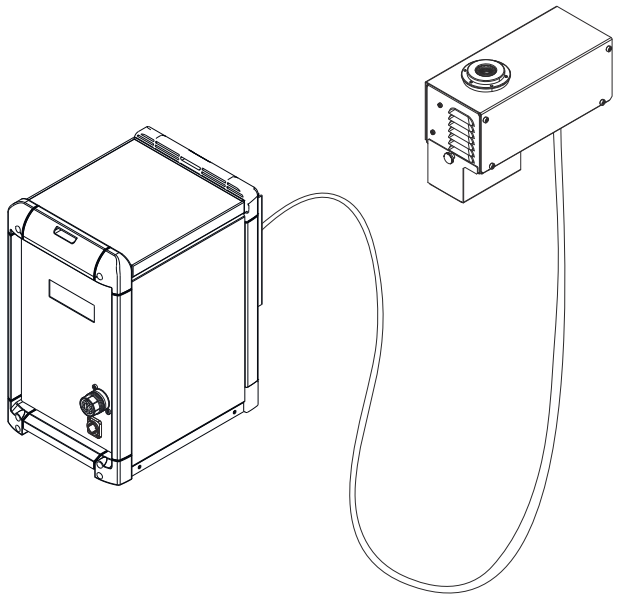
Operating Instructions

Robacta TC 2000 ext.
Robacta TC 2000 ext. US
Cleaning Unit TC 2000



EN-US | Operating instructions

42,0426,0259,EA 005-27012023

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Safety Instructions

Explanation of Safety Instructions

⚠ DANGER!

Indicates an immediate danger.

▶ Death or serious injury may result if appropriate precautions are not taken.

⚠ WARNING!

Indicates a possibly dangerous situation.

▶ Death or serious injury may result if appropriate precautions are not taken.

⚠ CAUTION!

Indicates a situation where damage or injury could occur.

▶ Minor injury or damage to property may result if appropriate precautions are not taken.

NOTE!

Indicates the possibility of flawed results and damage to the equipment.

General

The device has been manufactured using state-of-the-art technology and according to recognized safety standards. If used incorrectly or misused, however, it can cause

- injury or death to the operator or a third party,
- damage to the device and other material assets belonging to the operating company,
- inefficient operation of the device.

All persons involved in the commissioning, operation, maintenance, and servicing of the device must

- be suitably qualified,
- have knowledge of automated welding and
- have read these Operating Instructions and any system component operating instructions in full and follow them carefully.

The Operating Instructions must always be at hand wherever the device is being used. In addition to the Operating Instructions, all applicable local rules and regulations regarding accident prevention and environmental protection must also be followed.

All safety and danger notices on the device must

- must be kept in a legible state
- not be damaged/marked
- not be removed
- not be covered, pasted, or painted over

For the location of the safety and danger notices on the device, refer to the section headed "General" in the Operating Instructions for the device.
Before switching on the device, remove any faults that could compromise safety.

Your personal safety is at stake!

Intended Use

The device is to be used exclusively for its intended purpose.

The device is intended exclusively for the electromagnetic cleaning of Fronius welding torches.
Utilization for any other purpose, or in any other manner, shall be deemed to be “not in accordance with the intended purpose.” The manufacturer is not responsible for any damage resulting from improper use.

Proper use also means
- Reading and adhering to all instructions in the operating instructions
- Reading and adhering to all safety instructions and danger notices
- Carrying out all the specified inspection and servicing work

The device is designed for operation in industry and business. The manufacturer shall not be liable for any damage resulting from use in a living area.

The manufacturer shall also not be liable for faulty or incorrect work results.

Environmental Conditions

Operation or storage of the device outside the stipulated area will be deemed as not in accordance with the intended purpose. The manufacturer is not responsible for any damage resulting from improper use.

Temperature range of the ambient air:
- During operation: 0°C to + 40°C (32°F to 104°F)
- During transport and storage: -25°C to +55°C (-13°F to 131°F)

Relative humidity:
- Up to 50% at 40°C (104°F)
- Up to 90% at 20°C (68°F)

Ambient air: free of dust, acids, corrosive gases or substances, etc.

Altitude above sea level: up to 2000 m (6500 ft.)

Obligations of the Operating Company

The operating company must only allow persons to work with the device if they
- Are familiar with the basic occupational safety and accident prevention regulations and are trained in handling the device
- Have read and understood these Operating Instructions, especially the section "Safety Rules," and have confirmed this with their signature
- Are trained according to the requirements for the work results

The safety-conscious work of the personnel must be checked regularly.

Obligations of Personnel

All persons who are assigned to work with the device must do the following before beginning the work:
- Follow the basic regulations for occupational safety and accident prevention
- Read these Operating Instructions, especially the section "Safety Rules," and confirm that they have understood and will follow them by signing

Before leaving the workplace, ensure that no personal injury or property damage can occur in one's absence.

Particular hazard areas

Do not linger in the operating area of the robot.

Always integrate the device into a higher-level safety system in a secured area.

If this area has to be accessed for preparatory or maintenance work, ensure that
- the entire system is shut down for the duration of access to this area
- and remains shut down to prevent unintended operation, e.g., as a result of a control error

In addition to these Operating Instructions, the safety rules of the robot manufacturer must be followed.

Covers and side parts must only be opened/removed during maintenance and repair work.

During operation:
- Ensure that all covers are closed and all side parts have been mounted properly.
- Keep all covers and side parts closed.

Personal Protection and Protection of Others

Electromagnetic fields may cause health problems that are not yet known:
- Effects on the health of persons close by, for example those with pacemakers, metal implants and hearing aids
- General prohibition for persons with pacemakers: Persons with pacemakers must seek advice from their doctor before working with the device or being in the immediate vicinity of the device
- General prohibition for persons with metal implants: Persons with metal implants must seek advice from their doctor before working with the device or being in the immediate vicinity of the device

Magnetic fields generated by high amperage may eject ferromagnetic parts, such as spatter accumulations, from the cleaning aperture. To prevent injury, always wear protective goggles with side protection and never look into the cleaning aperture when the device is switched on.

You are exposed to numerous hazards while handling the device, for example:
- Flying sparks and pieces of hot metal
- Arc radiation that poses a risk of injury to the eyes and skin
- Electrical risks from mains current and welding current
- Increased noise exposure
- Harmful welding fumes and gases

Wear suitable protective clothing when dealing with the device. The protective clothing must have the following properties:
- Flame resistant
- Insulating and dry
- Covering the entire body and in good condition with no damage
- Safety helmet
- Cuffless pants

Protective clothing involves the following:
- Protecting the face and eyes from UV radiation, heat and flying sparks with a face guard featuring a regulation-compliant filter
- Wearing regulation-compliant protective goggles with side protection behind the face guard
- Wearing rigid, wet-insulating footwear
- Protecting hands with appropriate gloves (featuring electrical insulation and thermal protection)
- Wearing ear protection to reduce noise exposure and protect against injury

Keep persons, especially children, away during the operation of the devices and during the welding process. If persons are in the vicinity, however:
- instruct them about all dangers (blinding hazard due to arcs, injury hazard due to flying sparks, welding fume hazardous to health, noise exposure, possible hazard due to mains current or welding current, possible hazard due to electromagnetic fields, possible hazard due to the magnetic field of the cleaning aperture, moving mechanical parts, compressed air/parting agent mixture discharged from the cleaning aperture, flying chips or similar, etc.),
- provide suitable protective equipment, or
- construct suitable protective walls and curtains.

Dangers due to Mains Current and Operating Current

An electric shock is life-threatening and may be deadly.

Do not touch voltage-carrying parts inside or outside of the device.

All cables and leads must be secured, undamaged, insulated, and adequately dimensioned. Replace loose connections and scorched, damaged, or inadequately dimensioned cables and leads immediately.

Do not wrap cables or leads around your body or parts of the body.

Only put the device into operation if it is correctly connected on the output side.

Operate the device only on a grid with a ground conductor and a socket with a ground conductor contact.

Operating the device on a grid without a ground conductor is considered to be grossly negligent. The manufacturer is not responsible for any damage resulting from improper use.

Have the grid and device supply lead regularly inspected by an electrician to ensure that the ground conductor is functioning properly.

Switch off unused devices.

Before working on the device, disconnect the mains plug.

Secure the device to prevent the mains plug from being connected and the device switched on again by affixing a clearly legible and understandable warning sign.

After opening the device:
- Discharge all electrically charged components
- Ensure that all components are disconnected from the power supply

If work is needed on voltage-carrying parts, bring in a second person who will switch off the main switch at the correct time.

The housing screws act as a ground conductor connection for grounding the housing. The screws must not under any circumstances be replaced by other screws without a reliable ground conductor connection.

EMC Device Classifications

Devices in emission class A:
- Are only designed for use in industrial settings
- Can cause line-bound and radiated interference in other areas

Devices in emission class B:
- Satisfy the emissions criteria for residential and industrial areas. This is also true for residential areas in which the energy is supplied from the public low-voltage grid.

EMC device classification as per the rating plate or technical data.

EMC Measures

WARNING! Electromagnetic field! Electromagnetic fields may cause health problems that are not yet known.

It is the operating company's responsibility to ensure that there is no electromagnetic interference with electrical and electronic equipment.
If electromagnetic interference is detected, the operating company is obliged to take measures to rectify the situation.

Check and evaluate possible problems and the interference immunity of equipment in the vicinity according to national and international regulations:
- Safety devices
- Grid power lines, signal lines and data transfer lines
- IT and telecommunications equipment
- Devices for measuring and calibrating
- The health of persons close by

Supporting measures to avoid EMC problems:
1. Grid power supply
   - If electromagnetic interference occurs despite a grid connection that complies with regulations, take additional measures (e.g., use a suitable grid filter).
2. Shield, if necessary
   - Shield other devices in the vicinity
   - Shield the entire welding installation
3. Do not carry magnetic or electronic data carriers:
   Magnetic or electronic data carriers can be damaged due to the magnetic fields occurring during operation of the device.
4. Do not carry watches or pieces of metal. Watches may be damaged by the operation of the device.

Safety Measures at the Setup Location and During Transport

A toppling device can be deadly! Set up the device securely on an even, solid surface
- A tilt angle of no more than 10° is permitted.

Special regulations apply in areas at risk of fire or explosion
- Follow the appropriate national and international regulations.

Use instructions and checks within the company to ensure that the vicinity of the workplace is always clean and organized.

Only set up and operate the device in accordance with the degree of protection shown on the rating plate.

Install the device with an all-round clearance of at least 0.5 m (19.69 in.) to walls, neighboring devices, or other objects.

Install the device at a minimum distance of 1 m (40 in.) away from IT equipment and control lines, as well as from the welding process.

Set up the device in such a way that welding spatter cannot hit the cleaning device.

Before transporting the device, always completely drain the parting agent.

Take care to ensure that the applicable national and regional guidelines and accident prevention regulations are observed when transporting the device, especially guidelines concerning hazards during transport and shipment.

It is essential to conduct a visual inspection of the device to check for damage after it has been transported but before it is commissioned. Have any damage repaired by trained service technicians before commissioning the device.

Safety Measures in Normal Operation

Only operate the device when all safety devices are fully functional. If the safety devices are not fully functional, there is a danger of:
- Injury or death to the operator or a third party
- Damage to the device and other material assets belonging to the operating company
- Inefficient operation of the device

Safety devices that are not fully functional must be repaired before the device is started up.

Never bypass or disable safety devices.

Before starting up the device, ensure that no one can be put in danger.

The device must be examined at least once a week for externally detectable damage and functionality of the safety devices.

