

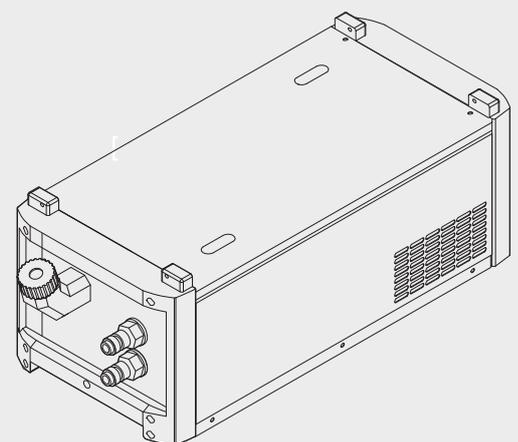


**FK 4000**  
**FK 4000 R**  
**FK 4000 R US**  
**FK 4000 R FC**  
**FK 4000 Rob**

Operating Instructions

EN

Cooling unit



42,0426,0017,EN 010-29012020



# Dear reader,

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## 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.

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## Explanation of safety notices



### **DANGER!**

**Indicates immediate danger.**

- ▶ If not avoided, death or serious injury will result.
- 



### **WARNING!**

**Indicates a potentially hazardous situation.**

- ▶ If not avoided, death or serious injury may result.
- 



### **CAUTION!**

**Indicates a situation where damage or injury could occur.**

- ▶ If not avoided, minor injury and/or damage to property may result.
- 

### **NOTE!**

**Indicates a risk of flawed results and possible damage to the equipment.**

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# 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.

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All persons involved in commissioning, operating, maintaining and servicing the device must:

- be suitably qualified,
- have sufficient knowledge of welding and
- read and follow these operating instructions carefully.

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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.

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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.

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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, 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.

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The device is intended solely for the welding processes specified on the rating plate. Any use above and beyond this purpose is deemed improper. The manufacturer shall not be held liable for any damage arising from such usage.

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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 maintenance work.

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Never use the device for the following purposes:

- Thawing out pipes
- Charging batteries
- Starting engines

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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.

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The manufacturer likewise accepts no liability for inadequate or incorrect results.

## Environmental conditions

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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.

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Ambient temperature range:

- during operation: -10 °C to + 40 °C (14 °F to 104 °F)
  - during transport and storage: -20 °C to +55 °C (-4 °F to 131 °F)
- 

Relative humidity:

- up to 50% at 40 °C (104 °F)
  - up to 90% at 20 °C (68 °F)
- 

The surrounding air must be free from dust, acids, corrosive gases or substances, etc.  
Can be used at altitudes of up to 2000 m (6561 ft. 8.16 in.)

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### **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.

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### **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.

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### **Mains connection**

Devices with a higher rating may affect the energy quality of the mains due to their current consumption.

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This may affect a number device types in terms of:

- Connection restrictions
- Criteria with regard to the maximum permissible mains impedance <sup>\*)</sup>
- Criteria with regard to the minimum short-circuit power requirement <sup>\*)</sup>

<sup>\*)</sup> at the interface with the public grid  
see "Technical data"

---

In this case, the plant operator or the person using the device should check whether the device may be connected, where appropriate by discussing the matter with the power supply company.

---

**IMPORTANT!** Ensure that the mains connection is earthed properly

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### **Protecting yourself and others**

Anyone working with the device exposes themselves to numerous risks, e.g.

- flying sparks and hot pieces of metal
  - Arc radiation, which can damage eyes and skin
  - Hazardous electromagnetic fields, which can endanger the lives of those using cardiac pacemakers
  - Risk of electrocution from mains current and welding current
  - Greater noise pollution
  - Harmful welding fumes and gases
-

Suitable protective clothing must be worn when working with the device. The protective clothing must have 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

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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 (risk of dazzling by the arc, injury from flying sparks, harmful welding fumes, noise, possible risks from mains current and welding current, etc.)
- Provide suitable protective equipment
- Alternatively, erect suitable safety screens/curtains.

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### Noise emission values

The device generates a maximum sound power level of <80 dB(A) (ref. 1pW) when idling and in the cooling phase following operation at the maximum permissible operating point under maximum rated load conditions according to EN 60974-1.

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It is not possible to provide a workplace-related emission value during welding (or cutting) as this is influenced by both the process and the environment. All manner of different welding parameters come into play, including the welding process (MIG/MAG, TIG welding), the type of power selected (DC or AC), the power range, the type of weld metal, the resonance characteristics of the workpiece, the workplace environment, etc.

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### Danger from toxic gases and vapours

The fumes produced during welding contain harmful gases and vapours.

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Welding fumes contain substances that cause cancer, as stated in Monograph 118 of the International Agency for Research on Cancer.

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Use at-source extraction and a room extraction system.

If necessary, use a welding torch with an integrated extraction device.

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Keep your face away from welding fumes and gases.

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Fumes and hazardous gases

- must not be breathed in
- must be extracted from the working area using appropriate methods.

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Ensure an adequate supply of fresh air. Ensure that there is a ventilation rate of at least 20 m<sup>3</sup> per hour at all times.

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Otherwise, a welding helmet with an air supply must be worn.

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If there is any doubt about whether the extraction capacity is sufficient, the measured toxic emission values should be compared with the permissible limit values.

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The following components are responsible, amongst other things, for the degree of toxicity of welding fumes:

- Metals used for the workpiece
- Electrodes
- Coatings
- Cleaners, degreasers, etc.
- Welding process used

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The relevant material safety data sheets and manufacturer's specifications for the listed components should therefore be studied carefully.

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Recommendations for trade fair scenarios, risk management measures and for identifying working conditions can be found on the European Welding Association website under Health & Safety (<https://european-welding.org>).

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Flammable vapours (e.g. solvent fumes) should be kept away from the arc's radiation area.

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Close the shielding gas cylinder valve or main gas supply if no welding is taking place.

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### **Danger from flying sparks**

Flying sparks may cause fires or explosions.

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Never weld close to flammable materials.

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Flammable materials must be at least 11 metres (36 ft. 1.07 in.) away from the arc, or alternatively covered with an approved cover.

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A suitable, tested fire extinguisher must be available and ready for use.

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Sparks and pieces of hot metal may also get into adjacent areas through small gaps or openings. Take appropriate precautions to prevent any danger of injury or fire.

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Welding must not be performed in areas that are subject to fire or explosion or near sealed tanks, vessels or pipes unless these have been prepared in accordance with the relevant national and international standards.

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Do not carry out welding on containers that are being or have been used to store gases, propellants, mineral oils or similar products. Residues pose an explosive hazard.

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### **Risks from mains current and welding current**

An electric shock is potentially life threatening and can be fatal.

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

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During MIG/MAG welding and TIG welding, the welding wire, the wirespool, the feed rollers and all pieces of metal that are in contact with the welding wire are live.

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Always set the wirefeeder up on a sufficiently insulated surface or use a suitable, insulated wirefeeder holder.

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Make sure that you and others are protected with an adequately insulated, dry temporary backing or cover for the earth or ground potential. This temporary backing or cover must extend over the entire area between the body and the earth or ground potential.

---

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.

Use the handle to ensure the power connections are tight before every use.

In the case of power cables with a bayonet connector, rotate the power cable around the longitudinal axis by at least 180° and pre-load.

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

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The electrode (rod electrode, tungsten electrode, welding wire, etc.) must

- never be immersed in liquid for cooling
- Never touch the electrode when the power source is switched on.

Double the open circuit voltage of a power source can occur between the welding electrodes of two power sources. Touching the potentials of both electrodes at the same time may be fatal under certain circumstances.

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

The device must only be operated on a mains supply with a ground conductor and a socket with a ground conductor contact.

Operating the device on a grid without a ground conductor and in a socket without a ground conductor contact will be deemed gross negligence. The manufacturer shall not be held liable for any damage arising from such usage.

If necessary, provide an adequate earth connection for the workpiece.

Switch off unused devices.

Wear a safety harness if working at height.

Before working on the device, switch it off and pull out the mains plug.

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.

**Meandering welding currents**

If the following instructions are ignored, meandering welding currents can develop with the following consequences:

- Fire hazard
- Overheating of parts connected to the workpiece
- Irreparable damage to ground conductors
- Damage to device and other electrical equipment

Ensure that the workpiece is held securely by the workpiece clamp.

Attach the workpiece clamp as close as possible to the area that is to be welded.

If the floor is electrically conductive, the device must be set up with sufficient insulating material to insulate it from the floor.

If distribution boards, twin-head mounts, etc., are being used, note the following: The electrode of the welding torch / electrode holder that is not used is also live. Make sure that the welding torch / electrode holder that is not used is kept sufficiently insulated.

In the case of automated MIG/MAG applications, ensure that only an insulated wire electrode is routed from the welding wire drum, large wirefeeder spool or wirepool to the wire-feed unit.

**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.

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

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### EMC measures

In certain cases, even though a device complies with the standard limit values for emissions, it may affect the application area for which it was designed (e.g. when there is sensitive equipment at the same location, or if the site where the device is installed is close to either radio or television receivers).

If this is the case, then the operator is obliged to take appropriate action to rectify the situation.

