

Surface Cleaner

Keep for future use!



Types:

- Surface Cleaner speed controlled
- Surface Cleaner without speed control



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1 Operator instructions

Make sure you read the complete operating instructions before installing and commissioning the "Surface Cleaner". They form a constituent part of the "Surface Cleaner" and must be retained for later use or a subsequent owner.

Safety instructions must be observed and followed at all times.

For the convenience of the reader, **Surface Cleaner** is abbreviated **SC** below.

The **SC** consists of the following components:

- Ionizing unit (ionizing bar in different versions).
- Air gate with rotating nozzles.

The **SC** is operationally safe when used as intended.

The following signal words are used:



WARNING!

If ignored

- severe personal injury.
- or death may result.



CAUTION!

If ignored

- light personal injury may result.

ATTENTION!

If ignored

- light damage to the system or **SC** may result.

NOTE: *Important notes and additional information.*

2 Safety

All activities must be performed only by persons authorized by the owner. Such persons must

- have basic knowledge in the field of electrical engineering.
- have basic knowledge in the field of mechanical engineering.
- have been instructed in the installation and handling of compressed air devices and the resulting dangers.
- have read and understood the operator instructions.

Make sure to switch off the compressed air and power supply before starting work on the **SC**, and protect against inadvertent activation.

In the event of damage to the ionizing unit, the risk of electric shocks arises. Immediately take the ionizing unit out of operation in the event of visible damage and suspected electrical failure, and protect against reuse.

Never use air-assisted ionizing units without pressure reducer and compressed air filter, and never exceed the permissible maximum pressure. The compressed air must be filtered ($< 20 \mu\text{m}$), dry and oil-free. Secure air hoses with suitable clamps.

For reasons of safety, unauthorized conversions and modifications of the **SC** are not permitted.



WARNING!

The ionizing unit may influence heart pacemakers.

The electric high voltage in the ionizing unit results in an electric alternating field of 50 Hz which may influence the function of the heart pacemaker. Malfunction of the heart pacemaker may result in ventricular fibrillation or cardiac arrest.

- Persons wearing heart pacemakers must maintain a safety distance of more than 50 cm from the ionizing unit.
- The operator must mark the danger zone around the ionizing unit by means of a warning sign.
- The accident prevention regulations according to BGV A8 must be observed.
- An expert study on the influence of ionization systems on implanted heart pacemakers is available from HAUG GmbH & Co. KG.



CAUTION!

Injuries may be caused by the ionizing pins of the ionizing unit.

When touched, the ionizing pins may lead to stab or tear injuries to the hands.

- Protective gloves must be worn when working on the ionizing unit (EN 388 3122).

During operation, small amounts of ozone are generated by the ionizing units.

A very high ozone concentration and prolonged continuous exposure times may result in headache, irritation to the eyes, circulatory problems etc.

- To ensure that the maximum permissible ozone concentration at the workplace is not exceeded, adequate ventilation must be provided during operation of the ionizing units.
- An expert study on ozone emissions of ionization systems is available from HAUG GmbH & Co. KG.

The rotating nozzles may cause injuries.

The compressed air causes the nozzles to rotate. Contact with the rotating nozzles results in mechanical shocks which may cause bruising and haematoma.

- Never touch the **SC** during operation.
- The operator is responsible for providing a safety barrier preventing persons from approaching during operation.

ATTENTION!

Wetness and moisture may result in spark-overs and leakage paths. Damage to the ionizing unit and short-circuits are a likely consequence.

- Protect the ionizing units from moisture and wetness.
- Never use high-pressure cleaners to clean the units.

Insertion/removal of the high-voltage plug into/from the ionizing unit while the power pack is switched on may result in contact or separation spark-overs.

This may result in damage to the power pack or defects.

- Always switch off the power pack before plugging in/unplugging the high-voltage plug.

Any torsion or bending of the ionizing unit may result in hairline cracks in the interior.

