

**plasma**brush<sup>®</sup>

**Operating instructions**  
CAN communication package



Thank you for purchasing a high-quality **relyon plasma** GmbH product.  
To get the best from your product, please read these instructions carefully.



### **Important!**

**Read these instructions carefully before assembling, installing and starting up the machine!**

**Always follow the safety instructions!** Failure to follow the safety instructions may result in accidents, serious injury and serious damage to the machine.

**The product may only be started up and operated by trained and qualified persons!**

**Train your staff!** The operator / user is responsible for ensuring that personnel have fully understood the operation of the machine and the safety requirements.

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Original operating  
instructions

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# 1 Safety

The system was designed in accordance with the relevant international standards. However, as with any technical product, hazards may arise if the system is not used properly or is used for purposes other than its intended use.

Working with the system can be dangerous and may result in serious or fatal injury. It is therefore essential to protect yourself and others.

In addition to the safety instructions in this document, you must also comply with general safety standards.



## Caution - Danger!

When working with the system, please note and observe the safety instructions and requirements in these operating instructions because non-compliance may result in serious or fatal injury.

## 1.1 Residual risks

This system has been manufactured in accordance with the current state of the art. However, it is impossible to eliminate residual risks.

Always adhere to the following safety instructions:



## Caution – Electrical voltage!

- Danger: 230 V. If damage is visible on the electrical connection, mains cable or system:
  - Do not start up the system.
  - Have the damaged parts repaired by a qualified person or replace them.



## Tripping hazard!

Lay the connection cables in suitable cable trays. Lay cables such that they do not present a tripping hazard.

## 1.2 Information and obligations for the operator

- The system may emit interference.
  - The system has been tested in accordance with EMC legislation.
  - The operator must verify and assure electromagnetic compatibility with other electrical and electronic equipment in the immediate vicinity of the system.
- Ensure that:
  - Operating personnel have read and understood these operating instructions.
  - Anyone working near the machine is made aware of the dangers and is provided with the necessary protective equipment.
  - Repairs are only carried out by qualified persons.
- In particular, make operating personnel aware of the safety instructions in this document.
- Always keep the system in fully functional condition.
- Any modifications made to the machine will invalidate the operating licence and the warranty. Exception: Such modifications are expressly authorised by the manufacturer.

### 1.3 Intended use

The system is intended solely for operation with the PS2000 high-voltage source and a plasma generator from **relyon plasma** GmbH.

Coupled with a suitable plasma generator, the machine is intended solely for the plasma treatment of surfaces (metals, textiles, glass, plastics) to activate, clean, coat or remove residue at atmospheric pressure.

Under no circumstances may the system be used by non-trained persons.

### 1.4 Impermissible operating conditions

The system must not be operated under the following conditions:

- In explosive (Ex) zones
- In areas with severe build-up of dust
- Where there is excessive air humidity (>80% rel.)
- Where temperatures are outside of 0 – 40 °C or 32 – 104 °F.
- Where there are strong vibrations



#### **Note!**

Please also observe the information in the operating instructions of all additional components connected to the system.

## 2 System description

### 2.1 Function

The components of this system are the basic elements for communicating with a PS2000 current source using the CAN bus with a higher level PLC.

### 2.2 System overview

#### 2.2.1 Description of the components



No.	Components
1	CAN cable (length 2 m)
2	CAN terminal resistor (Sub-D)
3	CAN terminal resistor bushing (Sub-D)
4	USB stick with EDS file

### 2.2.2 Scope of delivery

The scope of delivery includes the following components:

- CAN cable (length 2 m)
- CAN terminal resistor (Sub-D)
- CAN terminal resistor bushing (Sub-D)
- USB stick with EDS file
- Operating instructions

### 2.2.3 Other hardware components needed

Depending on the PLC used, additional hardware components are needed for a functioning overall system. Recommendations for this are listed below.

