**

- ▶ Avoid using the machine during thunderstorms. This protects you from injury caused by lightning and from hypothermia.

#### **DANGER**



#### **Risk of death from electric shock and high-voltage cables**

- ▶ The safety distance from the cleaning device to the high-voltage cable must not be less than **20 meters (65,6 ft)**. Failure to maintain the safety distance puts your life and health at risk.

#### **WARNING**



#### **Risk of injury from falling**

- ▶ Use a fall-arrest system. This will protect you from injuries from falling off the roof.

#### **CAUTION**



#### **Illness and hypothermia caused by bad weather**

- ▶ In bad weather, wear suitable protective clothing. This will protect you from illness caused by hypothermia.



**CAUTION**



**Risk of injury when lifting heavy parts**

- ▶ When lifting the machine, lift it ergonomically correctly. This will protect you from back-strain injuries.

**CAUTION**



**Risk of injury from overloading/strain**

- ▶ Take regular breaks. This will prevent injuries caused by physical and mental overload and fatigue.

**NOTICE**

**Risk of damage due to frost**

- ▶ Prevent the machine from freezing up. Otherwise this could cause damage to the components. This will protect the machine from frost damage.



## Safe cleaning operation

Here you will find information about: the selection of a safe cleaning location, hazards in the working area, hazards when working.



## Working Safely

This section describes how to work safely with the Sola-Tecs C system.

### Selecting a safe starting point

- ▶ Basically, the place of use and its accessibility determines the starting point of the cleaning work.
- ▶ Before setting up the system, carry out an inspection and consider how and where you want to work safely.

#### WARNING

##### Risk of injury from falling

- ▶ Use a fall-arrest system. This will protect you from injuries from falling off the roof.

#### CAUTION

##### Risk of injury due to slippery surface

- ▶ Check the surface for any situations that may facilitate slipping. This will protect you from falling and injuring yourself.

#### CAUTION

##### Risk of injury due to falling

- ▶ Check your working area for unevenness and obstacles. This will protect you from injuries resulting from a fall.

- ▶ The starting point for cleaning must be easily accessible.

### Observing hazards in the working area

- ▶ In the immediate working environment, there must be **no high-voltage** conductive equipment (cables, switch cabinets, etc.)

### Determining the safety of the modules to be cleaned

- ▶ Check for defects in the system when you inspect it.

e.g.

- broken / defective solar modules
- exposed lines
- loose fastenings
- ...

#### DANGER

##### Risk of death from electric shock and high-voltage cables

- ▶ The safety distance from the cleaning device to the high-voltage cable must not be less than **20 meters (65,6 ft)**. Failure to maintain the safety distance puts your life and health at risk.



### Safety when cleaning

- ▶ When cleaning, make sure that you do not damage any components or lines.

### WARNING

#### Electric shock due to defective photovoltaics

- ▶ Check the modules for damage (cracks, scratches, leaks, etc.) prior to cleaning.

Damaged modules must not be cleaned. There is a risk of injury due to electric shock.

### WARNING

#### Electric shock from photovoltaics

- ▶ Cables and components of photovoltaic installations are always live during incidence of light. Touching live parts can lead to electric shock and is prohibited.

### Checking and preparing high-pressure equipment

- ▶ Check the high pressure connections for damage before starting work.
- ▶ Check the high-pressure hose for damage before starting work.

### CAUTION

#### Risk of injury from defective hoses and connections

- ▶ Check all high-pressure hoses and connections for damage. This will protect you from being injured by escaping hard water jets.

### CAUTION

#### Risk of injury due to incorrect installation of the joints

- ▶ Always hand-tighten and check the joints. This will protect you from injuries caused by uncontrolled flying joints.

### Checking lances for damage

- ▶ Check the clamp and end ring for damage.
- ▶ Check the carbon rods for damage, such as breaks or impact marks.
- ▶ Defective parts must be replaced immediately.

### WARNING

#### Risk of injury due to incorrect adjustment of the bracket

- ▶ The bracket must always clamp with sufficient force. This prevents personal injury and damage to property due to uncontrolled falling of parts.