- Only use appropriate original parting agents from the manufacturer.
- When handling parting agents, observe the information on the parting agent safety data sheets. The parting agent safety data sheets can be obtained from your service center or via the manufacturer’s website.
- Do not mix parting agents from the manufacturer with other parting agents.
- If damage occurs due to the use of other parting agents, the manufacture is not liable for this and all warranty claims are forfeited.
- Properly dispose of used parting agents according to national and international regulations.

Maintenance and repair

It is impossible to guarantee that bought-in parts are designed and manufactured to meet the demands made of them, or that they satisfy safety requirements.
- Use only original spare and wearing parts (also applies to standard parts).
- Do not carry out any modifications, alterations, etc. to the device without the manufacturer's consent.
- Components that are not in perfect condition must be replaced immediately.
- When ordering, please give the exact designation and part number as shown in the spare parts list, as well as the serial number of your device.

The housing screws provide the ground conductor connection for earthing the housing parts.
Only use original housing screws in the correct number and tightened to the specified torque.

Safety Inspection

The manufacturer recommends that a safety inspection of the device be performed at least every 12 months.

A safety inspection by a certified electrician is recommended:
- after changes
- after alterations
- after repair, care, and maintenance
- at least every 12 months.

For the safety inspection, follow the appropriate national and international standards and guidelines.

You can obtain more information about the safety inspection and calibration from your service center. The service center will provide the necessary documents upon request.

Disposal

Waste electrical and electronic equipment must be collected separately and recycled in an environmentally sound manner in accordance with the European Directive and national law. Used equipment must be returned to the distributor or through a local authorized collection and disposal system. Proper disposal of the used device promotes sustainable recycling of material resources. Failure to observe this may lead to potential health/environmental impacts.

Packaging materials
Separate collection. Check your municipality's regulations. Reduce the volume of the box.

Safety symbols

Devices with the CE label satisfy the essential requirements of the low-voltage and electromagnetic compatibility directive (e.g., relevant product standards of the EN 60974 series).

Fronius International GmbH declares that the device complies with Directive 2014/53/EU. The full text of the EU Declaration of Conformity is available on the following website: http://www.fronius.com

Devices marked with the CSA test mark satisfy the requirements of the relevant standards for Canada and the USA.

Data backup

The user is responsible for backing up any changes made to the factory settings. The manufacturer accepts no liability for any deleted personal settings.

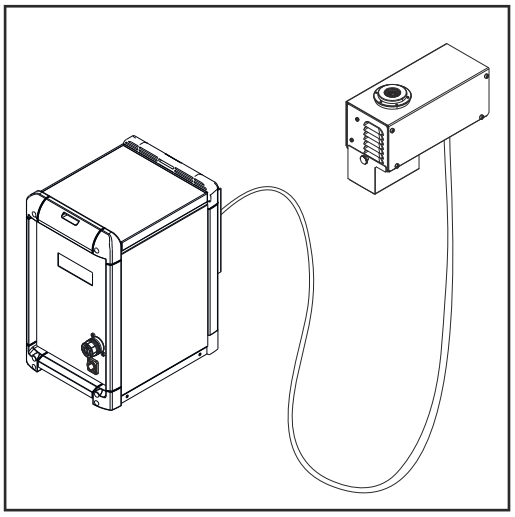
Copyright

Text and illustrations were accurate at the time of printing. Fronius reserves the right to make changes. The contents of the Operating Instructions shall not provide the basis for any claims whatsoever on the part of the purchaser. If you have any suggestions for improvement, or can point out any mistakes that you have found in the Operating Instructions, we will be most grateful for your comments.

General

General

Device concept



Base unit with cleaning unit

The cleaning device consists of
- a base unit – the Robacta TC 2000 ext. / Robacta TC 2000 ext. US and
- a cleaning unit – the Cleaning Unit TC 2000 in various designs

The cleaning device is designed to clean a variety of different welding torch geometries. The components are housed in a robust housing. The compact design permits installation in the smallest of spaces.

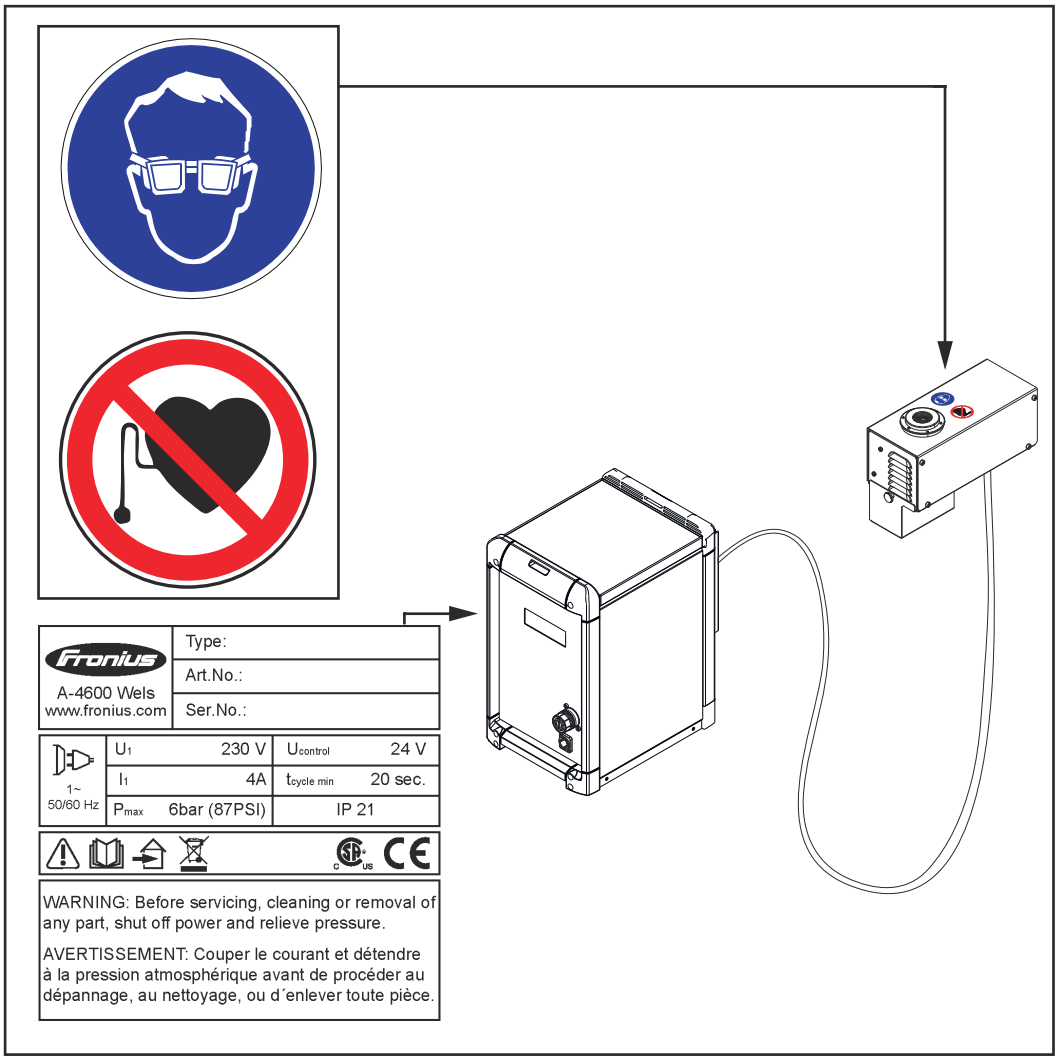
The cleaning device is largely maintenance-free, since there are no parts subject to mechanical stress.

Applications

The cleaning device is intended for the cleaning of welding torches in automated steel applications. The cleaning device is designed for use:
- In the automotive and supply industry
- In equipment engineering
- In chemical plant construction
- In mechanical engineering
- In rail vehicle construction
- In shipyards

Warning notices on the device

The device has safety symbols and a rating plate fitted. These safety symbols and the rating plate must not be removed or painted over. The symbols warn against operating the equipment incorrectly, as this may result in serious injury and damage to property.



WARNING! Risk of serious injuries due to:
- The magnetic field of the cleaning aperture
- Compressed air/parting agent mixture discharged from the cleaning aperture
- Flying debris (chips, etc.)
- Moving mechanical parts

During maintenance and servicing, keep the device de-energized and depressurized.

Do not use the functions described here until you have fully read and understood the following documents:
- These Operating Instructions
- All system component Operating Instructions, especially the safety rules

For indoor use only

Wear eye protection

Prohibition for persons with pacemakers. Persons with pacemakers must seek advice from their doctor before working with the device or being in the immediate vicinity of the device

Functional principle

Operating principle

a) As soon as the cleaning device is connected to the grid, the **28** (page **28**) lights up. The capacitors, which store the energy for the cleaning process, are discharged and no outputs are actuated.

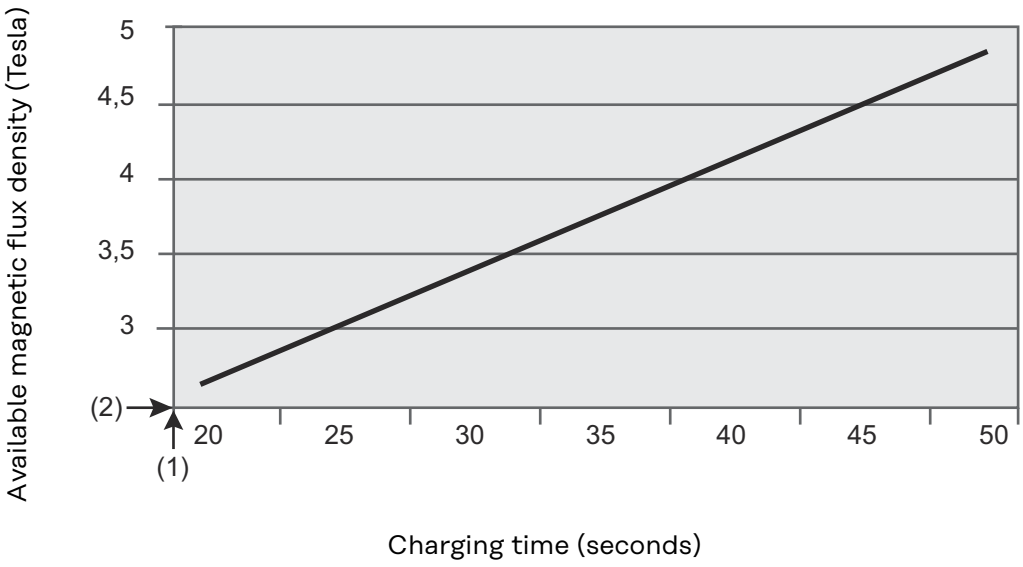
NOTE!

In order for the capacitors' charging process to begin, the following prerequisites must be met:

- ▶ Base unit connected to the grid
- ▶ Base unit connected to the robot control
- ▶ Interconnecting hosepack of cleaning unit connected to the base unit
- ▶ The 'Quick Stop' signal must be set

b) Before the capacitors are charged, the device temperature is checked. If it is within tolerance, the capacitors will be charged for the cleaning process.
If the operating temperature is exceeded, the overtemperature **28** (page **28**) will light up. In this case, the charging process of the capacitors will only take place after cooling down to the permissible operating temperature.

c) After 20 seconds of charging time, the 'Ready' signal will be output to the robot control - the **29** indicator (page **29**) on the device will flash. As soon as the capacitors are fully charged, the indicator will light up permanently. Although after 20 seconds the maximum magnetic flux density is not yet available to the device, the cleaning process (discharge process) can be initiated by means of the 'Cleaning Start' signal. For setup purposes, the cleaning process can be triggered manually by means of **29** (page **29**) on the device.
After 50 seconds of charging time, the maximum magnetic flux density is available for the cleaning process.
For the exact ratio of charging times to available magnetic flux density, please see the diagram below.



d) After the cleaning process has finished, the program sequence starts again with a check of the device temperature. If a cleaning process has finished incorrectly, the 'Error' signal will be output. The cleaning device once again initiates the charging process of the capacitors. If the cleaning readiness is 'Ready', another cleaning process can be carried out.