This will allow leakage paths for the high voltage to be formed which will damage the ionizing unit.

- Do not twist or bend the ionizing unit.

Pulling the high-voltage cable of the ionizing unit may result in gaps at the contact points within the high-voltage plug and connection of the unit.

Arcs may form at the gaps as a result of the high voltage, resulting in possible damage to the ionizing unit.

- Do not pull the high-voltage cable.

3 Intended use

The **SC** is intended for the contact-free cleaning of surfaces in industrial production processes. It removes electrostatic charges and contamination (e.g. dust or similar) from paper, film, textiles, glass, plastics etc.

The **SC** must be operated with filtered (< 20 µm), dry and oil-free compressed air only. Never exceed the maximum operating pressure of 10 bar.

This ionizing unit is only approved for alternating high voltage.

The high-voltage connector (system X-2000) of the ionizing unit matches all popular HAUG power packs. The ionizing unit must only be connected to a HAUG power pack.

The warranty only covers units and accessories of HAUG GmbH & Co. KG.

The installation and operating conditions indicated in these Operating Instructions must be adhered to.



WARNING

Risk of explosion!
Ignitable sparks may form at the ionizing units.

- Do not install or use the ionizing units in area with potentially explosive atmosphere.

4 Description of unit

High-voltage plug System X-2000

The high-voltage plug system can be taken apart. This allows the high-voltage plug to be assembled or dismantled.

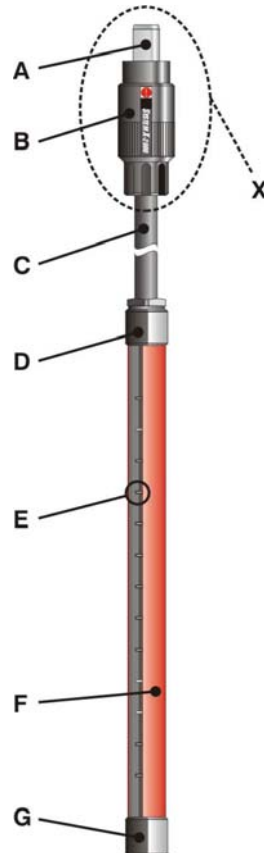


Ionizing unit:

Ionizing bars EI RN, EI RNE, EI VS,
EI VSE, EI VSA, EI VSAE

- A: Pin bushing
- B: Screw cap
- C: High-voltage cable
- D: Starter piece
- E: Ionizing pin
- F: Counter-electrode
- G: End piece

X: High-voltage plug (X-2000)

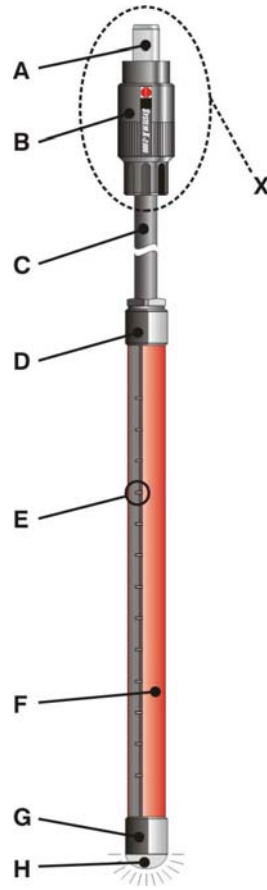


Ionizing unit with visual function indicator:

