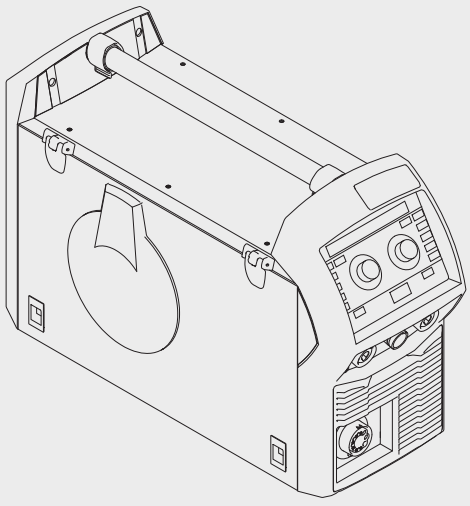
TPS 270i C

EN

Operating instructions

MIG/MAG power source



42,0426,0206,EN 015-17112020

Contents

Safety rules

Explanation of safety notices

⚠ DANGER!

Indicates immediate danger.
▶ If not avoided, death or serious injury will result.

⚠ WARNING!

Indicates a potentially hazardous situation.
▶ If not avoided, death or serious injury may result.

⚠ CAUTION!

Indicates a situation where damage or injury could occur.
▶ If not avoided, minor injury and/or damage to property may result.

NOTE!

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

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 device types 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.

IMPORTANT! Ensure that the mains connection is earthed properly

---

Residual current protective device

Local regulations and national guidelines may require a residual current protective device when connecting equipment to the public grid.
The type of residual current protective device recommended by the manufacturer for the equipment is indicated in the technical data.

Protecting yourself and others

Anyone working with the device exposes themselves to numerous risks, e.g.
- flying sparks and hot pieces of metal
- Arc radiation, which can damage eyes and skin
- Hazardous electromagnetic fields, which can endanger the lives of those using cardiac pacemakers
- Risk of electrocution from mains current and welding current
- Greater noise pollution
- Harmful welding fumes and gases

Suitable protective clothing must be worn when working with the device. The protective clothing must have the following properties:
- Flame-resistant
- Insulating and dry
- Covers the whole body, is undamaged and in good condition
- Safety helmet
- Trousers with no turn-ups

Protective clothing refers to a variety of different items. Operators should:
- Protect eyes and face from UV rays, heat and sparks using a protective visor and regulation filter
- Wear regulation protective goggles with side protection behind the protective visor
- Wear stout footwear that provides insulation even in wet conditions
- Protect the hands with suitable gloves (electrically insulated and providing protection against heat)
- Wear ear protection to reduce the harmful effects of noise and to prevent injury

---

Keep all persons, especially children, out of the working area while any devices are in operation or welding is in progress. If, however, there are people in the vicinity:
- Make them aware of all the dangers (risk of dazzling by the arc, injury from flying sparks, harmful welding fumes, noise, possible risks from mains current and welding current, etc.)
- Provide suitable protective equipment
- Alternatively, erect suitable safety screens/curtains.

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 cause cancer, as stated in Monograph 118 of the International Agency for Research on Cancer.

Use at-source extraction and a room extraction system.
If necessary, use a welding torch with an integrated extraction device.

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. Ensure that there is a ventilation rate of at least 20 m³ per hour at all times.

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

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

The following components are responsible, amongst other things, for the degree of toxicity of welding fumes:
- Metals used for the workpiece
- Electrodes
- Coatings
- Cleaners, degreasers, etc.
- Welding process used

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

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

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

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

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 wirefeeder 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 base or cover for the earth or ground potential. This base or cover must extend over the entire area between the body and the earth or ground potential.

All cables and leads must be secured, undamaged, insulated and adequately dimensioned. Replace loose connections and scorched, damaged, or inadequately dimensioned cables and leads immediately.
Use the handle to ensure the power connections are tight before every use.
In the case of power cables with a bayonet connector, rotate the power cable around the longitudinal axis by at least 180° and pretension.

Do not wrap 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 touch the electrode when the power source is switched on.

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

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

Protection class I devices require a mains supply with ground conductor and a connector system with ground conductor contact for proper operation.

Operation of the device on a mains supply without ground conductor and on a socket without ground conductor contact is only permitted if all national regulations for protective separation are observed.
Otherwise, this is considered gross negligence. The manufacturer shall not be held liable for any damage arising from such usage.

If necessary, provide adequate earthing 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.

Position the device with sufficient insulation against electrically conductive environments, e.g. Insulation against conductive floor or insulation to conductive racks.

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 wirefeeder.

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.

Requirement for the shielding gas

Especially with ring lines, contaminated shielding gas can cause damage to equipment and reduce welding quality.
Meet the following requirements regarding shielding gas quality:
- Solid particle size < 40 µm
- Pressure condensation point < -20 °C
- Max. oil content < 25 mg/m³

Use filters if necessary.

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.

Danger from escaping shielding gas

Risk of suffocation from the uncontrolled escape of shielding gas

Shielding gas is colourless and odourless and, in the event of a leak, can displace the oxygen in the ambient air.
- Ensure an adequate supply of fresh air with a ventilation rate of at least 20 m³/hour.
- Observe safety and maintenance instructions on the shielding gas cylinder or the main gas supply.
- Close the shielding gas cylinder valve or main gas supply if no welding is taking place.
- Check the shielding gas cylinder or main gas supply for uncontrolled gas leakage before every start-up.

Safety measures at the installation location and during transport

A device toppling over could easily kill someone. Place the device on a solid, level surface such that it remains stable
- The maximum permissible tilt angle is 10°.

Special regulations apply in rooms at risk of fire or explosion
- Observe relevant national and international regulations.

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

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

When setting up the device, ensure there is an all-round clearance of 0.5 m (1 ft. 7.69 in.) to ensure that cooling air can flow in and out freely.

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

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

Before transporting the device, allow coolant to drain completely and detach the following components:
- Wirefeeder
- Wirespool
- Shielding gas cylinder

After transporting the device, the device must be visually inspected for damage before commissioning. Any damage must be repaired by trained service technicians before commissioning the device.

Safety measures in normal operation

Only operate the device when all safety devices are fully functional. If the safety devices are not fully functional, there is a risk of
- injury or death to the operator or a third party
- damage to the device and other material assets belonging to the operator
- inefficient operation of the device

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

Never bypass or disable safety devices.

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

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

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

Only the manufacturer's original coolant is suitable for use with our devices due to its properties (electrical 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.

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

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

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

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

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

Commissioning, maintenance and repair

It is impossible to guarantee that bought-in parts are designed and manufactured to meet the demands made of them, or that they satisfy safety requirements.

- Use only original spare and wearing parts (also applies to standard parts).
- Do not carry out any modifications, alterations, etc. to the device without the manufacturer's consent.
- Components that are not in perfect condition must be replaced immediately.
- When ordering, please give the exact designation and part number as shown in the spare parts list, as well as the serial number of your device.

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 directives (e.g. relevant product standards of the EN 60 974 series).

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

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

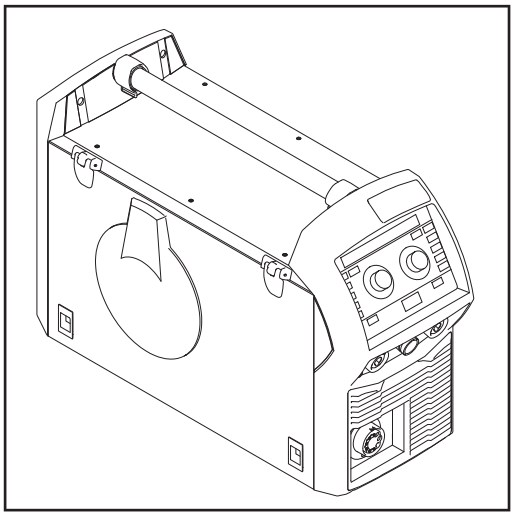
Copyright

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 TPS 270i C MIG/MAG power source is a completely digitised, microprocessor-controlled inverter power source with integrated 4-roller wire drive.

The modular design and potential for system add-ons ensure a high degree of flexibility.
Its compact design makes the TPS 270i C particularly suitable for mobile applications.

The power source can be adapted to any specific situation.

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 the 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.

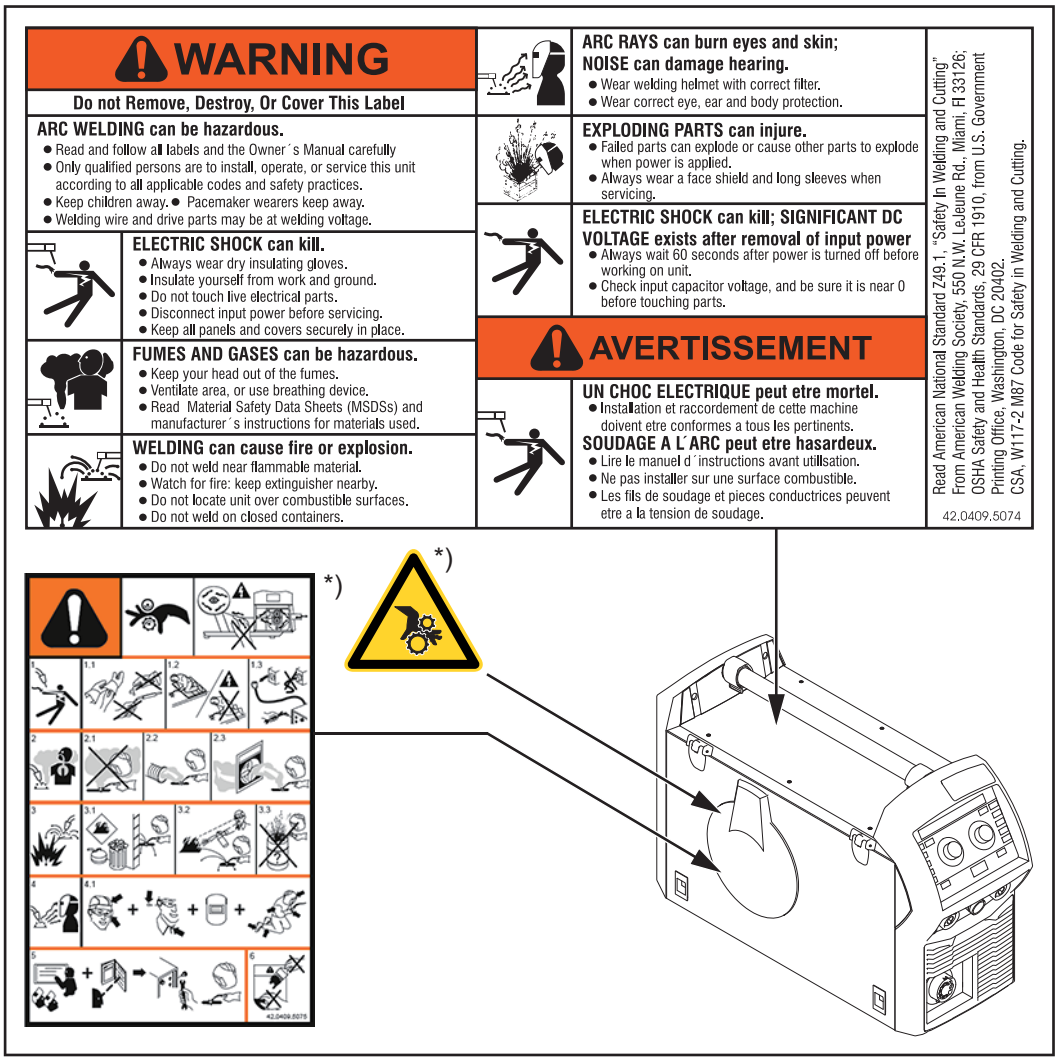
Application areas

The devices are used in trade and industry for manual applications with classical steel, galvanised sheets, chrome/nickel and aluminium.

The integrated 4-roller wire drive, high performance and low weight of the power source makes it the ideal choice for portable applications on building sites or in repair workshops.

Warning notices on the device

Warning notices and safety symbols are affixed to power sources with the CSA test mark for use in North America (USA and Canada). These warning notices and safety symbols must not be removed or painted over. They warn against incorrect operation, as this may result in serious injury and damage.



*) on the inside of the device

Welding is dangerous. The following basic requirements must be met to ensure the equipment is used properly:

- Anyone performing automated welding must be sufficiently qualified
- Suitable protective equipment must be used
- All persons not involved must be kept at a safe distance from the wirefeeder and the welding process

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

- These Operating Instructions
- All the Operating Instructions for the system components, especially the safety rules

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

Keep hands, hair, clothing and tools away from moving parts. For example:
- Cogs
- Feed rollers
- Wirespools and welding wires

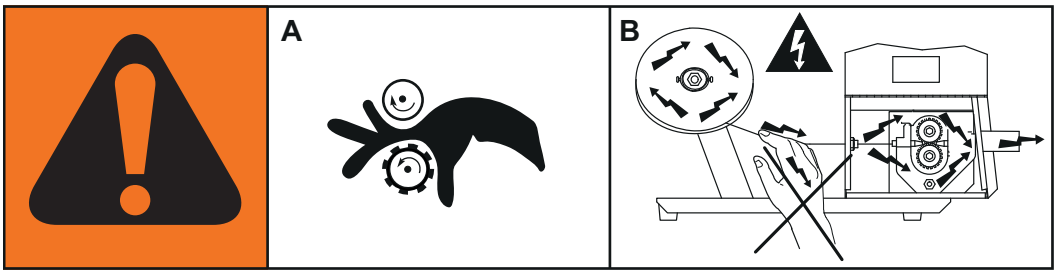
Do not reach into the rotating cogs of the wire drive or into rotating drive components.

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

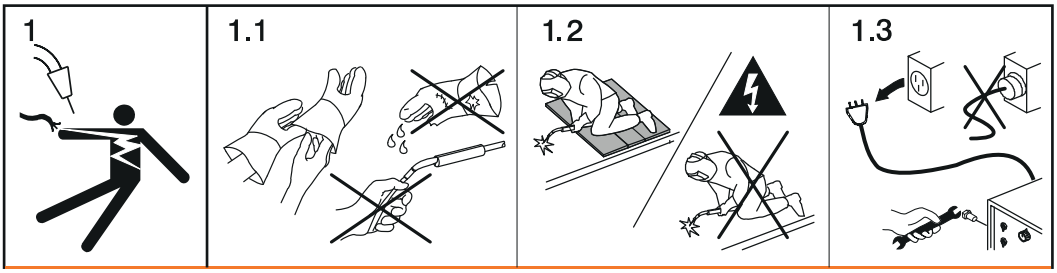
Description of Warning Notices on the Device

On certain device versions, warning notices are attached to the device.

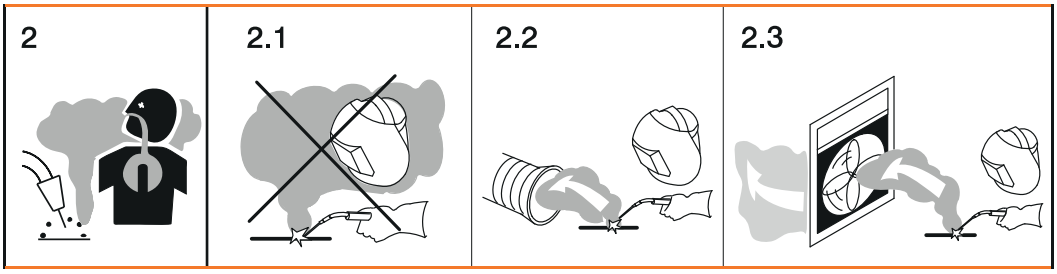
The arrangement of the symbols may vary.



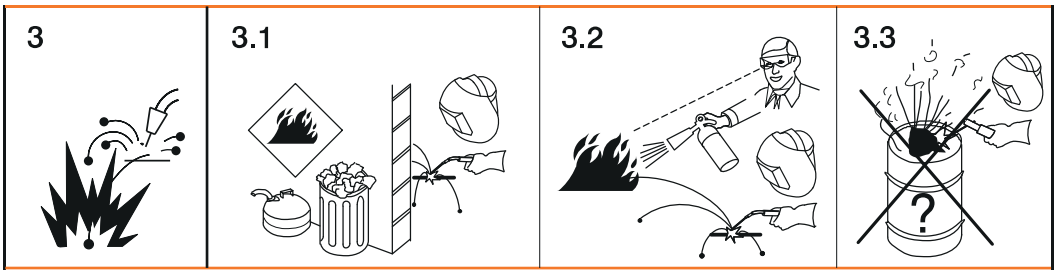
.	**Warning! Watch Out!** **There are possible hazards as shown by the symbols.**
A	Drive rolls can injure fingers.
B	Welding wire and drive parts are at welding voltage during operation Keep hands and metal objects away.



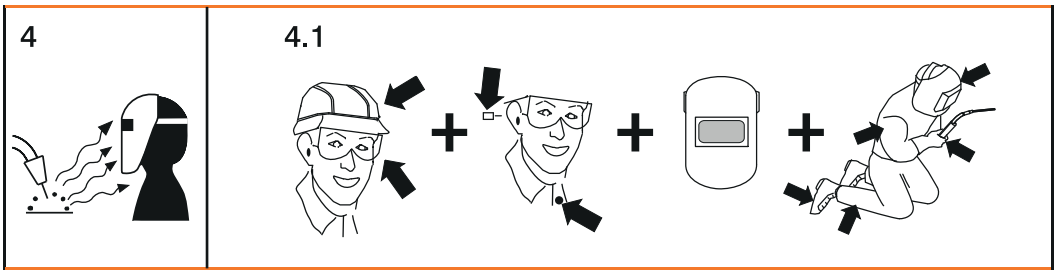
1.	Electric shock can kill.
1.1	Wear dry insulating gloves. Do not touch electrode with bare hand. Do not wear wet or damaged gloves.
1.2	Protect yourself from electric shock by insulating yourself from work and ground.
1.3	Disconnect input plug or power before working on machine



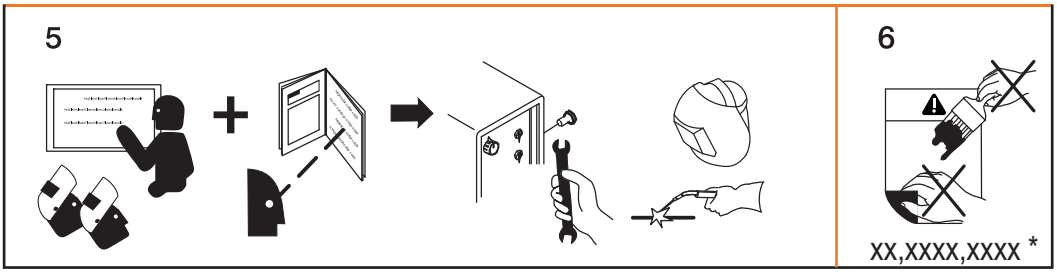
2.	Breathing welding fumes can be hazardous to your health.
2.1	Keep your head out of the fumes.
2.2	Use forced ventilation or local exhaust to remove the fumes.
2.3	Use ventilating fan to remove fumes.



3	Welding sparks can cause explosion or fire.
3.1	Keep flammables away from welding. Don't weld near flammables.
3.2	Welding sparks can cause fires.Have a fire extinguisher nearby and have a watchperson ready to use it.
3.3	Do not weld on drums or any closed containers.



4.	Arc rays can burn eyes and injure skin.
4.1	Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.



5.	Become trained and read the instructions before working on the machine or welding.
6.	Do not remove or paint over (cover) the label.
*	identifying number to order label from manufacturer

Welding packages, welding characteristics and welding processes

General

Various welding packages, welding characteristics and welding processes are available with TPSi power sources that enable a wide range of materials to be effectively welded.

Welding characteristics

Depending on the welding process and shielding gas mix, various process-optimised welding characteristics are available when selecting the filler metal.

Examples of welding characteristics:
- MIG/MAG 3700 PMC Steel 1,0mm M21 - arc blow *
- MIG/MAG 3450 PMC Steel 1,0mm M21 - dynamic *
- MIG/MAG 3044 Pulse AlMg5 1.2 mm I1 - universal *
- MIG/MAG 2684 Standard Steel 0.9 mm M22 - root *

The additional designation (*) next to the welding process provides information about the special properties and use of the welding characteristic.
The description of the characteristics is set out as follows:

Designation
Welding process
Properties

arc blow
PMC
Characteristic with improved arc break properties by deflecting the external magnetic fields

braze
CMT, LSC, PMC
Characteristics for brazing processes (high brazing speed, reliable wetting and good flow of braze material)

braze+
CMT
Optimised characteristics for brazing processes with special "Braze+" gas nozzle (narrow gas nozzle opening, high shielding gas flow rate)

cladding
CMT, LSC, PMC
Characteristic for cladding with low penetration, low dilution and wide weld seam flow for improved wetting

dynamic
CMT, PMC, Pulse, Standard
Characteristics for high welding speeds with concentrated arc

flanged edge
CMT
Characteristics for flange welds with frequency and energy yield adjustments;
the edge is fully covered with the weld seam but not melted down

galvanized
CMT, LSC, PMC, Pulse, Standard
Characteristics for galvanised sheet surfaces (low zinc pore risk, reduced zinc melting loss)

galvannealed
PMC
Characteristics for iron/zinc-coated sheet surfaces

---

gap-bridging
CMT, PMC
Characteristics with very low heat input for optimum gap-bridging ability

---

Hot spot
CMT
Characteristics with hot start sequence, specially for plug welds and MIG/MAG spot weld joints

---

mix **
PMC

Also required: Pulse and PMC welding packages

Characteristics with process switch between pulsed and dip transfer arc
Specially for welding vertical-up seams with cyclic change between a hot and cold supporting process phase.

---

mix ** / ***
CMT

Also required: CMT drive unit WF 60i Robacta Drive CMT, Pulse, Standard and CMT welding packages

Characteristics with process switch between pulsed and CMT, where the CMT process is initiated by wire movement reversal.

---

mix drive ***
PMC

Also required: PushPull drive unit WF 25i Robacta Drive or WF 60i Robacta Drive CMT, Pulse and PMC welding packages

Characteristics with process switch between pulsed and dip transfer arc, where the dip transfer arc is initiated by wire movement reversal.

---

multi arc
PMC
Characteristics for components being welded by several arcs each influencing the other

---

PCS **
PMC
Pulse Controlled Spray Arc - Direct transition from the concentrated pulsed arc to a short spray arc. The advantages of pulsed and standard arcs combined in a single characteristic

---

pipe
PMC
Characteristic for pipe applications and positional welding on narrow gap applications

---

retro
CMT, Pulse, PMC, Standard
Characteristics with the properties of the TransPuls Synergic (TPS) predecessor series

---

ripple drive ***
PMC

Also required:
CMT drive unit WF 60i Robacta Drive CMT

Characteristics that behave like interval mode for clear weld rippling, especially with aluminium

---

root
CMT, LSC, Standard
Characteristics for root passes with powerful arc

---

seam track
PMC, Pulse
Characteristics with increased seam-tracking signal, especially for use with several welding torches on one component.

TIME
PMC
Characteristics for welding with long stick out and TIME shielding gases
(T.I.M.E. = Transferred Ionized Molten Energy)

---

universal
CMT, PMC, Pulse, Standard
Characteristics for conventional welding tasks in renowned Fronius quality

---

WAAM
CMT
Characteristics with reduced heat input and greater stability at a higher deposition rate for welding bead onto bead in adaptive structures

---

weld+
CMT
Characteristics for welding with short stick out and Braze+ gas nozzle (gas nozzle with small opening and high flow velocity)

** Mixed process characteristics

*** Welding characteristics with special properties provided by additional hardware

---

Summary of MIG/MAG pulse synergic welding

MIG/MAG pulse synergic

MIG/MAG pulse synergic welding is a pulsed-arc process with controlled material transfer.
In the base current phase, the energy supply is reduced to such an extent that the arc is only just stable and the surface of the workpiece is preheated. In the pulsing current phase, a precise current pulse ensures the targeted detachment of a droplet of welding material.
This principle guarantees a low-spatter weld and precise working across the entire power range, as unwelcome short circuits with simultaneous droplet explosion and uncontrolled welding spatter are virtually eliminated.

Summary of MIG/MAG standard synergic welding

MIG/MAG standard synergic

The MIG/MAG standard synergic welding process is a MIG/MAG welding process across the entire power range of the power source with the following arc types:

Short circuit arc
Droplet transfer takes place during a short circuit in the lower power range.