NOTE!

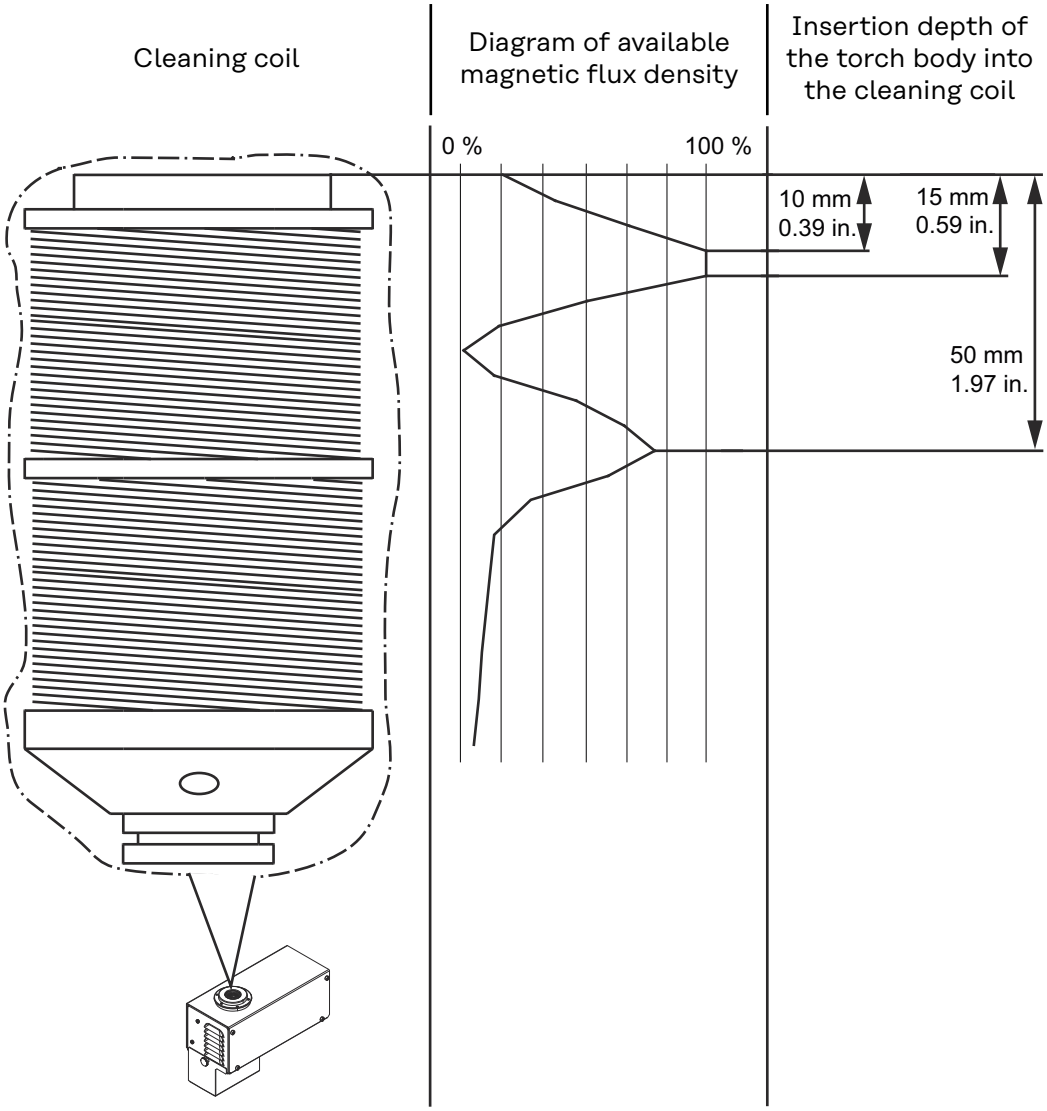
If the robot control deactivates the 'Quick Stop' signal during the program sequence, the cleaning device program sequence will be aborted immediately.
For safety reasons, the capacitors are discharged via the cleaning coil.

Representation of the magnetic flux density within the cleaning coil for single-wire applications

Depending on the requirements, the insertion depth of the welding torch in the cleaning coil can be used to regulate how strong an effect the magnetic flux density should have on the individual areas of the welding torch.

NOTE!

For the operation of the cleaning device, use the insertion depth details for the welding torch from the program sequence.

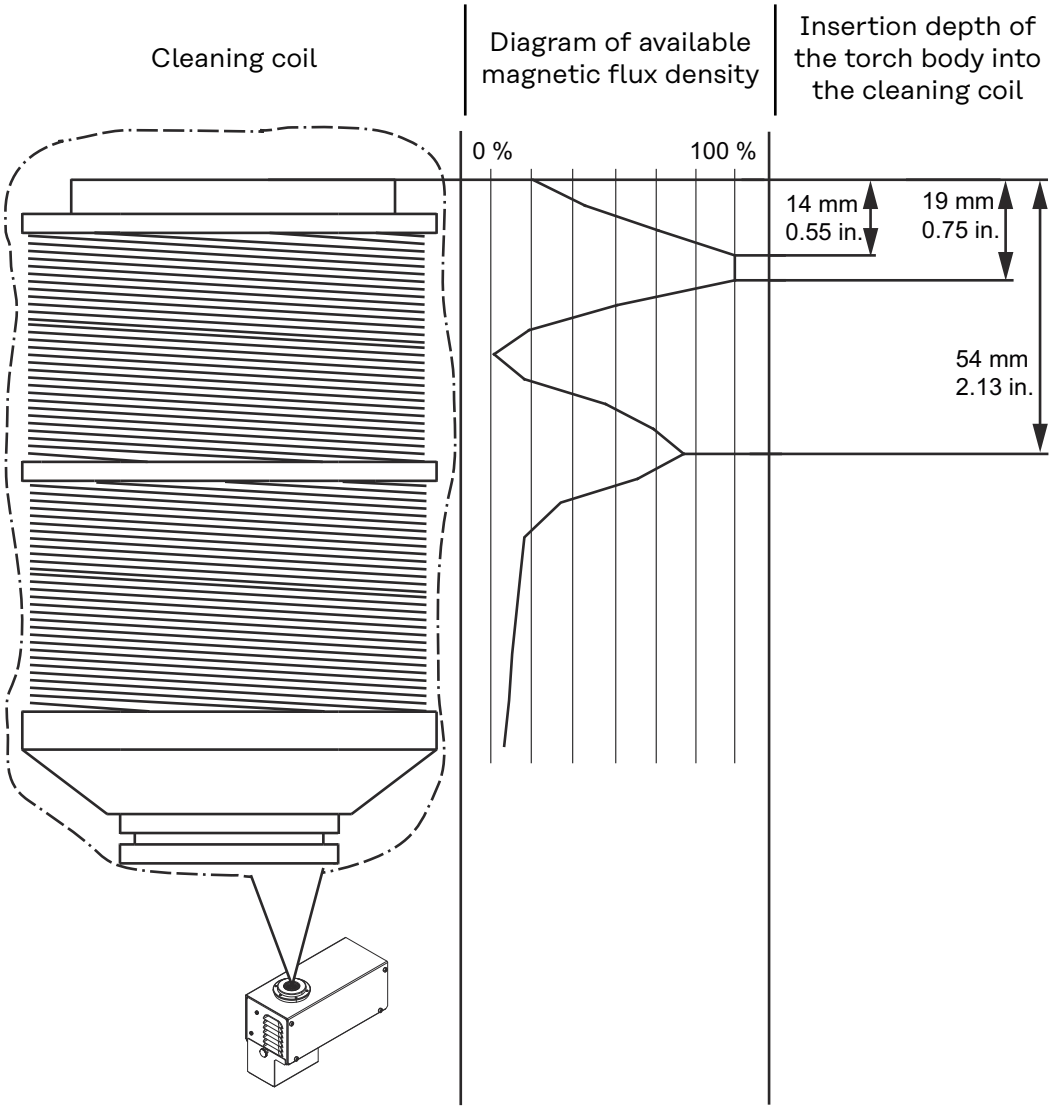


Representation of the magnetic flux density within the cleaning coil for twin applications

Depending on the requirements, the insertion depth of the welding torch in the cleaning coil can be used to regulate how strong an effect the magnetic flux density should have on the individual areas of the welding torch.

NOTE!

For the operation of the cleaning device, use the insertion depth details for the welding torch from the program sequence.



Scope of Supply and Options

General

The cleaning device may be operated in conjunction with various options. Depending on the area of application, various sequences in the work process can be optimized as a result.

Scope of Supply

- Base unit (available in various versions)
- Standard I/O (X1) connecting plug without cable
- Four screws for mounting the cleaning device on the work stand

Available Options

Available options for the cleaning device

- Cleaning unit (available in various versions)
- Work stand for the base unit (available in various heights)
- Work stand for the cleaning unit (available in various heights)
- Wire cutter
- Installation kit for parting agent atomizer

Transport

Transport equipment

Transport the device using the following transport equipment:
- On a pallet using a counterbalanced lift truck
- On a pallet using a lift truck
- Manually

⚠ WARNING!

Danger from devices and objects falling.
This can result in severe personal injury and damage to property.
▶ When transporting the device by counterbalanced lift truck or lift truck, secure the device to prevent it from falling.
▶ Do not turn, brake, or accelerate in a sudden, jerking manner.

Transport Instructions on the packaging

⚠ CAUTION!

Danger due to improper transport.
This can result in damage to property.
▶ Follow the transport instructions on the device packaging.

Operating controls, connections and mechanical components

Safety

Safety

Please follow the safety rules below when using all the functions described in the "Operating controls, connections, and mechanical components" chapter.

⚠ WARNING!

Danger from incorrect operation and work that is not carried out properly.
This can result in severe personal injury and damage to property.

- ▶ All the work and functions described in this document must only be carried out by trained and qualified personnel.
- ▶ Read and understand this document.
- ▶ Read and understand all the Operating Instructions for the system components, especially the safety rules.

Standard I/O (X1) Connecting Plug Configuration for the Robot Control

General

⚠ WARNING!

Danger from electrical current.
This can result in serious personal injury and damage to property.
▶ The cleaning device must not be supplied with electrical power until the installation has been completed.

NOTE!

To avoid any interference, keep the line length between the cleaning device and the robot control as short as possible.

The standard I/O (X1) connecting plug for connecting the cleaning device to the robot control is included in the scope of supply. Adjust the cable harness for the robot control connection technology.

