/ Perfect Charging / **Perfect Welding** / Solar Energy

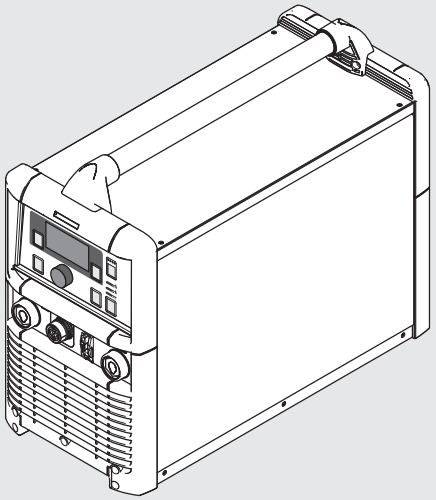
Fronius
SHIFTING THE LIMITS

TransTig 2200 / 2500 / 3000 / 4000 Comfort
MagicWave 2200 / 2500 / 3000 / 4000 Comfort

EN

Operating Instructions
Spare parts list

TIG Power source



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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.

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Safety rules

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" chapter, special care is required.

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 welding and
- read and follow these operating instructions carefully.

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 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.

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.

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.

Never use the device for the following purposes:
- Thawing out pipes
- Charging batteries
- Starting engines

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: -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)

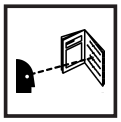
The surrounding air must be free from dust, acids, corrosive gases or substances, etc.
Can be used at altitudes of up to 2000 m (6561 ft. 8.16 in.)

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.

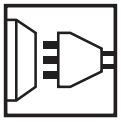
Obligations of personnel



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.

Mains connection



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

This may affect a number of types of device in terms of:
- connection restrictions
- criteria with regard to the maximum permissible mains impedance *)
- criteria with regard to the minimum short-circuit power requirement *)

*) 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.

NOTE! Ensure that the mains connection is earthed properly

Protecting yourself and others

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

- 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

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 (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 or
- erect suitable safety screens/curtains.

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.

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.

Danger from toxic gases and vapours

The fumes produced during welding contain harmful gases and vapours.

Welding fumes contain substances that may, under certain circumstances, cause birth defects or cancer.

Keep your face away from welding fumes and gases.

Fumes and hazardous gases
- must not be breathed in
- must be extracted from the working area using appropriate methods.

Ensure an adequate supply of fresh air.

Otherwise, a protective mask with an air supply must be worn.

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

If there is any doubt about whether the extraction system is powerful enough, then the measured toxic emission values should be compared with the permissible limit values.

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.

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

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

Danger from flying sparks

Flying sparks may cause fires or explosions.

Never weld close to flammable materials.

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

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

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.

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.

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.

Risks from mains current and welding current

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

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

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.

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

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. Loose connections, scorched, damaged or inadequately dimensioned cables and leads must be repaired/replaced immediately.

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

The electrode (rod electrode, tungsten electrode, welding wire, etc) must
- never be immersed in liquid for cooling
- never be touched 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.

If the device is operated on a mains supply without a ground conductor and using a socket without a ground conductor contact, this 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 wirespool 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.

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

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

Specific hazards

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

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

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

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

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.).

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

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

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.

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

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

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.

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

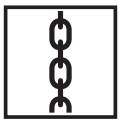
Observe the information on the coolant safety data sheet when handling coolant. The coolant safety data sheet may be obtained from your service centre or downloaded from the manufacturer's website.

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).

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.



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.

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.

Factors affecting welding results

The following requirements with regard to shielding gas quality must be met if the welding system is to operate in a correct and safe manner:
- Size of solid matter particles < 40 µm
- Pressure dew point < -20 °C
- Max. oil content < 25 mg/m³

Filters must be used if necessary.

NOTE! There is an increased risk of soiling if ring mains are being used

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.

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

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

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

Never hang a welding torch on a shielding gas cylinder.

Never touch a shielding gas cylinder with an electrode.

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

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.

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

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

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

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

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 escape unhindered.

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.

Before transporting the device, allow coolant to drain completely and detach the following components:
- Wire-feed unit
- 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 if 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 conductibility, 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.

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

The 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 and 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.

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

Safety inspection

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

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

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 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 affects on the environment and your health!

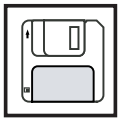
Safety symbols

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

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

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

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 information

General

Device concept

The MagicWave (MW) 2200 / 2500 / 3000 / 4000 Comfort and Trans-Tig (TT) 2200 / 2500 / 3000 / 4000 Comfort TIG power sources are completely digitised, microprocessor-controlled inverter power sources.

The modular design and potential for system add-ons ensure a high degree of flexibility. The devices can be adapted to any situation.

The power sources are generator-compatible. They are exceptionally sturdy in day-to-day operation thanks to the protected control elements and their powder-coated housings.

The TIG pulsed arc function, with its wide frequency range, is available on both the MagicWave and TransTig.

To optimise the ignition sequence in TIG AC welding, the MagicWave takes account not only of the diameter of the electrode, but also of its temperature, calculated with reference to the preceding welding and welding off-times.
RPI (**R**everse **P**olarity **I**gnition) ensures an excellent ignition response during TIG DC welding.

Functional principle

The central control and regulation unit of the power sources is coupled with a digital signal processor. The central control and regulation unit and signal processor control the entire welding process.
During the welding process, the actual data is measured continuously and the device responds immediately to any changes. Control algorithms ensure that the desired target state is maintained.

This results in:
- a precise welding process,
- exact reproducibility of all results
- excellent weld properties.

Field of application

The devices are used in workshops and industry for manual and automated TIG applications with unalloyed and low-alloy steel and high-alloy chrome-nickel steels.

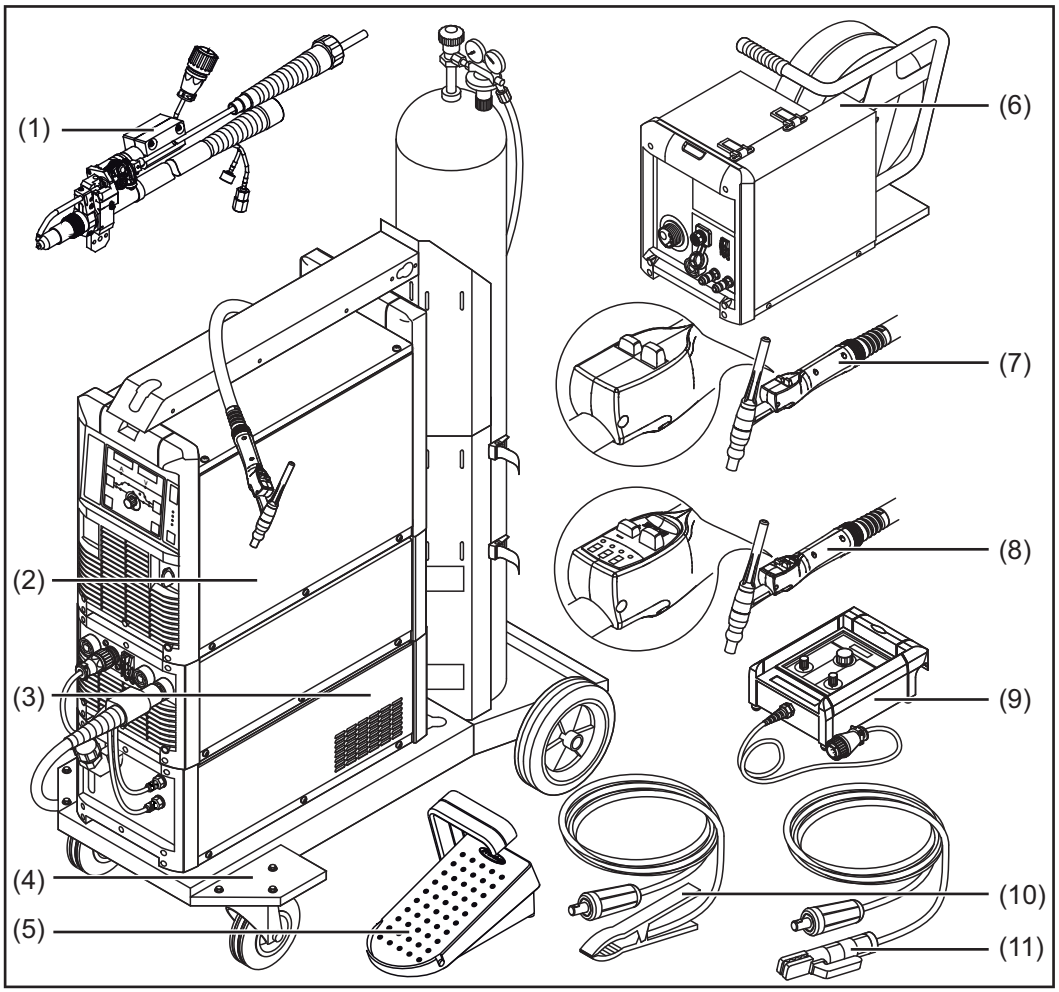
The MagicWave power sources perform exceptionally well when it comes to welding aluminium, aluminium alloys and magnesium due to the variable AC frequency.

System components

General

The TransTig and MagicWave power sources can be used with a wide variety of system add-ons and options.

Overview



System add-ons and options

Item	Description
(1)	TIG robot welding torch Cold wire feeders with wire drive
(2)	Power sources
(3)	Cooling units
(4)	Trolley with gas cylinder holder
(5)	Pedal remote control unit
(6)	Cold wire-feed unit
(7)	TIG welding torch Standard / Up/Down
(8)	JobMaster TIG welding torch
(9)	Remote control units and robot accessories
(10)	Grounding (earthing) cable
(11)	Electrode cable

Control elements and connections

Description of the control panels

General

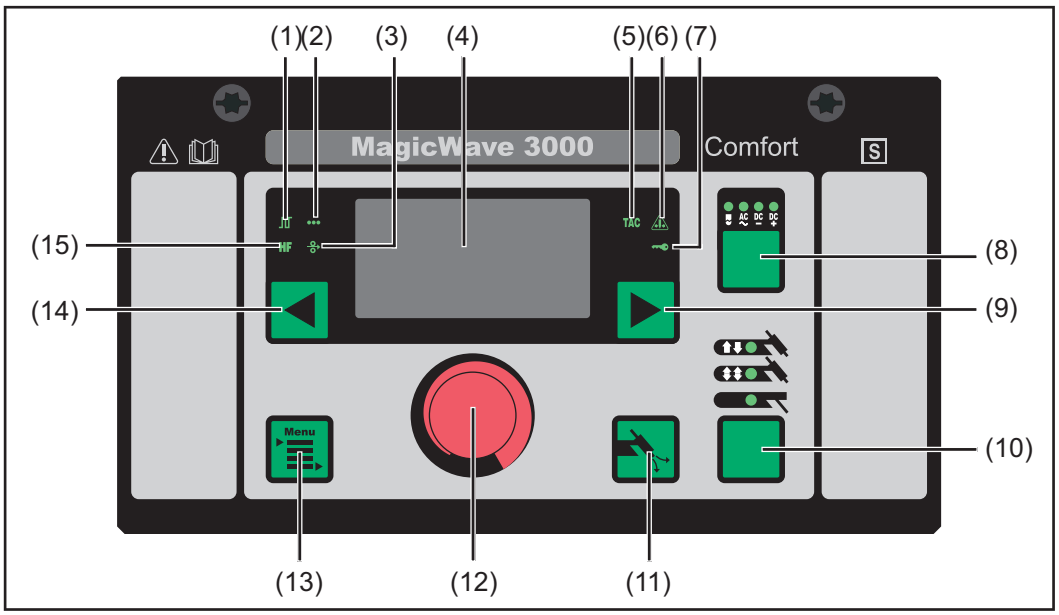
NOTE! Due to software updates, you may find that your device has certain functions that are not described in these operating instructions or vice versa. Individual illustrations may also differ slightly from the actual controls on your device, but these controls function in exactly the same way.

Safety

WARNING! Operating the equipment incorrectly can cause serious injury and damage. Do not use the functions described 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

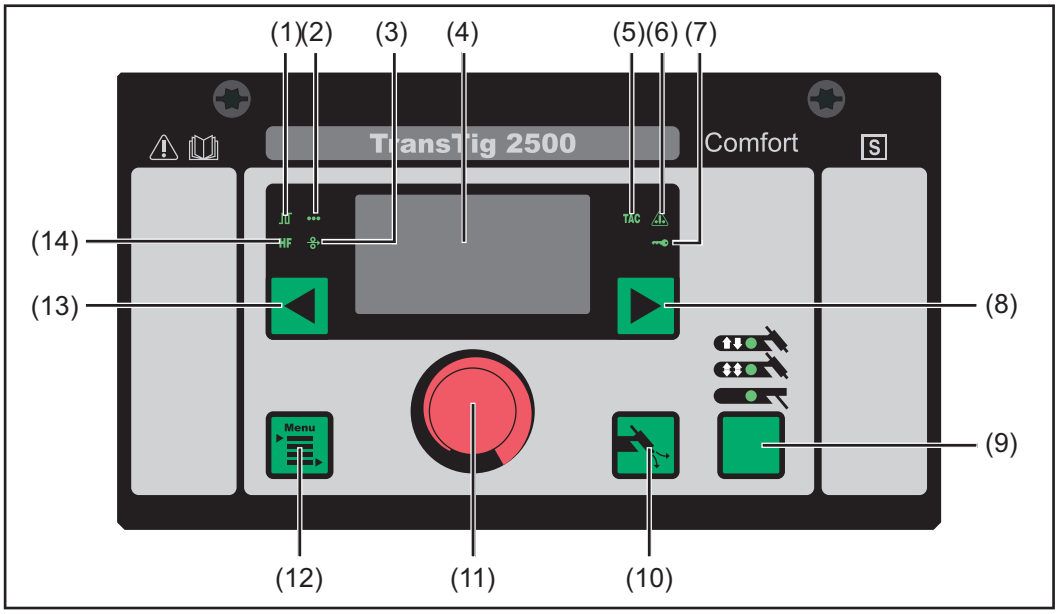
MagicWave Comfort control panel



No.	Function
(1)	**Pulse indicator** lights up when the F-P set-up parameter has been set to a pulse frequency
(2)	**Spot welding indicator** lights up when the SPt set-up parameter has been set to a spot welding time
(3)	**Cold wire-feed unit indicator** lights up when a cold wire-feed unit is connected
(4)	**Display**
(5)	**Tacking indicator** lights up when the tAC set-up parameter has been set to a period of time
(6)	**Electrode overload indicator** lights up if the tungsten electrode is overloaded See section on TIG welding in Chapter "Welding mode" for more information on the electrode overload indicator.
(7)	**Keylock indicator** lights up when the keylock is activated

No.	Function
(8)	**Process button** for selecting the welding process depending on the mode that has been chosen **2-step mode/4-step mode:**  automatic cap-shaping; only available in conjunction with TIG AC welding  TIG AC welding process  TIG DC- welding process Manual metal arc welding mode:  MMA AC welding process  MMA DC- welding process  MMA DC+ welding process When a process is selected, the LED on the relevant symbol lights up.
(9)	**Right arrow key** for navigating in the menu
(10)	**Mode button** for selecting the mode  2-step mode  4-step mode  Manual metal arc welding When a mode is selected, the LED on the relevant symbol lights up.
(11)	**Gas test button** for setting the required shielding gas flow rate on the gas pressure regulator After pressing this button, gas flows for 30 seconds. Press the button again to stop the gas flow prematurely.
(12)	**Adjusting dial** - Turn the adjusting dial to: select welding parameter - Press the adjusting dial to: confirm a selection in a menu, accept values
(13)	**Menu button** for calling up the menu in the selected process
(14)	**Left arrow key** for navigating in the menu
(15)	**HF (high frequency) ignition indicator**  lights up when the HF ignition welding parameter has been set to an interval for the high frequency pulses

TransTig Comfort control panel

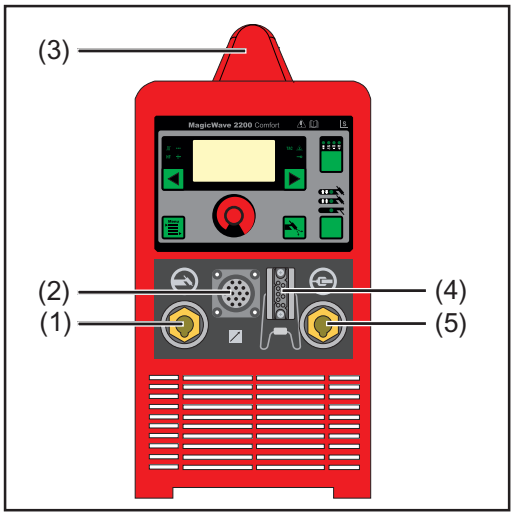


No.	Function
(1)	**Pulse indicator** lights up when the F-P set-up parameter has been set to a pulse frequency
(2)	**Spot welding indicator** lights up when the SPt set-up parameter has been set to a spot welding time
(3)	**Cold wire-feed unit indicator** lights up when a cold wire-feed unit is connected
(4)	**Display**
(5)	**Tacking indicator** lights up when the tAC set-up parameter has been set to a period of time
(6)	**Electrode overload indicator** lights up if the tungsten electrode is overloaded See section on TIG welding in Chapter "Welding mode" for more information on the electrode overload indicator.
(7)	**Keylock indicator** lights up when the keylock is activated
(8)	**Right arrow key** for navigating in the menu
(9)	**Mode button** for selecting the mode 2-step mode 4-step mode Manual metal arc welding When a mode is selected, the LED on the relevant symbol lights up.
(10)	**Gas test button** for setting the required shielding gas flow rate on the gas pressure regulator After pressing this button, gas flows for 30 seconds. Press the button again to stop the gas flow prematurely.
(11)	**Adjusting dial** - Turn the adjusting dial to: select welding parameter - Press the adjusting dial to: confirm a selection in a menu, accept values
(12)	**Menu button** for calling up the menu in the selected process

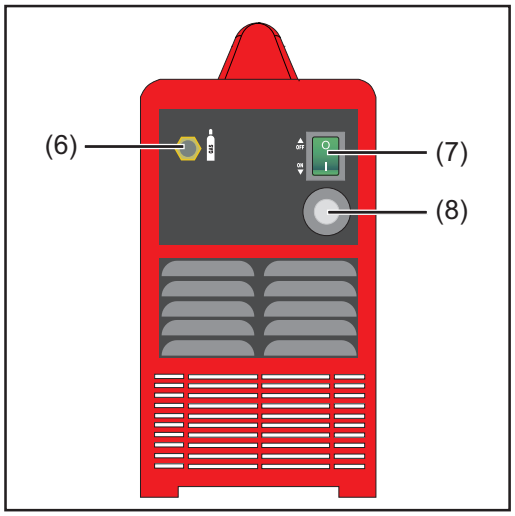
No.	Function	
(13)	**Left arrow key** for navigating in the menu	
(14)	**HF (high frequency) ignition indicator** lights up when the HF ignition welding parameter has been set to an interval for the high frequency pulses	HF

Connections, switches and mechanical components

MagicWave 2200 Comfort



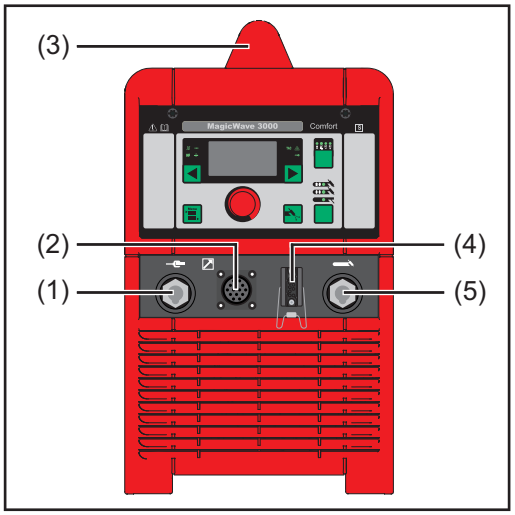
MagicWave 2200 Comfort - front



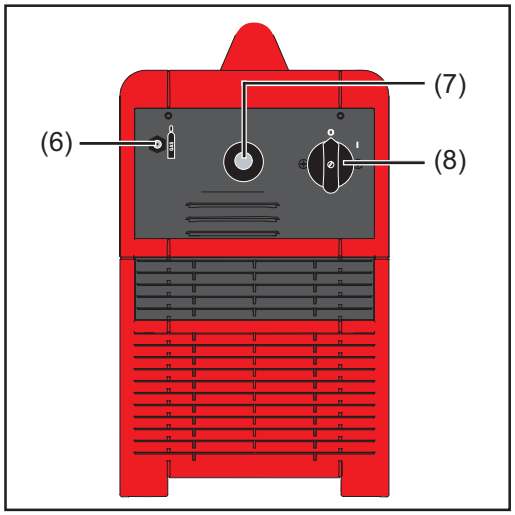
MagicWave 2200 Comfort - rear

No.	Function
(1)	**Welding torch connection** for connecting: - the TIG welding torch - the electrode cable for manual metal arc welding
(2)	**LocalNet connection** standardised connection socket for system add-ons (e.g. remote control, JobMaster TIG welding torch, etc.)
(3)	**Handle**
(4)	**Torch control connection** - for connecting the control plug of a conventional welding torch - input for the collision protection signal when a robot interface or field bus coupler is connected
(5)	**Grounding (earthing) cable connection** for connecting the grounding (earthing) cable
(6)	**Shielding gas connection**
(7)	**Mains switch** for switching the power source on and off
(8)	**Mains cable with strain relief device**

MagicWave 2500 / 3000 Comfort



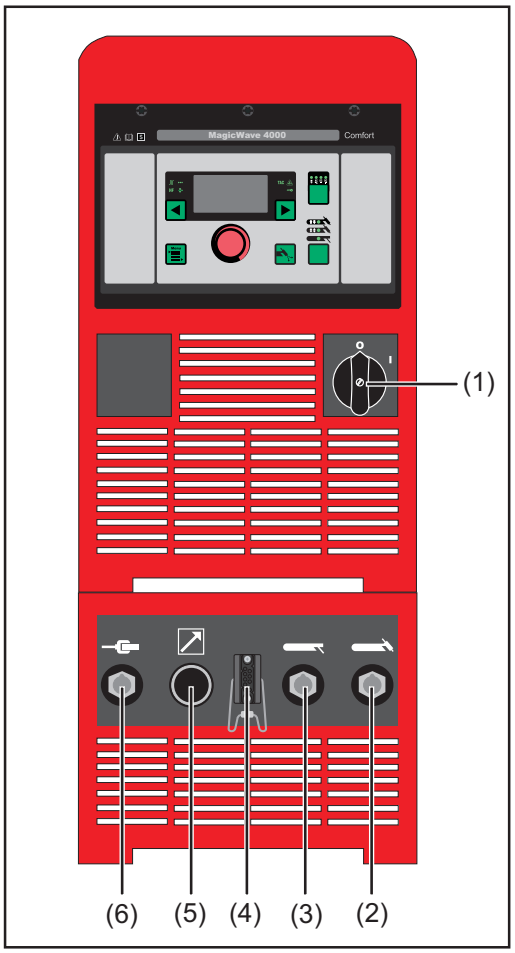
MagicWave 2500 / 3000 Comfort - front



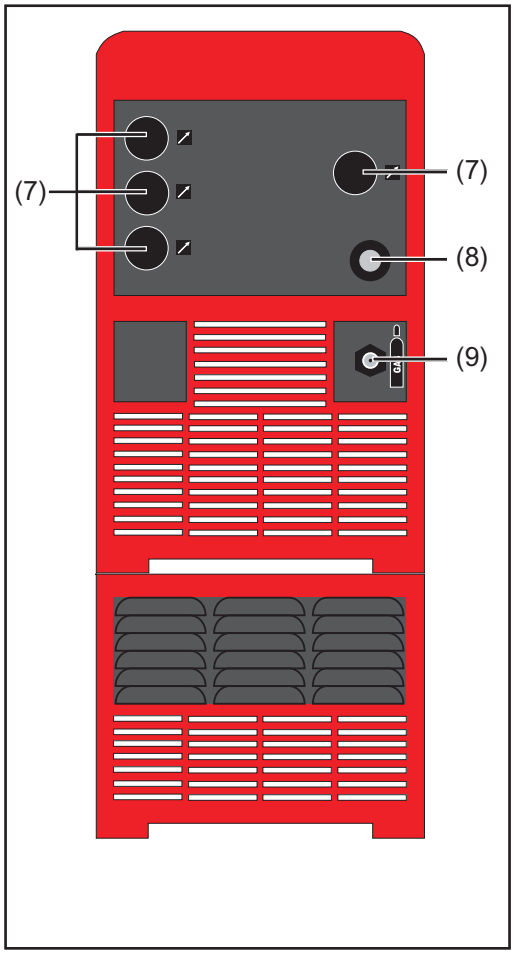
MagicWave 2500 / 3000 Comfort - rear

No.	Function
(1)	**Grounding (earthing) cable connection** for connecting the grounding (earthing) cable
(2)	**LocalNet connection** standardised connection socket for system add-ons (e.g. remote control, JobMaster TIG welding torch, etc.)
(3)	**Handle**
(4)	**Torch control connection** - for connecting the control plug of a conventional welding torch - input for the collision protection signal when a robot interface or field bus coupler is connected
(5)	**Welding torch connection** for connecting: - the TIG welding torch - the electrode cable for manual metal arc welding
(6)	**Shielding gas connection**
(7)	**Mains cable with strain relief device**
(8)	**Mains switch** for switching the power source on and off

MagicWave 4000 Comfort



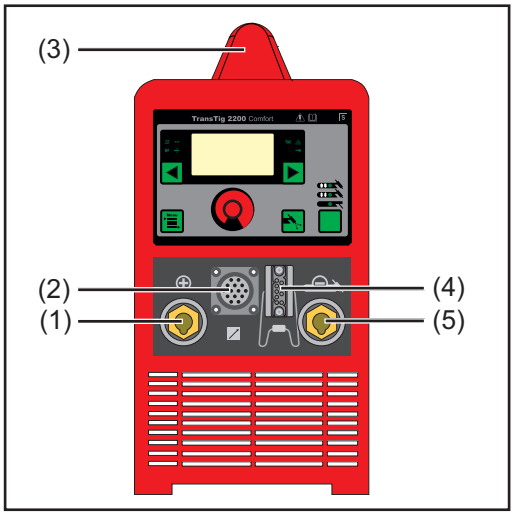
MagicWave 4000 Comfort - front



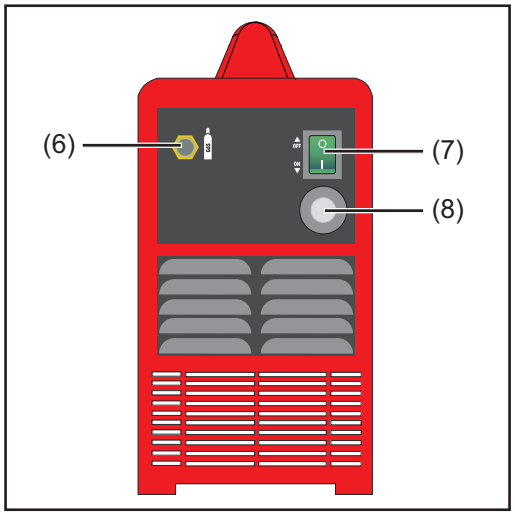
MagicWave 4000 Comfort - rear

No.	Function
(1)	**Mains switch** for switching the power source on and off
(2)	**Welding torch connection** for connecting the TIG welding torch
(3)	**Electrode holder connection** for connecting the electrode cable for manual metal arc welding
(4)	**Torch control connection** - for connecting the control plug of a conventional welding torch - input for the collision protection signal when a robot interface or field bus coupler is connected
(5)	**LocalNet connection** standardised connection socket for system add-ons (e.g. remote control, JobMaster TIG welding torch, etc.)
(6)	**Grounding (earthing) cable connection** for connecting the grounding (earthing) cable
(7)	**Blanking cover** reserved for LocalNet connection
(8)	**Mains cable with strain relief device**
(9)	**Shielding gas connection**

TransTig 2200 Comfort



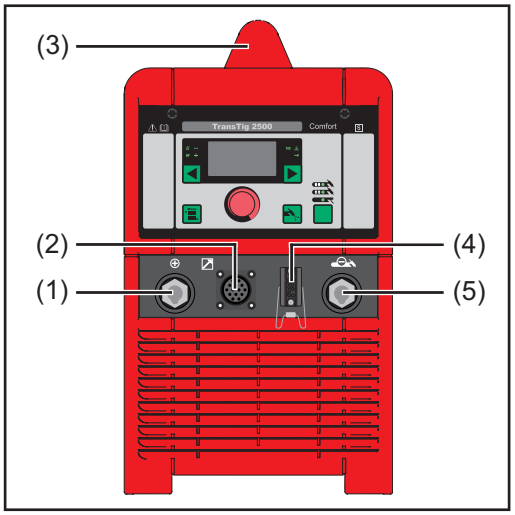
TransTig 2200 Comfort - front



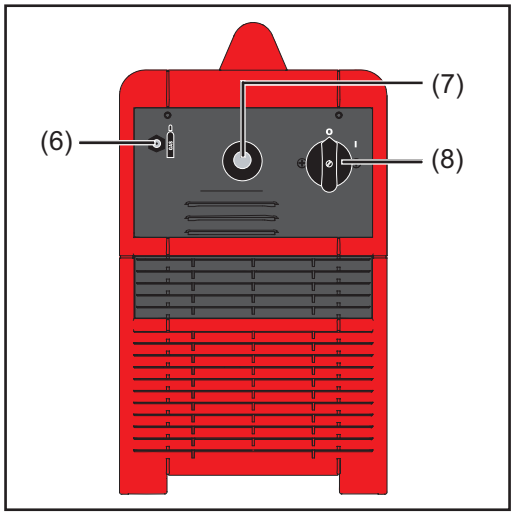
TransTig 2200 Comfort - rear

No.	Function
(1)	**(+) current socket with bayonet latch** for connecting - the grounding (earthing) cable when TIG welding - the electrode cable or grounding (earthing) cable during MMA welding (depending on the type of electrode)
(2)	**LocalNet connection** standardised connection socket for system add-ons (e.g. remote control, JobMaster TIG welding torch, etc.)
(3)	**Handle**
(4)	**Torch control connection** - for connecting the control plug of a conventional welding torch - input for the collision protection signal when a robot interface or field bus coupler is connected
(5)	**(-) current socket with bayonet latch** for connecting - the TIG welding torch - the electrode cable or grounding (earthing) cable during MMA welding (depending on electrode type)
(6)	**Shielding gas connection**
(7)	**Mains switch** for switching the power source on and off
(8)	**Mains cable with strain relief device**

TransTig 2500 / 3000 Comfort



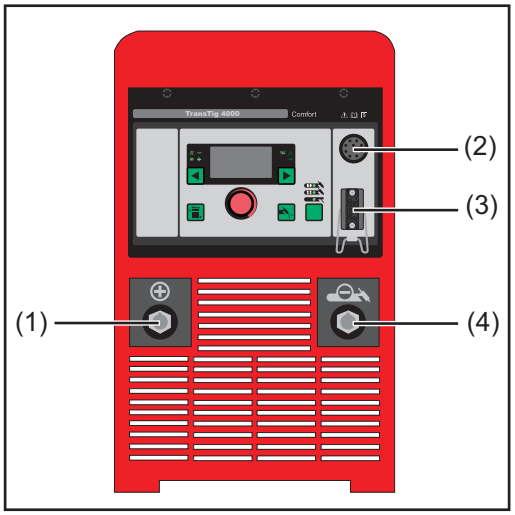
TransTig 2500 / 3000 Comfort - front



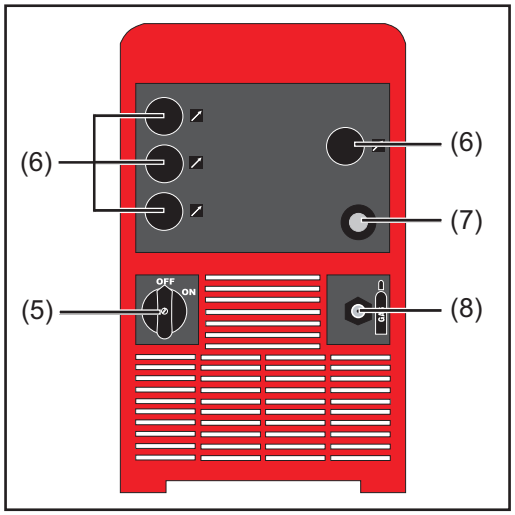
TransTig 2500 / 3000 Comfort - rear

No.	Function
(1)	**(+) current socket with bayonet latch** for connecting - the grounding (earthing) cable when TIG welding - the electrode cable or grounding (earthing) cable during MMA welding (depending on electrode type)
(2)	**LocalNet connection** standardised connection socket for system add-ons (e.g. remote control, JobMaster TIG welding torch, etc.)
(3)	**Handle**
(4)	**Torch control connection** - for connecting the control plug of a conventional welding torch - input for the collision protection signal when a robot interface or field bus coupler is connected
(5)	**(-) current socket with bayonet latch** for connecting - the TIG welding torch - the electrode cable or grounding (earthing) cable during MMA welding (depending on electrode type)
(6)	**Shielding gas connection**
(7)	**Mains cable with strain relief device**
(8)	**Mains switch** for switching the power source on and off

TransTig 4000 Comfort



TransTig 4000 Comfort - front



TransTig 4000 Comfort - rear

No.	Function
(1)	**(+) current socket with bayonet latch** for connecting - the grounding (earthing) cable when TIG welding - the electrode cable or grounding (earthing) cable during MMA welding (depending on the type of electrode)
(2)	**LocalNet connection** standardised connection socket for system add-ons (e.g. remote control, JobMaster TIG welding torch, etc.)
(3)	**Torch control connection** - for connecting the control plug of a conventional welding torch - input for the collision protection signal when a robot interface or field bus coupler is connected
(4)	**(-) current socket with bayonet latch** for connecting - the TIG welding torch - the electrode cable or grounding (earthing) cable during MMA welding (depending on the type of electrode)
(5)	**Mains switch** for switching the power source on and off OFF = - O - ON = - I -
(6)	**Blanking cover** reserved for LocalNet connection
(7)	**Mains cable with strain relief device**
(8)	**Shielding gas connection**

Installation and commissioning

Minimum equipment needed for welding task

General

Depending on which welding process you intend to use, a certain minimum equipment level will be needed in order to work with the power source.
The welding processes and the minimum equipment levels required for the welding task are then described.

TIG AC welding

- MagicWave power source
- Grounding (earthing) cable
- TIG welding torch with rocker switch
- Gas connection (shielding gas supply), with pressure regulator
- Filler metals (as required by the application)

TIG DC welding

- Power source
- Grounding (earthing) cable
- TIG welding torch with rocker switch
- Gas connection (shielding gas supply)
- Filler metals (as required by the application)

Automated TIG welding

- Power source
- Robot interface or field bus connection
- Grounding (earthing) cable
- TIG machine welding torch or TIG robot welding torch
  (a cooling unit is also required with water-cooled machine or robot welding torches)
- Gas connection (shielding gas supply)
- Cold wire-feed unit and filler metals (as required by the application)

MMA welding

- Power source
- Grounding (earthing) cable
- Electrode holder
- Rod electrodes (as required by the application)

Before installation and commissioning

Safety

WARNING! Incorrect operation or shoddy workmanship can cause serious injury or damage. All work described in this document must only be carried out by trained and qualified personnel. All functions described in this document must 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:

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

Utilisation for intended purpose

The power source is intended exclusively for TIG and MMA welding.
Utilisation for any other purpose, or in any other manner, shall be deemed to be not in accordance with the intended purpose.
The manufacturer shall not be liable for any damage resulting from such improper use.

Proper use also includes:

- following all the information in the operating instructions
- carrying out all the specified inspection and servicing work

Setup regulations

The device is tested to "Degree of protection IP23", meaning:

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

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

WARNING! If one of these machines topples over or falls it could cause serious or even fatal injury. Place device on a solid, level surface in such a way that it remains stable.

The venting duct is a very important safety feature. When choosing the location for the device, ensure that the cooling air can enter and exit unhindered through the air ducts on the front and back of the device. Electrically conductive dust (e.g. from grinding work) must not be allowed to get sucked into the device.

Mains connection

The devices are designed to run on the mains voltage shown on the respective rating plates. If your version of the device does not come with mains cables and plugs ready-fitted, these must be fitted in accordance with national regulations and standards. For details of fuse protection of the mains lead, please see the Technical Data.

NOTE! Inadequately dimensioned electrical installations can cause serious damage. The incoming mains lead and its fuse must be dimensioned to suit the local power supply. The technical data shown on the rating plate applies.

Start-up

Safety

WARNING! An electric shock can be fatal. If the machine is plugged into the mains electricity supply during installation, there is a high risk of very serious injury and damage. Do not carry out any work on the device unless
- the mains switch is in the "O" position,
- the device is unplugged from the mains.

Remarks on the cooling unit

We recommend using a cooling unit for the following applications and situations:
- JobMaster TIG welding torch
- Robot welding
- Hosepacks over 5 m long
- TIG AC welding
- In general, where welding is performed in higher power ranges

The cooling unit is powered from the power source. The cooling unit is ready for operation when the mains switch of the power source is in the "I" position.
More information on the cooling unit can be found in the operating instructions for the cooling unit.

General

This section describes how to commission the power source:
- for the main TIG welding application
- with reference to a standard configuration for a TIG welding device.

The standard configuration consists of the following system components:
- power source
- cooling unit
- TIG manual welding torch
- pressure regulator
- gas cylinder
- gas cylinder holder
- trolley

The steps set out below provide an overview of how to commission the power source. For detailed information about the individual steps, please refer to the operating instructions for the system components.

Connecting the gas cylinder

WARNING! If gas cylinders topple over, there is a risk of very serious injury and damage.
- Place gas cylinders on a solid, level surface in such a way that they remain stable
- Secure gas cylinders to prevent them from toppling over: fix the safety strap at the same height as the top part of the cylinder
- Never fix the safety strap around the neck of the cylinder

Follow the gas cylinder manufacturer's safety instructions.

1. Secure the gas cylinder
2. Take the protective cap off the gas cylinder
3. Briefly open the gas cylinder valve to remove any dust or dirt
4. Check the seal on the pressure regulator

5 Screw the pressure regulator onto the gas cylinder and tighten it

When using a TIG welding torch with an integral gas connector:

6 Use the gas hose to connect the pressure regulator to the shielding gas connection on the rear of the power source

7 Tighten the union nut on the gas hose

When using a TIG welding torch with no integral gas connector:

6 Connect the TIG welding torch gas hose to the pressure regulator

---

Establishing a ground (earth) connection to the workpiece

1 Move the mains switch to the O position

2 Plug the grounding (earthing) cable in and latch it
- for MagicWave: in the grounding (earthing) cable connection
- for TransTig: in the (+) current socket

3 Use the other end of the grounding (earthing) cable to establish a connection to the workpiece

---

Connecting the welding torch

CAUTION! Risk of damage from high frequencies. Do not use the JobMaster TIG welding torch with a LocalNet distributor.

1 Move the mains switch to the O position

2 Plug in the TIG welding torch cable and latch it by turning it clockwise:
- for MagicWave: in the welding torch connection
- for TransTig: in the (-) current socket

3 Plug the welding torch control plug into the torch control connection and latch it
or
connect the control line of the JobMaster TIG welding torch to the LocalNet connection

NOTE! Do not use pure tungsten electrodes (colour-coded green) on TransTig power sources.

4 Equip the welding torch in accordance with the welding torch operating instructions

5 Only when using a water-cooled torch and cooling unit:
Plug in the welding torch water connections to the water flow (black) and return (red) connections on the cooling unit.

Welding

TIG modes

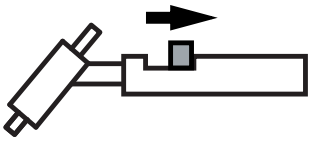
Safety

WARNING! Operating the equipment incorrectly can cause serious injury and damage. Do not use the functions described until you have thoroughly read and understood the following documents:

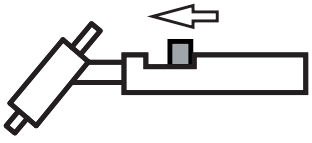
- these operating instructions
- all the operating instructions for the system components, especially the safety rules

See the "The Setup menu" section for information on the settings, setting range and units of measurement of the available welding parameters.

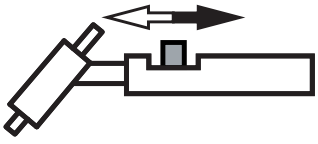
Symbols and their explanations



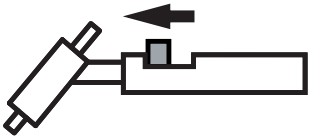
Pull back and hold the torch trigger



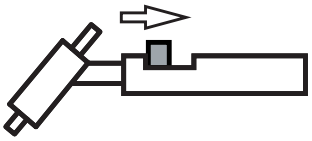
Release the torch trigger



Briefly pull back the torch trigger (< 0.5 s)



Push forward and hold the torch trigger



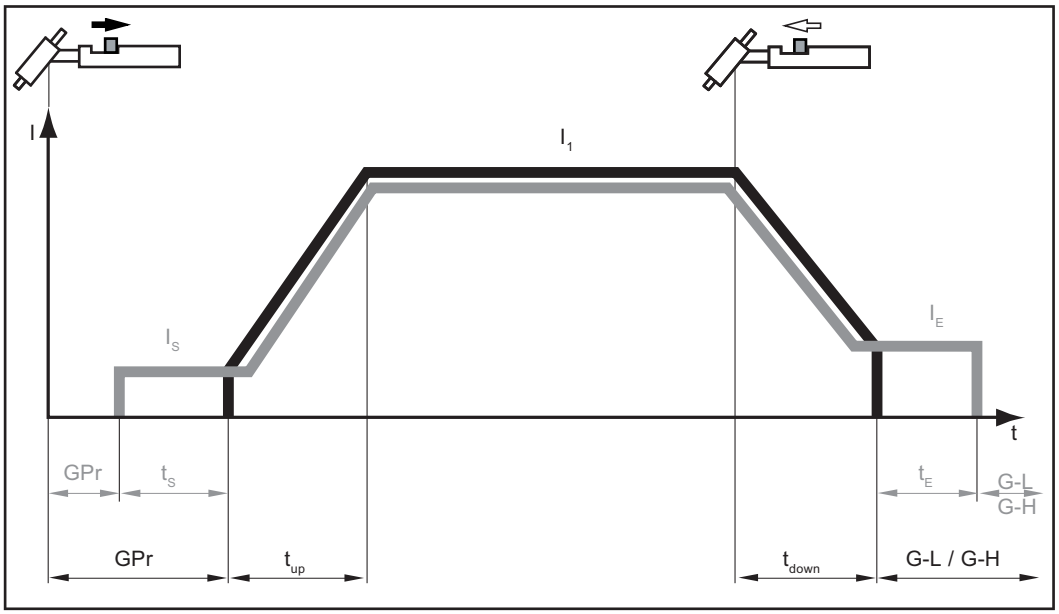
Release the torch trigger

GPr Gas pre-flow time	**SPt** Spot welding time
I_S Starting-current phase: the temperature is raised gently at low welding current, so that the filler metal can be positioned correctly	**I_E** Final current phase: to prevent any local overheating of the base material due to heat build-up towards the end of welding. This eliminates any risk of weld seam drop-through.
t_{up} Upslope phase: the starting current is continuously increased until it reaches the main current (welding current) I_1	**t_{down}** Downslope phase: the welding current is continuously lowered until it reaches the end-crater current.
I_1 Main current phase (welding-current phase): uniform thermal input into the base material, whose temperature is raised by the advancing heat	**I_2** Reduced current phase: intermediate lowering of the welding current in order to prevent any local overheating of the base material
G-H Gas post-flow time at maximum welding current	**G-L** Gas post-flow time at minimum welding current

2-step mode

- Welding: Pull back and hold the torch trigger
- End of welding: Release the torch trigger

NOTE! To work in 2-step mode after it has been selected, the SPt set-up parameter must be set to "OFF" and the spot welding indicator on the control panel must not light up.



2-step mode

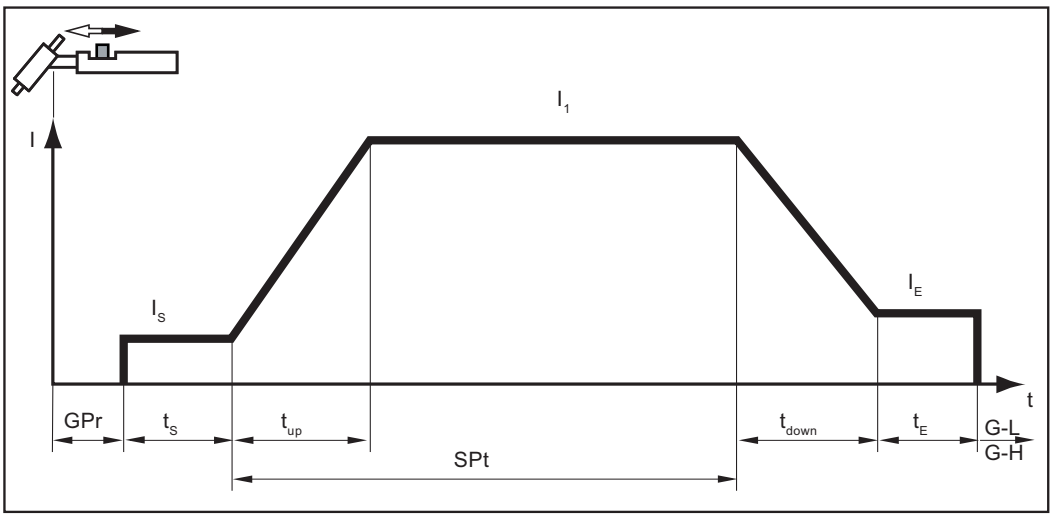
... Manual application ... Automatic application

Spot welding

If a value has been set for the SPt set-up parameter, 2-step mode will have the spot welding mode function. The special spot welding indicator on the control panel will light up.

