



TÄYDELLISTÄ HITSAUSTA

# **ROBACTA TC 2000**

/ Operating Instructions

/ Spare Parts List



# Dear reader,

## Introduction

Thank you for the trust you have placed in our company and congratulations on buying this high-quality Fronius product. These instructions will help you familiarise yourself with the product. Reading the instructions carefully will enable you to learn about the many different features it has to offer. This will allow you to make full use of its advantages.

Please also note the safety rules to ensure greater safety when using the product. Careful handling of the product will repay you with years of safe and reliable operation. These are essential prerequisites for excellent results.

## Explanation of safety symbols



**DANGER!** indicates immediate and real danger. If it is not avoided, death or serious injury will result.



**WARNING!** indicates a potentially dangerous situation. Death or serious injury may result if appropriate precautions are not taken.



**CAUTION!** indicates a situation where damage or injury could occur. If it is not avoided, minor injury and/or damage to property may result.



**NOTE!** indicates a risk of flawed results and possible damage to the equipment.

**IMPORTANT!** indicates tips for correct operation and other particularly useful information. It does not indicate a potentially damaging or dangerous situation.

If you see any of the symbols depicted in the "Safety rules", special care is required.



# Contents

|  |           |
|--|-----------|
| Safety rules .....   | 5         |
| General .....  | 5         |
| Proper use .....   | 5         |
| Environmental conditions .....   | 6         |
| Obligations of the operator .....  | 6         |
| Obligations of personnel .....   | 6         |
| Specific hazards .....   | 6         |
| Protecting yourself and others .....                                     | 7         |
| Risks from mains current and operating current .....                     | 8         |
| EMC Device Classifications .....   | 8         |
| EMC measures .....   | 9         |
| Safety measures at the installation location and during transport .....  | 9         |
| Safety measures in normal operation .....                                | 10        |
| Maintenance and repair .....   | 10        |
| Safety inspection .....  | 11        |
| Disposal .....   | 11        |
| Safety symbols .....   | 11        |
| Data protection .....  | 11        |
| Copyright .....  | 11        |
| <b>General .....</b>   | <b>13</b> |
| General .....  | 15        |
| Device concept .....   | 15        |
| Application areas .....  | 15        |
| Warning notices on the device .....                                      | 15        |
| Parting agent types and their use .....                                  | 17        |
| Functional principle .....   | 18        |
| Functional principle .....   | 18        |
| View of magnetic field strength inside the cleaning coil .....           | 19        |
| Scope of supply and options .....  | 20        |
| General .....  | 20        |
| Scope of supply .....  | 20        |
| Available options .....  | 20        |
| Transport .....  | 21        |
| Vehicles .....   | 21        |
| Transport notices on the packaging .....                                 | 21        |
| <b>Controls, connections and mechanical components .....</b>             | <b>23</b> |
| Safety .....   | 25        |
| Safety .....   | 25        |
| Standard I/O (X1) connecting plug pin assignment .....                   | 26        |
| General .....  | 26        |
| Standard I/O (X1) connecting plug pin assignment .....                   | 26        |
| Controls, connections and mechanical components .....                    | 28        |
| General .....  | 28        |
| Control panel .....  | 28        |
| Robacta TC 2000 connections and mechanical components .....              | 29        |
| <b>Installation and commissioning .....</b>                              | <b>31</b> |
| Safety .....   | 33        |
| Safety .....   | 33        |
| Before commissioning .....   | 34        |
| Operators, maintenance personnel .....                                   | 34        |
| Setup regulations .....  | 34        |
| Compressed air supply specifications .....                               | 34        |
| Mains connection .....   | 34        |
| Bolting the cleaning device to the underlying surface (foundation) ..... | 35        |

|  |           |
|--|-----------|
| Bolting the Robacta TC 2000 together with installation stand to the underlying surface (foundation) .. | 35        |
| Installing the wire cutter .....   | 36        |
| Installing the wire cutter on the Robacta TC 2000 .....  | 36        |
| Maximum wire diameter .....  | 36        |
| How the mechanically-controlled wire cutter works .....  | 36        |
| How the electrically-controlled wire cutter works .....  | 36        |
| Filling the dipping bowl with parting agent .....  | 37        |
| Filling the dipping bowl with parting agent .....  | 37        |
| Connecting the cleaning device to the "Robacta Reamer" parting agent container .....                   | 38        |
| Connecting the cleaning device to the "Robacta Reamer" parting agent container .....                   | 38        |
| Starting up the cleaning device .....  | 39        |
| General .....  | 39        |
| Prerequisites for start-up .....   | 39        |
| Cleaning programme .....   | 40        |
| Overview of program sequence with parting agent nebuliser .....  | 40        |
| Overview of program sequence with parting agent nebuliser and dipping bowl .....                       | 40        |
| Cooling welding torch in the dipping bowl .....  | 40        |
| Cleaning gas nozzle tip and nozzle fitting .....   | 40        |
| Spraying in parting agent .....  | 41        |
| Cleaning program sequence with parting agent nebuliser .....   | 42        |
| Cleaning program sequence with dipping bowl .....  | 43        |
| <b>Troubleshooting, maintenance and disposal</b> .....   | <b>45</b> |
| Safety .....   | 47        |
| Safety .....   | 47        |
| Troubleshooting .....  | 48        |
| Troubleshooting .....  | 48        |
| Care, maintenance and disposal .....   | 50        |
| Before each start-up .....   | 50        |
| Daily .....  | 50        |
| Weekly .....   | 50        |
| Every 3 months .....   | 50        |
| Every 6 months .....   | 50        |
| Every 12 months .....  | 50        |
| Disposal .....   | 50        |
| <b>Technical data</b> .....  | <b>51</b> |
| Technical data .....   | 53        |
| General .....  | 53        |
| Robacta TC 2000 .....  | 53        |
| <b>Appendix</b> .....  | <b>55</b> |
| Spare parts list: Robacta TC 2000 .....  | 56        |
| Circuit diagram: Robacta TC 2000 .....   | 59        |

# Safety rules

## General



The device is manufactured using state-of-the-art technology and according to recognised 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 commissioning, operating, maintaining and servicing the device must:

- be suitably qualified,
- have sufficient knowledge of automated welding, and
- read and carefully follow these operating instructions as well as the operating instructions for all system components.

---

The operating instructions must always be at hand wherever the device is being used. In addition to the operating instructions, attention must also be paid to any generally applicable and local regulations regarding accident prevention and environmental protection.

---

All safety and danger notices on the device

- must be in a legible state,
- must not be damaged,
- must not be removed,
- must 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 commissioning the device, rectify any faults that could compromise safety.

**This is for your personal safety!**

## Proper use



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

---

The device is intended solely for the electromagnetic cleaning of Fronius welding torches.

Any use above and beyond this purpose is deemed improper. The manufacturer shall not be held liable for any damage arising from such usage.

---

Proper use includes:

- carefully reading and following all the instructions given in the operating instructions
- studying and obeying all safety and danger notices carefully
- performing all stipulated inspection and servicing work.

---

The device is designed for use in industry and the workshop. The manufacturer accepts no responsibility for any damage caused through use in a domestic setting.

---

The manufacturer likewise accepts no liability for inadequate or incorrect 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 shall not be held liable for any damage arising from such usage.

---

Ambient temperature range:

- 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)

---

Keep ambient air free from dust, acids, corrosive gases and substances, etc.

---

Can be used at altitudes of up to 2000 m (6500 ft)

---

## Obligations of the operator



The operator must only allow persons to work with the device who:

- are familiar with the fundamental instructions regarding safety at work and accident prevention and have been instructed in how to use the device
- have read and understood these operating instructions, especially the section "safety rules", and have confirmed as much with their signatures
- are trained to produce the required results.

---

Checks must be carried out at regular intervals to ensure that operators are working in a safety-conscious manner.

---

## Obligations of personnel



Before using the device, all persons instructed to do so undertake:

- to observe the basic instructions regarding safety at work and accident prevention
- to read these operating instructions, especially the "Safety rules" section and sign to confirm that they have understood them and will follow them.

---

Before leaving the workplace, ensure that people or property cannot come to any harm in your absence.

---

## Specific hazards



Stay out of the working area of the robot.

---

The device must be incorporated into a higher-level safety system within a secured area.

---

If this area has to be accessed when setup and maintenance work is carried out, make sure that

- the entire system is switched off for the duration of the work in this area
- and that it is prevented from starting up accidentally, e.g. as the result of a control fault

---

In addition to these operating instructions, the safety rules issued by the robot manufacturer must also be observed.

---



**Protecting yourself and others**



Electromagnetic fields may pose as yet unknown risks to health:

- Effects on the health of persons in the vicinity, e.g. those with pacemakers, metallic implants and hearing aids
- Forbidden for anyone wearing a pacemaker: people fitted with a pacemaker must consult their doctor before working with the device or entering its immediate vicinity



- Forbidden for anyone with metal implants: people fitted with metal implants must consult their doctor before working with the device or entering its immediate vicinity



Magnetic fields generated by the high amperage can cause ferromagnetic parts such as spatter accumulations to be ejected from the cleaning opening. To prevent injury, never look into in the cleaning opening while the device is switched on; protective goggles with side protection must be worn at all times.



Persons involved with welding expose themselves to numerous risks, e.g.:

- flying sparks and hot pieces of metal
- arc radiation, which can damage eyes and skin



- risk of electrocution from mains current and welding current



- greater noise pollution



- harmful welding fumes and gases

Anyone working on the workpiece while welding is in progress must wear suitable protective clothing with the following properties:

- flame-resistant
- insulating and dry
- covers the whole body, is undamaged and in good condition
- safety helmet
- trousers with no turn-ups



Protective clothing refers to a variety of different items. Operators should:

- protect eyes and face from UV rays, heat and sparks using a protective visor and regulation filter.



- wear regulation protective goggles with side protection behind the protective visor.
- wear stout footwear that provides insulation even in wet conditions.
- protect the hands with suitable gloves (electrically insulated and providing protection against heat).
- wear ear protection to reduce the harmful effects of noise and to prevent injury.



Keep all persons, especially children, out of the working area while any devices are in operation or welding is in progress. If, however, there are people in the vicinity,

- make them aware of all the dangers (dazzling by arc, injury from flying sparks, inhalation of harmful welding fumes, noise, possible danger from mains or welding current, possible danger from electromagnetic fields, possible danger from the magnetic field around the cleaning opening, mechanically-powered parts, compressed air/parting agent mixture ejected from the cleaning opening, flying shavings and similar matter, etc.),
- provide suitable protective equipment or
- erect suitable safety screens/curtains.

---

**Risks from mains current and operating current**



An electric shock is life threatening and can be fatal.

---

Do not touch live parts either inside or outside the device.

---

All cables and leads must be secured, undamaged, insulated and adequately dimensioned. Loose connections, scorched, damaged or inadequately dimensioned cables and leads must be repaired/replaced immediately.

---

Only switch on the device when all output connections have been established correctly.

---

Only operate the device on a mains supply with a ground conductor. If the device is operated on a mains supply without a ground conductor, this will be deemed as gross negligence. The manufacturer shall not be held liable for any damage arising from such usage.

---

Arrange for the mains cable to be checked regularly by a qualified electrician to ensure the ground conductor is functioning properly.

---

Switch off unused devices.

---

Disconnect the mains plug before working on the device.



---

Attach a clearly legible and easy-to-understand warning sign to the device to prevent anyone from plugging the mains plug back in and switching it on again.

---

After opening the device:

- discharge all live components
- ensure that all components in the device are de-energised.

---

If work on live parts is required, appoint a second person to switch off the main switch at the right moment.