Intermediate arc
The droplet increases in size on the end of the wire electrode and is transferred in the mid-power range during the short circuit.

Spray arc
A short circuit-free transfer of material in the high power range.

Summary of the PMC process

PMC = Pulse Multi Control

PMC is a pulsed arc welding process with high-speed data processing, precise recording of the process status and improved droplet detachment. Faster welding possible with a stable arc and even fusion penetration.

Summary of the LSC process

LSC = Low Spatter Control

LSC is a new, low-spatter dip transfer arc process.The current is reduced before breaking the short-circuit bridge; re-ignition takes place at significantly lower welding current values.

Summary of SynchroPulse welding

SynchroPulse is available for all processes (standard/pulsed/LSC/PMC).
Due to the cyclical change of welding power between two operating points, SynchroPulse achieves a flaking seam appearance and non-continuous heat input.

Summary of the CMT process

CMT = Cold Metal Transfer

A special CMT drive unit is required for the CMT process.

The reversing wire movement in the CMT process results in a droplet detachment with improved dip transfer arc properties.
The advantages of the CMT process are as follows
- Low heat input
- Less spattering
- Reduced emissions
- High process stability

The CMT process is suitable for:
- Joint welding, cladding and brazing – particularly in the case of high requirements in terms of heat input and process stability
- Welding on light-gauge sheet with minimal distortion
- Special connections, such as copper, zinc, and steel/aluminium

NOTE!

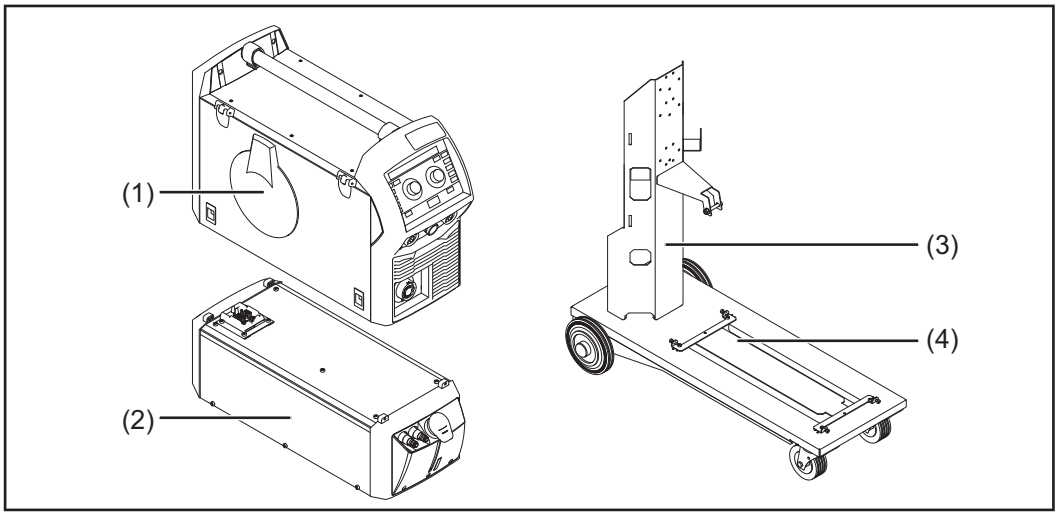
A CMT reference book is available complete with typical applications; see ISBN 978-3-8111-6879-4.

System components

General

The power sources can be operated with various system components and options. This makes it possible to optimise procedures and to simplify machine handling and operation, as necessitated by the particular field of application in which the power source is to be used.

Overview



(1) Power source
(2) Cooling unit
(3) Gas cylinder holder
(4) Trolley

also:
- Welding torch
- Grounding cable and electrode cable
- Dust filter
- Additional current sockets

Options

OPT/i TPS C wire feed

OPT/i TPS C polarity reverser

OPT/i TPS C SpeedNet Connector
Optional second SpeedNet connection socket

Installed on the rear of the power source.

OPT/i TPS 270i C ext. Sensor

OPT/i TPS 270i C PushPull

OPT/i TPS C TIG TMC

OPT/i TPS 270i C Ethernet

OPT/i Synergic Lines
Option for enabling all special characteristics available on TPSi power sources; this also automatically enables special characteristics created in future.

OPT/i GUN Trigger
Option for special functions in conjunction with the torch trigger

Controls, connections and mechanical components

Control panel

General

Welding parameters can be easily changed and selected using the adjusting dial.
The parameters are shown on the display while welding is in progress.

The synergic function ensures that other welding parameters are also adjusted whenever an individual parameter is changed.

NOTE!

As a result of firmware updates, you may find that your device has certain functions that are not described in these operating instructions, or vice versa.
Certain illustrations may also differ slightly from the actual controls on your device, but these controls function in exactly the same way.

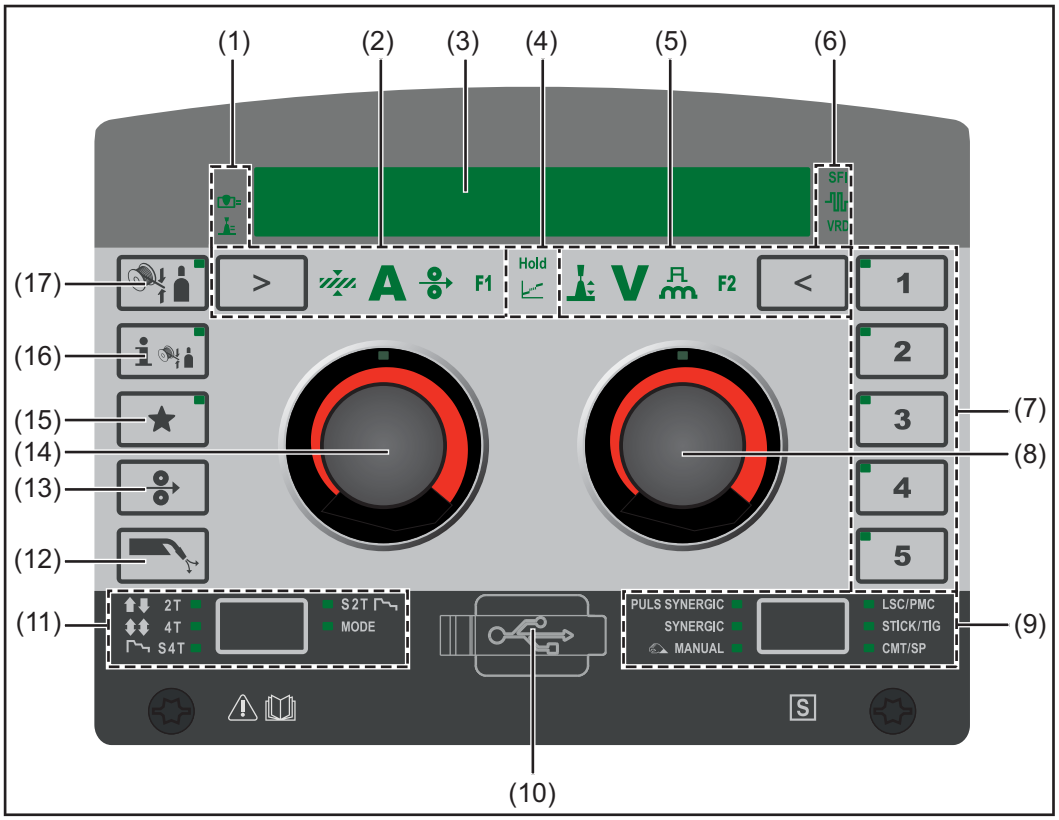
Safety

⚠ WARNING!

Danger from incorrect operation.
Possible serious injury and damage to property.

- ▶ Do not use the functions described here until you have read and completely understood these Operating Instructions.
- ▶ Do not use the functions described here until you have fully read and understood all of the Operating Instructions for the system components, in particular the safety rules!

Control panel



No.	Function
(1)	**Process control parameter indicator** For the LSC and PMC welding processes  **Penetration stabilizer indicator** Lights up if the penetration stabilizer is active  **Arc length stabilizer indicator** Lights up when the arc length stabilizer is active
(2)	**Left parameter selection**  The corresponding indicator lights up when a parameter is selected. The following parameters can be selected by pressing the button:  **Material thickness *** In mm or inches  **Welding current *** In A Before the start of welding, the machine automatically displays a standard value based on the programmed parameters. The actual value is displayed during welding.  **Wire speed *** In m/min or ipm  **Special function** Any parameter can be assigned to this The function can be selected if a parameter has been saved.  **Penetration stabilizer**

Arc length stabilizer
The "Penetration stabilizer" and "Arc length stabilizer" process control parameters can only be selected when the LSC/PMC welding process is used.
The currently adjustable parameter is marked with an arrow.
* Synergic parameter When a synergic parameter is changed, the synergic function automatically changes all other synergic parameters to match.

---

(3) **Display**
For displaying values

---

(4) **Hold/Intermediate arc indicator**

Hold

Hold indicator
The indicator lights up at the end of each welding operation and the actual values for the welding current, welding voltage and wire speed, etc. are automatically shown on the display.

Intermediate arc indicator
The indicator lights up when a spatter-prone intermediate arc occurs between the dip transfer arc and the spray arc.

---

(5) **Right parameter selection**

The corresponding indicator lights up when a parameter is selected.
The following parameters can be selected by pressing the button:

Arc length correction
For correcting the arc length

Welding voltage *
In V
Before the start of welding, the machine automatically displays a standard value based on the programmed parameters. The actual value is displayed during welding.

Pulse/dynamic correction

The function varies according to the welding process being used. A description of the various functions can be found in the Welding chapter under the corresponding welding process.

F2

Special function
Any parameter can be assigned to this
The function can be selected if a parameter has been saved.
* Synergic parameter
When a synergic parameter is changed, the synergic function automatically changes all other synergic parameters to match.

---

(6) Indicators

SFI

SFI indicator
Lights up when SFI (Spatter Free Ignition) is active

SynchroPulse indicator
Lights up when SynchroPulse is active

VRD

VRD indicator
Lights up when the voltage reduction device (VRD) is active

---

(7) EasyJob buttons
For saving, retrieving and deleting EasyJobs
The LED on the corresponding button lights up when an EasyJob is selected.

---

(8) Right adjusting dial with turn/press function
For setting the arc length correction, welding voltage, pulse/dynamic correction and F2 parameters
Turn the adjusting dial to:
change values, select parameters (in the Setup menu and when selecting the filler metal)
Press the adjusting dial to:
confirm a menu selection, apply values

---

(9) Welding process selection
The corresponding LED lights up when a welding process is selected.
The following welding processes can be selected by pressing the button:

- PULS SYNERGIC (MIG/MAG pulse synergic welding)
- SYNERGIC (MIG/MAG standard synergic welding)
- MANUAL (MIG/MAG standard manual welding)
- LSC/PMC (LSC = Low Spatter Control, PMC = Pulse Multi Control)
  Depending on which function package is enabled
- STICK/TIG (MMA welding/TIG welding)
- CMT / SP (CMT welding / special programs)

(10) **USB port**
For updating the software using a USB Ethernet adapter

(11) **Mode selection**
The corresponding LED lights up when a mode is selected.
The following modes can be selected by pressing the button:
- 2T (2-step mode)
- 4T (4-step mode)
- S4T (Special 4-step mode)
- S2T (Special 2-step mode)
- MODE (Special modes depending on the function package)

(12) **Gas-test button**
For setting the required 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.

(13) **Wire threading button**
To thread the wire electrode into the torch hosepack with no accompanying flow of gas or current

(14) **Left adjusting dial with turn/press function**
- For setting the sheet thickness, welding current, wire speed, F1, penetration stabilizer and arc length stabilizer parameters
- For displaying help texts

Turn the adjusting dial to:
select parameters, change values, display long help texts
Press the adjusting dial to:
confirm a menu selection, apply values, call up help texts for parameters

(15) **Favourites button**
Individual parameters or parent folders can be assigned to it

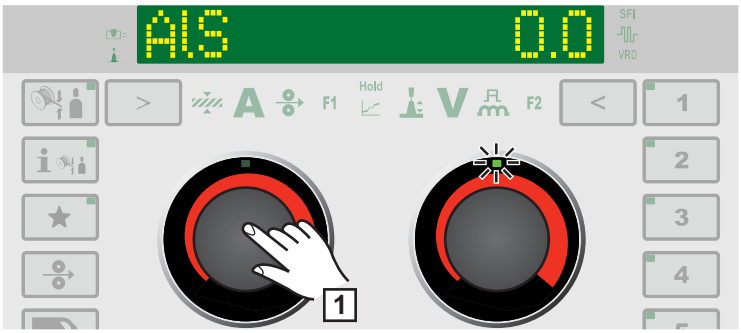
(16) **Filler metal info button**
For showing the currently set filler metal

(17) **Filler metal selection button**
For selecting the filler metal

Displaying plain text for parameters

The left adjusting dial can be used to display the corresponding plain text for each parameter abbreviation shown on the display.

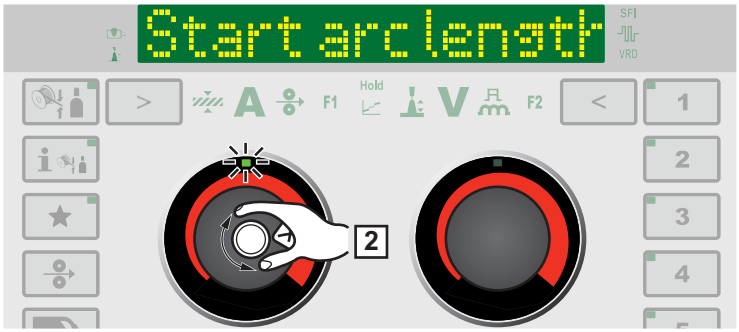
Example:



Parameter or entry from the Setup menu has been selected using the right adjusting dial; the LED on the right adjusting dial lights up.

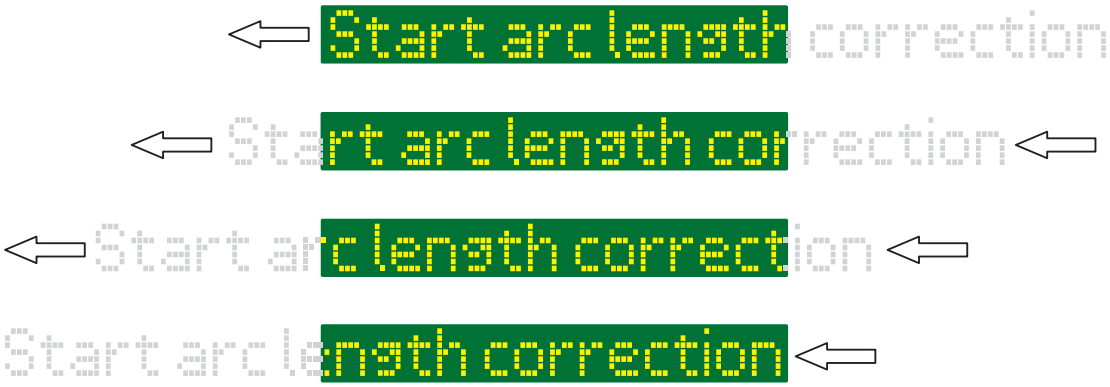
1 Press the left adjusting dial

The plain text for the parameter is displayed; the LED on the left adjusting dial lights up.



2 To display extended plain texts, turn the left adjusting dial

The plain text is moved across the display.



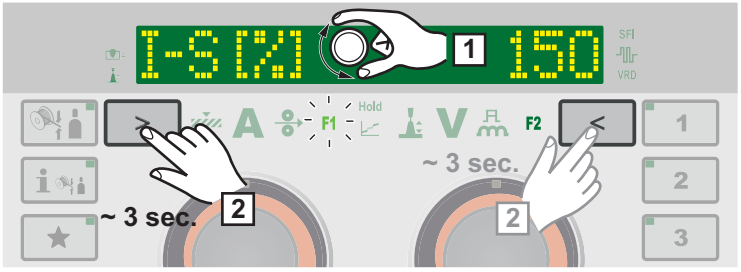
3 To make another selection, turn the right adjusting dial

F1/F2 special function parameters, Favourites button

EN

F1 and F2 special function parameters

Setting F1 and F2 special function parameters



Example: the selected parameter I-S is assigned to F1

1 Select the desired parameter in the Setup menu

Further information on the Setup menu can be found from page 89

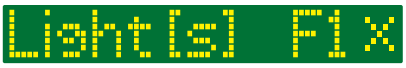
2 To assign the selected parameter to F1 or F2, press the parameter selection button for approx. 3 seconds:
F1 ... left parameter selection
F2 ... right parameter selection

F1/F2 flashes while the parameter selection button is pressed.

As soon as the parameter is saved, the indicator for the corresponding special function parameter lights up.
F1 (for example) and a tick is shown next to the parameter:

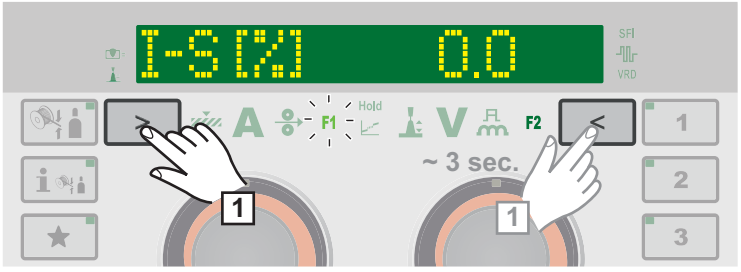
The selected parameter is now stored under F1.

If a parameter cannot be assigned to the F1 or F2 special function parameters, after approx. 5 seconds F1 (for example) and X is displayed:



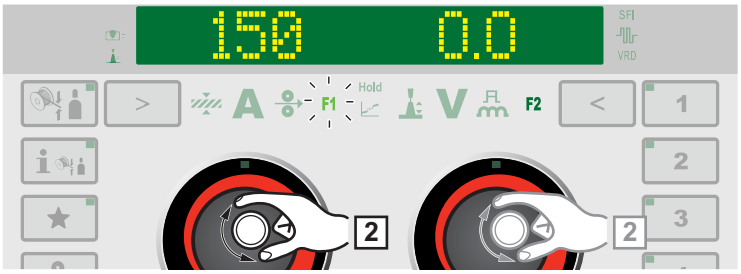
This deletes an existing stored parameter.

Retrieving F1 and F2 special function parameters



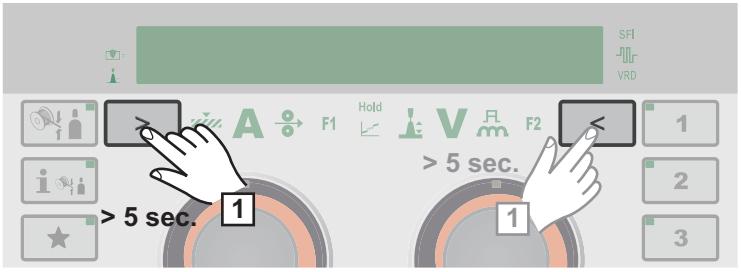
1 Press the parameter selection button until F1 or F2 lights up:
F1 ... left parameter selection
F2 ... right parameter selection

The stored parameter is shown first, then the currently set value of the parameter.



2 Change the value of the parameter by turning the adjusting dial:
F1 ... left adjusting dial
F2 ... right adjusting dial

Deleting F1 and F2 special function parameters



1 Press the parameter selection button for at least 5 seconds:
F1 ... left parameter selection
F2 ... right parameter selection

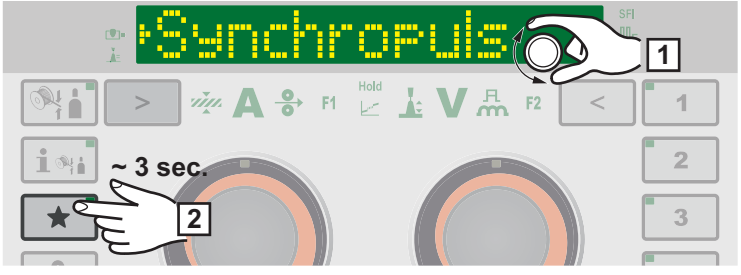
The stored parameter is deleted, F1 (for example) and X is shown on the display:

The F1 and F2 special function parameters can also be set in the Setup menu (page 112).

The Favourites button

Assigning the Favourites button

Individual parameters or parent folders from the Setup menu can be assigned to the Favourites button. These parameters or parent folders can then be called up directly using the control panel.



Example: The selected SynchroPulse folder is assigned to the Favourites button

1 Select the desired parameter or the desired parent folder in the Setup menu

Further information on the Setup menu can be found from page 89

2 To assign the selected parameter or folder to the Favourites button, press the Favourites button for approx. 3 seconds

Next to the parameter or folder ★ and a tick are shown:

The selected parameter or folder is now assigned to the Favourites button.

Retrieving favourites

Parameters or folders stored under the Favourites button can be retrieved in any setting, except for when the Setup menu is active.
Ongoing selection processes or called up jobs are cancelled when favourites are retrieved.

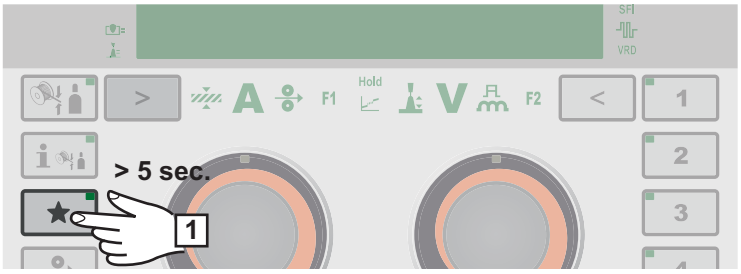
1 Briefly press the "Favourites" button (< 3 seconds)

The LED on the Favourites button lights up and the stored parameter or folder is shown on the display.

2 To end retrieval of the favourite, briefly press the Favourites button again (< 3 seconds)

The LED on the Favourites button goes out and the display switches to the welding parameters.

Deleting favourites



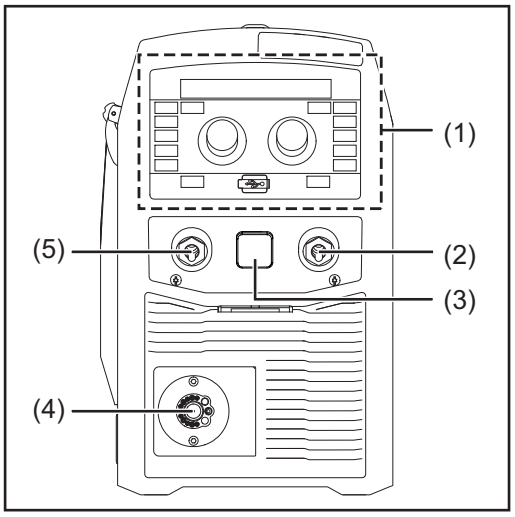
1 Press the Favourites button for at least 5 seconds:

The stored parameter or folder is deleted and ★ and X are shown on the display:

The Favourites button can also be assigned in the Setup menu (page **113**).