- Welding: briefly pull back the torch trigger
  The welding time corresponds to the value set for the SPt set-up parameter.
- to end the welding process prematurely: pull the torch trigger back again

When using a pedal remote control, the spot welding time starts when the pedal remote control is operated. The power cannot be controlled using the pedal remote control.

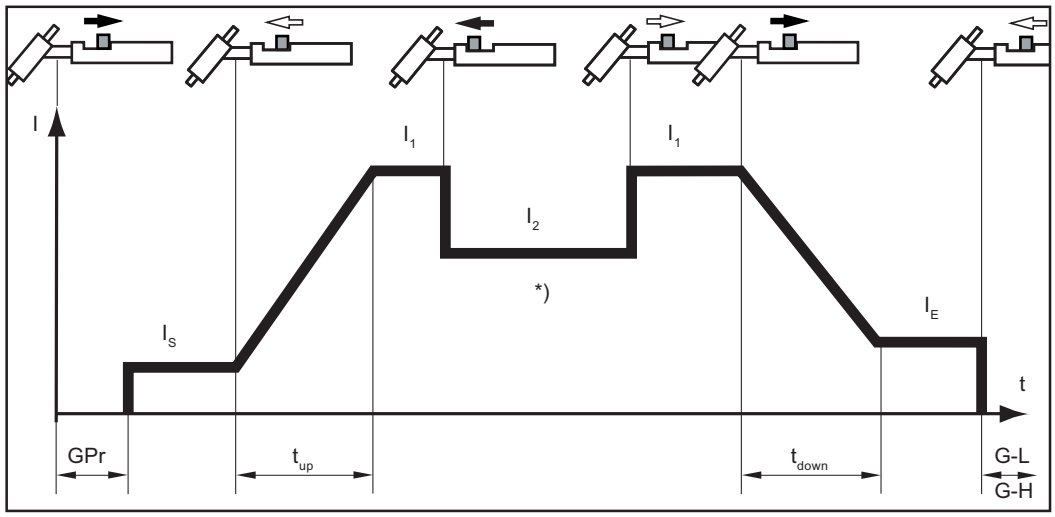


Spot welding

4-step mode

- Welding start-up with starting current I_S: Pull back and hold the torch trigger
- Welding with main current I_1: Release the torch trigger
- Lowering to final current I_E: Pull back and hold the torch trigger
- End of welding: Release the torch trigger

NOTE! For 4-step mode, the special 4-step- (SFS) set-up parameter must be set to "OFF".



4-step mode

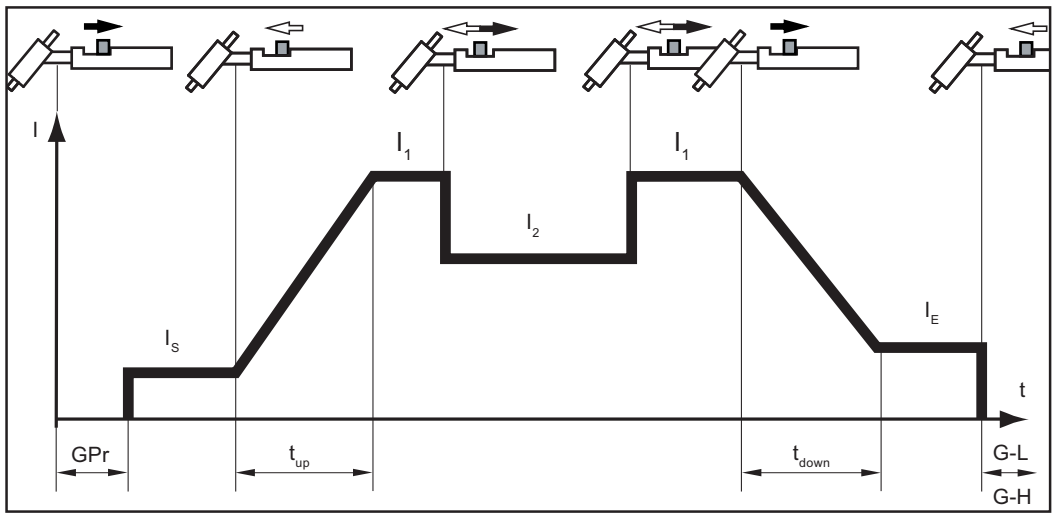
*) Intermediate lowering

Intermediate lowering during the main current phase reduces the welding current to the specified reduced current I_2.

- To activate intermediate lowering, push forward and hold the torch trigger
- To revert to the main current, release the torch trigger

Special 4-step mode: variant 1

Variant 1 of special 4-step mode is activated, when the special 4-step (SFS) set-up parameter-is set to "1".
Briefly pull back the torch trigger to start intermediate lowering to the specified reduced current I_2. Briefly pull back the torch trigger a second time, to restore the main current I_1.

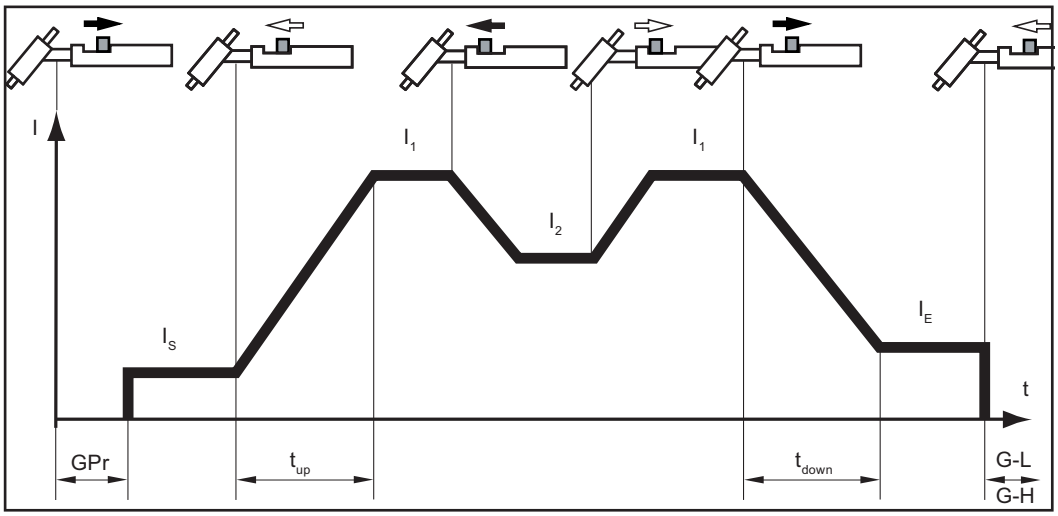


Special 4-step mode: Variant 1

Special 4-step mode: variant 2

Variant 2 of the special 4-step mode is activated when the special 4-step SFS set-up parameter -is set to "2“.
Intermediate lowering takes place in variant 2 on the basis of the selected slope values - downslope t_{down} and upslope t_{up}:

- Push forward and hold the torch trigger: the welding current continuously drops at the set downslope value until it reaches the specified reduced current I_2. It remains at the reduced current value I_2 until the torch trigger is released.
- When the torch trigger is released: the welding current rises at the specified upslope value until it reaches the main current value I_1.



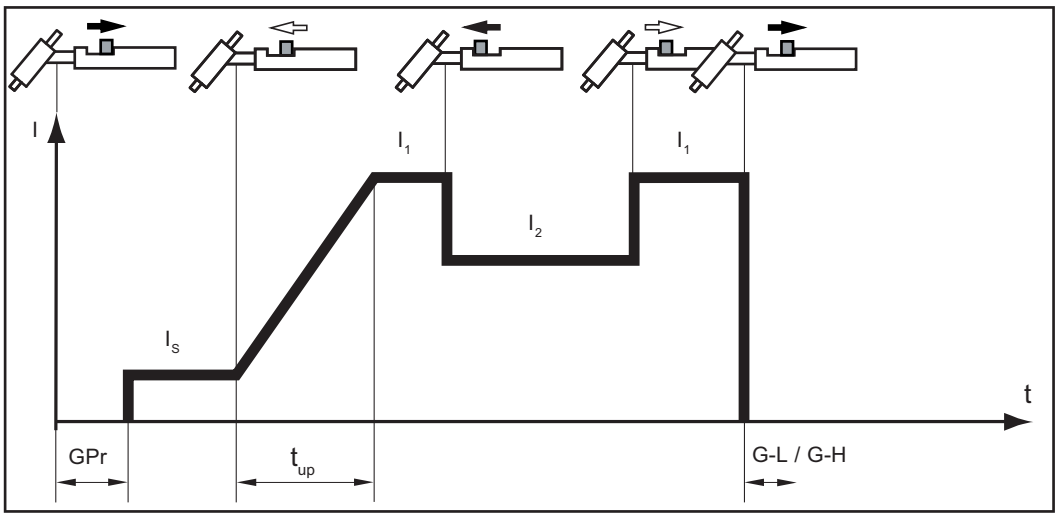
Special 4-step mode: Variant 2

Special 4-step mode: variant 3

Variant 3 of special 4-step mode is activated when the special 4-step mode (SFS) set-up parameter -is set to "3".

In variant 3, push forward and hold the torch trigger to start intermediate lowering. Release the torch trigger to resume the main current I_1.

When the torch trigger is pulled back, welding ends immediately without downslope and final current.

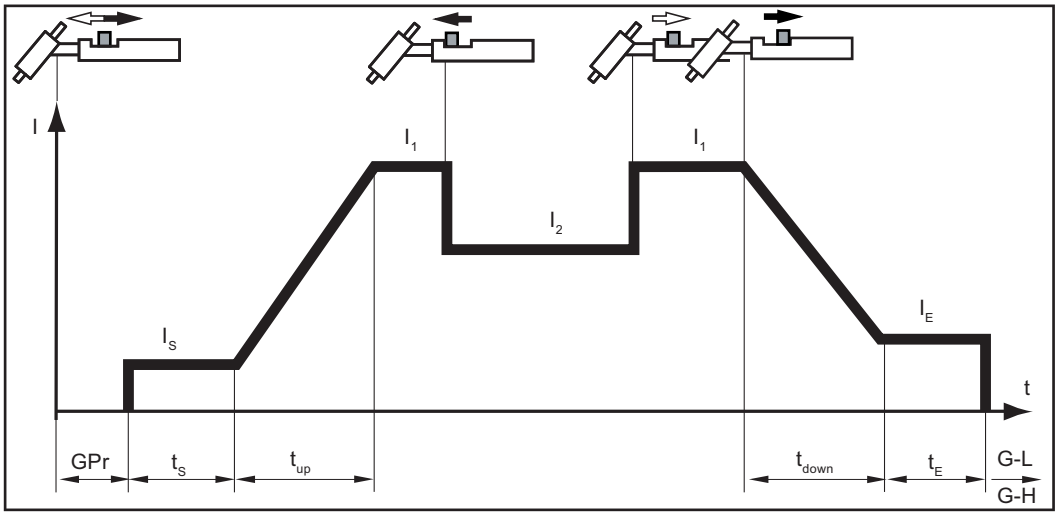


Special 4-step mode: Variant 3

Special 4-step mode: variant 4

Variant 4 of the special 4-step mode is activated when the SFS set-up parameter is set to "4".

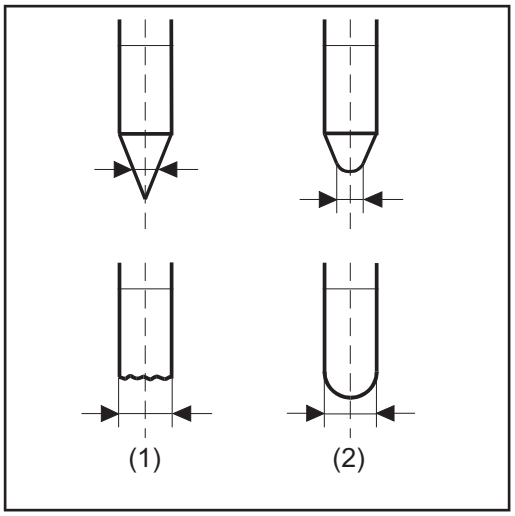
- Welding start-up and welding: briefly pull back and release the torch trigger - the welding current will rise at the specified upslope value from the starting current I_S until it reaches the main current value I_1.
- Push forward and hold the torch trigger for intermediate lowering
- Release the torch trigger to resume the main current I_1
- End of welding: briefly pull back and release the torch trigger



Special 4-step mode: variant 4

Cap shaping and cap overloading

Cap shaping



On MagicWave power sources, an automatic cap-shaping function is available for the TIG AC welding process:

- When the TIG AC welding process is selected, activate automatic cap-shaping
- The ideal cap for the specified diameter of the tungsten electrode is formed during welding start-up.
  A separate cap-shaping operation on a test workpiece is not necessary.
- The automatic cap-shaping function is then reset and deactivated.
  The automatic cap-shaping function has to be activated separately for each tungsten electrode.

(1) Before ignition
(2) After ignition

NOTE! The automatic cap-shaping function is not necessary if a sufficiently large cap has already formed at the tip of the tungsten electrode.

Cap overloading

If the cap is overloaded, there is a risk of an excessively large cap forming on the tungsten electrode. This will affect the ignition properties.

If the cap is overloaded, the "Electrode overload" indicator will light up on the control panel.

Possible causes of cap overloading:

- tungsten electrode diameter is too small
- main current value I_1 set too high
- the balance has been set too far towards "+"

Remedy:

- use a tungsten electrode with a larger diameter
- reduce the main current and/or set the balance further towards "-"

NOTE! The "Electrode overload" indicator is fine-tuned to work with the following tungsten electrodes:

- TIG AC welding: pure tungsten electrodes
- TIG DC welding: ceriated electrodes

For all other electrodes, the "Electrode overload" indicator must be treated as a reference value.

TIG welding

Safety

WARNING! Operating the equipment incorrectly can cause serious injury and damage. Do not use the functions described 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

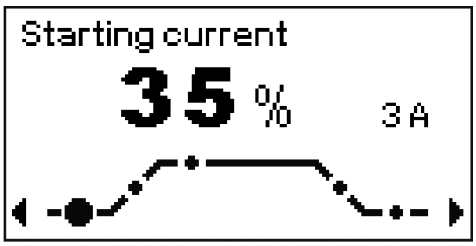
WARNING! An electric shock can be fatal. If the power source is connected to the mains electricity supply during installation, there is a high risk of very serious injury and damage. Before carrying out any work on the device make sure that:
- the power source mains switch is in the "O" position
- the power source is unplugged from the mains

Welding parameters: display and navigation

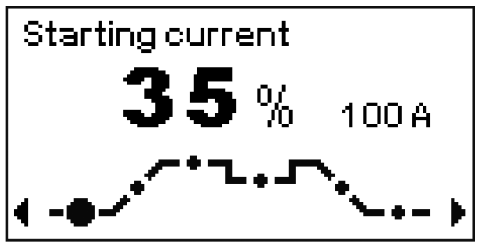
The TIG welding parameters are shown as soon as the 2-step or 4-step mode is selected.

Use the left and right arrow keys to navigate within the welding parameters.

Welding parameters for TIG



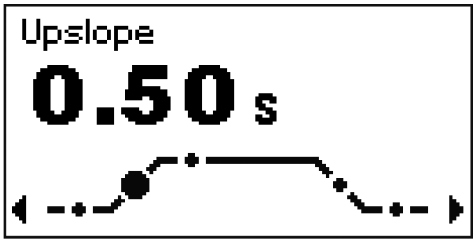
Starting current 2-step mode



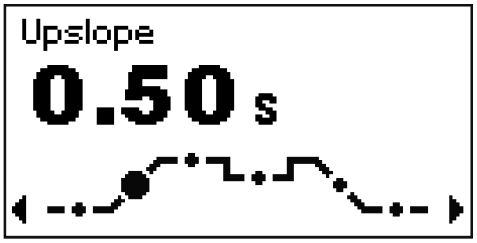
Starting current 4-step mode

Unit	% (of main current)
Setting range	30 - 200 AC, 0 - 200 DC
Factory setting	35 AC, 50 DC

IMPORTANT! The starting current is saved separately for the TIG AC welding and TIG DC welding modes.



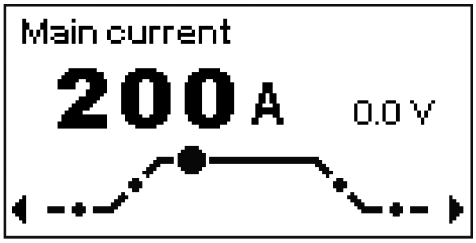
Upslope, 2-step mode



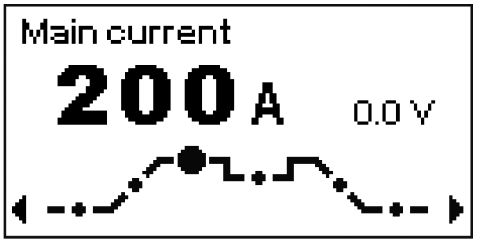
Upslope, 4-step mode

Unit	s
Setting range	0,0 - 9,9
Factory setting	0,1

IMPORTANT! The upslope is saved separately for 2-step and 4-step modes.



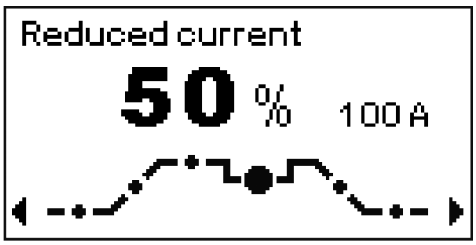
Main current, 2-step mode



Main current, 4-step mode

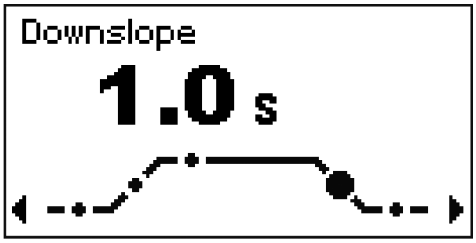
Unit	A	
Setting range	MW 2500 Comfort 3 - 250 MW 3000 Comfort 3 - 300	TT 2500 Comfort 3 - 250 TT 3000 Comfort 3 - 300
Factory setting	-	

IMPORTANT! On welding torches with the Up/Down function, the entire setting range can be selected while the device is idling. During welding, the main current can be corrected in steps of +/-20 A.



In the case of 4-step mode

Unit	% (of main current)
Setting range	0 - 100
Factory setting	50

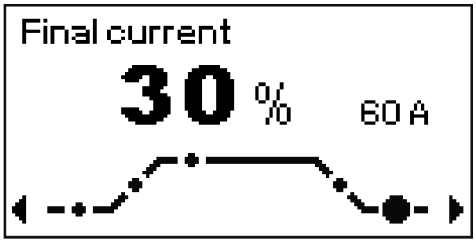


Downslope, 2-step mode

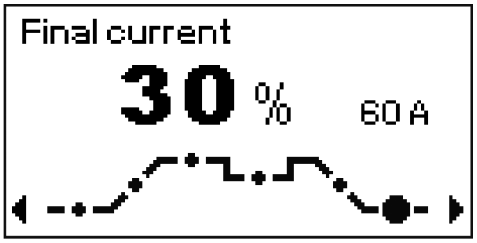
Downslope, 4-step mode

Unit	s
Setting range	0,0 - 9,9
Factory setting	1,0

IMPORTANT! The downslope is saved separately for 2-step and 4-step modes.

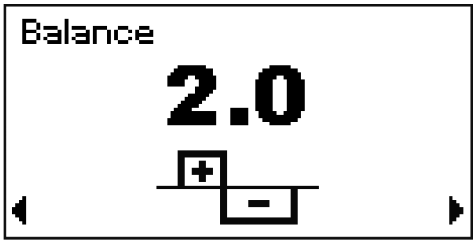


Final current, 2-step mode



Final current, 4-step mode

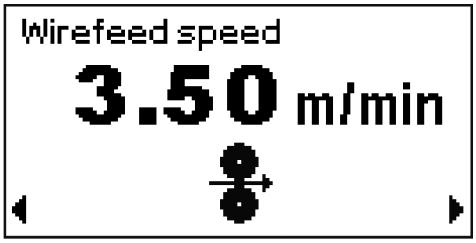
Unit	% (of main current)
Setting range	0 - 100
Factory setting	30



only with MagicWave for the TIG AC welding process

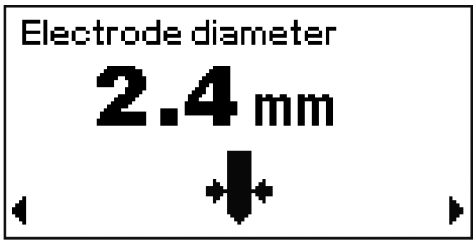
Unit	1
Setting range	-5 - +5
Factory setting	0

-5: highest fusing power, lowest cleaning action
+5: highest cleaning action, lowest fusing power



If cold wire-feed unit option is available

Unit	m/min	ipm
Setting range	OFF / 0.1 - max.	OFF / 3.9 - max.
Factory setting	OFF	



Unit	mm	in.
Setting range	OFF - max.	OFF - max.
Factory setting	2,4	0.1

Preparation

1 Plug in the mains plug

CAUTION! Risk of injury and damage from electric shock. As soon as the mains switch is in the "I" position, the tungsten electrode of the welding torch is live. Make sure that the tungsten electrode does not touch any persons or electrically conductive or earthed parts (e.g. housing, etc.).

2 Move the mains switch to the I position

The starting sequence with the Fronius logo, current firmware version and Fronius internet address is displayed for approx. 1 second:

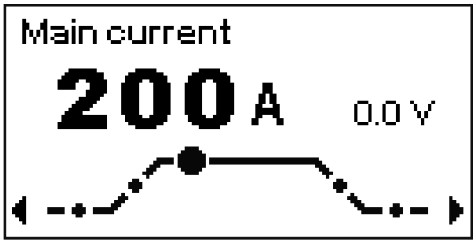
TIG welding

1 Press the Mode button to select the required TIG mode:

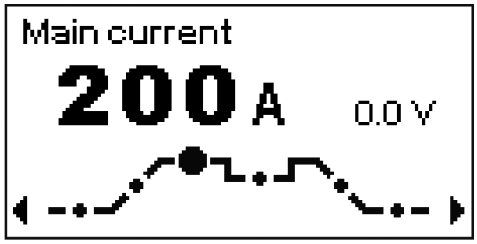
2-step mode

4-step mode

The image for the TIG welding parameter is shown on the display:



TIG welding parameters for 2-step mode (main current welding parameter selected)



TIG welding parameters for 4-step mode (main current welding parameter selected)

2 Only with MagicWave: Press the Mode button to select the required TIG mode:

AC welding process

AC welding process with automatic cap-shaping function

DC welding process

3 Use the right arrow key to select the relevant welding parameters

4 Use the adjusting dial to set the selected welding parameter to the required value

5 If necessary, additional welding parameters can be set in the set-up menu:

- Press the menu key
  The relevant menu is displayed:

- Use the adjusting dial to select the desired set-up menu
- Open the selected set-up menu by pressing the adjusting dial
- Use the adjusting dial to select the welding parameter
- To change the welding parameter press the adjusting dial
- Change the welding parameter value using the adjusting dial
- Press the adjusting dial
- Exit the set-up menu

NOTE! All welding parameter set values that have been set using the adjusting dial remain stored until the next time they are changed. This applies even if the power source is switched off and on again in the meantime.

6 Open the gas cylinder valve

7 Set the shielding gas flow rate:

Press the Gas test button
The test gas flow lasts for a maximum of 30 seconds. Press the button again to stop the gas flow prematurely.

- Turn the adjusting screw on the underside of the pressure regulator until the pressure gauge shows the required gas flow rate

8 For long hosepacks and if condensation forms when the device is left unused in a cold environment:
purge protective gas shield and set the GPU set-up parameter to a time value

9 Start welding (ignite the arc)

Igniting the arc

General

To ensure the best ignition sequence in the TIG AC welding process, the MagicWave power sources take account of:
- the diameter of the tungsten electrode
- the current temperature of the tungsten electrode with reference to the preceding welding and weld-off times

To ensure the ideal ignition sequence in TIG DC welding, MagicWave power sources are equipped with RPI (**R**everse **P**olarity **I**gnition).
At the start of welding, the polarity is briefly reversed. Electrons emerge from the workpiece and strike the tungsten electrode. This results in the tungsten electrode heating up rapidly which is an essential prerequisite for optimum ignition properties.
Further information on the RPI function can be found in the Chapter Set-up parameters, Section "TIG set-up 2nd".

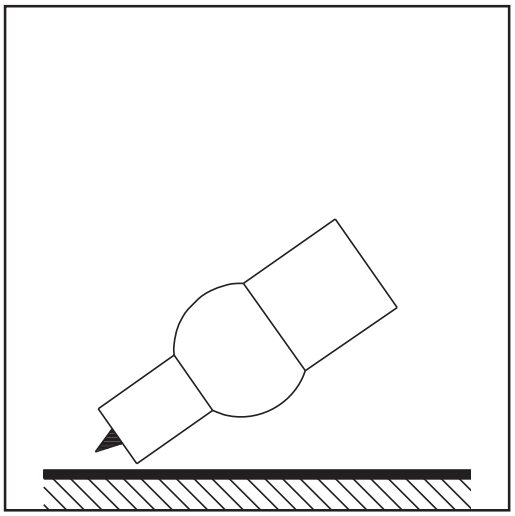
Igniting the arc using high frequency (HF ignition)

HF ignition is activated when a time value has been set for the HFt setup parameter.
The HF ignition indicator lights up on the control panel.

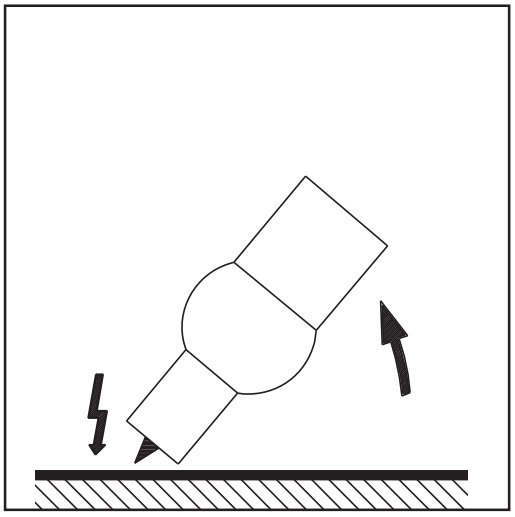
HF

Compared with touchdown ignition, HF ignition eliminates the risk of contamination of the tungsten electrode and the workpiece.

Procedure for HF ignition:

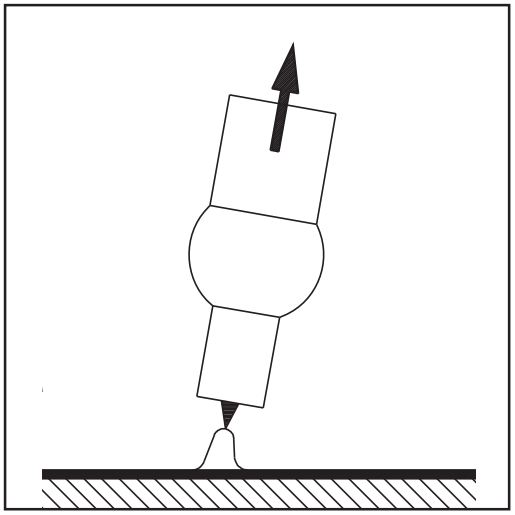


1 Place the gas nozzle down on the ignition location so that there is a gap of approx. 2 to 3 mm (5/64 to 1/8 in.) between the tungsten electrode and the workpiece



2 Increase the tilt angle of the torch and actuate the torch trigger according to the mode you have selected

The arc ignites without the electrode touching down on the workpiece.



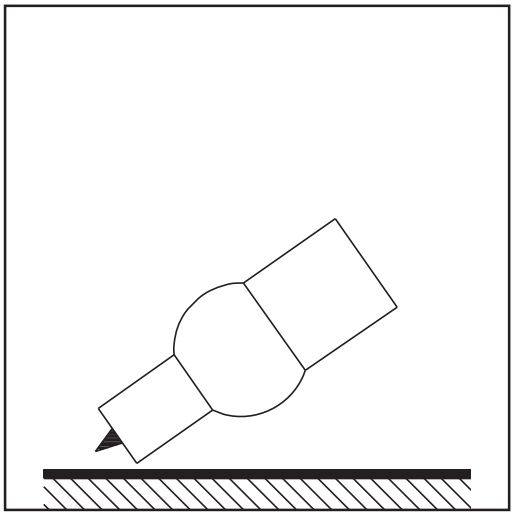
3 Tilt the torch back into the normal position

4 Carry out welding

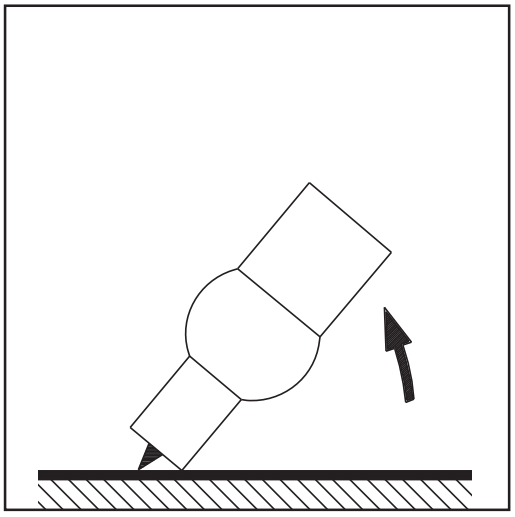
Touchdown ignition

If the HFt setup parameter is set to OFF, HF ignition is deactivated. The welding arc is ignited by touching the workpiece with the tungsten electrode.

Procedure for igniting the arc using touchdown ignition:



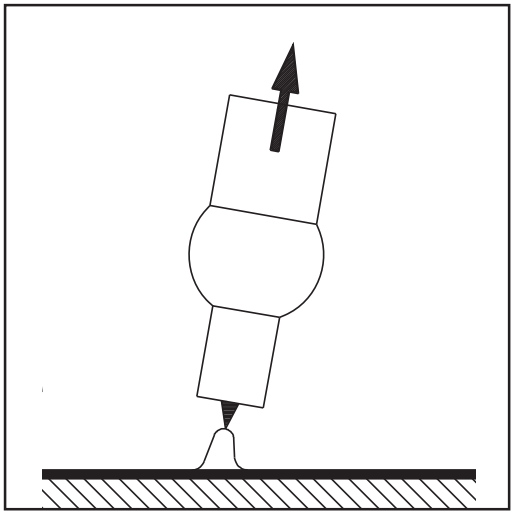
1 Place the gas nozzle down on the ignition location so that there is a gap of approx. 2 to 3 mm (5/64 to 1/8 in.) between the tungsten electrode and the workpiece



2 Actuate the torch trigger

Shielding gas flows.

3 Gradually tilt the welding torch up until the tungsten electrode touches the workpiece



4 Raise the welding torch and move it into its normal position

The arc ignites.

5 Carry out welding

End of welding

1 Depending on the set mode, finish welding by releasing the torch trigger

2 Wait for the set gas post-flow and hold welding torch in position over the end of the weld seam

Special functions and options

Arc break watch-dog function

If the arc breaks and the current does not start to flow again within the time specified in the set-up menu, the power source cuts out automatically. The service code "no | Arc" appears on the control panel.

To start the welding process again, press any key on the control panel or the torch trigger.

The settings for the arc break watchdog set-up parameter (Arc) are described in "TIG set-up 2nd" section.

Ignition time-out function

The power source has an ignition time-out function.

Once the torch trigger is pressed, gas pre-flow begins immediately. Ignition then begins. If an arc does not appear within the time specified in the set-up menu, the power source cuts out automatically. The service code "no | IGn" appears on the control panel.

"E55" is displayed on the JobMaster TIG welding torch.
To try again, press any key on the control panel or press the torch trigger.

The settings for the ignition time-out parameter (ito) are described in the "TIG set-up 2nd" section.

TIG pulsing

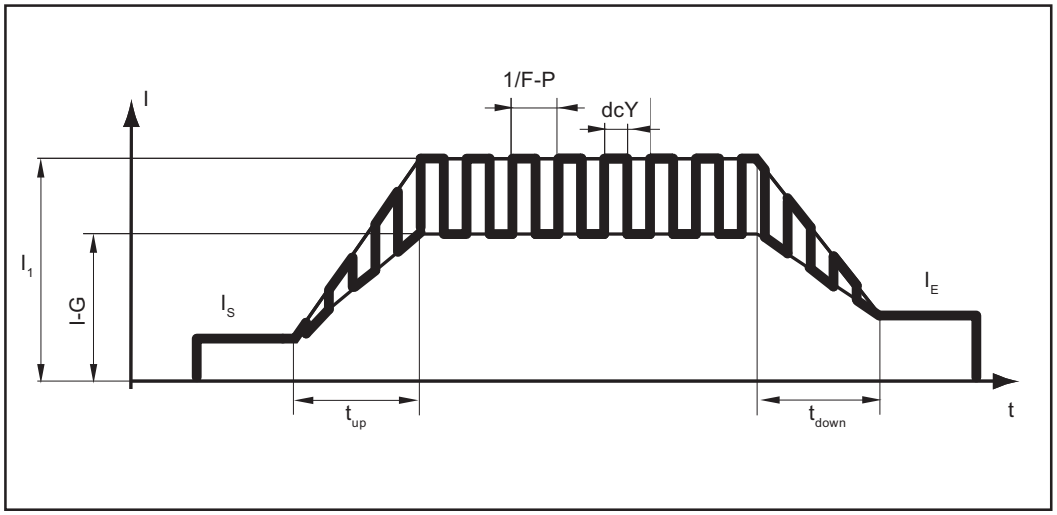
The welding current set at the start of welding is not always ideal for the welding process as a whole:

- if the amperage is too low, the base material will not melt sufficiently,
- if overheating occurs, the liquid weld pool may drip.

The TIG pulsing function (TIG welding with pulsing welding current) offers a remedy: a low ground current I-G rises steeply to the significantly higher pulse current I1 and, depending on the set dcY (duty cycle) time, drops back to the ground current I-G.
In TIG pulsing, small sections of the welding location melt quickly and then solidify again quickly.
In manual applications using TIG pulsing, the welding wire is applied in the maximum current phase (only possible in the low frequency range: 0.25 - 5 Hz). Higher pulse frequencies are mainly used in automatic mode to stabilise the arc.

TIG pulsing is used for out-of-position welding of steel pipes or when welding thin sheets.

Mode of operation of TIG pulsing when TIG DC welding is selected:



TIG pulsing - welding current curve

Legend:

I_S	Starting current	F-P	Pulse frequency *)
I_E	Final current	dcY	Duty cycle
t_{up}	Upslope	I-G	Ground current
t_{Down}	Downslope	I_1	Main current

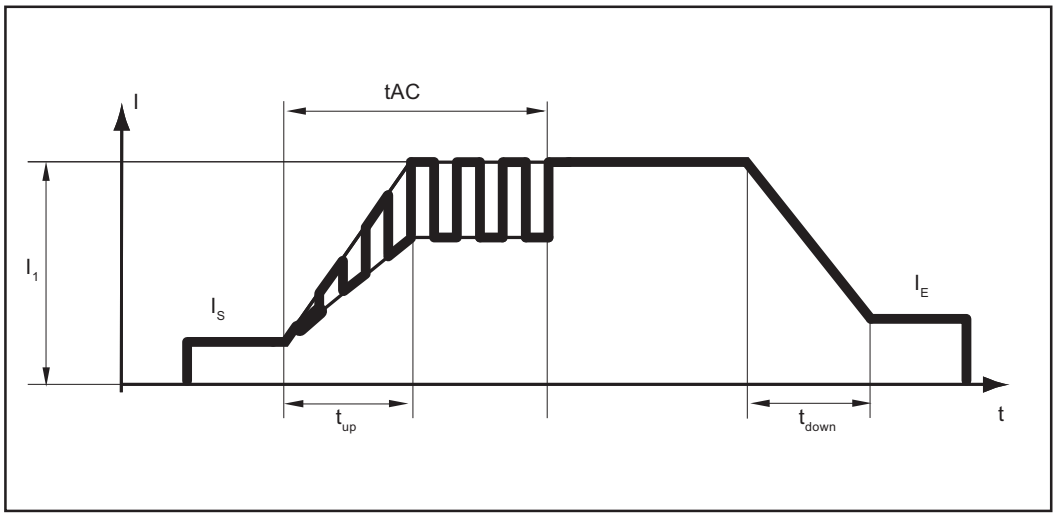
*) (1/F-P = time interval between two pulses)

Tacking function

The tacking function is available for the TIG DC welding process.

When a time period is specified for the tAC (tacking) set-up parameter, the tacking function is assigned to 2-step mode and 4-step mode. The operating sequence of the modes remains unchanged.
During this period, a pulsed welding current is present that makes the weld pool run together better when two parts are being tacked.

Mode of operation of tacking function when TIG DC welding is selected:



Tacking function - welding current curve

Legend:

tAC	Duration of pulsed welding current for the tacking process
I_S	Starting current
I_E	Final current
t_{up}	Upslope
t_{Down}	Downslope
I_1	Main current

NOTE! The following points apply to the pulsed welding current:
- The power source automatically regulates the pulsing parameters as a function of the specified main current I_1
- There is no need to set any pulsing parameters

The pulsed welding current begins:
- after the end of the starting-current phase I_S
- With the upslope phase t_{up}

Depending on what tAC time has been set, the pulsed welding current may continue up to and including the final current phase I_E (tAC set-up parameter set to "ON").

After the tAC time has elapsed, welding continues at a constant welding current, and any pulsing parameters that may have been set continue to be available.

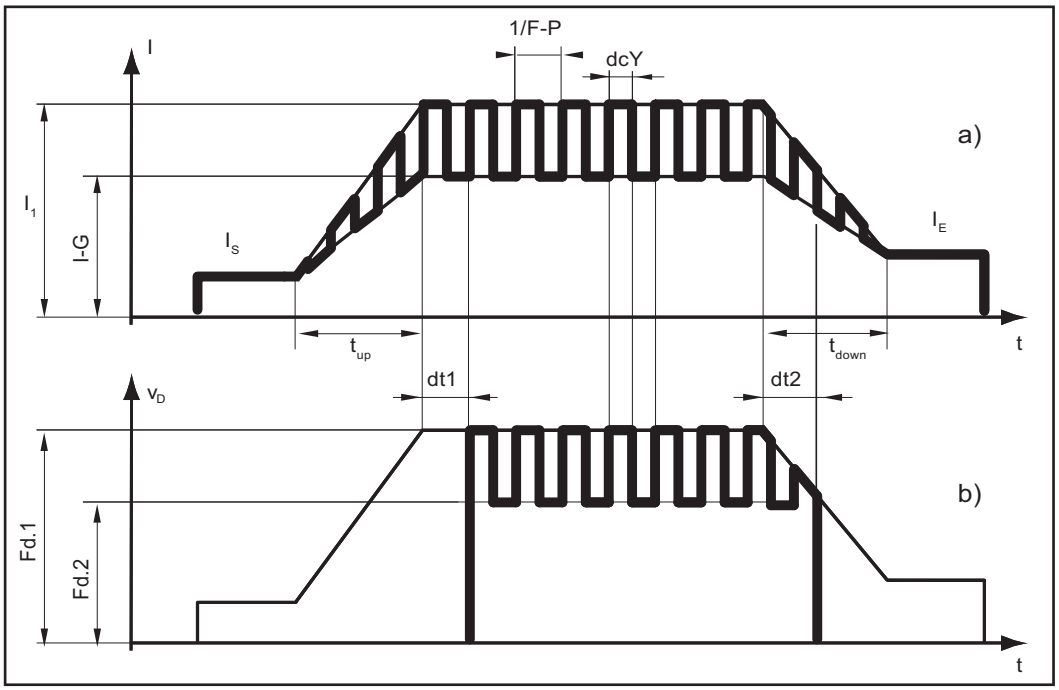
NOTE! To set a specified tacking time, the tAC set-up parameter can be combined with the SPt set-up parameter (spot welding time).

TIG cold-wire welding

TIG cold-wire welding is only possible in conjunction with a cold wire- feed unit.

Mode of operation of TIG cold-wire welding at a set pulse frequency when DC welding is selected:

a) Current waveshape
b) Wire feed speed curve



Legend:

I_S	Starting current	dcY	Duty cycle
I_E	Final current	I-G	Ground current
t_{up}	Upslope	I_1	Main current
t_{Down}	Downslope	F-P	Pulse frequency [1]
Fd.1	Wire feed speed 1	Fd.2	Wire feed speed 2
dt1	Delay in the start of wirefeeding from the beginning of main current phase I_1	dt2	Delay in the end of wirefeeding from the end of main current phase I_1

[1] (1/F-P = time interval between 2 pulses)

MMA welding

Safety

WARNING! Operating the equipment incorrectly can cause serious injury and damage. Do not use the functions described 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

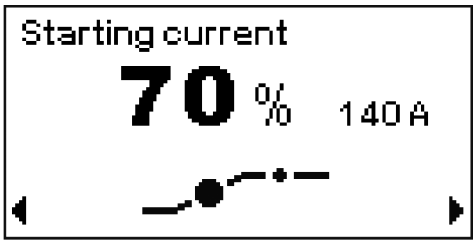
WARNING! An electric shock can be fatal. If the power source is connected to the mains electricity supply during installation, there is a high risk of very serious injury and damage. Before carrying out any work on the device make sure that:
- the power source mains switch is in the "O" position
- the power source is unplugged from the mains

Welding parameters: display and navigation

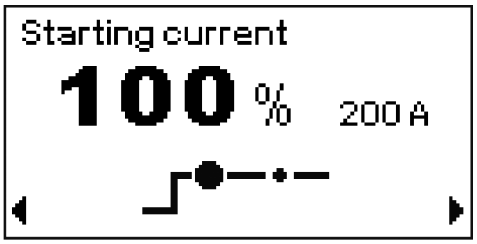
The welding parameters for manual metal arc welding are shown as soon as the manual metal arc welding mode is selected.

Use the left and right arrow keys to navigate within the welding parameters.

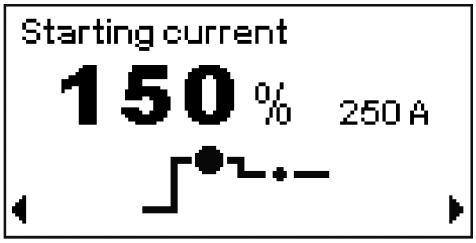
Welding parameters for rod electrodes



Starting current: starting current < main current ("SoftStart")

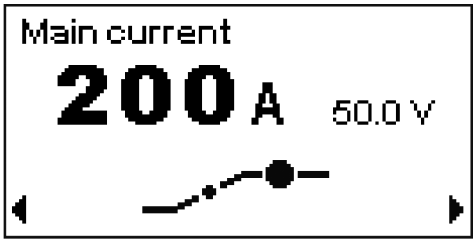


Starting current: starting current = main current

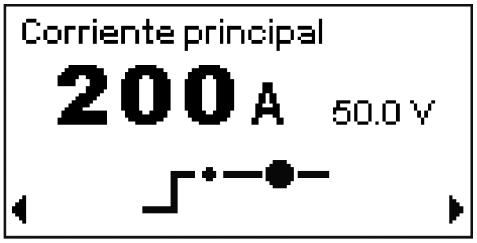


Starting current: starting current > main current ("Hot-Start")

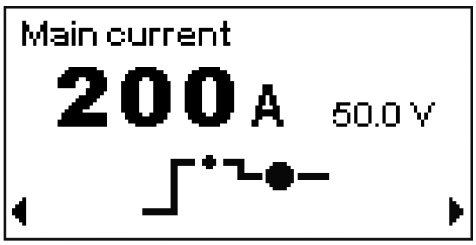
Unit	% (of main current)
Setting range	0 - 200
Factory setting	150



Main current: starting current < main current ("SoftStart")

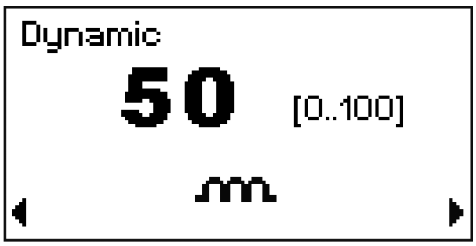


Main current: starting current = main current



Main current: starting current > main current ("HotStart")

Unit	A	
Setting range	MW 2500 Comfort 3 - 250 MW 3000 Comfort 3 - 300	TT 2500 Comfort 3 - 250 TT 3000 Comfort 3 - 300
Factory setting	-	

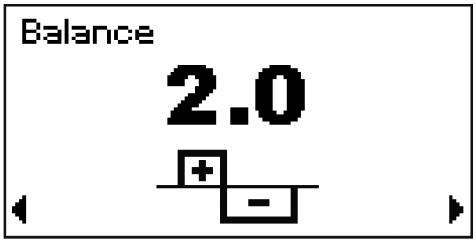


To obtain optimum welding results, it will sometimes be necessary to adjust the arc-force dynamic.

Unit	% (of main current)
Setting range	0 - 100
Factory setting	20

0	soft, low-spatter arc
100	harder, more stable arc

Functional principle:
at the instant of droplet transfer or when a short circuit occurs, there is a momentary rise in amperage. In order to obtain a stable arc, the welding current is temporarily increased. If the rod electrode threatens to sink into the weld pool, this measure prevents the weld pool solidifying, as well as preventing more prolonged short circuiting of the arc. This largely prevents the rod electrode from sticking.



only with MagicWave for the manual metal arc AC welding process

Unit	1
Setting range	-5 - +5
Factory setting	0

-5: highest fusing power, lowest cleaning action

+5: highest cleaning action, lowest fusing power

Preparation

1 Switch off cooling units (set-up parameter C-C to OFF)

2 Move the mains switch to the O position

3 Disconnect the mains plug

4 Disconnect the TIG welding torch

5 Plug the grounding (earthing) cable in and latch it into place:
- for MagicWave: in the grounding (earthing) cable connection
- for TransTig: in the (+) current socket

6 Use the other end of the grounding (earthing) cable to establish a connection to the workpiece

7 Plug in the electrode cable and twist it clockwise to latch it into place:
- for MagicWave: in the welding torch connection
- for TransTig: in the (-) current socket

8 Plug in the mains plug

CAUTION! Risk of injury and damage from electric shock. As soon as the mains switch is in the "I" position, the rod electrode in the electrode holder is live. Make sure that the rod electrode does not touch any persons or electrically conducting or earthed parts (e.g. the housing etc.).