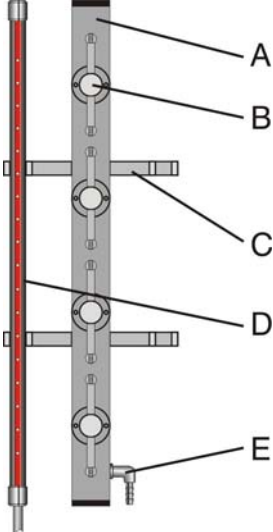
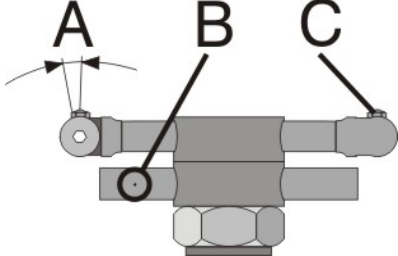
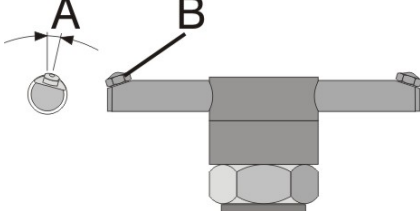
Ionizing bars EI RN OF, EI VS OF,
EI VSA OF

- A: Pin bushing
- B: Screw cap
- C: High-voltage cable
- D: Starter piece
- E: Ionizing pin
- F: Counter-electrode
- G: End piece
- H: Visual function indicator

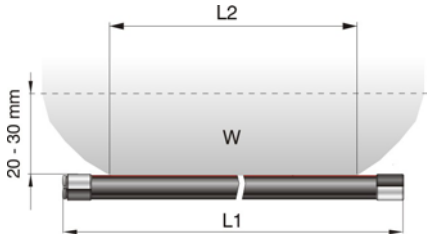
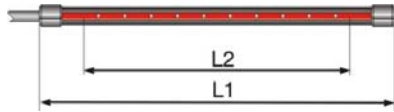
X: High-voltage plug (X-2000)



NOTE: *The visual function indicator at the end of the ionizing bar flashes during operation. The flashing indicates that the ionizing bar is working properly. If the visual function indicator does not flash during operation, a failure has occurred. Refer to Section "Troubleshooting".*

<p>Surface Cleaner:</p> <p>A: Body (air gate) B: Nozzle C: Bar holder D: Ionizing bar (ionizing unit) E: Air connection</p>	 <p>The diagram shows a vertical assembly. On the left is a red cylindrical body (A) with a nozzle (B) at the top. This is attached to a horizontal bar holder (C). Below the bar holder is an ionizing bar (D) with three circular units. At the bottom right is an air connection (E).</p>
<p>Speed-controlled nozzle: The speed is factory-set to 600 rpm.</p> <p>A: angle of incidence B: drive bore C: nozzle insert</p>	 <p>The diagram shows a horizontal nozzle assembly. Label A points to the angle of incidence of the nozzle tip. Label B points to the drive bore on the side. Label C points to the nozzle insert at the end.</p>
<p>Nozzle: The speed depends on the operating pressure and angle of incidence.</p> <p>A: angle of incidence B: nozzle insert</p>	 <p>The diagram shows a horizontal nozzle assembly. Label A points to the angle of incidence of the nozzle tip. Label B points to the nozzle insert at the end.</p>

5 Installation

<p>1. Check whether the SC corresponds to the ordering data. In the event of any damage to the SC, contact HAUG GmbH & Co. KG.</p>	
<p>2. During installation, please remember that the ionizing bars have a restricted effective range (W). The effective range (W) extends in a way similar to the one shown in the illustration.</p> <ul style="list-style-type: none"> The length (L2) of the effective range can be calculated as follows. 	
<p>The length of the ionizing bar (L1), minus the following lengths, is the length of the effective range (L2).</p> <p>EI RN, EI RNE, EI VS, EI VSE, EI VSA, EI VSAE $L2 = L1 - 100 \text{ mm}$</p> <p>EI RN OF, EI VS OF, EI VSA OF $L2 = L1 - 150 \text{ mm}$</p>	

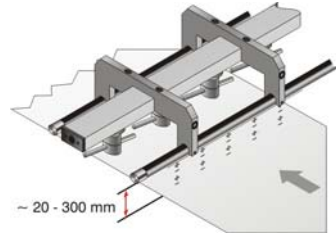
3. Prepare the installation site with regard to the following installation parameters:

ATTENTION!