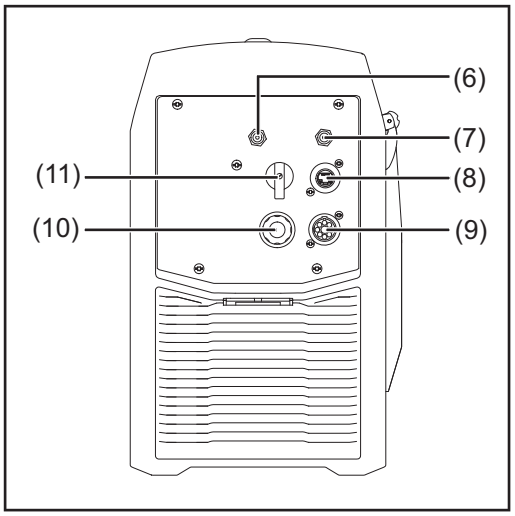
Connections, switches and mechanical components

Connections, switches and mechanical components



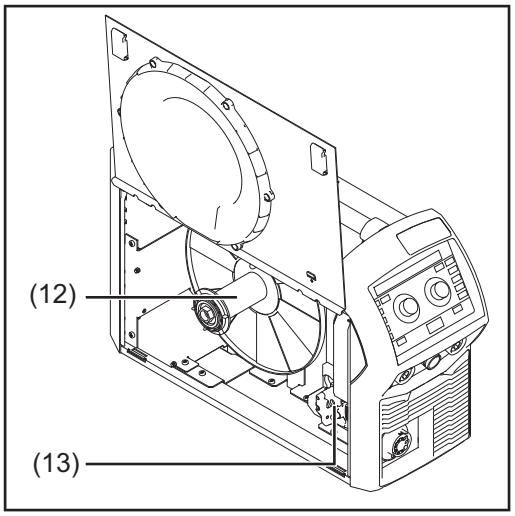
Front

No.	Function
(1)	**Control panel with display** for operating the power source
(2)	**(+) current socket with bayonet latch**
(3)	**Blanking cover** reserved for the TMC connection socket of the TIG option
(4)	**Welding torch connection** for connecting the welding torch
(5)	**(-) current socket with bayonet latch** used to connect the grounding cable during MIG/MAG welding



Rear

No.	Function
(6)	**MIG/MAG shielding gas connection socket**
(7)	**Blanking cover/TIG shielding gas connection socket (option)**
(8)	**Blanking cover/Ethernet connection socket (option)**
(9)	**Blanking cover/SpeedNet Connector connection socket (option)/external sensor (option)**
(10)	**Mains cable with strain relief device**
(11)	**Mains switch** for switching the power source on and off



Side view

No.	Function
(12)	**Wirespool holder with brake** for holding standard wirespools weighing up to 19 kg (41.89 lb.) and with a max. diameter of 300 mm (11.81 in)
(13)	**4 roller drive**

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.

MIG/MAG gas-cooled welding

- Power source
- Grounding (earthing) cable
- MIG/MAG welding torch, gas-cooled
- Shielding gas supply
- Wire electrode

MIG/MAG water-cooled welding

- Power source
- Cooling unit
- Grounding (earthing) cable
- MIG/MAG welding torch, water-cooled
- Shielding gas supply
- Wire electrode

Manual CMT welding

- Power source
- Standard, Pulse and CMT welding packages enabled on the power source
- Grounding cable
- PullMig CMT welding torch incl. CMT drive unit and CMT wire buffer

  IMPORTANT! For water-cooled CMT applications, a cooling unit is also required!

- OPT/i PushPull
- CMT interconnecting hosepack
- Wire electrode
- Gas connection (shielding gas supply)

TIG DC welding

- Power source
- Grounding (earthing) cable
- TIG gas-valve torch
- Gas connection (shielding gas supply)
- Filler metal (depending on the application)

MMA welding

- Power source
- Grounding (earthing) cable
- Electrode holder with welding cable
- Rod electrodes

Before installation and commissioning

Safety

⚠ WARNING!

Danger from incorrect operation.
Possible serious injury and damage to property.
▶ Do not use the functions described here until you have read and completely understood these Operating Instructions.
▶ Do not use the functions described here until you have fully read and understood all of the Operating Instructions for the system components, in particular the safety rules!

Proper use

The power source may only be used for MIG/MAG, MMA and TIG welding. 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 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 IP 23 protection, meaning:
- protection against penetration by solid foreign bodies with diameters > 12.5 mm (0.49 in.)
- protection against direct sprays of water at any angle up to 60° from the vertical

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

⚠ WARNING!

If one of these devices topples over or falls it could cause serious or even fatal injury.
▶ Place devices, upright consoles and trolleys on a solid, level surface in such a way that they remain stable.

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

Mains connection

- The devices are designed for the mains voltage specified on the rating plate.
- Devices with a nominal voltage of 3 x 575 V must be operated on three-phase systems with earthed star point.
- If your version of the appliance does not come with mains cables and mains plugs ready-fitted, these must be fitted by a qualified person in accordance with national standards.
- The fuse protection for the mains lead is indicated in the technical data.

⚠ CAUTION!

An inadequately dimensioned electrical installation can cause serious damage.

▶ The mains lead and its fuse protection must be dimensioned to suit the local power supply.
The technical data shown on the rating plate applies.

Generator-powered operation

The power source is generator-compatible.

The maximum apparent power S_{1max} of the power source must be known in order to select the correct generator output.
The maximum apparent power S_{1max} of the power source is calculated as follows:

3-phase devices: $S_{1max} = I_{1max} \times U_1 \times \sqrt{3}$

Single-phase devices: $S_{1max} = I_{1max} \times U_1$

See device rating plate or technical data for I_{1max} and U_1 values

The generator apparent power S_{GEN} needed is calculated using the following rule of thumb:

$S_{GEN} = S_{1max} \times 1.35$

A smaller generator may be used when not welding at full power.

IMPORTANT! The generator apparent power S_{GEN} must always be higher than the maximum apparent power S_{1max} of the power source.

When using single-phase devices with a 3-phase generator, note that the specified generator apparent power is often only available as a whole across all three phases of the generator. If necessary, obtain further information on the single-phase power of the generator from the generator manufacturer.

NOTE!

The voltage delivered by the generator must never exceed the upper or lower limits of the mains voltage tolerance range.
Details of the mains voltage tolerance can be found in the "Technical data" section.

Information on system components

The steps and activities described below include references to various system components, including:
- Trolley
- Welding torch
- etc.

For more detailed information about installing and connecting the system components, please refer to the appropriate operating instructions.

Connecting the mains cable

Safety

⚠ WARNING!

Danger due to work that has been carried out incorrectly.
This can result in serious injury and damage to property.
- ▶ The work described below must only be carried out by trained and qualified personnel.
- ▶ Observe national standards and directives.

⚠ CAUTION!

Danger due to improperly prepared mains cable.
This can cause short circuits and damage.
- ▶ Fit ferrules to all phase conductors and the ground conductor of the stripped mains cable.

General

If no mains cable is connected, a mains cable that is suitable for the connection voltage must be fitted before commissioning.
Strain-relief devices for the following cable cross-sections are fitted to TPS 270i C power sources:

Power source	External diameter of cable
TPS 270i C /nc	14 - 16 mm
TPS 270 i C / S/nc	14 - 16 mm
TPS 270i C /MV/nc	14 - 18.5 mm

Strain-relief devices for other cable cross-sections must be designed accordingly.

Stipulated mains cables

Power source	Mains voltage	Cable cross-section	
		USA / Canada *	Europe
TPS 270i C /nc	3 x 380 V 3 x 400 V 3 x 460 V	AWG 14	4G 2.5 mm²
TPS 270i C /MV/nc	3 x 200 V 3 x 230 V	AWG 12	4G 2.5 mm²
	3 x 380 V 3 x 400 V 3 x 460 V	AWG 14	4G 2.5 mm²
TPS 270i C /S/nc **	3 x 460 V 3 x 575 V	AWG 14	-

* Cable type for USA / Canada: Extra-hard usage

** Power source without CE mark; not available in Europe

AWG = **A**merican **w**ire **g**auge

Connecting the mains cable - general

⚠ CAUTION!

Risk of injury and damage from short circuits.
Short circuits can occur between the phase conductors or between the phase conductors and the ground conductor unless ferrules are used.

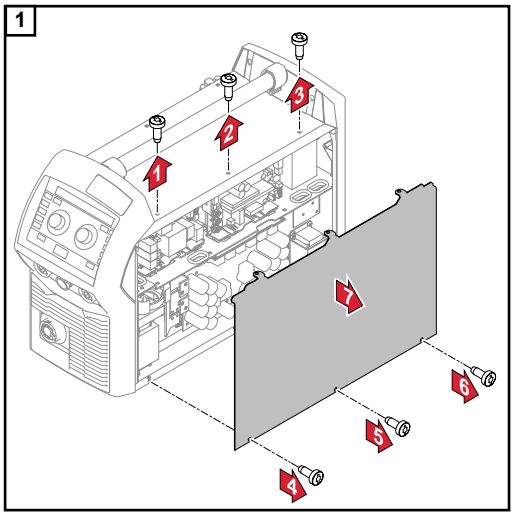
▶ Strip the insulation of the mains cable and fit ferrules to all phase conductors, as well as the ground conductor.

NOTE!

Mains cables must be connected to devices in compliance with national standards and guidelines and the work must be carried out by suitably qualified personnel!

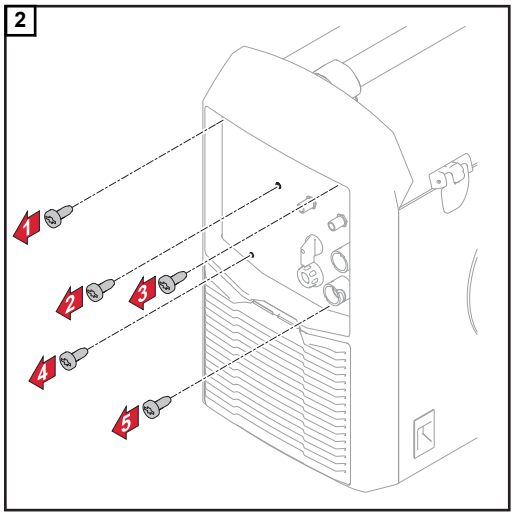
IMPORTANT! The ground conductor should be approx. 20 - 25 mm (0.8 - 1 in.) longer than the phase conductors.

1



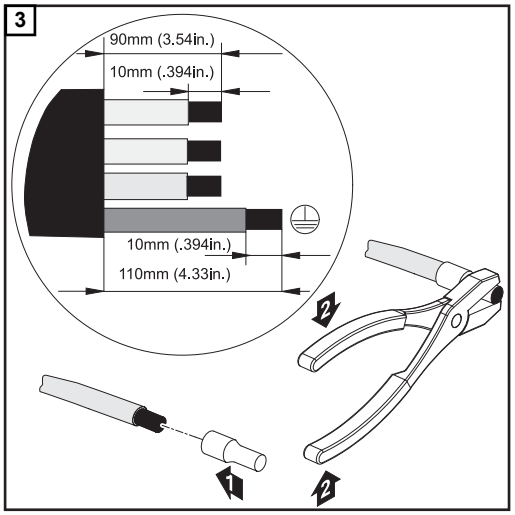
6 x TX25

2

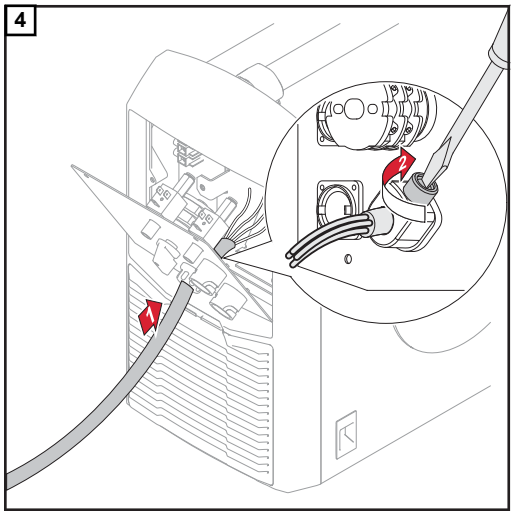


5 x TX25

3

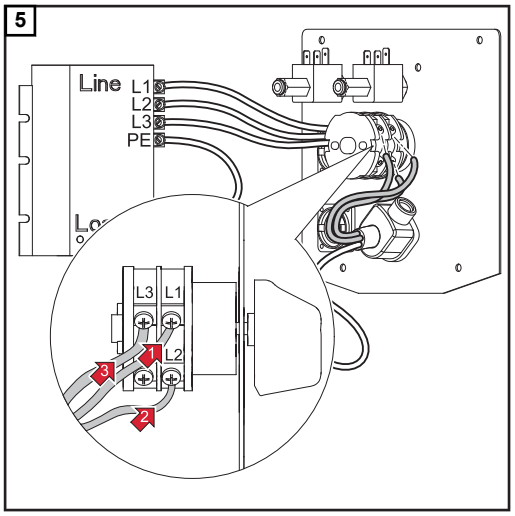


4

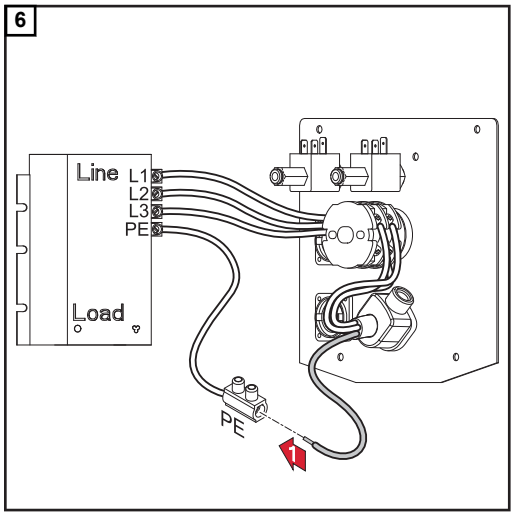


Tightening torque = 1.2 Nm

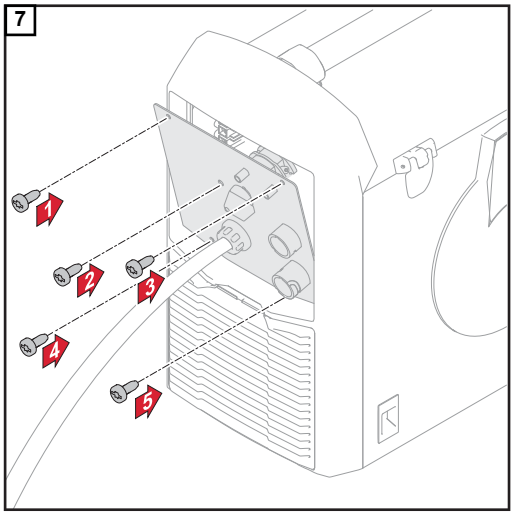
IMPORTANT! When connecting the cable to the switch, ensure:
- To route the conductors near to the switch
- Not to make the conductors unnecessarily long
- To fit the protective hose supplied over the cable and insert the covered cable into the strain-relief device if cable diameters are small



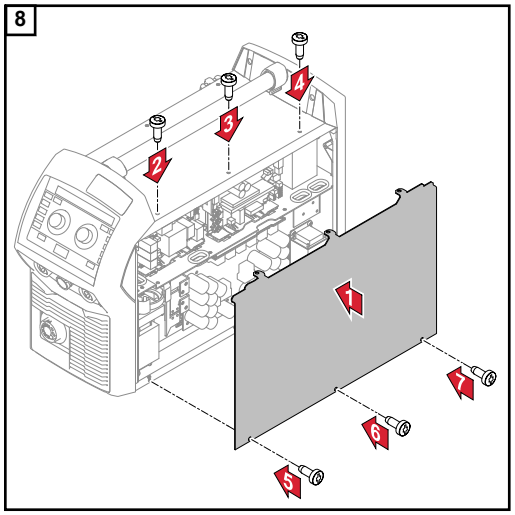
Tightening torque = 1.2 Nm



Tightening torque = 1.2 Nm



5 x TX25, tightening torque = 3 Nm



6 x TX25, tightening torque = 3 Nm

Start-up

Safety

⚠ 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
- ▶ Before carrying out any work on the device make sure that the power source is unplugged from the mains

⚠ WARNING!

Danger from electrical current due to electrically conductive dust in the device.
This can result in serious injury and damage to property.

- ▶ Only operate the device with an air filter fitted. The air filter is a very important safety device for adhering to the IP 23 protection class.

General

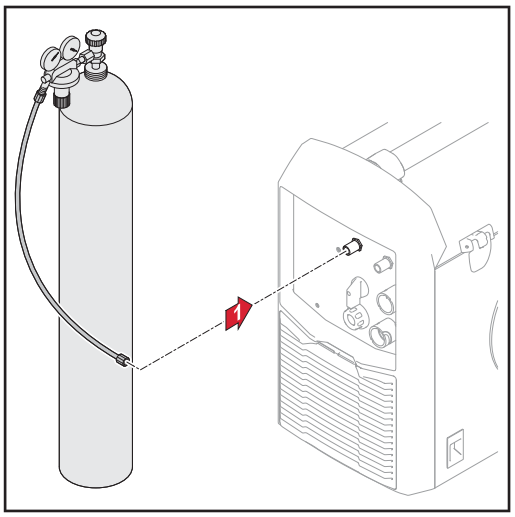
Commissioning the power source is described with reference to a manual gas-cooled MIG/MAG application.

Connecting the gas cylinder

⚠ WARNING!

There is a high risk of very serious injury and damage if a gas cylinder falls over.

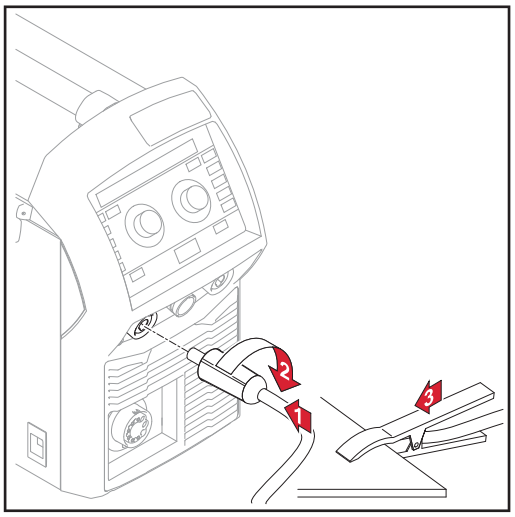
- ▶ Place them on a solid, level surface in such a way that they remain stable
- ▶ Secure the gas cylinders to prevent them from falling over
- ▶ Observe the safety rules of the gas cylinder manufacturer



Connecting the gas hose

1. Place the gas cylinder on a solid, level surface in such a way that it remains stable
2. Secure the gas cylinder to prevent it from toppling over (but not around the neck of the cylinder)
3. Take the protective cap off the gas cylinder
4. Briefly open the gas cylinder valve to remove any dust or dirt
5. Inspect the seal on the gas pressure regulator
6. Screw the pressure regulator onto the gas cylinder and tighten it
7. Connect the pressure regulator to the shielding gas connection on the power source using the gas hose

Establishing a ground earth connection



Connecting the grounding cable

1 Plug the grounding cable into the (-) current socket

2 Lock the grounding cable in place

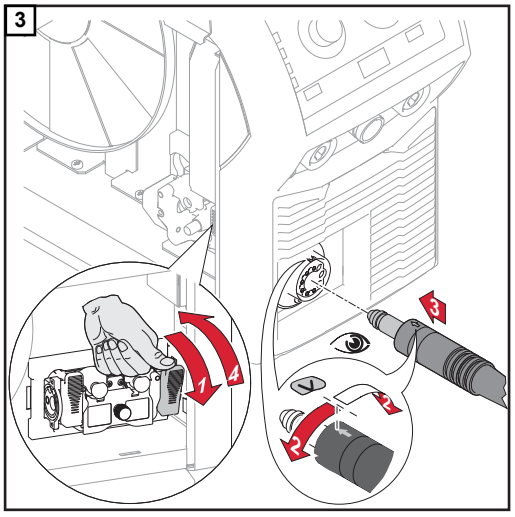
3 Use the other end of the grounding cable to establish a connection to the workpiece

Connecting the welding torch

1 Before connecting the welding torch, check that all cables, lines and hosepacks are undamaged and properly insulated.

2 Open the wire-feed unit cover

3



Inserting/replacing feed rollers

In order to achieve optimum wire electrode feed, the feed rollers must be suitable for the diameter and alloy of the wire being welded.

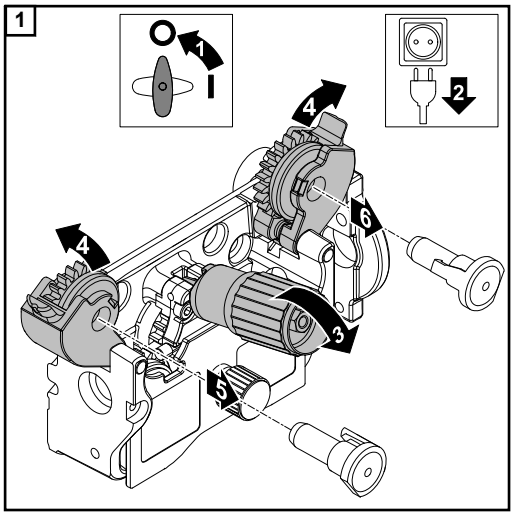
NOTE!

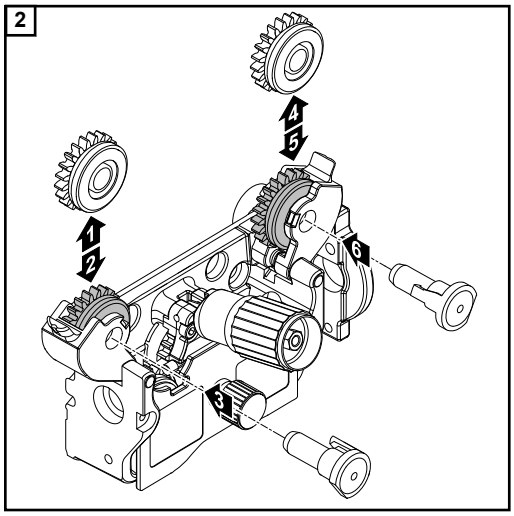
Only use feed rollers that are suitable for the wire electrode.
An overview of the feed rollers available and their possible areas of use can be found in the spare parts lists.

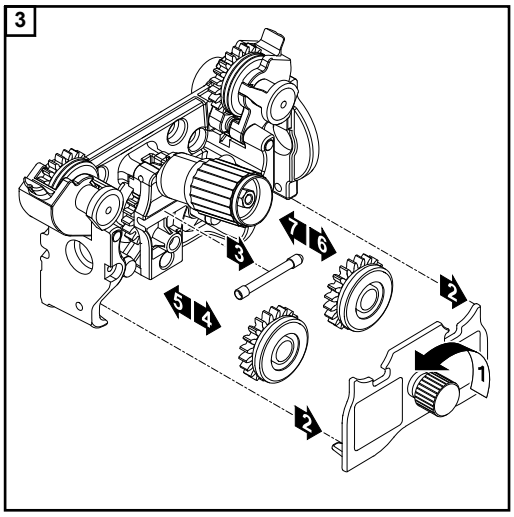
⚠ CAUTION!

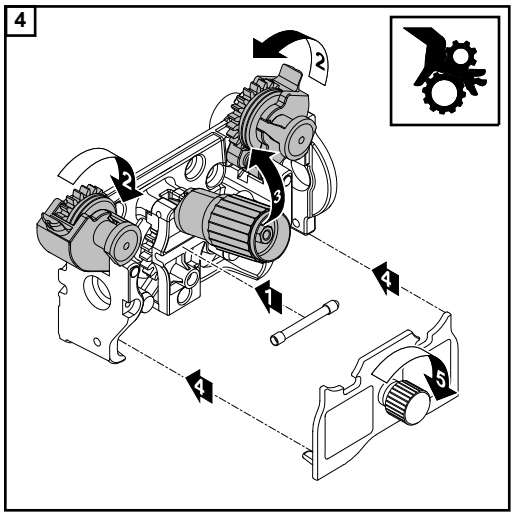
Risk of injury if the feed roller holders fly upwards.

► When unlocking the lever, keep fingers away from the area to the left and right of the lever.









Inserting the wirespool

⚠ CAUTION!

Risk of injury due to springiness of spooled wire electrode.

▶ While inserting the wirespool, hold the end of the wire electrode firmly to avoid injuries caused by the wire springing back.

⚠ CAUTION!

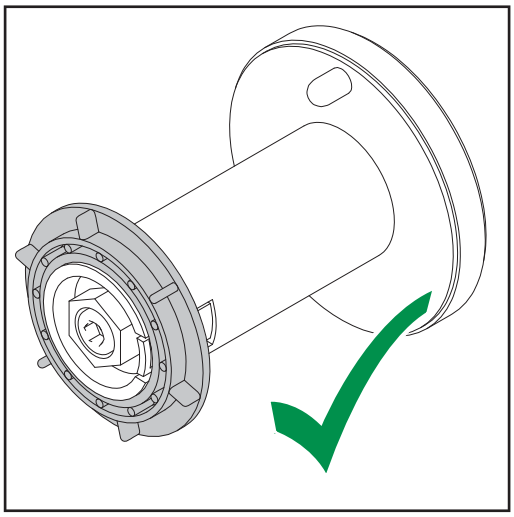
Risk of injury from falling wirespool.