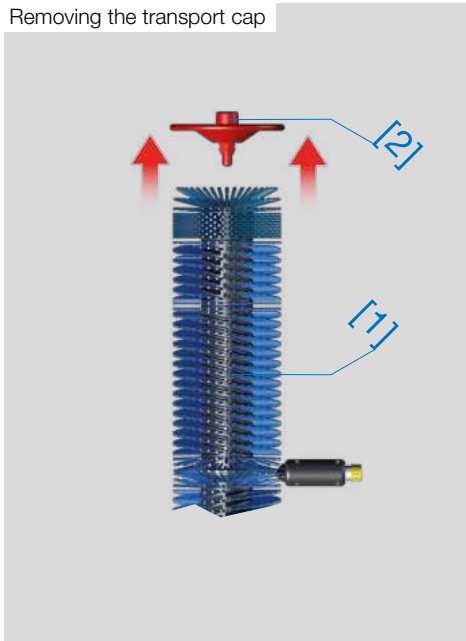


## Commissioning the Sola-Tecs C

Here you will find information about how  
to prepare the cleaner for work.



Removing the transport cap



## Preparation for mounting the cleaner

In this step, the Sola-Tecs C is prepared for installation.

### Removing the transport cap

- ▶ Clamp the cleaner [1] between your thighs and pull the transport caps [2] upwards.

### ⚠ CAUTION

#### Risk of injury during disassembly

- ▶ Wear gloves during disassembly. This will protect your skin from abrasions and pinching.

Checking the gearbox



### Checking the gearbox

- ▶ Place the cleaner on a clean surface and turn the brush onto one side. The second side must turn with it. The gearbox should not make any chopping noises.

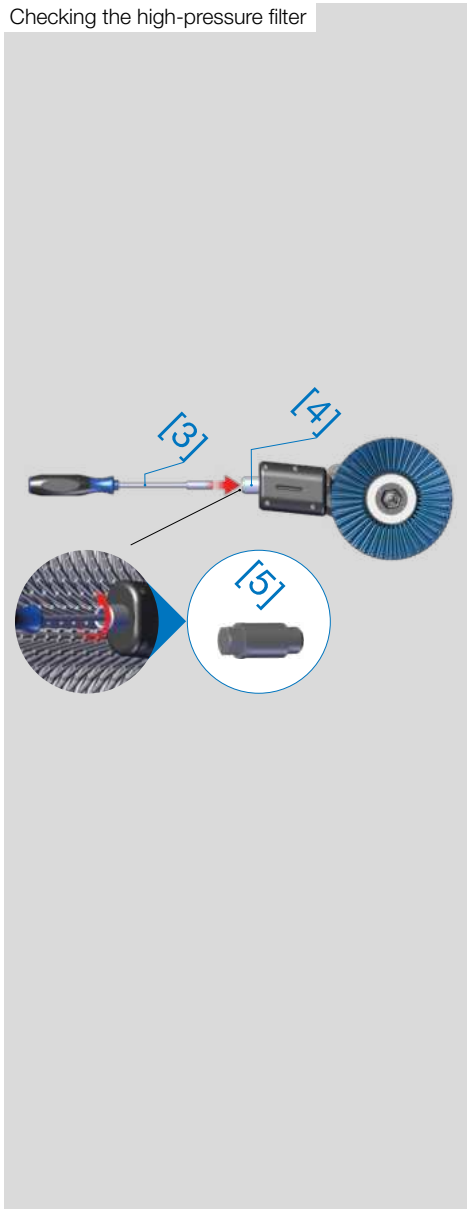
### Checking the high-pressure filter

- ▶ Take the socket wrench [3]. Insert the socket wrench into the connector pin [4] until it is positioned on the HD filter.





Checking the high-pressure filter



Turn the socket wrench until it clicks into place. Turn the screw to the left until the HD filter [5] can be loosened. Check the HD filter for contamination. Clean or replace the HD filter if necessary. Screw the HD filter back into place by hand in a clockwise direction.