9 Move the mains switch to the I position

The starting sequence with the Fronius logo, current firmware version and Fronius internet address is displayed for approx. 1 second:

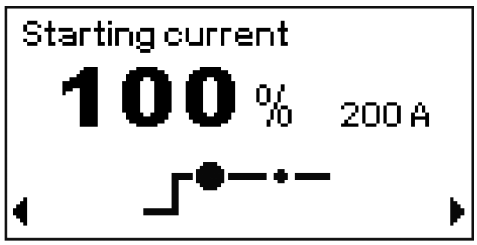
Manual metal arc welding

1 Press the Mode button to select:

MMA welding mode

NOTE! If the MMA welding mode is selected, the welding voltage will only be available after a 3-second delay.

The image for the rod electrode welding parameter is shown on the display:



2 Only for MagicWave: press the process button to select the required welding process:

MMA AC welding process

MMA DC- welding process

MMA DC+ welding process

NOTE! The TransTig power source has no switchover facility between the MMA DC- and MMA DC+ welding processes.

Procedure with TransTig power source for switching from MMA DC- welding to MMA DC+ welding:

a) Move the mains switch to the O position
b) Disconnect the mains plug
c) Reconnect the electrode holder and the earthing (grounding) cable to the opposite current sockets (i.e. swap them over)
d) Plug in the mains plug

CAUTION! Risk of injury and damage from electric shock. As soon as the mains switch is in the "I" position, the rod electrode in the electrode holder is live. Make sure that the rod electrode does not touch any persons or electrically conducting or earthed parts (e.g. the housing etc.).

e) Move the mains switch to the I position
The starting sequence with the Fronius logo, current firmware version and Fronius internet address is displayed for approx. 1 second:

3 Use the right arrow key to select the relevant welding parameters

4 Use the adjusting dial to set the selected welding parameter to the required value

5 If necessary, additional welding parameters can be set in the set-up menu:
- Press the menu key
  The relevant menu is displayed:

- Use the adjusting dial to select the desired set-up menu
- Open the selected set-up menu by pressing the adjusting dial
- Use the adjusting dial to select the welding parameter
- To change the welding parameter press the adjusting dial
- Change the welding parameter value using the adjusting dial
- Press the adjusting dial
- Exit the set-up menu

NOTE! All welding parameter set values that have been set using the adjusting dial remain stored until the next time they are changed. This applies even if the power source is switched off and on again in the meantime.

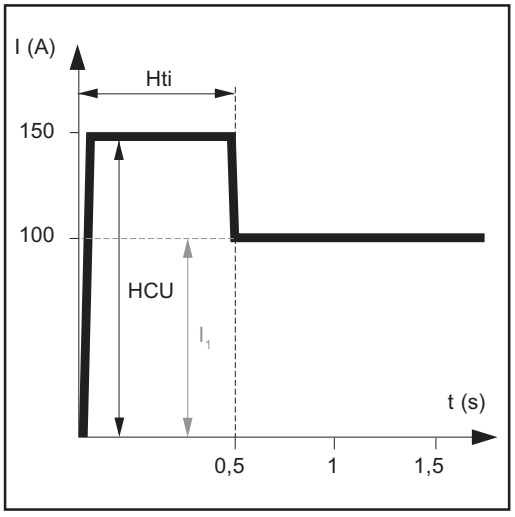
6 Start welding

Hotstart function

To obtain optimum welding results, it will sometimes be necessary to adjust the hotstart function.

Benefits
- Improved ignition, even when using electrodes with poor ignition properties
- Better fusion of the base material in the start-up phase, meaning fewer cold-shut defects
- Largely prevents slag inclusions

For details on setting the available welding parameters, please refer to the "Rod elect. set-up 2nd" section.



Example of hotstart function

Legend

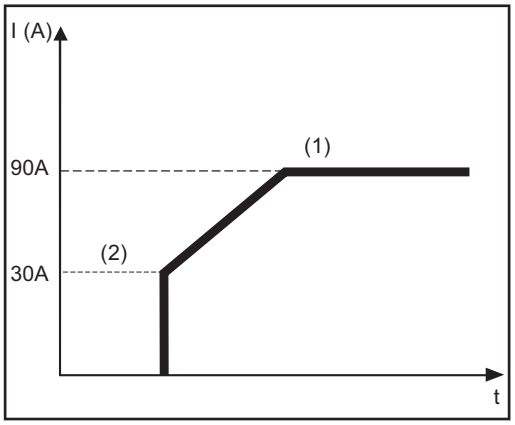
Hti	Hot-current time, 0-2 s, factory setting: 0.5 s
HCU	HotStart current, 0-200%, factory setting 150%
I_1	Main current = set welding current

Function:
during the specified hot-current time (Hti), the welding current I_1 is increased to the HotStart current HCU.

To activate the hotstart function, the HotStart current HCU must be > 100.

SoftStart function

The SoftStart function is intended for basic electrodes. Ignition takes place at a low welding current. Once the arc is stable, the welding current continues to rise until it reaches the welding current command value.



Example of "SoftStart" function

Benefits:
- Improved ignition properties for electrodes that ignite at low welding currents
- Largely prevents slag inclusions
- Reduces welding spatter

(1) Main current
(2) Starting current

Anti-stick function

As the arc becomes shorter, the welding voltage may drop so far that the rod electrode will tend to stick. This may also cause the rod electrode to burn out.

Electrode burn-out is prevented by activating the anti-stick function. If the rod electrode begins to stick, the power source immediately switches the welding current off. After the rod electrode has been detached from the workpiece, the welding process can be continued without any problems.

The anti-stick function can be activated and deactivated in the "Rod elect. setup 2nd" menu.

Welding job

Safety

WARNING! Operating the equipment incorrectly can cause serious injury and damage. Do not use the functions described 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

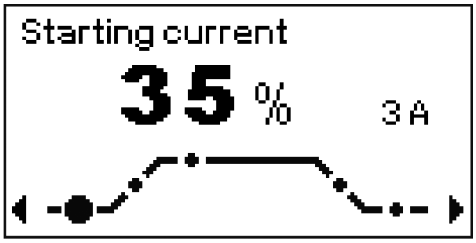
WARNING! An electric shock can be fatal. If the power source is connected to the mains electricity supply during installation, there is a high risk of very serious injury and damage. Before carrying out any work on the device make sure that:
- the power source mains switch is in the "O" position
- the power source is unplugged from the mains

Welding parameters: display and navigation

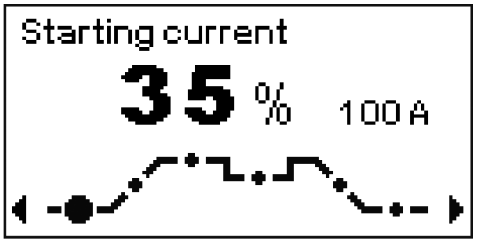
The welding parameters for the welding job are displayed as soon as a job has been selected. LEDs on the relevant symbols are illuminated according to the method and operating mode of the chosen job.

Use the left and right arrow keys to navigate within the welding parameters.

Welding parameters for TIG



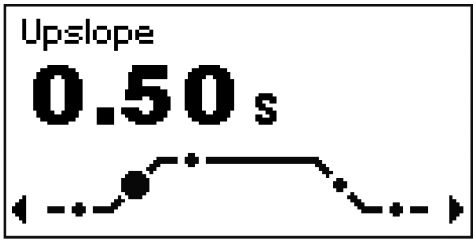
Starting current 2-step mode



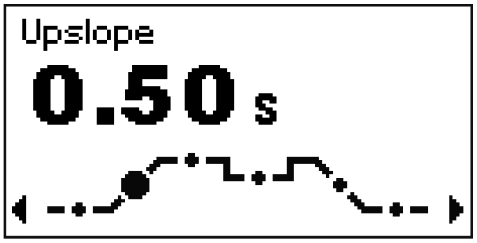
Starting current 4-step mode

Unit	% (of main current)
Setting range	30 - 200 AC, 0 - 200 DC
Factory setting	35 AC, 50 DC

IMPORTANT! The starting current is saved separately for the TIG AC welding and TIG DC welding modes.



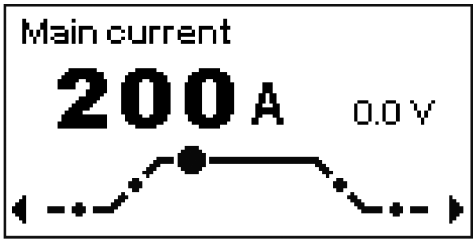
Upslope, 2-step mode



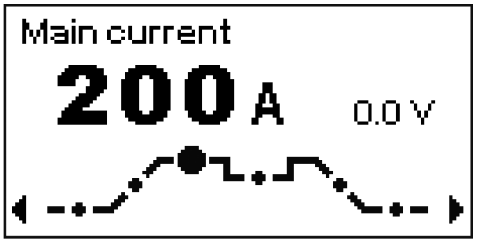
Upslope, 4-step mode

Unit	s
Setting range	0,0 - 9,9
Factory setting	0,1

IMPORTANT! The upslope is saved separately for 2-step and 4-step modes.



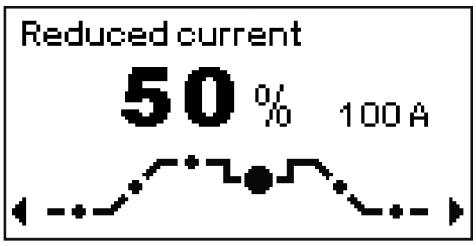
Main current, 2-step mode



Main current, 4-step mode

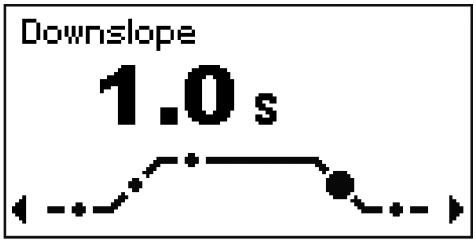
Unit	A	
Setting range	MW 2500 Comfort 3 - 250 MW 3000 Comfort 3 - 300	TT 2500 Comfort 3 - 250 TT 3000 Comfort 3 - 300
Factory setting	-	

IMPORTANT! On welding torches with the Up/Down function, the entire setting range can be selected while the device is idling. During welding, the main current can be corrected in steps of +/-20 A.



In the case of 4-step mode

Unit	% (of main current)
Setting range	0 - 100
Factory setting	50

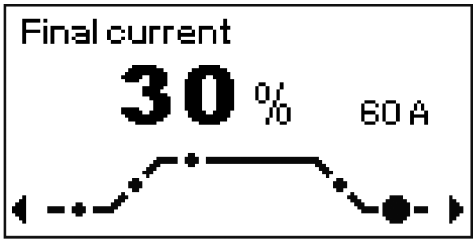


Downslope, 2-step mode

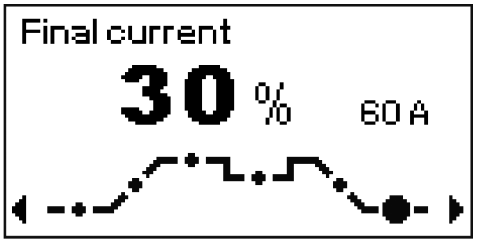
Downslope, 4-step mode

Unit	s
Setting range	0,0 - 9,9
Factory setting	1,0

IMPORTANT! The downslope is saved separately for 2-step and 4-step modes.

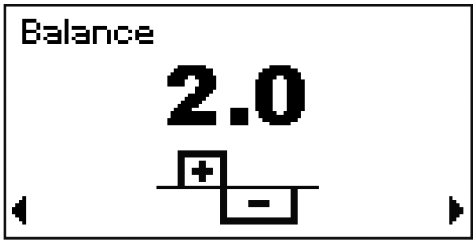


Final current, 2-step mode



Final current, 4-step mode

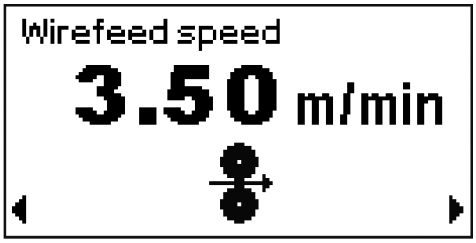
Unit	% (of main current)
Setting range	0 - 100
Factory setting	30



only with MagicWave for the TIG AC welding process

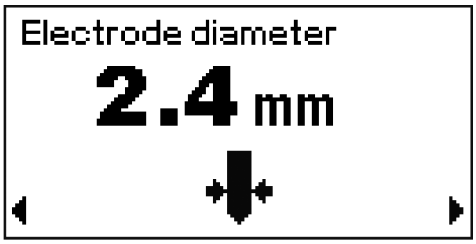
Unit	1
Setting range	-5 - +5
Factory setting	0

-5: highest fusing power, lowest cleaning action
+5: highest cleaning action, lowest fusing power



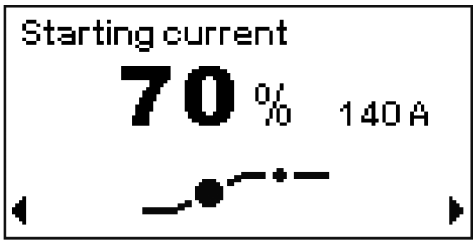
If cold wire-feed unit option is available

Unit	m/min	ipm
Setting range	OFF / 0.1 - max.	OFF / 3.9 - max.
Factory setting	OFF	

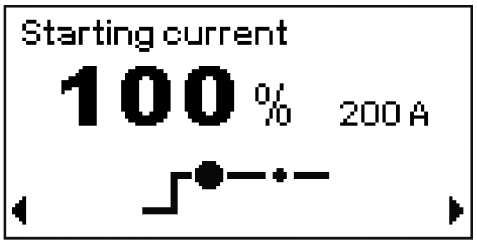


Unit	mm	in.
Setting range	OFF - max.	OFF - max.
Factory setting	2,4	0.1

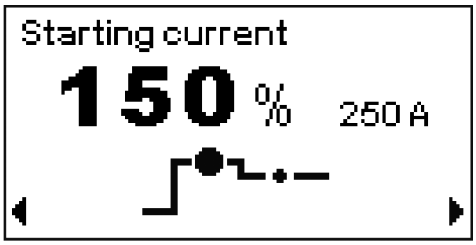
Welding parameters for rod electrodes



Starting current: starting current < main current ("SoftStart")

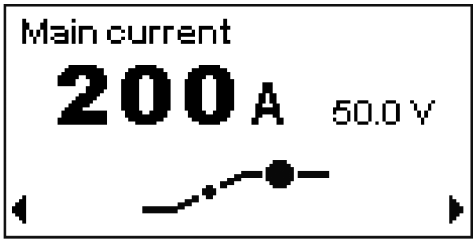


Starting current: starting current = main current

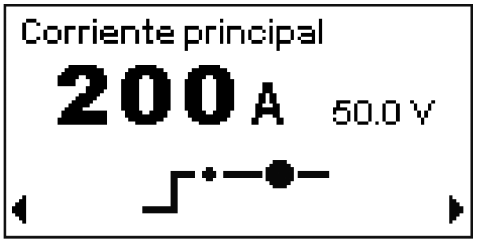


Starting current: starting current > main current ("Hot-Start")

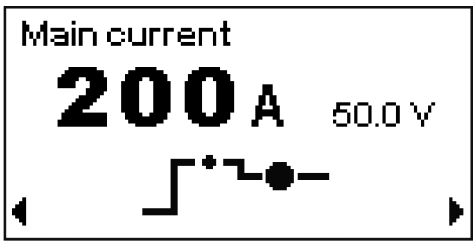
Unit	% (of main current)
Setting range	0 - 200
Factory setting	150



Main current: starting current < main current ("SoftStart")

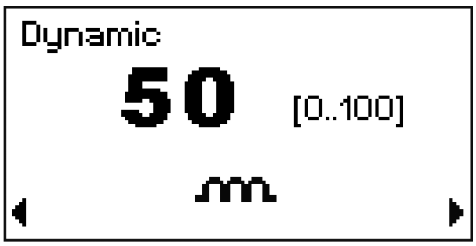


Main current: starting current = main current



Main current: starting current > main current ("HotStart")

Unit	A	
Setting range	MW 2500 Comfort 3 - 250 MW 3000 Comfort 3 - 300	TT 2500 Comfort 3 - 250 TT 3000 Comfort 3 - 300
Factory setting	-	

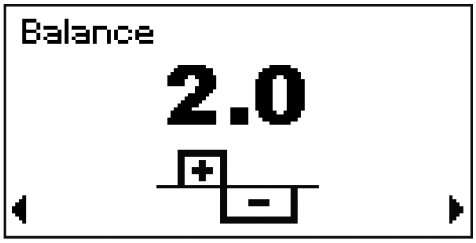


To obtain optimum welding results, it will sometimes be necessary to adjust the arc-force dynamic.

Unit	% (of main current)
Setting range	0 - 100
Factory setting	20

0	soft, low-spatter arc
100	harder, more stable arc

Functional principle:
at the instant of droplet transfer or when a short circuit occurs, there is a momentary rise in amperage. In order to obtain a stable arc, the welding current is temporarily increased. If the rod electrode threatens to sink into the weld pool, this measure prevents the weld pool solidifying, as well as preventing more prolonged short circuiting of the arc. This largely prevents the rod electrode from sticking.



only with MagicWave for the manual metal arc AC welding process

Unit	1
Setting range	-5 - +5
Factory setting	0

-5: highest fusing power, lowest cleaning action

+5: highest cleaning action, lowest fusing power

Preparation

1 Set up and install the power source in accordance with the welding job

2 Plug in the mains plug

CAUTION! Risk of injury and damage from electric shock. As soon as the mains switch is in the "I" position, the tungsten electrode of the welding torch is live. Make sure that the tungsten electrode does not touch any persons or electrically conductive or earthed parts (e.g. housing, etc.).

3 Move the mains switch to the I position

The starting sequence with the Fronius logo, current firmware version and Fronius internet address is displayed for approx. 1 second:

Welding job

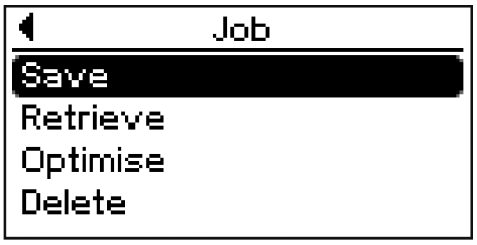
1 Press Menu key

The relevant main menu appears, e.g.:

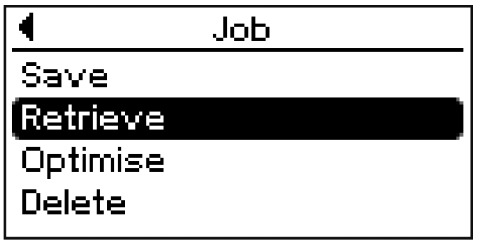
2 Use the adjusting dial to select "job" (turn the adjusting dial)

3 Press the adjusting dial

The menu items for the job will now appear:

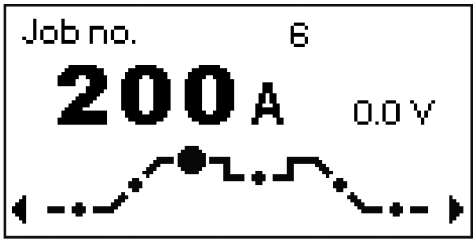


4 Use the adjusting dial to select 'Retrieve' (turn the adjusting dial)

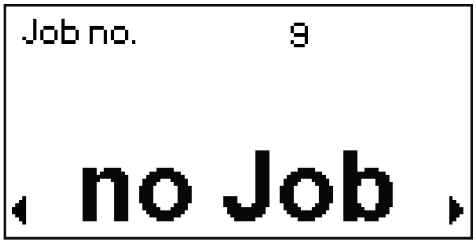


5 Press the adjusting dial

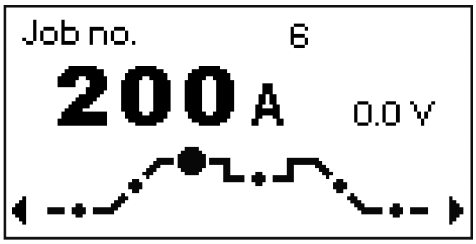
The display now shows the last job that was selected:



A free memory location is indicated as follows:

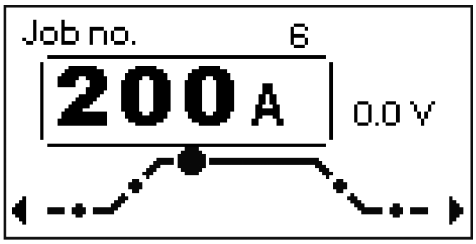


6 Use the adjusting dial to select the desired job (turn the adjusting dial)

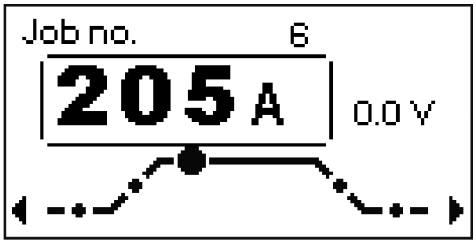


7 To change welding parameters according to the job correction stored in the job:

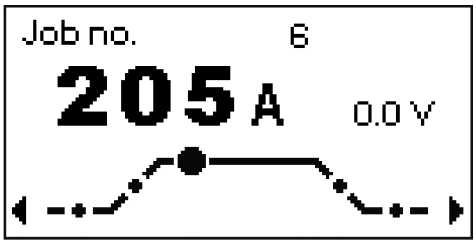
- Use left and right arrow keys to select welding parameters
- Press the adjusting dial
  The value of the selected welding parameter is displayed in a box:



- Use the adjusting dial to set the required value (turn the adjusting dial)



- Press the adjusting dial
  The adjusted value of the selected welding parameter is applied

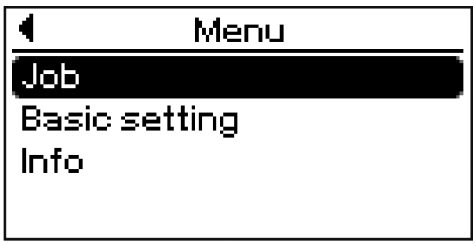


8 Start welding

Finishing the welding job

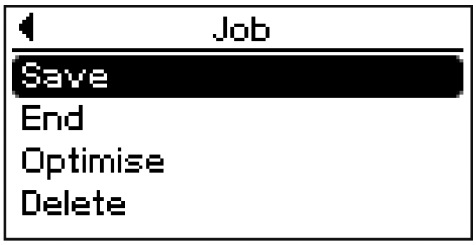
1 Finish welding

2 Press Menu key
The main menu for the welding job appears:

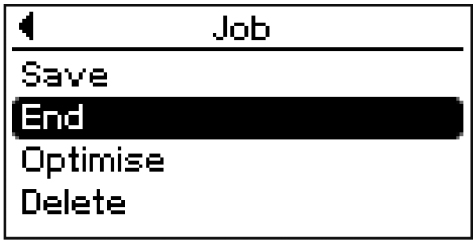


3 Use the adjusting dial to select "job" (turn the adjusting dial)

4 Press the adjusting dial
The menu items for an active job will now appear:

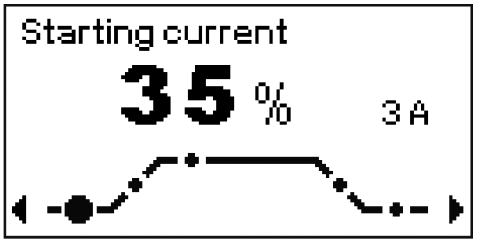


5 Use the adjusting dial to select "Finish" (turn the adjusting dial)



6 Press the adjusting dial

The welding parameters are shown for the most recently selected method, e.g.:



Starting current 2-step mode

Saving settings as a job

General

In the individual welding processes, settings and welding parameters can be stored in 100 jobs (job numbers 0 to 99).

Preparation

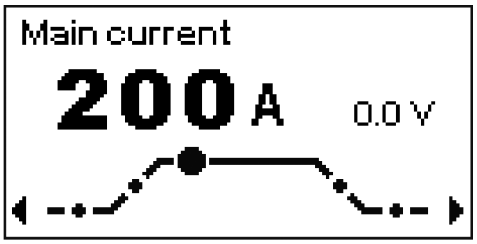
1 Select the mode to be saved using the Mode button:

TIG 2-step mode

TIG 4-step mode

Manual metal arc welding mode

The relevant image for the welding parameters is displayed, e.g.:



TIG welding parameters for 2-step mode (main current welding parameter selected)

2 Only for MagicWave: press the Process button to select the required welding process

TIG AC welding process / manual metal arc AC welding

TIG AC welding process with automatic cap-shaping function / manual metal arc DC welding

TIG DC welding process / manual metal arc DC+ welding

3 Use the right arrow key to select the individual welding parameters

4 Change the welding parameter value by turning the adjusting dial

5 Press the Menu key in order to set other welding parameters in the set-up menu

The relevant menu is displayed, e.g.:

6 Use the adjusting dial to select the desired set-up menu

7 Open the selected set-up menu by pressing the adjusting dial

8 Use the adjusting dial to select a welding parameter

9 To change a welding parameter press the adjusting dial

10 Change the welding parameter value using the adjusting dial

11 Press the adjusting dial

12 Press Menu key

The latest menu appears, e.g.:

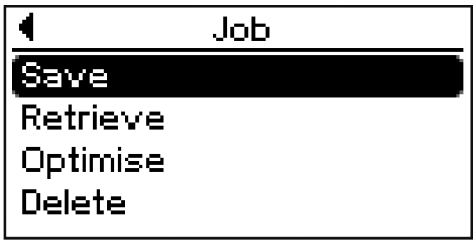
Saving settings as a job

NOTE! When settings are saved as a job, all the settings are stored in the welding parameters as well as in the relevant set-up menus in a job. When creating jobs you MUST therefore also take into account the welding parameters in the set-up menus.

1 Select the job from the relevant set-up menu by turning the 'Job' adjusting dial

2 Press the adjusting dial

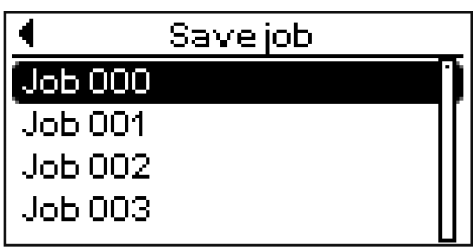
The menu items for the job will now appear:



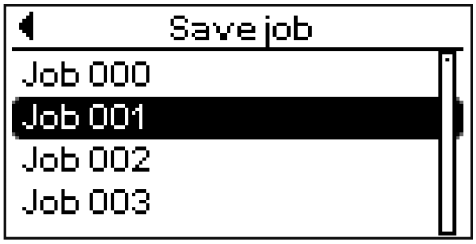
3 Use the adjusting dial to select "Save" (turn the adjusting dial)

4 Press the adjusting dial

The first "Save job" screen will appear:



5 Turn the adjusting dial to select the job number under which the settings are to be stored



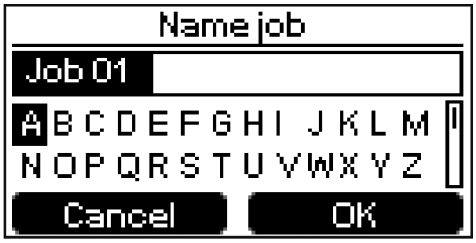
6 Press the adjusting dial

- If there is memory available, then the settings will be stored under the selected job number.
- If all the memory is occupied, then a warning prompt will appear.

Free memory:

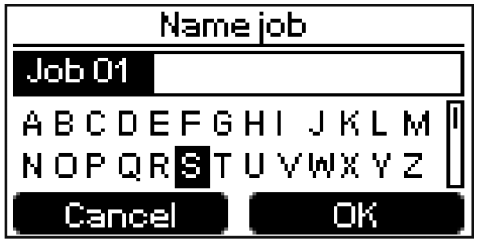
The second "Save job" screen appears briefly:

The "Name job" screen appears:

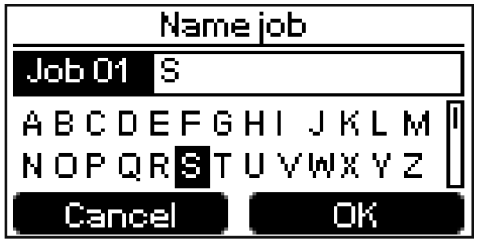


7 Name job:

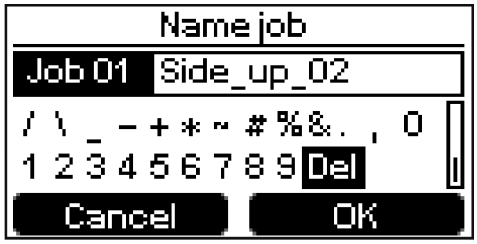
- Turn the adjusting dial to select the desired letters / numbers:



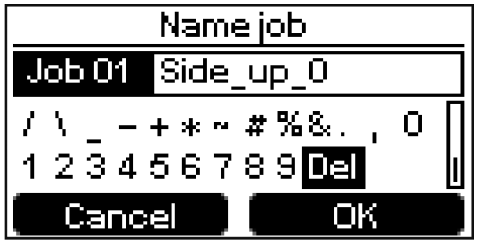
- Then press the adjusting dial in order to enter these letters / numbers:



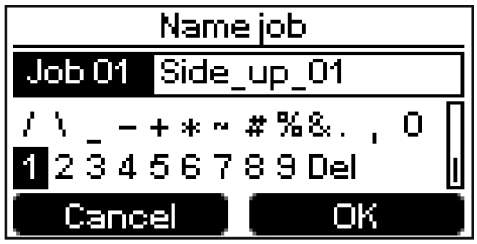
- In order to delete letters / numbers, turn the adjusting dial and select 'Del':



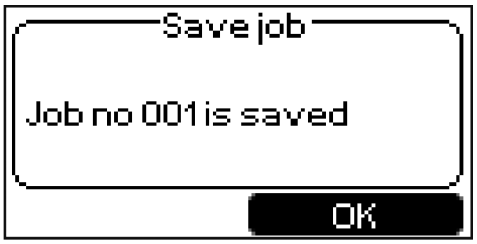
- Press the adjusting dial to delete the last character:



- Press the button on the right (OK) in order to accept the name

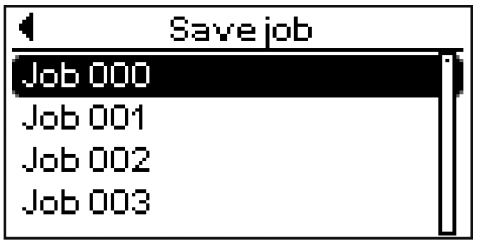


The settings will be stored and the third 'Save job' screen will appear:



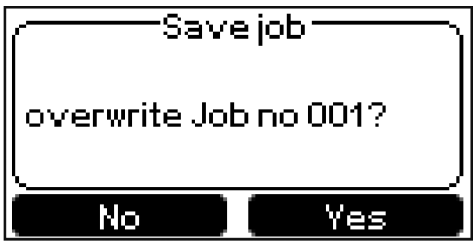
8 Press the button on the right (OK)

The job numbers overview appears:



Allocated memory:

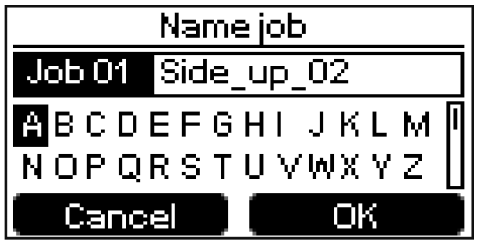
A warning prompt will appear:



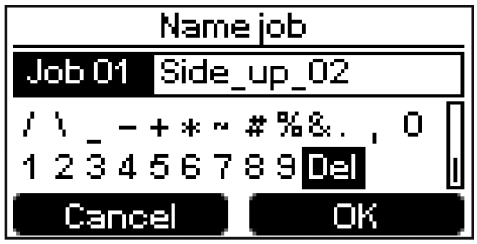
7 Press the button on the left or right:

- Left button (No): Do not overwrite job, return to job numbers overview
- Right button (Yes): Store settings under the chosen job number:

The "Name job" screen appears:



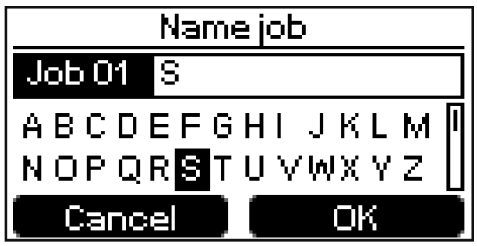
- If necessary, delete the existing job name: Turn the adjusting dial and select 'Del'



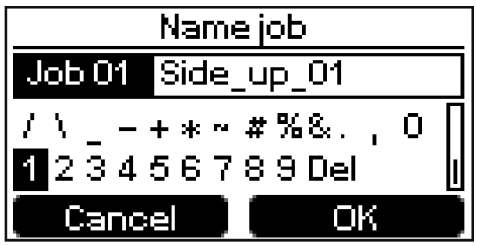
- Press the adjusting dial to delete the last character:

- Turn the adjusting dial to select the desired letters / numbers:

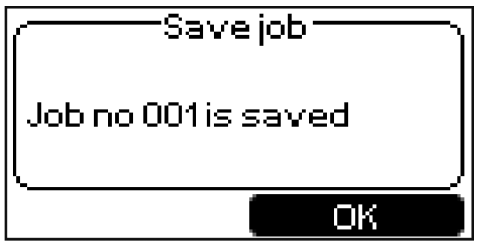
- Then press the adjusting dial in order to enter these letters / numbers:



- Press the button on the right (OK) in order to accept the name

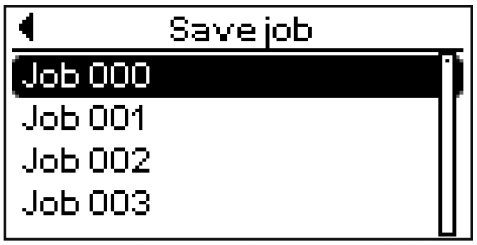


The settings will be stored and the "Job saved" screen will appear:



8 Press the button on the right (OK)

The job numbers overview appears:

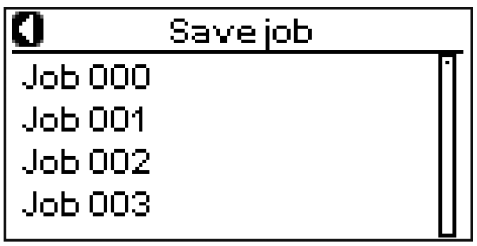


Finish saving job

1 Press Menu key

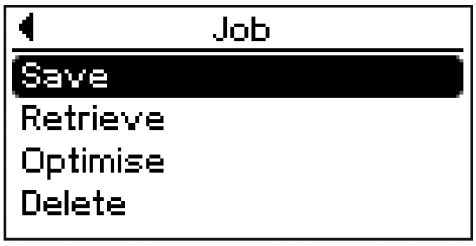
or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

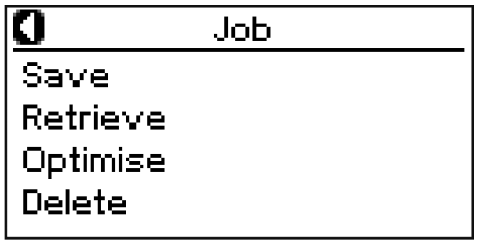
The menu items for the job will now appear:



2 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

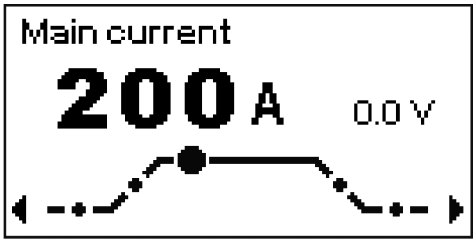
The current set-up menu is displayed:

3 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial

The current welding parameters are displayed e.g.:



TIG welding parameters for 2-step mode (main current welding parameter selected)

Setup settings

The Setup menu

General

The set-up menu provides easy access to the knowledge base in the power source and to additional functions. The set-up menu can be used to make simple adjustments of the welding parameters to suit the various job settings.

- The set-up menu contains all the set-up parameters that have an immediate effect on the welding process.
- The 2nd level of the set-up menu contains all the set-up parameters needed for making the preliminary settings on the welding device.

The welding parameters are arranged in logical groups.

Overview

"The set-up menu" is composed of the following sections:

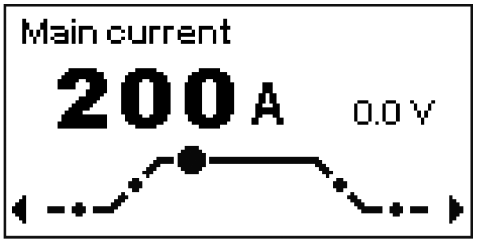
- TIG setup
- TIG setup 2nd
- AC setup
- AC setup 2nd
- Gas setup
- Cold wire setup
- Calibrating the push-pull unit
- Rod elec. setup (rod electrode setup)
- Rod elec. setup 2nd (rod electrode setup 2nd)
- AC setup (for rod electrodes)
- Job
- Basic setting
- Info
- Lock keys
- Factory - for resetting the welding machine
- L/R alignment

TIG setup

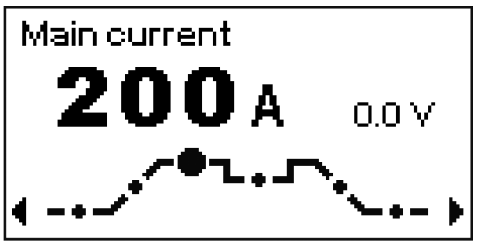
Opening the TIG setup

1 Press the Mode button to select 2-step mode or 4-step mode

The image for the TIG welding parameter is shown on the display:



TIG welding parameters for 2-step mode



TIG welding parameters for 4-step mode

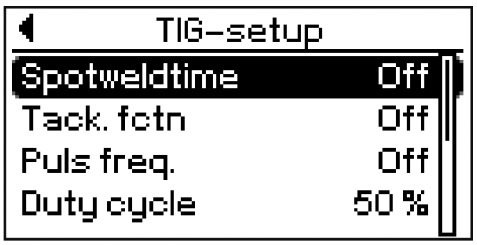
2 Press Menu key

The main menu appears:

3 Use the adjusting dial to select "TIG setup" (turn the adjusting dial)

4 Press the adjusting dial

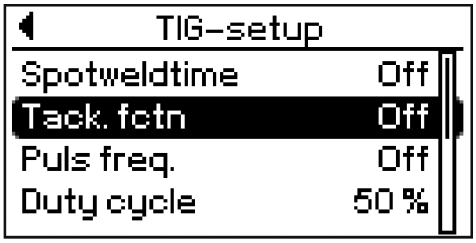
The TIG setup parameters are shown:



The power source is now in the TIG setup.

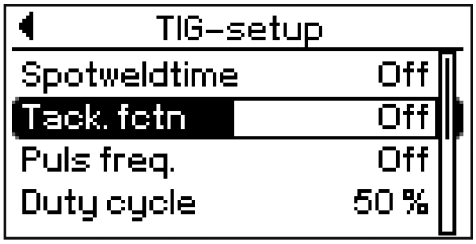
Changing welding parameters

1 Select the desired welding parameter by turning the adjusting dial:

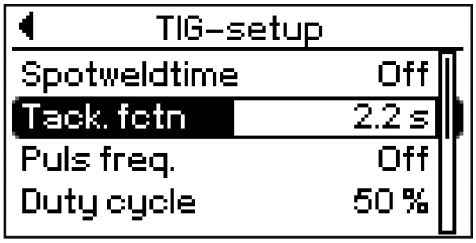


2 To set the welding parameter, press the adjusting dial

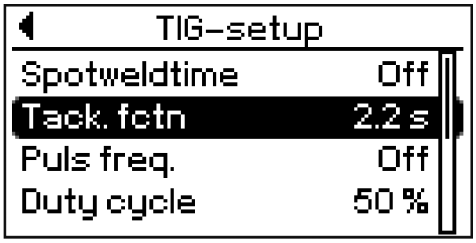
The value of the selected welding parameter can now be changed:



3 Change the welding parameter value by turning the adjusting dial:



4 To apply the welding parameter value press the adjusting dial

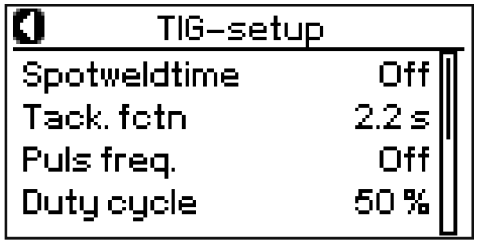


Exiting TIG setup

1 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

The main menu appears:

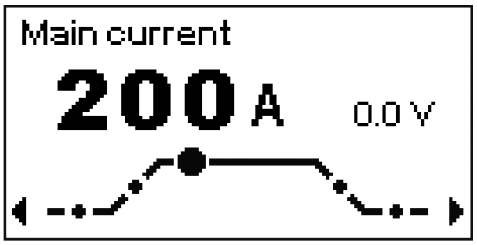
2 Press Menu key

or

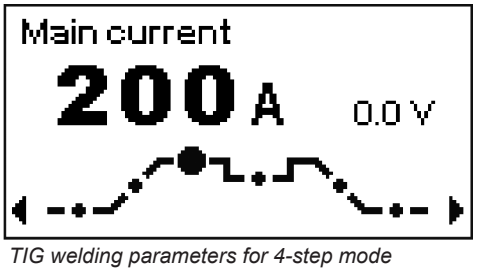
- Select the arrow symbol by turning the adjusting dial

- Press the adjusting dial

The image for the TIG welding parameter is shown:



TIG welding parameters for 2-step mode



TIG welding parameters for 4-step mode

Welding parameters in the TIG set-up

"Minimum" and "maximum" are used for setting ranges that differ according to power source, wire-feed unit, welding program, etc.

Spot welding time

Unit	s
Setting range	OFF / 0.05 - 25.0
Factory setting	OFF

If a value has been set for the spot welding time, "2-step mode" will work in the same way as spot welding mode.

The spot welding indicator remains lit on the control panel as long as a value has been specified for the spot welding time.

Tacking function

for the TIG DC welding process: Duration of the pulsed welding current at the start of tacking

Unit	s
Setting range	OFF / 0.1 - 9.9 / ON
Factory setting	OFF

ON	The pulsed welding current remains in effect until the end of the tacking operation
0.1 - 9.9 s	The set time begins with the upslope phase. After the end of the pre-set time period, welding continues with a constant welding current; any pulsing parameters that have been set are available.
OFF	The tacking function is deactivated

TAC The tacking indicator remains lit on the control panel as long as a value has been specified for the tacking time.

Pulse frequency

Unit	Hz / kHz
Setting range	OFF / 0.20 Hz - 2.00 kHz
Factory setting	OFF

The selected pulse frequency is also used for the reduced current I_2.

IMPORTANT!If the pulse frequency is set to "OFF":
- then the welding parameters Duty Cycle, Ground Current and Wirefeed spd2 (from cold wire setup) are not available
- the wire feed speed set on the control panel is used for constant wirefeed at a constant welding current.

The pulse indicator remains lit on the control panel as long as a value has been specified for the pulse frequency.

Setting the pulse frequency:

0.2 Hz to 5 Hz	Thermal pulsing (out-of-position welding, automated welding)
1 kHz to 2 kHz	Arc-stabilising pulsing (stabilising the arc at a low welding current)

Duty Cycle
The ratio of pulse duration to base current duration when a pulse frequency has been set

Unit	%
Setting range	10 - 90
Factory setting	50

Ground current

Unit	% (of main current I_1)
Setting range	0 - 100
Factory setting	50

Starting current time

Unit	s
Setting range	OFF / 0.01 - 9.9
Factory setting	OFF

The starting current time t-S specifies the duration of the starting-current phase I_S .

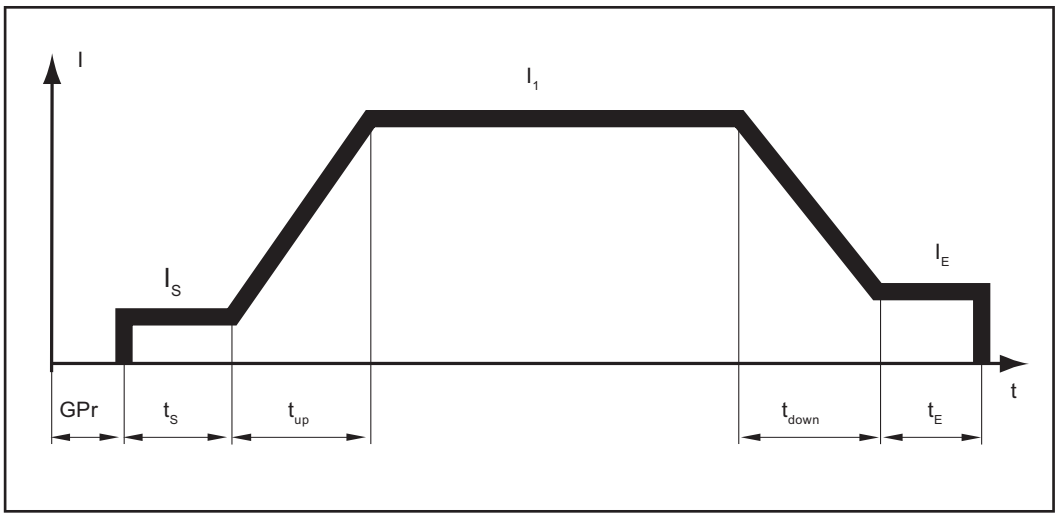
IMPORTANT!The starting current time only applies in 2-step mode. In 4-step mode, the duration of the starting-current phase I_S is controlled using the torch trigger

Final current time

Unit	s
Setting range	OFF / 0.01 - 9.9
Factory setting	OFF

The final current time t-E specifies the duration of the final current phase I_E .