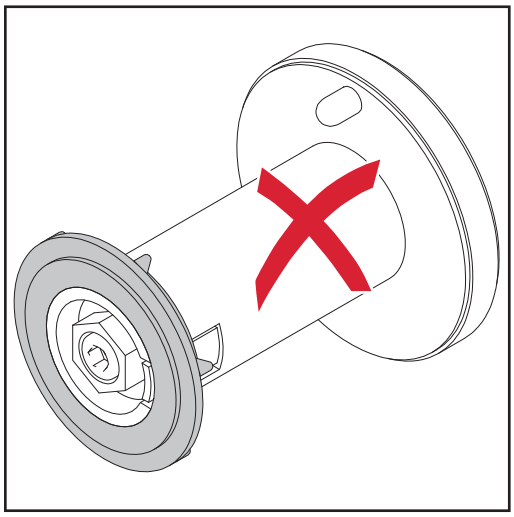
▶ Make sure that the wirespool is fitted securely to the wirespool holder.

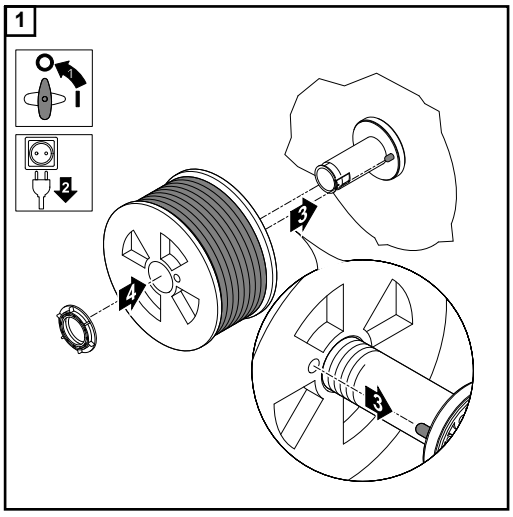
⚠ CAUTION!

Risk of injury and impaired performance if the wirespool topples over because the locking ring has been placed the wrong way round.

▶ Always position the locking ring as shown in the diagram on the left.







Inserting the basket-type spool

⚠ CAUTION!

Risk of injury due to springiness of spooled wire electrode.

▶ While inserting the basket-type spool, hold the end of the wire electrode firmly to avoid injuries caused by the wire springing back.

⚠ CAUTION!

Risk of injury from falling basket-type spool.

▶ Make sure that the basket-type spool and basket-type spool adapter are fitted securely to the wirespool holder.

NOTE!

When working with basket-type spools, only use the basket-type spool adapter included in the scope of supply.

⚠ CAUTION!

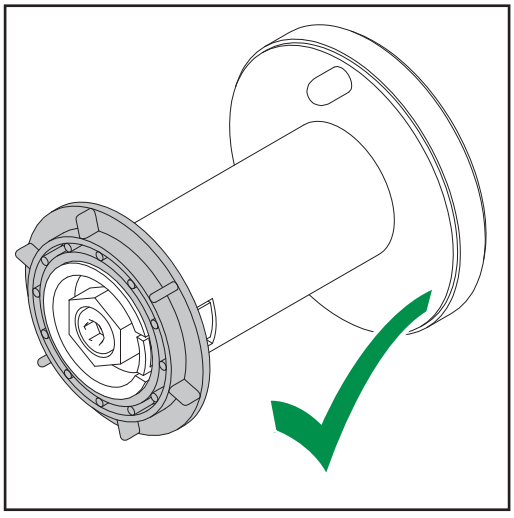
Risk of injury from falling basket-type spool.

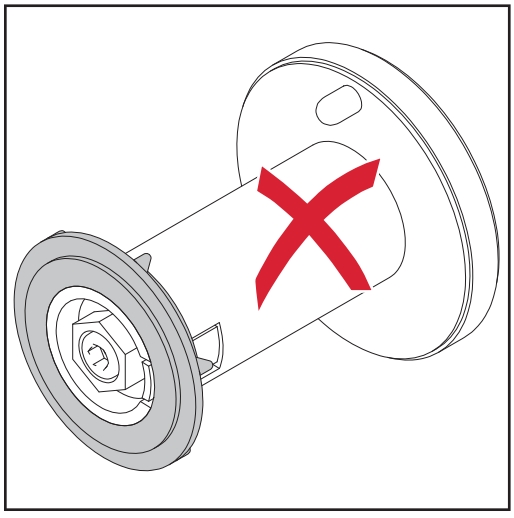
▶ Place the basket-type spool on the adapter provided in such a way that the bars on the spool are inside the adapter guideways.

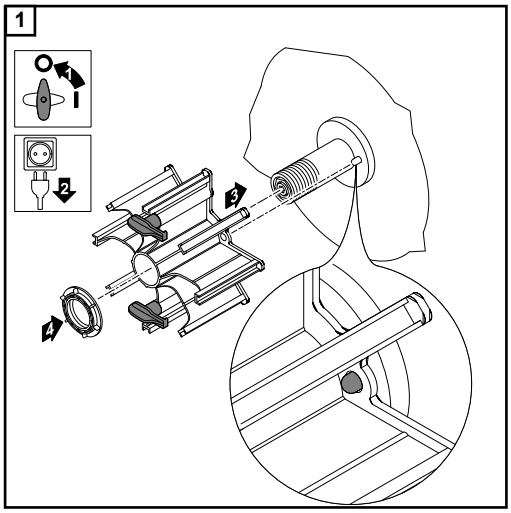
⚠ CAUTION!

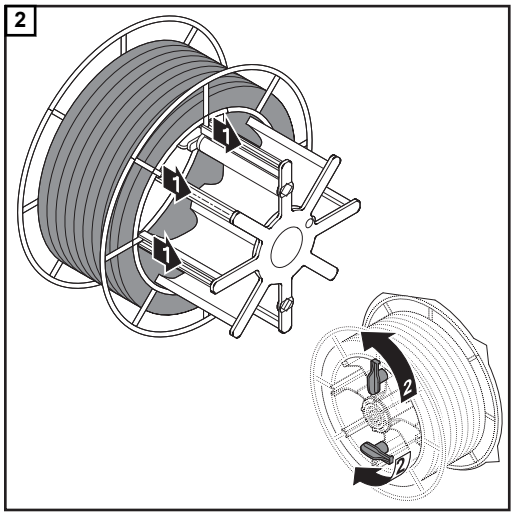
Risk of injury and impaired performance if the basket-type spool topples over because the locking ring has been placed the wrong way round.

▶ Always position the locking ring as shown in the diagram on the left.









Feeding in the wire electrode

⚠ CAUTION!

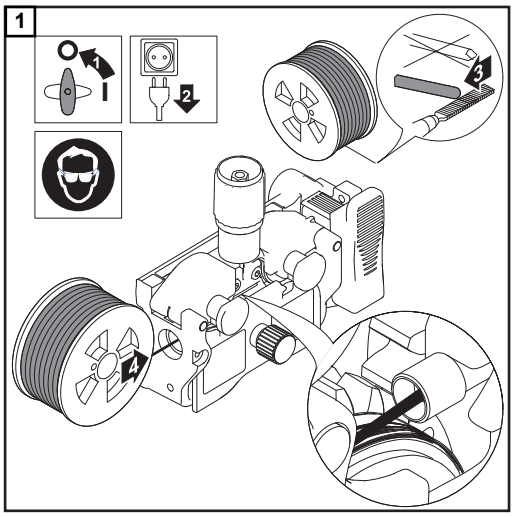
Risk of injury from springiness of spooled wire electrode.

▶ When inserting the wire electrode into the 4-roller drive, hold the end of the wire electrode firmly to avoid injuries caused by the wire springing back.

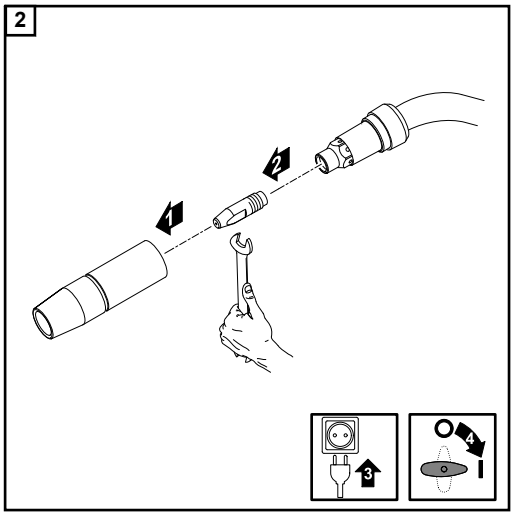
⚠ CAUTION!

Risk of damage to the welding torch from sharp end of wire electrode.

▶ Deburr the end of the wire electrode well before feeding in.
Arrange the welding torch hosepack in as straight a line as possible.



2

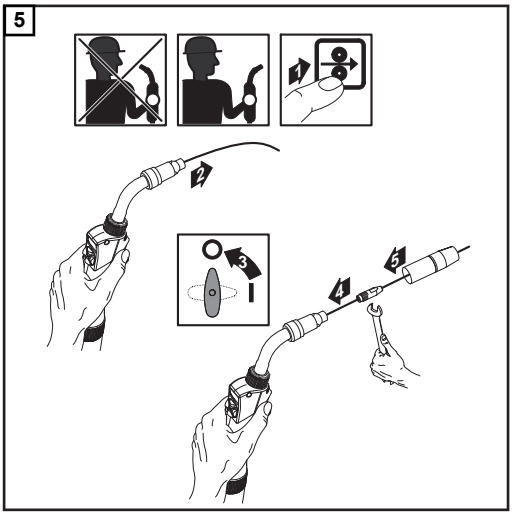


⚠ CAUTION!

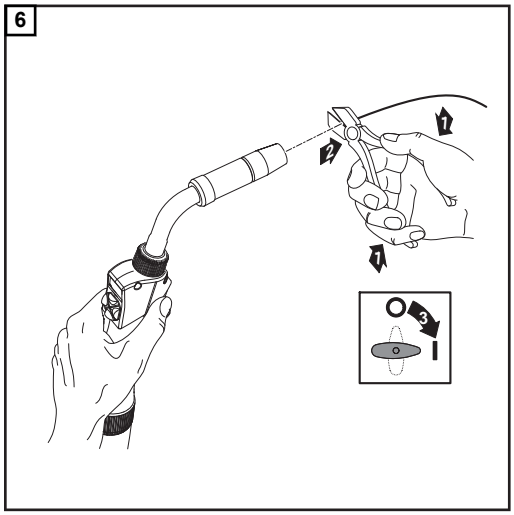
Risk of injury and damage from electric shock and from the wire electrode emerging from the torch.

- ▶ Keep the welding torch away from the face and body when pressing the torch trigger or feeder inching button.
- ▶ Do not point the welding torch at people
- ▶ Make sure that the wire electrode does not touch any conductive or earthed (grounded) parts (e.g. the housing, etc.) when pressing the torch trigger

5



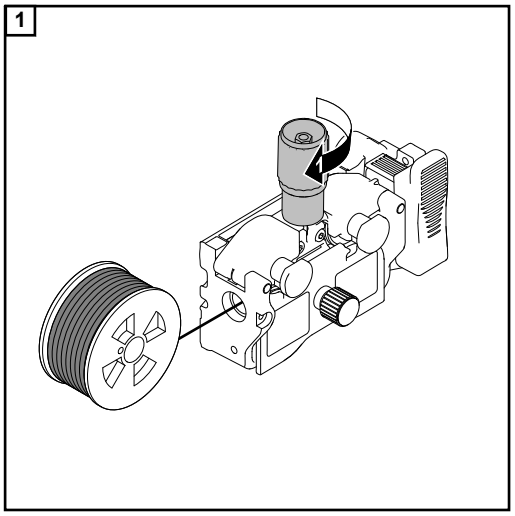
6



Setting the contact pressure

NOTE!

Set the contact pressure in such a way that the wire electrode is not deformed but nevertheless ensures proper wirefeeding.



Contact pressure standard values for U-groove rollers

Steel:
4 - 5

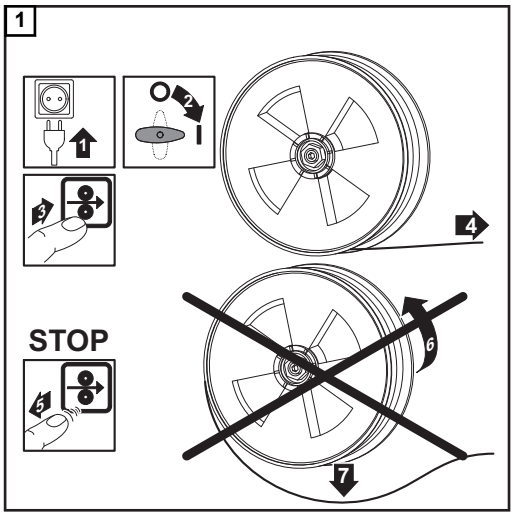
CrNi
4 - 5

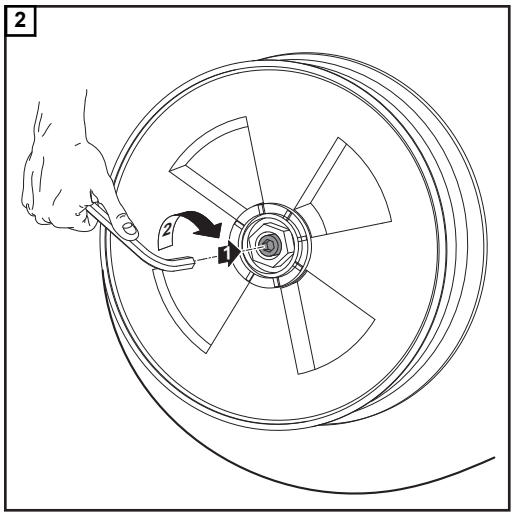
Tubular cored electrodes
2 - 3

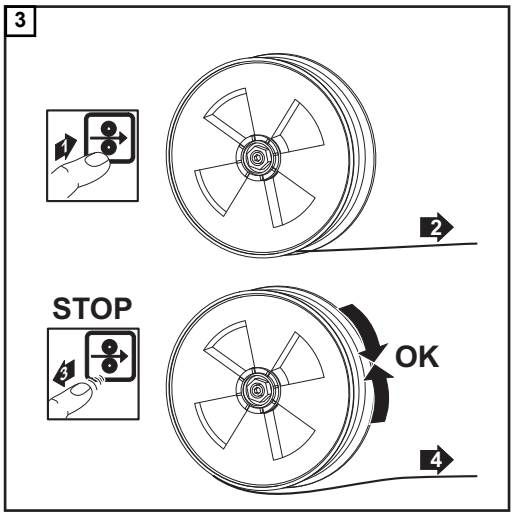
Adjusting the brake

NOTE!

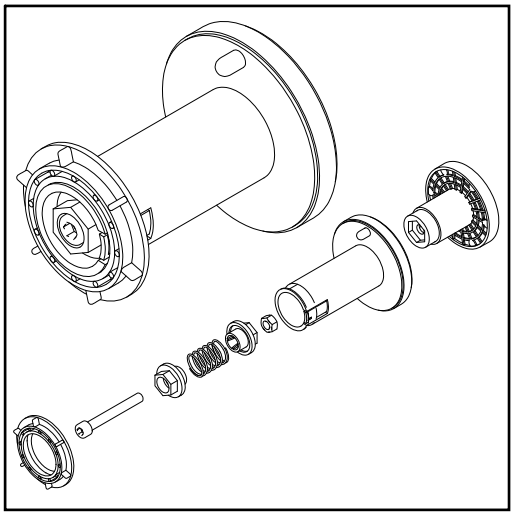
After releasing the torch trigger the wirespool should stop unreeling.
Adjust brake if necessary.







Design of the brake



⚠ WARNING!

Danger from incorrect installation.
This can result in severe personal injury and damage to property.

- ▶ Do not dismantle the brake.
- ▶ Maintenance and servicing of brakes is to be carried out by trained, qualified personnel only.

The brake is only available as a complete unit.
This illustration is for information purposes only.

Performing R/L alignment

IMPORTANT! For optimum welding results, the manufacturer recommends performing an R/L alignment when starting the device for the first time and when any changes are made to the welding system.

Welding

MIG/MAG modes

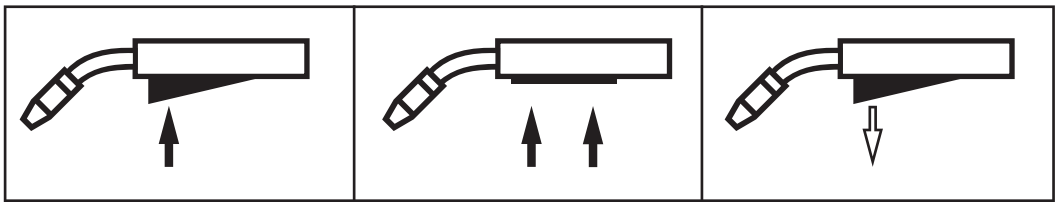
General

⚠ WARNING!

Danger from incorrect operation.
Possible serious injury and damage to property.
- ▶ Do not use the functions described here until you have read and completely understood these Operating Instructions.
- ▶ Do not use the functions described here until you have fully read and understood all of the Operating Instructions for the system components, in particular the safety rules!

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

Symbols and their explanations



Press the torch trigger | Hold the torch trigger | Release the torch trigger

GPr
Gas pre-flow

I-S
Starting-current phase: the base material is heated up rapidly, despite the high thermal dissipation that occurs at the start of welding

t-S
Starting current time

Start arc length correction

SL1
Slope 1: the starting current is steadily lowered until it reaches the welding current

I
Welding-current phase: uniform thermal input into the base material, whose temperature is raised by the advancing heat

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-E
Final current time

End arc length correction

SL2
Slope 2: the welding current is steadily lowered until it reaches the final current

GPo
Gas post-flow

A detailed explanation of the parameters can be found in the section headed "Process parameters"

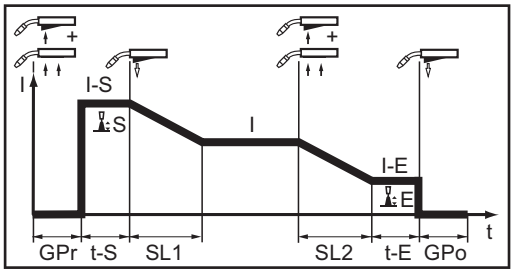
2-step mode

"2-step mode" is suitable for
- Tacking work
- Short weld seams
- Automated and robot welding

4-step mode

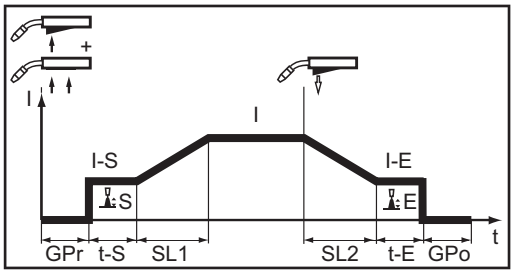
"4-step mode" is suitable for longer weld seams.

Special 4-step mode



"Special 4-step mode" is particularly suitable for welding aluminium materials. The special slope of the welding current curve takes account of the high thermal conductivity of aluminium.

Special 2-step mode



"Special 2-step mode" is ideal for welding in the higher power range. In special 2-step mode, the arc starts at a low power, which makes it easier to stabilise.

MIG/MAG and CMT welding

Safety

⚠ WARNING!

Danger from incorrect operation.
Possible serious injury and damage to property.
- ▶ Do not use the functions described here until you have read and completely understood these Operating Instructions.
- ▶ Do not use the functions described here until you have fully read and understood all of the Operating Instructions for the system components, in particular 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
- ▶ Before carrying out any work on the device make sure that the power source is unplugged from the mains

MIG/MAG and CMT welding – overview

The "MIG/MAG and CMT welding" section comprises the following steps:
- Switching on the power source
- Selecting the welding process and operating mode
- Retrieving the currently set filler metal
- Selecting the filler metal
- Setting the welding parameters
- Setting the shielding gas flow rate
- MIG/MAG or CMT welding

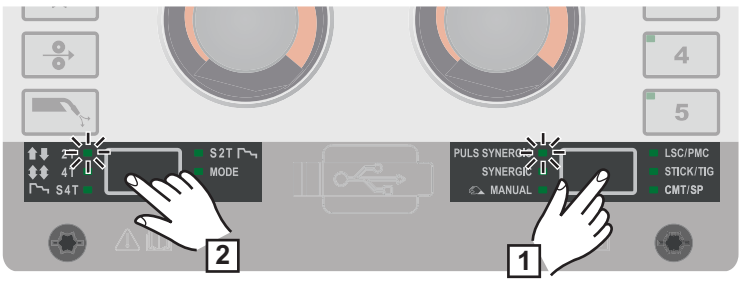
Switching on the power source

[1] Connect the mains cable

[2] Move the mains switch to the "I" position

IMPORTANT! For optimum welding results, the manufacturer recommends performing an R/L alignment when starting the device for the first time and when any changes are made to the welding system.

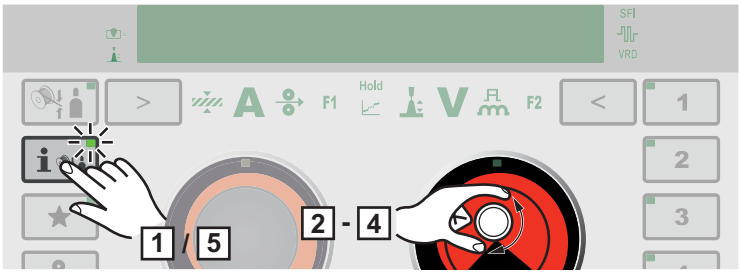
Setting the welding process and operating mode



[1] Press the "Welding process" button until the LED for the desired welding process lights up

2 Press the "Mode" button until the LED for the desired operating mode lights up

Retrieving the currently set filler metal



1 Press the "Filler metal info" button

The LED on the button lights up and the currently set filler metal is shown on the display:

2 Turn the right adjusting dial

The currently set wire diameter is shown on the display:

3 Turn the right adjusting dial

The currently set shielding gas is shown on the display:

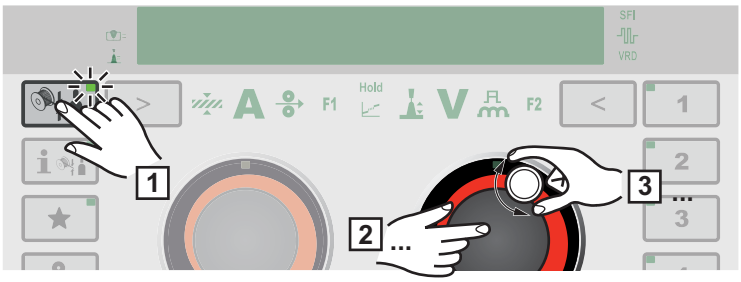
4 Turn the right adjusting dial

The currently set characteristic is shown on the display:

5 Press the "Filler metal info" button

The currently set welding parameter values are shown on the display.

Selecting the filler metal



1 Press the "Filler metal selection" button

The LED on the button lights up and "filler metal?" is shown on the display:

2 Press the right adjusting dial

The first available filler metal is displayed:

3 Select the desired filler metal by turning the right adjusting dial

4 Press the right adjusting dial

"diameter?" is shown on the display: *

5 Press the right adjusting dial

The first available wire diameter is displayed:

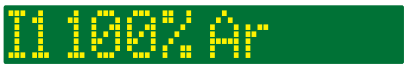
6 Select the desired wire diameter by turning the right adjusting dial

7 Press the right adjusting dial

"gas?" is shown on the display: *

8 Press the right adjusting dial

The first available shielding gas is displayed:



9 Select the desired shielding gas by turning the right adjusting dial

10 Press the right adjusting dial

If available, the first available characteristic is displayed: *

11 Select the desired characteristic by turning the right adjusting dial

12 Press the right adjusting dial

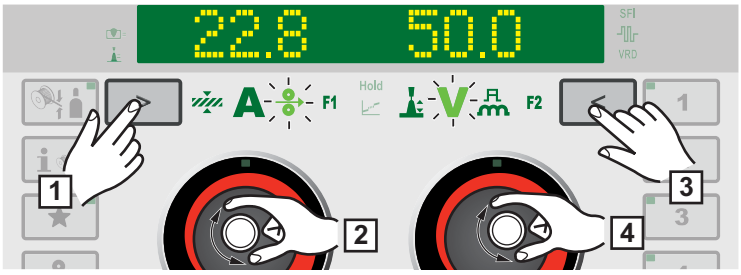
A prompt to apply the new filler metal is displayed: *

13 Press the right adjusting dial

The set filler metal is saved.