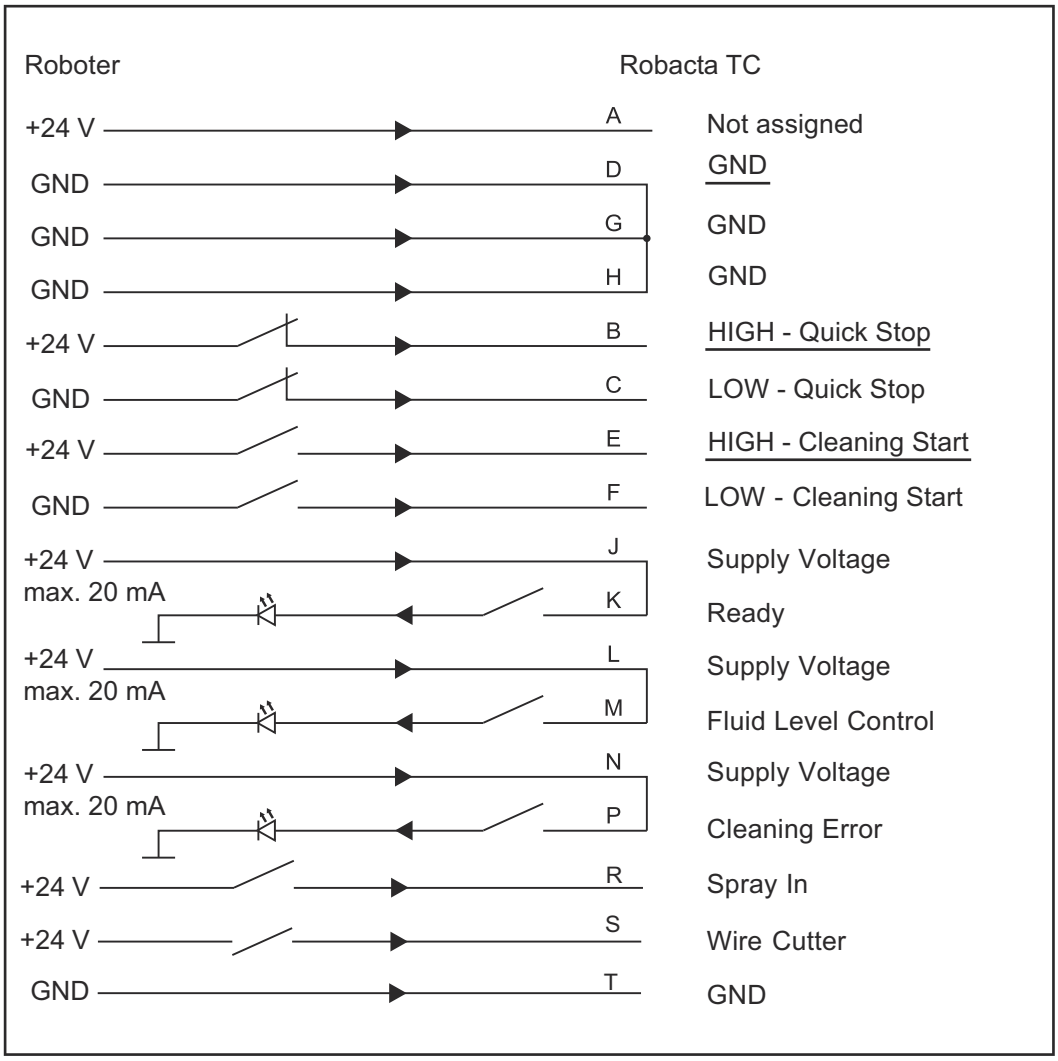
Standard I/O (X1) connecting plug configuration

⚠ WARNING!

Danger due to unexpectedly activated cleaning device / unexpectedly activated system components.
This can result in serious personal injury and damage to property.
▶ Assign the signal input Quick Stop with either HIGH only, or
▶ Assign the signal input Quick Stop with LOW only.

NOTE!

Depending on the requirements for the robot application, not all input and output signals (commands) need to be used.
The input and output signals that are underlined in the graphic below represent the minimum level of commands to be applied.



Standard I/O (X1) connecting plug configuration

Operating controls, connections and mechanical components

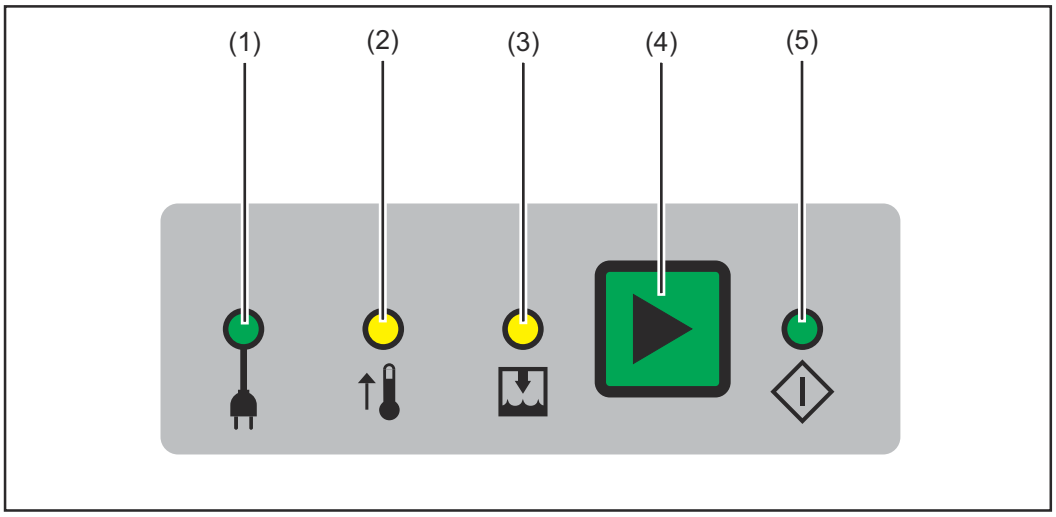
General

All functions of the cleaning device are activated via the robot control. For setup operation, the cleaning process can be triggered manually on the base unit housing.

NOTE!

Individual images may differ slightly from your device.
However, the function of the operating elements and connections is identical.

Control panel



No.	Function
(1)	**Mains voltage indication** Lights up when the device is being supplied with mains voltage

NOTE!

If the capacitors have been charged in the device, they usually discharge automatically as soon as the device is disconnected from the grid.
The discharge time is usually around 1 second.
In the event of an error, the capacitors may not be discharged. In this case, it is essential to follow the instructions in the section **What to Do in the Event of an Error** on page **57**.

(2)	**Overtemperature indication** Lights up when the device heats up excessively

NOTE!

After this indication lights up, one more cleaning process can be carried out.
The device will not charge itself for the next cleaning process until it has cooled down to the operating temperature.

(3) Fill level indication
No function, always lit

(4) Discharge button
If the button is pressed briefly, the cleaning device will carry out the following functions:
1. Cleaning process is triggered

If the button is pressed and held down, the cleaning device will carry out the following functions in sequence:
1. Cleaning process is triggered
2. Wire cutter is activated (if present)
3. Compressed air/parting agent mixture is sprayed out of the cleaning aperture

NOTE!

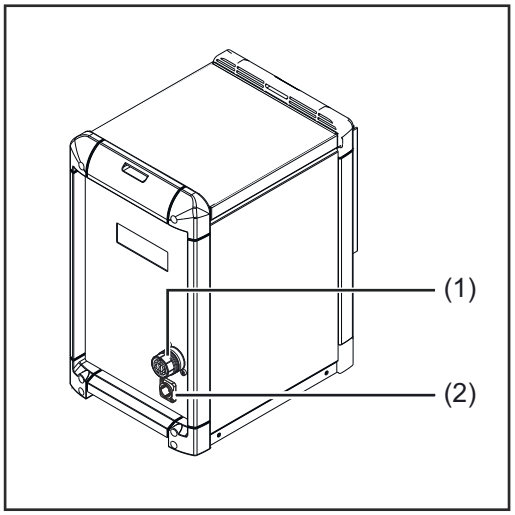
Prerequisite for the cleaning device to perform the above function:
▶ The signal Quick Stop is set, capacitors are thus charged

(5) Ready to clean indication
Lights up when the device is ready to clean

⚠ **WARNING!**

Danger from electrical current.
This can result in serious personal injury and damage to property.
▶ Once the ready to clean indication (5) lights up, do not disconnect the interconnecting hosepack from the base unit.
▶ Before disconnecting the interconnecting hosepack, disconnect the power supply and the compressed air supply to the base unit.

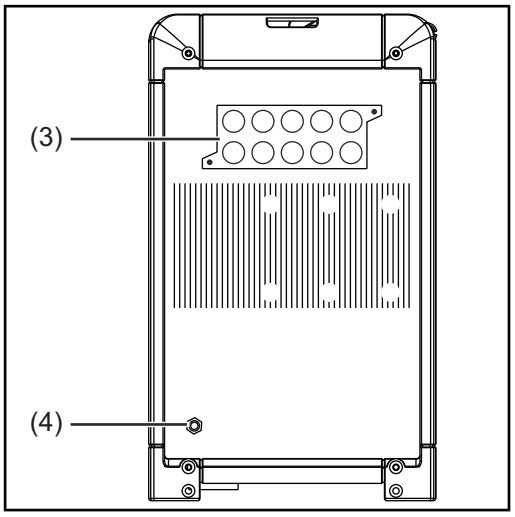
Connections and mechanical components of the base unit



Device front

(1) Standard I/O (X1) connection socket

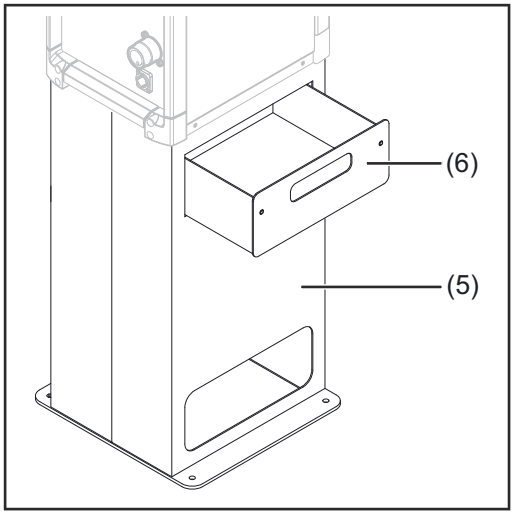
(2) Mains cable connection socket



Device rear

(3) **Cleaning unit connection socket**
For connecting the cleaning unit connection cable

(4) **Compressed air connection socket**
For supplying the cleaning device with compressed air

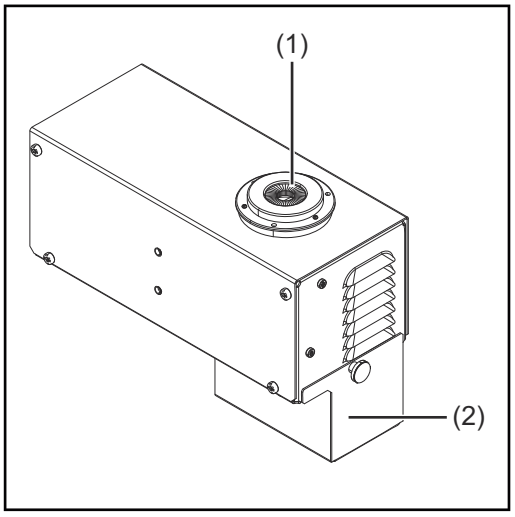


Optional work stand

(5) **Work stand (option)**

(6) **Collecting container for welding residues**

Connections and mechanical components of the cleaning unit



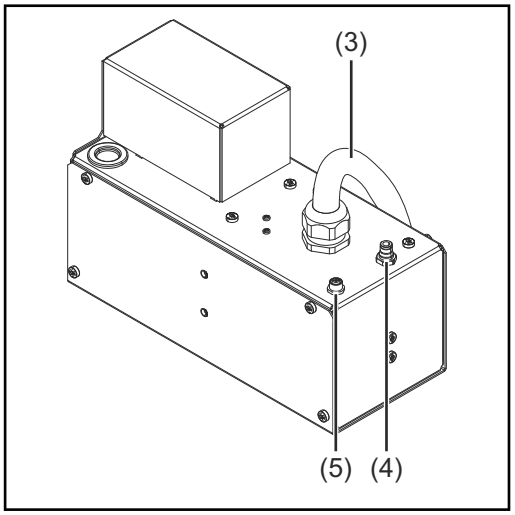
Top of the cleaning unit

(1) **Cleaning aperture with internal parting-agent injection nozzles and brush seal**
- For cleaning the gas nozzle and the interior of the welding torch
- For wetting the gas nozzle and the interior of the welding torch with parting agent

(2) **Collecting container for welding residues**

NOTE!

The cleaning aperture of the standard cleaning unit (Cleaning Unit TC 2000) is equipped with a brush seal at the factory.
This cleaning unit may only be operated if the brush seal is installed. Brush seals must not be removed.