### NOTICE

#### Risk of damage due to impurities in the water

- ▶ Never operate the cleaner without a high-pressure filter. This prevents damage caused by impurities in the water.

## Mounting cleaner on the lance

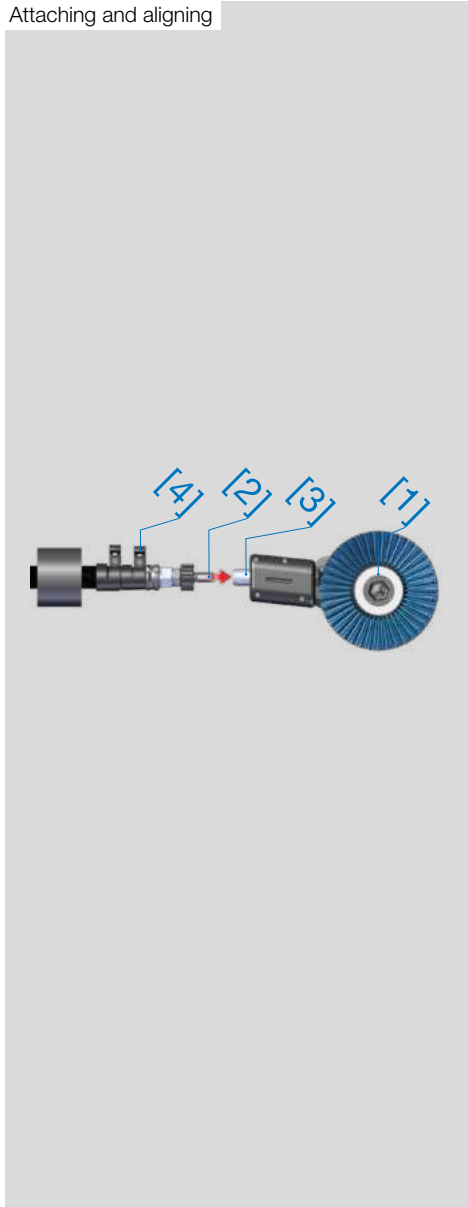
In this step, the Sola-Tecs C is mounted onto the lance. The lance - whether telescopic or modular - must be prepared for this step.

### Flushing the system

- ▶ Before connecting the lance, let the water run for at least 3 minutes to flush any dirt from the hose.



## Attaching and aligning

**Attaching and aligning**

- ▶ Place the Sola-Tecs C [1] on a flat surface.
- ▶ Insert the lance with the hexagon [2] up to the stop on the connection PIN [3].
- ▶ Make sure that the brackets [4] point upwards. If the clamps do not point upwards, open the first clamp and turn the lance until the clamp points upwards.

**NOTICE****Risk of damage caused by seizing of thread and hexagonal nipple**

- ▶ Grease (DIN 51502: KP2G-30) hexagon nipple Lance and thread connection PIN before assembly. This reduces the risk of seizing and any resulting damage.



Screwing on the telescopic lance



Screwing on the modular pole



### Screwing on the telescopic lance and the modular pole

- ▶ Screw the quick connector [5] onto the connection PIN [3] by turning it clockwise. Make sure that the connection PIN will slide when screwing it on.
- ▶ Screw on until the Sola-Tecs C [1] is firmly attached.
- ▶ Tighten the quick-release screw connection hand-tight.

#### CAUTION

##### Risk of injury due to incorrect installation of the joints

- ▶ Always hand-tighten and check the joints.  
This will protect you from injuries caused by uncontrolled flying joints.

#### NOTICE

##### Preventing damage to the quick connector

- ▶ Tighten the quick-release screw connection hand-tight. Do not use any tools (pliers etc.) for tightening. This will prevent chipping of the plastic and damage to the thread.