* The previous item can be called up by turning the right adjusting wheel and selecting "back".

Setting the welding parameters



1 Press the button until the desired welding parameter lights up

Material thickness

Welding current

Wire speed

Special function

2 Turn the left adjusting dial to change the value of the welding parameter

4 Turn the right adjusting dial to change the value of the welding parameter

The amended parameter values are applied immediately.
If one of the wire speed, material thickness, welding current or welding voltage parameters are changed during synergic welding, the remaining parameters are immediately altered accordingly.

Setting the shielding gas flow rate

1 Open the gas cylinder valve

2 Press the gas test button

Shielding gas flows out

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

4 Press the gas test button

The flow of gas stops.

MIG/MAG or CMT welding

⚠ CAUTION!

Risk of injury and damage from electric shock and from the wire electrode emerging from the torch.
When pressing the torch trigger:

- ▶ keep the torch away from your face and body
- ▶ do not point the welding torch at people
- ▶ make sure that the wire electrode does not touch any electrically conducting or earthed (grounded) parts, such as the housing, etc.

1 Press the torch trigger and start welding

Whenever welding ends, the actual values for the welding current, welding voltage and wire speed are stored, and HOLD appears on the display.

NOTE!

It is not always possible to change parameters that have been set on a system component control panel (e.g. remote control) on the power source control panel.

MIG/MAG and CMT welding parameters

Welding parameters for MIG/MAG pulse synergic welding, for CMT welding and PMC welding

The following welding parameters can be set and displayed for MIG/MAG pulse synergic welding, CMT welding and PMC welding:

using the left adjusting dial:

Material thickness[1)]

Setting range: 0.1 - 30.0 mm [2)] / 0.004 - 1.18 in. [2)]

Welding current[1)]
in A

Setting range: depends on the welding process and welding program selected

Before the start of welding, the machine automatically displays a standard value based on the programmed parameters. The actual value is displayed during welding.

Wire speed[1)]

Setting range: 0.5 - 25 m/min [2)] / 20 - 980 ipm. [2)]

Special function
any parameter can be assigned to this (see page **41**)

The function can be selected if a parameter has been saved.

Penetration stabilizer[4)] (see page **95**)

Setting range: 0 - 10 m/min / 0 - 393.7 ipm
Factory setting: 0

Arc length stabilizer[4)] (see page **97**)

Setting range: 0 - 5
Factory setting: 0

using the right adjusting dial:

Arc length correction
for correcting the arc length;

Setting range: -10 - +10
Factory setting: 0

- .... shorter arc length
0 ... neutral arc length
+ ... longer arc length

Welding voltage[1)]
in V

Setting range: depends on the welding process and welding program selected

Before the start of welding, the machine automatically displays a standard value based on the programmed parameters. The actual value is displayed during welding.

Pulse/dynamic correction
for correcting the pulsing energy of a pulsed arc

Setting range: -10 - +10
Factory setting: 0

- ... lower droplet detachment force
0 ... neutral droplet detachment force
+ ... increased droplet detachment force

F2

Special function
any parameter can be assigned to this (see page 41)

The function can be selected if a parameter has been saved.

Welding parameters for MIG/MAG standard synergic welding and LSC welding

The following welding parameters can be set and displayed for MIG/MAG standard synergic welding and LSC welding:

using the left adjusting dial:

Material thickness[1)]

Setting range: 0.1 - 30.0 mm [2] / 0.004 - 1.18 in. [2]

A

Welding current[1]
in A

Setting range: depends on the welding process and welding program selected

Before the start of welding, the machine automatically displays a standard value based on the programmed parameters. The actual value is displayed during welding.

Wire speed[1]
for setting a harder, more stable arc

Setting range: 0.5 - 25 m/min [2] / 20 - 980 ipm. [2]

F1

Special function
any parameter can be assigned to this (see page **41**)

The function can be selected if a parameter has been saved.

Penetration stabilizer[4] (see page **95**)

Setting range: 0 - 10 m/min / 0 - 393.7 ipm
Factory setting: 0

---

using the right adjusting dial:

Arc length stabilizer[4] (see page **97**)

Setting range: 0 - 2
Factory setting: 0

Arc length correction
for correcting the arc length, which is pre-set by the characteristic or the synergic program

Setting range: -10 - +10
Factory setting: 0

- .... shorter arc length
0 ... neutral arc length
+ ... longer arc length

V

Welding voltage[1)]
in V

Setting range: depends on the welding process and welding program selected

Before the start of welding, the machine automatically displays a standard value based on the programmed parameters. The actual value is displayed during welding.

Pulse/dynamic correction
for influencing the short-circuiting dynamic at the instant of droplet transfer

Setting range: -10 - +10
Factory setting: 0

- ... harder and more stable arc
0 ... neutral arc
+ ... soft and low-spatter arc

F2

Special function
any parameter can be assigned to this (see page 41)

The function can be selected if a parameter has been saved.

Welding parameters for MIG/MAG standard manual welding

The following welding parameters can be set and displayed for MIG/MAG standard manual welding:

using the left adjusting dial:

Wire speed[1)]
for setting a harder, more stable arc

Setting range: 0.5 - 25 m/min [2)] / 20 - 980 ipm. [2)]

F1

Special function
any parameter can be assigned to this (see page 41)

The function can be selected if a parameter has been saved.

using the right adjusting dial:

Welding voltage[1)]
in V

Setting range: depends on the welding process and welding program selected

Pulse/dynamic correction
for influencing the short-circuiting dynamic at the instant of droplet transfer

Setting range: 0 - 10
Factory setting: 0

0 ... harder and more stable arc
10 ... soft and low-spatter arc

Special function
any parameter can be assigned to this (see page 41)

The function can be selected if a parameter has been saved.

Explanation of footnotes

1) Synergic parameter
When a synergic parameter is changed, the synergic function automatically changes all other synergic parameters to match.

The actual setting range depends on the power source and wirefeeder used and on the welding program selected.

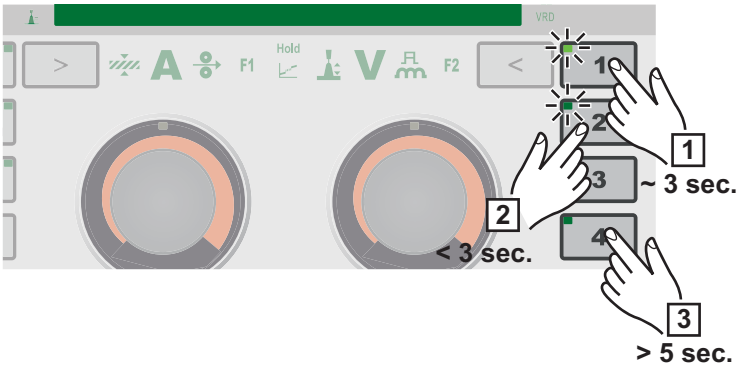
2) The actual setting range depends on the welding program selected.
3) The maximum value depends on the wirefeeder used.
4) Only in the LSC and PMC welding processes

EasyJob mode

General

The 5 EasyJob buttons enable up to 5 operating points to be saved quickly.
The current welding settings are saved.

EasyJob mode



Storing EasyJob operating points

1 To store the current welding settings, press one of the EasyJob buttons for approx. 3 seconds.

"Job", the button number and a tick are shown on the display and the EasyJob button LED lights up, e.g.: Job1✓
The settings have now been stored.

IMPORTANT! If an operating point has already been saved under an EasyJob button it will be overwritten without any prior warning.

Retrieving EasyJob operating points

2 To retrieve a saved EasyJob operating point, press the corresponding EasyJob button briefly (< 3 seconds).

The EasyJob button LED lights up and the saved values are shown on the display.
17.5 62.0
If no values are displayed after pressing an EasyJob button, an operating point is not stored under this EasyJob button.

Deleting EasyJob operating points

3 To delete an EasyJob operating point, press the relevant EasyJob button for approx. 5 seconds.

After approx. 3 seconds the saved operating point will be overwritten with the current settings and "Job", the button number and a tick are shown on the display.
After a total of approx. 5 seconds the EasyJob button LED goes out and "Job", the button number and an X are shown on the display, e.g.: Job1x
The EasyJob operating point has been deleted.

Spot welding

Spot welding

Spot welding can be carried out in the following welding processes:
PULSE SYNERGIC | SYNERGIC | MANUAL | LSC/PMC | SP (CMT)

1 Select the desired welding process by pressing the "Welding process" button
2 Select the MODE by pressing the "Mode" button

"Spot" appears briefly on the display.

3 Setup menu / Process parameters / Spot welding
4 Press the right adjusting dial

The SPt (spot welding time) parameter is shown.

5 Enter the desired value for the spot welding time: press and turn the right adjusting dial

Setting range: 0.1 - 10.0 s
Factory setting: 1.0 s

6 Confirm the value by pressing the right adjusting dial

NOTE!

4-step mode is assigned as standard for spot welding.
Press the torch trigger - Spot welding process runs until the end of the spot welding time
- Press again to stop the spot welding time prematurely

▶ The spot welding setting can be changed to 2-step in the Setup menu under Settings / System / SPm
(more information on 2-step and 4-step mode for spot welding starts on page 116)

7 Select the filler metal, wire diameter and shielding gas
8 Open the gas cylinder valve
9 Set the shielding gas flow rate

⚠ **CAUTION!**

Risk of injury and damage from electric shock and from the wire electrode emerging from the torch.
When pressing the torch trigger:

▶ Keep the welding torch away from your face and body
▶ Wear suitable protective goggles
▶ Do not point the welding torch at people
▶ Make sure that the wire electrode does not touch any conductive or earthed parts (e.g. housing, etc.)

10 Spot welding

Procedure for producing a welding spot:

1 Hold the welding torch vertical
2 Press and release the torch trigger
3 Keep the torch in the same position

4 Wait for the gas post-flow time

5 Lift the torch off the workpiece

NOTE!

Pre-set start of welding and end of welding parameters are also active for spot welding.

- ▶ A start of welding / end of welding action for spot welding can be stored in the Setup menu under Process parameters / Start/End.
- ▶ If the final current time is active, the end of welding is not after the pre-set spot welding time, but only once the pre-set slope and final current times have ended.

TIG welding

Safety

⚠ WARNING!

Danger from incorrect operation.
Possible serious injury and damage to property.
- ▶ Do not use the functions described here until you have read and completely understood these Operating Instructions.
- ▶ Do not use the functions described here until you have fully read and understood all of the Operating Instructions for the system components, in particular 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
- ▶ Before carrying out any work on the device make sure that the power source is unplugged from the mains

Preparations

1. Move the mains switch to the "O" position
2. Disconnect the mains plug
3. Remove the MIG/MAG welding torch
4. Disconnect the grounding (earthing) cable from the (-) current socket
5. Plug the grounding (earthing) cable into the 2nd (+) current socket and twist to fasten it
6. Use the other end of the grounding (earthing) cable to establish a connection to the workpiece
7. Plug the bayonet current plug on the TIG gas-valve torch into the (-) current socket and twist it clockwise to fasten it
8. Screw the pressure regulator onto the (argon) gas cylinder and tighten it
9. Connect the gas hose of the TIG gas-valve torch to the pressure regulator
10. Plug in the mains plug

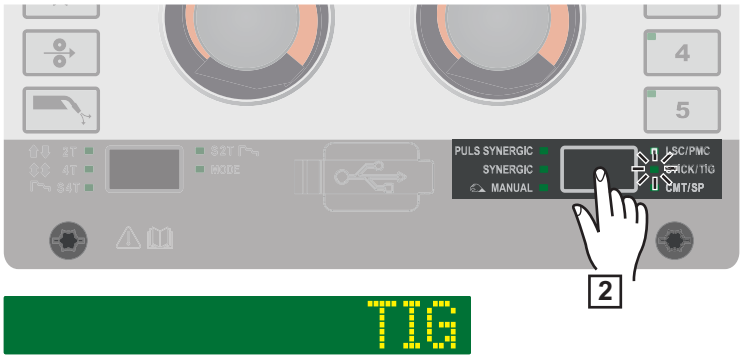
TIG welding

⚠ 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.)

1. Move the mains switch to the "I" position

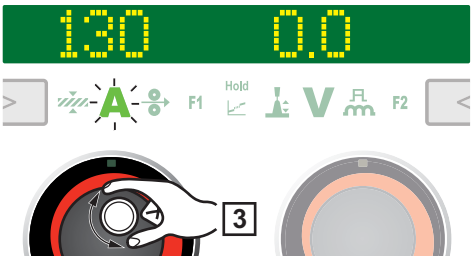
IMPORTANT! For optimum welding results, the manufacturer recommends performing an R/L alignment when starting the device for the first time and when any changes are made to the welding system.



2 Press the "Welding process" button until the LED for the STICK/TIG welding process lights up and "TIG" is shown on the display.

After a short time, the currently set welding current is shown on the display. The welding current indicator lights up.

The welding voltage is applied to the welding socket with a three second time lag.



NOTE!

Parameters that have been set on a system component control panel (e.g. wire feed unit or remote control) might not be able to be changed on the power source control panel.

3 To change the welding current, turn the left adjusting dial

The altered welding current is applied immediately.

4 Adjust the process parameters accordingly to make user- or application-specific settings on the welding system

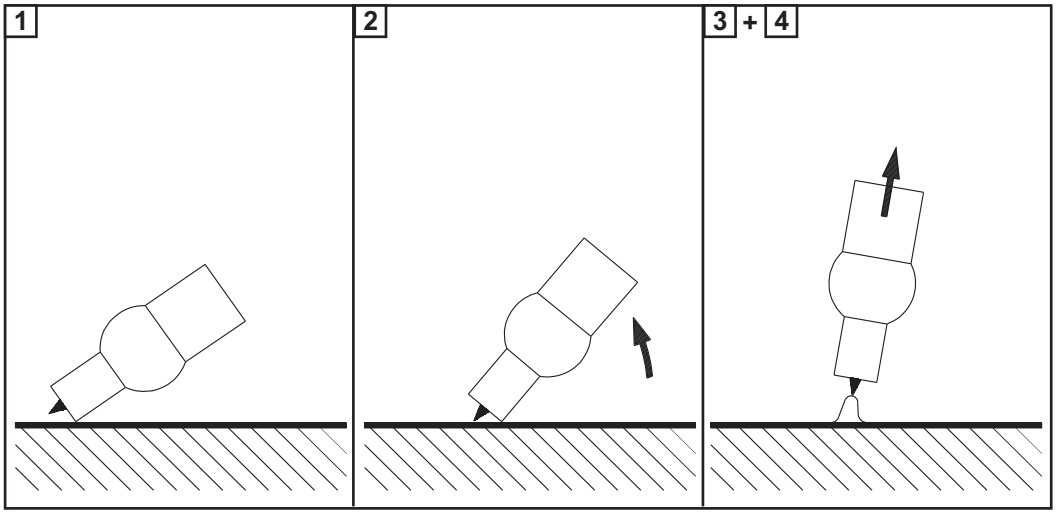
5 Open the gas stop valve on the TIG gas-valve torch

6 Set the desired shielding gas flow rate on the pressure regulator

7 Start welding (ignite the arc)

Igniting the arc

The welding arc is ignited by touching the workpiece with the tungsten electrode.



1 Place the gas nozzle on the ignition location so that there is a gap of 2-3 mm (0.08 - 0.12 in.) between the tip of the tungsten electrode and the workpiece

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

3 Raise the torch and tilt it into the normal position - the arc now ignites

4 Carry out welding

Finishing welding

1 Lift the TIG gas-valve torch away from the workpiece until the arc goes out.

IMPORTANT! To protect the tungsten electrode, ensure that the shielding gas at the end of welding flows for long enough to allow the tungsten electrode to cool sufficiently.

2 Close the gas stop valve on the TIG gas-valve torch

MMA welding

Safety

⚠ WARNING!

Danger from incorrect operation.
Possible serious injury and damage to property.
- ▶ Do not use the functions described here until you have read and completely understood these Operating Instructions.
- ▶ Do not use the functions described here until you have fully read and understood all of the Operating Instructions for the system components, in particular 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
- ▶ Before carrying out any work on the device make sure that the power source is unplugged from the mains

Preparations

1. Move the mains switch to the "O" position
2. Disconnect the mains plug
3. Remove the MIG/MAG welding torch

NOTE!

Check the rod electrode packaging or labelling to determine whether the rod electrodes are for positive pole or negative pole welding.

4. Plug the grounding (earthing) cable into either the (-) or the (+) current socket depending on the type of electrode, and twist to fasten it
5. Use the other end of the grounding (earthing) cable to establish a connection to the workpiece
6. Plug the bayonet current plug of the electrode holder cable into the free current socket with the opposite polarity, according to the type of electrode, and twist it clockwise to latch it in place
7. Plug in the mains plug

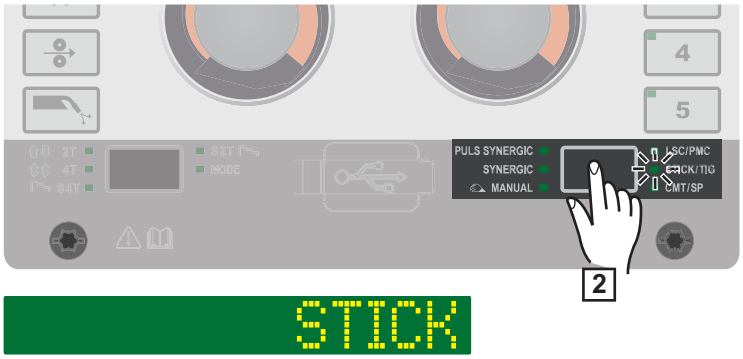
MMA welding

⚠ 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 conductive or earthed parts (e.g. housing, etc.)

1. Move the mains switch to the "I" position

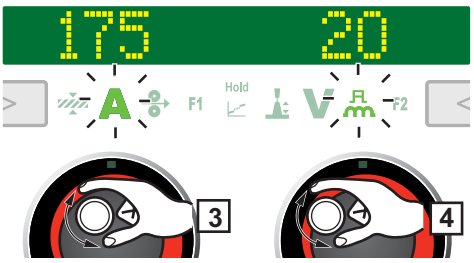
IMPORTANT! For optimum welding results, the manufacturer recommends performing an R/L alignment when starting the device for the first time and when any changes are made to the welding system.



2 Press the "Welding process" button until the LED for the STICK/TIG welding process lights up and "STICK" is shown on the display.

After a short time, the currently set welding current and the currently set dynamic are shown on the display. The welding current and dynamic indicators light up.

The welding voltage is applied to the welding socket with a three second time lag.



NOTE!

Parameters that have been set on a system component control panel (e.g. wire feed unit or remote control) might not be able to be changed on the power source control panel.

3 To change the welding current, turn the left adjusting dial

4 If required, turn the right adjusting dial to change the dynamic

The amended values are applied immediately.

5 Adjust the process parameters accordingly to make user- or application-specific settings on the welding system

6 Start welding

Welding parameters for manual metal arc welding

The following welding parameters can be set and displayed for manual metal arc welding:

using the left adjusting dial:

Main current[1)]
in A

Setting range: depends on the power source available

Before the start of welding, the machine automatically displays a standard value based on the programmed parameters. The actual value is displayed during welding.

using the right adjusting dial:

Arc-force dynamic
to influence the short-circuiting dynamic at the instant of droplet transfer

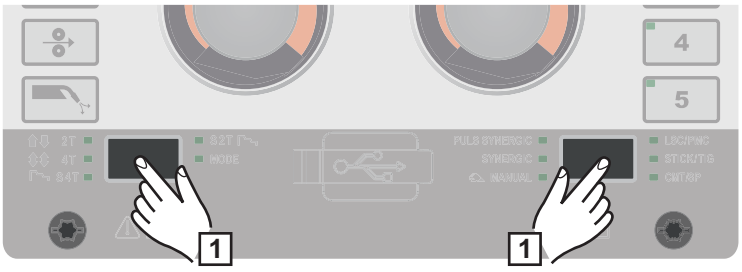
Setting range: 0 - 100
Factory setting: 20

0 ... soft and low-spatter arc
100 ... harder and more stable arc

Setup settings

Setup menu - overview

Entering/exiting the Setup menu

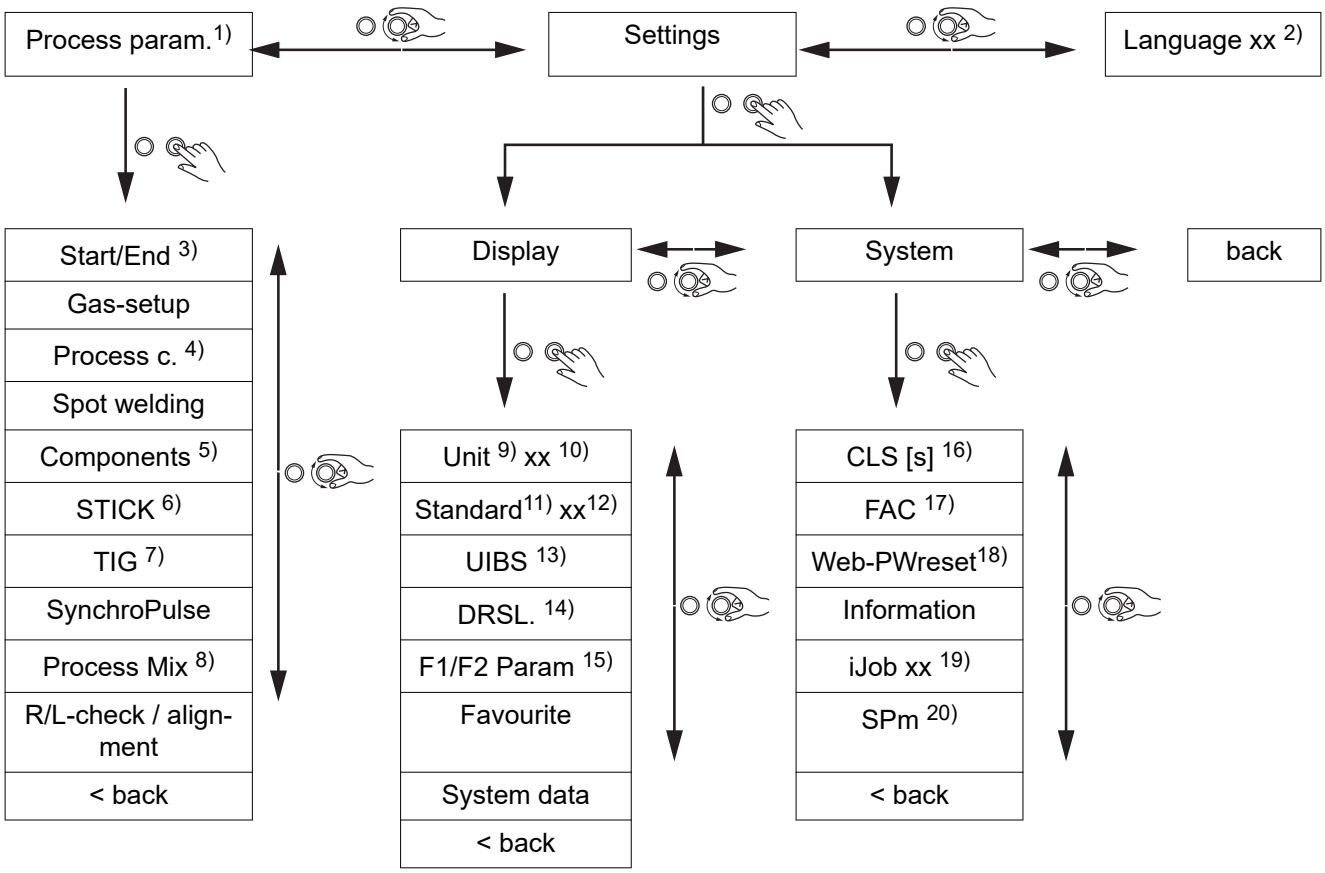


1 To enter the Setup menu, press the "Welding process" and "Mode" buttons at the same time

"Process parameters" is shown on the display.