Underside of the cleaning unit

(3) Interconnecting hosepack
For connecting to the base unit

⚠ WARNING!

Danger from electrical current.
This can result in serious personal injury and damage to property.

- ▶ Once the ready to clean indication lights up, do not disconnect the interconnecting hosepack from the base unit.
- ▶ Before disconnecting the interconnecting hosepack, disconnect the power supply and the compressed air supply to the base unit.

(4) Parting agent atomizer connection socket
For connecting to the 'Robacta Reamer' parting agent container

(5) Wire cutter connection socket
For electrically controlling the wire cutter

Installation and Startup

Safety

Safety

Please follow the safety rules below during all the tasks described in the "Installation and commissioning" chapter.

⚠ WARNING!

Danger from incorrect operation and work that is not carried out properly.
This can result in serious personal injury and damage to property.
- ▶ All the work and functions described in this document must only be carried out by a trained Fronius service technician.
- ▶ Read and understand this document in full.
- ▶ Read and understand all safety rules and user documentation for this equipment and all system components.

⚠ WARNING!

Danger due to machines starting automatically.
This can result in serious personal injury and damage to property.
- ▶ In addition to these Operating Instructions, observe the safety rules of the robot manufacturer and welding system manufacturer.
- ▶ Ensure that all protective measures have been taken in the robot's operating area and remain in effect while you are in this area.

⚠ WARNING!

Danger from electric shock and mechanically moving parts.
This can result in serious personal injury and damage to property.
- ▶ Before working on the cleaning device or the associated system components, disconnect the customer's compressed air and voltage supply from the cleaning device and the associated system components.
- ▶ Make sure that the customer's compressed air and power supply remain disconnected from the cleaning device and the associated system components until all work has been completed.

⚠ WARNING!

If the cleaning device is being supplied with voltage and/or compressed air, there is a risk of serious injury due to:
the magnetic field of the cleaning opening,
flying parts (chips, etc.),
compressed air/parting agent mixture escaping from the cleaning opening,
activated wire cutter.
This can result in serious personal injury and damage to property.
If work is required on the cleaning device while the cleaning device is being supplied with voltage and/or compressed air, take the following safety measures:
- ▶ Keep all ferromagnetic parts away from the device (e.g., tools).
- ▶ Keep your body, especially hands, face, and hair, as well as objects and all items of clothing, away from the cleaning aperture and the wire cutter.
- ▶ Wear hearing protection.
- ▶ Wear protective goggles with side protection.

Before installation

Operating personnel, maintenance personnel

⚠ WARNING!

Danger due to machines starting automatically.
This can result in severe personal injury and damage to property.
- ▶ The device must only ever be operated/maintained by one person.
- ▶ Ensure that there is only one person in the device's operating area while it is being worked on.

Setup regulations

The device has been tested according to protection class IP 21. This means:
- Protection against solid foreign bodies larger than Ø 12.5 mm (0.49 inches)
- Protection against dripping water

The device must not be set up and operated outdoors. The installed electrical components must be protected against direct exposure to moisture.

NOTE!

Install the device at a minimum distance of 1 m (40 inches) away from IT equipment and control lines, as well as from the welding process.

NOTE!

Install the device with an all-round clearance of at least 0.5 m (19.69 inches) to walls, neighboring devices, or other objects.

NOTE!

Set up the device in such a way that welding spatter cannot hit the cleaning device.

Specifications for the compressed air supply

To ensure the proper functioning of the cleaning device, fulfill the following specifications for the compressed air supply:
- Set up a compressed air supply using the pressure relief valve and compressed air filter
- Guarantee the compressed air quality in accordance with ISO 8573-1:2001, class 7 4 3, instrument air
  - Solid particle concentration ≤ 10 mg/m³
  - Pressure dew point steam ≤ + 3 °C
  - Oil concentration ≤ 1 mg/m³

Mains connection

⚠ CAUTION!

Danger due inadequately dimensioned electrical installations.
This can lead to serious damage
▶ The grid lead and its fuse protection should be designed to suit the existing power supply.
The technical data on the rating plate should be followed.

⚠ CAUTION!

Danger due to incorrect mains voltage.
Serious damage may result.
▶ If the mains voltage is outside the tolerances specified in the technical data, do not connect the device to the grid.

The cleaning device is designed for the mains voltage listed on the rating plate. The fuse protection required for the grid lead may be found in the "Technical data" section. If mains cables or mains plugs are not included with your version of the appliance, attach the appropriate mains cable or mains plug in accordance with your country's standards.

Setting Up and Connecting the Cleaning Device

Assembly note

NOTE!

Before the definitive installation of the base unit and cleaning unit, make sure that the cleaning unit interconnecting hosepack is long enough for the planned installation positions.
After the installation of the devices, the interconnecting hosepack must rest on the ground without any tensile stress and must not be suspended in the air.

Screwing the cleaning unit and work stand to the mounting surface (foundation)

⚠ **WARNING!**

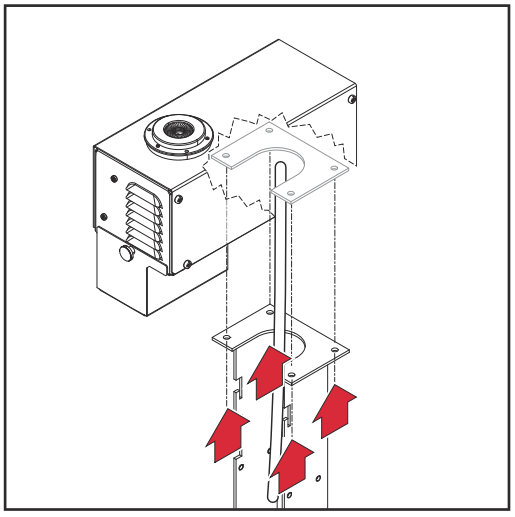
Danger from welding residues being thrown out of the cleaning aperture of the cleaning unit.
This can result in serious personal injury and damage to property.
▶ Only use the cleaning unit with the supplied collecting container for welding residues.

⚠ **WARNING!**

Danger from machines toppling over or falling.
This can result in serious personal injury and damage to property.
▶ Depending on the mounting surface (foundation), different mounting materials may be required for connecting the work stand to the surface.
▶ The mounting materials required for connecting the work stand to the mounting surface are not supplied with the work stand. The screws that are supplied with the work stand are not suitable for screwing the work stand to the mounting surface. The installer is responsible for selecting the proper mounting materials.

1 Position the work stand (available as an option) on a level, solid, and vibration-free surface
- Position the work stand so that the robot's approach route to the cleaning unit on the work stand is as short as possible

2 Tightly screw the work stand to the mounting surface using the selected mounting materials



3 Position the cleaning unit on the work stand

4 Attach the cleaning unit to the work stand using lock washers and screws – lock washers and screws are supplied with the work stand

5 Clip the collecting container for the welding residues onto the cleaning unit and fasten it with the knurled-head screw

Screwing the base unit and work stand to the surface (foundation)

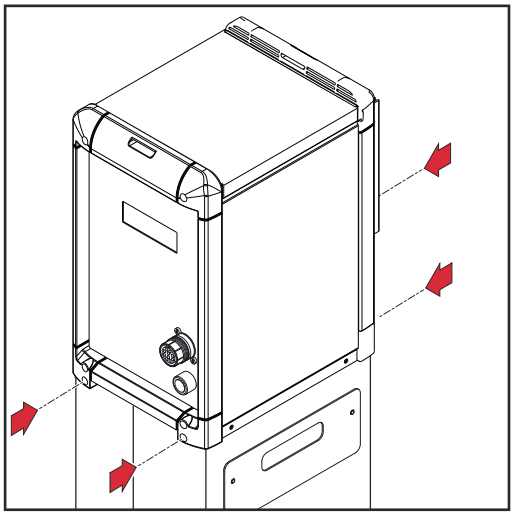
⚠ WARNING!

Danger from machines toppling over or falling.
This can result in serious personal injury and damage to property.

- ▶ Only attach the base unit to the foundation with the work stand provided for that purpose.
- ▶ Depending on the surface, different mounting materials may be required for connecting the work stand to the surface.
- ▶ The mounting materials required for connecting the work stand to the mounting surface are not supplied with the work stand. The screws that are supplied with the work stand are not suitable for screwing the work stand to the mounting surface. The installer is responsible for selecting the proper mounting materials.

1 Position the work stand (available as an option) on a level, solid, and vibration-free surface
   - Position the work stand in such a way that the interconnecting hosepack of the cleaning unit can be connected to the base unit

2 Tightly screw the work stand to the mounting surface using the selected mounting materials



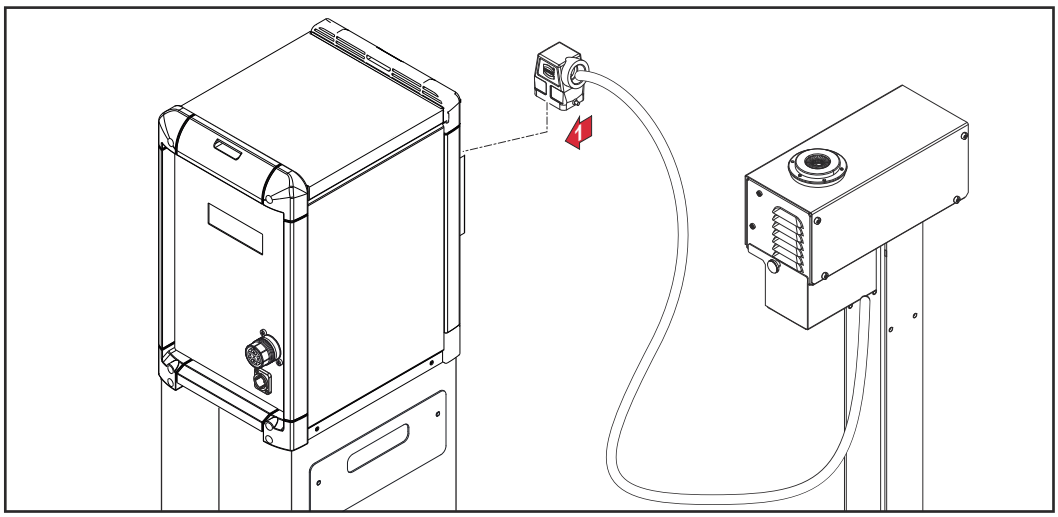
3 Position the base unit on the work stand

4 Attach the base unit to the work stand with four screws – use the screws supplied with the base unit

Connecting the cleaning unit to the base unit

1 Remove the cover from the cleaning unit connection socket on the rear of the base unit

2 Insert the connecting plug of the interconnecting hosepack into the base unit



3 Tighten the screws on the connecting plug of the interconnecting hosepack to secure it in the cleaning unit connection socket

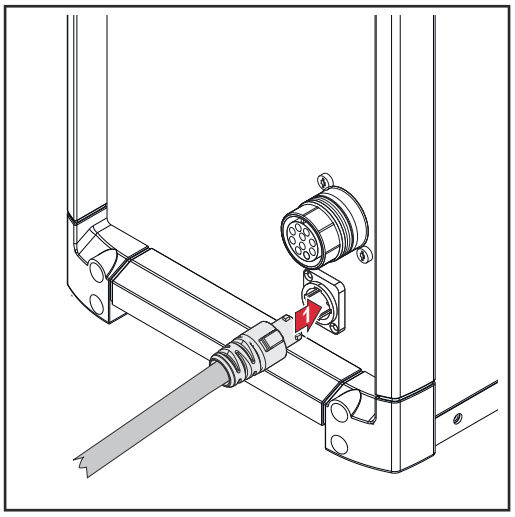
⚠ WARNING!

Danger from electrical current.
This can result in serious personal injury and damage to property.