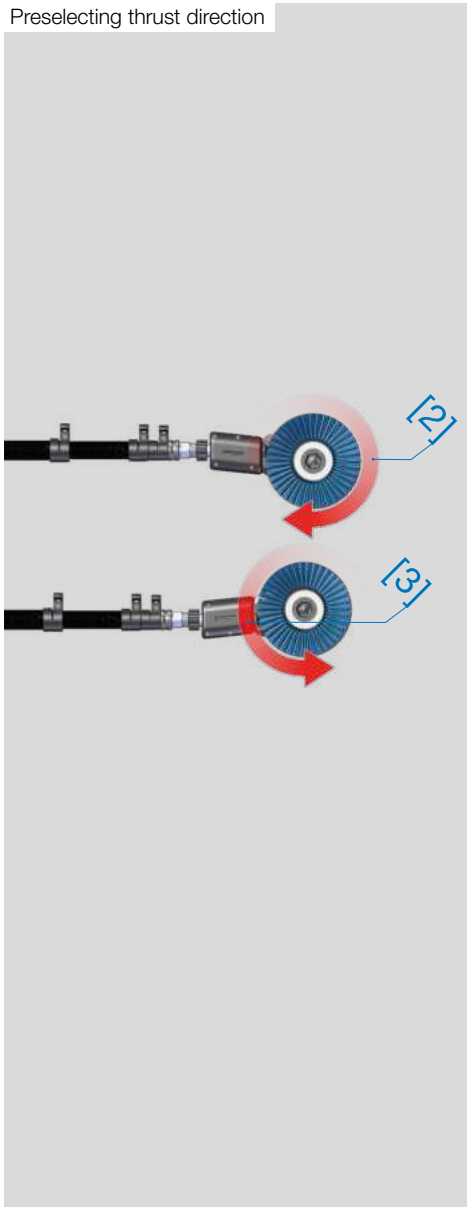


## Working with the Sola-Tecs C

Here you will find information about working with  
the cleaner.



Preselecting thrust direction



## Working with the cleaner

Here, working with the cleaner is described. How do I switch on the cleaner? How do I work on the photovoltaic modules?

### Placing the cleaner at the starting point

- ▶ The direction of rotation of the brush roller gives the cleaner a thrust direction and it can be operated by pulling it away from the user [2] and pushing it towards the user [3].
- ▶ The thrust direction is set by turning the cleaner on the lance by 180°.

#### WARNING

##### Electric shock due to defective photovoltaics

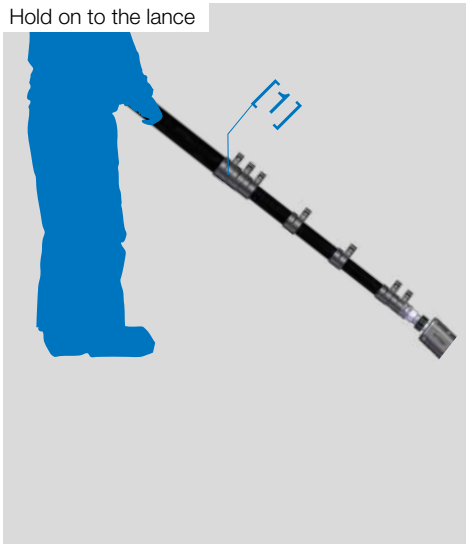
- ▶ Check the modules for damage (cracks, scratches, leaks, etc.) prior to cleaning. Damaged modules must not be cleaned. There is a risk of injury due to electric shock.

#### WARNING

##### Electric shock from photovoltaics

- ▶ Cables and components of photovoltaic installations are always live during incidence of light. Touching live parts can lead to electric shock and is prohibited.

## Working

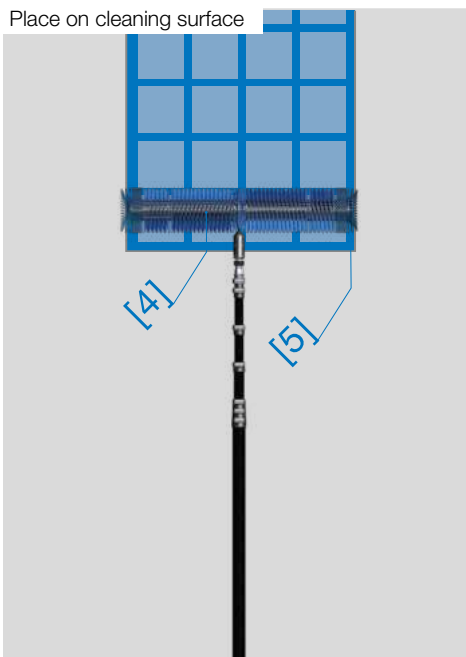


► Take the lance [1] with the Sola-Tecs C in your hand.