Components	Description
HMS CM CANopen-master/slave module for SIMATIC S7-1200 PLC (021620-B)	This module can be used to establish communication with the PS2000 current source when using a <b>SIMATIC S7-1200 PLC</b> .
Beckhoff EL6751 CANopen-master/slave terminal	This module can be used to establish communication with the PS2000 current source when using a <b>Beckhoff PLC</b> .

Other manufacturers of PLC modules offer comparable components for your systems.

## 3 Transport / storage

- Protect the system from dirt and foreign objects.
- Protect the system from impact.

## 4 Unpacking and installation

### 4.1 Unpacking

- Carefully open the packaging.
- Take the components out of the packaging.

### 4.2 Installation requirements

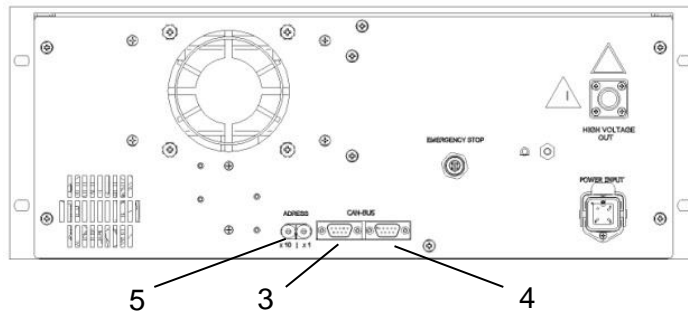
Before installing the machine, the following points must be met:

- The components must be undamaged.
- If installing as a permanent installation or in a building, a suitable switch or circuit breaker that satisfies national safety requirements (in Germany: VDE 0100) must be fitted as an upstream all-pole cut-off device that will disconnect the system from the power supply. This cut-off device should be fitted near the machine and must be easily accessible to the user. The switch must also be labelled as the cut-off device for the machine.
- Only a trained electrician may wire the system.
- Observe all installation requirements and safety notices for the additional machines connected.

### 4.3 System component installation

To install the system, carry out the following steps in the order specified:

1. Connect the CAN terminal resistor (bushing) to the intended module of the higher level PLC (for more information, see Chapter 2.2.3 Other hardware components needed).
2. Connect the CAN cable to the CAN terminal resistor (bushing).
3. Connect CAN cable to the rear connection of the PS2000 current source.
4. Terminate the CAN bus on the PS2000 with the provided terminal resistor; if necessary, also refer to the operating instructions of the PS2000 current source if necessary.
5. Set the PS2000 node number to the specified setting of the higher level PLC in the software.



6. Establish the emergency stop circuit for the PS2000 and all other connections of the additional machines as described in the corresponding operating instructions.

✓ The system is installed.



## 5 Operation

### 5.1 Start-up

To operate the system, the following points must be met:

- The main switches of the connected PS2000 current source must be switched on.
- The emergency stop circuit must be connected correctly.
- The CAN bus cables must be connected, both ends must be terminated with terminal resistors and the correct CAN bus address on the rear side of the current source must be set.
- The baud rate of the current source is 500 kBd. When programming the higher level control system, this must be taken into account and set correctly.
- The plasma generator must have a gas supply.
- All additional machines/components must be correctly connected.

If these points are met, you can use the higher level PLC to control your plasma process.

Please note that it is essential that a gas flow is present in order to operate the plasma generator. A test to ensure sufficient gas flow is present using the higher level PLC is recommended. This can be done using a SFAB flow meter type from Festo, for example. This check then has to be provided in the overall system. Before activating the high voltage for plasma generation, there must be a gas flow through the plasma generator for at least 2 seconds.



#### **Attention – Damage to machine!**

The plasma generator may be damaged if it is operated with no gas or too little gas.

- Never switch on the high voltage before sufficient gas is flowing through the plasma generator!

## 6 Environment

### 6.1 Disposal



#### **Consider the environment.**

Electrical and electronic equipment used must not be disposed of along with normal waste.

- The machine contains valuable materials that can be recycled. Take the machine to a suitable collection point.

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