---

The housing screws provide an adequate PE conductor connection for earthing the housing. The screws must never be replaced with different screws unless a reliable PE conductor connection is set up.

---

**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 mains.

---

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

**EMC measures**



**Warning, electromagnetic field.** Electromagnetic fields may pose as yet unknown risks to health.

It is the operator's responsibility to ensure that no electromagnetic interference occurs in electrical and electronic devices. If electromagnetic interference is detected, the operator is obliged to take action to rectify the situation.

Check for possible problems, and check and evaluate neighbouring devices' resistance to interference according to national and international requirements:

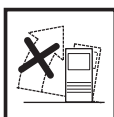
- Safety devices
- Power, signal and data transfer lines
- IT and telecommunications devices
- Measuring and calibrating devices
- Health of neighbouring persons

Supporting measures for avoidance of EMC problems:

1. Mains supply
  - If electromagnetic interference arises despite the correct mains connection, additional measures are necessary (e.g. use of a suitable line filter)
2. Shielding, if necessary
  - Shield off other nearby devices
  - Shield off entire welding installation
3. Do not have any magnetic or electronic data carriers about your person: magnetic or electronic data carriers can be damaged by the magnetic fields generated when the device is in use.
4. Do not have any watches or pieces of metal about your person. Watches can be damaged when the device is in use.



**Safety measures at the installation location and during transport**



A device toppling over could easily kill someone. Place the device on a solid, level surface such that it remains stable

- The maximum permissible tilt angle is 10°.



Special regulations apply in rooms at risk of fire or explosion

- Observe relevant national and international regulations.

---

Use internal directives and checks to ensure that the workplace environment is always clean and clearly laid out.

---

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

---

When setting up the device, ensure an all-round clearance of at least 0.5 m (19.69 in.) from any surrounding objects, e.g. walls, other devices or objects.

---

The device must be set up at least 1 m (40 in.) away from computers, control lines and the welding process.

---

Position the device to prevent welding spatter coming into contact with the cleaning device.

---

Before transporting the device, allow parting agent to drain completely.

---

When transporting the device, observe the relevant national and local guidelines and accident prevention regulations. This applies especially to guidelines regarding the risks arising during transport.

---

After transporting the device, the device must be visually inspected for damage before commissioning. Any damage must be 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 risk of

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

---

Any safety devices that are not functioning properly must be repaired before switching on the device.

---

Never bypass or disable safety devices.

---

Before switching on the device, ensure that no one is likely to be endangered.

---

Check the device at least once a week for obvious damage and proper functioning of safety devices.

---



- Only use suitable original parting agent from the manufacturer.
  - Observe the information on the parting agent safety data sheets when handling parting agent. The parting agent safety data sheets may be obtained from your service centre or downloaded from the manufacturer's website.
  - Do not mix the manufacturer's parting agent with other parting agents.
  - If damage results from using a different parting agent, the manufacturer accepts no liability. In addition, no warranty claims will be entertained.
  - Used parting agent must be disposed of properly in accordance with the relevant 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 replacement and wearing parts (also applies to standard parts).

Do not make any modifications, alterations, etc. to the device without the manufacturer's consent.

Parts that are not in perfect condition must be replaced immediately.

When ordering, please give the precise designation and part number as shown in the spare parts list, as well as the serial number of your device.

---

## Safety inspection



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

---

A safety inspection should be carried out by a qualified electrician

- after any changes are made
- after any additional parts are installed, or after any conversions
- after repair, care and maintenance has been carried out
- at least every twelve months.

---

For safety inspections, follow the appropriate national and international standards and directives.

---

Further details on safety inspection and calibration can be obtained from your service centre. They will provide you on request with any documents you may require.

---

## Disposal



Do not dispose of this device with normal domestic waste! To comply with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and its implementation as national law, electrical equipment that has reached the end of its life must be collected separately and returned to an approved recycling facility. Any device that you no longer require must either be returned to your dealer or given to one of the approved collection and recycling facilities in your area. Ignoring this European Directive may have potentially adverse effects on the environment and your health!

---

## Safety symbols



Devices with the CE mark satisfy the essential requirements of the low-voltage and electromagnetic compatibility directive (e.g. relevant product norms from the EN 60 974 series).

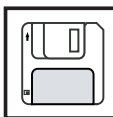


---

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

---

## Data protection



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

---

## Copyright



Copyright of these operating instructions remains with the manufacturer.

---

The text and illustrations are all technically correct at the time of printing. We reserve 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 instructions, we will be most grateful for your comments.



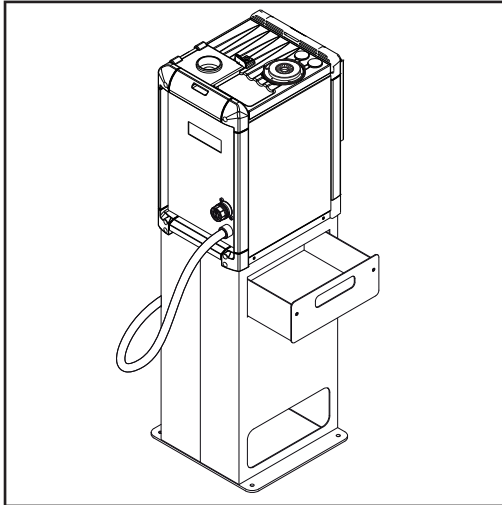
# General





# General

## Device concept



*Robacta TC 2000 on optional installation stand*

The Robacta TC 2000 can be used to clean practically every torch shape. The components are contained in a robust housing. The compact design means it can be set up in the narrowest of spaces (e.g. in robot cells). The Robacta TC 2000 is fully compatible with the Robacta TC 1000 installation stand and standard I/O connecting plug (X1).

The cleaning device is more or less maintenance-free, as there are no mechanically stressed parts.

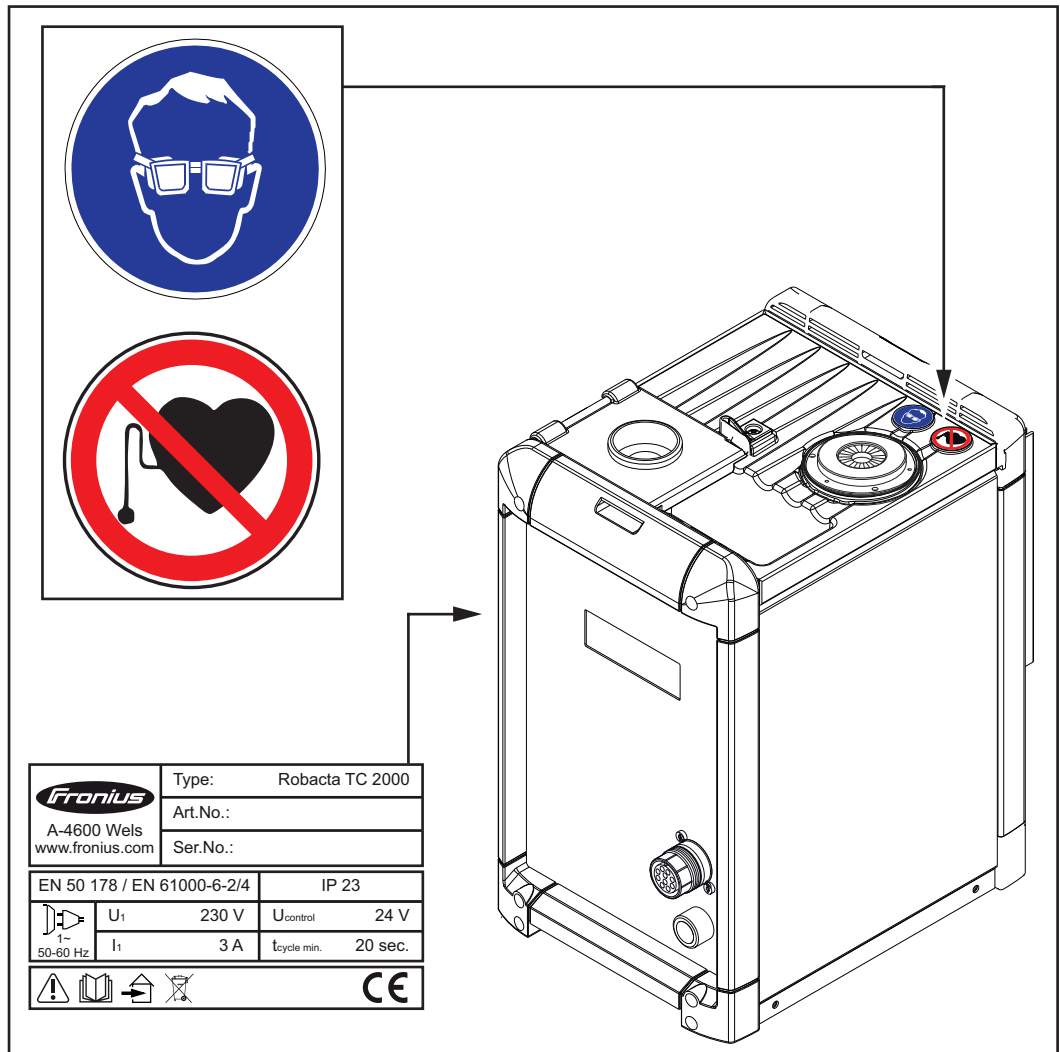
## Application areas

The cleaning device cleans welding torches in automated steel applications. It has been designed for use in the

- automotive and component supply industry
- equipment construction
- chemical plant construction
- mechanical engineering
- rolling stock construction
- shipyards

## Warning notices on the device

The device is fitted with safety symbols and a rating plate. The safety symbols and 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.



**WARNING!** Risk of serious injury from:

- the magnetic field surrounding the cleaning opening
- compressed air/parting agent mixture escaping from the parting-agent injection nozzle
- flying parts (shavings, etc.)
- mechanically powered parts

Keep device free from current and pressure during maintenance and servicing.



Do not use the functions described here until you have thoroughly read and understood the following documents:

- these operating instructions
- all the operating instructions for the system components, especially the safety rules



For indoor use only



Wear eye protection



Forbidden for anyone wearing a pacemaker

---

**Parting agent  
types and their  
use**



**NOTE!** Parting agents are not included in the scope of supply.

Parting agent types and their use:

- "Robacta TC Cool / Robacta TC Cool MD" parting agent for immersing the welding torch in the dipping bowl
- "Robacta Reamer" parting agent for spraying the torch after the cleaning operation

Recommendation for using the dipping bowl with

- Gas-cooled welding torches
- Water-cooled welding torches in the upper power range (hot gas nozzles)

Spraying the welding torch with "Robacta Reamer" parting agent is recommended for all applications.