---

Check and evaluate the immunity to interference of nearby devices according to national and international regulations. Examples of equipment that may be susceptible to interference from the device include:

- Safety devices
- Power, signal and data transfer lines
- IT and telecommunications devices
- Measuring and calibrating devices

---

Supporting measures for avoidance of EMC problems:

1. Mains supply
  - If electromagnetic interference arises despite correct mains connection, additional measures are necessary (e.g. use a suitable line filter).
2. Welding power leads
  - must be kept as short as possible
  - must run close together (to avoid EMF problems)
  - must be kept well apart from other leads
3. Equipotential bonding
4. Earthing of the workpiece
  - If necessary, establish an earth connection using suitable capacitors.
5. Shielding, if necessary
  - Shield off other nearby devices
  - Shield off entire welding installation

---

### EMF measures

Electromagnetic fields may pose as yet unknown risks to health:

- effects on the health of others in the vicinity, e.g. wearers of pacemakers and hearing aids
- wearers of pacemakers must seek advice from their doctor before approaching the device or any welding that is in progress
- for safety reasons, keep distances between the welding cables and the welder's head/torso as large as possible
- do not carry welding cables and hosepacks over the shoulders or wind them around any part of the body

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### Specific hazards

Keep hands, hair, clothing and tools away from moving parts. For example:

- Fans
- Cogs
- Rollers
- Shafts
- Wirespools and welding wires

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Do not reach into the rotating cogs of the wire drive or into rotating drive components.

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Covers and side panels may only be opened/removed while maintenance or repair work is being carried out.

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During operation

- Ensure that all covers are closed and all side panels are fitted properly.
  - Keep all covers and side panels closed.
- 

The welding wire emerging from the welding torch poses a high risk of injury (piercing of the hand, injuries to the face and eyes, etc.).

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Therefore always keep the welding torch away from the body (devices with wire-feed unit) and wear suitable protective goggles.

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Never touch the workpiece during or after welding - risk of burns.

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Slag can jump off cooling workpieces. The specified protective equipment must therefore also be worn when reworking workpieces, and steps must be taken to ensure that other people are also adequately protected.

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Welding torches and other parts with a high operating temperature must be allowed to cool down before handling.

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Special provisions apply in areas at risk of fire or explosion - observe relevant national and international regulations.

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Power sources for work in areas with increased electric risk (e.g. near boilers) must carry the "Safety" sign. However, the power source must not be located in such areas.

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Risk of scalding from escaping coolant. Switch off cooling unit before disconnecting coolant flow or return lines.

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Observe the information on the coolant safety data sheet when handling coolant. The coolant safety data sheet may be obtained from your service centre or downloaded from the manufacturer's website.

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Use only suitable load-carrying equipment supplied by the manufacturer when transporting devices by crane.

- Hook chains and/or ropes onto all suspension points provided on the load-carrying equipment.
  - Chains and ropes must be at the smallest angle possible to the vertical.
  - Remove gas cylinder and wire-feed unit (MIG/MAG and TIG devices).
- 

If the wire-feed unit is attached to a crane holder during welding, always use a suitable, insulated wirefeeder hoisting attachment (MIG/MAG and TIG devices).

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If the device has a carrying strap or handle, this is intended solely for carrying by hand. The carrying strap is not to be used if transporting with a crane, counterbalanced lift truck or other mechanical hoist.

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All lifting accessories (straps, handles, chains, etc.) used in connection with the device or its components must be tested regularly (e.g. for mechanical damage, corrosion or changes caused by other environmental factors).

The testing interval and scope of testing must comply with applicable national standards and directives as a minimum.

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Odourless and colourless shielding gas may escape unnoticed if an adapter is used for the shielding gas connection. Prior to assembly, seal the device-side thread of the adapter for the shielding gas connection using suitable Teflon tape.

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**Requirement for the shielding gas**

Especially with ring lines, contaminated shielding gas can cause damage to equipment and reduce welding quality.

Meet the following requirements regarding shielding gas quality:

- Solid particle size < 40 µm
- Pressure condensation point < -20 °C
- Max. oil content < 25 mg/m<sup>3</sup>

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Use filters if necessary.

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**Danger from shielding gas cylinders**

Shielding gas cylinders contain gas under pressure and can explode if damaged. As the shielding gas cylinders are part of the welding equipment, they must be handled with the greatest of care.

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Protect shielding gas cylinders containing compressed gas from excessive heat, mechanical impact, slag, naked flames, sparks and arcs.

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Mount the shielding gas cylinders vertically and secure according to instructions to prevent them falling over.

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Keep the shielding gas cylinders well away from any welding or other electrical circuits.

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Never hang a welding torch on a shielding gas cylinder.

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Never touch a shielding gas cylinder with an electrode.

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Risk of explosion - never attempt to weld a pressurised shielding gas cylinder.

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Only use shielding gas cylinders suitable for the application in hand, along with the correct and appropriate accessories (regulator, hoses and fittings). Only use shielding gas cylinders and accessories that are in good condition.

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Turn your face to one side when opening the valve of a shielding gas cylinder.

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Close the shielding gas cylinder valve if no welding is taking place.

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If the shielding gas cylinder is not connected, leave the valve cap in place on the cylinder.

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The manufacturer's instructions must be observed as well as applicable national and international regulations for shielding gas cylinders and accessories.

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**Danger from escaping shielding gas**

Risk of suffocation from the uncontrolled escape of shielding gas

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Shielding gas is colourless and odourless and, in the event of a leak, can displace the oxygen in the ambient air.

- Ensure an adequate supply of fresh air with a ventilation rate of at least 20 m<sup>3</sup>/hour.
- Observe safety and maintenance instructions on the shielding gas cylinder or the main gas supply.
- Close the shielding gas cylinder valve or main gas supply if no welding is taking place.
- Check the shielding gas cylinder or main gas supply for uncontrolled gas leakage before every start-up.

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**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 there is an all-round clearance of 0.5 m (1 ft. 7.69 in.) to ensure that cooling air can flow in and out freely.

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.

Do not lift or transport operational devices. Switch off devices before transport or lifting.

Before transporting the device, allow coolant to drain completely and detach the following components:

- Wirefeeder
- Wirespool
- Shielding gas cylinder

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.

Always fasten the shielding gas cylinder securely and remove it beforehand if the device is to be transported by crane.

Only the manufacturer's original coolant is suitable for use with our devices due to its properties (electrical conductivity, anti-freeze agent, material compatibility, flammability, etc.).

Only use suitable original coolant from the manufacturer.

Do not mix the manufacturer's original coolant with other coolants.

Only connect the manufacturer's system components to the cooling circuit.

The manufacturer accepts no liability for damage resulting from use of other system components or a different coolant. In addition, all warranty claims will be forfeited.

Cooling Liquid FCL 10/20 does not ignite. The ethanol-based coolant can ignite under certain conditions. Transport the coolant only in its original, sealed containers and keep well away from any sources of ignition.

Used coolant must be disposed of properly in accordance with the relevant national and international regulations. The coolant safety data sheet may be obtained from your service centre or downloaded from the manufacturer's website.

Check the coolant level before starting to weld, while the system is still cool.

---

**Commissioning, 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.

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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.

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**Safety inspection**

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

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The manufacturer recommends that the power source be calibrated during the same 12-month period.

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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.

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

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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 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!

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**Safety symbols**

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

Fronius International GmbH hereby declares that the device is compliant with Directive 2014/53/EU. The full text on the EU Declaration of Conformity can be found at the following address: <http://www.fronius.com>

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

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**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.

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**Copyright**

Copyright of these operating instructions remains with the manufacturer.

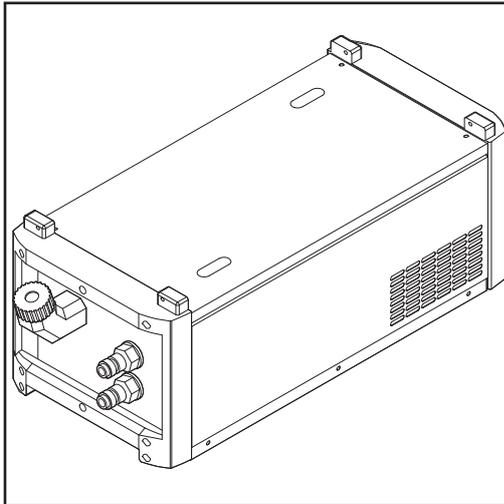
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The text and illustrations are all technically correct at the time of printing. We reserve the right to make changes. The contents of the operating instructions shall not provide the basis for any claims whatsoever on the part of the purchaser. If 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

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## Device concept



Five cooling units are available for cooling the power sources listed below:

- FK 4000 with oscillating armature pump and auto-transformer
- FK 4000 R with centrifugal pump
- FK 4000 R FC with centrifugal pump and flow sensor with coolant filter
- FK 4000 R US with centrifugal pump, auto-transformer and flow sensor with coolant filter
- FK 4000 Rob with magnetically-coupled centrifugal pump, flow sensor with coolant filter and thermostat

The cooling units described in these instructions can be operated with all power sources in the:

- TransSynergic 4000 / 5000 series
  - TransPuls Synergic 2700 series
  - TransPuls Synergic 3200 / 4000 / 5000 series
  - TransTig 2200 / 4000 / 5000 series
  - MagicWave 1700 / 2200 / 4000 / 5000 series
- 

## Scope of supply

- Cooling unit
  - 5 l coolant in a canister
  - Four Allen screws (for securing the power source on the cooling unit)
  - Four M5 nuts (for securing the power source on the cooling unit)
  - One 2 A fuse (spare)
  - Operating instructions
- 

## Validity of "General Delivery and Payment Conditions"

With regard to cooling units, the "General Delivery and Payment Conditions" according to the price list only apply under the following conditions:

- Max. 8 hrs/day operation (single-shift operation) / FK 4000 Rob: 24 hrs/day operation (three-shift operation)
  - Only original coolant from the manufacturer is used
  - Regular maintenance and regular change of coolant
- 

## Information about the coolant



### CAUTION!

#### **Danger from using non-permitted coolant.**

This can result in serious damage to property.