► Position yourself at the starting point of the surface to be cleaned.

► Place the cleaner [4] at the starting point of the surface to be cleaned on the photovoltaic modules [5].

*Make sure that the working direction is always from top to bottom or from bottom to top. Never work from the side or at an angle, otherwise the cleaner can slip off!*



### WARNING

#### Risk of injury from falling parts

► Check the surface to be cleaned for parts that could fall.  
In this way you will protect yourself and other persons from injury from falling parts.

### WARNING

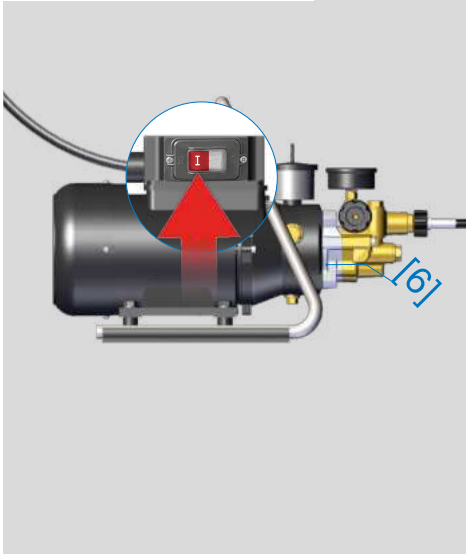
#### Risk of injury due to sudden start-up

► Start and stop the machine only using a suitable system and not using the high-pressure cleaner.  
This will protect you from injuries caused by unintentional start-up.



## Working

Switch on high-pressure cleaner

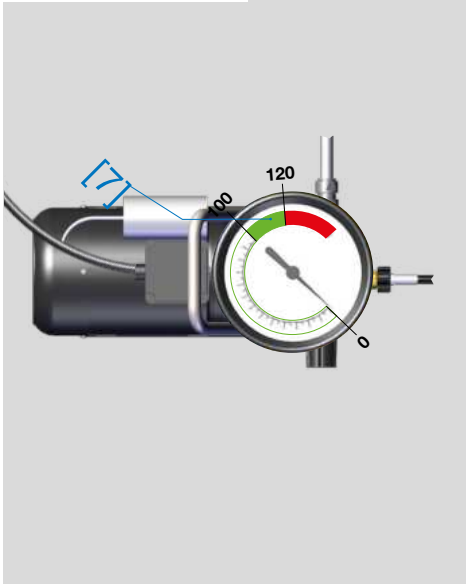


▶ Switch on the high-pressure cleaner [6].

▶ Set the working pressure [7] in the range of 100 - 120 bar.

*We recommend our water stop or our radio remote control accessories.*

Set the working pressure



### WARNING

#### Risk of injury due to excessive operating pressure

▶ Do not operate the machine above the specified maximum operating pressure.

In this way you protect yourself from injuries caused by connecting parts being flung away in an uncontrolled manner.