# Functional principle

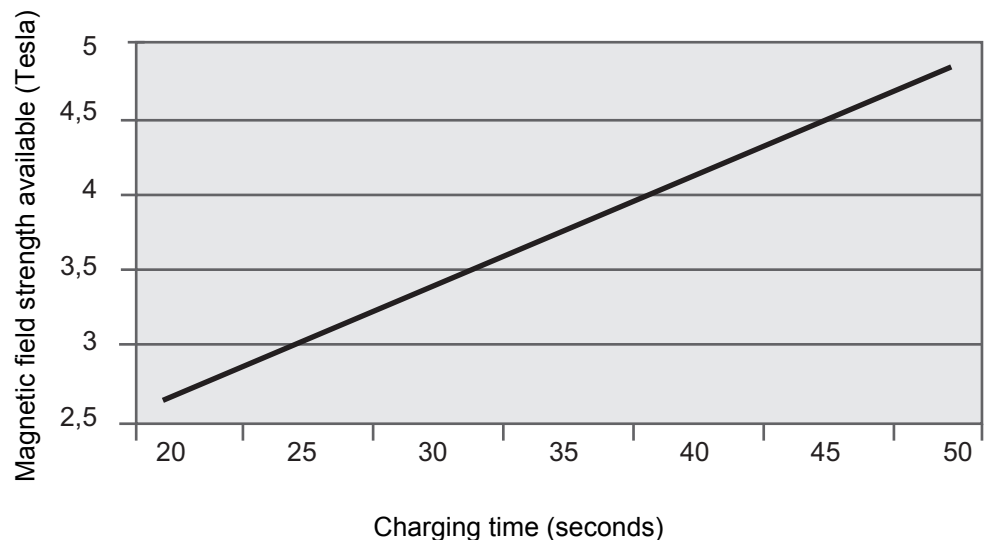
## Functional principle

- Once the cleaning device is connected to the mains power supply, the mains voltage indicator lights up. The capacitors, which store energy for the cleaning operation, are discharged and no outputs are activated.



**NOTE!** Before the capacitors can be charged, the cleaning device must be connected to both the mains power supply and the robot control. The "Quick Stop" signal must also be set.

- The device temperature is checked before the capacitors are charged. If it lies within the tolerance range, the capacitors are charged in preparation for a cleaning operation. If the operating temperature is exceeded, the overtemperature indicator lights up. Capacitor charging only begins once the temperature has fallen to the permitted operating temperature.
- The "Ready" signal is output to the robot control after 20 seconds of charging - the "Ready-to-discharge" indicator on the device lights up. Although the device has still not achieved maximum magnetic field strength after just 20 seconds, the cleaning operation (discharge process) can still be triggered using the "Cleaning Start" signal. For adjustment purposes, the cleaning operation can also be manually triggered using the discharge button on the device.  
The maximum magnetic field strength for cleaning is available after 50 seconds. See the diagram below for the exact relationship between charging time and the magnetic field strength available.



- Once the cleaning operation is complete, the program sequence restarts by checking the device's temperature. If there was a problem during the cleaning operation, the "Error" signal is output. The cleaning device resumes charging the capacitors. Once ready to clean ("Ready"), a second cleaning operation can be started.

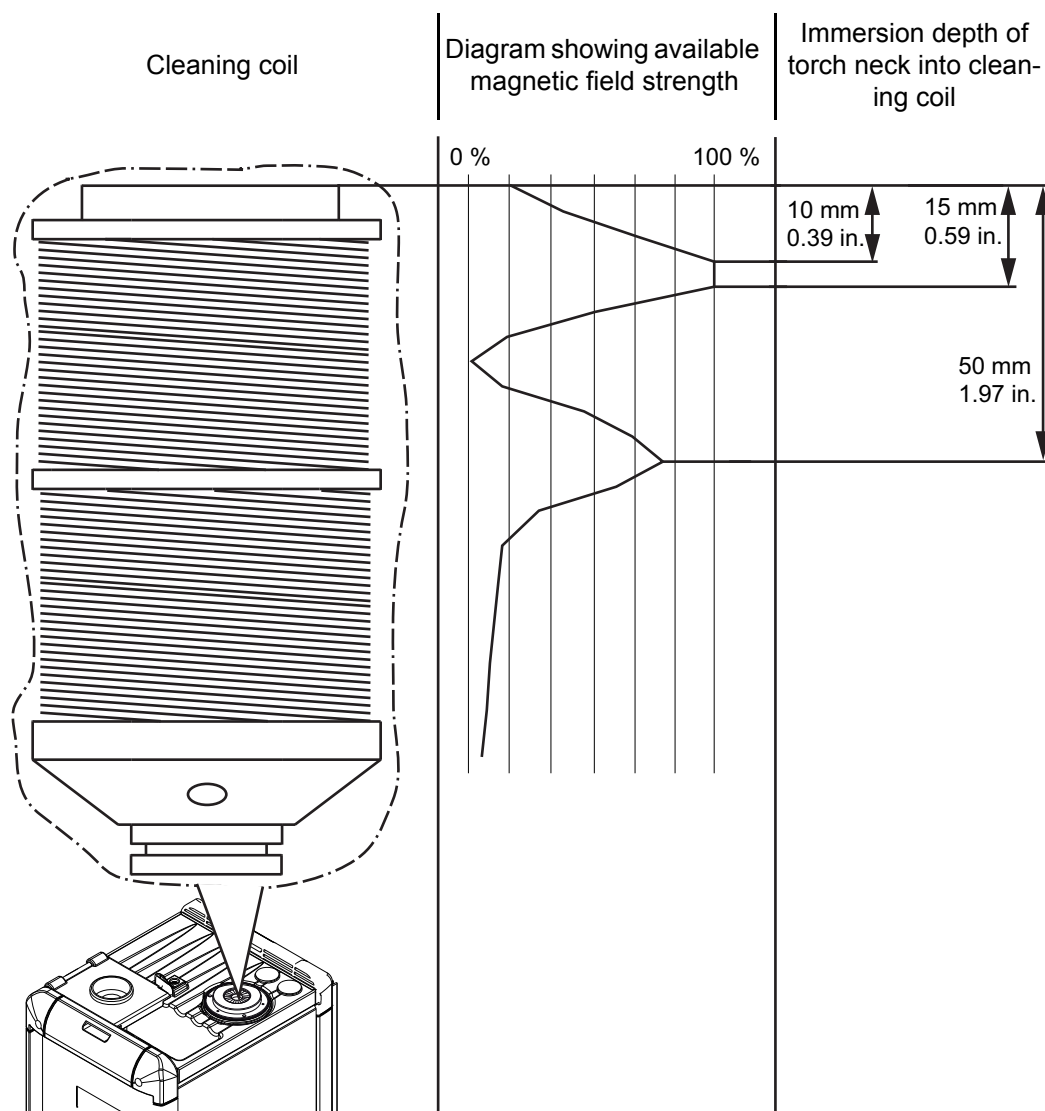
**NOTE!** If the robot control deactivates the "Quick Stop" signal during the program sequence, the cleaning device program sequence is interrupted immediately. For safety reasons the capacitors are discharged via the cleaning coil.

- Automatic refilling of the dipping bowl with "Robacta TC Cool / Robacta TC Cool MD" parting agent ensures an optimum fill level in the dipping bowl. After draining the "Robacta TC Cool / Robacta TC Cool MD" parting agent container, the fill level in the dipping bowl drops. The level sensor detects that the level has dropped too low and the fill level indicator lights up. At the same time, the "Fluid level control" signal is transmitted to the robot control.
  - The device cleaning function remains available even if the fill level indicator is illuminated.

**View of magnetic field strength inside the cleaning coil**

Depending on the application, the strength of the magnetic field on the individual areas of the welding torch can be controlled by regulating how deeply the welding torch is immersed in the cleaning coil.

**NOTE!** When using the cleaning device, refer to the program sequence for details of the welding torch immersion depth.



# Scope of supply and options

---

**General**                    The cleaning device can be operated in conjunction with various options. This makes it possible to optimise various procedures in the welding process, as necessitated by the particular field of application.

---

**Scope of supply**        -    Robacta TC 2000 with dipping bowl and integral cleaning unit  
                                  -    Standard I/O connecting plug (X1) without cable  
                                  -    4 screws for fitting the Robacta TC 2000 to the installation stand

---

**Available options**      Available options for the Robacta TC 2000  
                                  -    Installation stand (available in various heights)  
                                  -    Wire cutter  
                                  -    Wire cutter fitting set  
                                  -    Parting agent nebuliser installation set  
                                  -    Robot interface

# Transport

---

## Vehicles

The device is to be transported by the following vehicles:

- on pallets using a counterbalanced lift truck
- on pallets using a lift truck
- manually



**WARNING!** Equipment that falls or topples over can cause serious or even fatal injury.

- When transporting the device on a counterbalanced lift truck or lift truck, secure it to prevent it from falling over
- Do not suddenly change direction, brake or accelerate

---

## Transport notices on the packaging



**CAUTION!** Risk of damage due to incorrect transport. Observe the transport notices on the device packaging.





# **Controls, connections and mechanical components**



# Safety

---

## Safety

Observe the following safety rules for all work described in the "Control elements, connections and mechanical components" section.



**WARNING!** Operating the equipment incorrectly can cause serious injury and damage. The functions described must only be used by trained and qualified personnel. Do not use the functions described here until you have thoroughly read and understood the following documents:

- these operating instructions
- all the operating instructions for the system components, especially the safety rules

# Standard I/O (X1) connecting plug pin assignment for robot control

---

## General



**WARNING!** An electric shock can be fatal. The cleaning device must remain de-energised until the installation is fully complete.



**NOTE!** To avoid malfunctions, keep the cable length between the cleaning device and robot control as short as possible.

The standard I/O (X1) connecting plug for connecting the cleaning device to the robot control is part of the scope of supply. The cable harness must be adapted to the connection technology on the robot control.

---

## Standard I/O (X1) connecting plug pin assignment

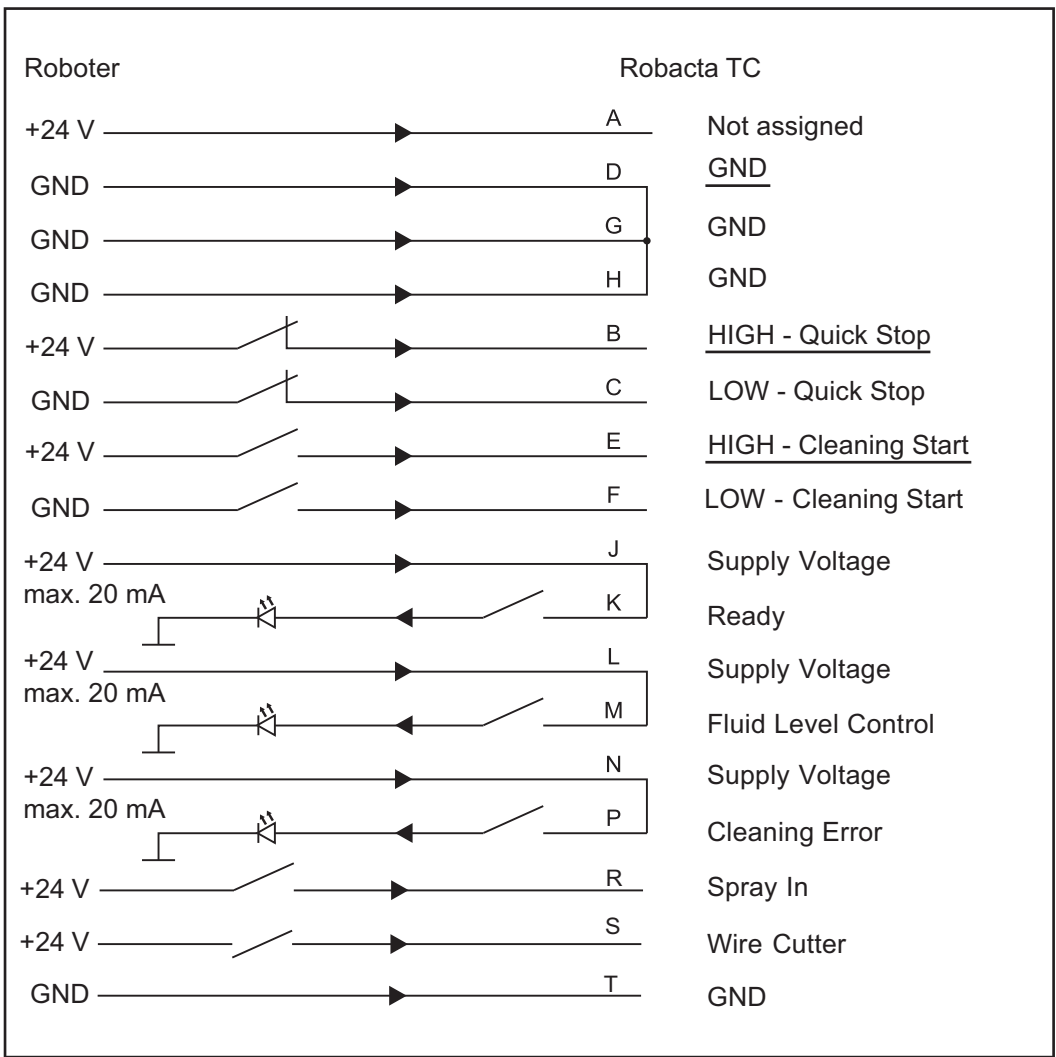


**WARNING!** Danger of serious injury and material damage due to unexpected start-up of the cleaning device / system components. Only assign the "Quick Stop" signal input once:

- either "HIGH - Quick Stop"
- or "LOW - Quick Stop"



**NOTE!** Depending on the demands placed on the robot application, not all input and output signals (commands) need to be used. The underlined I/O signals represent the minimum command subset required in each instance.