▶ If the interconnecting hosepack needs to be disconnected after commissioning the base unit, disconnect the voltage supply and the compressed air supply before disconnecting the hosepack.

Connecting the Mains Cable

Connecting the mains cable



1 To connect the mains cable:
- Plug in the mains cable
- Turn the mains cable 45° to the right until it audibly locks into place

Installing the wire cutter

Installing the wire cutter on the cleaning device

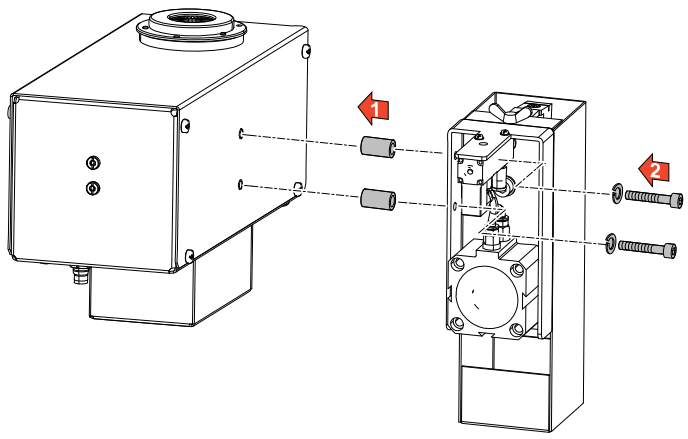
NOTE!

Wire cutters for conventional applications (one wire electrode) and for twin applications (two wire electrodes) should be installed in the same manner – as described below.

NOTE!

The spacers, lock washers and screws for installing the wire cutter are supplied with the wire cutter.

1



2 Connect the wire cutter connection cable to the wire cutter connection socket on the cleaning unit

3 Connect the wire cutter's compressed air supply

Maximum Wire Diameter

For conventional applications (one wire electrode), wire electrodes with a diameter of up to 1.6 mm (0.063 in.) can be cut with the appropriate wire cutter.

For twin applications (two wire electrodes), two wire electrodes with a diameter of up to 1.6 mm (0.063 in.) can be cut simultaneously with the appropriate wire cutter.

Operating Principle of the Electrically Controlled Wire Cutter

The opening and closing of the electrically controlled wire cutter is triggered by an active signal from the robot control.

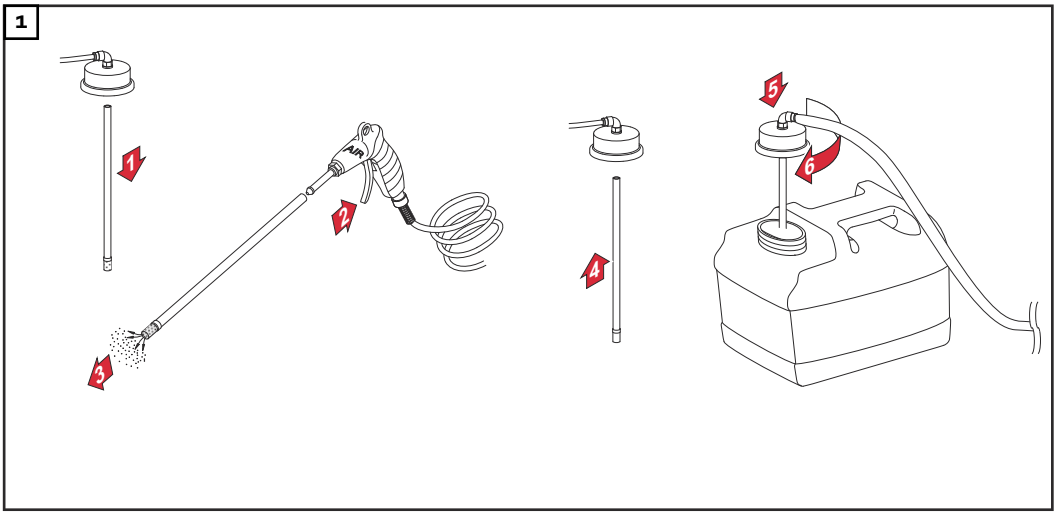
Connecting the Cleaning Unit to the ‘Robacta Reamer’ Parting Agent Container

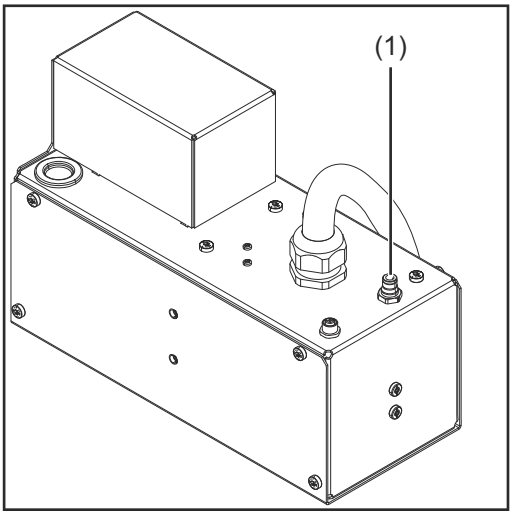
Connecting the cleaning unit to the 'Robacta Reamer' parting agent container

NOTE!

Only use the 'Robacta Reamer' parting agent provided by the manufacturer.
Its composition is specifically tailored for use with the cleaning device. Correct operation is not ensured when other products are used.

1





Underside of the cleaning unit

2 Connect the parting agent hose from the parting agent container to the parting agent atomizer connection socket (1) on the underside of the cleaning unit

NOTE!

The parting agent injection time must be set via the robot control.
The selected injection time cannot be less than 0.5 seconds.
An injection time of ~ 0.7 seconds is recommended. Depending on the size of the gas nozzle, the necessary injection time may vary.

Start up the Cleaning Device

General

NOTE!

If wetting agent has not been applied to the inside of the welding torch, this may lead to the permanent contamination of the welding torch when welding begins.
Always wet the inside of the welding torch with the manufacturer's 'Robacta Reamer' parting agent before starting an automatic application.

To achieve optimum cleaning results, observe the following points:
- Always wet the inside of the welding torch with parting agent
- Adhere to the specified cleaning procedures
- Adhere to the specified cleaning positions
- Blow out the welding torch with compressed air during cleaning (but not while parting agent is being injected into the inside of the welding torch)

NOTE!

Individual small spatters are not removed by the cleaning device.
Small welding spatters do not, however, affect the welding process.

Requirements for Commissioning

The following requirements must be met in order to commission the cleaning device:
- Base unit screwed tightly to the surface
- Cleaning unit screwed tightly to the surface
- Interconnecting hosepack of cleaning unit connected to the base unit
- Base unit connected to the grid
- Base unit supplied with compressed air
- Base unit connected to the robot control

Only if present/used
- 'Robacta Reamer' parting agent container connected to the cleaning unit
- Wire cutter installed and supplied with compressed air

Cleaning Program Sequence for Single Wire Applications

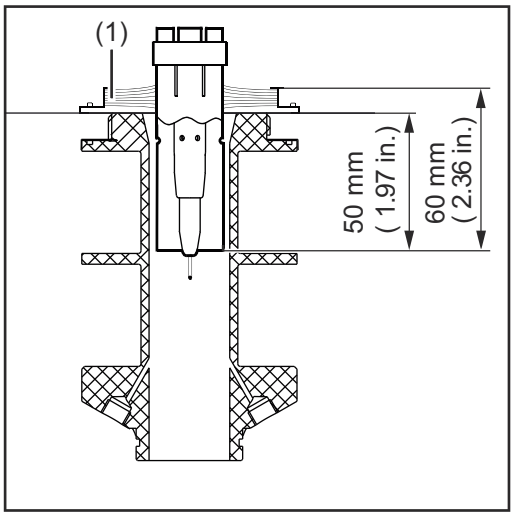
Program Sequence with Parting Agent Atomizer – Overview

1. Welding
2. Clean the gas nozzle tip and nozzle fitting
3. Inject parting agent
4. Welding

Cleaning the Gas Nozzle Tip and Nozzle Fitting – Detailed Description

NOTE!

During the cleaning process, blow out the welding torch with compressed air via the hosepack.
Contamination and surplus parting agent will be removed.



NOTE!

Make sure that the gas nozzle does not touch the housing parts of the cleaning aperture at any time.

1 Position the welding torch approx. 50 mm (1.97 in.) above the cleaning aperture and centrically with respect to the middle of the cleaning aperture

NOTE!

If the brush seal (1) is installed, pay attention to the changed reference point when positioning the welding torch.

2 Move the welding torch vertically to the cleaning position
- See graphic

3 Trigger the cleaning process and leave the welding torch in the cleaning position for approximately 1 second

Injecting Parting Agent – Detailed Description

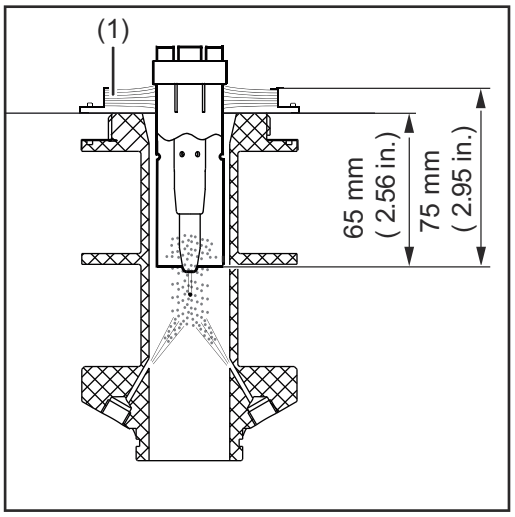
The even application of a parting agent has the following advantages:
- Reduced adhesion of welding spatter
- New contamination is prevented

NOTE!

If the brush seal (1) is installed, pay attention to the changed reference point when positioning the welding torch.

NOTE!

Make sure that the gas nozzle does not touch the housing parts of the cleaning aperture at any time.



1 Move the welding torch to the injection position
- See graphic

NOTE!

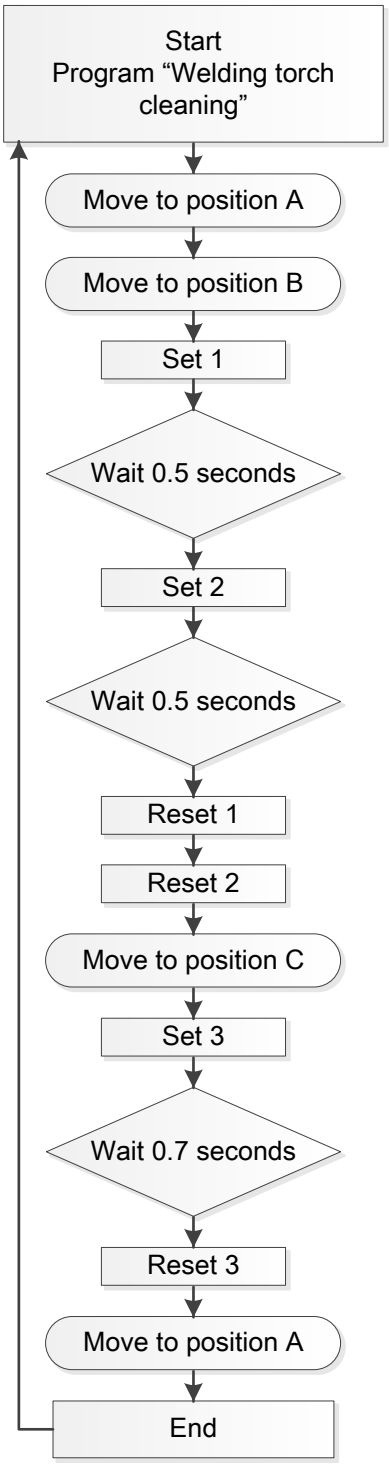
During the injection process, do not blow out compressed air through the welding torch.