### CAUTION

#### Risk of injury from defective hoses and connections

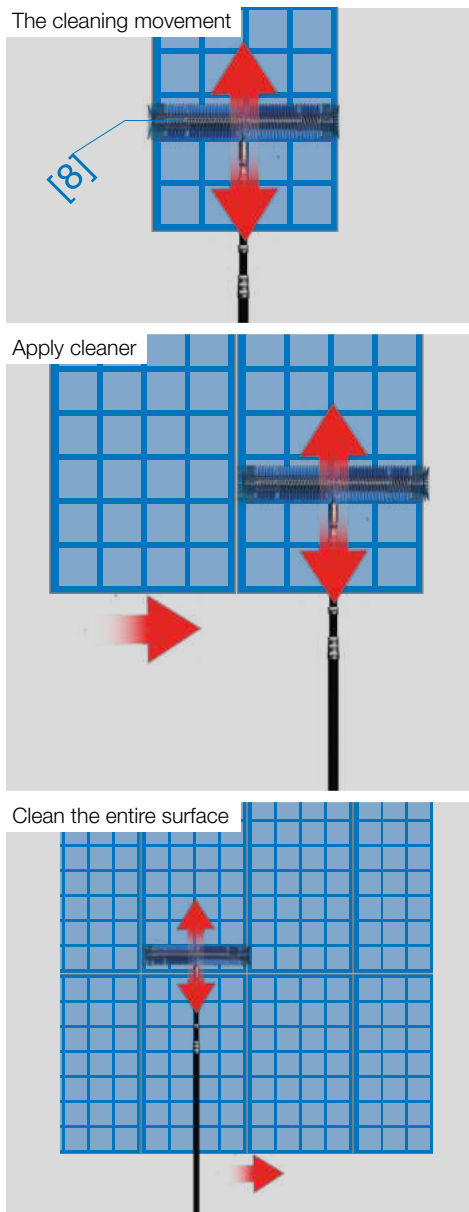
▶ Check all high-pressure hoses and connections for damage.

This will protect you from being injured by escaping hard water jets.

### NOTICE

#### Risk of damage due to stud bolts

▶ Avoid running over stud bolts. This protects the machine and the bristles against increased wear.



### Cleaning with the Sola-Tecs C

- ▶ Guide the cleaner [8] vertically away from you and back towards you in linear, even movements (similar to a sweeping movement).
- ▶ Move the cleaner [8] in a horizontal direction and repeat the cleaning movement.
- ▶ Repeat these two steps until you have cleaned your surface.
- ▶ Switch off the high-pressure cleaner after finishing cleaning work or during breaks.

#### WARNING

##### Risk of injury from falling cleaner

- ▶ When working at the edge of the work area, be careful not to go too far over the edge.
- In this way you will avoid personal injury and damage to property caused by a falling cleaner.

#### WARNING

##### Danger of injury due to incorrect guidance of the cleaning device

- ▶ Do not move the SOLA brush and SOLA-TECS C vertically upwards or vertically downwards.
- This will prevent injuries from a falling cleaning device.



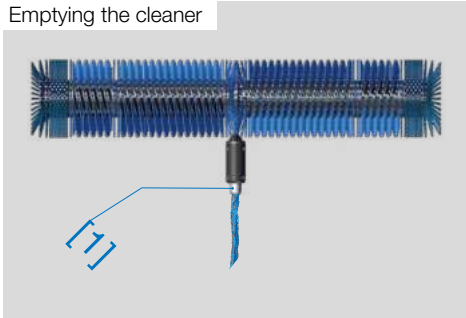


## Transport and storage

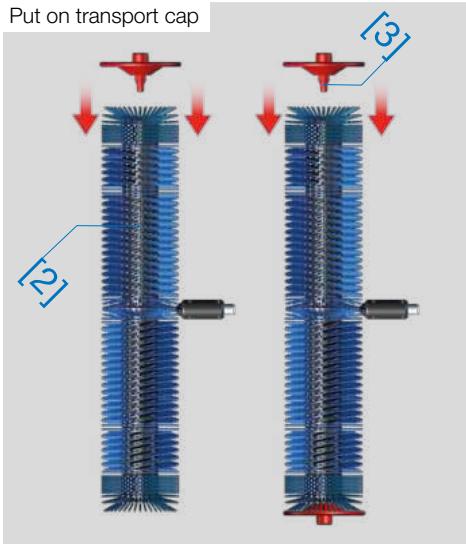
Here you will find information about transporting and storing the cleaner.