Standard I/O (X1) connecting plug pin assignment

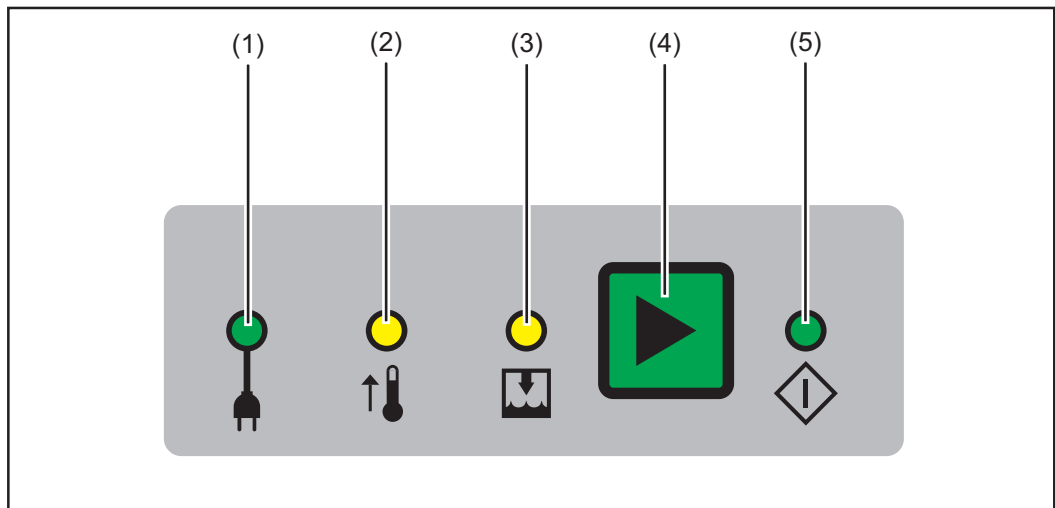
# Controls, connections and mechanical components

## General

All functions of the Robacta TC are activated by the robot control. For adjustment, the cleaning operation can be manually triggered on the Robacta TC housing. For easier operation, the Robacta TC is fitted with indicator lights.

 **NOTE!** The individual illustrations may differ slightly from your device. However, the functioning of the controls and the connections is identical.


## Control panel



| No. | Function |
|-----|----------|
|-----|----------|


|     |                                |
|-----|--------------------------------|
| (1) | <b>Mains voltage indicator</b> |
|-----|--------------------------------|

lights up when the device is powered by mains voltage

 **NOTE!** If the capacitors in the device are charged, they will discharge automatically as soon as the device is unplugged from the mains. Discharge time is approx. 1 second.

|     |                                  |
|-----|----------------------------------|
| (2) | <b>Overtemperature indicator</b> |
|-----|----------------------------------|


lights up when the device overheats


 **NOTE!** One more cleaning operation can be carried out after this indicator lights up. Only once the device has cooled back down to the operating temperature will the device recharge in preparation for the next cleaning operation.

|     |                             |
|-----|-----------------------------|
| (3) | <b>Fill level indicator</b> |
|-----|-----------------------------|

will come on

- if the fill level in the dipping bowl drops below minimum
- if the dipping bowl is not used, hence there is no parting agent in the dipping bowl

 **NOTE!** If the dipping bowl in use, it should be refilled with parting agent as soon as the fill level indicator lights up.

 **NOTE!** The cleaning function of the Robacta TC remains available even if the fill level indicator is illuminated.


|     |                      |
|-----|----------------------|
| (4) | <b>Discharge key</b> |
|-----|----------------------|

press the key briefly; the cleaning device will perform the following functions:

1. Cleaning is started

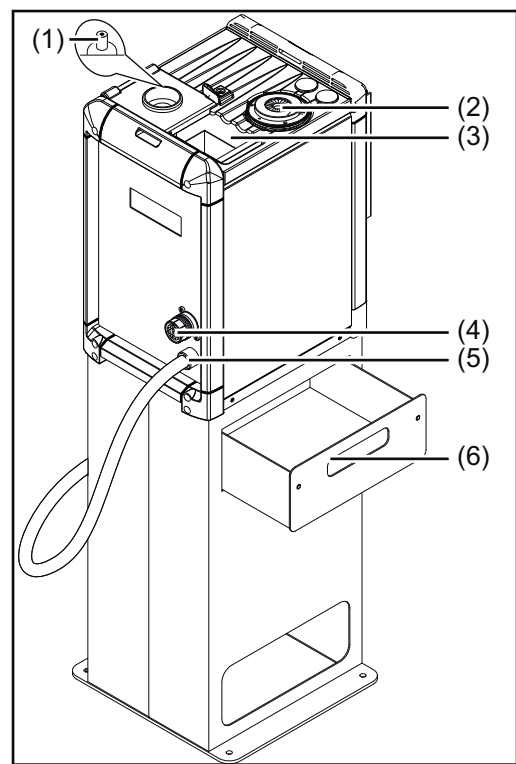
press and hold the key; the cleaning device will perform the following functions in sequence:

1. Cleaning is started
2. Wire cutter is activated
3. Compressed air/parting agent mixture is sprayed out of the cleaning opening

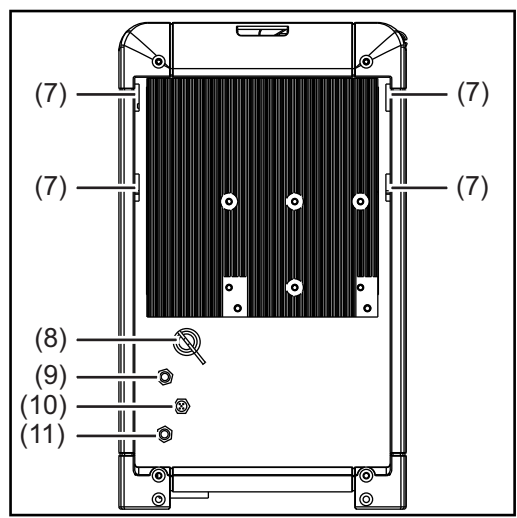
 **NOTE!** The cleaning device can only perform these functions if the "Quick Stop" signal is set and the capacitors are charged.

- 
- (5) **Ready-to-clean indicator**  
lights up when the device is ready to clean
- 




**Robacta TC 2000 connections and mechanical components**






Front of device



Rear of device

- 
- | No. | Function   |
|-----|--|
| (1) | <b>Level sensor</b><br>monitors the parting agent fill level in the dipping bowl   |
| (2) | <b>Cleaning opening with internal parting-agent injection nozzle and brush seal</b><br>for cleaning the gas nozzle and the inside of the welding torch<br>for coating the gas nozzle and welding torch interior with parting agent                 |
|     |  <b>NOTE!</b> To avoid excess soiling, only use the device with the brush seal in place.  |
| (3) | <b>Dipping bowl with spill tray</b>  |
|     |  <b>NOTE!</b> If the dipping bowl is not in use, ensure that there are no parting agent residues left in the bottom.  |
|     |  <b>NOTE!</b> Ensure that there is always sufficient parting agent in the dipping bowl when in use (i.e. ensure that the fill level indicator never lights up). |
| (4) | <b>Standard I/O connection socket (X1)</b>   |
-

- 
- (5) **Mains cable with strain relief device**
- 
- (6) **Spatter tray for welding residues**
- 
- (7) **Recesses for the wire cutter holder**  
for attaching the wire cutter holder to the cleaning device
- 
- (8) **Drain hose**  
for emptying the dipping bowl
- 
- (9) **Parting agent nebuliser connection**  
for connecting to the "Robacta Reamer" parting agent container, for spraying the compressed air/parting agent mixture into the cleaning opening
- 
- 
- (10) **Wire cutter connection socket**  
for electrically controlling the wire cutter
- 
- 
- (11) **Compressed air connection**  
for supplying the cleaning device with compressed air
- 
-



# **Installation and commissioning**



## Safety

Observe the following safety rules for all work described in the "Installation and start-up" section.



**WARNING!** Incorrect operation or poorly executed work can cause serious injury or damage. All activities described in these operating instructions may only be carried out by trained and qualified personnel. All functions described in these operating instructions may only be used by trained and qualified personnel. Do not carry out any of the work or use any of the functions described until you have fully read and understood the following documents:

- these operating instructions
- all the operating instructions for the system components, especially the safety rules



**WARNING!** Machines that start up automatically can cause serious injury and damage. In addition to these operating instructions, the safety rules issued by the manufacturers of the robot and welding systems must also be observed. For your personal safety, ensure that all protective measures have been taken and will remain in place while you are in the working area of the robot.



**WARNING!** Risk of serious injury from electric shock and mechanically powered parts. Before performing work on the cleaning device or any connected system components:

- disconnect the customer's compressed air and power supplies from the cleaning device and the connected system components
- ensure that they remain disconnected until all work is complete



**WARNING!** Whenever the cleaning device is supplied with voltage and/or compressed air, a risk of serious injury exists from:

- the magnetic field surrounding the cleaning opening
- flying parts (shavings, etc.)
- compressed air/parting agent mixture escaping from the parting-agent injection nozzle
- activated wire cutter

If work has to be performed on the cleaning device while it is supplied with voltage and/or compressed air:

- keep all ferromagnetic parts, such as tools, away from the device
- keep your body, especially your hands, face and hair, any objects and all clothing away from the cleaning opening and the wire cutter
- wear ear protection
- wear protective goggles with side protection

# Before commissioning

---

## Operators, maintenance personnel



**NOTE!** The device must only be used by 1 person at a time. It is also necessary to ensure that no-one else is within the working area of the device when the device is being used.



**NOTE!** The device must only be serviced by 1 person at a time. It is also necessary to ensure that no-one else is within the working area of the device when the device is being worked on.

---

## Setup regulations

The device is tested to IP 23, meaning:

- protection against penetration by solid foreign bodies with diameters > 12.5 mm (0.49 in.)
- protection against direct sprays of water at any angle up to 60° from the vertical

The device must not be set up and operated outdoors. The built in electrical parts must be protected from direct wetting.



**NOTE!** The device must be set up at least 1 m (40 in.) away from computers, control lines and the welding process.



**NOTE!** When setting up the device, ensure an all-round clearance of at least 0.5 m (19.69 in.) from any surrounding objects, e.g. walls, other devices or objects.