IMPORTANT!The final current time only applies in 2-step mode. In 4-step mode, the duration of the final current phase I_E is controlled with the torch trigger (see: "TIG operating modes").



2-step mode: Starting and final current time

Legend:

GPr	Gas pre-flow time
I_S	Starting current
t_S	Starting current time
t_{up}	UpSlope
I_1	Main current
t_{down}	Downslope
I_E	Final current
t_E	Final current time

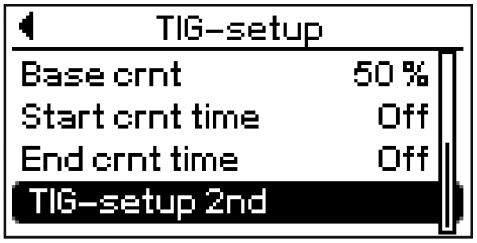
TIG-Setup 2nd
Second level of the TIG setup

TIG setup 2nd

Opening the TIG setup 2nd

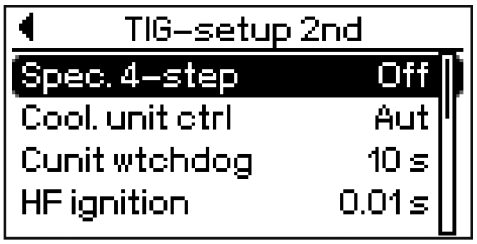
1 Opening the TIG setup

2 Select the 'TIG setup 2nd' parameter



3 Press the adjusting dial

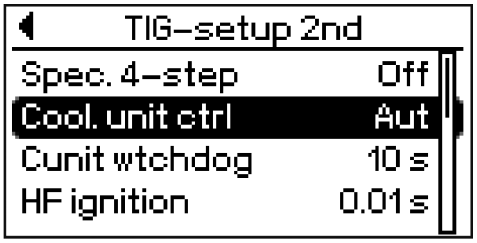
The TIG setup 2nd parameters are shown:



The power source is now in TIG setup 2nd

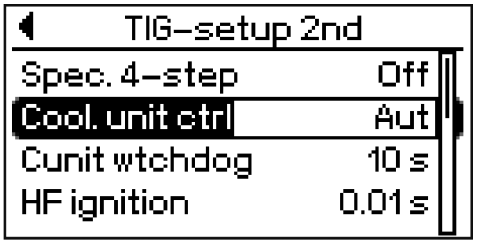
Changing welding parameters

1 Select the desired welding parameter by turning the adjusting dial:

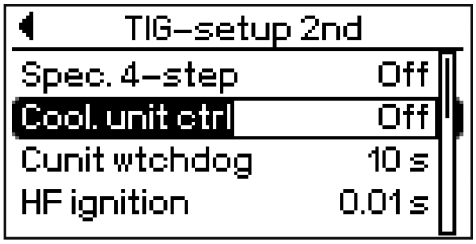


2 To set the welding parameter, press the adjusting dial

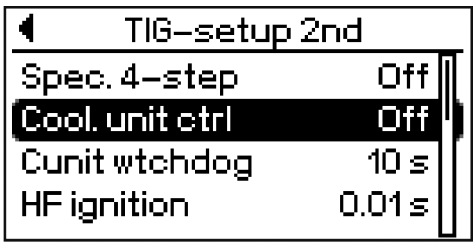
The value of the selected welding parameter can now be changed:



3 Change the welding parameter value by turning the adjusting dial:



4 To apply the welding parameter value press the adjusting dial

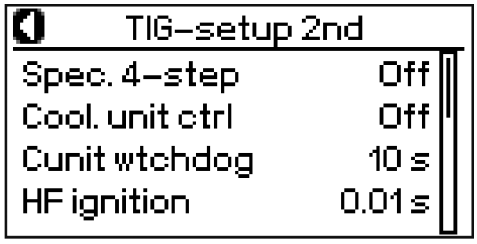


Exiting TIG setup 2nd

1 Press Menu key

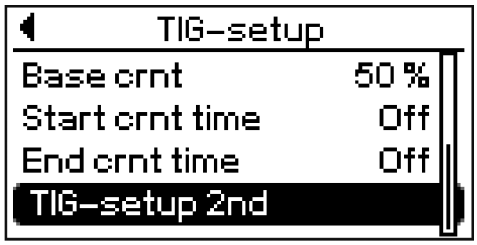
or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

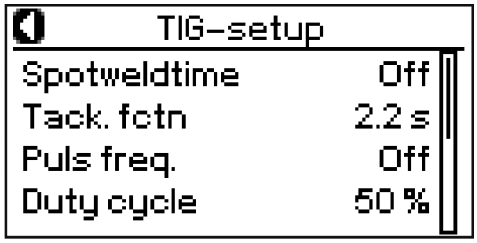
The TIG setup parameters are shown:



2 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

The main menu appears:

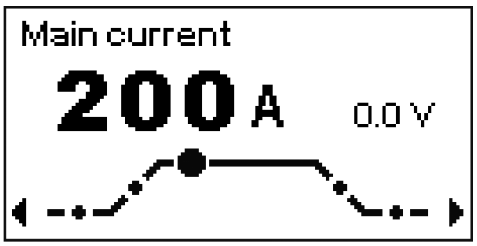
3 Press Menu key

or

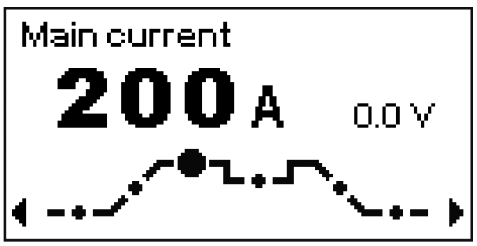
- Select the arrow symbol by turning the adjusting dial

- Press the adjusting dial

The image for the TIG welding parameter is shown:



TIG welding parameters for 2-step mode



TIG welding parameters for 4-step mode

Welding parameters in the TIG set-up 2nd

"Minimum" and "maximum" are used for setting ranges that differ according to power source, wire-feed unit, welding program, etc.

Special 4-step
Special 4-step mode

Unit	-
Setting range	OFF / 1 - 3
Factory setting	OFF
1	Variant 1
2	Variant 2
3	Variant 3

Cool. unit ctrl
Cooling unit control (option)

Unit	-
Setting range	Aut / ON / OFF
Factory setting	Aut
Aut	Cooling unit is switched off 2 minutes after the end of welding
ON	Cooling unit is ON all the time
OFF	Cooling unit is OFF all the time

IMPORTANT! If the coolant unit is provided with the optional "thermostat", the coolant return temperature is checked continuously. If the return temperature is less than 50 °C, the cooling unit is switched off automatically.

Cunit wtchdog
Cooling unit watchdog

Time from when the flow watchdog is triggered until the "no | H2O" service code is output. For example, if there are air bubbles in the cooling system, the cooling unit will not cut out until the end of this pre-set time.

Unit	s
Setting range	5 - 25
Factory setting	10

IMPORTANT! Each time the power source is switched on, the cooling unit carries out a test run for 180 seconds.

HF ignition
High frequency ignition: Time interval between the HF pulses

Unit	s
Setting range	0.01 - 0.4 / OFF / EHF (Start with external arc starters, e.g. plasma welding)
Factory setting	0,01

NOTE! If there are problems with sensitive equipment in the immediate vicinity, increase the HF ignition parameter to a maximum of 0.4 s.

HF The special HF ignition indicator remains lit as long as a value has been specified for the HF ignition parameter.

If the “HF ignition” set-up parameter is set to “OFF”, no high frequency ignition takes place at the start of welding. In this case, welding starts with touchdown ignition.

rPI ignition
Reversed polarity ignition

Unit	-
Setting range	ON / OFF
Factory setting	OFF

IMPORTANT! The rPI ignition function
- is only available on the MagicWave power source
- is not recommended for welding light-gauge sheets

L/R alignment

L (inductivity) - welding circuit inductivity (in microhenry)
R (resistance) - welding circuit resistance (in mOhm)

See the "L/R alignment" section for further details.

Ignition time-out
Time until safety cut-out is triggered after abortive ignition attempt

Unit	s
Setting range	0,1 - 9,9
Factory setting	5

IMPORTANT! "Ignition Time-Out" is a safety function so it cannot be deactivated. A description of the ignition time out function may be found in the Chapter "TIG welding".

Arc break
Arc break watchdog

Time until safety cut-out following an arc break

Unit	s
Setting range	0,1 - 9,9
Factory setting	2

IMPORTANT! The arc break watchdog is a safety function and cannot be deactivated. A description of the arc break watchdog function may be found in the section "TIG welding".

Ext. Parameter
External parameter

a user-defined welding parameter for the JobMaster TIG welding torch or robot interface (both optional).
A freely selectable welding parameter is available both on the JobMaster TIG welding torch and for the robot interface. If “Ext. parameter” has been selected, you can use the adjusting dial to choose between the following possibilities for this freely definable welding parameter:

OFF	No freely defined welding parameter has been assigned (factory setting)	I-E	Final current
		ACF	AC frequency
ELd	Electrode diameter	F-P	Pulse frequency
bAL	Balance	dcY	Duty cycle
SPt	Spot welding time	I-G	Ground current
I-S	Starting current	tAC	Tacking function: Duration of the tacking operation
UPS	UpSlope		
I-2	Reduced current	Fd.1	Wire feed speed 1 (cold wire-feed unit option)
dsl	Downslope		

The number of user-defined welding parameters depends on the configuration and the mode that has been selected.

Special 2-step
Special 2-step mode for HF ignition after touching the workpiece

Unit	-
Setting range	OFF / 1
Factory setting	OFF

Ignition sequence, when the STS parameter is set to 1:
- Touch the workpiece with the tungsten electrode
- The short-circuit detection on the power source is triggered
- Lift the tungsten electrode off
- After 300 ms the gas pre-flow time begins
- HF ignition is initiated
- Welding ends due to arc break

Ign. delay
Ignition delay

Delayed ignition with immediate high frequency start

Unit	s
Setting range	OFF / 0.1 - 1
Factory setting	OFF

If a time value is set for the welding parameter "Ign. delay", the welding arc is ignited with a delay according to this time value: Press the torch trigger - high frequency is activated for the specified duration - the welding arc is ignited

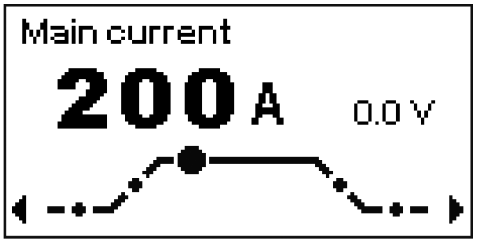
AC setup

General

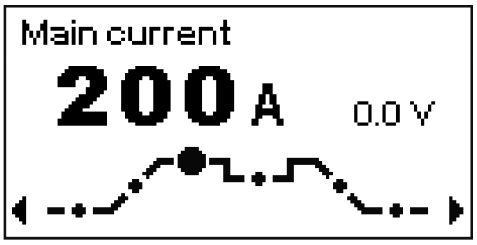
This setup is only available with MagicWave power sources.

Open the AC set-up

1 Press the Mode button to select 2-step mode or 4-step mode
The image for the TIG welding parameter is shown on the display:



TIG welding parameters for 2-step mode



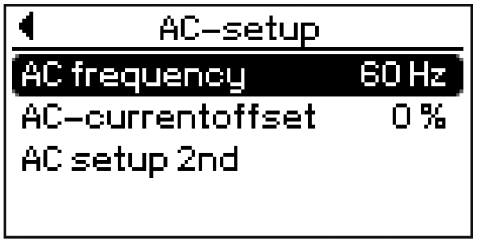
TIG welding parameters for 4-step mode

2 Press Menu key
The main menu appears:

3 Use the adjusting dial to select "AC setup" (turn the adjusting dial)

4 Press the adjusting dial

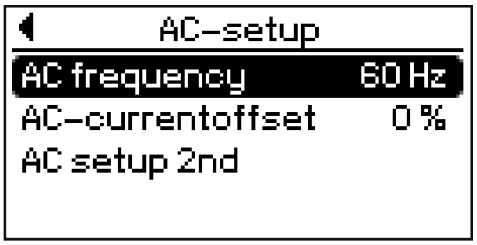
The AC setup parameters are shown:



The power source is now in AC setup.

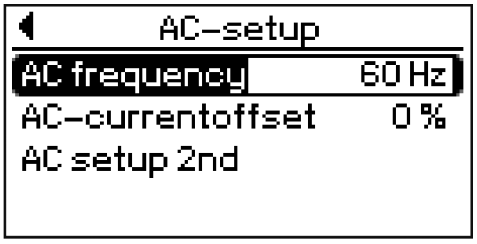
Changing welding parameters

1 Select the desired welding parameter by turning the adjusting dial:

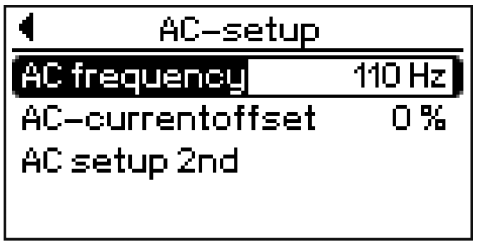


2 To set the welding parameter, press the adjusting dial

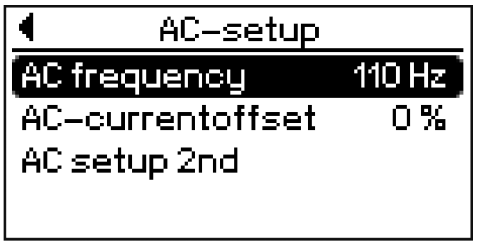
The value of the selected welding parameter can now be changed:



3 Change the welding parameter value by turning the adjusting dial:



4 To apply the welding parameter value press the adjusting dial

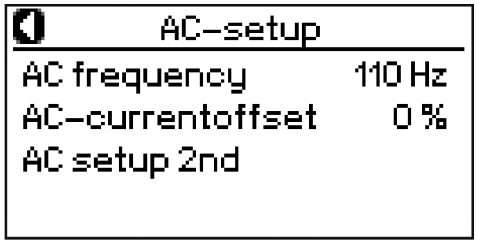


Exiting AC setup

1 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

The main menu appears:

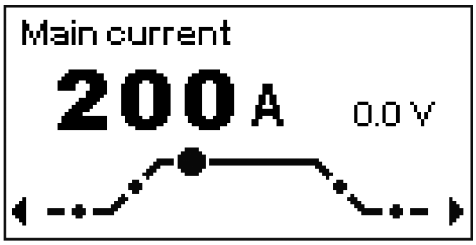
2 Press Menu key

or

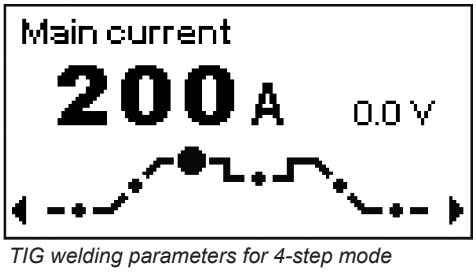
- Select the arrow symbol by turning the adjusting dial

- Press the adjusting dial

The image for the TIG welding parameter is shown:



TIG welding parameters for 2-step mode



TIG welding parameters for 4-step mode

Welding parameters in AC setup

"Minimum" and "maximum" are used for setting ranges that differ according to power source, wire-feed unit, welding program, etc.

AC frequency

Unit	Hz
Setting range	Syn / 40 - 250
Factory setting	60
Syn	for mains synchronisation of two power sources for simultaneous AC welding.

IMPORTANT! If using the "Syn" setting, remember to check the "Phase sync." parameter in AC setup 2nd.

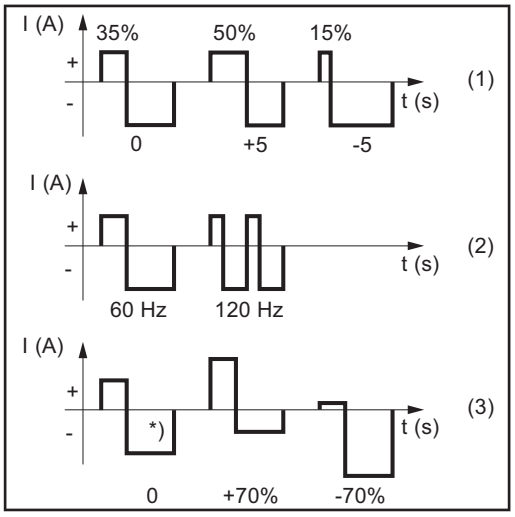
Low frequency	soft, distant arc with shallow heat input
High frequency	focused arc with deep heat input

AC current offset

Unit	%
Setting range	-70 to +70
Factory setting	0
+70	distant arc with shallow heat input
-70	narrow arc, deep heat input, faster welding speed

AC setup 2nd

second level of the AC setup



Effect of the AC parameters on the waveshape

(1) Balance
(2) AC frequency
(3) AC current offset
*) Factory setting: 20% shift to the negative

AC setup 2nd

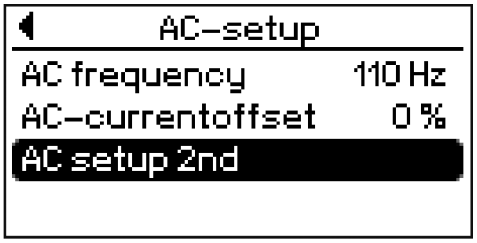
General

This setup is only available with MagicWave power sources.

Opening the AC setup 2nd

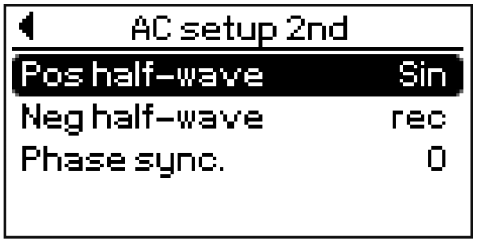
1 Open the AC setup

2 Select the 'AC setup 2nd' parameter



3 Press the adjusting dial

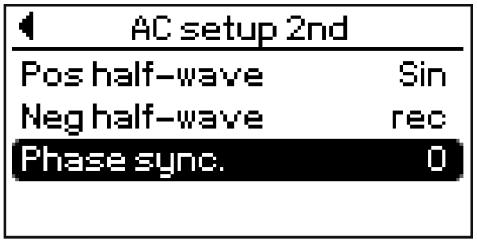
The AC setup 2nd parameters are shown:



The power source is now in AC setup 2nd.

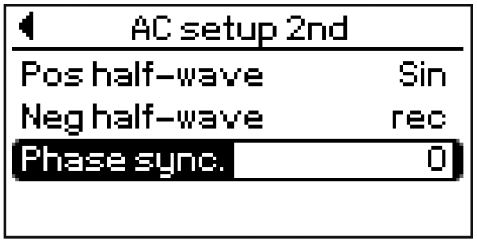
Changing welding parameters

1 Select the desired welding parameter by turning the adjusting dial:

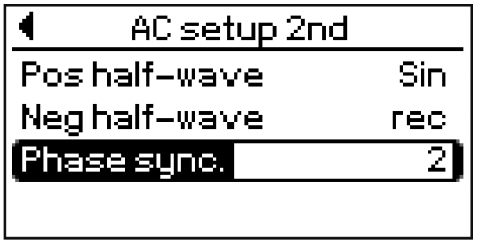


2 To set the welding parameter, press the adjusting dial

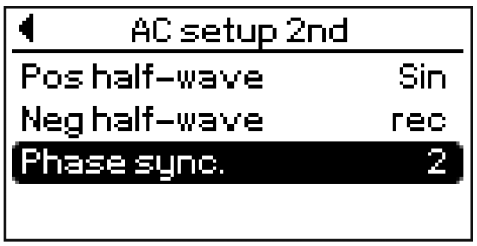
The value of the selected welding parameter can now be changed:



3 Change the welding parameter value by turning the adjusting dial:



4 To apply the welding parameter value press the adjusting dial

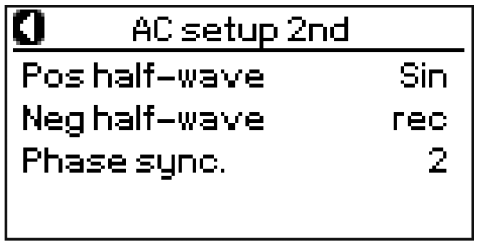


Exiting AC setup 2nd

1 Press Menu key

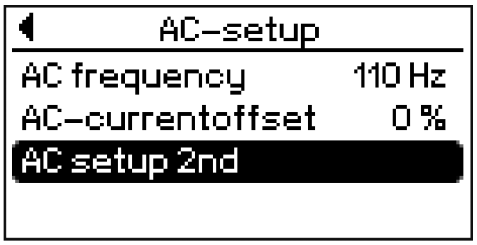
or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

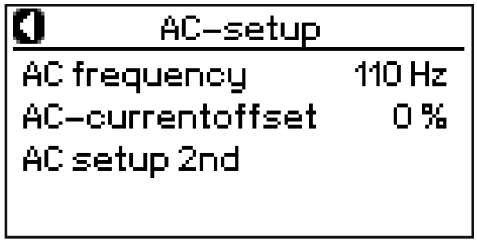
The AC setup parameters are shown:



2 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

The main menu appears:

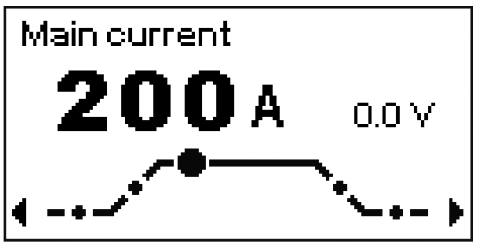
3 Press Menu key

or

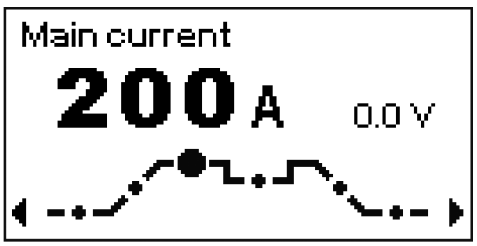
- Select the arrow symbol by turning the adjusting dial

- Press the adjusting dial

The image for the TIG welding parameter is shown:



TIG welding parameters for 2-step mode



TIG welding parameters for 4-step mode

Welding parameters in AC setup 2nd

"Minimum" and "maximum" are used for setting ranges that differ according to power source, wire-feed unit, welding program, etc.

Pos half-wave
positive half-wave

Unit	-
Setting range	Tri / Sin / Rec / Off
Factory setting	Sin
Tri	Triangular waveform
Sin	Sine ... sinusoidal waveform (standard setting for a low-noise, stable arc)
Rec	Rectangular waveform with decreased edge steepness, for reducing noise levels compared to those that occur with the 100% rectangular waveform
Off	100% rectangular waveform (stable but loud arc)

Neg. half-wave
Negative half-wave

Unit	-
Setting range	Tri / Sin / Rec / Off
Factory setting	OFF
Tri	Triangular waveform
Sin	Sine ... sinusoidal waveform (standard setting for a low-noise, stable arc)
Rec	Rectangular waveform with decreased edge steepness, for reducing noise levels compared to those that occur with the 100% rectangular waveform
Off	100% rectangular waveform (stable but loud arc)

Phase sync.

Phase synchronisation of mains connection of two power sources for simultaneous AC welding.

Unit	-
Setting range	0 - 5
Factory setting	0

IMPORTANT! Before phase synchronisation, the "AC frequency" welding parameter must be set to "Syn" in the AC setup.

Phase adjustment takes place as follows:
- Prepare a test workpiece for simultaneous AC welding.
- Adjust the phase synchronisation value on a power source to between 0 and 5 until the best welding result is achieved.

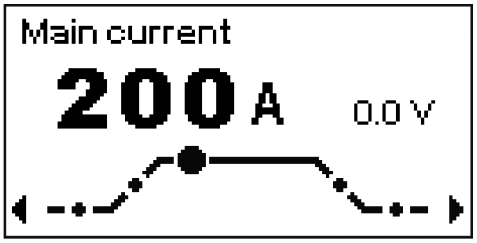
Gas setup

General

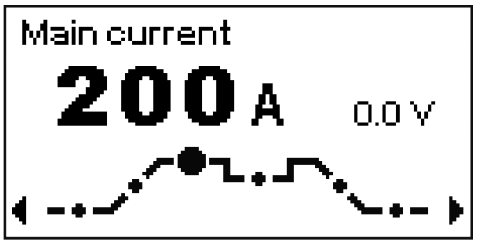
The gas setup offers easy access to the protective gas shield settings.

Opening the gas setup

1 Press the Mode button to select 2-step mode or 4-step mode
The image for the TIG welding parameter is shown on the display:



TIG welding parameters for 2-step mode



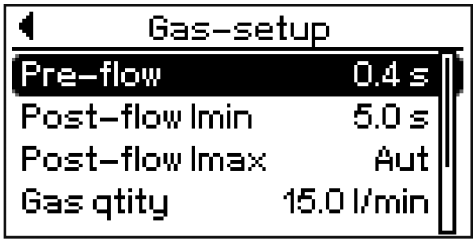
TIG welding parameters for 4-step mode

2 Press Menu key
The main menu appears:

3 Use the adjusting dial to select "gas setup" (turn the adjusting dial)

4 Press the adjusting dial

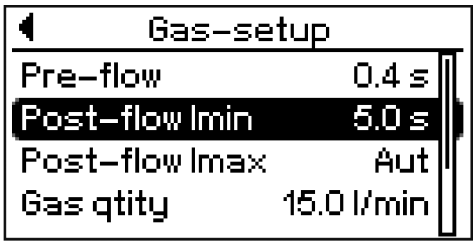
The gas setup parameters are shown:



The power source is now in gas setup.

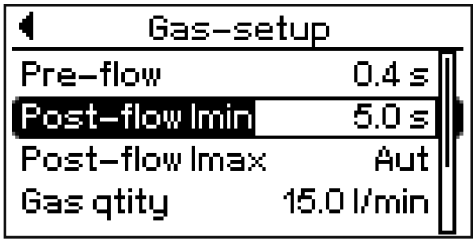
Changing welding parameters

1 Select the desired welding parameter by turning the adjusting dial:

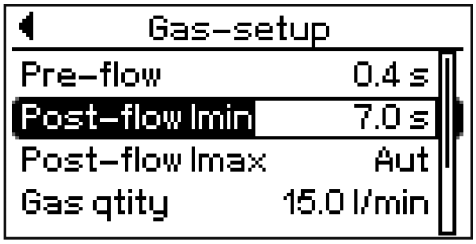


2 To set the welding parameter, press the adjusting dial

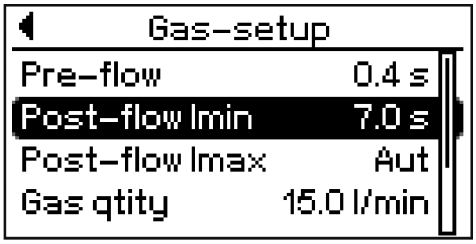
The value of the selected welding parameter can now be changed:



3 Change the welding parameter value by turning the adjusting dial:



4 To apply the welding parameter value press the adjusting dial

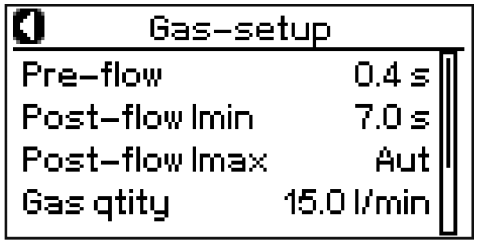


Exiting gas setup

1 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

The main menu appears:

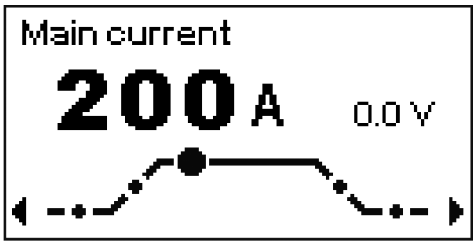
2 Press Menu key

or

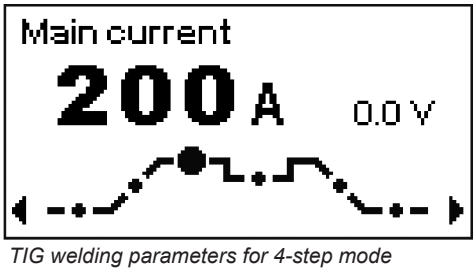
- Select the arrow symbol by turning the adjusting dial

- Press the adjusting dial

The image for the TIG welding parameter is shown:



TIG welding parameters for 2-step mode



TIG welding parameters for 4-step mode

Gas setup parameters

"Minimum" and "maximum" are used for setting ranges that differ according to power source, wire-feed unit, welding program, etc.

Pre-flow
Gas pre-flow time

Unit	s
Setting range	0,0 - 9,9
Factory setting	0,4

Post-flow Imin
Post-flow at I_{min}

Gas post-flow time at minimum welding current (minimum gas post-flow time)

Unit	s
Setting range	0 - 25
Factory setting	5

Post-flow Imax
Post-flow at I_{max}

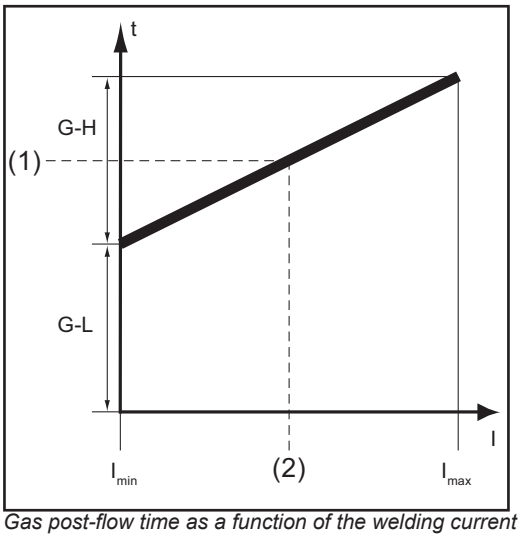
Increase in gas post-flow time at maximum welding current

Unit	s
Setting range	0 - 40/Aut
Factory setting	Aut

The value set for "post-flow Imax" only applies if the maximum welding current actually has been set. The actual value is derived from the present welding current. With a medium welding current, for example, the actual value will be one-half of the value set for "post-flow Imax".

IMPORTANT! The values set for the 'post-flow Imin' and 'post-flow Imax' welding parameters are added together. For example, if both welding parameters are at maximum (25 s / 40 s), the gas post-flow will last:
- 25 s at minimum welding current
- 65 s at maximum welding current
- 37.5 s if the welding current is exactly half the maximum, etc.

If Aut is selected, the gas post-flow time is calculated automatically. This takes the selected process (AC or DC welding) into account.



Gas post-flow time as a function of the welding current

Legend:

(1).... Gas post-flow time at any given moment

(2).... Welding current at any given moment

G-H.... Post-flow Imax

G-L .... Post-flow Imin

Gas qtity

Command value for protective gas shield flow (only with the "digital gas control" option)

Unit	l/min	cfh
Setting range	OFF / 5.0 - max.	OFF / 10.71 - max.
Factory setting	15	32.14

IMPORTANT! Please refer to "Digital Gas Control" operating instructions for more detailed explanations of the "gas flow rate" welding parameter.

Gas correction

(only with the “Digital Gas Control“ option)

Unit	-
Setting range	AUT / 1.0 - 10.0
Factory setting	AUT

IMPORTANT! Please refer to "Digital Gas Control" operating instructions for more detailed explanations of the "gas correction" welding parameter.

Gas flushing

Purging of protective gas shield

Unit	min
Setting range	OFF / 0.1 - 10.0
Factory setting	OFF

Purging of the protective gas shield begins as soon as "gas flushing" is allocated a value. For safety reasons, purging of the shielding gas cannot be restarted until a new gas flushing value is entered.

IMPORTANT! Purging of the protective gas shield is necessary if condensation forms when the device is left unused in a cold environment for a prolonged period. Long hosepacks are most affected.

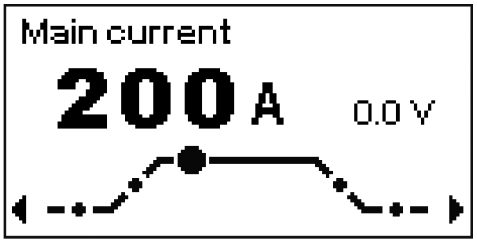
Cold wire setup

General

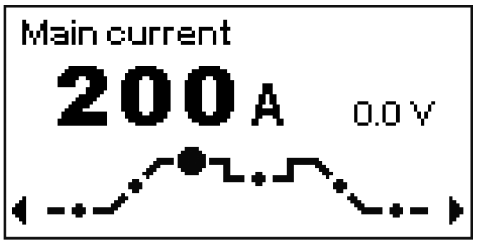
The cold wire setup is only available if a cold wire feeder is connected to the power source.

Opening the AC setup

1 Press the Mode button to select 2-step mode or 4-step mode
The image for the TIG welding parameter is shown on the display:



TIG welding parameters for 2-step mode



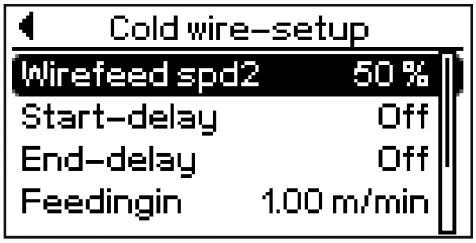
TIG welding parameters for 4-step mode

2 Press Menu key
The main menu appears:

3 Use the adjusting dial to select "cold wire setup" (turn the adjusting dial)

4 Press the adjusting dial

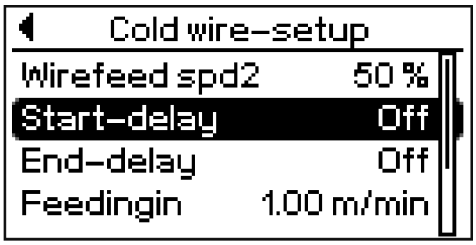
The cold wire setup welding parameters are shown:



The power source is now in the cold wire setup.

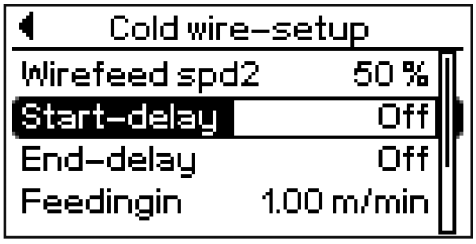
Changing welding parameters

1 Select the desired welding parameter by turning the adjusting dial:

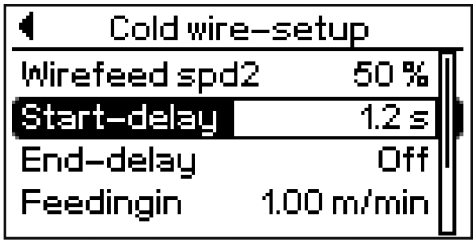


2 To set the welding parameter, press the adjusting dial

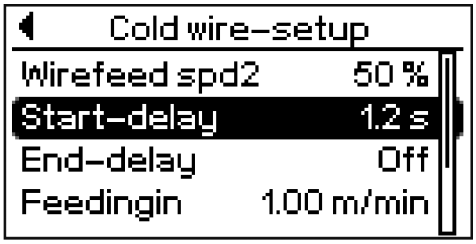
The value of the selected welding parameter can now be changed:



3 Change the welding parameter value by turning the adjusting dial:



4 To apply the welding parameter value press the adjusting dial

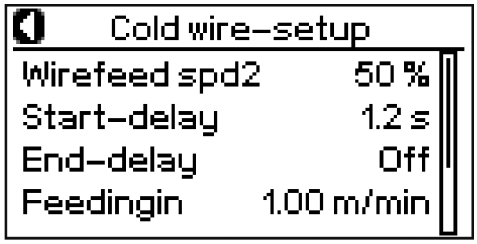


Exiting the cold wire setup

1 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

The main menu appears:

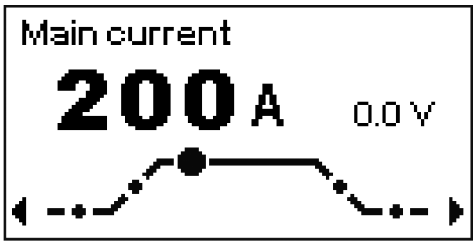
2 Press Menu key

or

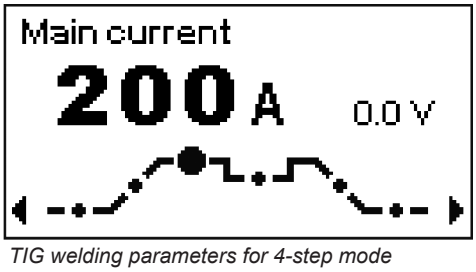
- Select the arrow symbol by turning the adjusting dial

- Press the adjusting dial

The image for the TIG welding parameter is shown:



TIG welding parameters for 2-step mode



TIG welding parameters for 4-step mode

Welding parameters in the cold wire setup

"Minimum" and "maximum" are used for setting ranges that differ according to power source, cold wire-feed unit, welding program, etc.

Wirefeed spd2
Wire feed speed 2

Unit	% (of the wire feed speed)
Setting range	0 - 100
Factory setting	50

If a value is set for both 'wire feed speed 2' and 'pulse frequency', then the wire feed speed alternates between the following values in sync with the pulse frequency of the welding current:
- Wire feed speed from the TIG welding parameters
- Wire feed speed 2

Start-delay
Delay in the start of wirefeeding from beginning of the main current phase

Unit	s
Setting range	OFF / 0.1 - 9.9
Factory setting	OFF

End-delay
Delay in the start of wirefeeding from end of the main current phase

Unit	s
Setting range	OFF / 0.1 - 9.9
Factory setting	OFF

Wire threading
Wire threading speed

Unit	m/min	ipm.
Setting range	0.1 - max.	3.94 - max.
Factory setting	5	197

Wire wdraw

Unit	mm	in.
Setting range	OFF / 1 - 50	OFF / 0.04 - 1.97
Factory setting	OFF	OFF

IMPORTANT!Wire withdrawal prevents the welding wire from burning at the end. Before the welding current is switched off, the wire is withdrawn to the set value. A prerequisite for this function is that the arc has ignited.

Push-pull
Selecting and calibrating the push-pull unit

Unit	-	
Setting range	00 - KD7000/VR1530KD22m 01 - KD7000/VR1530KD30m 02 - RobactaKD-Drive 10m 03 - RobactaKD-Drive 220m 15 - KD7000/VR1530KD10m	18 - RobactaKD-Drive 5m 19 - KD4010 10m 21 - BinzelTorchDr.IWG 8m 25 - KD7000-VR1530KD10m
Factory setting	0	

Calibrating push-pull unit

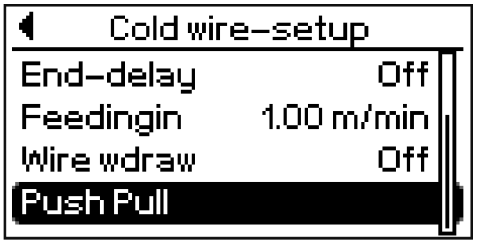
General

The push-pull unit must be calibrated before it is started up for the first time and whenever the wire feed software is updated. If the push-pull unit is not calibrated, standard welding parameters will be used - which may lead to an unsatisfactory welding result.

Calibrating the push-pull unit

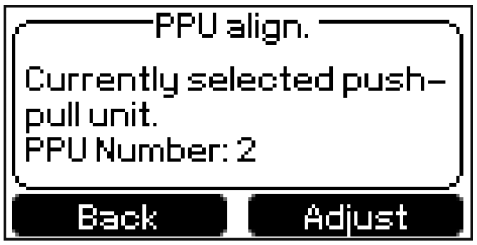
For an overview of the service codes used during calibration of the push-pull unit, please refer to "Service codes for push-pull calibration".

1 In cold wire setup select the "push-pull" parameter



2 Press the adjusting dial

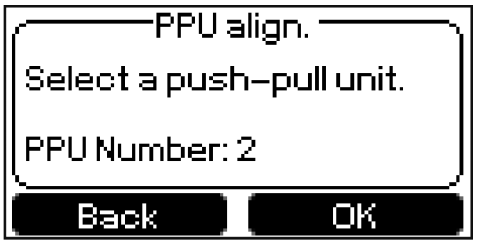
The first push-pull calibration screen is shown:



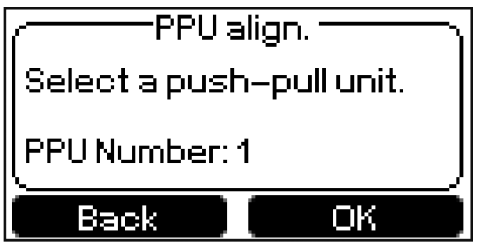
On the following push-pull calibration screens pressing the left button takes you back to the previous screen.

3 Press the right button

The second push-pull calibration screen is shown:

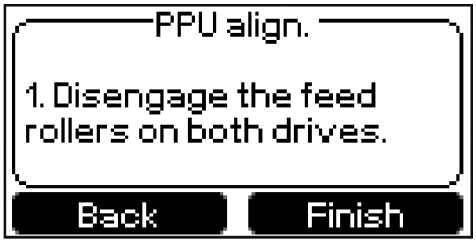


4 Use the adjusting dial to select the corresponding push-pull unit:



5 Press the right button

The third push-pull calibration screen is shown:

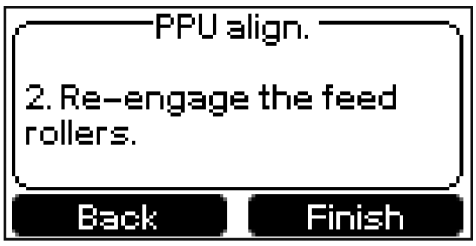


6 Follow the instructions shown

CAUTION! Risk of injury from rotating cogs and drive parts. Keep hands away from rotating cogs and the wire drive.

7 Press the right button

The fourth push-pull calibration screen is shown:

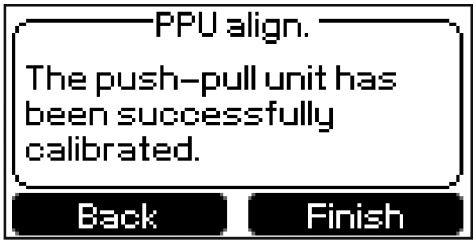


8 Follow the instructions shown

CAUTION! Risk of injury from welding wire emerging at speed and from rotating cogs and drive parts. Hold the welding torch so that it points away from your face and body. Keep hands away from rotating cogs and the wire drive.

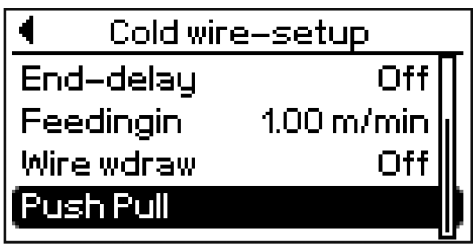
9 Press the right button

A confirmation appears once the push-pull unit has been calibrated:



10 Press the right button

The cold wire setup welding parameters are shown:



General

No.	Push-pull unit	Wire feed speed
00	Fronius KD 7000 Fronius VR 1530 KD	22 m/min or 866 ipm
01	Fronius KD 7000 Fronius VR 1530 KD	30 m/min or 1181 ipm
02	Fronius Robacta KD Drive Fronius Robacta Plasma KD Drive Fronius Robacta Laser KD Drive	10 m/min or 394 ipm
03	Fronius Robacta KD Drive Fronius Robacta Plasma KD Drive Fronius Robacta Laser KD Drive	22 m/min or 866 ipm
15	Fronius KD 7000 Fronius VR 1530 KD	10 m/min or 394 ipm
18	Fronius Robacta KD Drive Fronius Robacta Plasma KD Drive Fronius Robacta Laser KD Drive	5 m/min or 197 ipm
19	Fronius KD 4010	10 m/min or 394 ipm
21	Binzel Torch Drive IWG	8 m/min or 315 ipm
25	Fronius KD 7000 Fronius VR 1530 KD	10 m/min or 394 ipm

Service codes during calibration of the push-pull unit

The following abbreviations are used for the service codes shown during calibration of the push-pull unit:

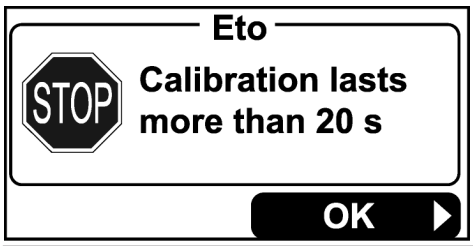
KD = Cold wire-feed unit

PPU = Push-pull unit

vDmin = minimum wire feed speed

vDmax = maximum wire feed speed

Service codes when the drive units are disengaged (open-circuit calibration)



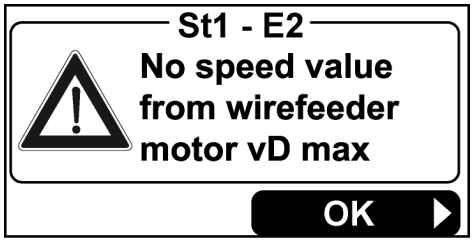
Cause: Incorrect measurement during push-pull calibration

Remedy: Repeat push-pull calibration

St1 - E1, St1 - E3

Cause: At minimum wire feed speed, the wire-feed unit motor does not deliver any actual rotational speed value.