- ▶ Only use coolant available from the manufacturer.
  - ▶ Do not mix different coolants.
  - ▶ When changing the coolant, make sure all the coolant is replaced.
  - ▶ When switching from ethanol-based coolant to FCL 10 coolant, Change Kit FCL10 must be used and the instructions provided must be followed.
-

**Information on leaks**

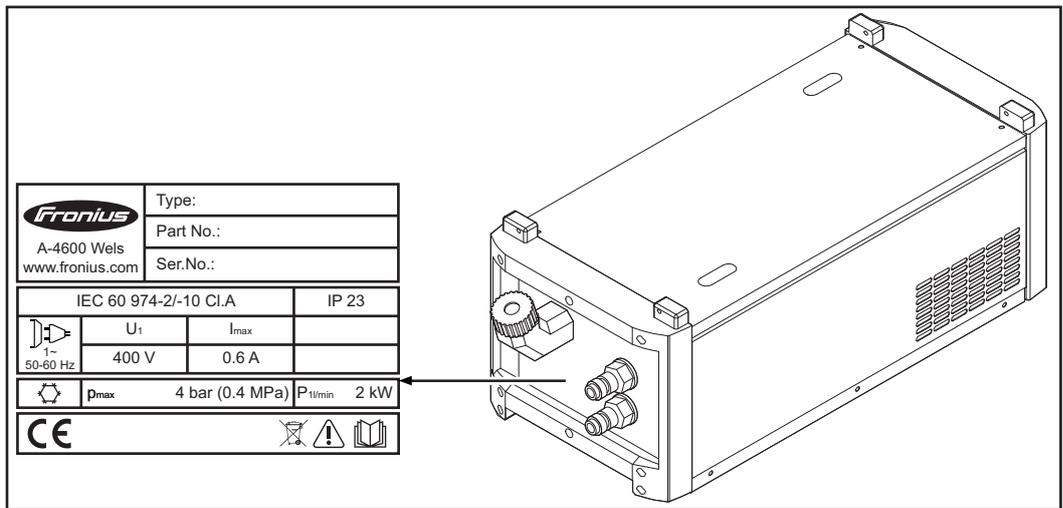
The following information on leaks does not apply to the FK 4000 Rob.

The shaft sealing surfaces inside the coolant pump are lubricated by the coolant, meaning that a certain leakage flow should always be expected. A low leakage flow is permitted.

The coolant pump requires a certain warm-up time after being started for the first time or upon restarting after a long period of downtime. An increased leakage flow can occur during this warm-up phase. The leakage flow will normally sink back down to a low level after the warm-up phase. If this is not the case then contact After-Sales Service.

**Warning notices on the device**

The cooling unit is fitted with safety symbols and a rating plate. The rating plate and safety symbols must not be removed or painted over. The symbols warn against operating the equipment incorrectly, as this may result in serious injury and damage.



- Welding is dangerous. The following basic requirements must be met to ensure the equipment is used properly:
- Welders must be sufficiently qualified
  - Suitable protective equipment must be used
  - All persons not involved must be kept at a safe distance from the cooling unit and the welding process

- 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

- Do not dispose of used devices with domestic waste. Dispose of them according to the safety rules.

# Application areas

---

## FK 4000

The cooling unit is recommended for use with:

- TransPuls Synergic 2700
- TransSynergic 4000 and TransPuls Synergic 4000, max. length of the interconnecting hosepack 5 m (16 ft. 5 in.)
- TransSynergic 5000 and TransPuls Synergic 5000, max. length of the interconnecting hosepack 1.2 m (4 ft.)

### **NOTE!**

**The cooling unit is supplied with the auto-transformer FK 4000 option as standard.**

---

## FK 4000 R, FK 4000 Rob, FK 4000 R FC, FK 4000 R US

The cooling units are recommended for use with:

- TransSynergic 4000 and TransPuls Synergic 4000, length of the interconnecting hosepack over 5 m (16 ft. 5 in.)
- TransSynergic 5000 and TransPuls Synergic 5000, length of the interconnecting hosepack over 1.2 m (4 ft.)
- PullMig or PushPull hosepacks
- Multilock hosepacks
- Robacta machine hosepacks
- Robacta or Robacta Drive robot hosepacks
- TIME and JobMaster welding torches
- MIG/MAG pulsed arc welding
- Welding in a higher power range
- Robot welding

Additional information for FK 4000 R FC:

- The flow sensor with coolant filter option is fitted as standard in the cooling unit

Additional information for FK 4000 Rob:

- The flow sensor with coolant filter option is fitted as standard in the cooling unit
- The thermostat option is fitted as standard in the cooling unit

Additional information for FK 4000 R US:

- The flow sensor with coolant filter option is fitted as standard in the cooling unit
- The FK 4000 auto-transformer option is fitted as standard in the cooling unit
- The cooling unit is intended for the American market. The other cooling units are not available on the American market

# Options

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## **FK 4000 auto-transformer**

This option is available for the following devices:

- FK 4000 R
- FK 4000 Rob
- FK 4000 R FC

The FK 4000 and FK 4000 R US cooling units are equipped with the FK 4000 auto-transformer option as standard.

- The FK 4000 auto-transformer is required if the cooling unit must be operated using a multivoltage power source (MV). The multivoltage power source has an input voltage of 3 x 200 - 240 V / 3 x 380 - 460 V (+/- 10%)
- The FK 4000 auto-transformer converts this voltage from the power source into what the cooling unit needs

---

## **FK 4000 R flow sensor with coolant filter**

This option is available for the following devices:

- FK 4000 - only if the interconnecting hosepack does not exceed a length of 5 m (16 ft. 5 in.)
- FK 4000 R

The FK 4000 R US, FK 4000 R FC and FK 4000 Rob cooling units are fitted with the flow sensor with coolant filter option as standard.

How it works:

- The option monitors the coolant flow during welding
- If the coolant flow falls below 0.7l/min (0.18 gal./min), "no | H2" is automatically displayed, the welding current is interrupted and the cooling unit switches off
- If the welding system has a Comfort or WeldProcessData (OPC Fronius LocalNet server) control panel, the coolant flow can be shown on it
  - To display the coolant flow value, press the F3 parameter selection / indicator key on the Comfort control panel

A disruption in the coolant flow can occur as a result of:

- Insufficient coolant
- Contaminated coolant
- Leaks in the cooling circuit
- Faulty coolant pump
- Frozen coolant (welding at too low a temperature)

---

## **Thermostat**

This option is available for the following devices:

- FK 4000
- FK 4000 R
- FK 4000 R FC
- FK 4000 R US

The FK 4000 Rob cooling unit has a thermostat option as standard.

- The thermostat option monitors the coolant temperature
- If the coolant temperature rises to above 70°C (185°F), the "hot | H2" indicator is automatically displayed and the welding current is interrupted. The cooling unit remains operational
- The thermostat restores the welding current when the temperature falls to 65°C (149°F).

---

**Coolant filter**

The coolant filter is equipped with a CrNi screen; its function is to filter dirt particles above 100 micrometres in size from the coolant. This ensures that no coarse dirt particles can pass into the coolant circuit. The coolant filter is fitted to the coolant return connection on the cooling unit.

# Control elements and connections

## Safety

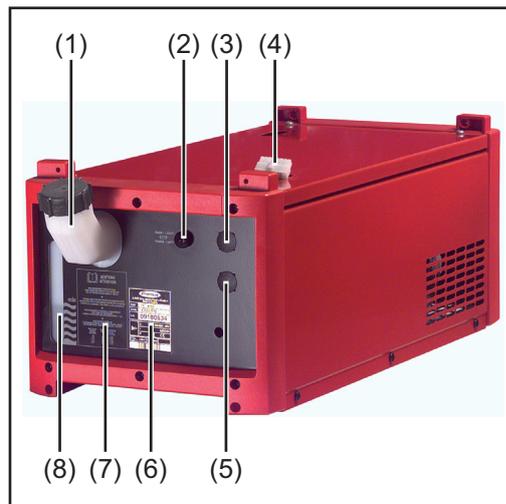
**⚠ WARNING!**

**Operating the equipment incorrectly can cause serious injury and damage.**

All functions described in this document must only be used by trained and qualified personnel. Do not use any of the functions described until you have thoroughly read and understood the following documents:

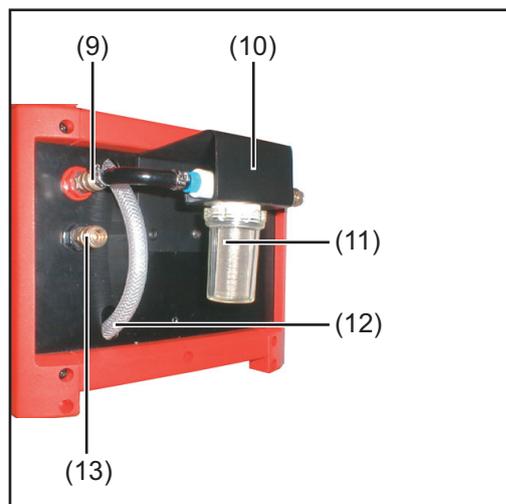
- ▶ this document
- ▶ all the operating instructions for the system components, especially the safety rules

## Control elements and connections



No.	Function
(1)	Fill nozzle with screw cap
(2)	Fuse for coolant pump
(3)	Blanking cover or coolant return connection (red)
(4)	Connector
(5)	Blanking cover or coolant flow connection (blue)

(6)	Rating plate
(7)	Operating and maintenance instructions
(8)	Viewing window for coolant level



(9)	Blanking cover or coolant return connection (red)
(10)	Mounting plate for coolant filter (included in scope of supply of flow sensor with coolant filter option)
(11)	Coolant filter (included in scope of supply of flow sensor with coolant filter option)
(12)	Drain hose

(13)	Blanking cover or coolant flow connection (blue)
------	--

# Before installation and commissioning

---

## Safety



### WARNING!

#### **Danger due to incorrect operation and incorrectly performed work.**

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 and used by trained and qualified personnel.
  - ▶ Fully read and understand this document.
  - ▶ Fully read and understand all the Operating Instructions for the system components, especially the safety rules.
- 

## Setup regulations



### WARNING!

#### **Danger from machines falling or toppling over.**

This can result in severe personal injury and damage to property

- ▶ Place all system components on a solid, level surface in such a way that they remain stable.
- 



### WARNING!

#### **Danger from electric current.**

An electric shock can be fatal.