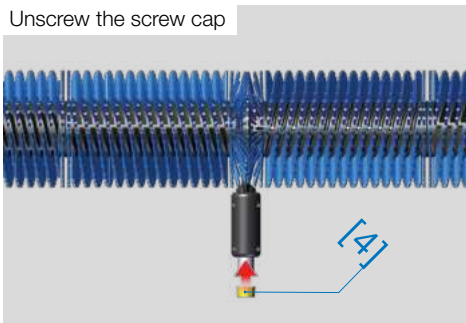
Emptying the cleaner



Put on transport cap



Unscrew the screw cap



## Transporting and Storing the Cleaner

This section explains how to transport and store the cleaner safely and without damage.

### ⚠ CAUTION

#### Risk of injury during disassembly

- ▶ Wear gloves during disassembly. This will protect your skin from abrasions and pinching.

#### Preparing for transport

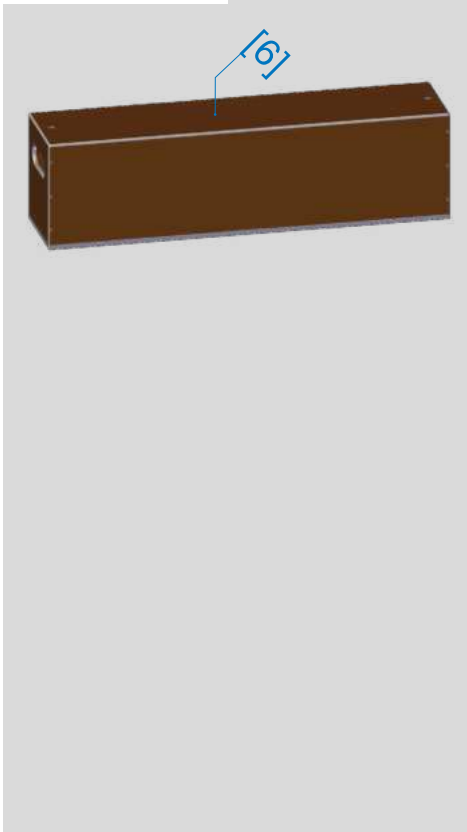
- ▶ Unscrew the cleaner from the lance.
- ▶ Hold the cleaner with the connection [1] facing the floor and let the water run out of the cleaner.
- ▶ Place the cleaner [2] with the end of the brush on the floor and fit the red transport cap [3].
- ▶ Repeat the process on the other side.
- ▶ Screw the yellow threaded cap [4] onto the connection PIN.
- ▶ Transport the Sola-Tecs C in the original box [5]. This is waterproof. Or in the optionally available transport box [6].



Original box



Optional transport box



### Preparing for storage

- ▶ Hold the cleaner with the connection facing the floor and let the water run out of the cleaner.
- ▶ Place the cleaner with the end of the brush on the floor and attach the red transport cap.
- ▶ Repeat the process on the other side.
- ▶ Screw the yellow threaded cap onto the connection PIN.
- ▶ Store the Sola-Tecs C in its original box. This is waterproof.
- ▶ Store the Sola-Tecs C in warm, dry place.

### NOTICE

#### Risk of frost damage

- ▶ Do not expose the machine to frost.  
Frost can damage the components.  
Avoiding frost protects the machine from damage caused by frozen water.



## Disposing of the cleaner

Here you will find information about product disposal and the associated components.



## What happens with the waste?

### Packaging

- ▶ The packaging is made of cardboard and can be recycled.

### Resin for ultrapure water production

- ▶ Please refer to the safety data sheet for disposal instructions.

### Gear housing, planetary gear and brush roller

- ▶ These components can be disposed of with non-recyclable waste.

### Gearbox shaft, gearbox cover and connection nipple

- ▶ These components can go into metal recycling.

### CAUTION

#### Risk of injury during disassembly

- ▶ Wear gloves during disassembly. This will protect your skin from abrasions and pinching.





Cleantecs GmbH | Grundweg 10 | 89250 Senden | +49 (0)7307 - 9265 0 |  
info@cleantecs.de | www.cleantecs.com