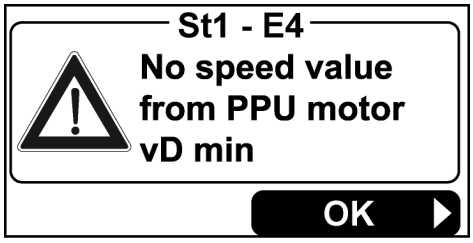
Remedy: Repeat the push-pull calibration. If the error message re-appears: Contact After-Sales Service.



St1 | E 2, St1 - E5

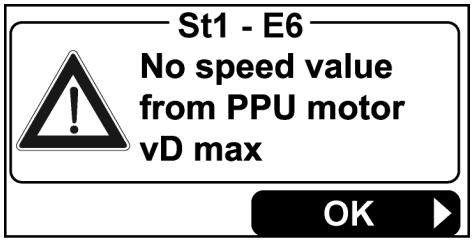
Cause: At maximum wire feed speed, the wire-feed motor does not deliver any actual rotational speed value.

Remedy: Repeat the push-pull calibration. If the error message re-appears: Contact After-Sales Service.



Cause: At minimum wire feed speed, the motor of the push-pull unit does not deliver any actual rotational speed value.

Remedy: Repeat the push-pull calibration. If the error message re-appears: Contact After-Sales Service.



Cause: At maximum wire feed speed, the motor of the push-pull unit does not deliver any actual rotational speed value.

Remedy: Repeat the push-pull calibration. If the error message re-appears: Contact After-Sales Service.

Cause: Push-pull calibration was interrupted: Quick-stop was activated by pressing the torch trigger.

Remedy: Repeat push-pull calibration

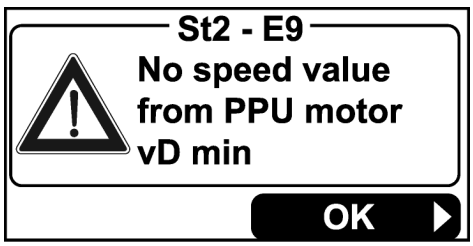
Service codes when the drive units are engaged (engaged calibration)

Cause: "Push-pull calibration - open-circuit" has not been carried out

Remedy: Carry out "push-pull calibration - open-circuit"

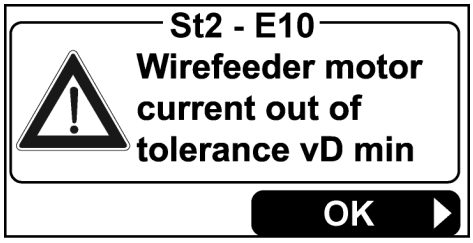
Cause: At minimum wire feed speed, the wire-feed unit motor does not deliver any actual rotational speed value.

Remedy: Repeat the push-pull calibration. If the error message re-appears: Contact After-Sales Service.



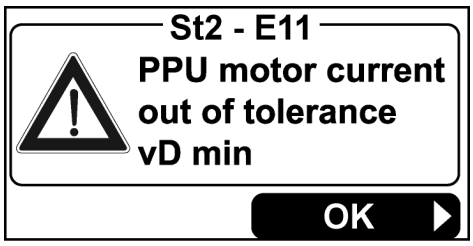
Cause: At minimum wire feed speed, the motor of the push-pull unit does not deliver any actual rotational speed value.

Remedy: Repeat the push-pull calibration. If the error message re-appears: Contact After-Sales Service.



Cause: At minimum wire feed speed, the motor current of the wire-feed unit motor is outside the permitted range. Possible reasons are disengaged wire-feed unit motors or wire feed problems.

Remedy: Engage the drive units of both wirefeeder motors, arrange the hosepack in as straight a line as possible; check the inner liner for kinks or soiling; check the contact pressure on the 2-roller or 4-roller drive of the push-pull unit. Repeat the push-pull calibration. If the error message re-appears: Contact After-Sales Service.

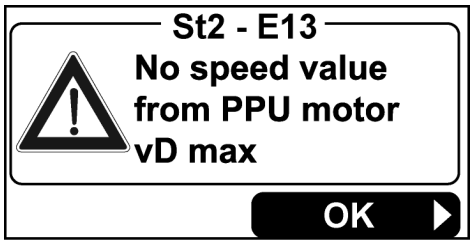


Cause: At minimum wire feed speed, the motor current of the push-pull unit is outside the permitted range. Possible reasons are disengaged wire-feed unit motors or wire feed problems.

Remedy: Engage the drive units of both wirefeeder motors, arrange the hosepack in as straight a line as possible; check the inner liner for kinks or soiling; check the contact pressure on the 2-roller or 4-roller drive of the push-pull unit. Repeat the push-pull calibration. If the error message re-appears: Contact After-Sales Service.

Cause: At maximum wire feed speed, the wire-feed motor does not deliver any actual rotational speed value.

Remedy: Repeat the push-pull calibration. If the error message re-appears: Contact After-Sales Service.

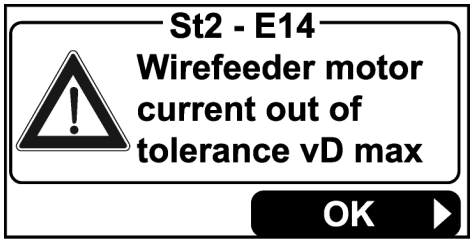


Cause: At maximum wire feed speed, the motor of the push-pull unit does not deliver any actual rotational speed value.

Remedy: Repeat the push-pull calibration. If the error message re-appears: Contact After-Sales Service, faulty actual value pick-up St2 | E 14

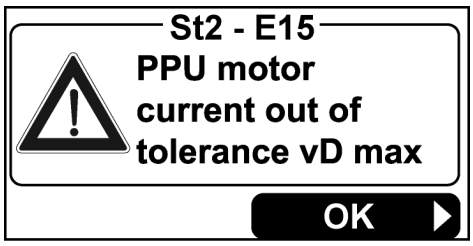
Cause: At maximum wire feed speed, the motor current of the wire-feed unit motor is outside the permitted range. Possible reasons are disengaged wire-feed unit motors or wire feed problems.

Remedy: Engage the drive units of both wirefeeder motors, arrange the hosepack in as straight a line as possible; check the inner liner for kinks or soiling; check the contact pressure on the 2-roller or 4-roller drive of the push-pull unit. Repeat the push-pull calibration. If the error message re-appears: Contact After-Sales Service.



Cause: At maximum wire feed speed, the motor current of the wire-feed unit motor is outside the permitted range. Possible reasons are disengaged wire-feed unit motors or wire feed problems.

Remedy: Engage the drive units of both wire-feed unit motors, arrange the hosepack in as straight a line as possible; check the inner liner for kinks or soiling; check the contact pressure on the 2-roller or 4-roller drive of the push-pull unit. Repeat the push-pull calibration. If the error message re-appears: Contact After-Sales Service.



Cause: At maximum wire feed speed, the motor current of the push-pull unit is outside the permitted range. Possible reasons are disengaged wire-feed unit motors or wire feed problems.

Remedy: Engage the drive units of both wire-feed unit motors, arrange the hosepack in as straight a line as possible; check the inner liner for kinks or soiling; check the contact pressure on the 2-roller or 4-roller drive of the push-pull unit. Repeat the push-pull calibration. If the error message re-appears: Contact After-Sales Service.

Cause: Push-pull calibration was interrupted: Quick-stop was activated by pressing the torch trigger.

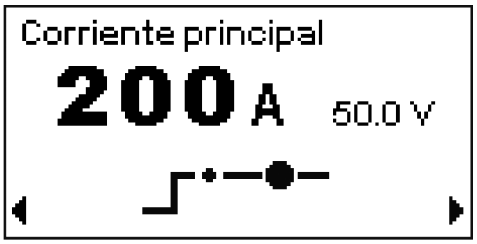
Remedy: Repeat push-pull calibration

Rod elec. setup (rod electrode setup)

Open the rod electrode setup

1 Press the Mode button to select the MMA welding mode

The image for the rod electrode welding parameter is shown on the display, e.g.:



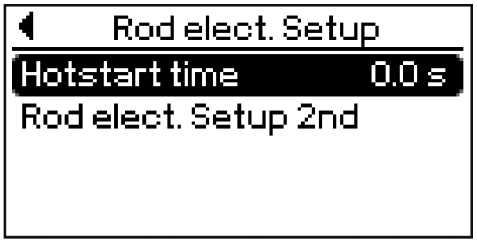
2 Press Menu key

The main menu appears:

3 Use the adjusting dial to select "Rod elec. setup" (turn the adjusting dial)

4 Press the adjusting dial

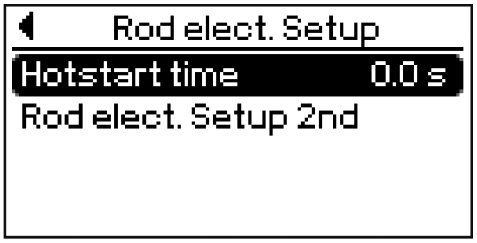
The rod electrode setup parameters are shown:



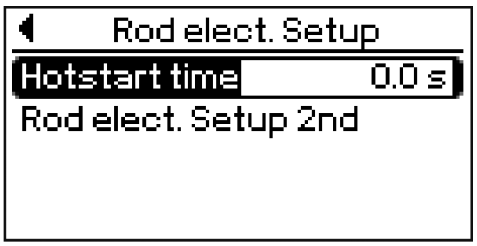
The power source is now in the rod electrode setup.

Changing welding parameters

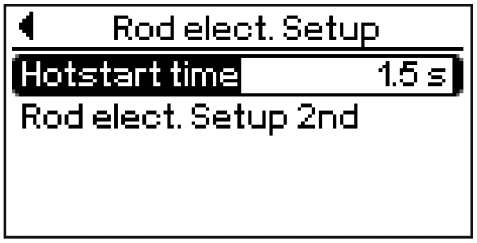
1 Select the desired welding parameter by turning the adjusting dial:



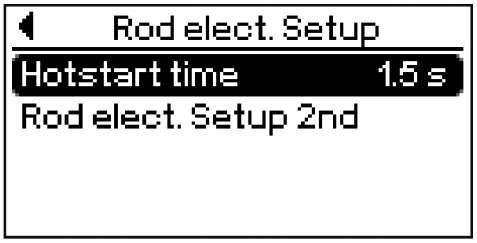
2 To set the welding parameter, press the adjusting dial
The value of the selected welding parameter can now be changed:



3 Change the welding parameter value by turning the adjusting dial:



4 To apply the welding parameter value press the adjusting dial

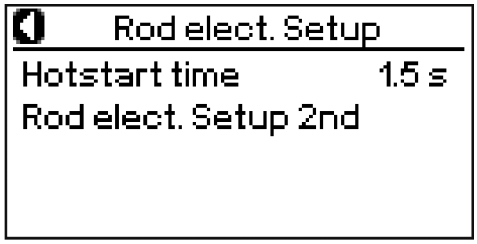


Exiting rod electrode-setup

1 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

The main menu appears:

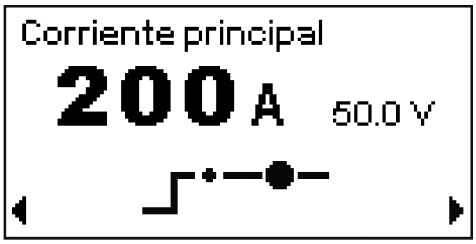
2 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial

- Press the adjusting dial

The image for the rod electrode welding parameter is shown:



Rod electrode setup parameters:

"Minimum" and "maximum" are used for setting ranges that differ according to power source, wire-feed unit, welding program, etc.

HotStart time

Unit	s
Setting range	0 - 2,0
Factory setting	0,5

To obtain optimum welding results, it will sometimes be necessary to adjust the hotstart function.

Advantages:
- Improved ignition, even when using electrodes with poor ignition properties
- Better fusion of the base material in the start-up phase, meaning fewer cold-shut defects
- Largely prevents slag inclusions

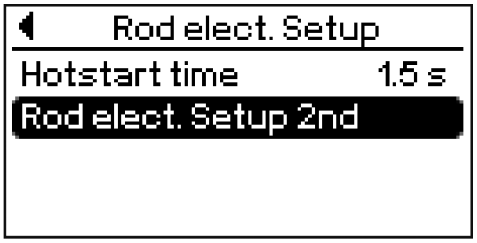
Rod elec. setup 2nd
Second level of the rod electrode setup

Rod elec. setup 2nd (rod electrode setup 2nd)

Opening the rod electrode setup 2nd

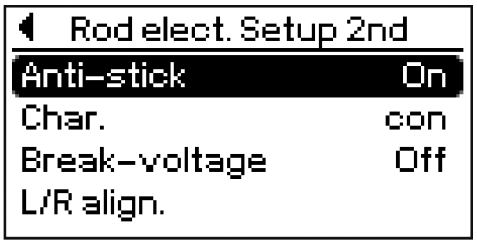
1 Open the rod electrode setup

2 Select the 'rod electrode setup 2nd' parameter



3 Press the adjusting dial

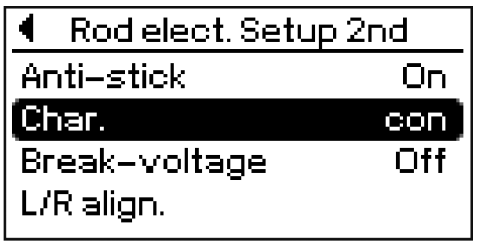
The parameters for rod electrode setup 2nd are shown:



The power source is now in rod electrode setup 2nd

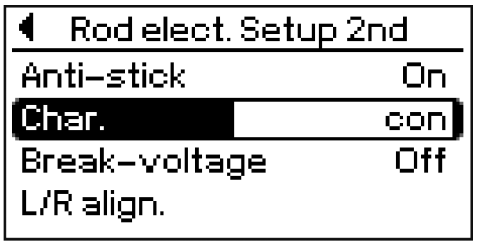
Changing welding parameters

1 Select the desired welding parameter by turning the adjusting dial:

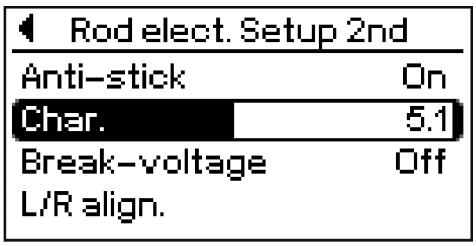


2 To set the welding parameter, press the adjusting dial

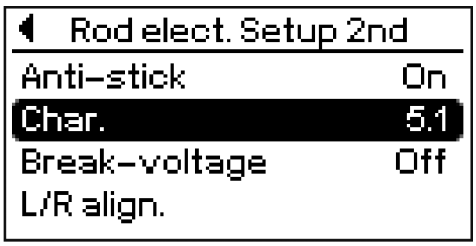
The value of the selected welding parameter can now be changed:



3 Change the welding parameter value by turning the adjusting dial:



4 To apply the welding parameter value press the adjusting dial

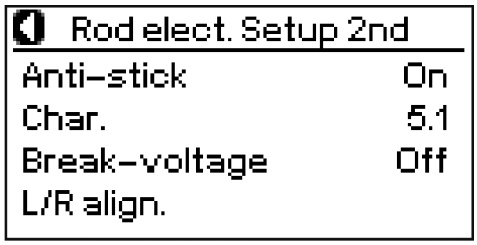


Exiting rod electrode setup 2nd

1 Press Menu key

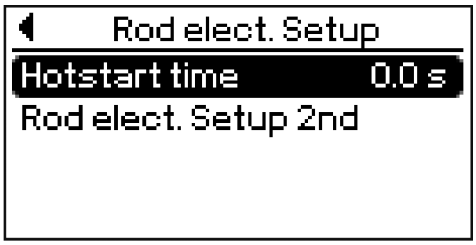
or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

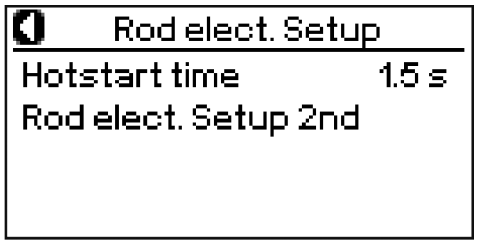
The rod electrode setup parameters are shown:



2 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

The main menu appears:

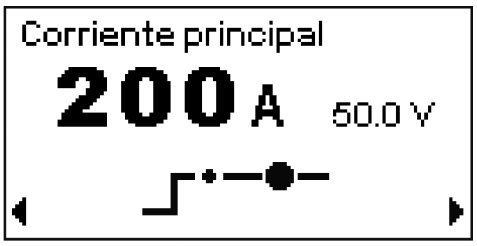
3 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial

- Press the adjusting dial

The image for the TIG welding parameter is shown:



Rod electrode setup 2nd parameters

"Minimum" and "maximum" are used for setting ranges that differ according to power source, wire-feed unit, welding program, etc.

Anti-stick

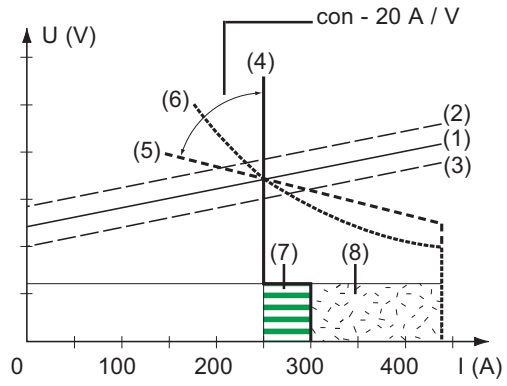
Unit	-
Setting range	ON / OFF
Factory setting	ON

As the arc becomes shorter, the welding voltage may drop so far that the rod electrode will tend to stick. This may also cause the rod electrode to burn out.

Electrode burn-out is prevented by activating the anti-stick function. If the rod electrode begins to stick, the power source immediately switches the welding current off. After the rod electrode has been detached from the workpiece, the welding process can be continued without any problems.

Char
For selecting characteristics

Unit	
Setting range	con or 0.1 - 20 or P
Factory setting	con



(1) Load line for rod electrode
(2) Load line for rod electrode where arc length is increased
(3) Load line for rod electrode where arc length is reduced
(4) Characteristic where "CON" parameter is selected (constant welding current)
(5) Characteristic where "0.1 - 20" parameter is selected (drooping characteristic with adjustable slope)
(6) Characteristic where "P" parameter is selected (constant welding power)
(7) Example of pre-set arc-force dynamic where characteristic (4) is selected
(8) Example of pre-set arc-force dynamic where characteristic (5) or (6) is selected

Characteristics that can be selected using the characteristic function

“con” parameter (constant welding current)
- If the “con” parameter is set, the welding current will be kept constant, irrespective of the welding voltage. This results in a vertical characteristic (4).
- The “con” parameter is especially suitable for rutile electrodes and basic electrodes, as well as for arc air gouging.
- For arc air gouging, set the arc-force dynamic to "100".

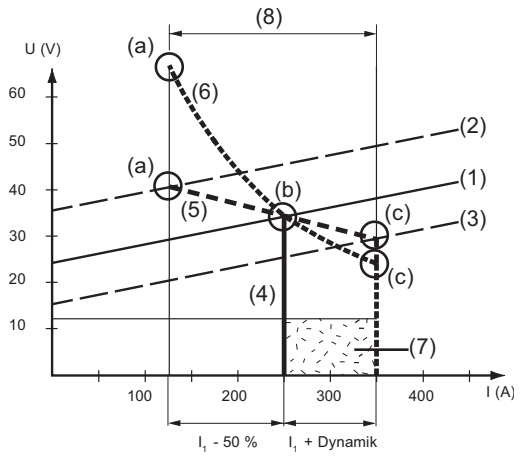
Parameter "0.1 - 20" (drooping characteristic with adjustable slope)
- Parameter “0.1 - 20” is used to set a drooping characteristic (5). The setting range extends from 0.1 A / V (very steep) to 20 A / V (very flat).
- Setting a flat characteristic (5) is only advisable for cellulose electrodes.

NOTE! When setting a flat characteristic (5), set the arc-force dynamic to a higher value.

"P" parameter (constant welding power)

- If the “P” parameter is set, the welding power is kept constant, irrespective of the welding voltage and welding current. This results in a hyperbolic characteristic (6).
- The “P” parameter is particularly suitable for cellulose electrodes.

NOTE! If there are problems with a rod electrode tending to "stick", set the arc-force dynamic to a higher value.



(1) Load line for rod electrode

(2) Load line for rod electrode where arc length is increased

(3) Load line for rod electrode where arc length is reduced

(4) Characteristic where "CON" parameter is selected (constant welding current)

(5) Characteristic where "0.1 - 20" parameter is selected (drooping characteristic with adjustable slope)

(6) Characteristic where "P" parameter is selected (constant welding power)

(7) Example of pre-set arc-force dynamic where characteristic (5) or (6) is selected

(8) Possible change in the current where characteristic (5) or (6) is selected, as a function of the welding voltage (arc length)

(a) Operating point where arc length is long

(b) Operating point when welding current IH is set

(c) Operating point where arc length is short

Setting example: I1 = 250 A, arc-force dynamic = 50

The characteristics (4), (5) and (6) shown here apply when using a rod electrode whose characteristic corresponds - at a given arc length - to the load line (1).

Depending on what welding current (I) has been set, the point of intersection (operating point) of characteristics (4), (5) and (6) will be displaced along the load line (1). The operating point provides information on the actual welding voltage and the actual welding current.

Where the welding current (I_1) is permanently set, the operating point may migrate along the characteristics (4), (5) and (6) depending on the welding voltage at that moment in time. The welding voltage U is dependent upon the length of the arc.

If the arc length changes (e.g. in accordance with the load line (2)) the resulting operating point will be the point where the corresponding characteristic (4), (5) or (6) intersects with the load line (2).

Applies to characteristics (5) and (6): Depending upon the welding voltage (arc length), the welding current (I) will also become either smaller or larger, even though the value set for I_1 remains the same.

Break-voltage
Welding voltage limitation

Unit	-
Setting range	OFF or 5 - 90 V
Factory setting	OFF

The arc length depends on the welding voltage. To end the welding process, it is usually necessary to significantly lift the rod electrode away from the workpiece. With the “Uco” parameter, the welding voltage can be limited to a value that makes it possible to end the welding operation simply by slightly lifting the rod electrode.

NOTE! If the welding process is stopped unintentionally during the welding, increase the value for the Uco parameter.

L/R alignment

L (inductivity) - welding circuit inductivity (in microhenry)
R (resistance) - welding circuit resistance (in mOhm)

See the "L/R alignment" section for further details.

AC setup (for rod electrodes)

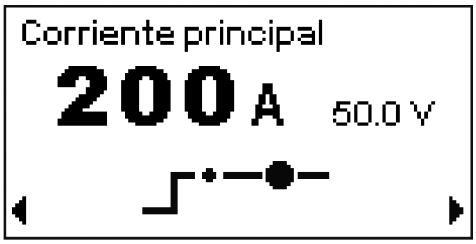
General

This setup is only available with MagicWave power sources.

Opening the AC setup

1 Press the Mode button to select the MMA welding mode

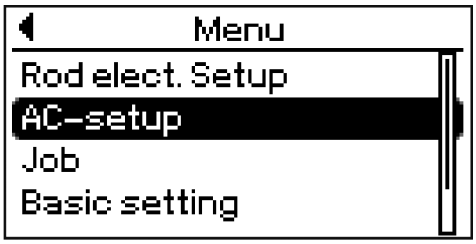
The image for the rod electrode welding parameter is shown on the display, e.g.:



2 Press Menu key

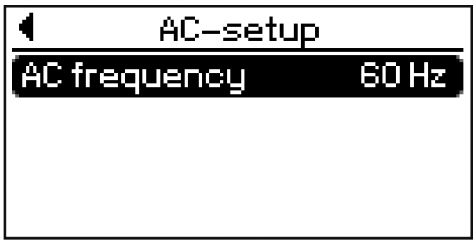
The main menu appears:

3 Use the adjusting dial to select "AC setup" (turn the adjusting dial)



4 Press the adjusting dial

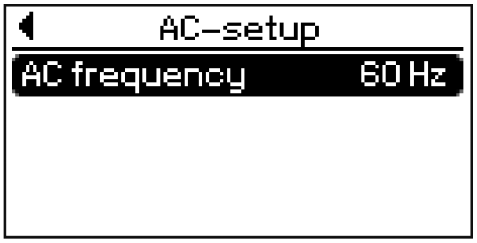
The AC setup parameters are shown:



The power source is now in AC setup.

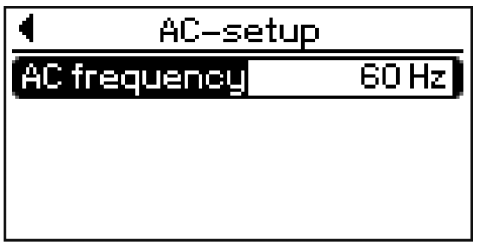
Changing welding parameters

1 Select the desired welding parameter by turning the adjusting dial:

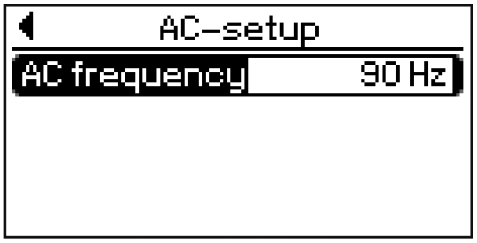


2 To set the welding parameter, press the adjusting dial

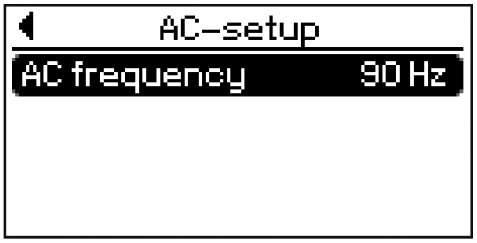
The value of the selected welding parameter can now be changed:



3 Change the welding parameter value by turning the adjusting dial:



4 To apply the welding parameter value press the adjusting dial

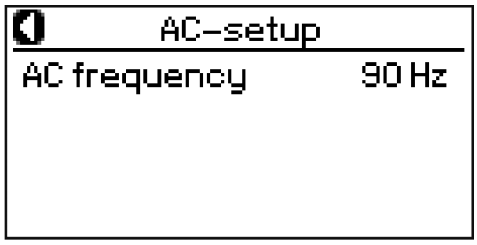


Exiting AC setup

1 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

The main menu appears:

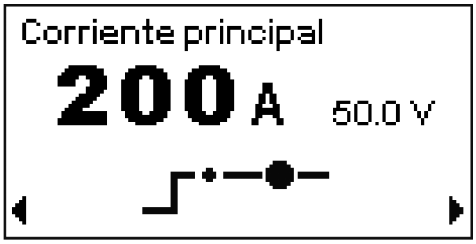
2 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial

- Press the adjusting dial

The image for the rod electrode welding parameter is shown:



Welding parameters in AC setup

"Minimum" and "maximum" are used for setting ranges that differ according to power source, wire-feed unit, welding program, etc.

AC frequency	
Unit	Hz
Setting range	Syn / 40 - 250
Factory setting	60
Syn	for mains synchronisation of two power sources for simultaneous AC welding.

Job

General

The following actions can be performed in the Job set-up menu:

Save:	Save settings as a job
Retrieve:	Retrieve jobs for the welding job
Retrieve:	Adjust and modify stored jobs
Delete:	Delete stored jobs

Opening the Job set-up menu

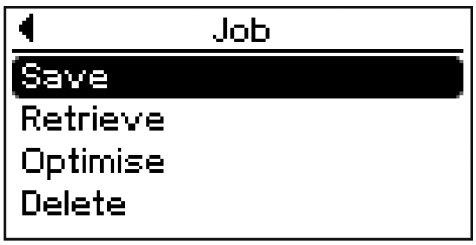
1 Press Menu key

The main menu appears, e.g.:

2 Use the adjusting dial to select "job" (turn the adjusting dial)

3 Press the adjusting dial

The menu items for the job appear:



The power source is now in the Job set-up menu.

Save / retrieve

The 'Save' and 'Retrieve' commands on the Job menu are described in the "Welding" chapter.

Overview

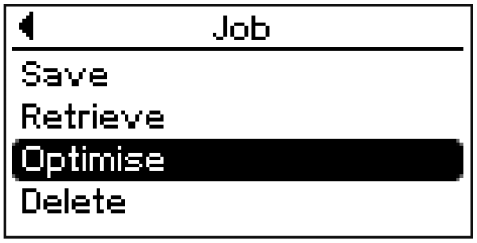
The Job set-up menu comprises the following sections:

- Optimise job
- Delete a job

Optimising a job

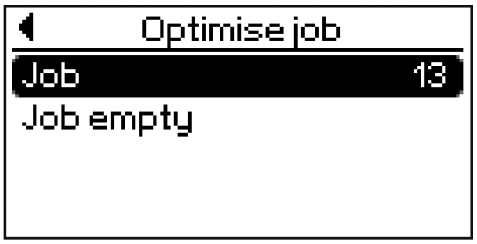
Optimising a job

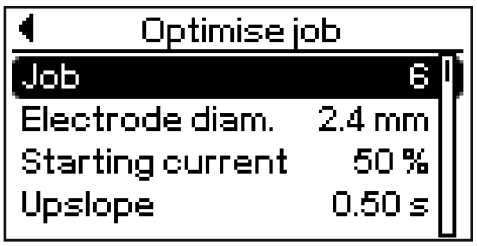
1 Use the adjusting dial to select '"optimise" (turn the adjusting dial)



2 Press the adjusting dial

The first "Optimise job" screen or the last job to be selected or saved appears:

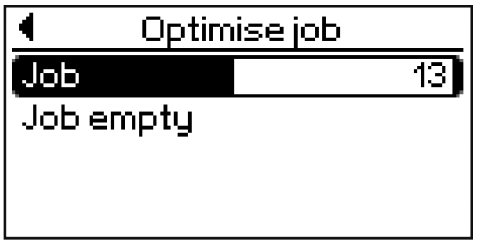


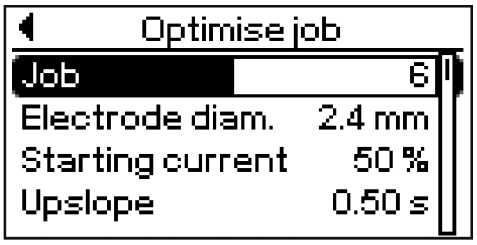


Example job

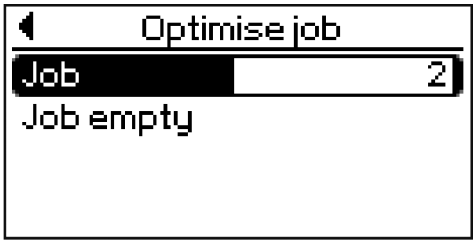
3 Press the adjusting dial to select the job

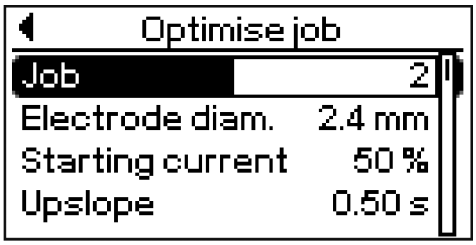
The job to be optimised can now be selected:





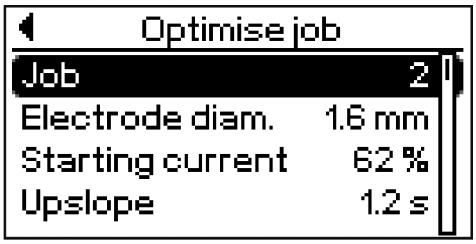
4 Use the adjusting dial to select the number of the job to be optimised (turn the adjusting dial)



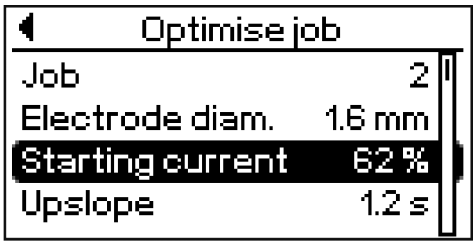


5 Press the adjusting dial

The welding parameters for the job to be optimised appear:

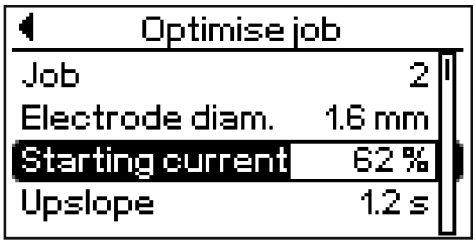


6 Turn the adjusting dial to select the welding parameters to be modified, e.g.:

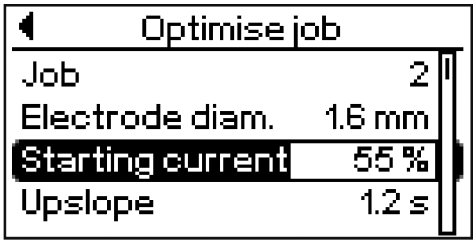


7 Press the adjusting dial

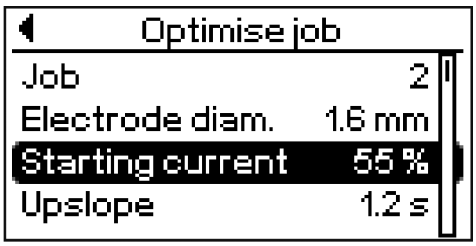
The value of the selected welding parameter can now be changed:



8 Change the welding parameter value by turning the adjusting dial:

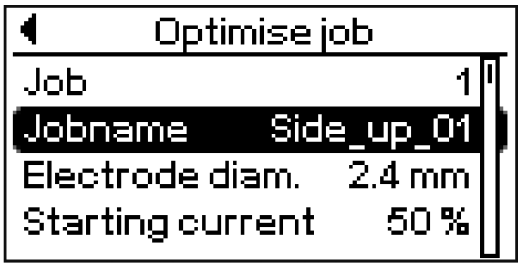


9 To apply the welding parameter value press the adjusting dial



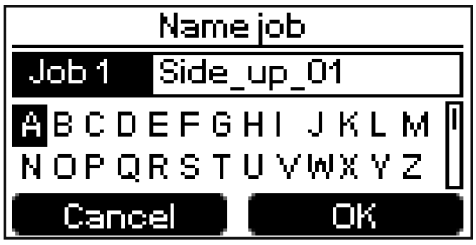
Renaming a job

1 In the "Optimise job" menu item, turn the adjusting dial to select "Job name"

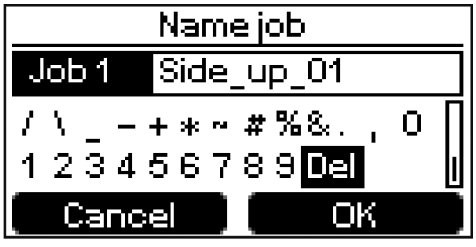


2 Press the adjusting dial

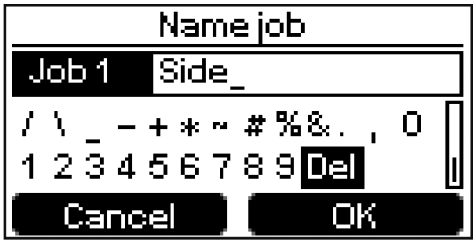
The "Name job" screen appears:



3 Delete the existing job name: Turn the adjusting dial and select 'Del'



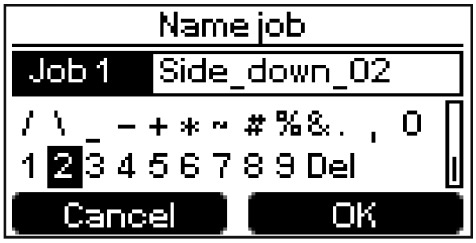
4 If you press the adjusting dial the last character will be deleted:



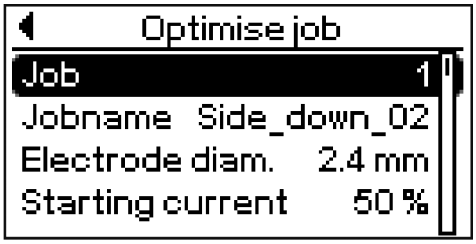
5 Turn the adjusting dial to select the desired letters / numbers:

6 Then press the adjusting dial in order to enter these letters / numbers:

7 Press the button on the right (OK) in order to accept the name



The new job name is applied and the "Optimise job" menu item will appear:

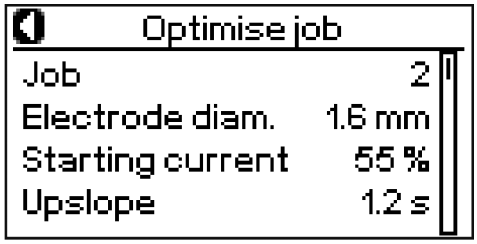


Finish optimising job

1 Press Menu key

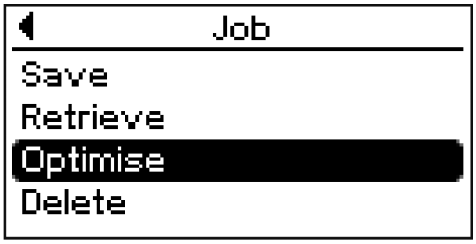
or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

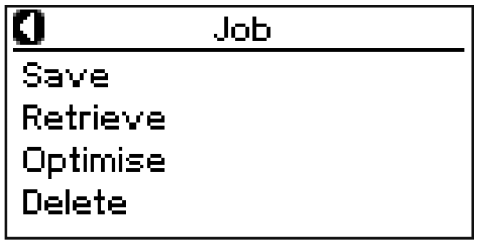
The menu items for the job appear:



2 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

The current set-up menu is displayed:

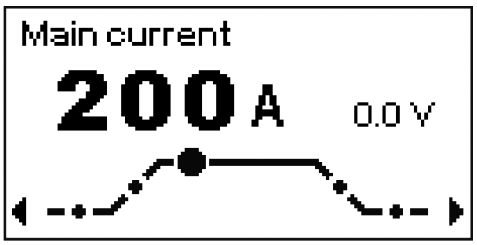
3 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial

- Press the adjusting dial

The current welding parameters will appear, e.g.:



TIG welding parameters for 2-step mode (main current welding parameter selected)

Adjustable TIG parameters

Electrode diam. Electrode diameter		
Unit	mm	
Setting range	Off / 0.1 - 4.8	
Starting current		
Unit	% (of main current)	
Setting range	30 - 200 AC, 0 - 200 DC	
UpSlope		
Unit	s	
Setting range	0,0 - 9,9	
Main current		
Unit	A	
Setting range	MW 2500 Comfort 3 - 250 MW 3000 Comfort 3 - 300	TT 2500 Comfort 3 - 250 TT 3000 Comfort 3 - 300
Reduced current In 4-step mode		
Unit	% (of main current)	
Setting range	0 - 100	
Downslope		
Unit	s	
Setting range	0,0 - 9,9	

Final current

Unit	% (of main current)
Setting range	0 - 100

Jobslope
For changing to another job during welding. Jobslope is the time that it takes for the welding current to adjust seamlessly from the present job to the next.

Unit	s
Setting range	Off / 0.1 - 9.9

NOTE! Switching over from one job to the next without interrupting welding is only possible with a JobMaster TIG welding torch, robot interface or field bus.

Pre-flow
Gas pre-flow time

Unit	s
Setting range	0,0 - 9,9

Post-flow. Imin
Post-flow at I_{min}

Gas post-flow time at minimum welding current (minimum gas post-flow time)

Unit	s
Setting range	0 - 25
Factory setting	5

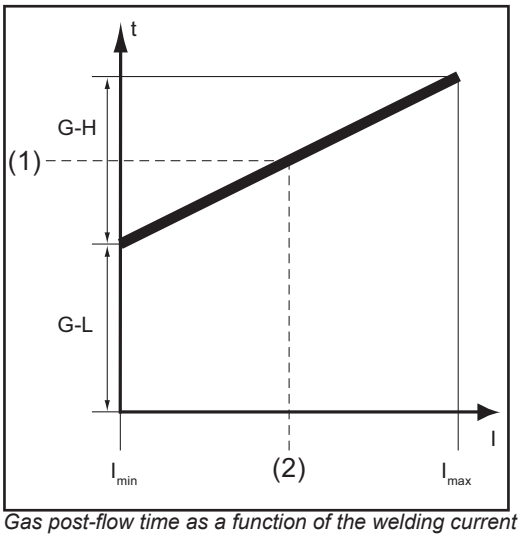
Post-flow Imax
Post-flow at I_{max}

Increase in gas post-flow time at maximum welding current

Unit	s
Setting range	0 - 40/Aut
Factory setting	Aut

The value set for "post-flow Imax" only applies if the maximum welding current actually has been set. The actual value is derived from the present welding current. With a medium welding current, for example, the actual value will be one-half of the value set for "post-flow Imax".

IMPORTANT! The values set for the 'post-flow Imin' and 'post-flow Imax' welding parameters are added together. For example, if both parameters are at maximum (25 s / 40 s), the gas post-flow will last:
- 25 s at minimum welding current
- 65 s at maximum welding current
- 37.5 s if the welding current is exactly half the maximum, etc.



Gas post-flow time as a function of the welding current

Legend:

(1).... Gas post-flow time at any given moment

(2).... Welding current at any given moment

G-H.... Post-flow Imax

G-L .... Post-flow Imin

If Aut is selected, the gas post-flow time is calculated automatically. This takes the selected process (AC or DC welding) into account.

Tacking function

for the TIG DC welding process: Duration of the pulsed welding current at the start of tacking

Unit	s
Setting range	OFF / 0.1 - 9.9 / ON
ON	The pulsed welding current remains in effect until the end of the tacking operation
0.1 - 9.9 s	The set time begins with the upslope phase. After the end of the pre-set time period, welding continues with a constant welding current; any pulsing parameters that have been set are available.
OFF	The tacking function is deactivated

Pulse frequency

Unit	Hz / kHz
Setting range	OFF / 0.20 Hz - 2.00 kHz

The selected pulse frequency is also used for the reduced current I_2.

IMPORTANT!If the pulse frequency is set to "OFF":

- then the welding parameters Duty Cycle, Ground Current and Wirefeed spd2 (from cold wire setup) are not available
- the wire feed speed set on the control panel is used for constant wirefeed at a constant welding current.

Setting the pulse frequency:

0.2 Hz to 5 Hz	Thermal pulsing (out-of-position welding, automated welding)
1 kHz to 2 kHz	Arc-stabilising pulsing (stabilising the arc at a low welding current)

Duty Cycle

The ratio of pulse duration to base current duration when a pulse frequency has been set

Unit	%
Setting range	10 - 90

Ground current

Unit	% (of main current I_1)
Setting range	0 - 100

Polarity

Unit	-
Setting range	AC (only MagicWave) / DC- / DC+

AC frequency
only with MagicWave for the TIG AC welding process

Unit	Hz
Setting range	Syn / 40 - 250
Syn	for mains synchronisation of two power sources for simultaneous AC welding.

IMPORTANT!If using the "Syn" setting, remember to check the "Phase sync." parameter in AC setup 2nd.

Low frequency	soft, distant arc with shallow heat input
High frequency	focused arc with deep heat input

AC-current offset
only with MagicWave for the TIG AC welding process

Unit	%
Setting range	-70 to +70
+70	highest fusing power, lowest cleaning action
-70	narrow arc, deep heat input, faster welding speed

Balance
only on MagicWave for TIG AC welding process

Unit	-
Setting range	-5 - +5
-5:	distant arc with shallow heat input
+5:	highest cleaning action, lowest fusing power

Spot welding time

Unit	s
Setting range	OFF / 0.05 - 25.0

If a value has been set for the spot welding time, "2-step mode" will work in the same way as spot welding mode.

Starting current time

Unit	s
Setting range	OFF / 0.01 - 9.9

The starting current time t-S specifies the duration of the starting-current phase I_s .

IMPORTANT!The starting current time only applies in 2-step mode. In 4-step mode, the duration of the starting-current phase I_s is controlled using the torch trigger

Final current time

Unit	s
Setting range	OFF / 0.01 - 9.9

The final current time t-E specifies the duration of the final current phase I_E .

IMPORTANT!The final current time only applies in 2-step mode. In 4-step mode, the duration of the final current phase I_E is controlled with the torch trigger (see: "TIG operating modes").

Current crrctn.
main current I1 correction range for job retrieval

Unit	%
Setting range	OFF / 1 - 100

IMPORTANT!The I1 correction range only applies to job retrieval.

In the jobs, all the settings are permanently saved, i.e. cannot be changed. However, the parameter "current crrctn" permits subsequent correction of the main current I1.

Example
The set-up parameter "current crrctn" has been set to 30%:
- The welding current I1 can then be decreased or increased by up to 30%.

IMPORTANT! Every subsequent correction of the main current I1 is reset (i.e. cancelled) when the power source is switched off.

Operating mode

Unit	-
Setting range	2t / 4t
2-step	2-step mode
4t	4-step mode

Wirefeed spd
Wire feed speed 1 (when cold wire-feed unit option is available)

Unit	m/min	ipm
Setting range	OFF / 0.1 - max.	OFF / 3.9 - max.

Wirefeed spd2
Wire feed speed 2

Unit	% (of the wire feed speed)
Setting range	0 - 100

If a value is set for both 'wire feed speed 2' and 'pulse frequency', then the wire feed speed alternates between the following values in sync with the pulse frequency of the welding current:
- Wire feed speed 1
- Wire feed speed 2

Start-delay
Delay in the start of wirefeeding from beginning of the main current phase

Unit	s
Setting range	OFF / 0.1 - 9.9

End-delay
Delay in the start of wirefeeding from end of the main current phase

Unit	s
Setting range	OFF / 0.1 - 9.9

Wire wdraw

Unit	mm	in.
Setting range	OFF / 1 - 50	OFF / 0.04 - 1.97

IMPORTANT!Wire withdrawal prevents the welding wire from burning at the end. Before the welding current is switched off, the wire is withdrawn to the set value. A prerequisite for this function is that the arc has ignited.

Wire threading
Wire threading speed

Unit	m/min	ipm.
Setting range	0.1 - max.	3.94 - max.