- ▶ Ensure the cooling unit is properly insulated.
  - ▶ Always ensure that there is no electrically conductive connection between the base plate of the cooling unit and the surface.
  - ▶ Before installing the cooling unit, remove all electrically conductive parts between the base plate of the cooling unit and the surface.
- 

The device is tested to IP 23 protection, meaning:

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

#### **Cooling air**

The system must be set up in such a way that the cooling air can flow unimpeded through the slots in the side panels. Ensure that there is always an all-round clearance of 0.5 m (1 ft 7.69 in.) around the device.

### NOTE!

#### **Risk from insufficient cooling air supply.**

This can result in serious damage to property.

- ▶ Air inlets and outlets must never be covered, not even partially.
- 

#### **Dust**

Ensure that no metallic dust, for example from grinding work, is sucked into the system by the fan.

#### **Outdoor operation**

The device can be set up and operated outdoors in accordance with degree of protection IP23. Avoid direct wetting (e.g. from rain).

---

**Information about the coolant**

The cooling unit is delivered empty.

Use only original Fronius coolant (Cooling Liquid FCL 10/20 or torch coolant) when filling the cooling unit. Other coolants are not recommended for electrical conductivity and material compatibility reasons.

---

**Guarantee provisions regarding the coolant pump**

The coolant pump may only be used with original coolant supplied by the manufacturer. Do not allow the coolant pump to run dry (even for a very short time), as this will destroy the coolant pump. The manufacturer accepts no liability for damage caused in such cases.

---

**Proper use**

The device is intended solely for use in conjunction with Fronius system components.

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

Any use above and beyond this purpose is deemed improper. The manufacturer is not liable for any damage, or unexpected or incorrect results arising out of such misuse.

Proper use also includes:

- carefully reading these operating instructions
- following all the instructions and safety rules in these operating instructions
- performing all stipulated inspection and maintenance 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.

# Fitting coolant connections to the front of the unit

---

## Safety



### WARNING!

**An electric shock can be fatal.**

Before starting work:

- ▶ turn the power source mains switch to the "O" position
- ▶ disconnect the power source from the mains
- ▶ ensure that the power source remains disconnected from the mains until all work has been completed

After opening the device, use a suitable measuring instrument to check that electrically charged components (e.g. capacitors) have been discharged.



### WARNING!

**An inadequate ground conductor connection can cause serious injury or damage.**

The housing screws provide a suitable ground conductor connection for earthing the housing and must NOT be replaced by any other screws that do not provide a reliable ground conductor connection.

---

## General

The coolant connections can be installed either at the front of the cooling unit or at the rear, thanks to the different central connectors.

When using the cooling unit with a TPS 2700, the coolant connections are to be moved from the rear to the front of the cooling unit.

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## Fitting coolant connections to the front of the unit

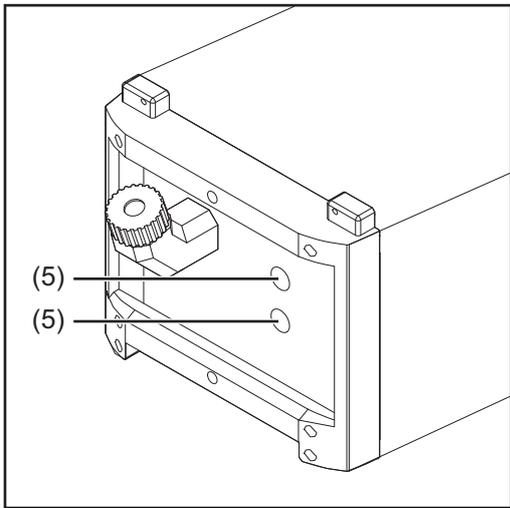
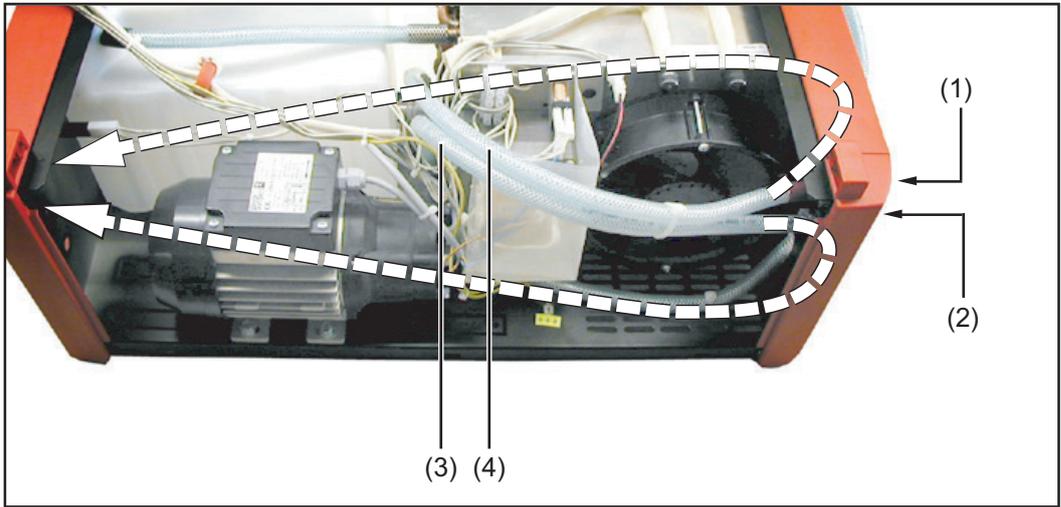
### NOTE!

**Make sure that no coolant enters the device.**

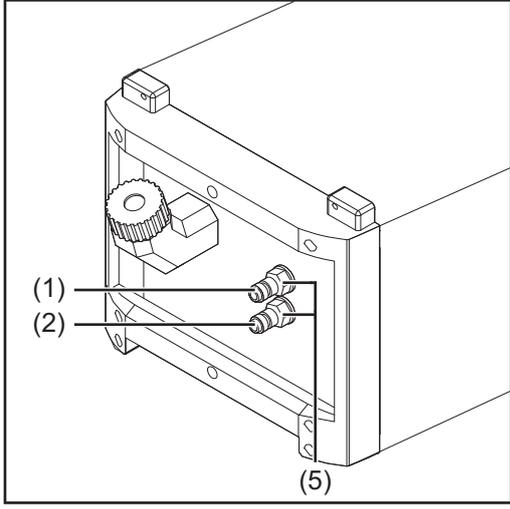
If there is any coolant on the exterior of the device, remove it immediately.

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- 1 Disconnect the cooling unit from all system components and ensure that it remains so for the duration of all work
- 2 Unscrew the three screws from the right side panel (as seen from the front) of the cooling unit and remove the side panel
- 3 Unscrew the plastic nuts from the coolant connections (1) and (2)
- 4 Route hoses for coolant return (3) and coolant flow (4) to the front panel



**5** Remove blanking covers (5) from the front and attach to the rear



**NOTE!**

Fit the coolant return connection (1) at the top and secure using the red plastic nut (coolant return is indicated by red insulating tape).

**6** Feed the coolant connection (1) and (2) from the inside outwards through the housing and secure to the front of the unit using the previously unscrewed plastic nuts

**7** Fit the side panel to the cooling unit and secure using three screws

# Adapting the cooling unit to the respective mains voltage

---

## Safety



### WARNING!

**An electric shock can be fatal.**

Before starting work:

- ▶ turn the power source mains switch to the "O" position
- ▶ disconnect the power source from the mains
- ▶ ensure that the power source remains disconnected from the mains until all work has been completed

After opening the device, use a suitable measuring instrument to check that electrically charged components (e.g. capacitors) have been discharged.



### WARNING!

**An inadequate ground conductor connection can cause serious injury or damage.**

The housing screws provide a suitable ground conductor connection for earthing the housing and must NOT be replaced by any other screws that do not provide a reliable ground conductor connection.

---

## General

The TS 4000 MV / 5000 MV and TPS 2700 MV / 4000 MV / 5000 MV power sources can be operated as standard at a mains voltage of 3 x 200-240V / 3 x 380-460V (+/-10%). The mains voltage switching in the power source takes place automatically.

The cooling units are factory-configured for the following mains voltages:

FK 4000	=	3 x 230 / 400 V, 50 / 60 Hz, +/-10%
FK 4000 R	=	3 x 400 V, 50 / 60 Hz, +/-10%
FK 4000 Rob	=	3 x 400 V, 50 / 60 Hz, +/-10%
FK 4000 R FC	=	3 x 400 V, 50 / 60 Hz, +/-10%
FK 4000 R US	=	3 x 230 / 460 V, 50 / 60 Hz, +/- 10%

The cooling units are adapted accordingly for other mains voltages with the help of an auto-transformer.

### NOTE!

**The auto-transformer is available as an option for the FK 4000 R, FK 4000 Rob and FK 4000 R FC cooling units.**

For the FK 4000 and FK 4000 R US cooling units, the auto-transformer is fitted as standard.