**NOTE!** Position the device to prevent welding spatter coming into contact with the cleaning device.

---

## Compressed air supply specifications

To ensure that the torch neck cleaning device functions correctly, the following compressed air supply specifications must be met:

- Establish compressed air supply using a pressure limiter and compressed air filter
  - Provide compressed air quality conforming to ISO 8573-1:2001, class 7 4 3, instrument air
    - Solid particle concentration  $\leq 10 \text{ mg/m}^3$
    - Vapour pressure dew point  $\leq + 3^\circ\text{C}$
    - Oil concentration  $\leq 1 \text{ mg/m}^3$
- 

## Mains connection

The cleaning device is designed to run at the mains voltage indicated on the rating plate. The fuse protection required for the mains cable can be found in the "Technical data" section. If there is no mains cable or mains plug on your device, fit one that conforms to national standards.



**CAUTION!** Risk of serious damage as the result of incorrect mains voltage. If the mains voltage lies outside the tolerances given in the technical data, do not under any circumstances connect the device to the mains.



**NOTE!** An inadequately dimensioned electrical installation can cause serious damage. The mains cable and its fuse must be dimensioned to suit the device being used. The technical data shown on the rating plate applies.

# Bolting the cleaning device to the underlying surface (foundation)

**Bolting the Robacta TC 2000 together with installation stand to the underlying surface (foundation)**

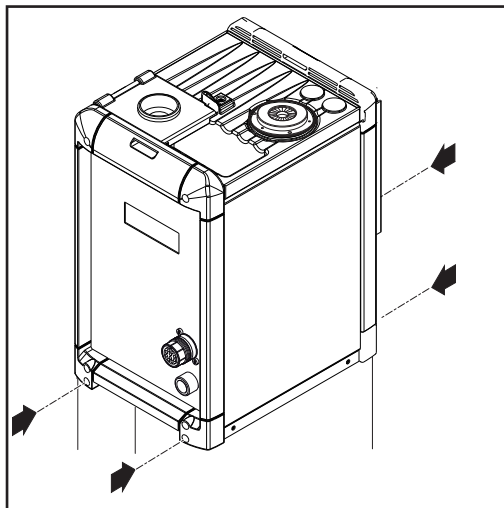


**NOTE!** The device may only ever be set up with the designated installation stand.



**NOTE!** Different fixings may be required to connect the installation stand to the underlying surface (foundation) depending on the nature of this surface. The fixings required to connect the installation stand to the underlying surface (foundation) are not included in the scope of supply of the installation stand. The installer is responsible for selecting the right type of fixing. Only the screws needed to fit the cleaning device to the installation stand are supplied with the stand itself.

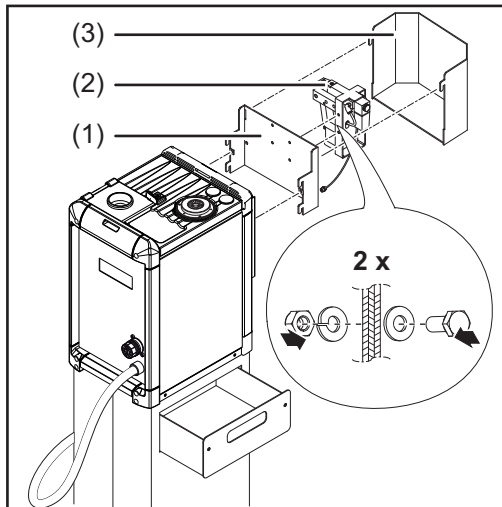
- 1** Place the optionally available installation stand on a level, firm and vibration-free surface (foundation)
  - Position the installation stand in such a way that the distance the robot has to travel to the cleaning device on the installation stand is as short as possible
- 2** Screw the installation stand to the underlying surface (foundation) using the appropriate fixings



- 3** Position the cleaning device on the installation stand
- 4** Screw the cleaning device to the installation stand using the 4 screws supplied with the stand

# Installing the wire cutter

## Installing the wire cutter on the Robacta TC 2000



- 1 Engage the wire cutter holder (1) onto the cleaning device
- 2 Screw the wire cutter (2) to the holder (1) using 2 screws, 2 washers, 2 lock washers and 2 nuts as shown. The installer is responsible for selecting the right screws, washers, lock washers and nuts
- 3 Engage the protective cover (3) onto the holder (1)
- 4 If using an electrically-controlled wire cutter: Plug the wire cutter connecting cable into the wire cutter connection socket on the cleaning device

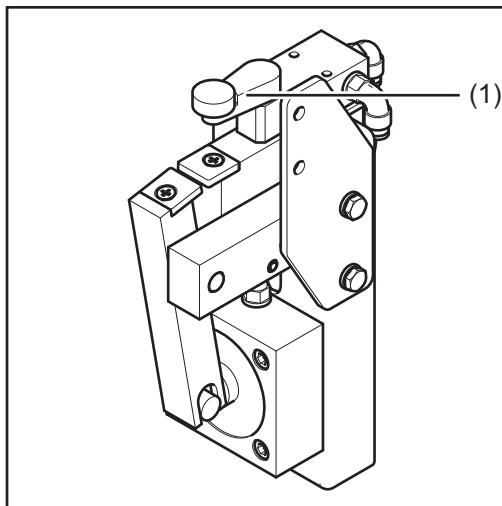


**NOTE!** The wire cutter cannot be supplied with compressed air from the cleaning device. The wire cutter must be supplied with compressed air from a separate supply line.

## Maximum wire diameter

Wire electrodes with a diameter of up to 1.6 mm (0.063 in.) can be cut by the wire cutter.

## How the mechanically-controlled wire cutter works



If a torch neck pushes the valve lever (1) to the side by more than 15° with the gas nozzle, the wire cutter is activated and the wire electrode is cut.



**NOTE!** The wire electrode is cut while the torch neck is moving.

## How the electrically-controlled wire cutter works

The electrically-controlled wire cutter opens and closes when there is an active signal from the robot control.

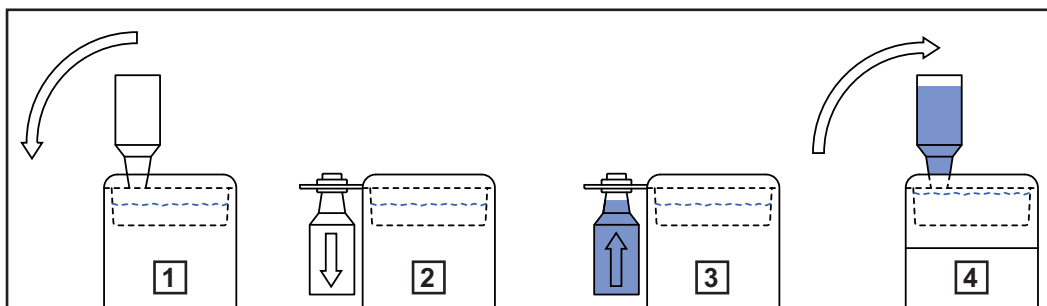
# Filling the dipping bowl with parting agent

## Filling the dipping bowl with parting agent



**NOTE!** Only use the "Robacta TC Cool / Robacta TC Cool MD" parting agent supplied by the manufacturer. The composition of the manufacturer's parting agent is intended specifically for the Robacta TC. If other manufacturers' products are used, trouble-free operation cannot be guaranteed.

- 1 Fold out the container holder containing the empty "Robacta TC Cool / Robacta TC Cool MD" parting agent container
- 2 Remove the empty "Robacta TC Cool / Robacta TC Cool MD" parting agent container and dispose of it according to national regulations
- 3 Open a new "Robacta TC Cool / Robacta TC Cool MD" parting agent container and put it into the holder
- 4 Fold the container holder containing the full "Robacta TC Cool / Robacta TC Cool MD" parting agent container carefully back above the dipping bowl
  - The optimum fill-level is regulated automatically



**NOTE!** Carry out the following maintenance on the dipping bowl at weekly intervals:

- Take the spill tray out of the dipping bowl and dispose of any accumulated dirt
- Check the consistency of the "Robacta TC Cool / Robacta TC Cool MD" parting agent. If the "Robacta TC Cool / Robacta TC Cool MD" parting agent is thick, add fresh water and stir to mix in
- Check the level sensor in the dipping bowl for dirt and clean if necessary



**NOTE!** Carry out the following maintenance on the dipping bowl every three months:

- Drain all the parting agent from the dipping bowl
- Take the spill tray out of the dipping bowl and dispose of any accumulated dirt
- Clean the dipping bowl and spill tray
- Fill the dipping bowl with new parting agent

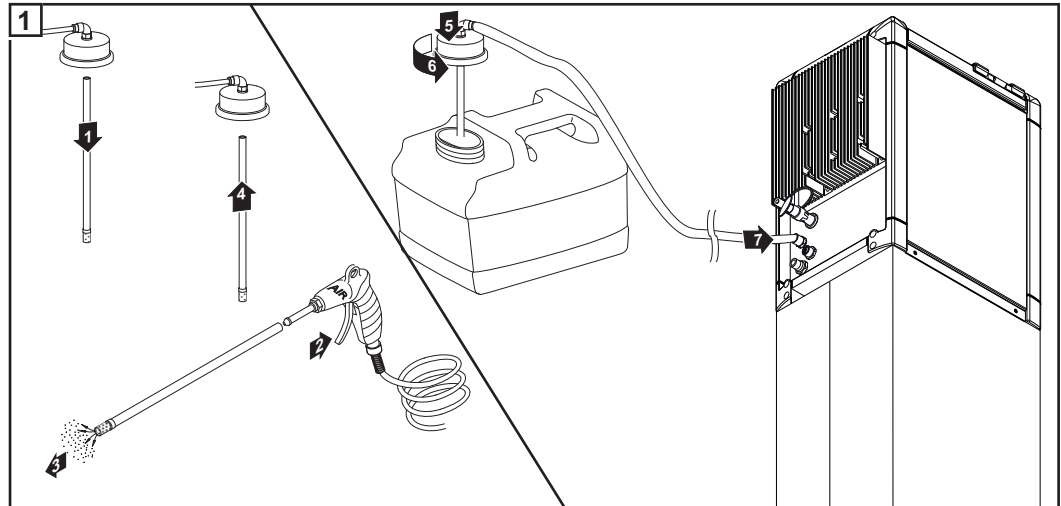
Take care never to damage the level sensor when performing maintenance work.

# Connecting the cleaning device to the "Robacta Reamer" parting agent container

Connecting the cleaning device to the "Robacta Reamer" parting agent container



**NOTE!** Only use "Robacta Reamer" parting agent supplied by the manufacturer. The composition of the manufacturer's parting agent is intended specifically for the Robacta TC. If other manufacturers' products are used, trouble-free operation cannot be guaranteed.



**NOTE!** The parting agent spray time must be set on the robot control. A minimum spray time of 0.5 seconds can be set. A spray time of approx. 0.7 seconds is recommended. This may vary depending on the size of the gas nozzle.



# Starting up the cleaning device

---

## General



**NOTE!** Not coating the interior of the welding torch may result in permanent soiling of the torch when welding begins. Always wet the inside of the welding torch with the manufacturer's "Robacta Reamer" parting agent before starting automatic operation.

To achieve the best cleaning results, please note the following:

- Apply an even layer of parting agent to the inside of the torch
- Follow the cleaning sequences as described below
- Keep to the specified cleaning positions
- Blow out the welding torch with compressed air during the cleaning operation (however not when parting agent is being actively sprayed into the torch interior)



**NOTE!** Single, small bits of welding spatter cannot be removed by the cleaning device. However, these small pieces do not influence the welding process.