2 Inject parting agent into the welding torch for approximately 0.7 seconds

3 Move the welding torch to the starting position above the cleaning aperture – approximately 50 mm (1.97 in.) above the cleaning aperture and centrically with respect to the middle of the cleaning aperture
- The cleaning process is completed and the welding torch is ready for use again

4 Make sure that not too much parting agent has collected at the gas nozzle (no formation of drops). If this is the case:
- reduce the injection time, or
- after the cleaning process, blow out the welding torch with compressed air through the hosepack

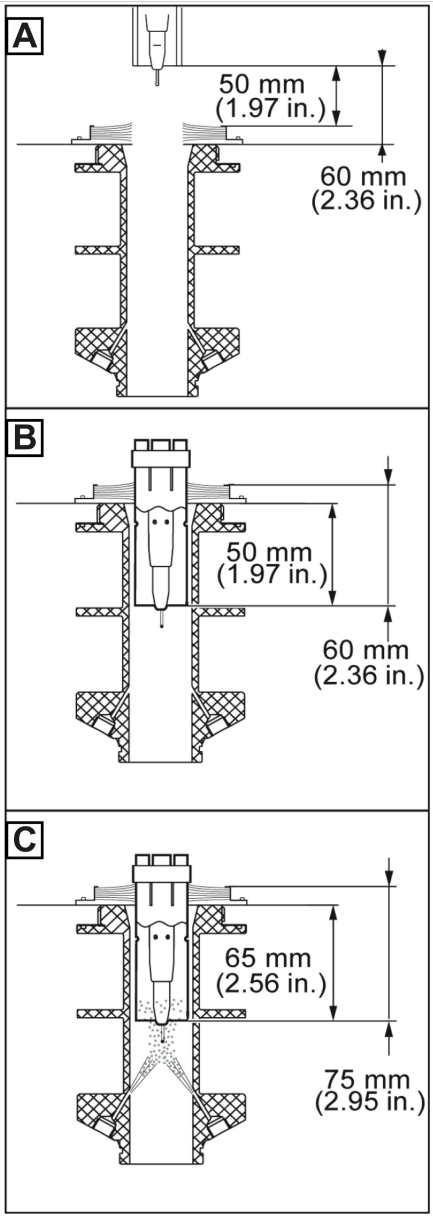
Cleaning Program Sequence with Parting Agent Atomizer



Set 1/Reset 1
Compressed air gas purging with welding torch

Set 2/Reset 2
Signal “Cleaning start”

Set 3/Reset 3
Signal “Spray in parting agent”



Cleaning Program Sequence for Twin Applications

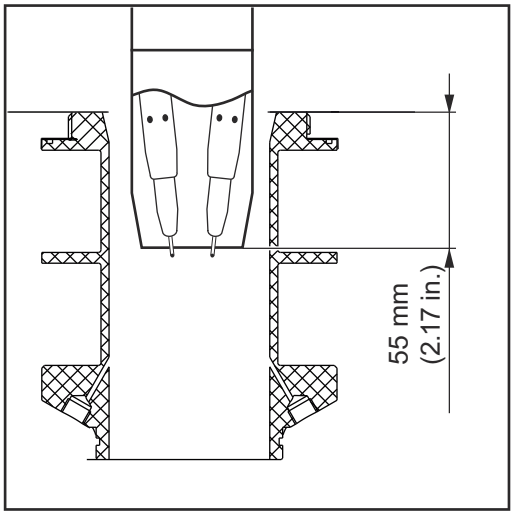
Program Sequence with Parting Agent Atomizer – Overview

1. Welding
2. Clean the gas nozzle tip and nozzle fitting
3. Inject parting agent
4. Welding

Cleaning the gas nozzle tip and nozzle fitting – detailed description

NOTE!

During the cleaning process, blow out the welding torch with compressed air via the hosepack. Contamination and surplus parting agent will be removed.



NOTE!

Make sure that the gas nozzle does not touch the housing parts of the cleaning aperture at any time.

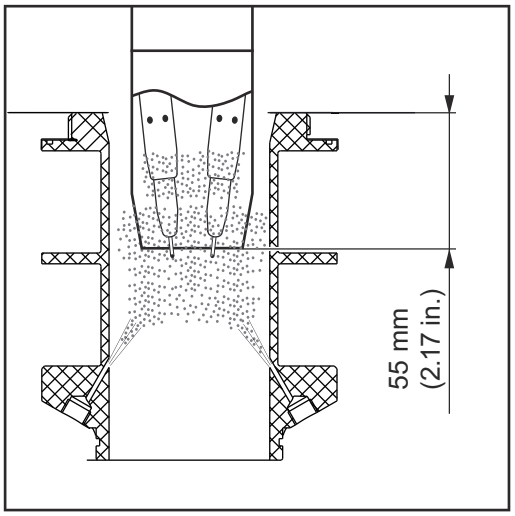
1. Position the welding torch approx. 50 mm (1.97 in.) above the cleaning aperture and centrically with respect to the middle of the cleaning aperture
2. Move the welding torch vertically to the cleaning/injection position
   - See graphic
3. Trigger the cleaning process and wait for approximately 1 second

Injecting parting agent – detailed description

The even application of a parting agent has the following advantages:
- Reduced adhesion of welding spatter
- New contamination is prevented

NOTE!

Make sure that the gas nozzle does not touch the housing parts of the cleaning aperture at any time.



1 Maintain the cleaning position/ injection position
- See graphic

NOTE!

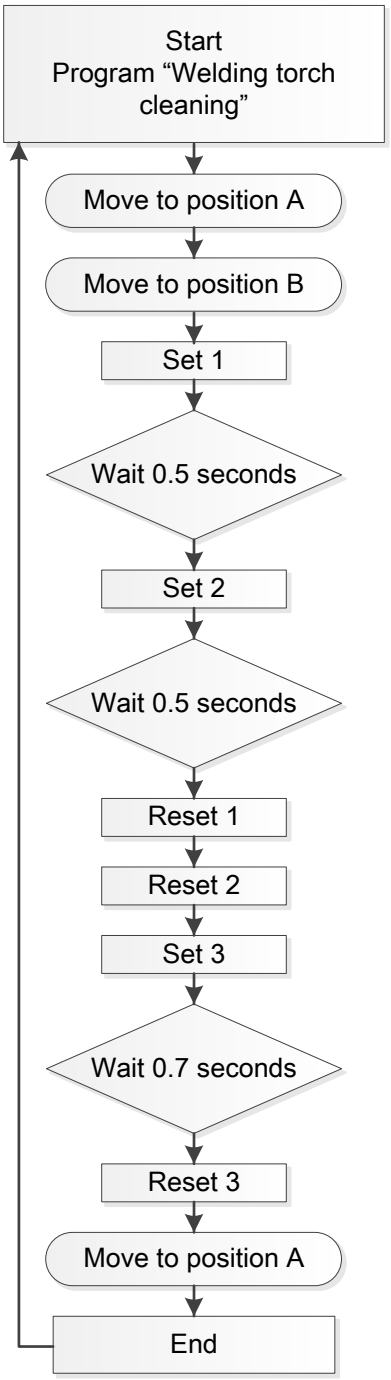
During the injection process, do not blow out compressed air through the welding torch.

2 Inject parting agent into the welding torch for approximately 0.7 seconds

3 Move the welding torch to the starting position above the cleaning aperture – approximately 50 mm (1.97 in.) above the cleaning aperture and centrically with respect to the middle of the cleaning aperture
- The cleaning process is completed and the welding torch is ready for use again

4 Make sure that not too much parting agent has collected at the gas nozzle (no formation of drops). If this is the case:
- reduce the injection time, or
- after the cleaning process, blow out the welding torch with compressed air through the hosepack

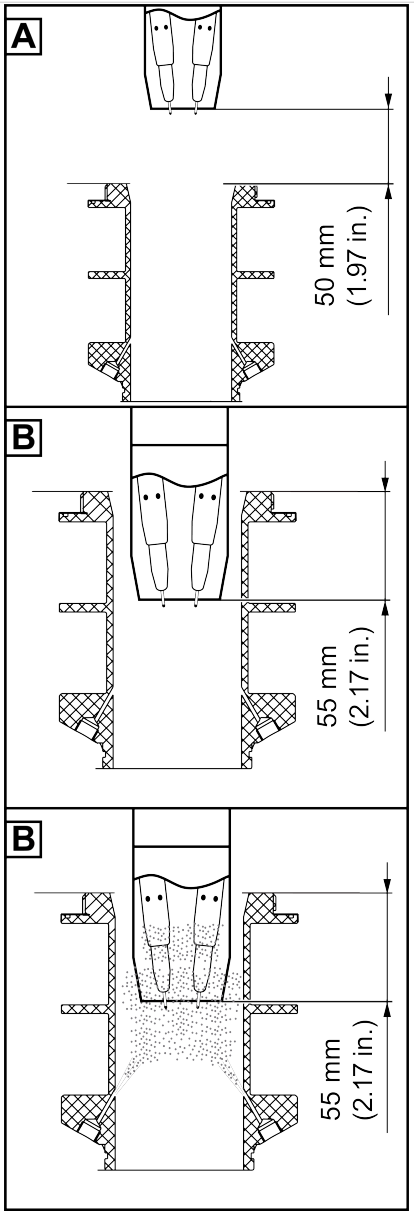
Cleaning Program Sequence with Parting Agent Atomizer



Set 1/Reset 1
Compressed air gas purging with welding torch

Set 2/Reset 2
Signal “Cleaning start”

Set 3/Reset 3
Signal “Spray in parting agent”



Troubleshooting, Maintenance, and Disposal

Safety

Safety

Please follow the safety rules below during all the tasks described in the "Troubleshooting, maintenance, and disposal" chapter.

⚠ WARNING!

Danger from incorrect operation and work that is not carried out properly.
This can result in serious personal injury and damage to property.
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- ▶ Read and understand this document in full.
- ▶ Read and understand all safety rules and user documentation for this equipment and all system components.

⚠ WARNING!

Danger due to machines starting automatically.
This can result in serious personal injury and damage to property.
- ▶ In addition to these Operating Instructions, observe the safety rules of the robot manufacturer and welding system manufacturer.
- ▶ Ensure that all protective measures have been taken in the robot's operating area and remain in effect while you are in this area.

⚠ WARNING!

Danger from electric shock and mechanically moving parts.
This can result in serious personal injury and damage to property.
- ▶ Before working on the cleaning device or the associated system components, disconnect the customer's compressed air and voltage supply from the cleaning device and the associated system components.
- ▶ Make sure that the customer's compressed air and power supply remain disconnected from the cleaning device and the associated system components until all work has been completed.

⚠ WARNING!

If the cleaning device is being supplied with voltage and/or compressed air, there is a risk of serious injury due to:
the magnetic field of the cleaning opening,
flying parts (chips, etc.),
compressed air/parting agent mixture escaping from the cleaning opening,
activated wire cutter.
This can result in serious personal injury and damage to property.
If work is required on the cleaning device while the cleaning device is being supplied with voltage and/or compressed air, take the following safety measures:
- ▶ Keep all ferromagnetic parts away from the device (e.g., tools).
- ▶ Keep your body, especially hands, face, and hair, as well as objects and all items of clothing, away from the cleaning aperture and the wire cutter.
- ▶ Wear hearing protection.
- ▶ Wear protective goggles with side protection.

⚠ WARNING!

Danger due to insufficient ground conductor connection.
This can result in serious personal injury and damage to property.

- ▶ The housing screws provide an adequate ground conductor connection for grounding the housing and should not under any circumstances be replaced by other screws that do not provide a reliable ground conductor connection.