Adjustable rod electrode parameters

Main current

Unit	A	
Setting range	MW 2500 Comfort 3 - 250 MW 3000 Comfort 3 - 300	TT 2500 Comfort 3 - 250 TT 3000 Comfort 3 - 300

Arc-force dynamic
In order to obtain optimum welding results, it will sometimes be necessary to set the arc-force dynamic function.

Unit	% (of main current)
Setting range	0 - 100
0	soft, low-spatter arc
100	harder, more stable arc

Functional principle:
at the instant of droplet transfer or when a short circuit occurs, there is a momentary rise in amperage. In order to obtain a stable arc, the welding current is temporarily increased. If the rod electrode threatens to sink into the weld pool, this measure prevents the weld pool solidifying, as well as preventing more prolonged short circuiting of the arc. This largely prevents the rod electrode from sticking.

Jobslope
For changing to another job during welding. Jobslope is the time that it takes for the welding current to adjust seamlessly from the present job to the next.

Unit	s
Setting range	Off / 0.1 - 9.9

NOTE! Switching over from one job to the next without interrupting welding is only possible with a JobMaster TIG welding torch, robot interface or field bus.

Starting current

Unit	% (of main current)
Setting range	30 - 200 AC, 0 - 200 DC

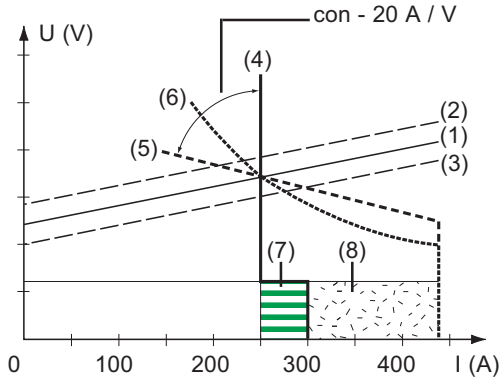
Starting curr time

Unit	s
Setting range	OFF / 0.01 - 9.9

The starting current time t-S specifies the duration of the starting-current phase I_s .

Char
For selecting characteristics

Unit	
Setting range	con or 0.1 - 20 or P
Factory setting	con



(1) Load line for rod electrode

(2) Load line for rod electrode where arc length is increased

(3) Load line for rod electrode where arc length is reduced

(4) Characteristic where "CON" parameter is selected (constant welding current)

(5) Characteristic where "0.1 - 20" parameter is selected (drooping characteristic with adjustable slope)

(6) Characteristic where "P" parameter is selected (constant welding power)

(7) Example of pre-set arc-force dynamic where characteristic (4) is selected

(8) Example of pre-set arc-force dynamic where characteristic (5) or (6) is selected

Characteristics that can be selected using the characteristic function

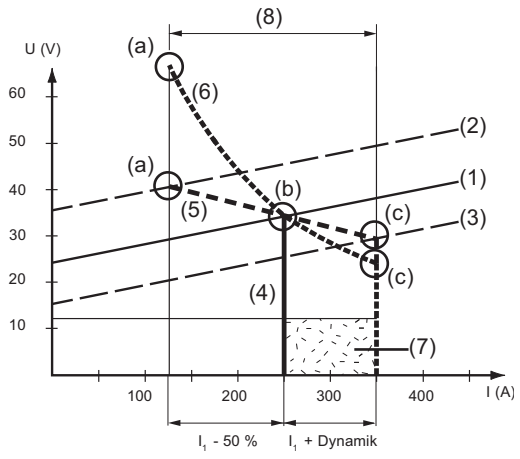
“con” parameter (constant welding current)
- If the “con” parameter is set, the welding current will be kept constant, irrespective of the welding voltage. This results in a vertical characteristic (4).
- The “con” parameter is especially suitable for rutile electrodes and basic electrodes, as well as for arc air gouging.
- For arc air gouging, set the arc-force dynamic to "100".

Parameter "0.1 - 20" (drooping characteristic with adjustable slope)
- Parameter “0.1 - 20” is used to set a drooping characteristic (5). The setting range extends from 0.1 A / V (very steep) to 20 A / V (very flat).
- Setting a flat characteristic (5) is only advisable for cellulose electrodes.

NOTE! When setting a flat characteristic (5), set the arc-force dynamic to a higher value.

"P" parameter (constant welding power)
- If the “P” parameter is set, the welding power is kept constant, irrespective of the welding voltage and welding current. This results in a hyperbolic characteristic (6).
- The “P” parameter is particularly suitable for cellulose electrodes.

NOTE! If there are problems with a rod electrode tending to "stick", set the arc-force dynamic to a higher value.



(1) Load line for rod electrode

(2) Load line for rod electrode where arc length is increased

(3) Load line for rod electrode where arc length is reduced

(4) Characteristic where "CON" parameter is selected (constant welding current)

(5) Characteristic where "0.1 - 20" parameter is selected (drooping characteristic with adjustable slope)

(6) Characteristic where "P" parameter is selected (constant welding power)

(7) Example of pre-set arc-force dynamic where characteristic (5) or (6) is selected

(8) Possible change in the current where characteristic (5) or (6) is selected, as a function of the welding voltage (arc length)

(a) Operating point where arc length is long

(b) Operating point when welding current IH is set

(c) Operating point where arc length is short

Setting example: I1 = 250 A, arc-force dynamic = 50

The characteristics (4), (5) and (6) shown here apply when using a rod electrode whose characteristic corresponds - at a given arc length - to the load line (1).

Depending on what welding current (I) has been set, the point of intersection (operating point) of characteristics (4), (5) and (6) will be displaced along the load line (1). The operating point provides information on the actual welding voltage and the actual welding current.

Where the welding current (I_1) is permanently set, the operating point may migrate along the characteristics (4), (5) and (6) depending on the welding voltage at that moment in time. The welding voltage U is dependent upon the length of the arc.

If the arc length changes (e.g. in accordance with the load line (2)) the resulting operating point will be the point where the corresponding characteristic (4), (5) or (6) intersects with the load line (2).

Applies to characteristics (5) and (6): Depending upon the welding voltage (arc length), the welding current (I) will also become either smaller or larger, even though the value set for I_1 remains the same.

Polarity	
Unit	-
Setting range	AC (only MagicWave) / DC- / DC+

AC frequency
only with MagicWave for the TIG AC welding process

Unit	Hz
Setting range	Syn / 40 - 250
Syn	For mains synchronisation of two power sources for simultaneous AC welding.

IMPORTANT! If using the "Syn" setting, remember to check the "Phase sync." parameter in AC setup 2nd.

Low frequency	soft, distant arc with shallow heat input
High frequency	focused arc with deep heat input

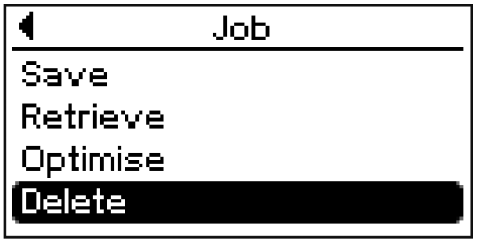
Balance
only on MagicWave for TIG AC welding process

Unit	-
Setting range	-5 - +5
-5:	distant arc with shallow heat input
+5:	highest cleaning action, lowest fusing power

Deleting a job

Deleting a job

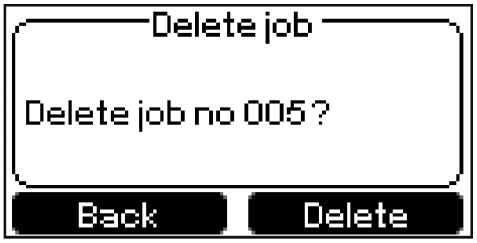
1 Use the adjusting dial to select "Delete" (turn the adjusting dial)



2 Press the adjusting dial

The first "Delete job" screen is displayed:

3 Turn the adjusting dial to select the job for deletion:



4 Press the right button

The second "Delete job" screen is displayed:

5 Press the button on the left or right

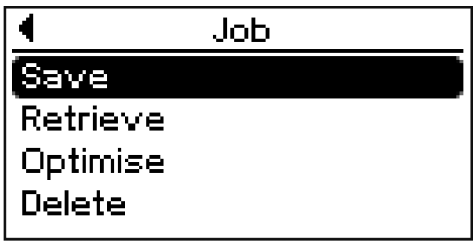
Left button (No): Do not delete job, return to first "Delete job" screen

Press right button (Yes): the selected job number will be deleted

The third "Delete job" screen is displayed:

6 Press the right button

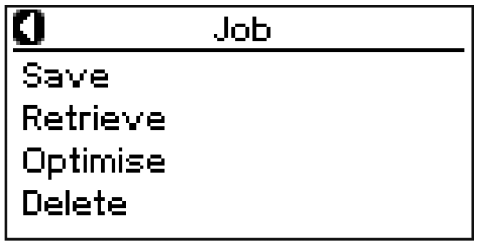
The menu items for the job appear:



7 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

The current set-up menu is displayed:

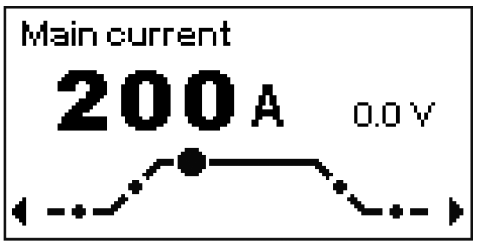
8 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial

- Press the adjusting dial

The current welding parameters are displayed e.g.:



TIG welding parameters for 2-step mode (main current welding parameter selected)

Basic setting

General

The basic settings can be called up in the menu when TIG 2-step mode, TIG 4-step mode or manual metal arc welding mode is selected.

Opening the basic settings

1 Press Menu key

The main menu appears:

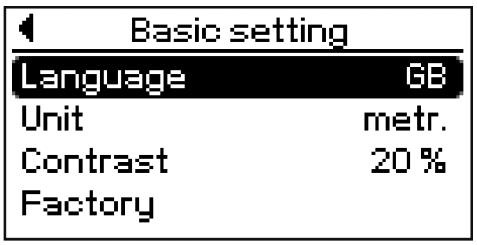
TIG main menu

Rod electrode main menu

2 Use the adjusting dial to select "Basic setting" (turn the adjusting dial)

3 Press the adjusting dial

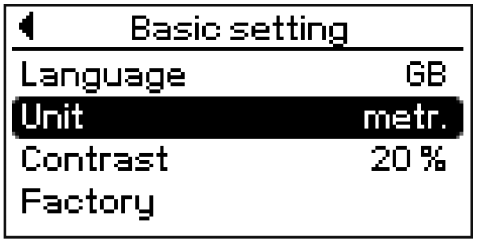
The basic settings parameters appear:



The power source is now in the basic settings.

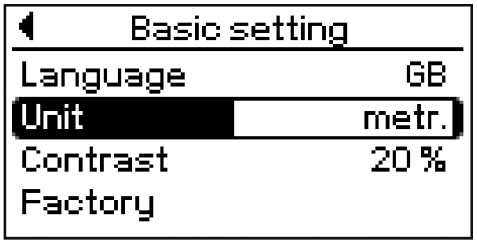
Changing welding parameters

1 Select the desired welding parameter by turning the adjusting dial:

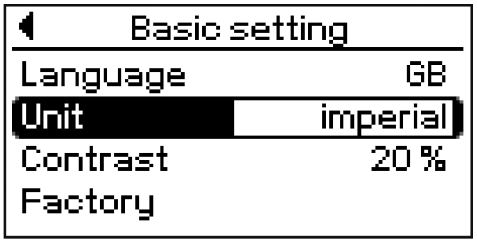


2 To set the welding parameter, press the adjusting dial

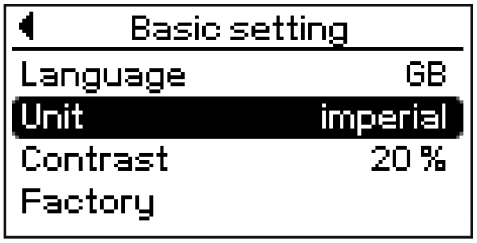
The value of the selected welding parameter can now be changed:



3 Change the welding parameter value by turning the adjusting dial:



4 To apply the welding parameter value press the adjusting dial

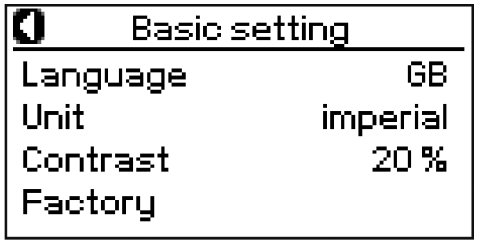


Exiting basic settings

1 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

The relevant main menu appears:

TIG main menu

Rod electrode main menu

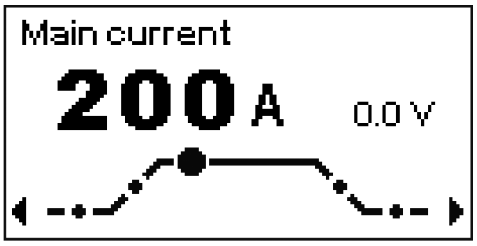
2 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial

- Press the adjusting dial

The image for the currently selected mode is shown, e.g.:



TIG welding parameters for 2-step mode

Basic setting parameters

"Minimum" and "maximum" are used for setting ranges that differ according to power source, cold wire-feed unit, welding program, etc.

Language

Unit	-
Setting range	D / GB / F / I / E / CZ / S / P / NL / PL
Factory setting	D

D	German	E	Spanish	NL	Dutch
GB	English	CZ	Czech	PL	Polish
F	French	S	Swedish		
I	Italian	P	Brazilian Portuguese		

Unit

Setting determines whether metric or imperial units are shown

Unit	-
Setting range	metr./imperial
Factory setting	metr.

metr.	Metric units (e.g. mm, m/min, l/min, etc.)
imperial	Imperial units (e.g. in., ipm, cfh, etc.)

Contrast

For setting the display contrast

Unit	%
Setting range	0 - 100
Factory setting	20

Factory

For resetting the welding machine

See the "Factory - resetting the welding machine" section for further details.

Info

General

The info screen can be called up in the menu when TIG 2-step mode, TIG 4-step mode or rod electrode welding mode is selected.

Calling up the info screen

1 Press Menu key

The main menu appears:

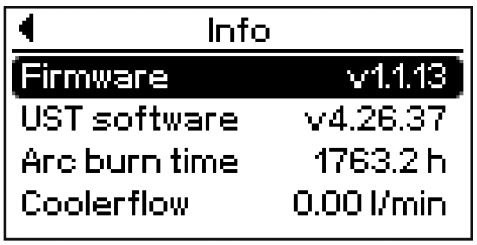
TIG main menu

Rod electrode main menu

2 Use the adjusting dial to select "Info" (turn the adjusting dial)

3 Press the adjusting dial

The info screen appears:



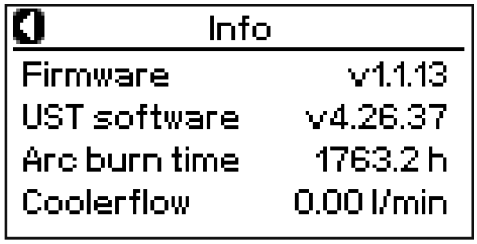
IMPORTANT! The entries on the info screen are read-only data and cannot be edited or set.

Exiting the info screen

1 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial



- Press the adjusting dial

The relevant main menu appears:

TIG main menu

Rod electrode main menu

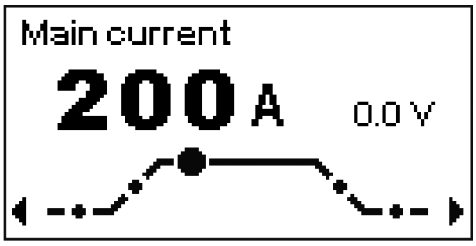
2 Press Menu key

or

- Select the arrow symbol by turning the adjusting dial

- Press the adjusting dial

The image for the currently selected mode is shown, e.g.:



TIG welding parameters for 2-step mode

Entries on the info screen

Firmware Current display/control panel firmware
UST Software Current software of the power source control board UST
Arc burn time Arc time Actual total arc burn time since using for the first time
Coolerflow Coolant flow Current coolant flow rate for a connected cooling unit in l/min

Lock keys

General

To prevent welding parameters or settings from being changed either intentionally or unintentionally, the 'Lock keys' function can be activated on the power source.

Lock keys

1 Press Menu key

The main menu appears:

TIG main menu

Rod electrode main menu

2 Use the adjusting dial to select "Lock keys" (turn the adjusting dial)

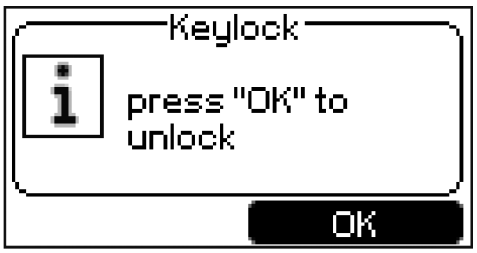
3 Press the adjusting dial

The keys are locked. If a key is pressed, the 'Keylock" screen will appear:

Unlock keys again

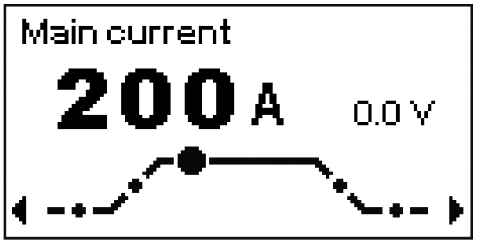
1 Press Menu key

The 'Lock/unlock keys' screen appears:



2 Press the key on the right (OK) within 3 seconds

The keys are unlocked and the image for the currently selected mode is shown, e.g.:



TIG welding parameters for 2-step mode (main current welding parameter selected)

Factory - for resetting the welding machine

General

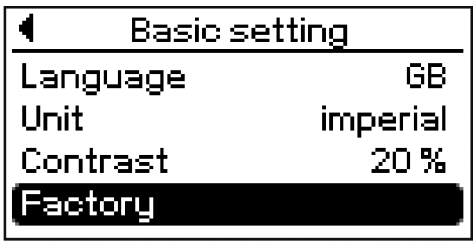
The welding machine can be reset in the menu when TIG 2-step mode, TIG 4-step mode or rod electrode welding mode is selected.

NOTE! When the welding machine is reset, all the personal settings in the set-up menu are lost. Jobs are not deleted when the welding machine is reset - these are preserved. The parameter settings in the second level of the set-up menu are not deleted either.

Factory - for resetting the welding machine

1 Opening the basic settings

2 Select 'Factory' by turning the adjustment dial:



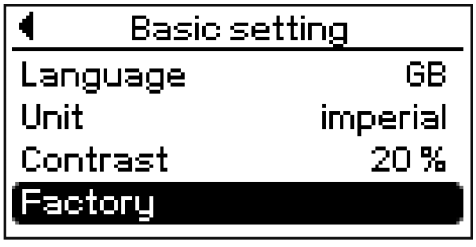
3 Press the adjusting dial to display the factory screen

Press the left button to cancel

Press the right button to reset the welding machine

The welding machine is reset and a confirmation screen appears:

4 If you press the button on the right the basic settings will appear:



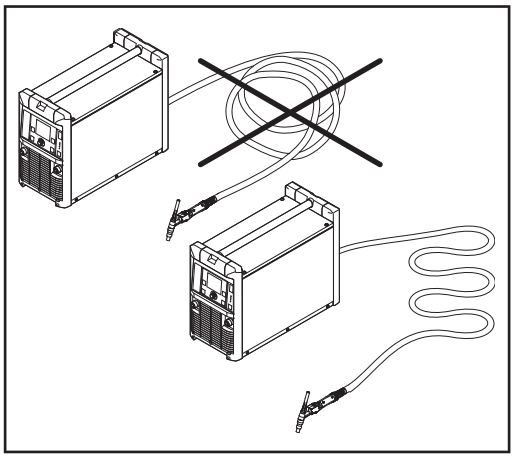
L/R alignment

Abbreviations

L = Welding circuit inductivity, μH (Microhenry)
R = Welding circuit inductivity, mOhm (Milliohm)

General information on welding circuit inductivity L

The way that the hosepack is arranged has a very significant effect on the weld properties. Particularly with pulsed-arc welding and AC welding, a high welding circuit inductivity may occur, depending on the length of the hosepack and on the way that it is arranged. The result is that the current rise is restricted.



Correct arrangement of the hosepack

Changing the way the hosepack is arranged may help to improve the welding results. The hosepack must be laid out as shown in the illustration.

General information on welding circuit resistance R

Measuring the welding circuit resistance "r" provides information on the overall resistance of the torch hosepack, welding torch, workpiece and grounding (earthing) cable.

If an increased welding circuit resistance is detected, e.g. after changing the torch, this may mean that the following components are faulty:

- Torch hosepack
- Welding torch
- Grounding (earthing) connection to the workpiece
- Grounding (earthing) cable

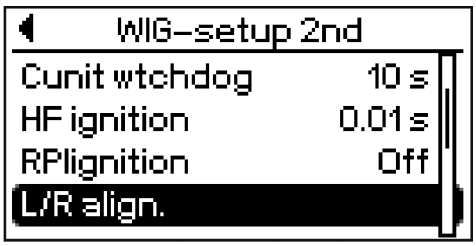
L/R alignment

Calibration of welding circuit inductivity and resistance can be done both in TIG setup 2nd and rod electrode setup 2nd.

NOTE! L/R alignment must be carried out separately for each welding process.

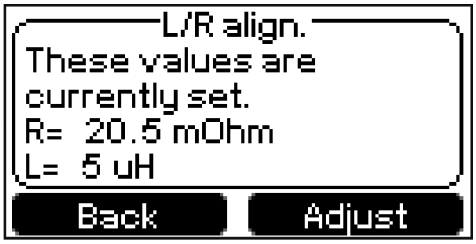
1 Enter TIG setup 2nd or rod electrode setup 2nd

2 Select 'L/R align.' by turning the adjustment dial:



3 Press the adjusting dial

The first L/R alignment screen is displayed:



In the following L/R alignment screens, pressing the left button takes you back to the previous screen.

4 Press the right button

The second L/R alignment screen is displayed:

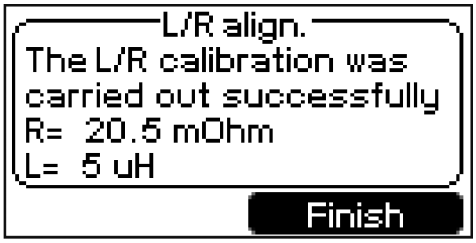
5 Follow the instructions shown

IMPORTANT! Make sure that the contacts between the earthing clamp and workpiece and the electrode and workpiece are on a cleaned section of the workpiece. While the measurement is being performed, the cooling unit and the cold wire-feed unit are deactivated.

During manual metal arc welding, place the electrode holder instead of the tungsten electrode fully on the workpiece.

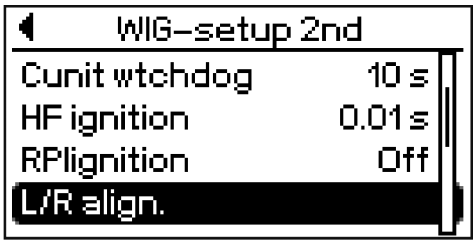
6 Press the right button

After R/L alignment, a confirmation and the current welding circuit resistance will be shown:



7 Press the right button

Depending on the mode selected, TIG setup 2nd or rod electrode setup 2nd is displayed:



Troubleshooting and maintenance

Troubleshooting

General

The digital power sources are equipped with an intelligent safety system. This means that apart from the fuse for the coolant pump, it has been possible to dispense with fuses entirely. After a possible malfunction or error has been remedied, the power source can be put back into normal operation again without any fuses having to be replaced.

Safety

WARNING! Work that is carried out incorrectly can cause serious injury or damage. All the work described below must only be carried out by trained and qualified personnel. Do not carry out any of the work described below until you have fully read and understood the following documents:
- this document
- all documents relating to the system components, especially the safety rules

WARNING! An electric shock can be fatal. Before starting the work described below:
- 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.

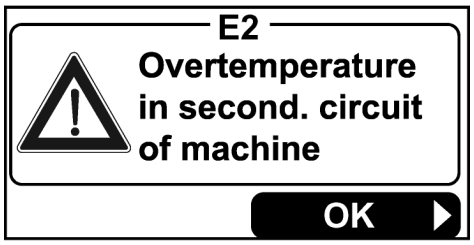
WARNING! An inadequate ground conductor connection can cause serious injury or damage. The housing screws provide a suitable ground conductor connection for earthing the housing and must NOT be replaced by any other screws that do not provide a reliable ground conductor connection.

Displayed service codes

If any error message that is not described here appears on the display, then the fault is one that can only be rectified by our After-Sales Service. Make a note of the error message shown in the display and of the serial number and configuration of the power source, and contact our After-Sales Service team with a detailed description of the error.

The service code can be hidden by pressing 'OK'. If the error persists, the service code will reappear after a short delay. If a fault on the device is rectified then the service code will not appear again.

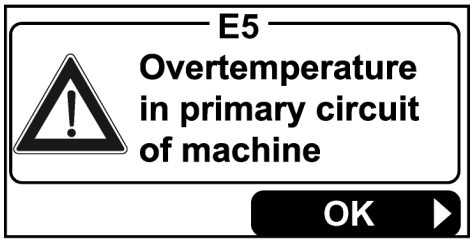
Cause:	No preconfigured program has been selected
Remedy:	Select a configured program



E2 - E4

Cause: Overtemperature in the secondary circuit of the power source

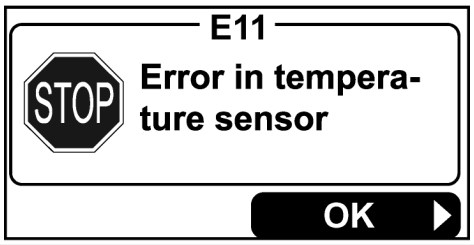
Remedy: Allow power source to cool down



E5 - E10

Cause: Overtemperature in the primary circuit of the power source

Remedy: Allow power source to cool down



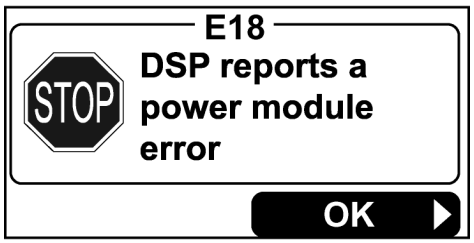
Cause: Temperature sensor fault (short circuit or break)

Remedy: Contact After-Sales Service

E17, E20, E21, E29, E35, E36

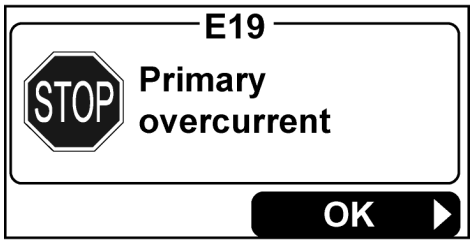
Cause: Fault in central control and regulation unit

Remedy: Contact After-Sales Service



Cause: Fault in power module

Remedy: Contact After-Sales Service



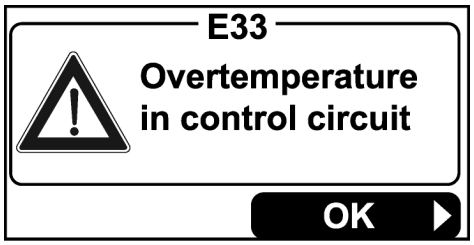
Cause: Primary overcurrent

Remedy: Contact After-Sales Service

When using power sources with a cold wire-feed unit

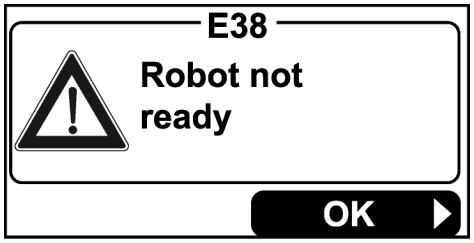
Cause: Fault in cold wire-feed unit

Remedy: Check cold wire-feed unit



Cause: Overtemperature in the control circuit

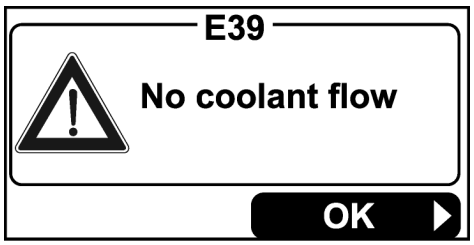
Remedy: Allow power source to cool down



If the power source is being used with a robot interface or a field bus

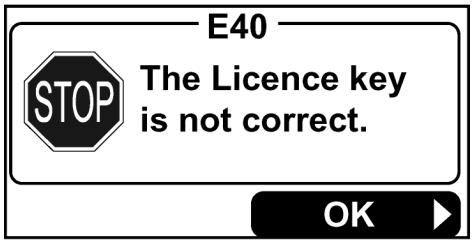
Cause: Robot not ready

Remedy: Initialise "Robot ready" signal, initialise "Source error reset" signal (N.B. "Source error reset" only available in conjunction with ROB 5000 and field bus coupler for robot control)



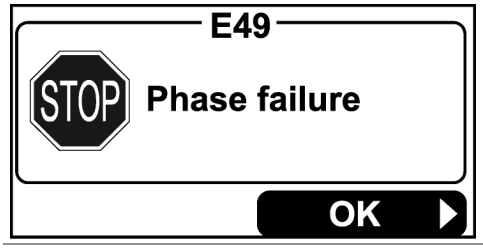
Cause: Cooling unit flow watchdog has been triggered

Remedy: Check the cooling unit; if necessary, top up the coolant or bleed the system as described in "Putting the cooling unit into service"



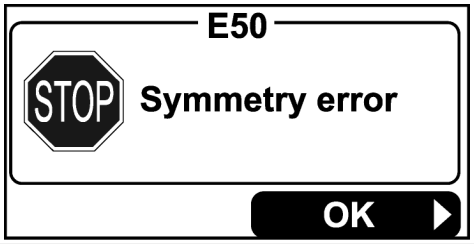
Cause: The software activation code is incorrect

Remedy: Check the software activation code, try again



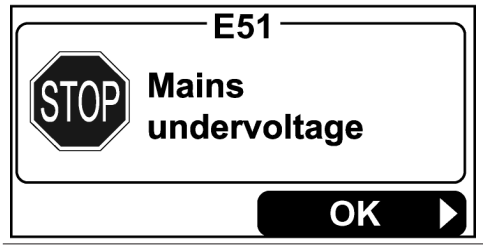
Cause: Phase failure in power supply

Remedy: Check the mains fuse, the mains lead and the mains plug



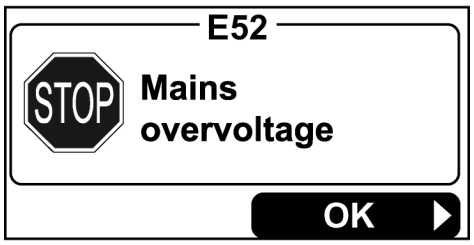
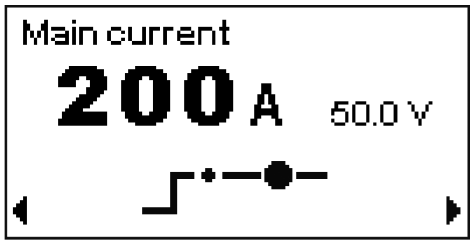
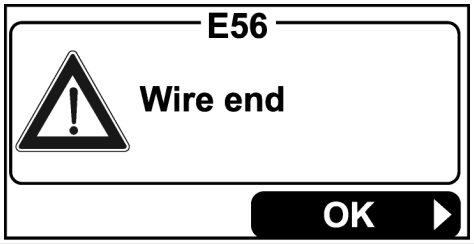
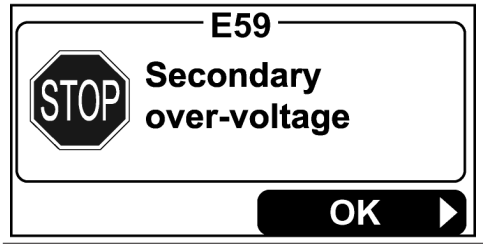
Cause: Indirect symmetry error

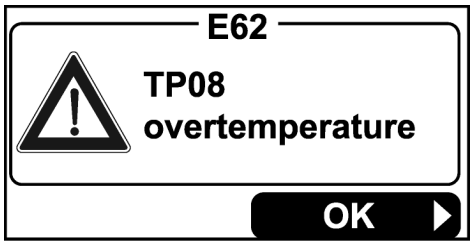
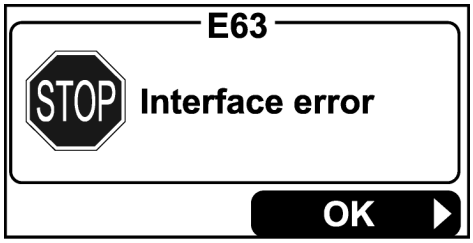
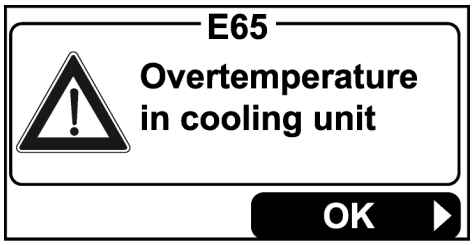
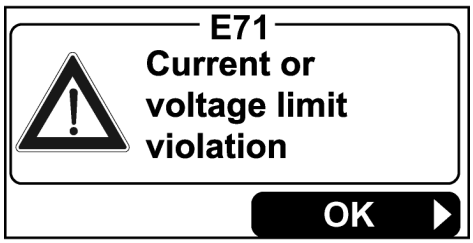
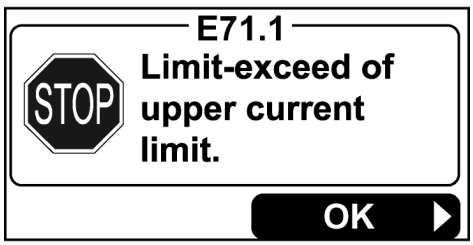
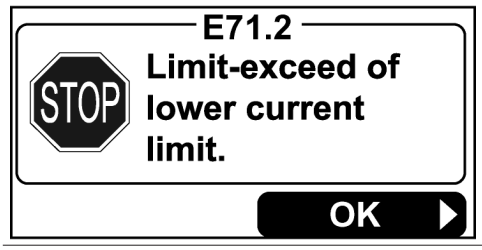
Remedy: Contact After-Sales Service

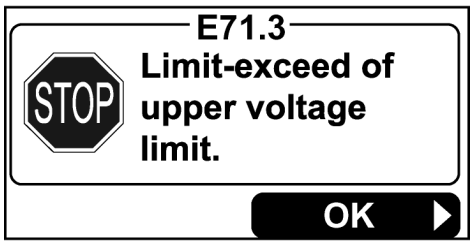


Cause: Mains undervoltage: The mains voltage has dropped below the lower limit of the tolerance range (see section "Technical data")

Remedy: Check the mains voltage

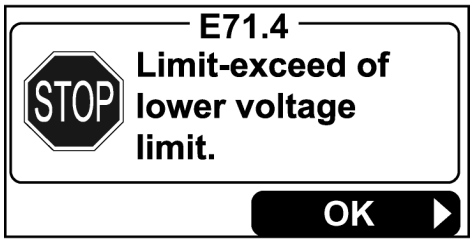
	Cause: Remedy:	Mains overvoltage: The mains voltage has exceeded the upper limit of the tolerance range (see section "Technical data") Check the mains voltage
	Cause: Remedy:	The earth current watchdog has triggered the safety cut-out of the power source. Switch off the power source, wait for 10 seconds and then switch it on again. If you have tried this several times and the error keeps recurring, contact After-Sales Service.
	Cause: Remedy:	Wire stick Correct wire short circuit
	Cause: Remedy:	Ignition time-out function is active: no current started flowing before the end of the time specified in the set-up menu. The safety cut-out of the power source has been triggered. Press the torch trigger repeatedly; clean the workpiece surface; if necessary, increase the time until the safety cut-out is triggered in the set-up menu: level 2
	Cause: Remedy:	Wire end - the wire-end check option has detected that there is no more welding wire available Insert new wirespool
	Cause: Remedy:	Arc break Press the torch trigger repeatedly; clean the surface of the workpiece
	Cause: Remedy:	Secondary overvoltage: safety cut-out has tripped. Contact After-Sales Service

	Cause: Remedy:	Overtemperature on TP 08 remote control Allow TP 08 remote control to cool down
	Cause: Remedy:	Interface fault Contact After-Sales Service
	Cause: Remedy:	Thermostat on cooling unit has tripped Wait until the end of the cooling phase, i.e. until "Hot | H2O" is no longer displayed. ROB 5000 or field bus coupler for robot control: Before resuming welding, set the "Source error reset" signal.
	Cause: Remedy:	Overtemperature in JobMaster welding torch Allow the JobMaster welding torch to cool down
	Cause: Remedy:	The upper/lower current or voltage limit was exceeded Check welding parameters
	Cause: Remedy:	The upper current limit was exceeded Check welding parameters
	Cause: Remedy:	The current dropped below the lower limit Check welding parameters



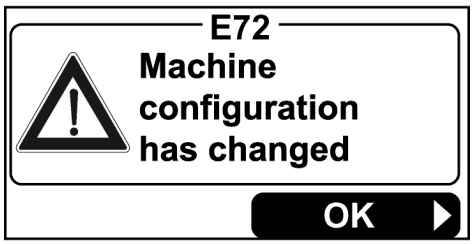
Cause: The upper voltage limit was exceeded

Remedy: Check welding parameters



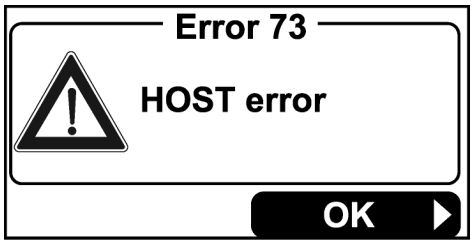
Cause: The voltage dropped below the lower limit

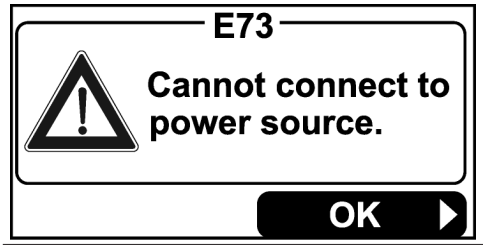
Remedy: Check welding parameters



Cause: The welding device configuration has been changed

Remedy: Check LHSB link



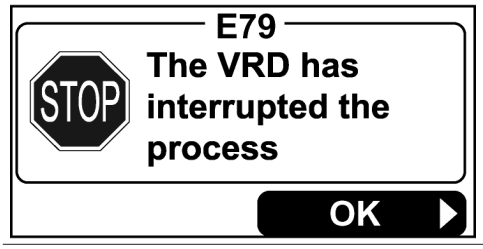


Cause: No connection to power source

Remedy: Check connection to power source and its software

Cause: Emergency Stop - safety circuit is open

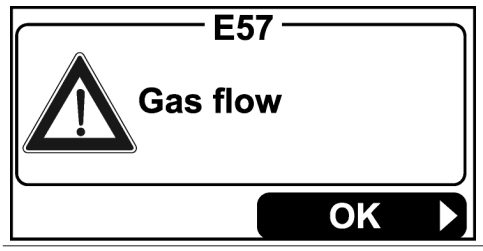
Remedy: Contact After-Sales Service



Cause: The VRD (Voltage Reduction Device) function has interrupted the welding process

Remedy: Contact After-Sales Service

Service codes displayed in conjunction with the digital gas control option



Cause: The gas watchdog option has detected that there is no gas pressure

Remedy: Check protective gas shield supply, connect new gas cylinders or gas cylinder valves/open gas pressure regulator

Displayed Service codes in conjunction with cold wire-feed unit

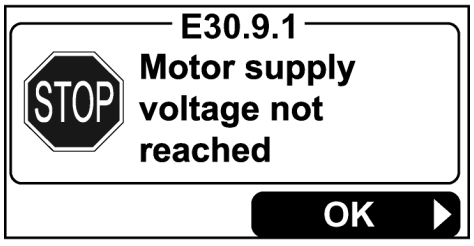
The following abbreviations are used for the service codes shown in conjunction with cold wire-feed units:

KD = Cold wire-feed unit

PPU = Push-pull unit

vDmin = minimum wire feed speed

vDmax = maximum wire feed speed

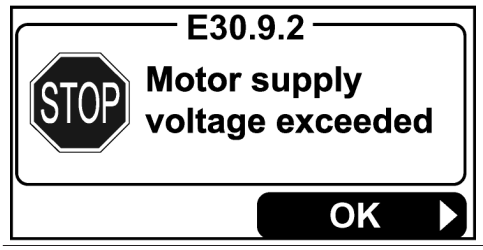


Cause: The external supply voltage has dropped below the tolerance limit

Remedy: Check the external supply voltage

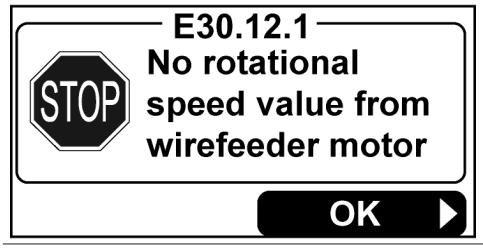
Cause: Wire-feed unit motor is sticking or defective

Remedy: Check or replace the wire-feed unit motor



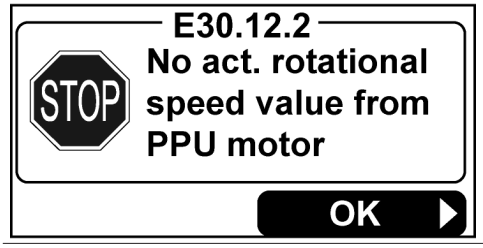
Cause: The external supply voltage has dropped below the tolerance limit

Remedy: Check the external supply voltage



Cause: No actual speed value from the wire-feed unit motor

Remedy: Check actual value and leads, if the error persists contact After-Sales Service



Cause: No actual speed value from the wire-feed unit motor

Remedy: Check actual value and leads, if the error persists contact After-Sales Service

Power source - troubleshooting

Power source does not function

Mains switch is on, but indicators are not lit up

Cause: There is a break in the mains lead; the mains plug is not plugged in
Remedy: Check the mains lead, ensure that the mains plug is plugged in

Cause: Mains socket or mains plug faulty
Remedy: Replace faulty parts

Cause: Mains fuse protection
Remedy: Change the mains fuse protection

No welding current

Mains switch is ON, overtemperature indicator is lit up

Cause: Overload
Remedy: Check duty cycle

Cause: Thermostatic safety cut-out has tripped
Remedy: Wait until the power source automatically comes back on after the end of the cooling phase

Cause: The fan in the power source is faulty
Remedy: Contact After-Sales Service

No welding current

Mains switch is on, indicators are lit up

Cause: Grounding (earthing) connection is incorrect
Remedy: Check the grounding (earthing) connection and terminal for correct polarity

Cause: There is a break in the current cable in the welding torch
Remedy: Replace welding torch

Nothing happens when the torch trigger is pressed

Mains switch is on, indicators are lit up

Cause: The control plug is not plugged in
Remedy: Plug in the control plug

Cause: Welding torch or welding torch control line is faulty
Remedy: Replace welding torch

No protective gas shield

All other functions are OK

Cause: Gas cylinder is empty

Remedy: Change the gas cylinder

Cause: Gas pressure regulator is faulty

Remedy: Change the gas pressure regulator

Cause: Gas hose is not fitted or is damaged

Remedy: Fit or change the gas hose

Cause: Welding torch is faulty

Remedy: Change the welding torch

Cause: Gas solenoid valve is faulty

Remedy: Contact After-Sales Service

Poor weld properties

Cause: Incorrect welding parameters

Remedy: Check the settings

Cause: Grounding (earthing) connection is incorrect

Remedy: Check the grounding (earthing) connection and terminal for correct polarity

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The welding torch becomes very hot

Cause: The dimensions of the welding torch are inadequate

Remedy: Observe the duty cycle and loading limits

Cause: Only on water-cooled machines: water flow rate is insufficient

Remedy: Check the water level, water flow rate, cleanliness, etc. If the coolant pump is blocked: use a screwdriver - placed on the bushing - to turn the coolant pump shaft

Cause: Only on water-cooled machines: welding parameter 'Cool. unit ctrl' is set to "OFF".

Remedy: In the set-up menu, set welding parameter 'Cool. unit ctrl' to "Aut" or "ON".

Care, maintenance and disposal

General

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

Safety

WARNING! Work that is carried out incorrectly can cause serious injury or damage. All the work described below must only be carried out by trained and qualified personnel. Do not carry out any of the work described below until you have fully read and understood the following documents:
- this document
- all documents relating to the system components, especially the safety rules

WARNING! An electric shock can be fatal. Before starting the work described below:
- 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.

At every start-up

- Check mains plug, mains cable, welding torch, interconnecting hosepack and grounding (earthing) connection for damage
- Check that there is a gap of 0.5 m (1 ft. 8 in.) all around the device to ensure that cooling air can flow and escape unhindered

NOTE! Air inlets and outlets must never be covered, not even partially.

Every 2 months

- If present: clean air filter

Every 6 months

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

NOTE! Risk of damage to electronic components. Do not bring air nozzle too close to electronic components.

- If a lot of dust has accumulated, clean the cooling air ducts.