2 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

Setup menu - overview



 ... Turn the right adjusting dial

 ... Press the right adjusting dial

 ... Press the left adjusting dial:
The parameter is shown in plain text

 ... Turn the left adjusting dial:
To read long plain texts for parameters; the plain text for the parameter is moved to the left on the display

1)	Process parameters	9)	Units	16)	Duration of interior lighting
2)	Language abbreviation	10)	metric/imperial		
3)	Start/end of welding	11)	Standards	17)	Restore factory settings
4)	Process control	12)	CEN/AWS	18)	Reset password for the website
5)	Component monitoring	13)	Display brightness		
6)	Electrode setup	14)	Display replaced characteristics	19)	Mode Setup – Special display for JobMaster
7)	TIG setup				
8)	Process Mix	15)	Activate F1/F2 parameter	20)	2-step/4-step spot welding

Process parameters

Process parameters for start of welding/end of welding

The following process parameters can be set and displayed for the start and end of welding:

I-S
Starting current
For setting the starting current for MIG/MAG welding (e.g. aluminium welding start-up)

Setting range: 0 - 200% (of welding current)
Factory setting: 135%

AIS
Start arc length correction
For correcting the arc length at the start of welding

Setting range: -10 - +10% (of welding voltage)
Factory setting: 0

- .... shorter arc length
0 ... neutral arc length
+ ... longer arc length

---

t-S
Starting current time
For setting the length of time the starting current is to be active

Setting range: off / 0.1 - 10.0 s
Factory setting: off

SL1
Slope 1
For setting the time during which the starting current is decreased or increased to the welding current

Setting range: 0 - 9.9 s
Factory setting: 1 s

SL2
Slope 2
For setting the time during which the welding current is decreased or increased to the final current.

Setting range: 0 - 9.9 s
Factory setting: 1 s

I-E
Final current
For setting the final current so that
a) heat build-up towards the end of welding is prevented and
b) the end-crater can be filled when welding aluminium

Setting range: 0 - 200% (of welding current)
Factory setting: 50

AIE
End arc length correction
For correcting the arc length at the end of welding

Setting range: -10 - +10% (of welding voltage)
Factory setting: 0

- .... shorter arc length
0 ... neutral arc length
+ ... longer arc length

---

t-E
Final current time
For setting the length of time for which the final current is to be active

Setting range: off / 0.1 - 10.0 s
Factory setting: off

SFI
to activate/deactivate the SFI function (Spatter Free Ignition of the arc)

Setting range: off / on
Factory setting: off

SFI-HS
SFI HotStart
For setting a HotStart time in conjunction with SFI ignition

During SFI ignition, a spray arc phase occurs within the set HotStart time. This increases the heat input irrespective of the mode, thus ensuring deeper penetration right from the very start of welding.

Setting range: off / 0.01 - 2.00 s
Factory setting: off

W-r
Wire retract
For setting the wire withdrawal value (= composite value based on backward movement of wire and a time).
The wire withdrawal depends on the features of the welding torch.

Setting range: 0.0 - 10.0
Factory setting: 0.0

IgC
Ignition current (manual mode)
For setting the ignition current for MIG/MAG standard manual welding

Setting range: 100 - 450 A
Factory setting: 450

W-r (man.)
Wire retract (manual mode)
For setting the wire withdrawal value (= composite value based on backward movement of wire and a time) for MIG/MAG standard manual welding.
The wire withdrawal depends on the features of the welding torch.

Setting range: 0.0 - 10.0
Factory setting: 0.0

Process parameters for Gas-Setup

The following process parameters can be set and displayed for Gas-Setup:

GPr
Gas pre-flow
For setting the gas flow time before the arc is ignited

Setting range: 0 - 9.9 s
Factory setting: 0.1 s

GPo
Gas post-flow
For setting the gas flow time after the arc has gone out

Setting range: 0 - 9.9 s
Factory setting: 0.5 s

GCV
Gas set value
For specifying the gas set value in l/min

GCF
Gas factor
For setting the gas correction factor

Setting range: aut, 0.90 - 20.0
Factory setting: aut

Process parameters for process control

The following process parameters can be set and displayed for the process control:
- PSt - penetration stabilizer
- AlSt - arc length stabilizer

Penetration stabilizer and arc length stabilizer can also be set in combination with one another.

Penetration stabilizer

The penetration stabilizer is used to set the max. permitted change in the wire speed to ensure that the welding current and hence the penetration is kept stable or constant with variable stick out.

The penetration stabilizer parameter is only available when the WP PMC (Welding Process Pulse Multi Control) or WP LSC (Welding Process Low Spatter Control) option has been enabled on the power source.

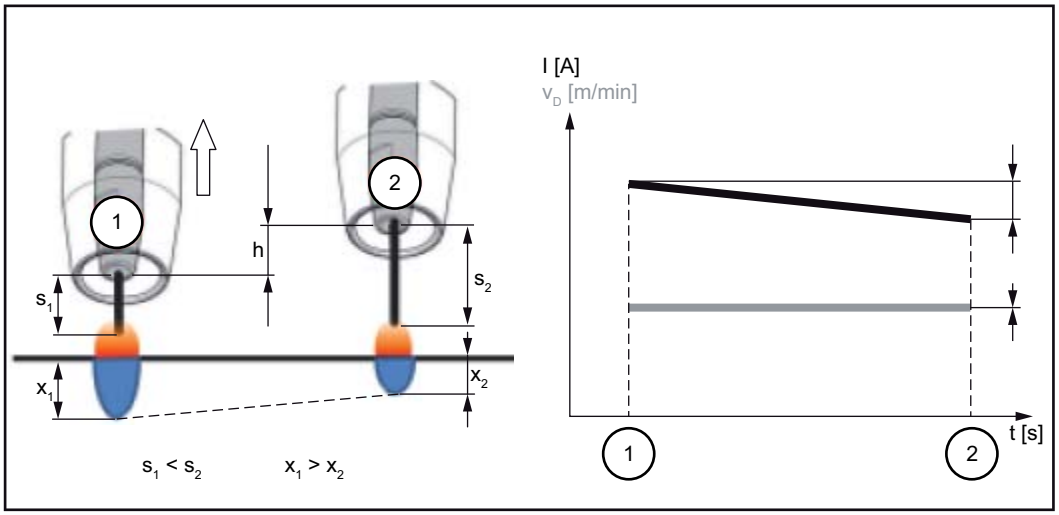
0 - 10.0 m/min (ipm)
Factory setting: 0 m/min

0
The penetration stabilizer is not activated.
The wire speed remains constant.

0.1 - 10.0
The penetration stabilizer is activated.
The welding current remains constant.

Application examples

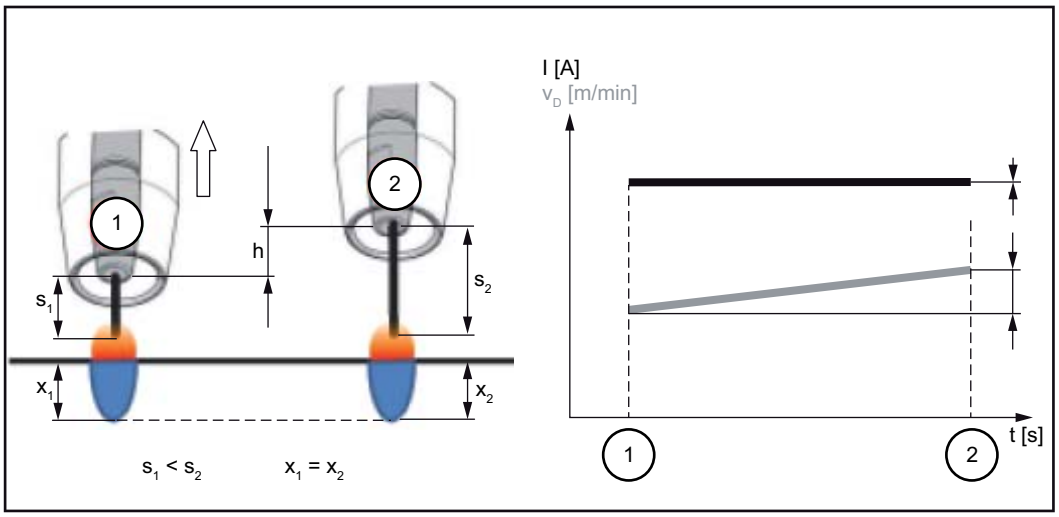
Penetration stabilizer = 0 m/min (not activated)



Penetration stabilizer = 0 m/min (not activated)

Changing the contact tube distance (h) alters the resistance in the welding circuit due to the longer stick out (s_2).
The constant voltage control for constant arc length causes a reduction in the mean current value and hence a smaller penetration (x_2).

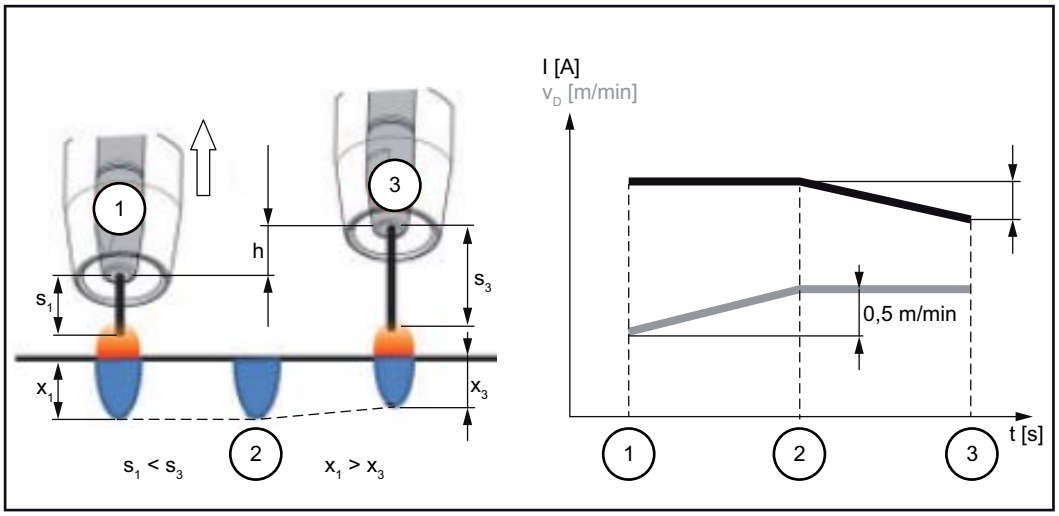
Penetration stabilizer = n m/min (activated)



Penetration stabilizer = n m/min (activated)

Specifying a value for the penetration stabilizer ensures a constant arc length without large current variations if the stick out is changed (s_1 ==> s_2).
The penetration (x_1, x_2) remains virtually unchanged and stable.

Penetration stabilizer = 0.5 m/min (activated)



Penetration stabilizer = 0.5 m/min (activated)

To minimise the change in welding current if the stick out is changed (s_1 ==> s_3), the wire speed is increased or reduced by 0.5 m/min.
In the example shown, the stabilising effect is obtained without a change in current up to the set value of 0.5 m/min (Position 2).

I ... Welding current v_D ... Wire speed

Arc length stabilizer

Arc length stabilizer
The arc length stabilizer forces short arcs, advantageous for welding, via a short-circuit current control and keeps them stable even with a variable stick out or external interference.

The arc length stabilizer welding parameter is only available if the WP PMC (Welding Process Pulse Multi Control) option has been enabled on the power source.

0.0 - 5.0 (effect of stabilizer)
Factory setting: 0.0

0.0
The arc length stabilizer is deactivated.

0.1 - 5.0
The arc length stabilizer is activated.
The arc length is decreased until short circuits start to occur.

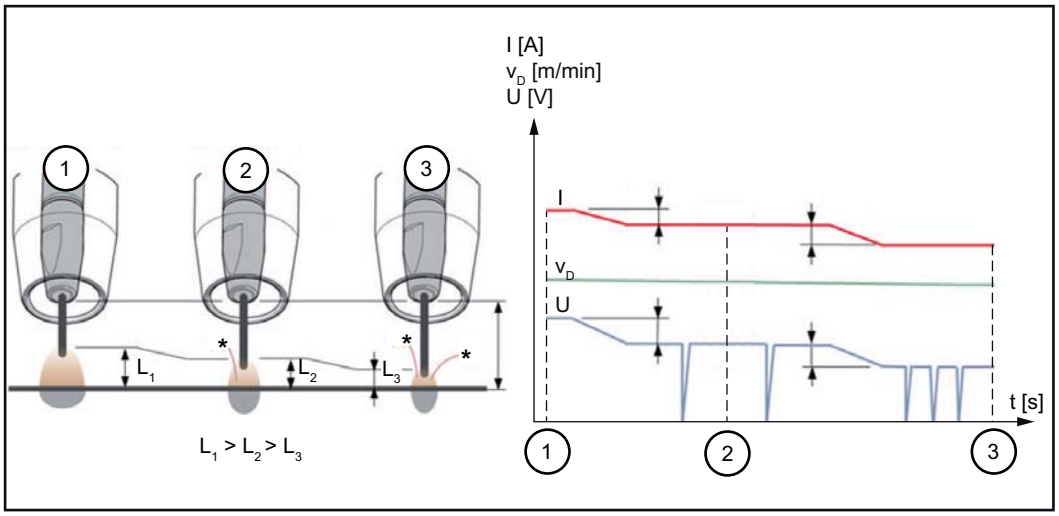
Application examples

Arc length stabilizer = 0 / 0.5 / 2.0

①Arc length stabilizer = 0

②Arc length stabilizer = 0.5

③Arc length stabilizer = 2

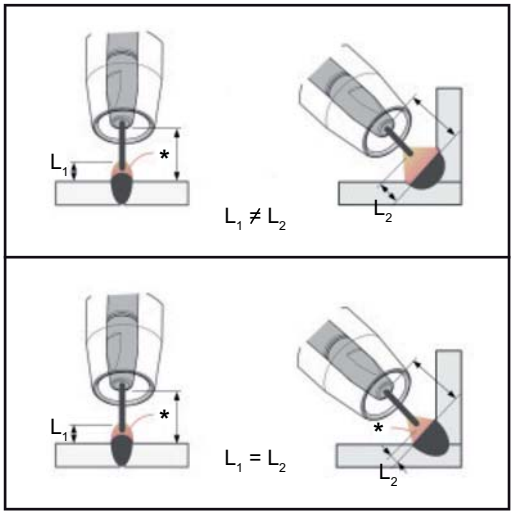


Arc length stabilizer = 0 / 0.5 / 2.0

Activating the arc length stabilizer reduces the arc length until short circuits start to occur. The frequency of the short circuits is controlled and kept stable.

Increasing the arc length stabilizer causes a further shortening of the arc length (L1 ==> L2 ==> L3). The advantages of a short, stable and controlled arc can be used more effectively.

Arc length stabilizer with change of weld seam profile and position



Arc length stabilizer not activated

A change of weld seam profile or welding position can negatively affect the welding result

Arc length stabilizer activated

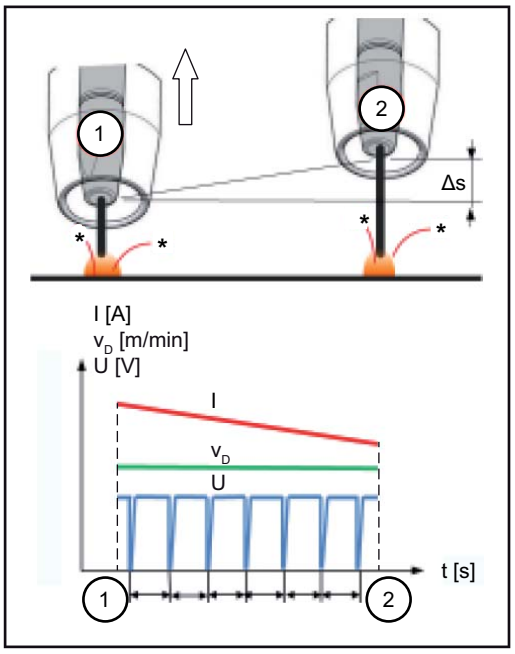
Since the number and duration of the short circuits is controlled, the properties of the arc stay the same if the weld seam profile or welding position is changed.

I ... Welding current v_D ... Wire speed U ... Welding voltage
* ... Number of short circuits

Combination of penetration stabilizer and arc length stabilizer

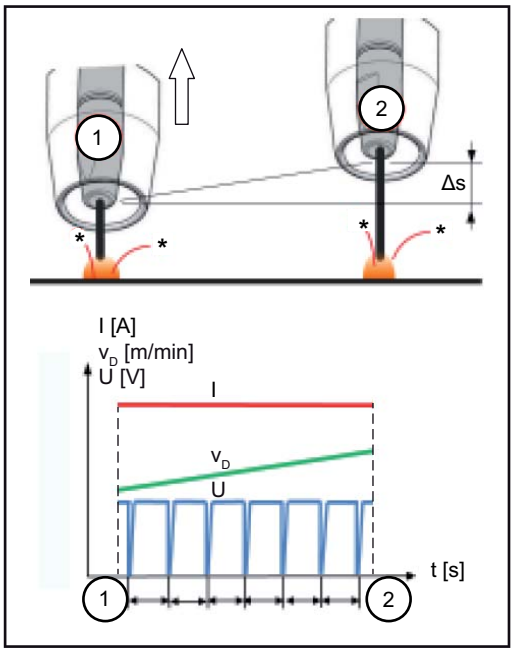
Example: Stick out change

Arc length stabilizer without penetration stabilizer



The advantages of a short arc are maintained even if the stick out is changed, since the short-circuit properties stay the same.

Arc length stabiliser with penetration stabilizer



If the stick out is changed with the penetration stabilizer activated, the penetration also stays the same.
The short circuit behaviour is controlled by the arc length stabilizer.

I ... Welding current v_D ... Wire speed U ... Welding voltage
* ... Number of short circuits Δs ... Stick out change

Process parameters for spot welding

SPt
Spot welding time

0.1 - 10.0 s
Factory setting: 1.0 s

Process parameters for monitoring and components

The following process parameters can be set and displayed for the system components of a welding system:

C-C
Cooling unit mode
To determine whether a cooling unit is to be switched on or off, or operated automatically

Setting range: eco / auto / on / off (depending on the cooling unit)
Factory setting: auto

C-t
Delay time flow sensor
For setting the time from when the flow sensor responds until a warning message is output

Setting range: 5 - 25 s
Factory setting: 10 s

CFU
Cooler flow warning limit

Setting range: off, 0.75 - 0.95 l/min
Factory setting: off

Fdi
Feeder inching speed
in m/min (ipm)
For setting the wire speed at which the wire electrode is threaded into the torch hosepack

Setting range:
min. - max. (depending on the wirefeeder)
Factory setting: 10.0 m/min

ito
Ignition time-out
Length of wire that is fed before the safety cut-out trips

Setting range: off / 5 - 100 mm (0.2 - 3.94 in.)
Factory setting: off

The ignition time-out process parameter is a safety function. The length of wire that is fed before the safety cut-out trips may differ from the pre-set wire length, particularly when the wire is being fed at fast wire speeds.

How it works:
Once the torch trigger is pressed, gas pre-flow begins immediately. Wirefeeding then begins, followed by ignition. If no current starts flowing before the specified length of wire has been fed, the power source cuts out automatically.
To try again, press the torch trigger again.

GSL
Lower gas flow rate limit

Setting range: 0.5 - 30.0 l/min
Factory setting: 7.0 l/min

GSt
Maximum duration of gas flow deviation

Setting range: off, 0.1 - 10.0 s
Factory setting: 2.0 s

GSF
Gas factor sensor
dependent on the shielding gas used
(only in conjunction with the OPT/i gas controller option)

Setting range: auto, 0.90 - 20.0
Factory setting: auto
(the correction factor is automatically set for standard gases from the Fronius welding database)

Process parameters for electrode setup

The following process parameters can be set and displayed for manual metal arc welding (STICK):

I-S
Starting current
For setting the starting current

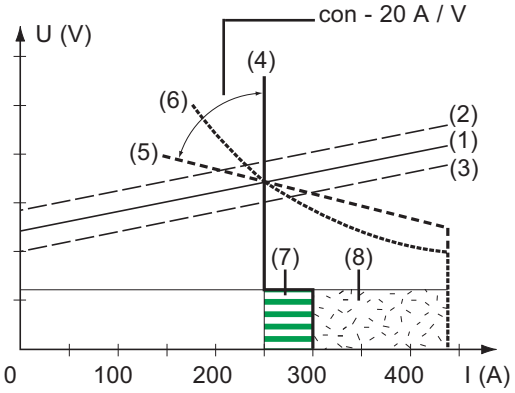
Setting range: 0 - 200%
Factory setting: 150%

Hti
Starting current time
For setting the length of time for which the starting current is to be active

Setting range: 0.0 - 2.0 s
Factory setting: 0.5 s

Eln
Characteristic
For selecting the electrode characteristic

Setting range: I-constant / 0.1 - 20.0 A/V / P-constant
Factory setting: I-constant



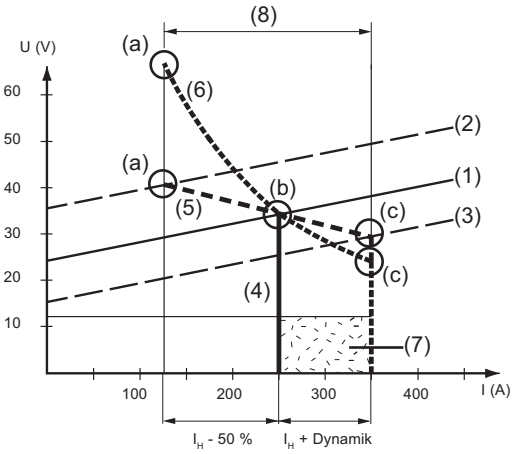
(1) Load line for rod electrode
(2) Load line for rod electrode where arc length is increased
(3) Load line for rod electrode where arc length is reduced
(4) Characteristic where "I-constant" parameter is selected (constant welding current)
(5) Characteristic where "0.1 - 20" parameter is selected (drooping characteristic with adjustable slope)
(6) Characteristic where "P-constant" 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

I-constant (constant welding current)
- If the "I-constant" parameter is set, the welding current will be kept constant, irrespective of the welding voltage. This results in a vertical characteristic (4).
- The "I-constant" parameter is particularly suitable for rutile electrodes and basic electrodes.

0.1 - 20.0 A/V (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.

P-constant (constant welding power)
- If the "P-constant" 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-constant" parameter is particularly suitable for cellulose electrodes, as well as for arc air gouging.
- For arc air gouging, set the arc-force dynamic to "100".



(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 "I-constant" parameter is selected (constant welding current)
(5) Characteristic where "0.1 - 20" parameter is selected (drooping characteristic with adjustable slope)
(6) Characteristic where "P-constant" parameter is selected (constant welding power)

(8) Example of pre-set arc-force dynamic where characteristic (5) or (6) is selected
(9) 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 where welding current I_H is set
(c) Operating point where arc length is short

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_H) is permanently set, the operating point may migrate along the characteristics (4), (5) and (6) according to the welding voltage at a given moment. The welding voltage U is dependent upon the arc length.

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_H remains the same.

Ast
Anti-stick
To activate/deactivate the anti-stick function

Setting range: off / on
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.

The anti-stick function prevents the electrode from burning out. If the rod electrode begins to stick, the power source switches the welding current off after 1.5 seconds. After the rod electrode has been lifted off the workpiece, the welding process can be continued without any problems.

Uco
Break voltage
For setting a voltage, at which the welding process can be ended by slightly lifting the rod electrode.

Setting range: 20.0 - 90.0 V
Factory setting: 90.0 V

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 break-voltage parameter, the welding voltage can be limited to a value that makes it possible to end the welding operation simply by lifting the rod electrode slightly.

IMPORTANT! If, during welding, you often find that the welding operation is ended unintentionally, increase the value of the break voltage.

Process parameters for TIG setup

The following process parameters can be set and displayed for TIG welding:

Uco
Break voltage
For setting a voltage, at which the welding process can be ended by slightly lifting the TIG welding torch.