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**Possible mains voltages for FK 4000, FK 4000 R, FK 4000 Rob and FK 4000 R FC**

The auto-transformer in the FK 4000, FK 4000 R and FK 4000 Rob cooling units can be configured for the following mains voltages:

- 3 x 200 / 400 V
- 3 x 200 / 440 V
- 3 x 200 / 460 V
- 3 x 230 / 400 V (= factory configuration)
- 3 x 230 / 440 V
- 3 x 230 / 460 V

Mains frequency in each case 50 / 60 Hz, mains voltage tolerance +/- 10%.

---

**Possible mains voltages for FK 4000 R US**

The auto-transformer in the FK 4000 R US cooling unit can be configured for the following mains voltages:

- 3 x 200 / 400 V
- 3 x 200 / 440 V
- 3 x 200 / 460 V
- 3 x 230 / 400 V
- 3 x 230 / 440 V
- 3 x 230 / 460 V (= factory configuration)

Mains frequency in each case 50 / 60 Hz, mains voltage tolerance +/- 10%.

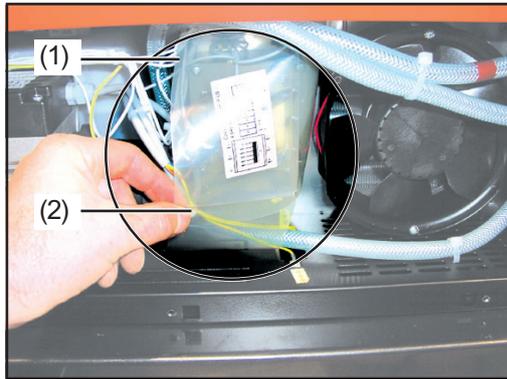
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**Adapting the cooling unit to the respective mains voltage**

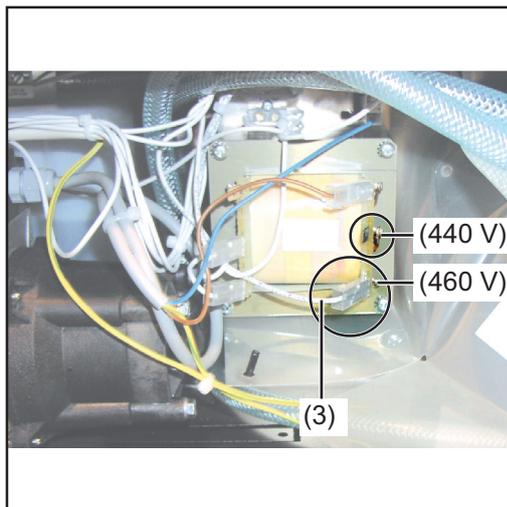
**NOTE!**

To adapt the FK 4000 R, FK 4000 Rob and FK 4000 R FC cooling units for the respective mains voltage, the optional auto-transformer must be installed on the cooling unit.

---



Remove plastic film



Change the auto-transformer connections (example shows FK 4000 R US)

- 1 Ensure that the cooling unit is disconnected from all system components and remains so for the duration of all work
- 2 Unscrew the three screws from the right side panel (as seen from the front) of the cooling unit and remove the side panel
- 3 Loosen and remove the plastic film (1) on the clip (2)
- 4 Change the auto-transformer connections according to the circuit diagram: connect the white cable (3) to the required mains voltage (the image to the left shows the reconnection of the auto-transformer using the FK 4000 R US as an example. The reconnection is carried out in the same way for other units; only the possible voltages differ.
  - In the circuit diagram for the unit, the factory configuration is shown by a solid line and the other options by a dashed line. The circuit diagram can be found on the inside of the side panel.

# Fitting the cooling unit to the trolley

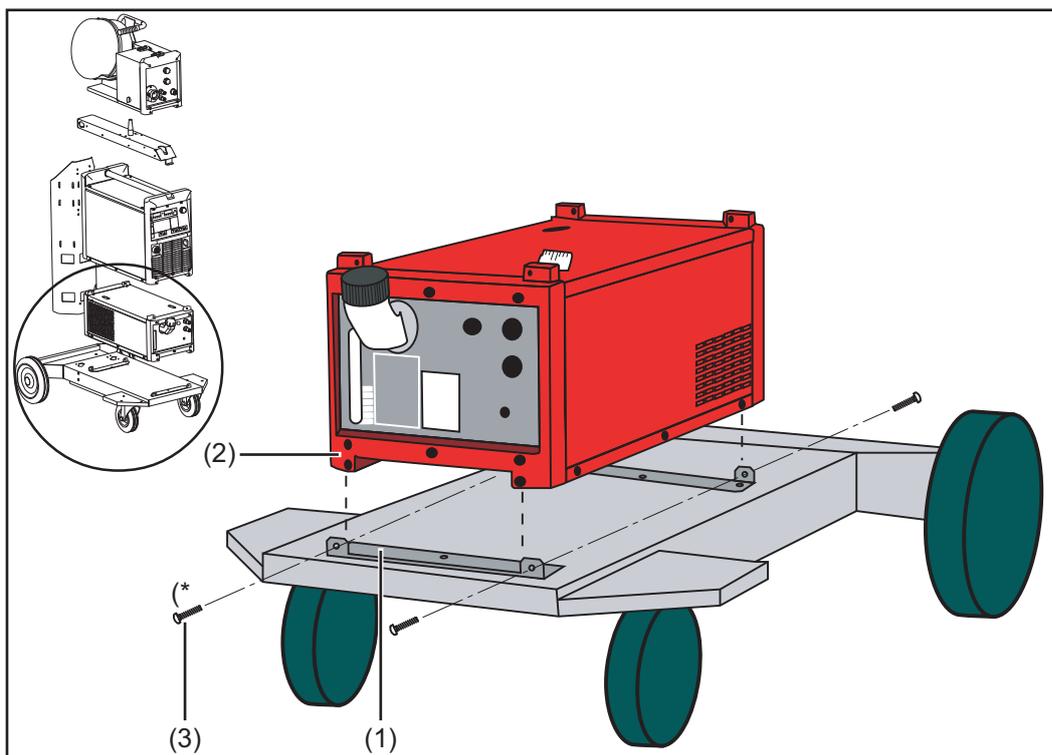
## General

The welding system can be fitted to a trolley to make the entire system more mobile.

### NOTE!

If the welding system is not equipped with an auto-transformer, the cooling unit must be installed right at the bottom.

## Fitting the cooling unit to the trolley



- 1 Place the cooling unit on the trolley base and fixing bracket (1)

### NOTE!

The fixing brackets must be placed within the plastic feet (2) of the cooling unit.

- 2 Secure the cooling unit to the fixing brackets using the four TX 25 screws provided (3), two at the front and two at the back

(\* Trolley scope of supply)

# Connecting the cooling unit to the power source

## Safety



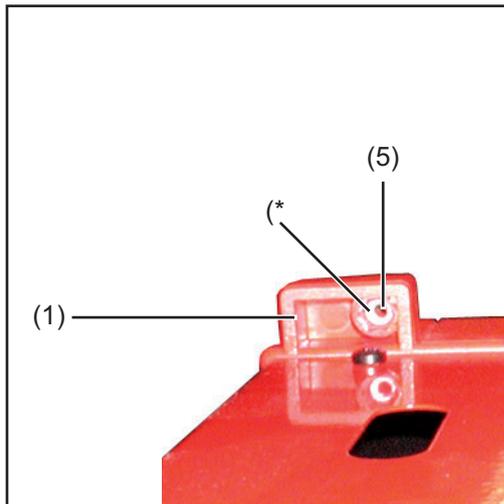
### WARNING!

#### Danger from electric current.

An electric shock can be fatal.

- ▶ Turn the power source mains switch to the "O" position.
- ▶ Disconnect the power source from the mains.
- ▶ Ensure that the power source remains disconnected from the mains until all work has been completed.

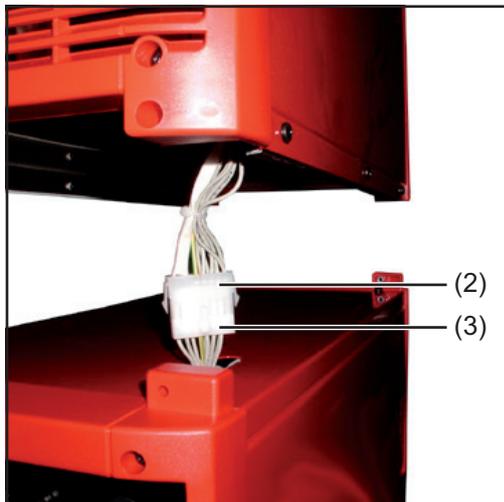
## Connecting the cooling unit to the power source



**1** Insert the M5 nuts provided (5) into the hexagon-shaped openings on the fixing bars (1) from the inside

**2** Unscrew the TX 25 screws from the protective cover on the underside of the power source and remove the protective cover (if present)