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

Appendix

Technical data

Special voltages

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

MagicWave 2200 Comfort

	MW 2200 Comfort
Mains voltage	230 V
Mains voltage tolerance	-20 % / +15 %
Mains frequency	50/60 Hz
Mains fuse protection (slow-blow)	16 A
Mains connection [1)]	No restrictions
Primary continuous power (100% d.c. [2)])	3.7 kVA
Cos phi	0,99
Welding current range	
TIG	3 - 220 A
Electrode	10 - 180 A
Welding current at	
10 min/25 °C (77 °F) 40% d.c.[2)]	220 A
10 min/25 °C (77 °F) 60% d.c.[2)]	180 A
10 min/25 °C (77 °F) 100% d.c.[2)]	150 A
10 min/40 °C (104 °F) 35% d.c.[2)]	220 A
10 min/40 °C (104 °F) 60% d.c.[2)]	170 A
10 min/40 °C (104 °F) 100% d.c.[2)]	150 A
Open circuit voltage	88 V
Working voltage	
TIG	10.1 - 18.8 V
Electrode	20.4 - 27.2 V
Striking voltage (U_p)	9.5 kV
The arc striking voltage is suitable for manual operation.	
Degree of protection	IP 23
Type of cooling	AF
Insulation class	B
EMC emission class (in accordance with EN/IEC 60974-10)	A
Dimensions L x W x H (with handle)	485 / 180 / 390 mm 19.1 / 7.1 / 15.4 in.
Weight (without handle)	17.4 kg 38.3 lb.
Weight (with handle)	17.8 kg 39.2 lb.
Mark of conformity	S, CE

MagicWave 2500 / 3000 Comfort

	MW 2500 Comfort	MW 3000 Comfort
Mains voltage	3 x 400 V	3 x 400 V
Mains voltage tolerance	± 15 %	± 15 %
Mains frequency	50/60 Hz	50/60 Hz
Mains fuse protection (slow-blow)	16 A	16 A
Mains connection [1]	Z_{max} at PCC [3] = 122 mOhm	Z_{max} at PCC [3] = 87 mOhm
Primary continuous power (100% d.c. [2])	4.7 kVA	5.5 kVA
Cos phi	0,99	0,99
Welding current range		
TIG	3 - 250 A	3 - 300 A
Electrode	10 - 250 A	10 - 300 A
Welding current at		
10 min/40 °C (104 °F) 35% d.c.[2]	-	300 A
10 min/40 °C (104 °F) 40% d.c.[2]	250 A	-
10 min/40 °C (104 °F) 100% d.c.[2]	180 A	200 A
Open circuit voltage	89 V	89 V
Working voltage		
TIG	10.1 - 20.0 V	10.1 - 22.0 V
Electrode	20.4 - 30.0 V	20.4 - 32.0 V
Striking voltage (U_p)	10 kV	10 kV
The arc striking voltage is suitable for manual operation.		
Degree of protection	IP 23	IP 23
Type of cooling	AF	AF
Insulation class	B	B
Dimensions L x W x H (with handle)	560 / 250 / 435 mm 22.0 / 9.8 / 17.1 in.	560 / 250 / 435 mm 22.0 / 9.8 / 17.1 in.
Weight	26.6 kg 58.64 lb.	28.1 kg 61.95 lb.
Mark of conformity	S, CE	S, CE

MagicWave 2500 / 3000 Comfort MV

	MW 2500 Comfort MV	MW 3000 Comfort MV
Mains voltage	3 x 200 - 240 V 3 x 400 - 460 V 1 x 200 - 240 V	3 x 200 - 240 V 3 x 400 - 460 V 1 x 200 - 240 V
Mains voltage tolerance	± 10 %	± 10 %
Mains frequency	50 / 60 Hz	50 / 60 Hz
Mains fuse protection (slow-blow)		
3 x 400 - 460 V 3 x 200 - 240 V 1 x 200 - 240 V	16 A 32 A 32 A	16 A 32 A 32 A
Mains connection [1]	Z_{max} at PCC[3] = 122 mOhm	Z_{max} at PCC[3] = 87 mOhm
Primary continuous power (100% d.c. [2])		
3 x 400 - 460 V 3 x 200 - 240 V 1 x 200 - 240 V	4,8 kVA 4,4 kVA 3,9 kVA	5,1 kVA 4,9 kVA 4,3 kVA
Cos phi	0,99	0,99
Welding current range (3-phase)		
TIG	3 - 250 A	3 - 300 A
Electrode	10 - 250 A	10 - 300 A
Welding current range (single phase)		
TIG	3 - 220 A	3 - 220 A
Electrode	10 - 180 A	10 - 180 A
Welding current at 3 x 400 - 460 V		
10 min/40°C (104°F) 35% d.c.[2]	-	300 A
10 min/40°C (104°F) 40% d.c.[2]	250 A	-
10 min/40°C (104°F) 100% d.c.[2]	180 A	190 A
Welding current at 3 x 200 - 240 V		
10 min/40°C (104°F) 30% d.c.[2]	-	300 A
10 min/40°C (104°F) 35% d.c.[2]	250 A	-
10 min/40°C (104°F) 100% d.c.[2]	160 A	180 A
Welding current at 1 x 200 - 240 V		
10 min/40°C (104°F) 40% d.c.[2]	220 A	-
10 min/40°C (104°F) 50% d.c.[2]	-	220 A
10 min/40°C (104°F) 100% d.c.[2]	150 A	160 A
Open circuit voltage	89 V	89 V
Working voltage		
TIG	10,1 - 20,0 V	10,1 - 22,0 V
Electrode	20,4 - 30,0 V	20,4 - 32,0 V
Striking voltage (U_p)	10 kV	10 kV
The arc striking voltage is suitable for manual operation.		
Degree of protection	IP 23	IP 23
Type of cooling	AF	AF
Insulation class	B	B
EMC emission class (in accordance with EN/IEC 60974-10)	A	A

	MW 2500 Comfort MV	MW 3000 Comfort MV
Dimensions L x W x H (with handle)	560 / 250 / 435 mm 22.0 / 9.8 / 17.1 in.	560 / 250 / 435 mm 22.0 / 9.8 / 17.1 in.
Weight	28,2 kg 62.17 lb.	30 kg 66.14 lb.
Mark of conformity	S, CE	S, CE

MagicWave 4000 Comfort, MagicWave 4000 Comfort MV

	MW 4000 Comfort	MW 4000 Comfort MV
Mains voltage	3 x 400 V	3 x 200 - 240 V 3 x 380 - 460 V
Mains voltage tolerance	± 15 %	± 10 %
Mains frequency	50/60 Hz	50/60 Hz
Mains fuse protection (slow-blow)	35 A	63/35 A
Mains connection [1)]	Restrictions possible	Restrictions possible
Primary continuous power (100% d.c. [2)])	15.5 kVA	13.9 kVA
Cos phi	0,99	0,99
Welding current range		
TIG	3 - 400 A	3 - 400 A
Electrode	10 - 400 A	10 - 400 A
Welding current at		
10 min/40 °C (104 °F) 40% d.c.[2)]	-	-
10 min/40 °C (104 °F) 45% d.c.[2)]	400 A	400 A
10 min/40 °C (104 °F) 60% d.c.[2)]	365 A	360 A
10 min/40 °C (104 °F) 100% d.c.[2)]	310 A	300 A
Open circuit voltage	90 V	90 V
Working voltage		
TIG	10.1 - 26.0 V	10.1 - 26.0 V
Electrode	20.4 - 36.0 V	20.4 - 36.0 V
Striking voltage (U_p)	9.5 kV	9.5 kV
The arc striking voltage is suitable for manual operation.		
Degree of protection	IP 23	IP 23
Type of cooling	AF	AF
Insulation class	F	F
EMC emission class (in accordance with EN/IEC 60974-10)	A	A
Dimensions L x W x H (with handle)	625 / 290 / 705 mm 24.6 / 11.4 / 27.8 in.	625 / 290 / 705 mm 24.6 / 11.4 / 27.8 in.
Weight	58.2 kg 128 lb.	60 kg 132.30 lb.
Mark of conformity	S, CE	S, CE, CSA

TransTig 2200 Comfort

	TT 2200 Comfort
Mains voltage	230 V
Mains voltage tolerance	-20 % / +15 %
Mains frequency	50 / 60 Hz
Mains fuse protection (slow-blow)	16 A
Mains connection [1]	No restrictions
Primary continuous power (100% d.c. [2])	3,0 kVA
Cos phi	0,99
Welding current range	
TIG	3 - 220 A
Electrode	10 - 180 A
Welding current at	
10 min/25°C (77°F) 50% ED[2]	220 A
10 min/25°C (77°F) 60% ED[2]	200 A
10 min/25°C (77°F) 100% ED[2]	170 A
10 min/40°C (104°F) 40% ED[2]	220 A
10 min/40°C (104°F) 60% ED[2]	180 A
10 min/40°C (104°F) 100% ED[2]	150 A
Open circuit voltage	84 V
Working voltage	
TIG	10,1 - 18,8 V
Electrode	20,4 - 27,2 V
Striking voltage (U_p)	9,5 kV
The arc striking voltage is suitable for manual operation.	
Degree of protection	IP 23
Type of cooling	AF
Insulation class	B
EMC emission class (in accordance with EN/IEC 60974-10)	A
Dimensions L x W x H (with handle)	485 / 180 / 390 mm 19.1 / 7.1 / 15.4 in.
Weight (without handle)	16,4 kg 37 lb.
Weight (with handle)	16,8 kg 37 lb.
Mark of conformity	S, CE

TransTig 2500 / 3000 Comfort

	TT 2500 Comfort	TT 3000 Comfort
Mains voltage	3 x 400 V	3 x 400 V
Mains voltage tolerance	± 15 %	± 15 %
Mains frequency	50/60 Hz	50/60 Hz
Mains fuse protection (slow-blow)	16 A	16 A
Mains connection [1]	Z_{max} at PCC [3] = 172 mOhm	Z_{max} at PCC [3] = 97 mOhm
Primary continuous power (100% d.c. [2])	5.1 kVA	5.7 kVA
Cos phi	0,99	0,99
Welding current range		
TIG	3 - 250 A	3 - 300 A
Electrode	10 - 250 A	10 - 300 A
Welding current at		
10 min/40 °C (104 °F) 45% d.c.[2]	-	300 A
10 min/40 °C (104 °F) 50% d.c.[2]	250 A	-
10 min/40 °C (104 °F) 60% d.c.[2]	240 A	270 A
10 min/40 °C (104 °F) 100% d.c.[2]	210 A	230 A
Open circuit voltage	85 V	85 V
Working voltage		
TIG	10.1 - 20.0 V	10.1 - 22.0 V
Electrode	20.4 - 30.0 V	20.1 - 32.0 V
Striking voltage (U_p)	10 kV	10 kV
The arc striking voltage is suitable for manual operation.		
Degree of protection	IP 23	IP 23
Type of cooling	AF	AF
Insulation class	B	B
Dimensions L x W x H (with handle)	560 / 250 / 435 mm 22.0 / 9.8 / 17.1 in.	560 / 250 / 435 mm 22.0 / 9.8 / 17.1 in.
Weight	24.2 kg 53.35 lb.	24.2 kg 53.35 lb.
Mark of conformity	S, CE	S, CE

TransTig 2500 / 3000 Comfort MV

	TT 2500 Comfort MV	TT 3000 Comfort MV
Mains voltage	3 x 200 - 240 V 3 x 400 - 460 V 1 x 200 - 240 V	3 x 200 - 240 V 3 x 400 - 460 V 1 x 200 - 240 V
Mains voltage tolerance	± 10 %	± 10 %
Mains frequency	50 / 60 Hz	50 / 60 Hz
Mains fuse protection (slow-blow)		
3 x 400 - 460 V	16 A	16 A
3 x 200 - 240 V	32 A	32 A
1 x 200 - 240 V	32 A	32 A
Mains connection [1]	Z_{max} at PCC [3] = 172 mOhm	Z_{max} at PCC [3] = 97 mOhm
Primary continuous power (100% d.c. [2])		
3 x 400 - 460 V	4,7 kVA	5,9 kVA
3 x 200 - 240 V	4,1 kVA	5,0 kVA
1 x 200 - 240 V	4,3 kVA	4,3 kVA
Cos phi	0,99	0,99
Welding current range (3-phase)		
TIG	3 - 250 A	3 - 300 A
Electrode	10 - 250 A	10 - 300 A
Welding current range (single phase)		
TIG	3 - 220 A	3 - 220 A
Electrode	10 - 180 A	10 - 180 A
Welding current at 3 x 400 - 460 V		
10 min/40 °C (104 °F) 45% d.c.[2]	-	300 A
10 min/40°C (104°F) 50% d.c.[2]	250 A	-
10 min/40°C (104°F) 100% d.c.[2]	200 A	240 A
Welding current at 3 x 200 - 240 V		
10 min/40°C (104°F) 35% d.c.[2]	-	300 A
10 min/40°C (104°F) 40% d.c.[2]	250 A	-
10 min/40°C (104°F) 100% d.c.[2]	180 A	210 A
Welding current at 1 x 200 - 240 V		
10 min/40°C (104°F) 50% d.c.[2]	220 A	-
10 min/40°C (104°F) 55% d.c.[2]	-	220 A
10 min/40°C (104°F) 100% d.c.[2]	190 A	190 A
Open circuit voltage	85 V	85 V
Working voltage		
TIG	10,1 - 20,0 V	10,1 - 22,0 V
Electrode	20,4 - 30,0 V	20,4 - 32,0 V
Striking voltage (U_p)	10 kV	10 kV
The arc striking voltage is suitable for manual operation		
Degree of protection	IP 23	IP 23
Type of cooling	AF	AF
Insulation class	B	B
EMC emission class (in accordance with EN/IEC 60974-10)	A	A

	TT 2500 Comfort MV	TT 3000 Comfort MV
Dimensions L x W x H (with handle)	560 / 250 / 435 mm 22.0 / 9.8 / 17.1 in.	560 / 250 / 435 mm 22.0 / 9.8 / 17.1 in.
Weight	25,9 kg 57.10 lb.	25,9 kg 57.10 lb.
Mark of conformity	S, CE	S, CE

TransTig 4000 Comfort, TransTig 4000 Comfort MV

	TT 4000 Comfort	TT 4000 Comfort MV
Mains voltage	3 x 400 V	3 x 200 - 240 V 3 x 380 - 460 V
Mains voltage tolerance	± 15 %	± 10 %
Mains frequency	50/60 Hz	50/60 Hz
Mains fuse protection (slow-blow)	35 A	63/35 A
Mains connection [1)]	Restrictions possible	Restrictions possible
Primary continuous power (100% d.c. [2)])	11.8 kVA	11.5 kVA
Cos phi	0,99	0,99
Welding current range		
TIG	3 - 400 A	3 - 400 A
Electrode	10 - 400 A	10 - 400 A
Welding current at		
10 min/40 °C (104 °F) 40% d.c.[2)]	-	-
10 min/40 °C (104 °F) 45% d.c.[2)]	400 A	400 A
10 min/40 °C (104 °F) 60% d.c.[2)]	365 A	360 A
10 min/40 °C (104 °F) 100% d.c.[2)]	310 A	300 A
Open circuit voltage	86 V	86 V
Working voltage		
TIG	10.1 - 26.0 V	10.1 - 26.0 V
Electrode	20.4 - 36.0 V	20.4 - 36.0 V
Striking voltage (U_p)	9.5 kV	9.5 kV
The arc striking voltage is suitable for manual operation.		
Degree of protection	IP 23	IP 23
Type of cooling	AF	AF
Insulation class	F	F
EMC emission class (in accordance with EN/IEC 60974-10)	A	A
Dimensions L x W x H (with handle)	625 / 290 / 475 mm 24.6 / 11.4 / 18.7 in.	625 / 290 / 475 mm 24.6 / 11.4 / 18.7 in.
Weight	39.8 kg 87.7 lb.	42.0 kg 92.6 lb.
Mark of conformity	S, CE	S, CE, CSA

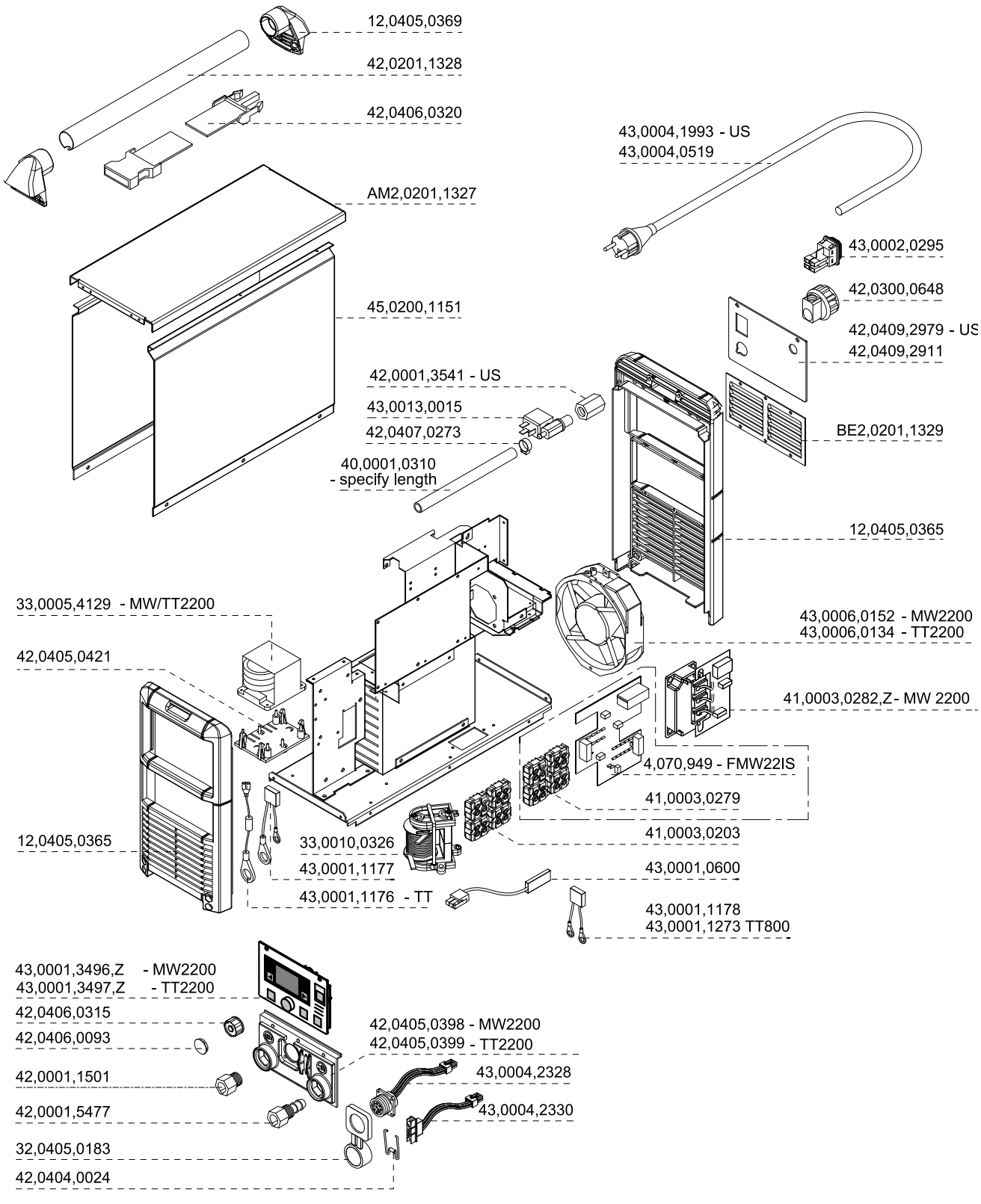
Explanation of footnotes

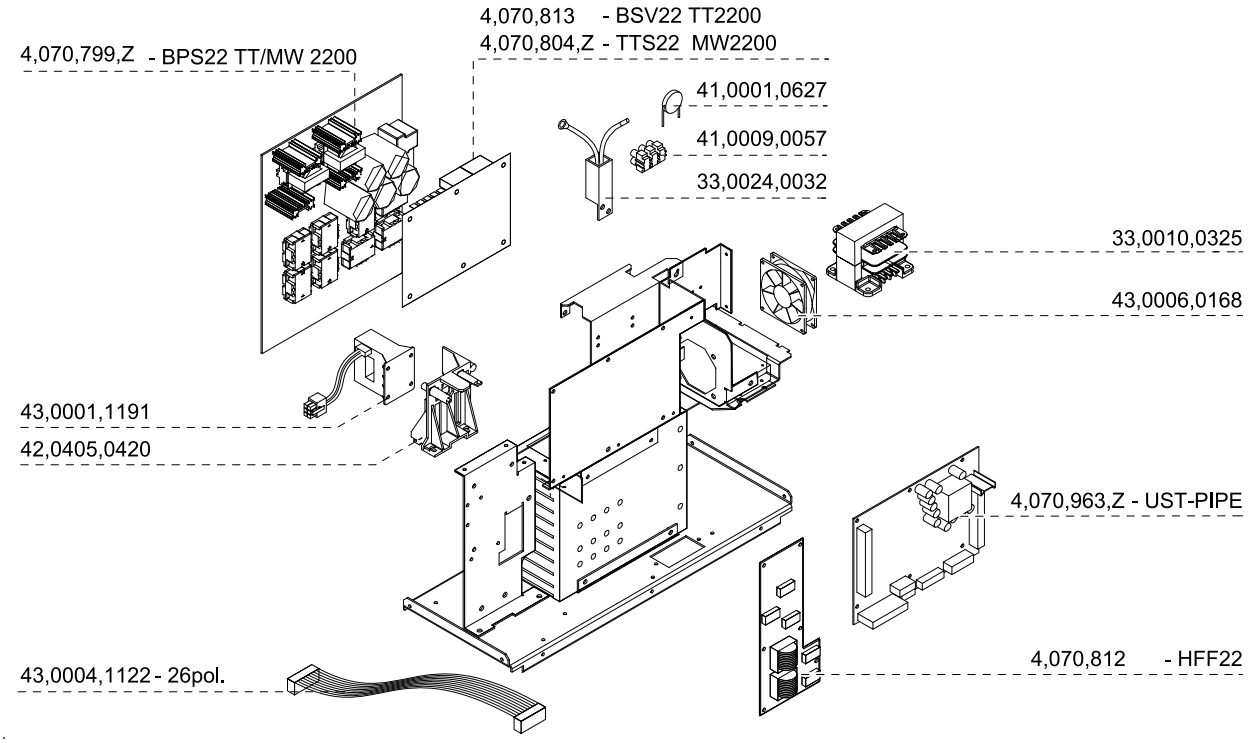
1) connected to public mains supply with 230 / 400 V and 50 Hz
2) d.c. = duty cycle
3) PCC = interface to the public grid

Spare parts and circuit diagrams

Spare parts list: TransTig / MagicWave 2200 Comfort

MagicWave 2200 Comfort **4,075,125,631**
TransTig 2200 Comfort **4,075,126,631**

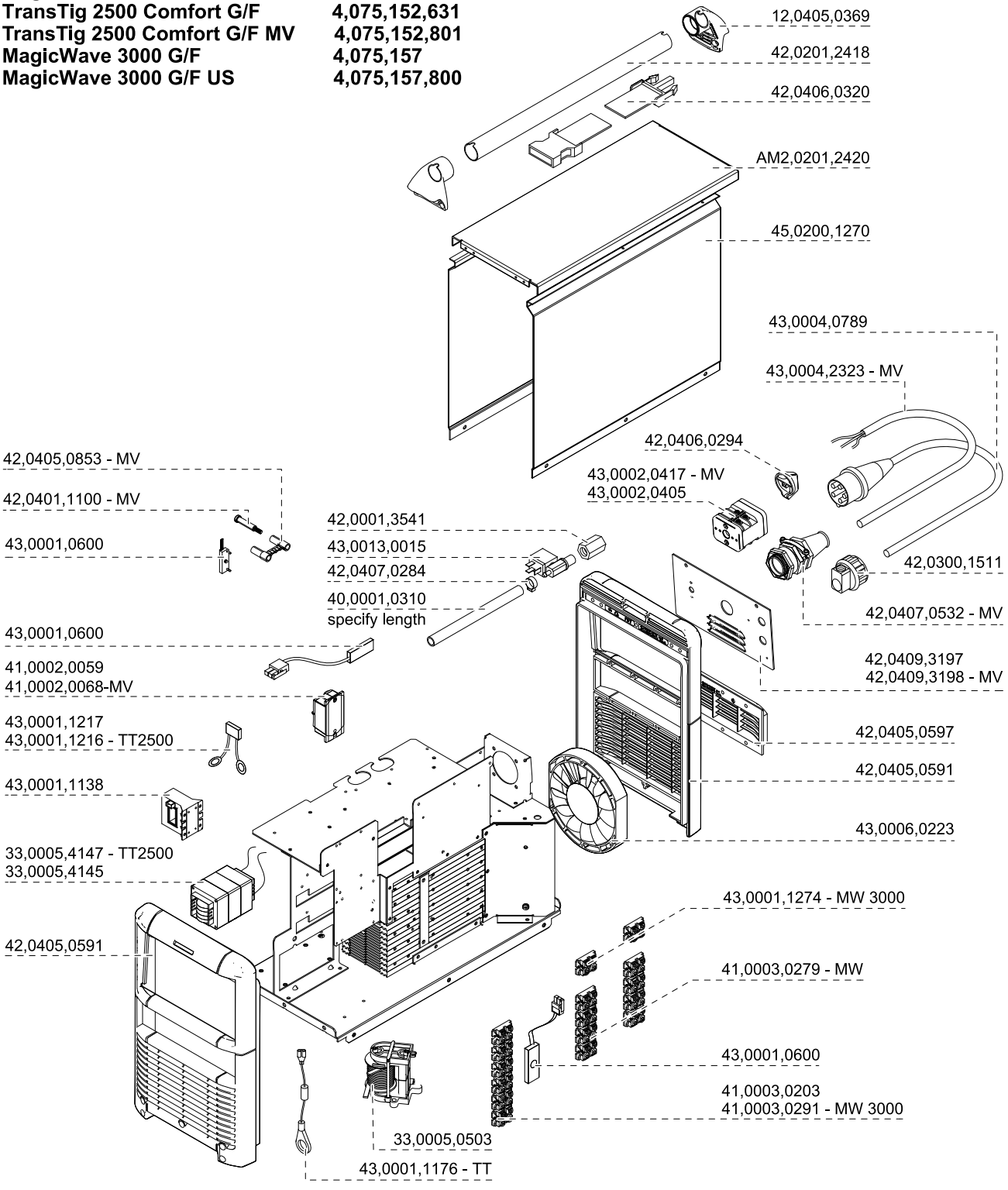


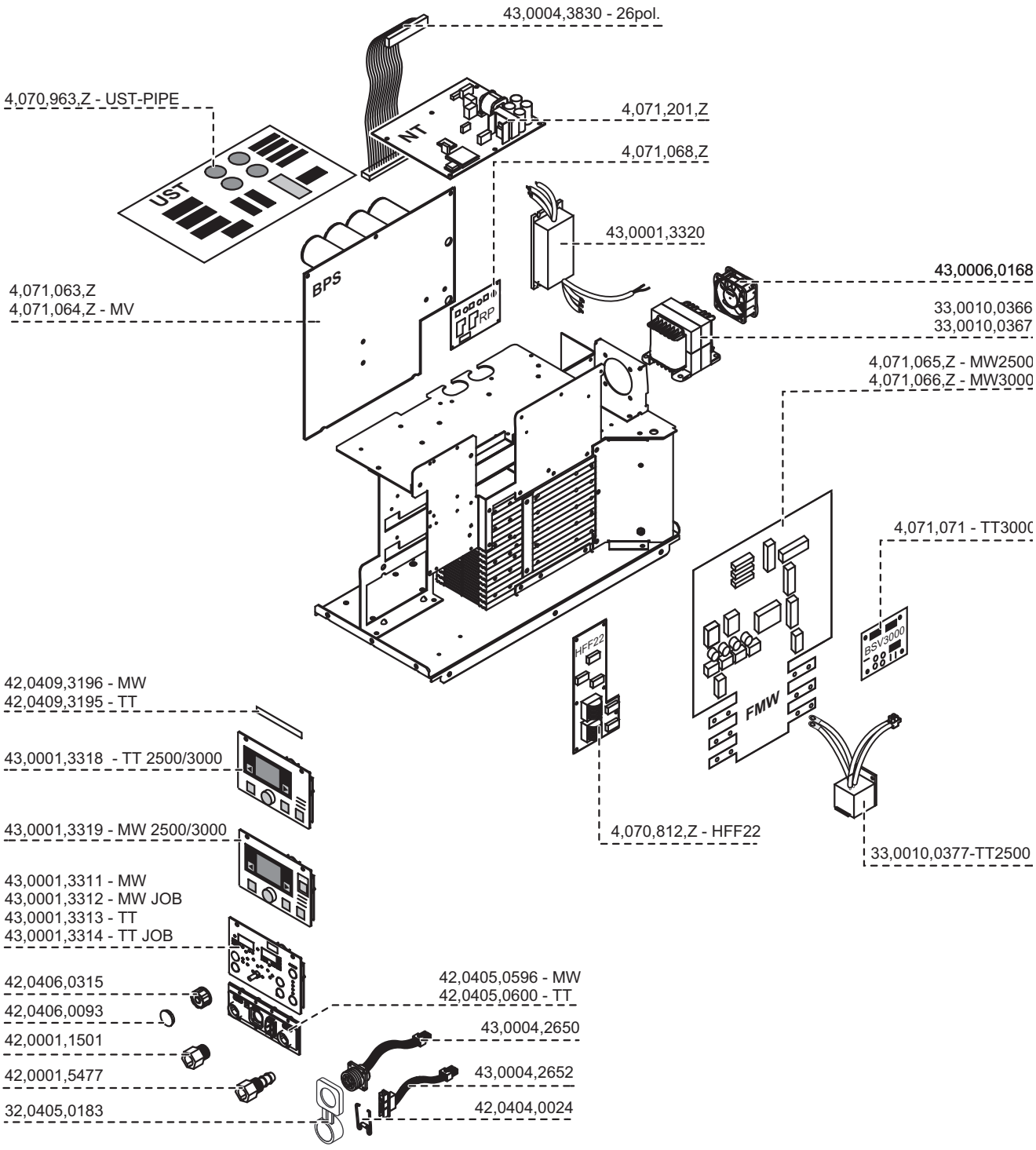

4,070,799,Z - BPS22 TT/MW 2200
4,070,813 - BSV22 TT2200
4,070,804,Z - TTS22 MW2200
41,0001,0627
41,0009,0057
33,0024,0032
33,0010,0325
43,0006,0168
43,0001,1191
42,0405,0420
4,070,963,Z - UST-PIPE
4,070,812 - HFF22
43,0004,1122 - 26pol.

Spare parts list: TransTig / MagicWave 2500 / 3000

MagicWave 2500 G/F	**4,075,155**
MagicWave 2500 G/F US	**4,075,155,800**
TransTig 2500 G/F	**4,075,151**
TransTig 2500 G/F US	**4,075,151,800**
MagicWave 2500 Job G/F	**4,075,156**
MagicWave 2500 Job G/F US	**4,075,156,800**
TransTig 2500 Job G/F	**4,075,152**
TransTig 2500 Job G/F US	**4,075,152,800**
MagicWave 2500 Comfort G/F	**4,075,156,631**
MagicWave 2500 Comfort MV G/F	**4,075,156,801**
TransTig 2500 Comfort G/F	**4,075,152,631**
TransTig 2500 Comfort G/F MV	**4,075,152,801**
MagicWave 3000 G/F	**4,075,157**
MagicWave 3000 G/F US	**4,075,157,800**

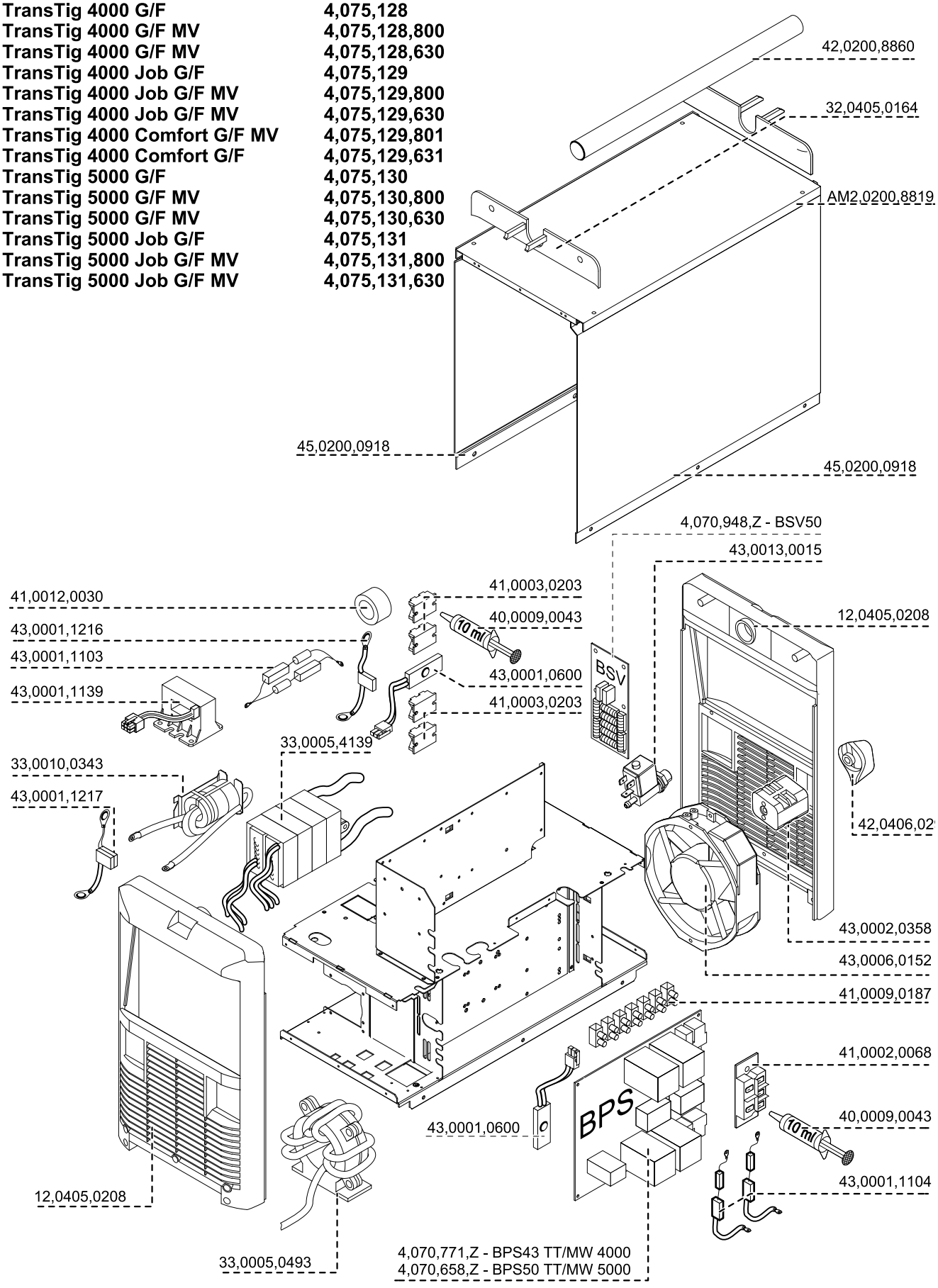
TransTig 3000 G/F	**4,075,153**
TransTig 3000 G/F US	**4,075,153,800**
MagicWave 3000 Job G/F	**4,075,158**
MagicWave 3000 Job G/F US	**4,075,158,800**
TransTig 3000 Job G/F	**4,075,154**
TransTig 3000 Job G/F US	**4,075,154,800**
MagicWave 3000 Comfort G/F	**4,075,158,631**
MagicWave 3000 Comfort MV G/F	**4,075,158,801**
TransTig 3000 Comfort G/F	**4,075,154,631**
TransTig 3000 Comfrt G/F MV	**4,075,154,801**

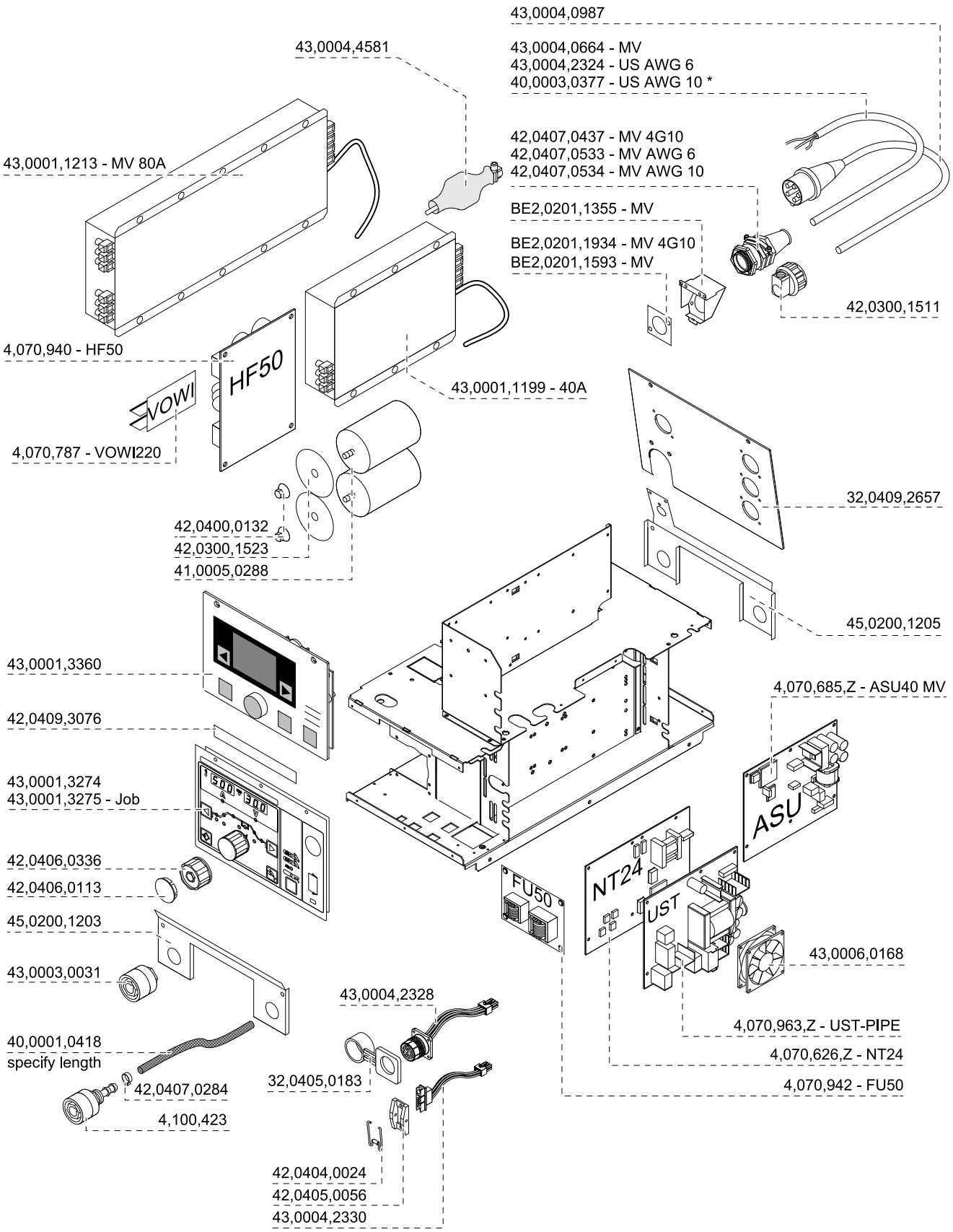



43,0004,3830 - 26pol.
4,070,963,Z - UST-PIPE
4,071,201,Z
4,071,068,Z
43,0001,3320
43,0006,0168
4,071,063,Z
4,071,064,Z - MV
33,0010,0366
33,0010,0367
4,071,065,Z - MW2500
4,071,066,Z - MW3000
4,071,071 - TT3000
42,0409,3196 - MW
42,0409,3195 - TT
43,0001,3318 - TT 2500/3000
43,0001,3319 - MW 2500/3000
43,0001,3311 - MW
43,0001,3312 - MW JOB
43,0001,3313 - TT
43,0001,3314 - TT JOB
4,070,812,Z - HFF22
33,0010,0377-TT2500
42,0406,0315
42,0406,0093
42,0001,1501
42,0001,5477
32,0405,0183
42,0405,0596 - MW
42,0405,0600 - TT
43,0004,2650
43,0004,2652
42,0404,0024
UST
NT
BPS
HFF22
BSV3000
FMW

Spare parts list: TransTig 4000

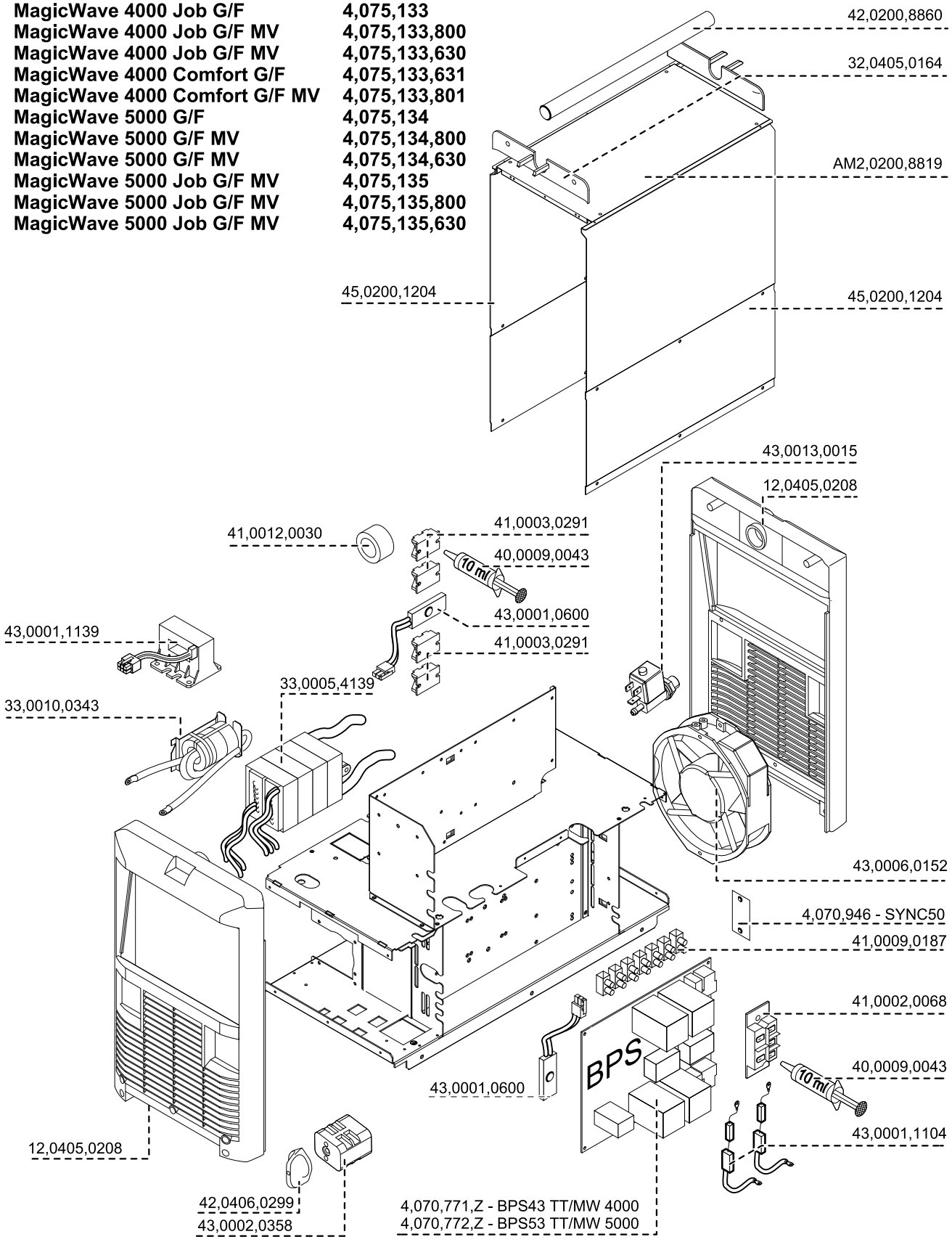
TransTig 4000 G/F	**4,075,128**
TransTig 4000 G/F MV	**4,075,128,800**
TransTig 4000 G/F MV	**4,075,128,630**
TransTig 4000 Job G/F	**4,075,129**
TransTig 4000 Job G/F MV	**4,075,129,800**
TransTig 4000 Job G/F MV	**4,075,129,630**
TransTig 4000 Comfort G/F MV	**4,075,129,801**
TransTig 4000 Comfort G/F	**4,075,129,631**
TransTig 5000 G/F	**4,075,130**
TransTig 5000 G/F MV	**4,075,130,800**
TransTig 5000 G/F MV	**4,075,130,630**
TransTig 5000 Job G/F	**4,075,131**
TransTig 5000 Job G/F MV	**4,075,131,800**
TransTig 5000 Job G/F MV	**4,075,131,630**