---

## Prerequisites for start-up

The following requirements must be met before the cleaning device is started up:

- Cleaning device is bolted to underlying surface
- If present, connect the "Robacta Reamer" parting agent container to the cleaning device
- If using the dipping bowl, the dipping bowl is filled with the "Robacta TC Cool / Robacta TC Cool MD" parting agent
- If present, wire cutter installed and supplied with compressed air
- Cleaning device connected to mains
- If the cleaning device has been connected to the "Robacta Reamer" parting agent container: compressed air supply to cleaning device has been established
- Cleaning device connected to robot control

# Cleaning programme

---

## Overview of program sequence with parting agent nebuliser

1. Welding
  2. Cleaning gas nozzle tip and nozzle fitting
  3. Spraying in parting agent
  4. Welding
- 

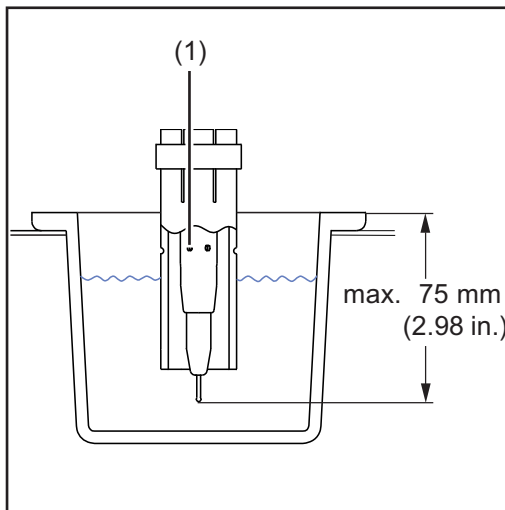
## Overview of program sequence with parting agent nebuliser and dipping bowl

1. Welding
  2. Cooling torch in dipping bowl
  3. Cleaning gas nozzle tip and nozzle fitting
  4. Spraying in parting agent
  5. Welding
- 


## Cooling welding torch in the dipping bowl

Immersing the hot welding torch in the "Robacta TC Cool / Robacta TC Cool MD" parting agent has the following benefits:

- The spatter that has accumulated on the gas nozzle is loosened
- The torch is cooled down more
- The anti-adhesive agent in the "Robacta TC Cool / Robacta TC Cool MD" parting agent prevents renewed soiling



- 1 After welding, position the welding torch approx. 50 mm (1.97 in.) above the dipping bowl

 **NOTE!** Do not dip torch more than 75 mm (2.98 in.) into the dipping bowl. The gas holes (1) must remain dry.

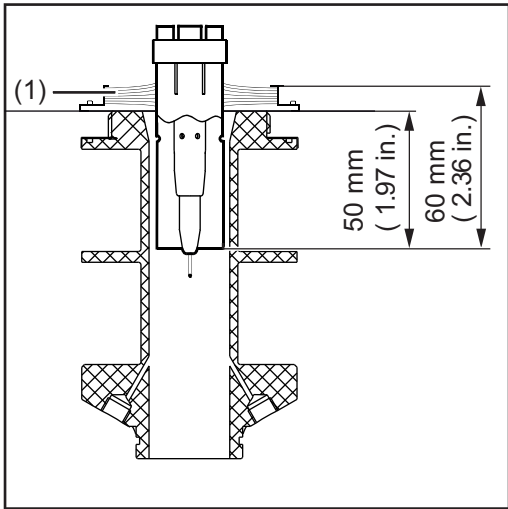
- 2 Dip torch vertically into the dipping bowl

- 3 Depending on the application, hold the torch in the dipping bowl for approx. 1 - 4 seconds so that any air in the torch can escape and the torch can cool sufficiently
  - 4 Raise the torch back to its original position above the dipping bowl
  - 5 Allow the torch to drip for approx. 1-4 seconds before bringing it back to its original position for cleaning
- 

## Cleaning gas nozzle tip and nozzle fitting



**NOTE!** During the cleaning operation, blow out the torch with compressed air through the hosepack - any remaining dirt or parting agent is removed.



- 1 Position the welding torch approx. 50 mm (1.97 in.) centrally above the middle of the cleaning opening

**NOTE!** If the brush seal (1) is fitted, note the changed reference point when positioning the welding torch.

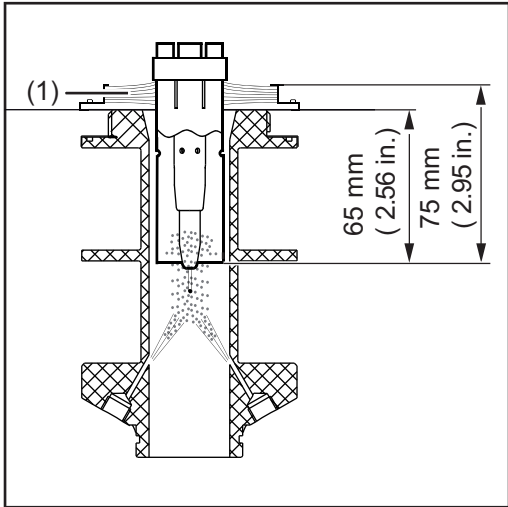
- 2 Move the welding torch vertically and into the cleaning position.
  - See Figure
- 3 Begin cleaning and hold torch for approx. 1 second in the cleaning position

**Spraying in parting agent**

Applying parting agent evenly has the following advantages:

- reduced welding spatter accumulation
- prevents re-soiling

**NOTE!** If the brush seal (1) is fitted, note the changed reference point when positioning the welding torch.

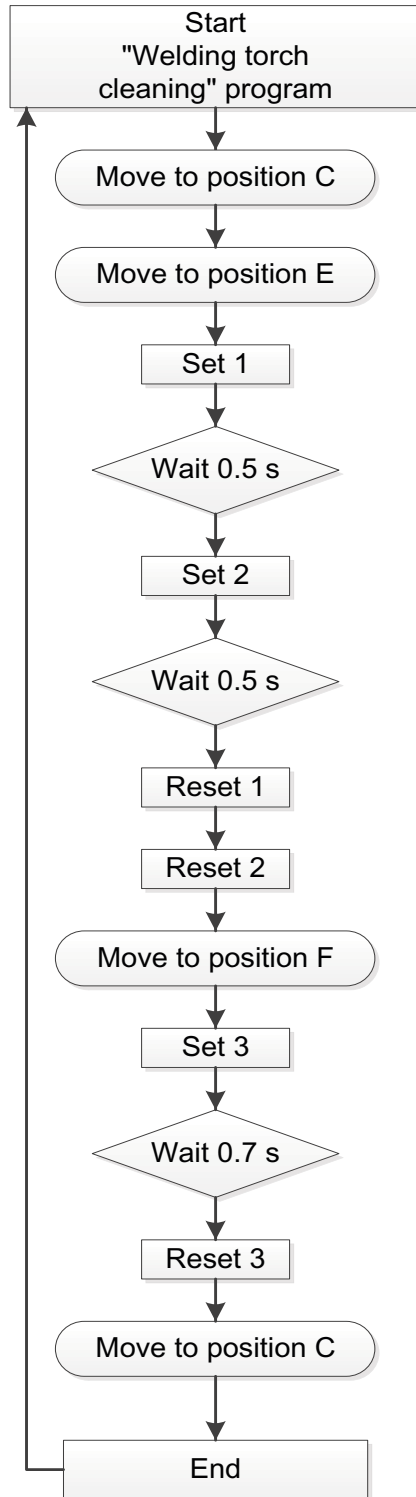


- 1 Place torch in spray-in position
  - See Figure

**NOTE!** During the spraying process, ensure that compressed air is not blown out through the torch.

- 2 Spray welding torch with parting agent for approx. 0.7 seconds
- 3 Move the welding torch to the start position above the cleaning opening - approx. 50 mm (1.97 in.) centrally above the middle of the cleaning opening
  - The cleaning operation is complete and the torch is once more ready for use