(\* Cooling unit scope of supply



**3** Pull the power source connector (2) as far out of the power source as possible

**4** Position the power source above the cooling unit

**5** Connect the power source connector (2) to the cooling unit connector (3)



### CAUTION!

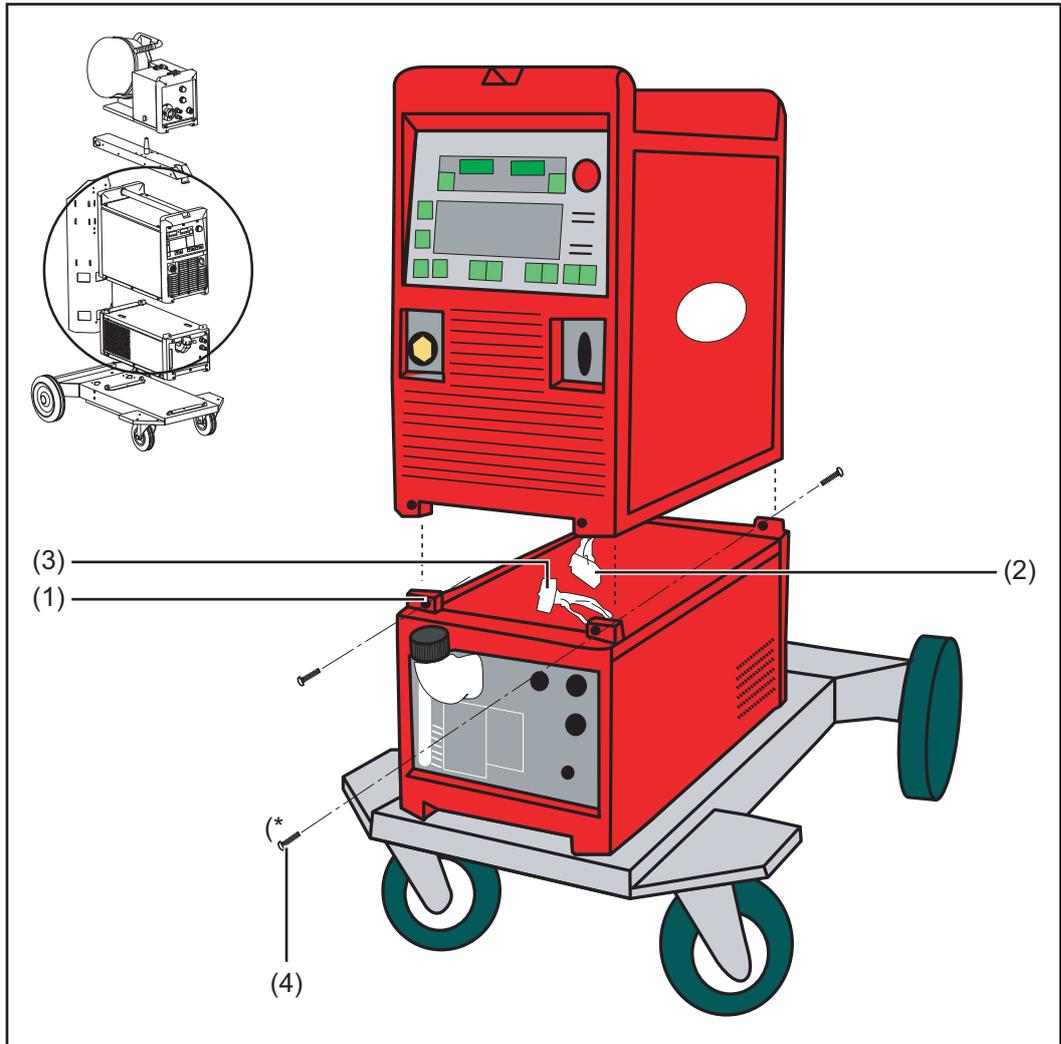
#### Risk of short circuit from kinked or damaged cables.

When positioning the power source, ensure that the cable is not kinked.

**NOTE!**

When positioning the power source, the cooling unit fixing bars must be placed within the plastic feet of the power source.

- 6 Placing the power source on the cooling unit
- 7 Secure the power source to the cooling unit fixing bars using the Allen screws provided (4), two at the front and two at the back



# Connecting the hosepacks to the cooling unit

## Safety



### WARNING!

#### Danger from electric current.

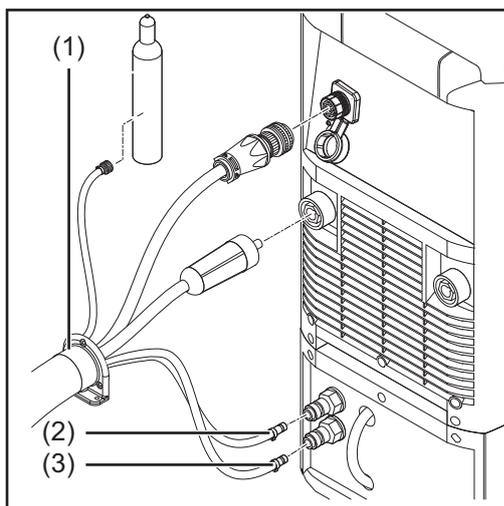
An electric shock can be fatal.

- ▶ Turn the power source mains switch to the "O" position.
- ▶ Disconnect the power source from the mains.
- ▶ Ensure that the power source remains disconnected from the mains until all work has been completed.

Connect the interconnecting hosepack coolant hoses to the cooling unit (TS/TPS 4000/5000)

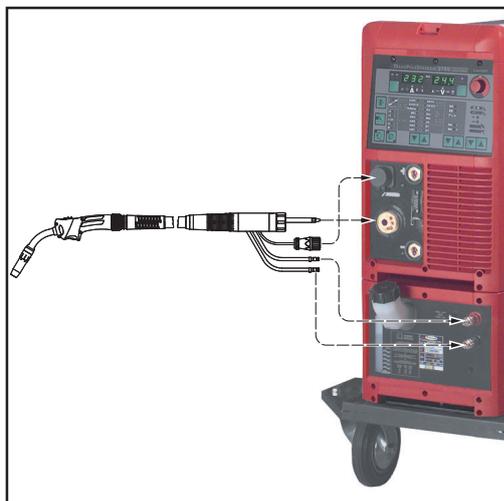
### NOTE!

For TS 4000 / 5000, TPS 3200 / 4000 / 5000 power sources, the power source (1) must be connected to the cooling unit using an interconnecting hosepack.



- 1 Plug in and secure the interconnecting hosepack strain-relief device (1) in the opening provided on the base of the trolley (see trolley operating instructions)
- 2 Connect the red hose from the interconnecting hosepack (2) to the coolant return connection on the cooling unit
- 3 Connect the blue hose from the interconnecting hosepack (3) to the coolant flow connection on the cooling unit

Connecting the welding torch coolant hoses to the cooling unit (TPS 2700)



### NOTE!

**A water-cooled welding torch with an external coolant connection is required for welding with a TPS 2700 power source and cooling unit.**

The coolant flow and return connections must be moved to the front of the cooling unit (see "Fitting coolant connections to the front of the unit").

- 1 Connect the red welding torch hose (2) to the coolant return connection on the cooling unit
- 2 Connect the blue welding torch hose (3) to the coolant flow connection on the cooling unit

# Putting the cooling unit into service

## Safety



### WARNING!

#### Danger from electric current.

An electric shock can be fatal.

- ▶ Turn the power source mains switch to the "O" position.
- ▶ Disconnect the power source from the mains.
- ▶ Ensure that the power source remains disconnected from the mains until all work has been completed.

## General

### NOTE!

#### The cooling unit is delivered without any coolant.

The coolant is supplied separately in a canister. Fill and bleed the cooling unit before start-up.

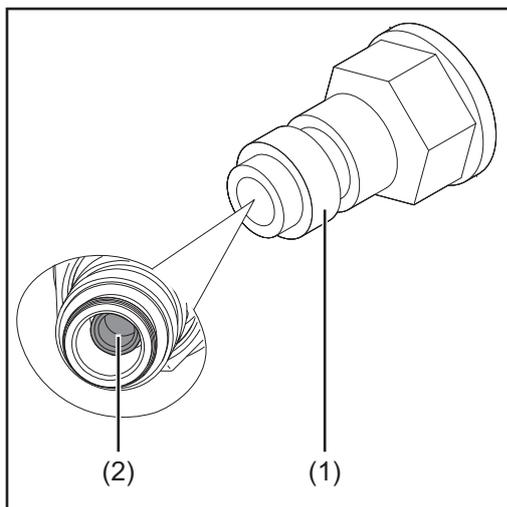
## Filling the cooling unit

### NOTE!

#### Make sure that no coolant enters the device.

If there is any coolant on the exterior of the device, remove it immediately.

- 1 Undo the screw cap on the fill nozzle



Locking ring on coolant flow connection, sealing cone inside coolant flow connection

- 2 Pull back the locking ring (1) on the coolant flow connection, disconnect the coolant hose and let go of the locking ring (1)
- 3 Carefully push back the sealing cone (2) in the centre of the coolant flow connection using a wooden or plastic pin ( $\varnothing = \text{max. } 6 \text{ mm} / 0.236 \text{ in.}$ ), until it audibly engages
- 4 Fill with fresh coolant
- 5 Pull back the locking ring (1) on the coolant flow connection to release the sealing cone (2) and then let go of the locking ring (1)

- 6 Connect the coolant flow connection hose to the coolant flow connection
- 7 Screw the screw cap onto the fill nozzle

---

**Commissioning  
the cooling unit**

**NOTE!**

**The coolant level and cleanliness of the coolant must always be checked before commissioning the cooling unit.**

---

- 1** Connect the power source to the mains
- 2** Turn the power source mains switch to the "I" position
  - The coolant pump starts up
- 3** Check the coolant flow until you can see a steady return flow of coolant through the fill nozzle

**NOTE!**

**During welding, check at regular intervals that the coolant is flowing properly.**  
You should be able to see a steady return flow of coolant through the fill nozzle.

---

# Care, maintenance and disposal

## Safety



### WARNING!

#### **Danger due to work that has been carried out incorrectly.**

All the work described below must only be carried out by trained and qualified personnel.

- ▶ Fully read and understand this document.
- ▶ Fully read and understand all the Operating Instructions for the system components, especially the safety rules.



### WARNING!

#### **Danger from electric current.**

An electric shock can be fatal.