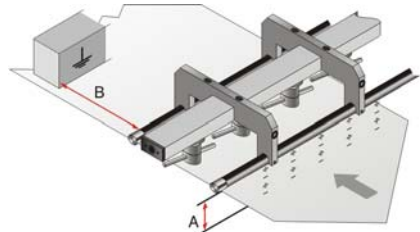
If the ionizing pins are covered in the ionizing unit by fasteners or machine parts, no ionization will be present at this point. At the covered points, an arc or leakage path may form due to contamination of electrically conductive materials, and damage the ionizing unit.

- Never attach mounting elements or machine parts over the ionizing pins.

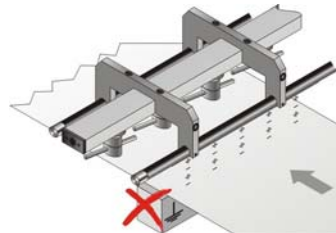
The most favourable distance of the SC to the material to be ionized is approx. 20 – 300 mm.
The limit values for the ionizing effect are at 10 mm min. and 500 mm max.



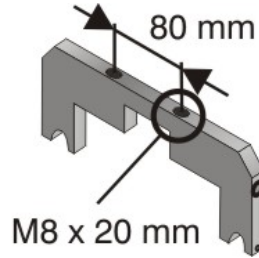
The distance of the SC to an earthed machine part (B) must be greater than the distance to the material to be ionized (A).



No earthed machine parts must lie behind the material to be ionized.



4. Pick up the **SC** on the M8 fastening screw threads, and mount in the machine.



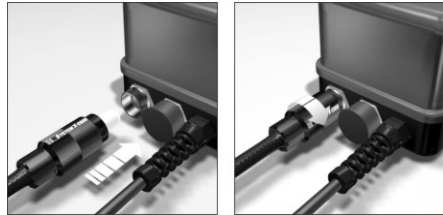
ATTENTION!

Any kinking and bending of the high-voltage cable may damage the shielding and insulation of the cable resulting in short circuits.

- The high-voltage cable must not be kinked.
- When routing around bends, the bending radius must not be smaller than 50 mm.



5. Switch off power pack and secure against inadvertent operation.
6. Insert the ionizing unit's high-voltage plug in the high-voltage socket of the power pack and press the high-voltage cable until it reaches the stop.
7. Screw the screw cap onto the high-voltage socket and tighten by hand.



NOTE: *The use of the HAUG tape roller allows the ionizing bar to be masked with adhesive tape such that the ionizing pins remain free. This protects the insulating section from heavy contamination.*

6 Maintenance

Clean the **SC** at intervals of no more than 14 days. The dirtier the environment, the shorter the cleaning interval. Once the ionizing and cleaning effect drops off, clean the unit to bring the ionization and cleaning effect back to normal.

ATTENTION

The ionizing unit may be damaged if inappropriate brushes or cleaning agents are used.

- We strongly recommend the exclusive use of **cleaning accessories** from HAUG GmbH & Co. KG. Refer to Section Accessories.

Dry cleaning

1. Switch off power pack and secure against inadvertent operation.
2. Switch off the compressed air supply.
3. Disconnect the ionizing unit from the power pack.
4. Brush the ionizing pins of the ionizing unit using special cleaning brush RB1.
5. Brush the inserts of the nozzles.
6. Blow off the SC with clean compressed air (max. 6 bar).
7. Check the high-voltage connections and high-voltage plugs for contamination. The connections must be clean and dry.
8. Reconnect the ionizing unit to the power pack.
9. Switch the compressed air supply back on.