**Cleaning program sequence with parting agent nebuliser**



Set 1/Reset 1

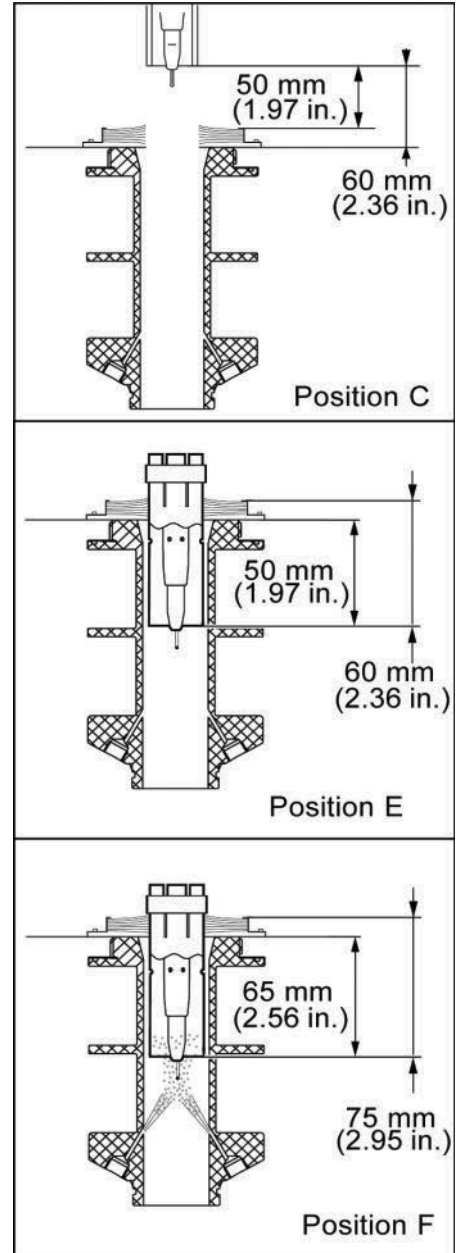
Blow compressed air through torch

Set 2/Reset 2

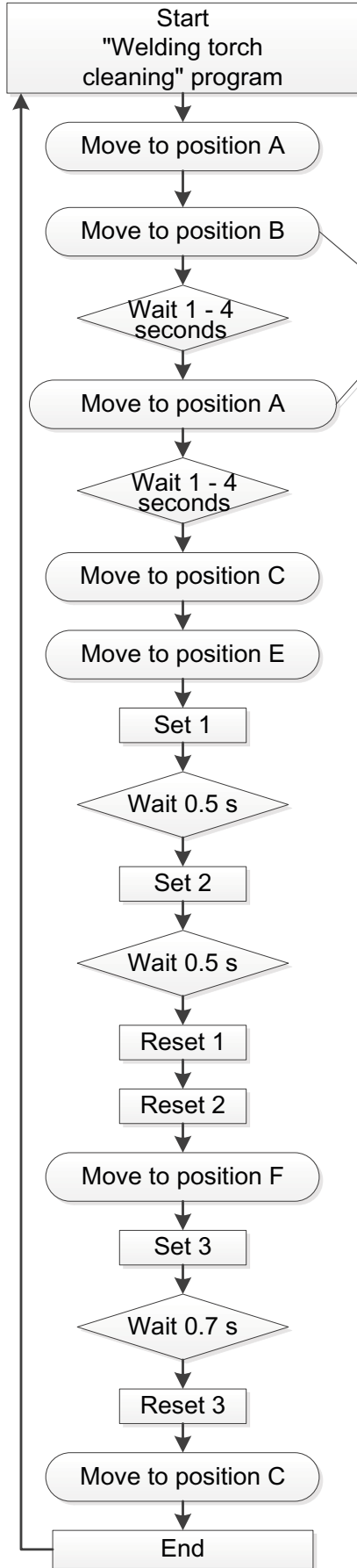
"Start cleaning" signal

Set 3/Reset 3

"Spray parting agent" signal

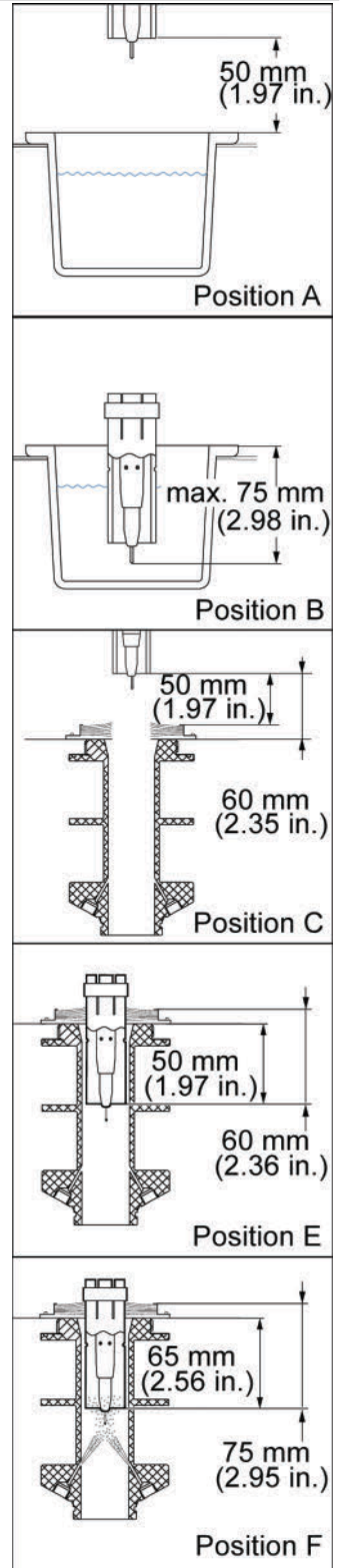


**Cleaning program sequence with dipping bowl**



- Set 1/Reset 1  
Blow compressed air through torch
- Set 2/Reset 2  
"Start cleaning" signal
- Set 3/Reset 3  
"Spray parting agent" signal

$V_{max} = 10 \text{ cm/s}$   
(236.22 ipm)





# **Troubleshooting, maintenance and disposal**





## Safety

Observe the following safety rules for all work described in the "Troubleshooting, maintenance and disposal" section.



**WARNING!** Incorrect operation or poorly executed work can cause serious injury or damage. All activities described in these operating instructions may only be carried out by trained and qualified personnel. All functions described in these operating instructions may only be used by trained and qualified personnel. Do not carry out any of the work or use any of the functions described until you have fully read and understood the following documents:

- these operating instructions
- all the operating instructions for the system components, especially the safety rules



**WARNING!** Machines that start up automatically can cause serious injury and damage. In addition to these operating instructions, the safety rules issued by the manufacturers of the robot and welding systems must also be observed. For your personal safety, ensure that all protective measures have been taken and will remain in place while you are in the working area of the robot.



**WARNING!** Risk of serious injury from electric shock and mechanically powered parts. Before performing work on the cleaning device or any connected system components:

- disconnect the customer's compressed air and power supplies from the cleaning device and the connected system components
- ensure that they remain disconnected until all work is complete
- using a suitable measuring instrument, ensure that electrically charged parts (e.g. capacitors) have been discharged



**WARNING!** Whenever the cleaning device is supplied with voltage and/or compressed air, a risk of serious injury exists from:

- the magnetic field surrounding the cleaning opening
- flying parts (shavings, etc.)
- compressed air/parting agent mixture escaping from the parting-agent injection nozzle
- activated wire cutter

If work has to be performed on the cleaning device while it is supplied with voltage and/or compressed air:

- keep all ferromagnetic parts, such as tools, away from the device
- keep your body, especially your hands, face and hair, any objects and all clothing away from the cleaning opening and the wire cutter
- wear ear protection
- wear protective goggles with side protection



**CAUTION!** An inadequate ground conductor connection can cause serious injury or damage. The housing screws provide a suitable ground conductor connection for earthing (grounding) the housing and must NOT be replaced by any other screws which do not provide a reliable ground conductor connection.

# Troubleshooting

---

## Troubleshooting

---

### **Mains voltage indicator not lit**

Mains cable connected

Cause: Faulty mains cable

Remedy: Check mains cable

Cause: The cleaning device is overheating

Remedy: Allow cleaning device to cool down. Once the permitted operating temperature has been reached, charging starts again. The cleaning device is then ready to clean again

---

### **"Ready-to-clean" signal not transmitted to robot control**

Mains voltage indicator lit

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

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

Cause: Supply to I/O standard connection socket (X1) is faulty

Remedy: Depending on the connection socket, check the assignment of inputs "B" and "H" / "D" and "G"

---

### **"Ready-to-clean" signal not transmitted to robot control**

Mains voltage indicator lit, overtemperature indicator lit

Cause: The cleaning device is overheating

Remedy: Allow cleaning device to cool down. Once the permitted operating temperature has been reached, charging of the capacitors starts again. The cleaning device is then ready to clean again

---

### **Fill level indicator lit**

The liquid in the dipping bowl is below the optimum fill level

Cause: "Robacta TC Cool / Robacta TC Cool MD" parting agent container is empty

Remedy: Replace "Robacta TC Cool / Robacta TC Cool MD" parting agent container

---

### **Fill level indicator lit**

The "Robacta TC Cool / Robacta TC Cool MD" parting agent container is not yet empty

Cause: Level sensor is dirty

Remedy: Clean level sensor with fresh water

Cause: Level sensor faulty

Remedy: Contact After-Sales Service

---

### **Fill level indicator lit**

A dipping bowl is not available or is not being used

Cause: A parting agent nebuliser is being used

Remedy: Not necessary

---

**Fill level indicator not lit**

The liquid in the dipping bowl is already below the optimum fill level

Cause: Fill-level sensor faulty  
Remedy: Contact After-Sales Service

**Parting agent does not spray**

The "Robacta Reamer" parting agent container is full

Cause: Not enough spray  
Remedy: Adjust spray amount (spray time)

Cause: Dirty suction filter in "Robacta Reamer" parting agent container  
Remedy: Blow through suction filter in "Robacta Reamer" parting agent container using compressed air from the inside outwards through the suction hose (see "Connecting the cleaning device to the "Robacta Reamer" parting agent container")

Cause: Compressed air supply interrupted  
Remedy: Establish the compressed air supply

Cause: Compressed air supply line faulty or dirty  
Remedy: Clean compressed air supply line, replace if necessary

Cause: Faulty vacuum pump  
Remedy: Contact After-Sales Service (arrange for vacuum pump to be replaced)

Cause: Faulty solenoid valve  
Remedy: Contact After-Sales Service (arrange for solenoid valve to be replaced)

**Parting agent does not spray**

Cause: The "Robacta Reamer" parting agent container is empty  
Remedy: Fill with parting agent

**Pores in the weld seam**

Cause: Too much parting agent inside the torch  
Remedy: Remove parting agent residue by blowing out the torch interior. Ensure compressed air supply

Cause: Too much parting agent inside the torch  
Remedy: Reduce amount of parting agent spray (spraying time)

**Error is sent to the robot. Overtemperature and fill level indicators flash at the same time, no cleaning takes place**

Cause: Quick Stop is active (HI - Quick Stop = LO / LO - Quick Stop = HI)  
Remedy: Deactivate Quick Stop (HI - Quick Stop = HI / LO - Quick Stop = LO)

Cause: Fault in the cleaning device  
Remedy: Disconnect the cleaning device from the mains and wait for approx. 1 minute before reconnecting it to the mains  
Contact After-Sales Service if this does not remedy the situation

# Care, maintenance and disposal

---

- Before each start-up**
- Check the fill level in the "Robacta Reamer" parting agent container and the dipping bowl, top up if necessary



**NOTE!** The "Robacta TC Cool / Robacta TC Cool MD" and "Robacta Reamer" parting agents differ in their composition. Use the appropriate medium depending on the application concerned.

---

**Daily**



**NOTE!** Clean the device exterior of any parting agent or dirt, especially on top. Only use solvent-free cleaning products on the device.

---

**Weekly**

- Empty the spatter tray for welding residues
  - Take the spill tray out of the dipping bowl and dispose of any accumulated dirt
  - Check the consistency of the "Robacta TC Cool / Robacta TC Cool MD" parting agent. If the "Robacta TC Cool / Robacta TC Cool MD" parting agent is thick, add fresh water and stir to mix in
  - Check the level sensor in the dipping bowl for dirt and clean if necessary
  - Clean the cleaning opening on the inside
  - Check the "Robacta Reamer" and "Robacta TC Cool / Robacta TC Cool MD" parting agent containers for soiling and clean if necessary
  - Blow through suction filter in "Robacta Reamer" parting agent container using compressed air from the inside outwards through the suction hose (see "Connecting the cleaning device to the "Robacta Reamer" parting agent container")
  - Check the condition of the brush seal above the cleaning opening. Replace the brush seal if worn
- 

**Every 3 months**

- Drain all the parting agent from the dipping bowl
- Take the spill tray out of the dipping bowl and dispose of any accumulated dirt
- Clean the dipping bowl and spill tray
- Fill the dipping bowl with new parting agent



**NOTE!** Take care never to damage the fill-level sensor when performing maintenance work.

---

**Every 6 months**

- Open the device and blow clean using dry reduced compressed air



**NOTE!** Do not bring the air nozzle too close to electronic parts.

---

**Every 12 months**

- Arrange for a safety inspection to be carried out on the device by a Fronius service engineer
- 

**Disposal**

Dispose of in accordance with the applicable national and local regulations.

# **Technical data**



# Technical data

## General



**NOTE!** An inadequately dimensioned electrical installation can cause serious damage. The mains cable and its fuse must be dimensioned to suit the device being used. The technical data shown on the rating plate applies.