- ▶ Turn the power source mains switch to the "O" position.
- ▶ Disconnect the power source from the mains.
- ▶ Ensure that the power source remains disconnected from the mains until all work has been completed.
- ▶ After opening the device, use a suitable measuring instrument to check that electrically charged components (e.g. capacitors) have been discharged.



### WARNING!

#### **Danger from inadequate ground conductor connection.**

This can result in severe personal injury and damage to property.

- ▶ The housing screws provide a suitable ground conductor connection for earthing the housing and must NOT be replaced by any other screws that do not provide a reliable ground conductor connection.



### CAUTION!

#### **Danger from hot coolant.**

This can result in severe scalds.

- ▶ Wait until the coolant has cooled down before carrying out any of the activities described below.

### NOTE!

#### **Risk from coolant leakage.**

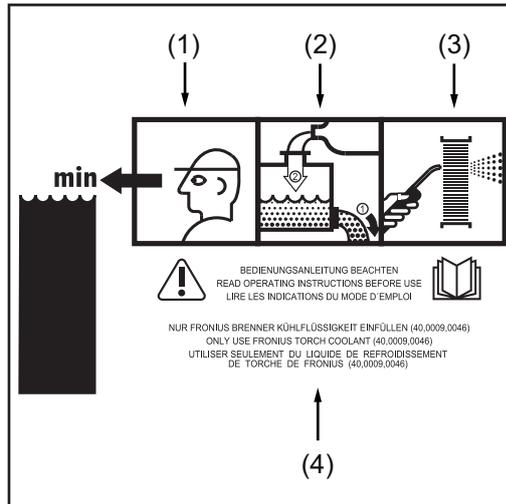
This can result in serious damage to property.

- ▶ Make sure that no coolant gets into the device.
- ▶ If there is any coolant on the exterior of the cooling unit, remove it immediately.

## General

Under normal operating conditions, the device requires only a minimum of care and maintenance. However, it is vital to observe some important points to ensure the welding system remains in a usable condition for many years.

**Symbols for care and maintenance of the cooling unit**



- (1) Check coolant level
- (2) Change the coolant
- (3) Gas purge the cooler
- (4) Read operating instructions

The relevant maintenance intervals and work are described in detail in the following pages.

**Maintenance intervals, maintenance work**

Maintenance interval	Maintenance work
At every start-up	<p><b>NOTE!</b></p> <p><b>Risk due to start-up without coolant.</b> This can result in serious damage to property.</p> <ul style="list-style-type: none"> <li>▶ If water-cooled system components are operated without coolant, this will normally result in the failure of the system components.</li> <li>▶ Fronius shall not be liable for any damage resulting from such action. In addition, no warranty claims will be entertained.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>- Ensure that all the hosepacks, the welding torch and the ground earth connection are undamaged</li> <li>- Check that there is an all-round clearance of 0.5 m (1 ft 7.69 in.) around the device to ensure that cooling air can flow in and out freely</li> <li>- Check the screw connections between all system components for tightness</li> <li>- Check all the coolant connections of the welding system for tightness</li> <li>- Monitor the coolant return flow in the coolant container               <ul style="list-style-type: none"> <li>- If no coolant is returning to the container, identify and remedy the cause</li> </ul> </li> </ul>

Every week	<ul style="list-style-type: none"> <li>- Check coolant level. If the coolant level is below the "min" mark, top up with coolant</li> <li>- Check the purity of the coolant. Change the coolant if necessary</li> </ul>
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**NOTE!**

**Risk from non-permitted coolant.**  
 This can result in serious damage to property.

- ▶ Use only original Fronius coolant (Cooling Liquid FCL 10/20 or torch coolant) when filling the cooling unit.
- ▶ Other coolants are not recommended for electrical conductivity and material compatibility reasons.

Every 2 months	<ul style="list-style-type: none"> <li>- If present: Check the coolant filter for dirt and clean if necessary</li> </ul>
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Every 6 months	<ul style="list-style-type: none"> <li>- Gas purge the cooler</li> </ul>
----------------	--

Every 6 months for 3-shift operation with ethanol-based coolant	<ul style="list-style-type: none"> <li>- Gas purge the cooler</li> <li>- Change the coolant</li> </ul>
---	--

Every 12 months for single-shift operation with ethanol-based coolant	<ul style="list-style-type: none"> <li>- Change the ethanol-based coolant</li> </ul>
---	--

Every 12 months in 3-shift operation with FCL 10/20 coolant	<ul style="list-style-type: none"> <li>- Change the coolant</li> </ul>
---	--

Every 24 months in single-shift operation with FCL 10/20 coolant	<ul style="list-style-type: none"> <li>- Change the coolant</li> </ul>
--	--

**Gas purge the cooler**



**Gas purging the cooler:**

**NOTE!**

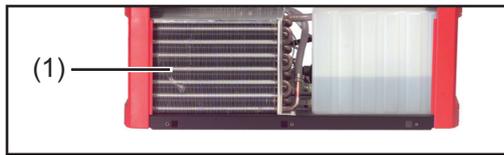
**For the sake of clarity, the cooling unit is shown in the following figures without the power source.**  
 However, the power source can remain on the cooling unit when gas purging the cooler. Always follow the instructions in the "Safety" section at the start of the "Care, maintenance and disposal" chapter.

**NOTE!**

**Risk of damage to electronic components.**

Do not bring air nozzle too close to electronic components.

---



- Remove the unit side panels and clean the cooler (1)

If a large amount of dust has accumulated:

- Remove device side panels and clean inside of device with dry reduced compressed air
- 

**Changing the coolant**



**Changing the coolant:**

**NOTE!**

**The coolant must not be disposed of in the public sewage system.**

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

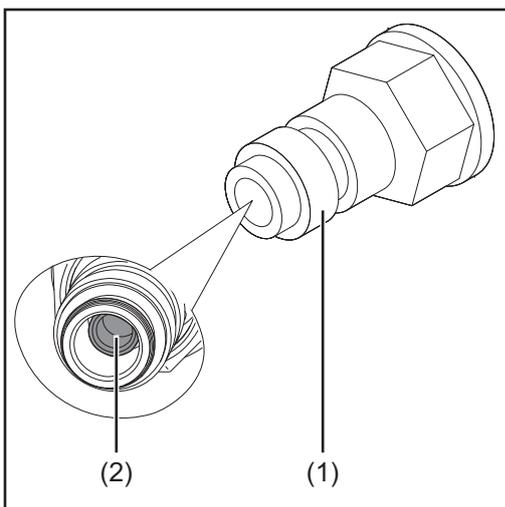
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**NOTE!**

**Use only original Fronius coolant when refilling the cooling unit.**

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- 1 Undo the screw cap on the fill nozzle
- 2 Place a suitable container underneath the cooling unit drain hose to catch the coolant
- 3 Pull the drain hose out of the upper recess of the cooling unit and hold it in the container
- 4 Remove the drain hose cap
- 5 Allow the coolant to flow into the container
- 6 Dispose of used coolant properly
- 7 Place the cap on the drain hose
- 8 Return the drain hose to its original position



Locking ring on coolant flow connection, sealing cone inside coolant flow connection

- 9 Pull back the locking ring (1) on the coolant flow connection, disconnect the coolant hose and let go of the locking ring (1)
- 10 Carefully push back the sealing cone (2) in the centre of the coolant flow connection using a wooden or plastic pin ( $\varnothing = \text{max. } 6 \text{ mm} / 0.236 \text{ in.}$ ), until it audibly engages
- 11 Fill to the "max" mark with fresh coolant
- 12 Pull back the locking ring (1) on the coolant flow connection to release the sealing cone again (2) and then let go of the locking ring (1)

- 13 Connect the coolant flow connection hose to the coolant flow connection
- 14 Screw the screw cap onto the fill nozzle

#### Notes on changing the welding torch

#### CAUTION!

#### Excess pressure will damage the cooling unit.

Before gas purging the welding torch with compressed air, undo the screw cap on the fill nozzle.

#### Disposal

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



# Troubleshooting



## Safety



### WARNING!

#### **Danger due to work that has been carried out incorrectly.**

This can result in severe personal injury and damage to property

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



### WARNING!

#### **Danger from electric current.**

An electric shock can be fatal.

- ▶ Turn the power source mains switch to the "O" position.
- ▶ Disconnect the power source from the mains.
- ▶ Ensure that the power source remains disconnected from the mains until all work has been completed.
- ▶ After opening the device, use a suitable measuring instrument to check that electrically charged components (e.g. capacitors) have been discharged.



### WARNING!

#### **Danger from inadequate ground conductor connections.**

This can result in severe personal injury and damage to property.

- ▶ The housing screws provide a suitable ground conductor connection for earthing the housing and must NOT be replaced by any other screws that do not provide a reliable ground conductor connection.



### CAUTION!

#### **Danger from hot coolant.**

This can result in severe scalds.

- ▶ Wait until the coolant has cooled down before carrying out any of the activities described below.

### NOTE!

#### **Risk from coolant leakage.**

This can result in serious damage to property.

- ▶ Make sure that no coolant gets into the device.
- ▶ If there is any coolant on the exterior of the cooling unit, remove it immediately.