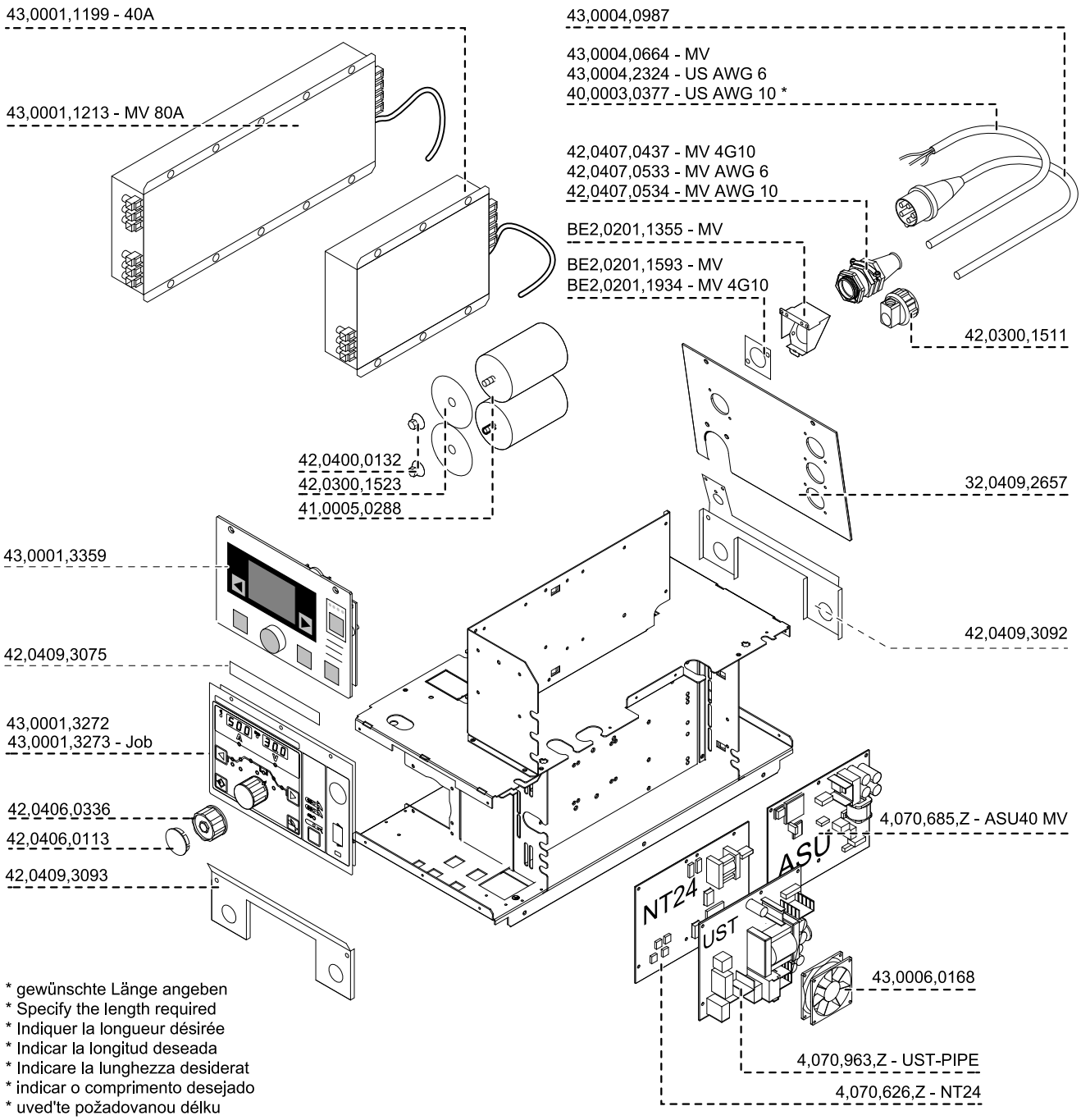


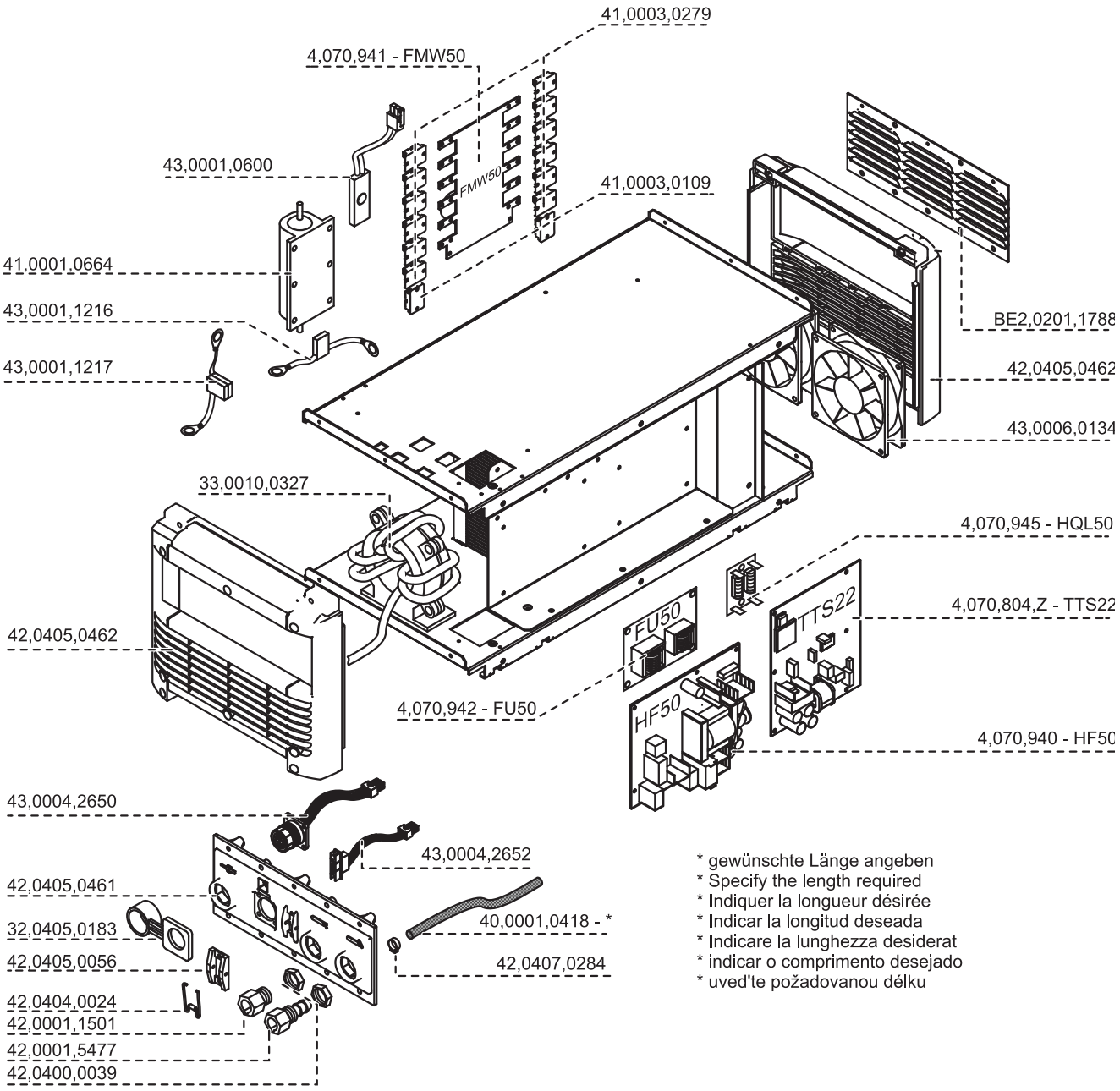

43,0004,0987
43,0004,4581
43,0004,0664 - MV
43,0004,2324 - US AWG 6
40,0003,0377 - US AWG 10 *
43,0001,1213 - MV 80A
42,0407,0437 - MV 4G10
42,0407,0533 - MV AWG 6
42,0407,0534 - MV AWG 10
BE2,0201,1355 - MV
BE2,0201,1934 - MV 4G10
BE2,0201,1593 - MV
42,0300,1511
4,070,940 - HF50
HF50
VOWI
43,0001,1199 - 40A
4,070,787 - VOWI220
32,0409,2657
42,0400,0132
42,0300,1523
41,0005,0288
45,0200,1205
43,0001,3360
4,070,685,Z - ASU40 MV
42,0409,3076
43,0001,3274
43,0001,3275 - Job
ASU
NT24
UST
FU50
42,0406,0336
42,0406,0113
45,0200,1203
43,0003,0031
43,0006,0168
43,0004,2328
4,070,963,Z - UST-PIPE
40,0001,0418
specify length
4,070,626,Z - NT24
32,0405,0183
42,0407,0284
4,070,942 - FU50
4,100,423
42,0404,0024
42,0405,0056
43,0004,2330

Spare parts list: MagicWave 4000

MagicWave 4000 G/F	**4,075,132**
MagicWave 4000 G/F MV	**4,075,132,800**
MagicWave 4000 G/F MV	**4,075,132,630**
MagicWave 4000 Job G/F	**4,075,133**
MagicWave 4000 Job G/F MV	**4,075,133,800**
MagicWave 4000 Job G/F MV	**4,075,133,630**
MagicWave 4000 Comfort G/F	**4,075,133,631**
MagicWave 4000 Comfort G/F MV	**4,075,133,801**
MagicWave 5000 G/F	**4,075,134**
MagicWave 5000 G/F MV	**4,075,134,800**
MagicWave 5000 G/F MV	**4,075,134,630**
MagicWave 5000 Job G/F MV	**4,075,135**
MagicWave 5000 Job G/F MV	**4,075,135,800**
MagicWave 5000 Job G/F MV	**4,075,135,630**

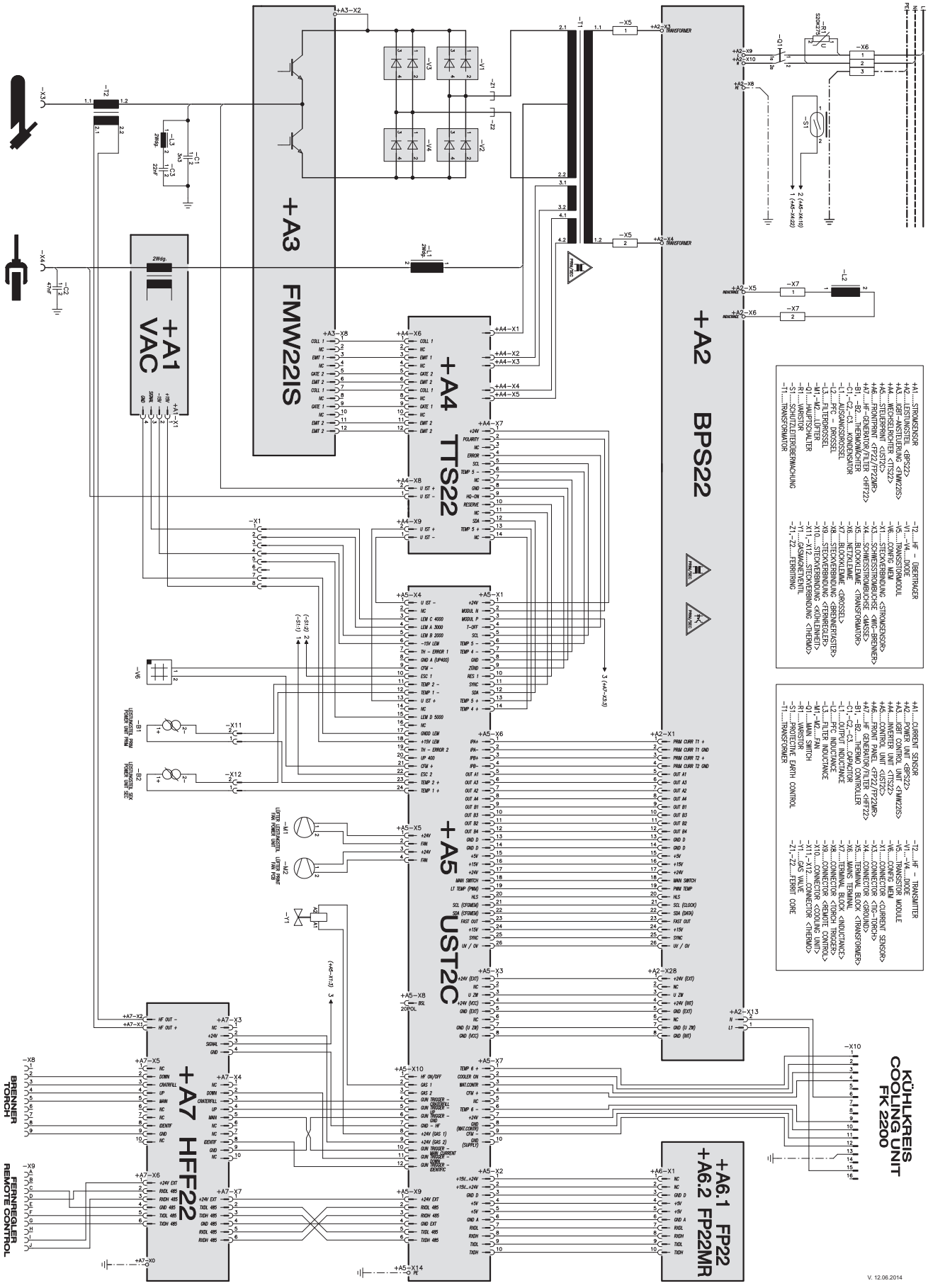



43,0001,1199 - 40A
43,0001,1213 - MV 80A
43,0004,0987
43,0004,0664 - MV
43,0004,2324 - US AWG 6
40,0003,0377 - US AWG 10 *
42,0407,0437 - MV 4G10
42,0407,0533 - MV AWG 6
42,0407,0534 - MV AWG 10
BE2,0201,1355 - MV
BE2,0201,1593 - MV
BE2,0201,1934 - MV 4G10
42,0300,1511
42,0400,0132
42,0300,1523
41,0005,0288
32,0409,2657
43,0001,3359
42,0409,3075
42,0409,3092
43,0001,3272
43,0001,3273 - Job
42,0406,0336
42,0406,0113
42,0409,3093
4,070,685,Z - ASU40 MV
NT24
UST
ASU
43,0006,0168
4,070,963,Z - UST-PIPE
4,070,626,Z - NT24
* gewünschte Länge angeben
* Specify the length required
* Indiquer la longueur désirée
* Indicar la longitud deseada
* Indicare la lunghezza desiderat
* indicar o comprimento desejado
* uved'te požadovanou délku

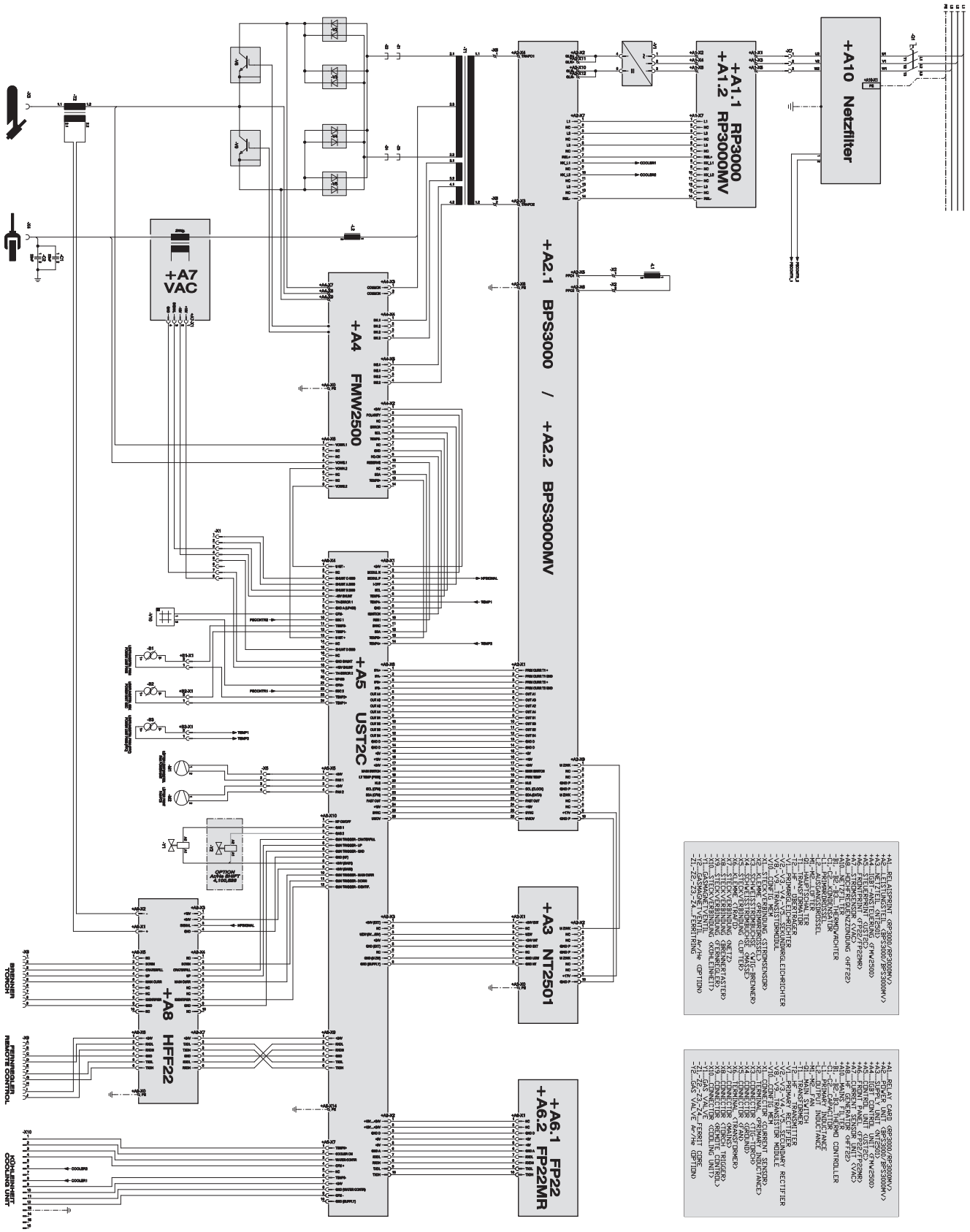


* gewünschte Länge angeben
* Specify the length required
* Indiquer la longueur désirée
* Indicar la longitud deseada
* Indicare la lunghezza desiderat
* indicar o comprimento desejado
* uved'te požadovanou délku

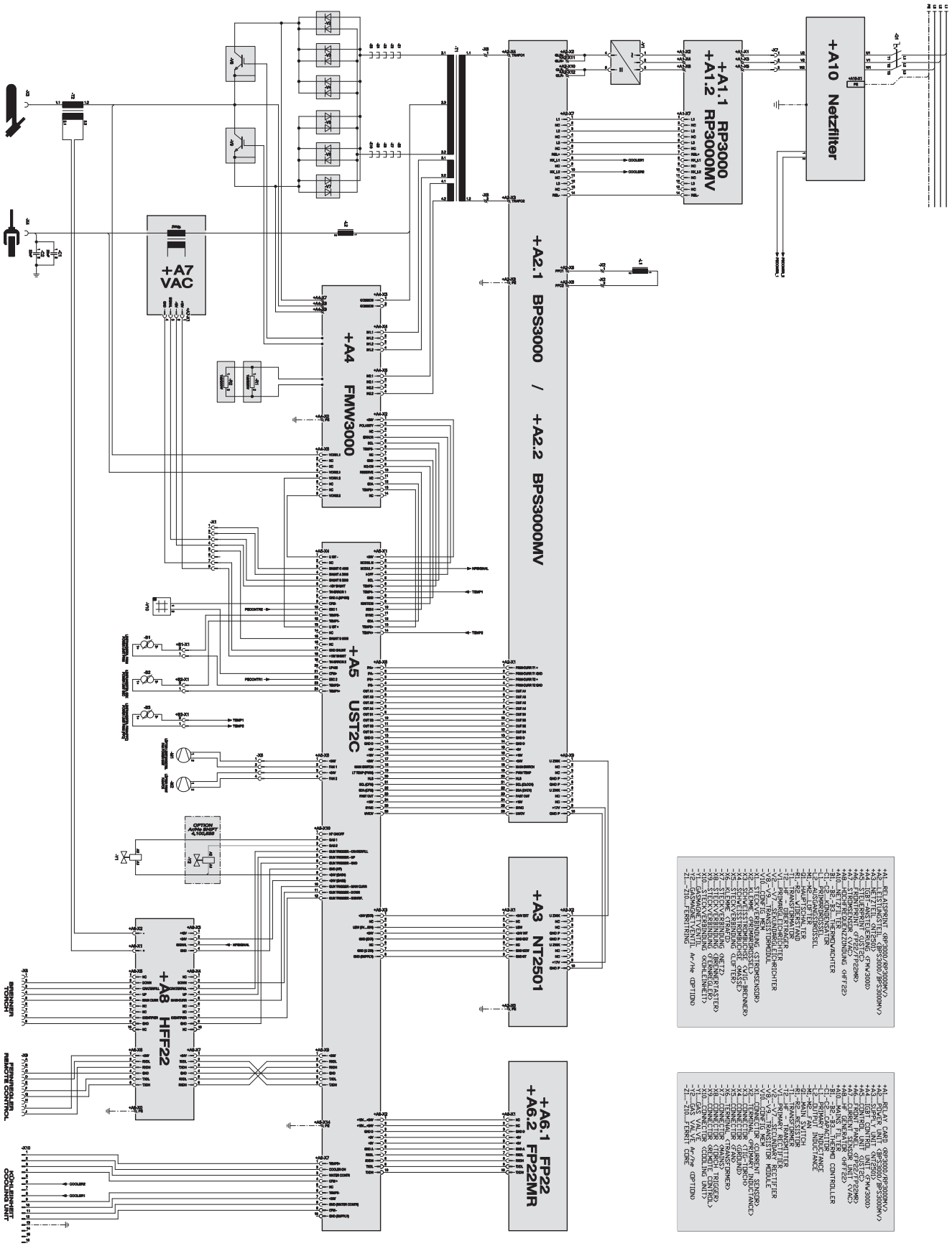
Circuit diagrams: MagicWave 2200 Comfort



Circuit diagrams: MagicWave 2500 Comfort

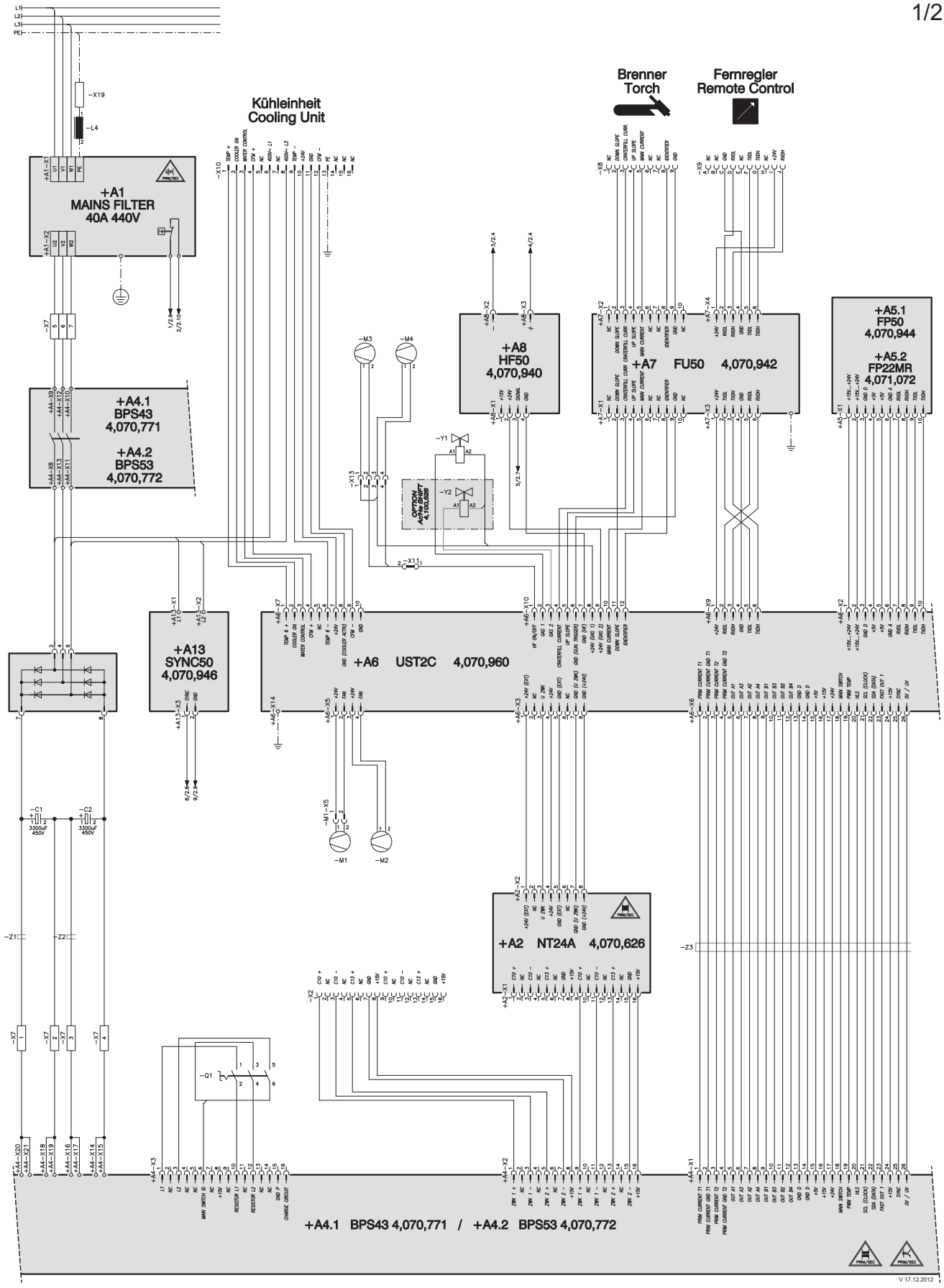


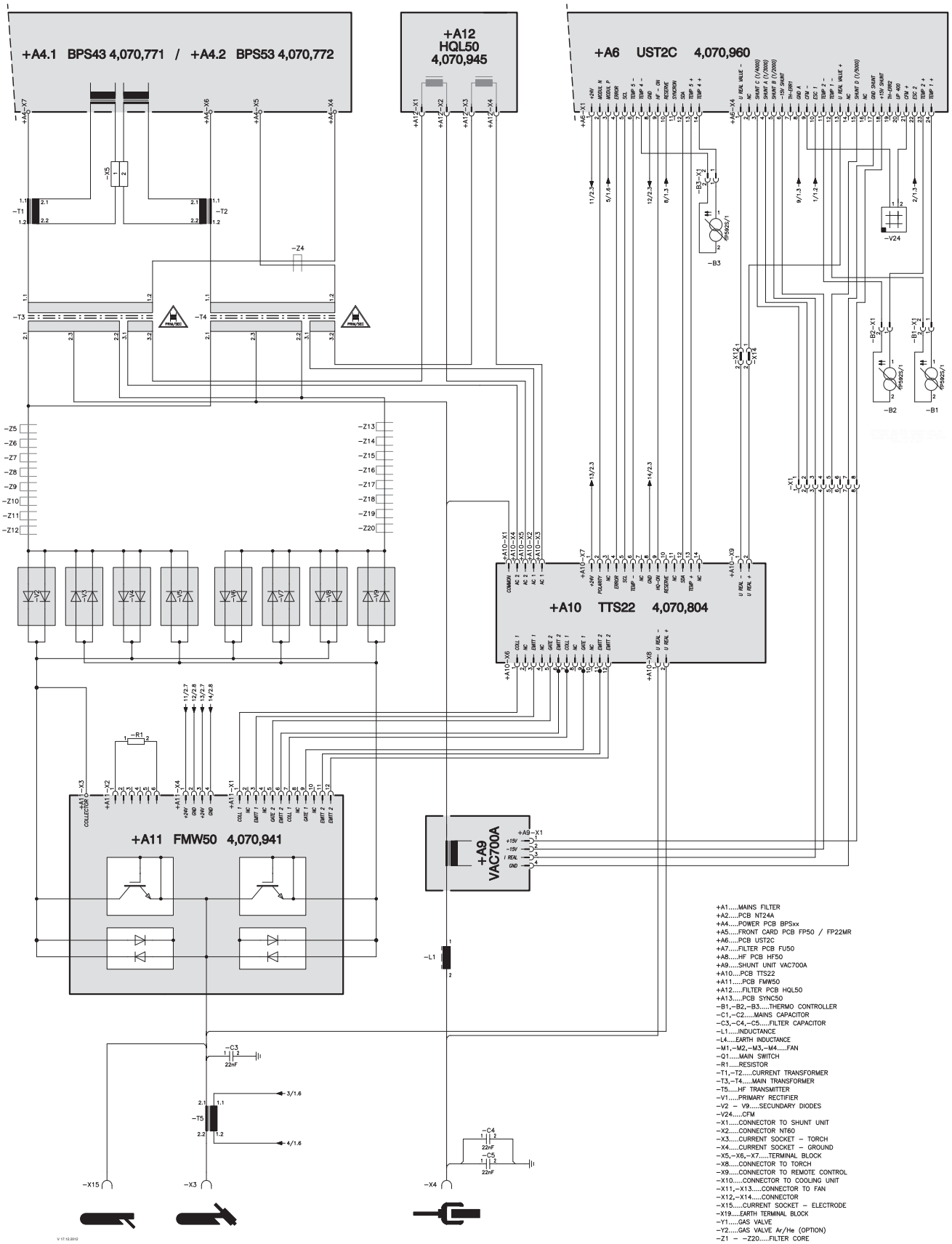
Circuit diagrams: MagicWave 3000 Comfort



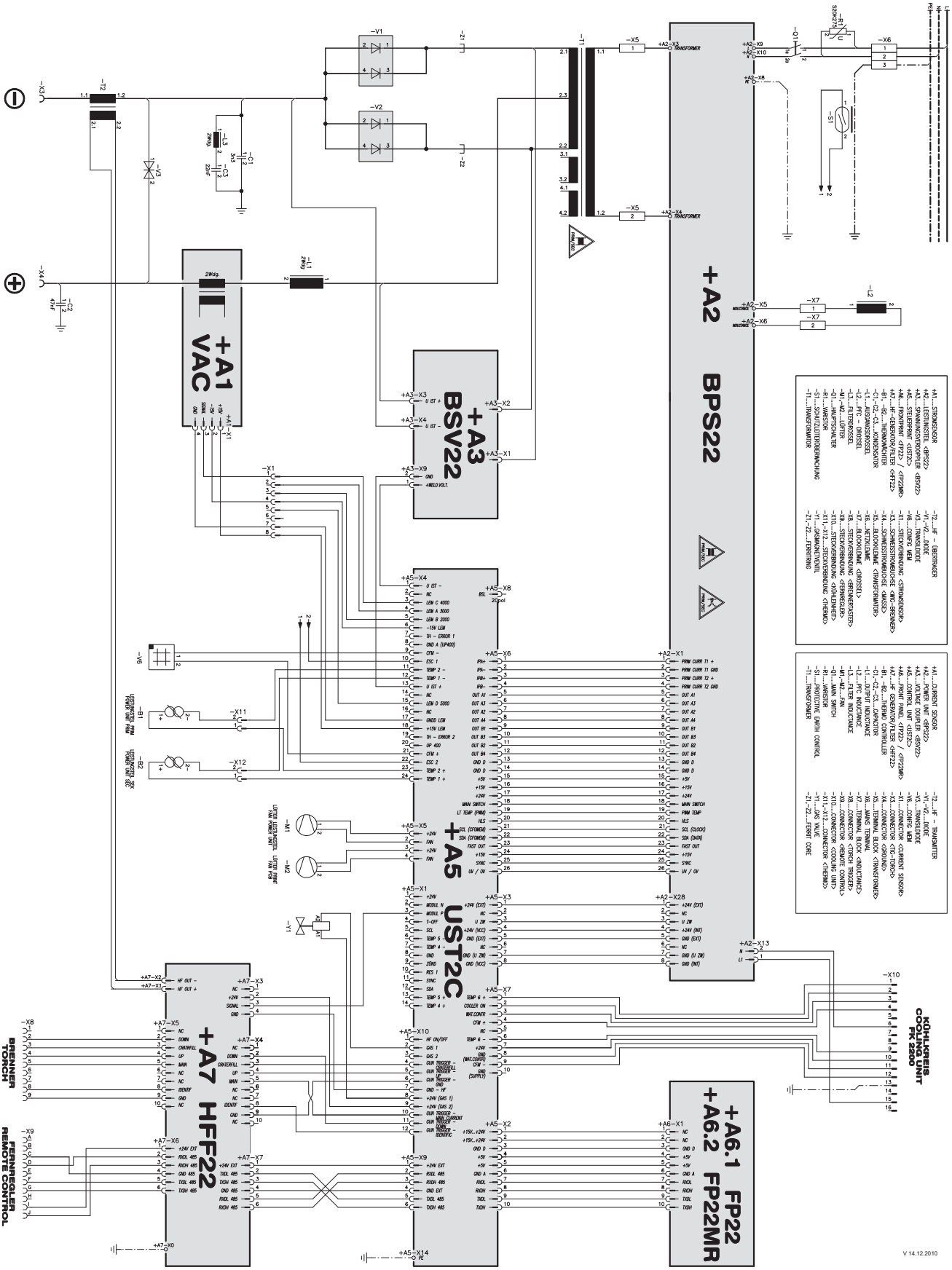
Circuit diagrams: MagicWave 4000 Comfort

1/2

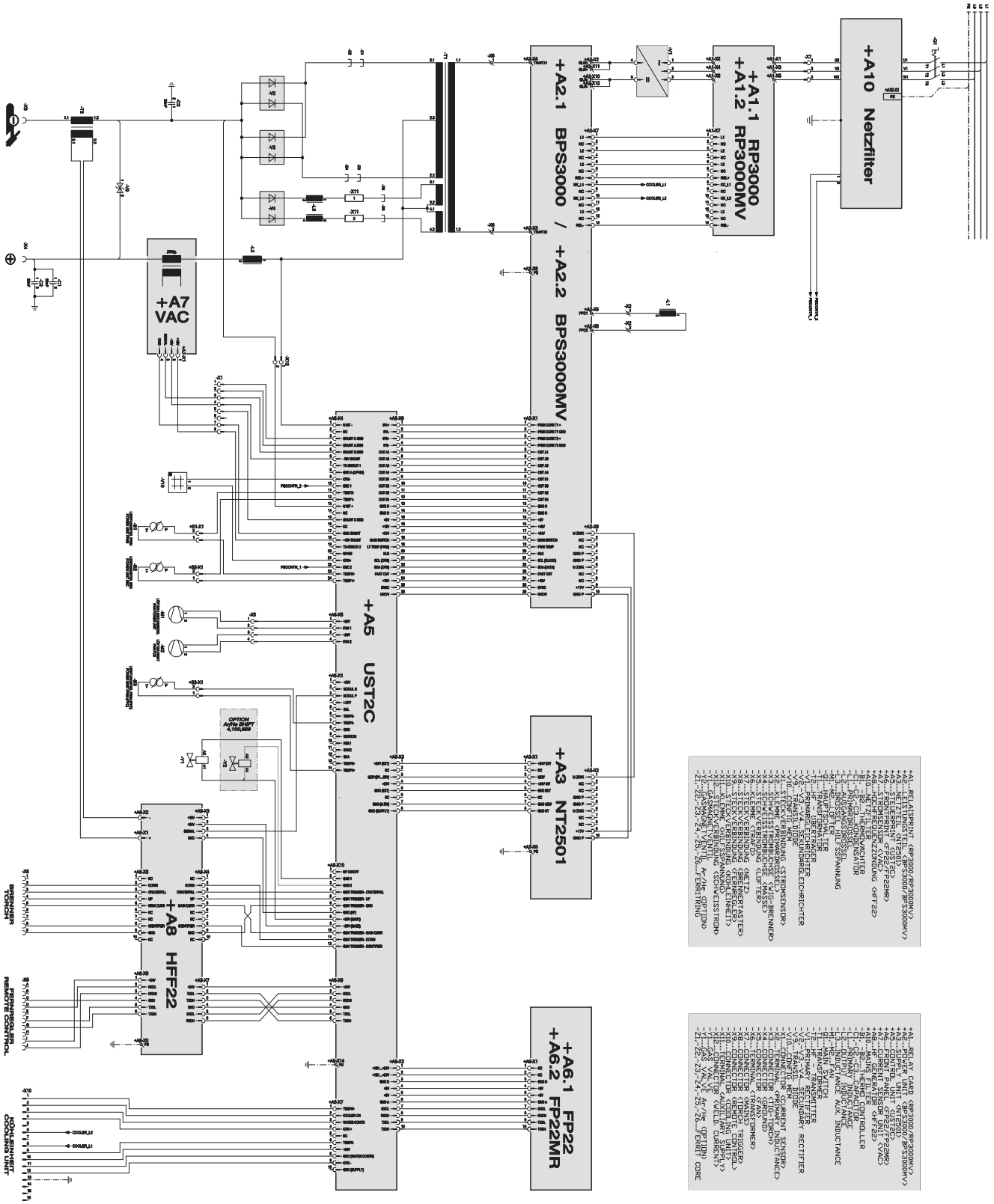



+A4.1 BPS43 4,070,771 / +A4.2 BPS53 4,070,772
+A12 HQL50 4,070,945
+A6 UST2C 4,070,960
+A10 TTS22 4,070,804
+A11 FMW50 4,070,941
+A9 VAC700A
+A1.....MAINS FILTER
+A2.....PCB NT24A
+A4.....POWER PCB BPSxx
+A5.....FRONT CARD PCB FP50 / FP22MR
+A6.....PCB UST2C
+A7.....FILTER PCB FU50
+A8.....HF PCB HF50
+A9.....SHUNT UNIT VAC700A
+A10.....PCB TTS22
+A11.....PCB FMW50
+A12.....FILTER PCB HQL50
+A13.....PCB SYNC50
–B1,–B2,–B3.....THERMO CONTROLLER
–C1,–C2.....MAINS CAPACITOR
–C3,–C4,–C5.....FILTER CAPACITOR
–L1.....INDUCTANCE
–L4.....EARTH INDUCTANCE
–M1,–M2,–M3,–M4.....FAN
–Q1.....MAIN SWITCH
–R1.....RESISTOR
–T1,–T2.....CURRENT TRANSFORMER
–T3,–T4.....MAIN TRANSFORMER
–T5.....HF TRANSMITTER
–V1.....PRIMARY RECTIFIER
–V2 – V9.....SECUNDARY DIODES
–V24.....CFM
–X1.....CONNECTOR TO SHUNT UNIT
–X2.....CONNECTOR NT60
–X3.....CURRENT SOCKET – TORCH
–X4.....CURRENT SOCKET – GROUND
–X5,–X6,–X7.....TERMINAL BLOCK
–X8.....CONNECTOR TO TORCH
–X9.....CONNECTOR TO REMOTE CONTROL
–X10.....CONNECTOR TO COOLING UNIT
–X11,–X13.....CONNECTOR TO FAN
–X12,–X14.....CONNECTOR
–X15.....CURRENT SOCKET – ELECTRODE
–X19.....EARTH TERMINAL BLOCK
–Y1.....GAS VALVE
–Y2.....GAS VALVE Ar/He (OPTION)
–Z1 – –Z20.....FILTER CORE

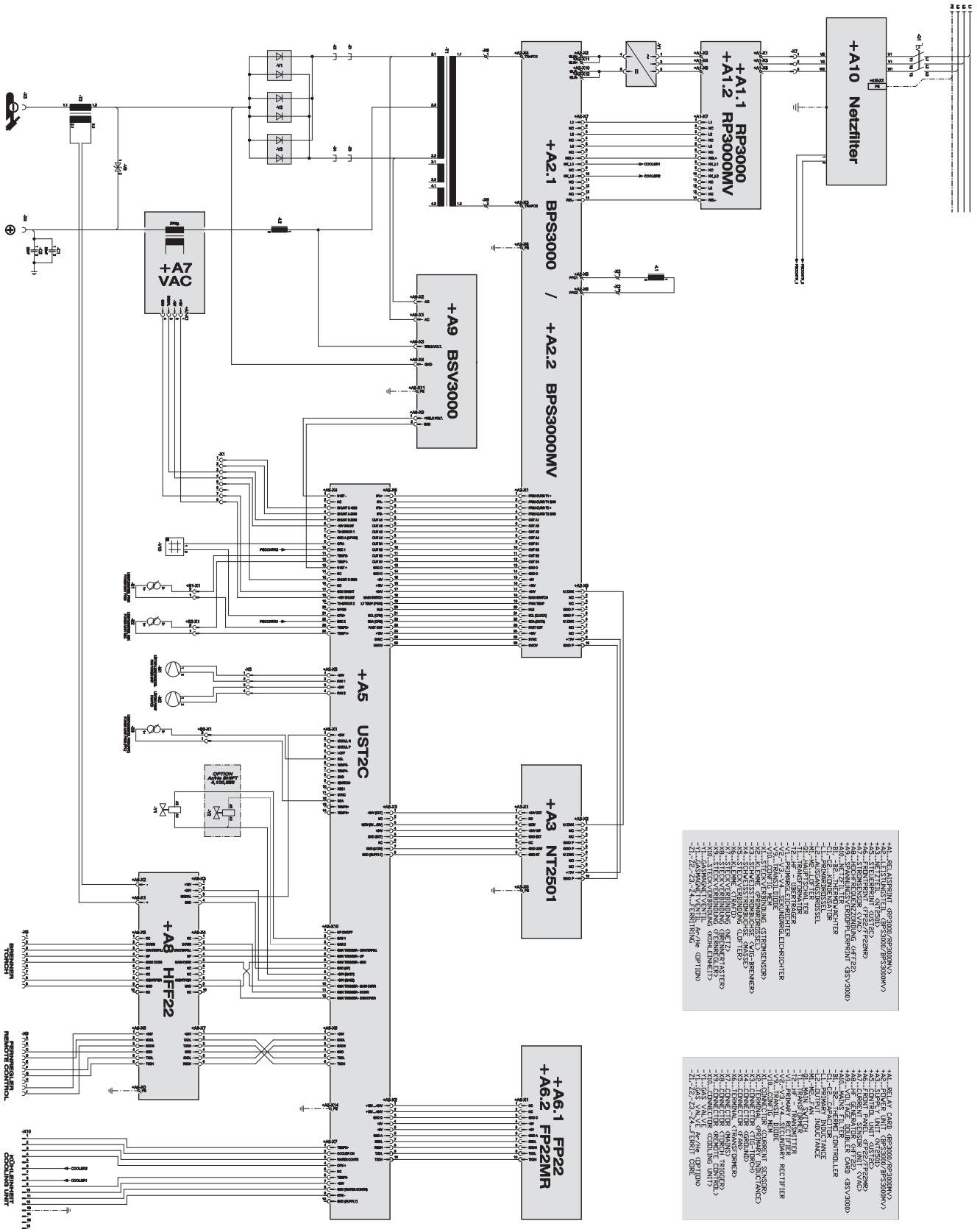
Circuit diagrams: TransTig 2200 Comfort



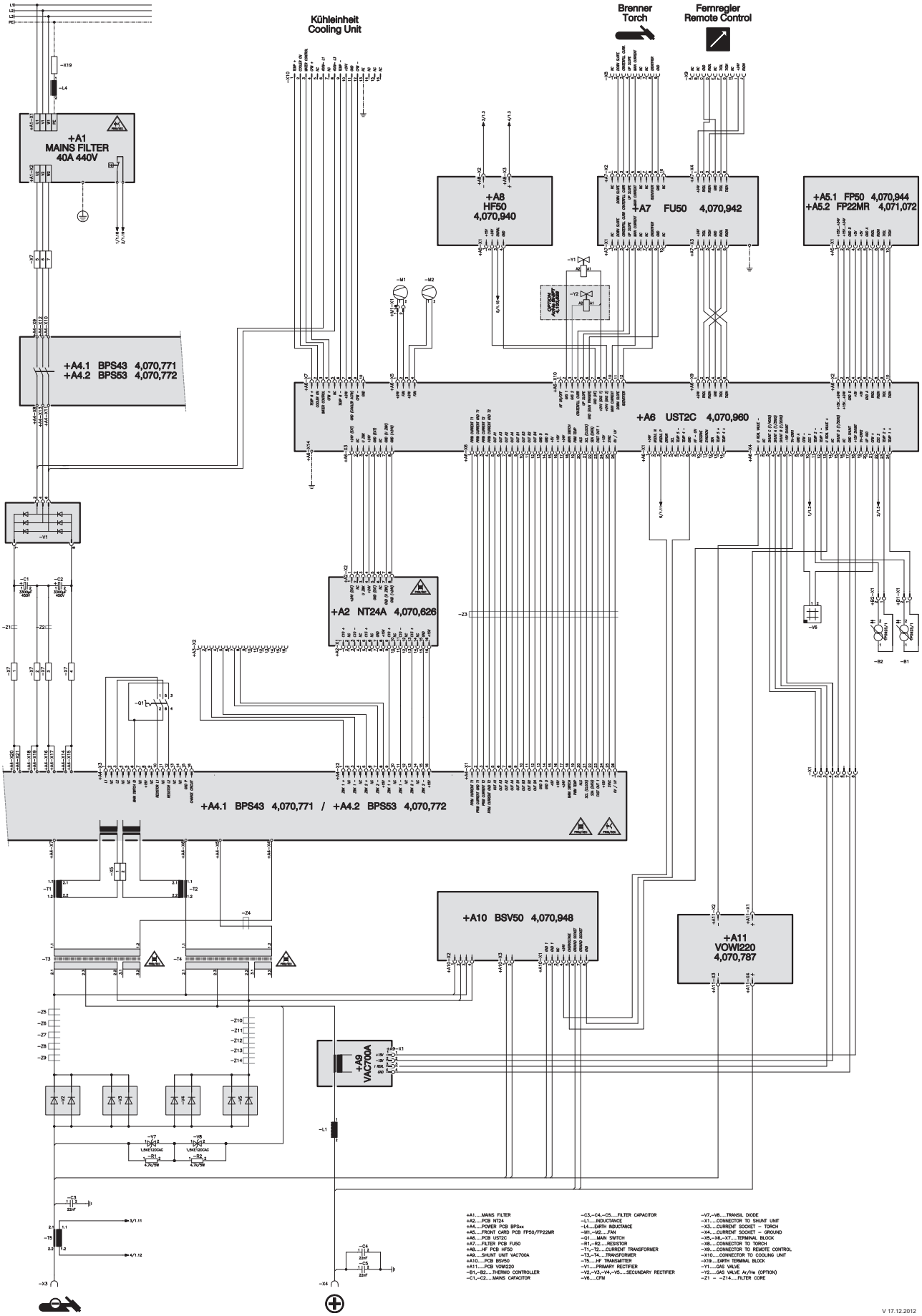
Circuit diagrams: TransTig 2500 Comfort



Circuit diagrams: TransTig 3000 Comfort



Circuit diagrams: TransTig 4000 Comfort



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of our Sales & service partners and Locations