## Robacta TC 2000

|   |  |
|---|--|
| Mains voltage   | 230 V  |
| Mains voltage tolerance   | -10% / +10%                                    |
| Mains frequency   | 50/60 Hz                                       |
| Nominal output  | 180 W  |
| Mains fuse protection (slow-blow)                                     | 10 A   |
| Compressed air supply   | 6 bar<br>86.99 psi                             |
| Minimum cleaning interval   | from 20 s                                      |
| Dipping bowl minimum capacity   | 0.75 l<br>0.20 gal.                            |
| Degree of protection  | IP 23  |
| Dimensions l/w/h  | 330 / 250 / 422 mm<br>12.99 / 9.84 / 16.61 in. |
| Weight (without "Robacta TC Cool / Robacta TC Cool MD" parting agent) | 24.4 kg<br>53.79 lb.                           |
| EMC emission class  | A  |
| Mark of conformity  | CE   |



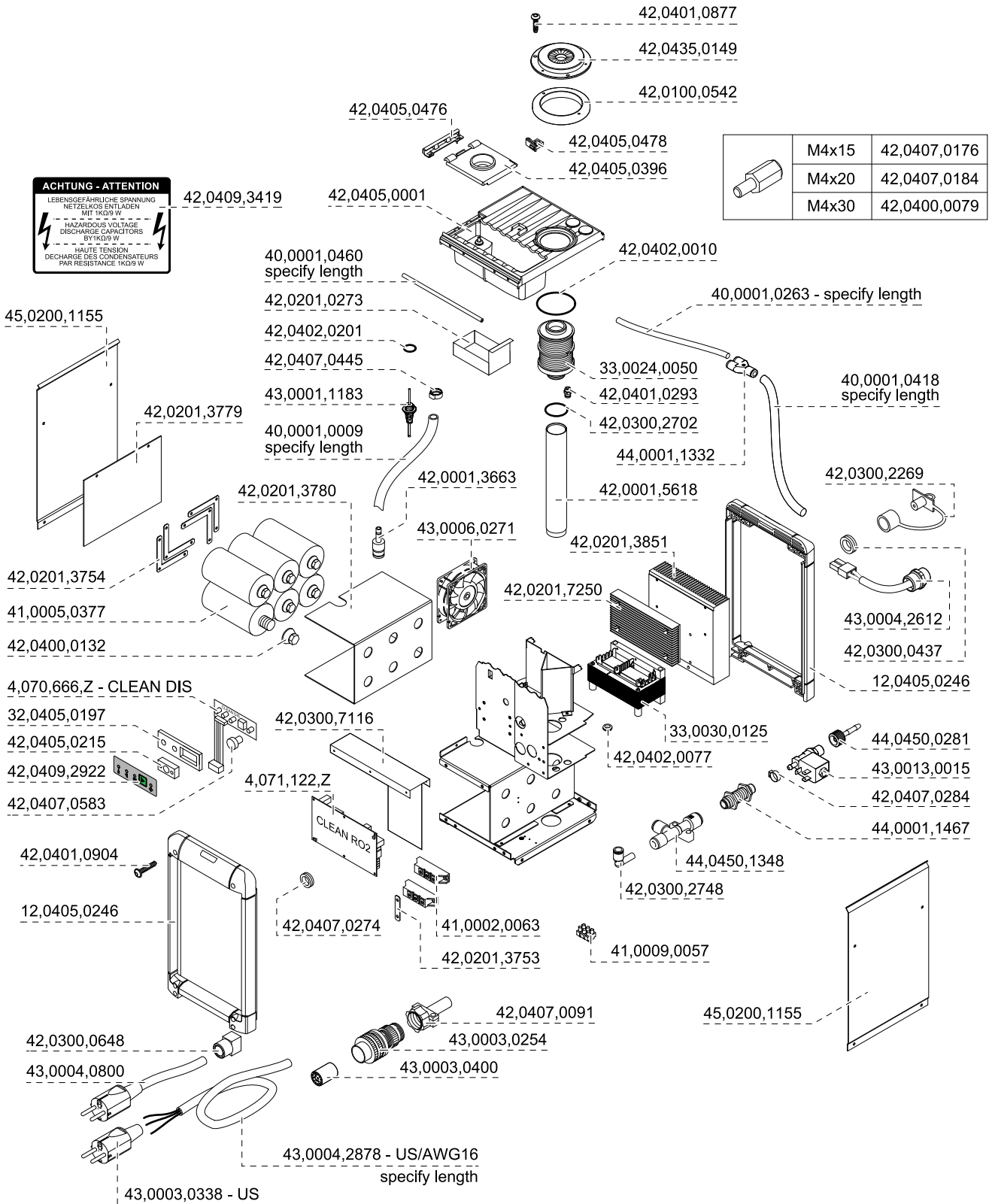


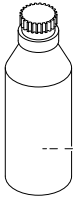
# Appendix

# Spare parts list: Robacta TC 2000

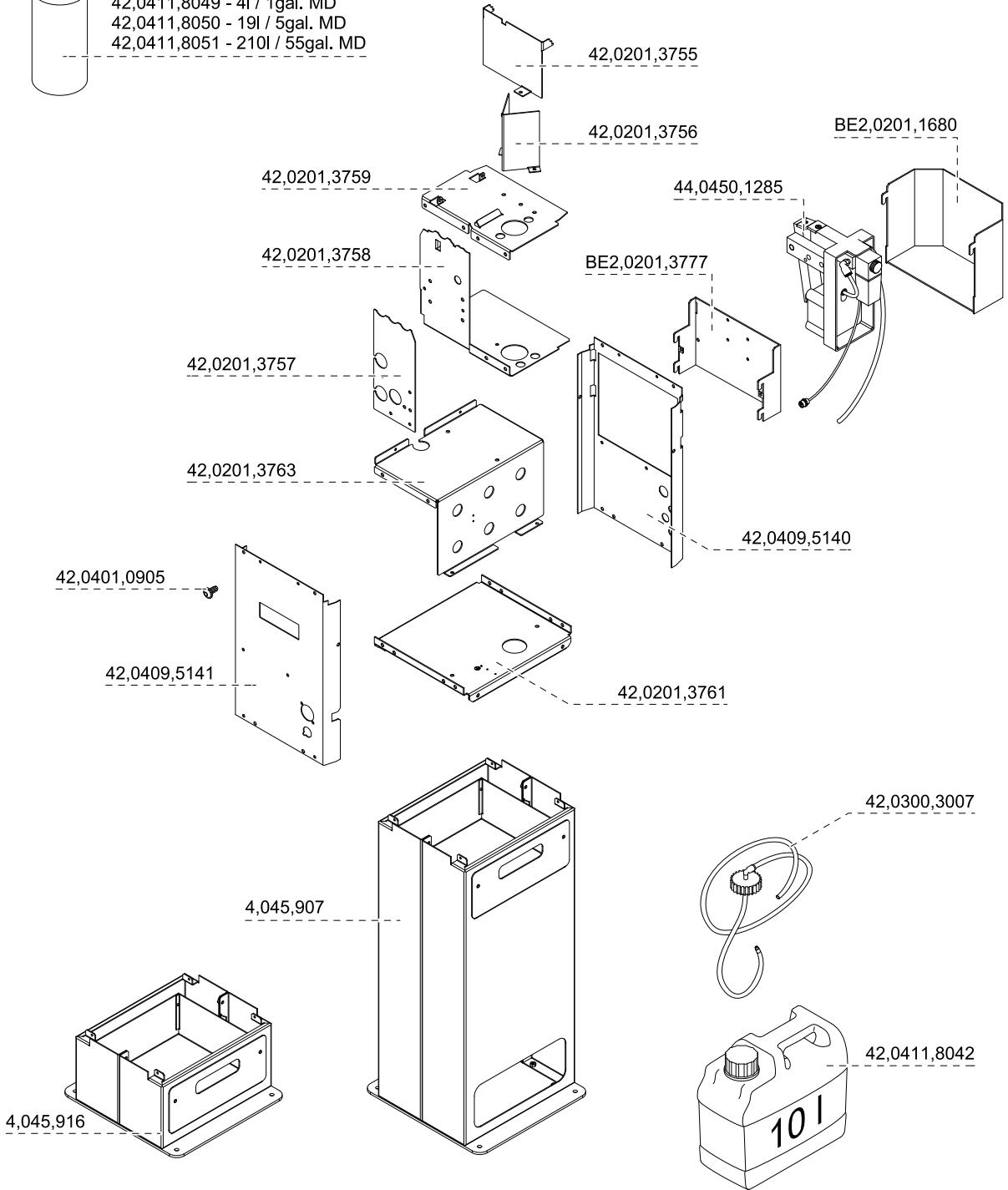
Robacta TC 2000  
Robacta TC 2000 / US

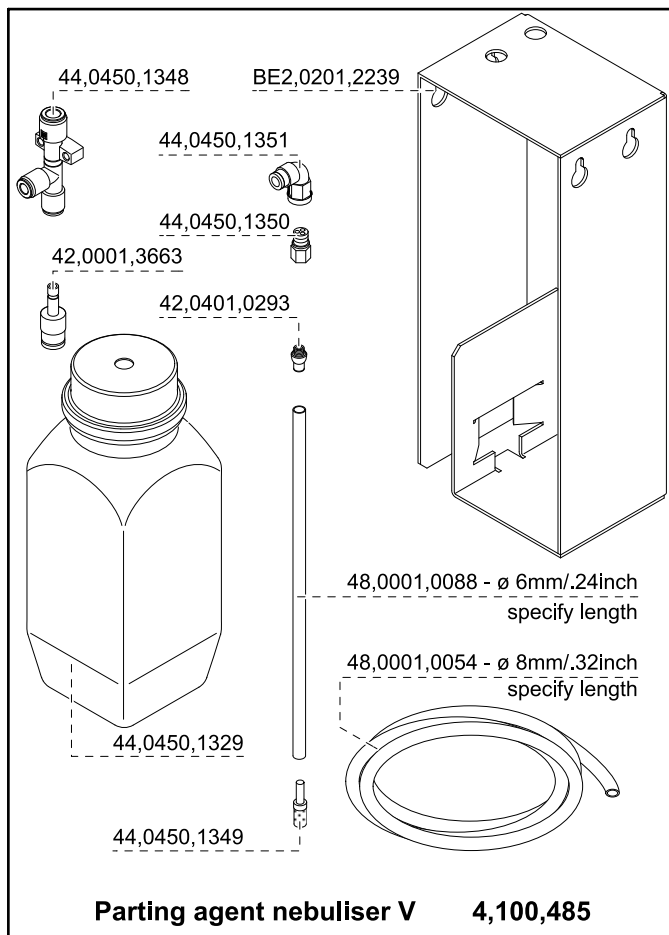
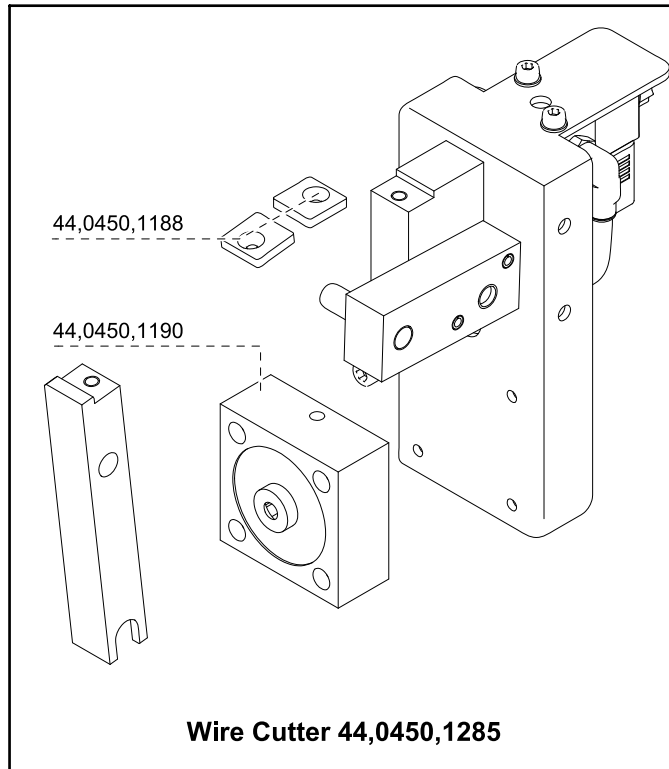
4,075,123  
4,075,123,800





- 42,0411,8038 - 1l / 32oz.
- 42,0411,8039 - 4l / 1gal.
- 42,0411,8043 - 19l / 5gal.
- 42,0411,8044 - 210l / 55gal.
- 42,0411,8048 - 1l / 32oz. MD
- 42,0411,8049 - 4l / 1gal. MD
- 42,0411,8050 - 19l / 5gal. MD
- 42,0411,8051 - 210l / 55gal. MD





Maahantuonti ja myynti:

**PRONIUS**

Pronius Oy

Keisarinviitta 20 B  
33960 Pirkkala

+358 (0)44 200 9060  
info@pronius.fi  
www.pronius.fi