## General

If the cooling unit is fitted with one of the following options, the relevant error message appears on the power source control panel:

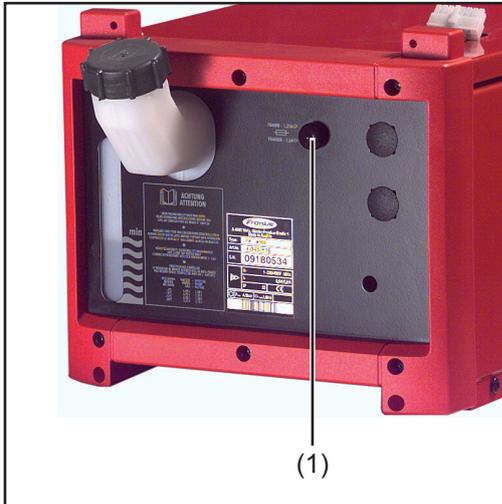
- Flow watchdog with coolant filter ... no | H2O (coolant flow error)
- Thermostat ... hot | H2O (coolant temperature too high)

---

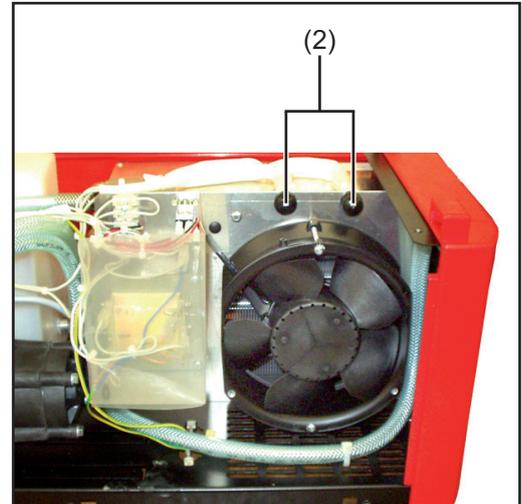
## Fuse-protecting the cooling unit

The cooling unit is protected by three fuses:

- Coolant pump fuse (1) on the front of cooling unit (fuse blows if the coolant pump becomes overloaded or blocked)
- Two fuses (2) inside the unit, above the fan (fuses blow if there is a short circuit to earth)



*Fuse on front of the unit*



*Fuses above the fan*

---

## Troubleshooting

Make a note of the serial number and configuration of the device and contact our After-Sales Service team with a detailed description of the error, if

- errors occur that are not listed below
- the troubleshooting measures listed are unsuccessful

---

**Insufficient or no coolant flow**

Cause: Coolant level too low

Remedy: Top up coolant

Cause: Constriction or foreign body in cooling circuit

Remedy: Remove constriction or foreign body

Cause: Coolant pump fuse defective

Remedy: Replace coolant pump fuse

Cause: Coolant contaminated

Remedy: Change the coolant

Cause: Coolant filter displaced when connecting coolant return

Remedy: Clean coolant filter using clean tap water or change filter element

Cause: Coolant pump is jammed (FK 4000 R, FK 4000 R US and FK 4000 Rob only)

Remedy: Turn coolant pump shaft (see operating instructions, "Turning coolant pump shaft" section). Contact after-sales service if the coolant pump shaft proves impossible to turn

Cause: Coolant pump defective

Remedy: Contact after-sales service

Cause: Permitted duty cycle exceeded

Remedy: Wait until the end of the coolant pump cooling phase

Cause: Flow sensor has tripped, requesting parameter F3 from the welding system shows that there is nothing flowing through: Coolant pump defective

Remedy: Contact after-sales service

Cause: Flow sensor has tripped, requesting parameter F3 on the power source shows that there is still a small amount flowing through: coolant hoses kinked or coolant filter displaced when connecting coolant return

Remedy: Repair coolant hoses, clean coolant filter using clean tap water or change filter element

---

**Insufficient cooling power**

Cause: Faulty fan

Remedy: Contact after-sales service

Cause: Coolant pump defective

Remedy: Contact after-sales service

Cause: Cooler contaminated

Remedy: Gas purge cooler with dry compressed air

Cause: Cooling capacity of connected cooling unit not high enough

Remedy: Use a cooling unit with a greater cooling power

---

**High operating noise level**

Cause: Coolant level too low

Remedy: Top up coolant

Cause: Coolant pump defective

Remedy: Contact After-Sales Service

---

**no | H2O**

The cooling unit flow sensor has tripped. The error message appears on the power source control panel.

Cause: Coolant flow problem

Remedy: Check coolant level, cleanliness and proper return;  
change coolant if necessary

Cause: Coolant filter displaced when connecting coolant return

Remedy: Clean coolant filter using clean tap water or change filter element

---

**hot | H2O**

The cooling unit thermostat has tripped. The error message appears on the power source control panel.

Cause: The coolant temperature is too high

Remedy: Wait until the end of the cooling phase, i.e. until "hot | H2O" is no longer displayed.

If using a ROB 5000 or field bus coupler for robot control: Before resuming welding, set the "Source error reset" signal.

---

# Twisting the coolant pump shaft

## Safety



### WARNING!

#### Danger due to work that has been carried out incorrectly.

This can result in severe personal injury and damage to property

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



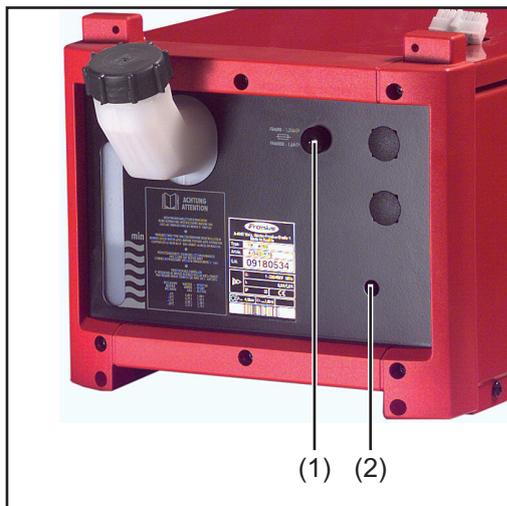
### WARNING!

#### Danger from electric current.

An electric shock can be fatal.

- ▶ Turn the power source mains switch to the "O" position.
- ▶ Disconnect the power source from the mains.
- ▶ Ensure that the power source remains disconnected from the mains until all work has been completed.

## Turning the coolant pump shaft



- 1 Remove the coolant pump fuse (1)
- 2 Insert a suitable slotted screwdriver from the outside through the coolant pump shaft bushing (2) and turn the coolant pump shaft
- 3 Contact after-sales service if the coolant pump shaft proves impossible to turn
- 4 Remove the slotted screwdriver
- 5 Replace the coolant pump fuse (1)

# Technical data

## General

The cooling capacity of a cooling unit depends on

- Ambient temperature
- Delivery head
- Flow rate Q (l/min) - The flow rate Q depends on the length of the interconnecting hosepack and the diameter of the hose.

## FK 4000

Mains voltage	3 x 230 / 400 V AC
Mains voltage tolerance	-10% / +10%
Mains frequency	50 / 60 Hz
Current consumption	0.9 A / 0.6 A
Cooling power at Q = 1 l/min + 25°C (77°F) Q = 1 l/min + 40°C (104°F)	1120 W 700 W
Max. delivery head	5 m 16 ft. 5 in.
Max. delivery rate	1.6 l/min 0.35 gal./min
Max. pump pressure	4 bar 58 psi
Pump	Oscillating armature pump
Pump service life	approx. 3,000 hrs
Coolant quantity	5.5 l 1.21 gal.
Protection class	IP 23
Dimensions l/w/h	725/290/230 mm 28.54/11.42/9.06 in.
Weight (without coolant)	14.1 kg 31.09 lb.
Mark of conformity	CE

## FK 4000 R, FK 4000 R FC

Mains voltage	3 x 400 V AC
Mains voltage tolerance	-10% / +10%
Mains frequency	50 / 60 Hz
Current consumption	0.6 A
Cooling power at Q = 1 l/min + 25°C (77°F) Q = 1 l/min + 40°C (104°F)	1360 W 870 W
Max. delivery head	33 m 108 ft. 3.24 in.
Max. delivery rate	3.5 l/min 0.77 gal./min
Max. pump pressure	4 bar 58 psi
Pump	Centrifugal pump

Pump service life	approx. 10,000 hrs
Coolant quantity	5.5 l 1.21 gal.
Protection class	IP 23
Dimensions l/w/h	725/290/230 mm 28.54/11.42/9.06 in.
Weight (without coolant)	13.3 kg 29.32 lb.
Mark of conformity	CE

**FK 4000 Rob**

Mains voltage	3 x 400 V AC
Mains voltage tolerance	-10% / +10%
Mains frequency	50 / 60 Hz
Current consumption	0.6 A
Cooling power at Q = 1 l/min + 25°C (77°F) Q = 1 l/min + 40°C (104°F)	1360 W 870 W
Max. delivery head	33 m 108 ft. 3.24 in.
Max. delivery rate	3.5 l/min 0.77 gal./min
Max. pump pressure	4 bar 58 psi
Pump	Centrifugal pump
Pump service life	approx. 15,000 hrs
Coolant quantity	5.5 l 1.21 gal.
Protection class	IP 23
Dimensions l/w/h	725/290/230 mm 28.54/11.42/9.06 in.
Weight (without coolant)	13.3 kg 29.32 lb.
Mark of conformity	CE

**FK 4000 R US**

Mains voltage	200 - 230 / 400 - 460 V AC
Mains voltage tolerance	-10% / +10%
Mains frequency	50 / 60 Hz
Current consumption	1.3 A / 0.5 A
Cooling power at Q = 1 l/min + 25°C (77°F) Q = 1 l/min + 40°C (104°F)	1360 W 870 W
Max. delivery head	33 m 108 ft. 3.24 in.
Max. delivery rate	3.5 l/min 0.77 gal./min
Max. pump pressure	4 bar 58 psi

Pump	Centrifugal pump
Pump service life	approx. 10,000 hrs
Coolant quantity	5.5 l 1.21 gal.
Protection class	IP 23
Dimensions l/w/h	725/290/230 mm 28.54/11.42/9.06 in.
Weight (without coolant)	13.3 kg 29.32 lb.
Mark of conformity	CSA







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