Troubleshooting

Troubleshooting

Make a note of the serial number and configuration of the device, and provide the service team with a detailed error description if:

- Errors occur that are not covered in this document
- The troubleshooting measures provided in this document are unsuccessful

Grid voltage indication does not light up

Grid lead connected

Cause:	Grid lead defective
Remedy:	Check grid lead

“Ready to clean” signal is not output to the robot control

Grid voltage indication lights up

Cause:	Quick Stop is active (HI - Quick Stop = LO or LO - Quick Stop = HI)
Remedy:	Deactivate Quick Stop (HI - Quick Stop = HI or LO - Quick Stop = LO)
Cause:	Supply to the standard I/O (X1) connection socket defective
Remedy:	Depending on the connection, check the assignment of inputs B and H or C and H, as well as D or G
Cause:	Temperature sensor of cleaning coil defective
Remedy:	Contact service team – cleaning coil needs replacing

“Ready to clean” signal is not output to the robot control

Grid voltage indication lights up, overtemperature indication lights up

Cause:	Cleaning device has overheated
Remedy:	Allow cleaning device to cool down. As soon as the permissible operating temperature has been reached, a new capacitor charging process will take place. The cleaning device will then be ready to clean again

Parting agent is not injected

'Robacta Reamer' parting agent container is full

Cause: Injection quantity too low

Remedy: Set injection quantity (injection time)

Cause: Intake filter in 'Robacta Reamer' parting agent container dirty

Remedy: Blow out the intake filter in the 'Robacta Reamer' parting agent container from the inside out with compressed air using the intake hose (see section **Clean the intake filter in the parting agent container** starting on page **58**)

Cause: Compressed air supply interrupted

Remedy: Set up the compressed air supply

Cause: Compressed air supply line defective or dirty

Remedy: Clean compressed air supply line and replace if necessary

Cause: Vacuum pump defective

Remedy: Contact service team (vacuum pump needs replacing)

Cause: Solenoid valve defective

Remedy: Contact service team (solenoid valve needs replacing)

Parting agent is not injected

Cause: 'Robacta Reamer' parting agent container is empty

Remedy: Fill with parting agent

Cause: Interconnecting hosepack damaged

Remedy: Inform service team

Pores in the weld seam

Cause: Too much parting agent in the inside of the welding torch

Remedy: Remove residues of parting agent by blowing out the inside of the welding torch. Ensure supply of compressed air

Cause: Too much parting agent in the inside of the welding torch

Remedy: Reduce parting agent injection quantity (shorten duty cycle of pump for parting agent)

Error is issued to robot. Overtemperature indication and fill level indication flash at the same time; cleaning does not take place

Cause: Quick Stop is active (HI - Quick Stop = LO or LO - Quick Stop = HI)

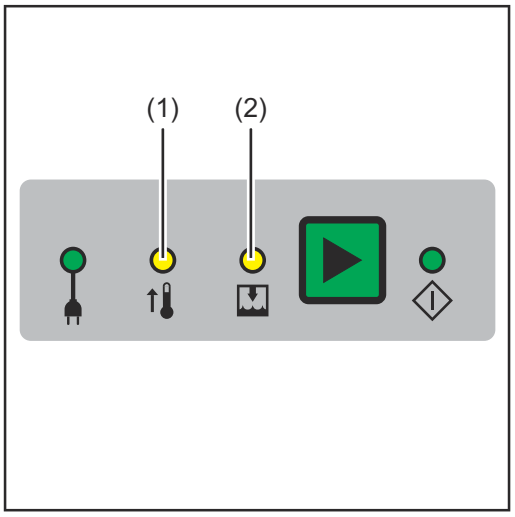
Remedy: Deactivate Quick Stop (HI - Quick Stop = HI or LO - Quick Stop = LO)

Cause: The cleaning device has detected an error

Remedy: Disconnect the cleaning device from the grid and reconnect after approximately 1 minute
If this does not lead to any improvement, contact the service team and follow the instructions in the next chapter **What to Do in the Event of an Error** on page **57**

What to Do in the Event of an Error

What to Do in the Event of an Error



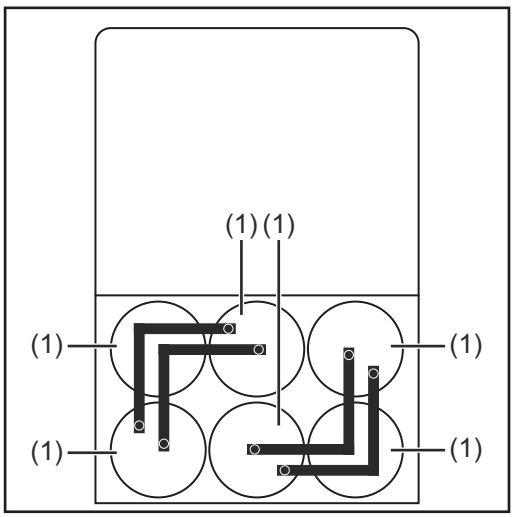
⚠ WARNING!

Danger of serious damage to property and personal injury from electric shock.

The cleaning device has detected a serious error if:

- ▶ The overtemperature indication (1) and fill level indication (2) flash simultaneously
- ▶ The Quick-Stop signal is not active

In this case, the cleaning unit interconnecting hosepack must not be disconnected from the base unit until the following safety measures have been taken.



Side view of base unit with open side panel

Safety measures:

1. Ensure that the cleaning device is disconnected from the power and compressed air supply
2. Looking from the front, remove the left side panel from the base unit
3. Make sure that the six capacitors (1) are discharged
4. Replace the side panel
   - The cleaning unit interconnecting hosepack can now be disconnected from the base unit

Service, maintenance and disposal

Before Every Start-up

1 Check the fill level in the 'Robacta Reamer' parting agent container and top up if necessary

Daily

NOTE!

Only clean the devices with cleaning products that are free of solvents.

1 Remove any deposited parting agent and contamination from the outside of the base unit and cleaning unit.

Weekly

1 Empty the cleaning unit's welding residue collecting container

2 Clean the inside of the cleaning unit's cleaning aperture

3 Check the 'Robacta Reamer' parting agent container for contamination and clean if necessary

4 Blow out the intake filter in the 'Robacta Reamer' parting agent container from the inside out with compressed air using the intake hose (see section **Clean the intake filter in the parting agent container** starting on page **58**)

5 If present, check the condition of the brush seal above the cleaning aperture. If the brush seal is worn out, replace it

Every Six Months

NOTE!

Do not blow electronic parts clean from a short distance away.

1 Open the base unit and cleaning unit and blow clean with dry and reduced compressed air

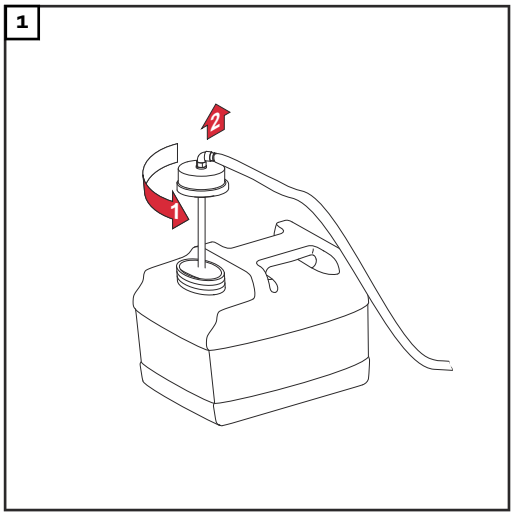
Every 12 Months

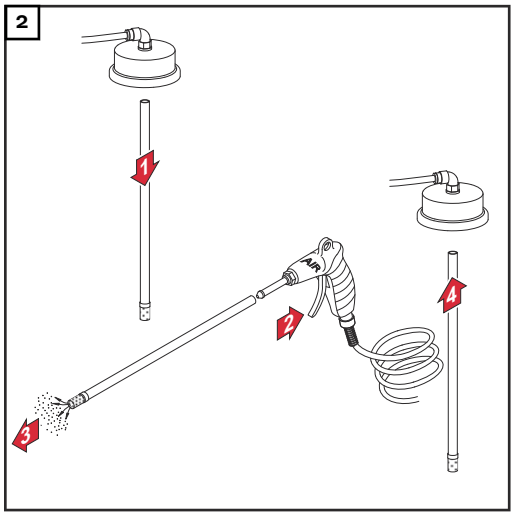
1 Have a Fronius service technician perform a safety inspection on the cleaning device

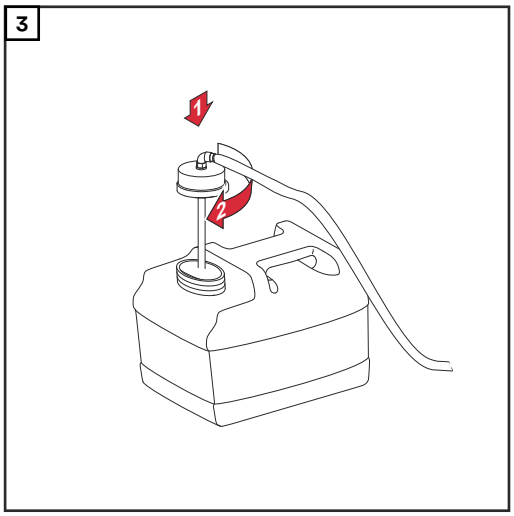
Clean the intake filter in the parting agent container

NOTE!

Only use the 'Robacta Reamer' parting agent provided by the manufacturer.
Its composition is specifically tailored for use with the Robacta TC. Correct operation is not ensured when other products are used.







Disposal

Disposal must only be carried out in accordance with the section of the same name in the "Safety rules" chapter.

Technical data

Technical data

General

⚠ CAUTION!

Danger due to insufficiently dimensioned electrical installations.
Serious damage may result.
▶ Select the grid lead and fuse protection to suit the device being used. The technical data on the rating plate applies.

Robacta TC 2000 ext.

Mains voltage	230 V
Mains voltage tolerance	-10%/+10%
Grid frequency	50/60 Hz
Nominal output	180 W
Mains fuse, slow-blow	10 A
Compressed air supply	6 bar 86.99 psi
Minimum cleaning interval	From 20 s
Protection class	IP 21
Dimensions l/w/h	360/250/422 mm 14.17/9.84/16.61 in.
Weight	18.75 kg 41.35 lb.
EMC device class	A
Marks of conformity	CE, CSA

Robacta TC 2000 ext. US

Mains voltage	110 V
Mains voltage tolerance	-5%/+5%
Grid frequency	50/60 Hz
Nominal output	180 W
Mains fuse, slow-blow	10 A
Compressed air supply	6 bar 86.99 psi
Minimum cleaning interval	From 20 s
Protection class	IP 21
Dimensions l/w/h	360/250/422 mm 14.17/9.84/16.61 in.
Weight	18.35 kg 40.45 lb.
EMC device class	A
Marks of conformity	CE, CSA

Cleaning Unit TC 2000

EMC device class	A
Dimensions l/w/h (without interconnecting hosepack and collecting container for welding residues)	340/145/300 mm 13.39/5.71/8.66 in.
Weight	8.1 kg 17.86 lb.

Cleaning Unit TC 2000 LH

EMC device class	A
Dimensions l/w/h (without interconnecting hosepack and collecting container for welding residues)	340/145/300 mm 13.39/5.71/8.66 in.
Weight	9.5 kg 20.94 lb.

Cleaning Unit TC 2000 Twin

EMC device class	A
Dimensions l/w/h (without interconnecting hosepack and collecting container for welding residues)	340/145/300 mm 13.39/5.71/8.66 in.
Weight	9.6 kg 21.16 lb.

Cleaning Unit TC 2000 Twin

EMC device class	A
Dimensions l/w/h (without interconnecting hosepack and collecting container for welding residues)	340/145/300 mm 13.39/5.71/8.66 in.
Weight	8.4 kg 18.52 lb.

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