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No electricity is required on the robot. The technology is robust, smart and simple, without any electronical device or battery, which ensures a very long life expectancy with very low maintenance operation.

- Length: adjustable to the panel height
- Weight: 40 kg (depending on panel size)
- Brush diameter: 200 mm
- Brush speed: 200 tr/min
- Max panel inclination: No maximum

The cleaning robot is motioned by an hydraulic water motor, which rotates 1 cylindrical brush and a driving belt.

TECHNICAL DATA

NO DAMAGE ON THE PANELS

Our technology guarantees no damage on the photovoltaic panel. Indeed, the brush material is very soft and has been chosen to avoid any risk of scratch. Moreover, the weight of the robot is distributed uniformly by the brushes themselves. The pressure on the cells does not exceed 7 Mpa.

A TRIPLE CLEANING ACTION COMBINED

The cleaning is performed by three combined actions: the rotation of the brush, the high pressure water and two squeegees. This ensures a very high cleaning efficiency in only one cleaning cycle.

AX SOLAR ROBOT is a brand of AX SYSTEM company. Based in northern France with 15 years experience, AX SYSTEM manufactures high pressure cleaning solutions.
HOW DOES IT WORKS?
Attentive to the solar plants operators constraints of use, AX SYSTEM has developed the simplest of use and the most effective photovoltaic panel cleaning solution. Our solution is completely autonomous and requires no electrical connection or water network.

The robot is supplied with pressurized water by our diesel pump unit, which provides water for cleaning and moving. No power supply is required. The robot does not carry any battery or electronic equipment, guaranteeing exceptional reliability.

Each row of panels is cleaned in two successive rounds trip. At the end of the cycle, the robot automatically positions itself on the rolling support, which then allows the robot to be placed in front of the next row. Robot control requires two operators. No robot handling is required.

Thanks to our outstanding technology, our robot is also the fastest and the most water economical:
- Cleaning speed : up too 3000 m²/h per passage*
- Movement speed : up too 25 m/min - 1.5 km/h*
- Water consumption : approx 0.10 L/m² per passage*

*depending on site and using conditions

---

**Installation Cleaning time**

<table>
<thead>
<tr>
<th>Size of the Solar Plant (MWc)</th>
<th>1 Robot</th>
<th>3 Robots</th>
<th>4 robots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual financial loss per efficiency loss due to dirt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10%</td>
<td>1 147 000 €</td>
<td>22 050 €</td>
<td>29 400 €</td>
</tr>
<tr>
<td>15%</td>
<td>1 014 700 000 €</td>
<td>220 500 €</td>
<td>294 000 €</td>
</tr>
<tr>
<td>20%</td>
<td>1 001 470 000 €</td>
<td>2 205 000 €</td>
<td>2 940 000 €</td>
</tr>
</tbody>
</table>

---

**Rolling Support**

Our rolling support is used to displace the cleaning robots easily from panel to panel.

After cleaning a row of panels, the robot ends its run on the support. Then operator moves the support manually to the next row, and launch the robot for a new cycle. The support also permits to store the robot between the phases of use.

Under the rolling support, a reel allows the smooth running and rewinding of the hose when using the robot.

---

**High Pressure Pump**

**Water Tank**

**Cleaning Robot**

**Water Demineralizer**

**Rolling Support**
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- Movement speed: up to 25 m/min - 1.5 km/h*
- Water consumption: approx 0.10 L/m² per passage*

When no electricity and no water inlet is easily accessible, this trailer is the solution. It comes with a 2000 liters polyethylene water tank, and a diesel high pressure pump.

This trailer can be towed between the power plant aisle by any car, and will deliver to the cleaning robots enough water to clean 20 000 m² for one passage (approx. 1.5 MW).

Other tank capacity are available on request.

2 000 L TRAILER WITH DIESEL HIGH PRESSURE PUMP

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Other tank capacity are available on request.

DIESEL HIGH PRESSURE PUMP

Our cleaning robots is feeded by an high pressure water pump which delivered the flow rate required to clean and to motion.

With our Diesel High Pressure Pump, no electrical connection is required. The pump is 100% autonomous and just has to be connected to the low pressure water.

Electrical drive pump are also available on demand.

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HOW TO CLEAN A PHOTOVOLTAIC PANEL ?

The cells of a photovoltaic panels are connected in series. If only one cells is hidden from the sun by dirt, the efficiency of the whole pannel drops. Depending on the natural environment around the solar plant, we estimate that without cleaning, the efficiency drops from 2 to 15% per month.

Thanks to a regular cleaning, solar power plants can maintain a constant efficiency and save money.

<table>
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<tbody>
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</tr>
<tr>
<td>10</td>
<td>147 000 €</td>
</tr>
<tr>
<td>100</td>
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</tr>
<tr>
<td>1 000</td>
<td>14 700 000 €</td>
</tr>
</tbody>
</table>

HOW LONG FOR MY INSTALLATION ?

It is interesting to have several robots to divide the cleaning times. The time is estimated in hours of work or working day of about 10 hours.

<table>
<thead>
<tr>
<th>Installation</th>
<th>Cleaning time</th>
</tr>
</thead>
<tbody>
<tr>
<td>MWc</td>
<td>1 Robot</td>
</tr>
<tr>
<td>1</td>
<td>5 hours</td>
</tr>
<tr>
<td>10</td>
<td>4 days</td>
</tr>
<tr>
<td>50</td>
<td>22 days</td>
</tr>
<tr>
<td>100</td>
<td>44 days</td>
</tr>
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</table>
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