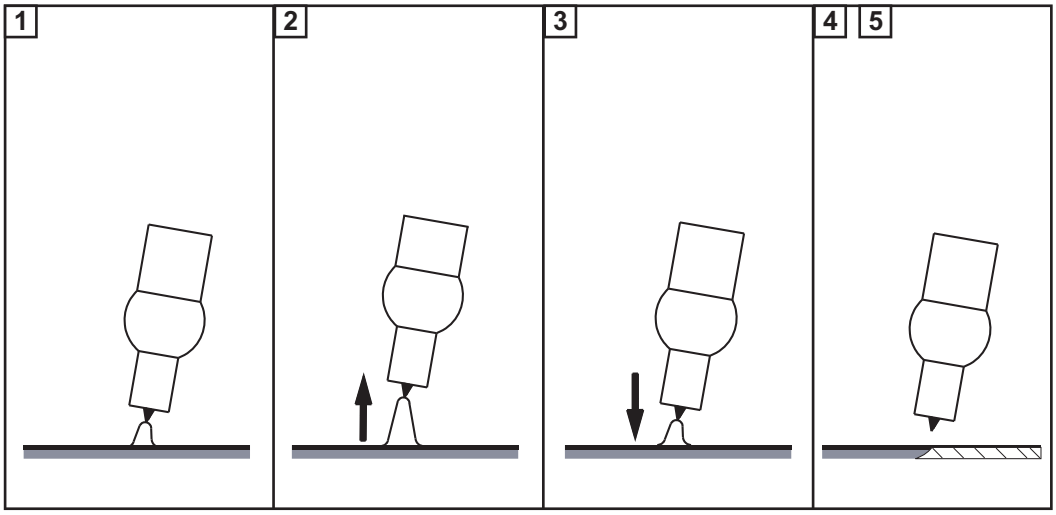
Setting range: 10.0 - 30.0 V
Factory setting: 14.0 V

CSS
Comfort Stop Sensitivity
To activate/deactivate the TIG Comfort Stop function

Setting range: off / 0.1 - 2.0 V
Factory setting: 0.8 V

At the end of the welding operation, the welding current is switched off automatically if the arc length increases by more than a defined amount. This prevents the arc being unnecessarily elongated when the TIG gas-valve torch is lifted off the workpiece.

Sequence:



1 Welding

2 At the end of the welding action, briefly raise the welding torch

The arc length is increased significantly.

3 Lower the welding torch
- The arc length is reduced significantly
- The TIG Comfort Stop function is triggered

4 Keep the welding torch at the same height
- The welding current is continuously decreased (downslope).
- The arc goes out.

IMPORTANT! The downslope is pre-set and cannot be adjusted.

5 Raise the welding torch from the workpiece

Process parameters for SynchroPulse

The following process parameters can be set for SynchroPulse welding:

Syn-Puls
SynchroPulse
To activate/deactivate SynchroPulse

Setting range: off / on
Factory setting: off

---

vd (1)
Wire speed
For setting the average wire speed and therefore the welding power for SynchroPulse

Setting range: 1.0 - 25.0 m/min (40 - 985 ipm)
Factory setting: 5 m/min

---

dFd (2)
Delta wire feed
For setting the Delta wire feed:
with SynchroPulse, the set wire speed is alternately increased/decreased by the Delta wire feed. The parameters concerned adapt themselves to this wire speed acceleration/ delay accordingly.

Setting range: 0.1 - 6.0 m/min (5 - 235 ipm)
Factory setting: 2.0 m/min

F (3)
Frequency
For setting the frequency for SynchroPulse

Setting range: 0.5 - 3.0 Hz
Factory setting: 3.0 Hz

DC (4)
Duty Cycle (high)
For weighting the duration of the higher operating point in a SynchroPulse period

Setting range: 10 - 90%
Factory setting: 50%

Al-h (5)
Arc length correction high
For correcting the arc length for SynchroPulse in the upper operating point (= average wire speed plus Delta wire feed)

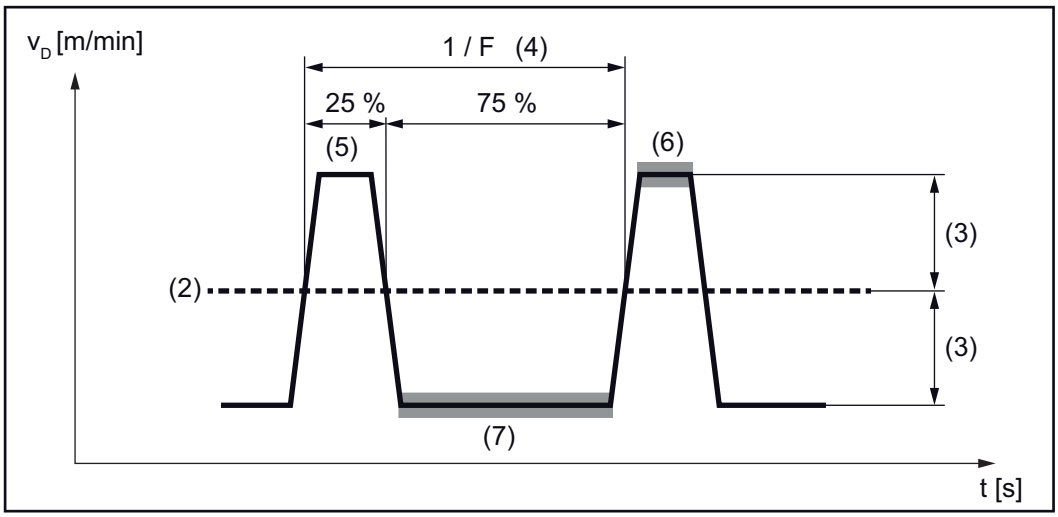
Setting range: -10.0 - +10.0
Factory setting: 0

- .... short arc
0 ... uncorrected arc length
+ ... longer arc

Al-l (6)
Arc correction low
For correcting the arc length for SynchroPulse in the lower operating point (= average wire speed less Delta wire feed)

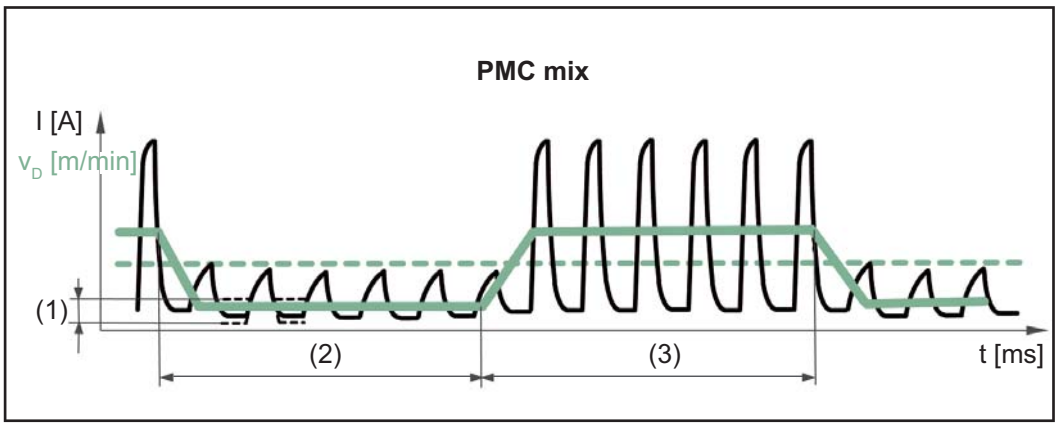
Setting range: -10.0 - +10.0
Factory setting: 0

- .... short arc
0 ... uncorrected arc length
+ ... longer arc

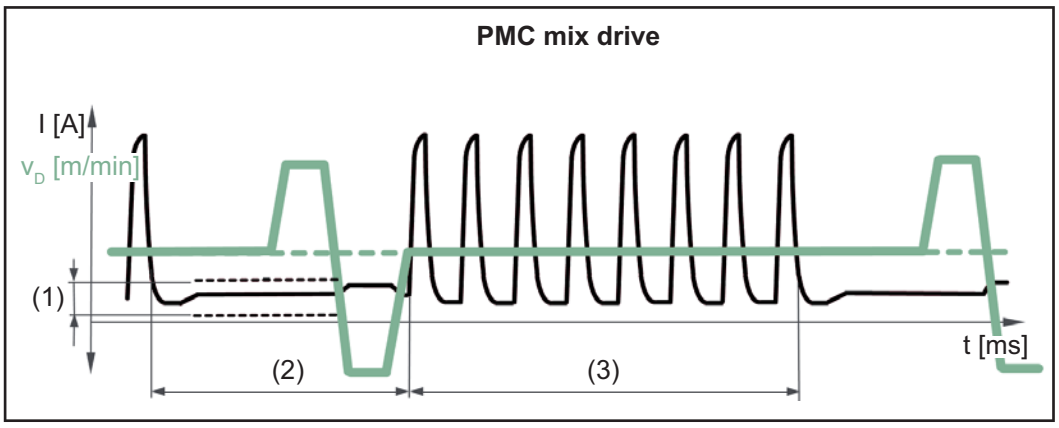


Process parameters for Process Mix

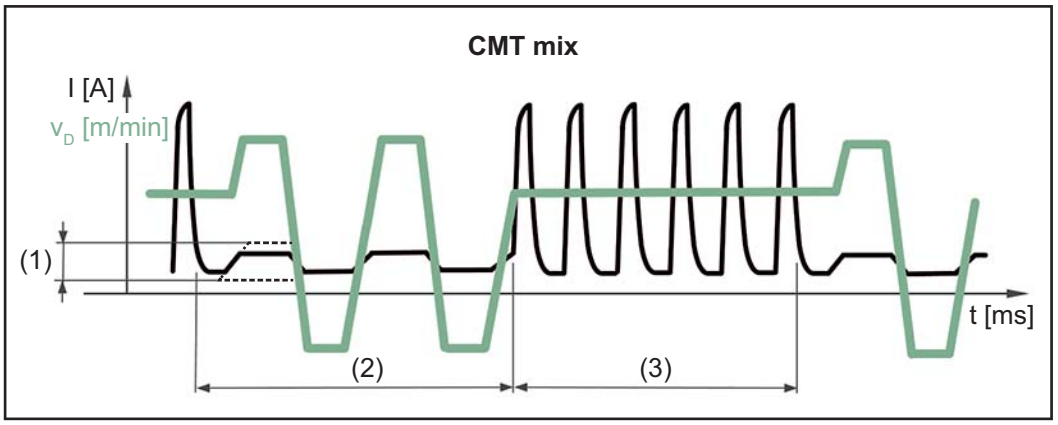
The following process parameters for mixed processes can be set under "Process mix":



Mixed process between PMC and LSC welding process. A cold LSC process phase follows a hot PMC process phase as part of a cycle.



Mixed process between PMC and wire movement reversal using a PushPull drive unit. A cold low power phase with calibration movement follows a hot PMC process phase.



Mixed process between CMT and PMC welding process. Cold CMT process phases follow hot PMC process phases.

(1) Lpc - Lower power correction
(2) Lptc - Lower power time correction
(3) Hptc - Upper power time correction

vd
Wire speed
Is taken from the welding parameters

Setting range: 1.0 - 25.0 m/min (40 - 985 ipm)

The wire speed value can also be specified or changed in the Process mix parameters.

Alc
Arc length correction
Is taken from the welding parameters

Setting range: -10.0 - +10.0

The arc length correction value can also be specified or changed in the Process mix parameters.

For CMT mix:

Positive correction:
increase in the pulsed voltage for the PMC phase
longer reverse movement in the CMT phase (increases arc length)

Negative correction:
reduction in the pulsed voltage for the PMC phase
shorter reverse movement in the CMT phase (reduces arc length)

PDc
Pulse/dynamic correction
Is taken from the welding parameters

Setting range: -10.0 - +10.0

The pulse/dynamic correction value can also be specified or changed in the Process mix parameters.

For CMT mix:

Positive correction:
increase in the pulse energy (pulse current height, pulse current width)
Reduction in the pulse frequency in the PMC phase

Negative correction:
reduction in the pulse energy (pulse current height, pulse current width)
Increase in the pulse frequency in the PMC phase

Hptc (3)
Upper power time correction
To set the duration of the hot process phase in a mixed process

Setting range: -10.0 - +10.0
Factory setting: 0

Lptc (2)
Lower power time correction
To set the duration of the cold process phase in a mixed process

Setting range: -10.0 - +10.0
Factory setting: 0.0

Upper and lower power time correction is used to define the relationship between hot and cold process phases.

If the lower power time correction is increased, the process frequency reduces and the LSC process phase becomes longer.

If the lower power time correction is reduced, the process frequency increases and the LSC process phase becomes shorter.

Lpc (1)
Lower power correction
To set the energy input in the cold process phase in a mixed process

Setting range: -10.0 - +10.0
Factory setting: 0

If the lower power correction is increased, this results in a higher wire speed and therefore higher energy yield in the cold LSC process phase.

R/L alignment

Align the welding circuit resistance (R) and welding circuit inductivity (L) if one of the following components of the welding system is changed:
- Torch hosepacks
- Return lead cables, welding power-leads
- Welding torches, electrode holders
- Push-pull units

Prerequisites for R/L alignment:

The welding system must be complete: closed welding loop with torch and torch hosepack, wirefeeders, return lead cable, interconnecting hosepacks.

Performing R/L alignment:

1 Select Setup menu / Process param. / R/L-check / alignment
2 Press the right adjusting dial

The current welding circuit inductivity values in µH and welding circuit resistance values in mOhm are displayed.

3 Press the right adjusting dial (or press the torch trigger)

"Connect earth" is shown on the display.

4 Establish a safe ground earth connection

IMPORTANT! Contact between the earthing clamp and workpiece must be established on a cleaned area of the workpiece.

5 Press the right adjusting dial (or press the torch trigger)

"Remove nozzle" is shown on the display.

6 Remove the gas nozzle from the welding torch
7 Press the right adjusting dial (or press the torch trigger)

"Contact workp." is shown on the display.

8 Place the contact tip of the welding torch flush against the workpiece surface
9 Press the torch trigger
(or press the right adjusting dial)

After a successful measurement, the current values are displayed.

10 Select "Finish" by turning the right adjusting dial
11 Press the right adjusting dial

12 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

Settings

General remarks

NOTE!

As a result of firmware updates, you may find that there are functions available on your unit that are not described in these operating instructions or vice versa.
Certain illustrations may also differ slightly from the actual control elements on your device. However, these controls function in exactly the same way.

⚠ WARNING!

Operating the equipment incorrectly can cause serious injury and damage.

- ▶ Do not use the functions described until you have thoroughly read and understood these operating instructions
- ▶ Do not use the functions described until you have thoroughly read and understood all the operating instructions for the system components, especially the safety rules

Overview

The settings contain the following options:

Under "View"
- Units
- Standards
- UIBS (display brightness)
- DRSL (display replaced characteristics)
- Setting F1 and F2 special function parameters
- Setting the parameters for the Favourites button
- System data

Under "System"
- Interior lighting setup
- Restore factory settings
- Resetting the password for the power source website
- Information
- Special display for JobMaster
- Spot welding mode

Setting the units

1 Select Setup menu / Settings / View / Unit

2 Press the right adjusting dial

The first of the available units is displayed.

3 Select the desired unit by turning the right adjusting dial:
- metric (mm, kg, etc.)
- imperial (in., lbs., etc.)

4 Press the right adjusting dial to apply the units

5 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

Setting the standards

1 Select Setup menu / Settings / View / Standard

2 Press the right adjusting dial

The first of the available standards is displayed.

3 Select the desired standard by turning the right adjusting dial:

- CEN
  Name of filler metal according to European standards
  (e.g. AlMg 5, CuSi3, Steel, etc.)

- AWS
  Name of filler metal according to the American Welding Society Standard
  (e.g. ER 5356, ER CuSi-A, ER 70 S-6, etc.)

4 Press the right adjusting dial to set the standard

5 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

---

Setting the display brightness

1 Select Setup menu / Settings / View / UIBS

UIBS = User interface brightness settings

2 Press the right adjusting dial

The value for the display brightness is shown.

3 Select the desired display brightness by turning the right adjusting dial (1 - 4)

4 Press the right adjusting dial to apply the value

5 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

---

Displaying replaced characteristics

1 Select setup menu / Settings / View / DRSL

DRSL = Display replaced synergic lines

2 Press the right adjusting dial

3 Select "on" by turning the right adjusting dial

4 Press the right adjusting dial to activate the function

5 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

---

Setting F1 and F2 special function parameters via the Setup menu

1 Select Setup menu / Settings / View / F1/F2 Param.

2 Press the right adjusting dial

The parameters currently stored under F1 and F2 are displayed.
If no parameters are stored, the first possible parameter is displayed.

3 Select the desired parameter by turning the right adjusting dial

4 Press the right adjusting dial

5 Turn the right adjusting dial to determine under which special function the parameter should be stored:
- ... the parameter is not assigned to a special function/a stored parameter is deleted
F1 ... parameter is stored under special function F1
F2 ... parameter is stored under special function F2

6 Press the right adjusting dial to confirm the selection

7 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

---

Setting the Favourites button via the Setup menu

1 Select Setup menu / Settings / View / Favourite

2 Press the right adjusting dial

The list of parent folders and parameters is displayed.
If a parameter or a folder is currently stored under the Favourites button, this is indicated with ★ at the end of the display.

3 Select the desired parameter or folder by turning the right adjusting dial

4 Press the right adjusting dial

5 Turn the right adjusting dial to determine whether the parameter or folder should be stored under the Favourites button:
- ... parameter or folder is not stored
★ ... parameter or folder is stored

6 Press the right adjusting dial to confirm the selection

The stored parameter or folder is indicated with ★ at the end of the display.

7 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

---

Retrieving system data

1 Select Setup menu / Settings / View / System data

2 Press the right adjusting dial

The first available system data value is displayed.

3 Select the desired system data value by turning the right adjusting dial

4 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

The following system data can be displayed:

IP
Current arc power in kW

The arc power is the product of welding current and welding voltage and is used to calculate the electrical energy input:

E = IP / vs

E	Electrical energy input in kJ/cm
IP	Arc power in kW
vs	Welding speed in cm/s

IE
Current arc energy in kJ

The arc energy is the sum total of the arc power and calculates the heat input of the weld seam most recently produced.
If the weld seam length is known the electrical energy input can be calculated:

E = IE / L

E	Electrical energy input in kJ/cm
IE	Arc energy in kJ
L	Length of the weld seam in cm

The arc energy is preferably used during manual welding.

I-M1
Current motor current in A, wirefeeder 1
(wirefeeder next to the arc)

I-M2
Current motor current in A, wirefeeder 2
(e.g. the rear wirefeeder in a push-pull system)

I-M3
Current motor current in A, wirefeeder 3
(e.g. an unreeling wirefeeder in a push-pull system with unreeling wirefeeder)

CFI
Current flow rate in l/min on the cooling unit
(with built-in OPT/i CU flow temperature sensor option)

Error output if flow rate < 0.7 l/min

CU-t
Current coolant temperature in °C on the cooling unit
(with built-in OPT/i CU flow temperature sensor option)

Error output if coolant temperature > 70 °C
(measured during coolant return)

I-t
Arc time in h

DC-t
Total power source operating hours in h

Gcon
Total gas consumption in l

Setting the interior lighting

1. Select Setup menu / Settings / System / CLS
2. Press the right adjusting dial
3. Select the desired duration by turning the right adjusting dial:
   off ... interior lighting switched off
   1 - 60 ... interior lighting is switched on for the duration entered
   on ... interior lighting is switched on permanently
4. Press the right adjusting dial
5. To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

Restoring the factory settings

1 Select Setup menu / Settings / System / FAC
2 Press the right adjusting dial
3 Turn the right adjusting dial to select "Yes", thereby restoring the power source to the factory settings
4 Press the right adjusting dial

The process parameters and machine default values are immediately reset to the factory settings without any further warning.

5 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

Resetting the password for the power source website

1 Select Setup menu / Settings / System / Web-PWreset
2 Press the right adjusting dial
3 Turn the right adjusting dial to select "Yes", thereby resetting the password for the power source:
User name = admin
Password = admin
4 Press the right adjusting dial

The password is immediately reset to the factory settings without any further warning.

5 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

Retrieving device information

1 Select Setup menu / Settings / System / Information
2 Press the right adjusting dial

The first item of available information is displayed.

3 Select the desired information by turning the right adjusting dial
Serial number
Image version
IP address
MAC address
4 Press the right adjusting dial to display the information
5 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

Setting the special display for JobMaster

1 Select Setup menu / Settings / System / iJob
2 Press the right adjusting dial
3 Activate or deactivate the function by turning the right adjusting dial:
off ... the special display for JobMaster is deactivated
on ... the special display for JobMaster is activated
4 Press the right adjusting dial
5 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

The following can now be set and carried out on the JobMaster welding torch:
- Mode
- SynchroPulse
- Gas test

Setting the mode for spot welding

1 Select Setup menu / Settings / System / SPm

2 Press the adjusting dial

3 Turn the adjusting dial and select the desired mode for spot welding

2-step = spot welding in 2-step mode:
The spot welding process runs for as long as the torch trigger is kept pressed and ends no later than at the expiry of the spot welding time.
Releasing the torch trigger stops the spot welding process before the spot welding time expires

4-step = spot welding in 4-step mode:
The spot welding process starts once the torch trigger is pressed and ends no later than at the expiry of the spot welding time.
Press the torch trigger again to stop the spot welding process before the spot welding time expires.

4 Press the right adjusting dial

5 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

More information on spot welding:
- Page **80** (spot welding in general)
- Page **100** (spot welding time)

Setting the language

Setting the language

1 Access the Setup menu
2 Select the language
3 Press the right adjusting dial

The language abbreviation of the currently set language is highlighted on the display.

4 Select the desired language by turning the right adjusting dial

The following languages can be selected:

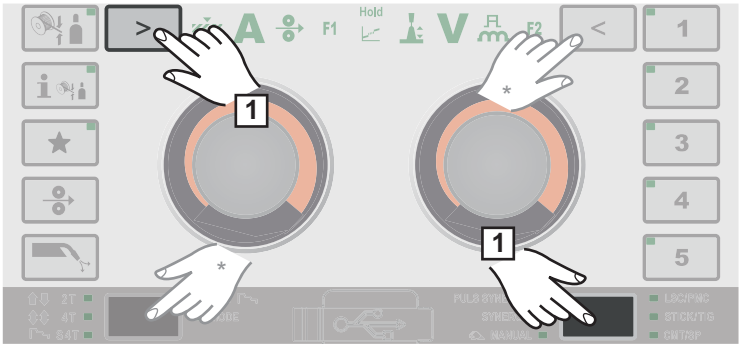
cs	Czech	nl	Dutch
da	Danish	no	Norwegian
de	German	pl	Polish
en	English	pt	Portuguese (Brazil)
es	Spanish	ro	Romanian
et	Estonian	ru	Russian
fr	French	sk	Slovak
hr	Croatian	sl	Slovenian
hu	Hungarian	sr	Serbian
it	Italian	sv	Swedish
lt	Lithuanian	tr	Turkish
lv	Latvian	uk	Ukrainian

5 Press the right adjusting dial to apply the language
6 To exit the Setup menu, press the "Welding process" and "Mode" buttons at the same time

Keylock

Keylock

To activate the keylock



1 Press the "Welding process" and left parameter selection buttons at the same time

* Alternatively, the "Mode" and right parameter selection buttons can be pressed.

The key symbol and a tick are shown on the display:

The following functions are disabled:
- the adjusting dial functions
- selection of the filler metal
- saving and deleting EasyJobs
- the "Mode" button
- the "Welding process" button
- the Setup menu

The following functions are available:
- the "Filler metal info" button
- retrieving EasyJobs
- the "Wire threading" button
- the "Gas-test" button
- the parameter selection buttons

To unlock keys again

1 Press the "Welding process" and left parameter selection buttons at the same time

* Alternatively, the "Mode" and right parameter selection buttons can be pressed.

The key symbol and a X are shown on the display:

SmartManager - The power source website

SmartManager - The power source website

General remarks

The power source has its own website: SmartManager.
As soon as the power source is connected to a computer with the help of a network cable, or is integrated into a network, the power source's SmartManager can be retrieved using the power source's IP address.
At least IE 10 or a similar modern browser is required to access SmartManager.

The entries displayed on SmartManager may vary depending on system configuration, software upgrades and available options.

Examples of entries displayed:

- Actual system data
- Documentation
- Job data
- Power source configuration
- Backup & Restore
- User management
- Signal visualisation
- Overview
- Update
- Function packages
- Characteristics overview
- Screenshot
- Robot interface *

* Depending on the available robot interface, the name of the interface will be displayed as an entry on the website.

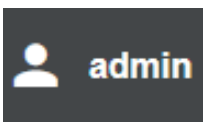
Calling up the power source website

1. Setup menu / Settings / System / Information ==> note the IP address of the power source (IP)
2. Enter the IP address in the browser search field
3. Enter user name and password

   Factory setting:
   User name = admin
   Password = admin

The power source website is displayed.