NOTE: *If dry cleaning does not yield the desired result, continue by using a wet cleaning process.*

Moist cleaning








1. Switch off power pack and secure against inadvertent operation.
2. Switch off the compressed air supply.
3. Disconnect the ionizing unit from the power pack.
4. Wet the special cleaning brush RB1 with the special cleaning agent SRM1. The special cleaning system **RS2** may also be used for cleaning.
5. Brush the ionizing pins of the ionizing unit.
6. Brush the inserts of the nozzles.
7. Blow off the SC with clean compressed air (max. 6 bar) and allow to dry.
8. Check the high-voltage connections and high-voltage plugs for contamination. The connections must be clean and dry.
9. Reconnect the ionizing unit to the power pack.
10. Switch the compressed air supply back on.

7 Troubleshooting

Error	Cause	Measure for elimination
No ionization	The ionizing unit is dirty.	Clean the ionizing unit.
	No high voltage.	Check power pack.
		Check connections.
Visual function indicator not flashing. Only for ionizing bar EI RN OF, EI VS OF, EI VSA OF	Error in ionization system.	Check power pack.
		Check connections.
Sparks-over	The ionizing unit is covered with an electrically conductive deposit.	Clean the ionizing unit.
	The ionizing pins are too close to an electrically conductive material.	Increase distance to the cause.
	The ionizing unit is damaged.	Switch off the SC automatically and secure against switching on.
Nozzle not rotating	No compressed air.	Check compressed air supply.
	Stiff or stuck nozzle.	Replace nozzle or return to HAUG GmbH & Co. KG for repair.

NOTE: *If the error cannot be removed in this way, return the power pack and SC for checking to HAUG GmbH & Co. KG (for address, see reverse).*

8 Accessories

Article	Illustrations	Order number
HAUG power pack		On request
Special cleaning fluid SRM1		10.7220.000
Special cleaning brush RB1		10.7218.000
Special cleaning system RS2		10.7218.004
Circular brush for special cleaning system		X – 5677
HAUG Tape-Roller		10.0008.000
Adhesive tape "crepe"		X – 0167
Polyester insulating tape		X – 7793
Nozzle inserts	Possible bore diameters in mm: 0.6; 0.8; 1.2; 1.4; 1.6; 1.8; 2.0	On request
Rotating nozzle	Controlled or uncontrolled	On request

9 Technical data

9.1 Supply voltage

Electric connection to HAUG power pack	7 – 8 kVAC
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9.2 Air supply system

Compressed air	Filtered (< 20 µm), dry and oil-free.
Operating pressure	5 - 10 bar
Maximum pressure	10 bar

Consumption table in l/min at 6 bar:

Bore diameter of nozzle inserts in mm.	Speed-controlled nozzle with 2 inserts.	Uncontrolled nozzle with 2 nozzle inserts.
0.6	100	40
0.8	140	80
1.0	170	110
1.2	240	180
1.4	340	280
1.6	420	360
1.8	520	460
2.0	630	570

9.3 Ambient conditions

Use in areas with potentially explosive atmospheres is prohibited.	
Only for inside use.	
Temperature:	
Rated application range	+5 °C to +45 °C
Extreme range for storage and transport	-15 °C to +60 °C
Humidity:	
Rated application range	20 % to 65 % RF
Extreme range for storage and transport	0 % to 85 % RF

9.4 Dimensions

Type	Cross-section	Length
EI RN, EI RNE, EI RN OF	Ø 20 mm	450 - 1950 mm
EI VS, EI VSE, EI VS OF, EI VSA, EI VSAE, EI VSA OF	Ø 20 mm	450 - 1950 mm
Air gate	30 x 50 mm	450 - 1950 mm
High-voltage cable	-	Customer-specific

10 Decommissioning

1. Switch off the machine and secure against unintended switching on.
2. Switch off power pack and secure against inadvertent operation.
3. Switch off the compressed air supply.
4. Disconnect the ionizing unit from the power pack.
5. Disconnect the air gate from the air supply system.
6. Dismantle the SC from the machine.

11 Disposal

Observe and maintain national and regional waste disposal regulations for the disposal of the **SC**.



made by



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