Changing password / logging off



By clicking this symbol
- the user password can be changed
- you can log out of SmartManager

Changing the password for the SmartManager:

1. Enter the old password
2. Enter the new password
3. Repeat the new password
4. Click on "Save"

Settings

Clicking on this symbol expands the display of characteristics, material specifications and certain welding parameters for the power source's SmartManager.

The settings depend on which user is currently logged on.

Language selection

The languages available for SmartManager can be displayed by clicking on the language abbreviation.

The language that is currently set is highlighted in white.

To change the language, click on the one you would like.

Fronius

A click on the Fronius logo opens the homepage of Fronius: www.fronius.com.

Overview

Overview

In the overview entry, welding system components and options are displayed with all available information, e.g. firmware version, item number, serial number, production date, etc.

Expand all groups / Reduce all groups

Click the "Expand all groups" button to show more details of the individual system components.

Power source example:
- TPSi Touch: item number
  MCU1: item number, version, serial number, production date
  Bootloader: version
  image: Version
  licences: WP Standard, WP Pulse, WP LSC, WP PMC, OPT/i Guntrigger, etc.
- SC2: item number
  firmware: version

Click the "Reduce all groups" button to hide the system component details again.

Save as XML-file

Click the "Save as XML-file" button to create an XML file of the system component details. This XML file can either be opened or saved.

Update

Update

The power source firmware can be updated in the "Update" entry.

The current firmware version on your power source is displayed.

Updating the power source firmware:

The update file can be downloaded via the following link, for example:
http://tps-i.com/index.php/firmware

1 Organise and save the update file
2 Click on "Search update file" to start the update process
3 Select update file

Click on "Update"

Once the update has been successfully completed, the power source may need to be restarted.

When an update has been completed successfully, a confirmation to this effect is displayed.

Searching for an update file (performing the update)

1 After clicking on "Search update file", select the desired firmware (*.ffw)
2 Click on "Open"

The selected update file is displayed on the power source SmartManager under "Update".

3 Click on "Update"

A progress bar is displayed above the update process.
When this reaches 100%, you will be prompted to restart the power source.

SmartManager is not available during the restart.
After the restart, SmartManager may not be available anymore.
If you select "No", the new software functions are activated when you next switch the device on/off.

4 To restart the power source, click on "Yes"

The power source restarts; the display goes black for a short time.
The Fronius logo is shown on the power source display during the restart.

Once the update has been completed successfully, confirmation and the current firmware version are displayed.
Finally, log back on to SmartManager.

Fronius Weld-Connect

The mobile application Fronius WeldConnect can also be called up in the "Update" entry. Fronius WeldConnect helps welders, design engineers and work schedulers to estimate various welding parameters.

Fronius WeldConnect

Fronius WeldConnect is available in the following forms:
- WeldConnect online (direct link)
- As an Android app
- As an Apple/IOS app

The welding parameters established in the mobile app can be transferred as welding jobs to the power source via WLAN (you will need to enter the IP address).

Screenshot

Screenshot

In the Screenshot entry, a digital image of the power source display can be created at any time, irrespective of the navigation or set values.

1 Click on "Create screenshot" to capture a screenshot of the display

A screenshot of the currently displayed settings is created.

Different functions are available for saving the screenshot depending on the browser used; the display may vary.

Backup & Restore

General remarks

In the backup & restore entry

- all welding system data can be saved as a backup (e.g. current parameter settings, jobs, user characteristics, defaults, etc.),
- any backups will be restored to the welding system
- You can select which data you would like to be backed up automatically.

Backup & Restore

Starting backup

1 Click on "Start backup" to save a backup of the welding system data

The data is saved in a selected location in the default format MCU1-YYYYMMDDH-Hmm.fbc.

YYYY = Year
MM = Month
DD = Day
HH = Hour
mm = Minute

The date and time correspond to the power source settings.

Searching for a restore file

1 Click on "Search restore file" to transfer an available backup to the power source

2 Select the file and click on "Open"

The selected backup file is displayed on the power source SmartManager under "Restore".

3 Click on "Start recovery"

Once the data has been successfully restored, a confirmation to this effect is displayed.

Automatic backup

1 Enter data for automatic backup

- Interval settings
  Interval: daily / weekly / monthly
  at: Time (hh:mm)

- Backup target
  Protocol: SFTB / SMB
  Server, port, storage location, domain/user, password

- Proxy settings
  Server, port, user, password

2 Save changes

3 Trigger automatic backup

Function Packages

Function Packages

In the Function Packages entry, the function packages, special characteristics, options, etc., present on the power source are displayed.
New function packages can also be uploaded.

Welding Packages

Under Welding Packages, the welding packages present on the power source are displayed with their respective item numbers, e.g.:
- WP Standard, (MIG/MAG standard synergic welding)
- WP Pulse (MIG/MAG pulse synergic welding)
- WP LSC (Low Spatter Control, low-spatter dip transfer arc process)
- WP PMC (Pulse Multi Control, enhanced pulsed arc welding process)

Possible upgrades:
- WP CMT
- etc.

Special characteristics

Under special characteristics, the available special characteristics present on the power source are displayed with their respective item numbers, e.g.:
- PMC - AlMg4,5Mn(Zr) - I3 Ar...
- etc.

Options

The options available on the power source are displayed under "Options" with their respective item numbers and possible upgrades, e.g.:

Options
- OPT/i GUN Trigger
- etc.

Possible upgrades
- OPT/i Jobs
- OPT/i Interface Designer ...
- etc.

Installing a function package

1. Organise and save a function package
2. Click on "Search function package file"
3. Select the desired function package file (*.xml)
4. Click on "Open"

   The selected function package file is displayed on the power source SmartManager under "Install function package".

5. Click on "Install function package"

   Once the function package has been successfully installed, a confirmation to this effect is displayed.

Synergic lines overview

Characteristics overview

In the Characteristics overview entry:

- Available characteristics in the welding system can be displayed: (Available characteristics button).

- Possible characteristics in the welding system can be displayed: (Possible characteristics button).

You can search for, sort and filter the displayed characteristics at any time.

The following information is displayed for the characteristics:

- Status
- Material
- Diameter
- Gas
- Property
- Process
- ID
- Replaced by
- SFI
- SFI HotStart
- Penetration stabilizer
- Arc length stabilizer
- CMT Cycle Step
- Special

To sort the characteristics in ascending or descending order, click on the arrow next to the respective information.

The column widths can be easily dragged and adjusted with the cursor.

Show /hide filter

Show filter

Hide filter

When you click on the "Show filter" symbol, the possible filter criteria are displayed. With the exception of "ID" and "replaced by", the characteristics can be filtered by all the information.

The first checkbox = select all

To hide filter criteria, click the "Hide filter" symbol.

Troubleshooting and maintenance

The Error menu

The Error menu

Notifications, warnings and errors are shown on the display with the corresponding number.

If an error occurs, the Error menu is always in the foreground.

Pressing the right adjusting dial opens the Error menu on "confirm".

Pressing the right adjusting dial a second time confirms the error; the Error menu closes.

By turning the right adjusting dial you can navigate between "Cause", "Solution" and "Hide".
If you select "Cause" or "Solution", the corresponding description is displayed when the right adjusting dial is pressed.
Turn the left or right adjusting dial to scroll through the displayed text.
Pressing the right adjusting dial takes you back to the Error menu.

If you select "Hide", the Error menu closes, however, the error will not be reset. The top right LED flashes on the display to show that there is a hidden, not reset error. The error can now be called up as the first entry in the Setup menu.
To enter the Setup menu, press the "Welding process" and "Mode" buttons at the same time.

Troubleshooting

General

The power sources are equipped with an intelligent safety system, meaning it has been possible to dispense with nearly all fuses. After a possible malfunction has been remedied, the power source can be used again as normal.

Possible malfunctions, warning notices or status codes are shown on the display as plain text dialogues.

Safety

⚠ WARNING!

An electric shock can be fatal.
Before opening the device

- ▶ Turn the mains switch to the "O" position
- ▶ Unplug the device from the mains
- ▶ Ensure the device cannot be switched back on
- ▶ Using a suitable measuring instrument, check to make sure 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.

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

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
Cause:	Short circuit on the 24 V supply of SpeedNet connection socket or external sensor
Remedy:	Unplug connected components

No welding current

Mains switch is on, overtemperature is displayed

Cause: Overload; the duty cycle has been exceeded
Remedy: Check duty cycle

Cause: Thermostatic automatic circuit breaker has been tripped
Remedy: Wait until the power source automatically comes back on after the end of the cooling phase

Cause: Limited supply of cooling air
Remedy: Ensure accessibility to cooling air ducts

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

No welding current

Mains switch is ON and indicators are lit up

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

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

Nothing happens when the torch trigger is pressed

Power source mains switch is ON and indicators are lit up

Cause: Only for welding torches with an external control plug: 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 the welding torch

No protective gas shield

All other functions are OK

Cause: Gas cylinder is empty
Remedy: Change the gas cylinder

Cause: The gas pressure regulator is faulty
Remedy: Replace 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: Poor ground earth connection
Remedy: Ensure good contact to workpiece

Cause: Inadequate or no protective gas shield
Remedy: Check the pressure regulator, gas hose, gas solenoid valve, torch gas connection, etc.

Cause: Welding torch is leaking
Remedy: Change the welding torch

Cause: Wrong contact tip, or contact tip is worn out
Remedy: Replace the contact tip

Cause: Wrong wire alloy or wrong wire diameter
Remedy: Check the wire electrode that has been inserted

Cause: Wrong wire alloy or wrong wire diameter
Remedy: Check weldability of the base material

Cause: The shielding gas is not suitable for this wire alloy
Remedy: Use the correct shielding gas

Irregular wire feed speed

Cause: Braking force has been set too high
Remedy: Loosen the brake

Cause: Hole in the contact tip is too narrow
Remedy: Use a suitable contact tip

Cause: Faulty inner liner in welding torch
Remedy: Check the inner liner for kinks, dirt, etc. and replace if necessary

Cause: The feed rollers are not suitable for the wire electrode being used
Remedy: Use suitable feed rollers

Cause: Feed rollers have the wrong contact pressure
Remedy: Optimise the contact pressure

Wirefeed problems

when using long hosepacks

Cause: Incorrect arrangement of hosepack
Remedy: Arrange the hosepack in as straight a line as possible, avoid tight bends

Welding torch becomes very hot

Cause:	The specification of the welding torch is inadequate
Remedy:	Observe the duty cycle and loading limits
Cause:	Only on water-cooled systems: Inadequate coolant flow
Remedy:	Check coolant level, coolant flow, for coolant contamination, etc. For further information refer to the cooling unit operating instructions.

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 the welding system remains in a usable condition for many years.

Safety

⚠ WARNING!

An electric shock can be fatal.
Before opening the device
- ▶ Turn the mains switch to the "O" position
- ▶ Unplug the device from the mains
- ▶ Ensure the device cannot be switched back on
- ▶ Using a suitable measuring instrument, check to make sure that electrically charged components (e.g. capacitors) have been discharged

At every start-up

- Check mains plug, mains cable, welding torch, interconnecting hosepack and grounding (earthing) connection for damage
- Check whether the all-round clearance of 0.5 m (1 ft. 8 in.) is kept to ensure that the cooling air can easily flow and escape.

NOTE!

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

If necessary

If a lot of dust has accumulated:
- Remove the fin element on the rear of the housing
- Detach the air filter located behind and clean

Every 2 months

- If present: clean air filter

Every 6 months

⚠ CAUTION!

Danger of damage to electronic components.
- ▶ Do not bring the air nozzle too close to electronic components.

- Open the device
- Clean out the device interior using dry compressed air at reduced pressure
- If a lot of dust has accumulated, clean the cooling air ducts

Updating firmware

IMPORTANT! To update the firmware you need a PC or laptop that is connected to the power source via an Ethernet network.

1 Get latest firmware (e.g. from the Fronius Download Center)
File format: official_tpsi_x.x.x-xxxx.ffw

2 Establish Ethernet connection between PC/laptop and power source

3 Open the power source SmartManager (see page 121)

4 Transfer the firmware to the power source (see page 124)

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

Technical data

Average consumption values during welding

Average wire electrode consumption during MIG/MAG welding

Average wire electrode consumption at a wire speed of 5 m/min			
	1.0 mm wire electrode diameter	1.2 mm wire electrode diameter	1.6 mm wire electrode diameter
Steel wire electrode	1.8 kg/h	2.7 kg/h	4.7 kg/h
Aluminium wire electrode	0.6 kg/h	0.9 kg/h	1.6 kg/h
CrNi wire electrode	1.9 kg/h	2.8 kg/h	4.8 kg/h

Average wire electrode consumption at a wire speed of 10 m/min			
	1.0 mm wire electrode diameter	1.2 mm wire electrode diameter	1.6 mm wire electrode diameter
Steel wire electrode	3.7 kg/h	5.3 kg/h	9.5 kg/h
Aluminium wire electrode	1.3 kg/h	1.8 kg/h	3.2 kg/h
CrNi wire electrode	3.8 kg/h	5.4 kg/h	9.6 kg/h

Average shielding gas consumption during MIG/MAG welding

Wire electrode diameter	1.0 mm	1.2 mm	1.6 mm	2.0 mm	2 x 1.2 mm (TWIN)
Average consumption	10 l/min	12 l/min	16 l/min	20 l/min	24 l/min

Average shielding gas consumption during TIG welding

Gas nozzle size	4	5	6	7	8	10
Average consumption	6 l/min	8 l/min	10 l/min	12 l/min	12 l/min	15 l/min

Technical data

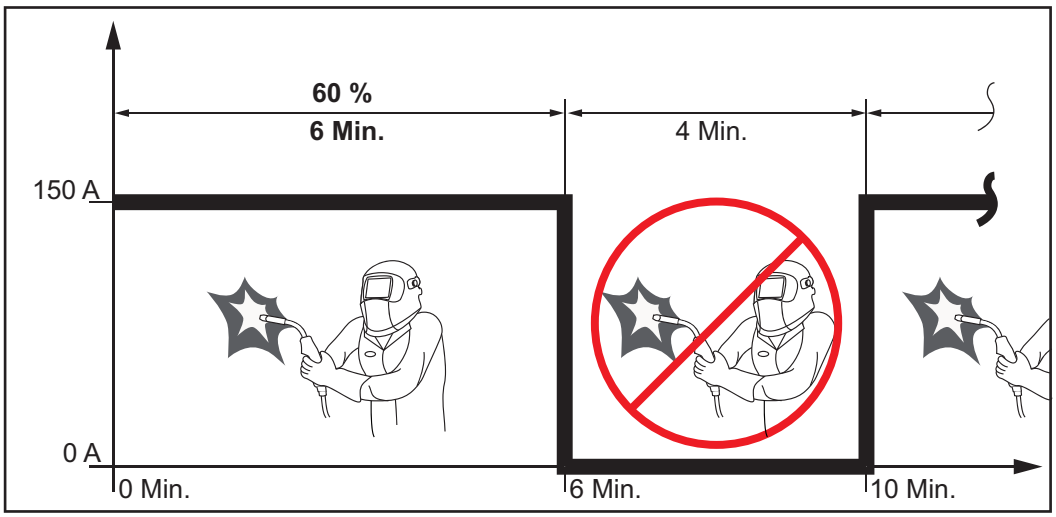
Explanation of the term "duty cycle"

Duty cycle (D.C.) is the proportion of time in a 10-minute cycle at which the device may be operated at its rated output without overheating.

NOTE!

The D.
C. values specified on the rating plate are based on an ambient temperature of 40°C. If the ambient temperature is higher, either the D.C. or output must be reduced accordingly.

Example: Welding at 150 A at 60% D.C.
- Welding phase = 60% of 10 minutes = 6 minutes
- Cooling phase = remaining time = 4 minutes
- After the cooling phase, the cycle begins anew.



If the device is to be continuously operated without stopping:

1 look in the technical data for a D.C. value of 100% for the reigning ambient temperature.

2 Reduce the output or amperage in line with this value so that the device can remain in use without observing a cooling phase.

Special voltages

For devices designed for special voltages, the technical data on the rating plate applies.

For all machines with a permitted mains voltage of up to 460 V: The standard mains plug allows the user to operate with a mains voltage of up to 400 V. For mains voltages up to 460 V fit a mains plug permitted for such use or install the mains supply directly.

TPS 270i C

Mains voltage (U_1)	3 x 400 V
Max. effective primary current (I_{1eff})	9.7 A
Max. primary current (I_{1max})	15.3 A
Mains fuse protection	16 A slow-blow
Mains voltage tolerance	-15 / +15%
Grid frequency	50/60 Hz
Cos phi (1)	0.99
Max. permitted mains impedance Z_{max} on PCC[1)]	117 mOhm
Recommended residual-current circuit breaker	Type B
Welding current range (I_2) MIG / MAG TIG Rod electrode	 3 - 270 A 3 - 270 A 10 - 270 A
Welding current at 10 min/40 °C (104 °F)	40% / 270 A 60% / 220 A 100% / 190 A
Output voltage range according to standard characteristic (U_2) MIG / MAG TIG Rod electrode	 14.2 - 27.5 V 14.1 - 20.8 V 20.4 - 30.8 V
Open circuit voltage (U_0 peak/U_0 r.m.s)	57 V
Degree of protection	IP 23
Type of cooling	AF
Overvoltage category	III
Pollution degree according to IEC60664	3
EMC device class	A
Safety symbols	S, CE, CSA
Dimensions l x w x h	687 x 276 x 445 mm 27.0 x 10.9 x 17.5 in.
Weight	33.1 kg 73.0 lb.
Max. noise emission (LWA)	69 dB (A)
Max. shielding gas pressure	7 bar 101.5 psi
Coolant	Original Fronius
Wire speed	1 - 25 m/min 40 - 980 ipm
Wire drive	4-roller drive
Wire diameter	0.8 - 1.6 mm 0.03 - 0.06 in.

Wirespool diameter	max. 300 mm max. 11.8 in.
Wirespool weight	max. 19.0 kg max. 41.9 lb.
Idle state power consumption at 400 V	31 W
Power source efficiency at 270 A / 30,8 V	90 %

The wirefeeder for the TPS 270i C is integrated in the power source.

1) Interface to a 230/400 V, 50 Hz public grid

TPS 270i C /nc

Mains voltage (U_1)	3 x 380 / 400 / 460 V
Max. effective primary current (I_{1eff}) 3 x 380 V 3 x 400 V 3 x 460 V	 9.5 A 9.7 A 8.5 A
Max. primary current (I_{1max}) 3 x 380 V 3 x 400 V 3 x 460 V	 16.0 A 15.3 A 13.4 A
Mains fuse protection	16 A slow-blow
Mains voltage tolerance	-10 / +15%
Grid frequency	50/60 Hz
Cos phi (1)	0.99
Max. permitted mains impedance Z_{max} on PCC[1)]	117 mOhm
Recommended residual-current circuit breaker	Type B
Welding current range (I_2) MIG / MAG TIG Rod electrode	 3 - 270 A 3 - 270 A 10 - 270 A
Welding current at 10 min/40 °C (104 °F)	40% / 270 A 60% / 220 A 100% / 190 A
Output voltage range according to standard characteristic (U_2) MIG / MAG TIG Rod electrode	 14.2 - 27.5 V 14.1 - 20.8 V 20.4 - 30.8 V
Open circuit voltage (U_0 peak/U_0 r.m.s)	66 V
Degree of protection	IP 23
Type of cooling	AF
Overvoltage category	III
Pollution degree according to IEC60664	3
EMC device class	A

Safety symbols	S, CE, CSA
Dimensions l x w x h	687 x 276 x 445 mm 27.0 x 10.9 x 17.5 in.
Weight	32.5 kg 71.7 lb.
Max. noise emission (LWA)	69 dB (A)
Max. shielding gas pressure	7 bar 101.5 psi
Coolant	Original Fronius
Wire speed	1 - 25 m/min 40 - 980 ipm
Wire drive	4-roller drive
Wire diameter	0.8 - 1.6 mm 0.03 - 0.06 in.
Wirespool diameter	max. 300 mm max. 11.8 in.
Wirespool weight	max. 19.0 kg max. 41.9 lb.
Idle state power consumption at 400 V	31 W
Power source efficiency at 270 A / 30.8 V	90 %

The wirefeeder for the TPS 270i C is integrated in the power source.

1) Interface to a 230/400 V, 50 Hz public grid

TPS 270i C /MV/nc

Mains voltage (U_1)	3 x 200 / 230 / 380 / 400 / 460 V
Max. effective primary current (I_{1eff})	
3 x 200 V	16.9 A
3 x 230 V	15.1 A
3 x 380 V	9.5 A
3 x 400 V	9.7 A
3 x 460 V	8.5 A
Max. primary current (I_{1max})	
3 x 200 V	26.5 A
3 x 230 V	23.7 A
3 x 380 V	16.0 A
3 x 400 V	15.3 A
3 x 460 V	13.4 A
Mains fuse protection	
3 x 200 / 230 V	35 A slow-blow
3 x 380 / 400 / 460 V	16 A slow-blow
Mains voltage tolerance	-10 / +15%
Grid frequency	50/60 Hz
Cos phi (1)	0.99
Max. permitted mains impedance Z_{max} on PCC[1)]	117 mOhm

Recommended residual-current circuit breaker	Type B
Welding current range (I_2) MIG / MAG TIG Rod electrode	 3 - 270 A 3 - 270 A 10 - 270 A
Welding current at 10 min/40 °C (104 °F)	40% / 270 A 60% / 220 A 100% / 190 A
Output voltage range according to standard characteristic (U_2) MIG / MAG TIG Rod electrode	 14.2 - 27.5 V 14.1 - 20.8 V 20.4 - 30.8 V
Open circuit voltage (U_0 peak/U_0 r.m.s)	66 V
Degree of protection	IP 23
Type of cooling	AF
Overvoltage category	III
Pollution degree according to IEC60664	3
EMC device class	A
Safety symbols	S, CE, CSA
Dimensions l x w x h	687 x 276 x 445 mm 27.0 x 10.9 x 17.5 in.
Weight	33.2 kg 73.1 lb.
Max. noise emission (LWA)	69 dB (A)
Max. shielding gas pressure	7 bar 101.5 psi
Coolant	Original Fronius
Wire speed	1 - 25 m/min 40 - 980 ipm
Wire drive	4-roller drive
Wire diameter	0.8 - 1.6 mm 0.03 - 0.06 in.
Wirespool diameter	max. 300 mm max. 11.8 in.
Wirespool weight	max. 19.0 kg max. 41.9 lb.
Idle state power consumption at 400 V	35,9 W
Power source efficiency at 270 A / 30.8 V	90 %

The wirefeeder for the TPS 270i C is integrated in the power source.

1) Interface to a 230/400 V, 50 Hz public grid

TPS 270i C /S/nc

Mains voltage (U_1)	3 x 460 / 575 V
Max. effective primary current (I_{1eff}) 3 x 460 V 3 x 575 V	 9.1 A 7.2 A
Max. primary current (I_{1max}) 3 x 460 V 3 x 575 V	 14.3 A 11.4 A
Mains fuse protection	20 A slow-blow
Mains voltage tolerance	-10 / +10%
Grid frequency	50/60 Hz
Cos phi (1)	0.99
Recommended residual-current circuit breaker	Type B
Welding current range (I_2) MIG / MAG TIG Rod electrode	 3 - 270 A 3 - 270 A 10 - 270 A
Welding current at 10 min/40 °C (104 °F)	40% / 270 A 60% / 220 A 100% / 190 A
Output voltage range according to standard characteristic (U_2) MIG / MAG TIG Rod electrode	 14.2 - 27.5 V 14.1 - 20.8 V 20.4 - 30.8 V
Open circuit voltage (U_0 peak/U_0 r.m.s)	68 V
Degree of protection	IP 23
Type of cooling	AF
Overvoltage category	III
Pollution degree according to IEC60664	3
Safety symbols	S, CSA
Dimensions l x w x h	687 x 276 x 445 mm 27.0 x 10.9 x 17.5 in.
Weight	30.4 kg 67.0 lb.
Max. noise emission (LWA)	69 dB (A)
Max. shielding gas pressure	7 bar 101.5 psi
Coolant	Original Fronius
Wire speed	1 - 25 m/min 40 - 980 ipm
Wire drive	4-roller drive
Wire diameter	0.8 - 1.6 mm 0.03 - 0.06 in.

Wirespool diameter	max. 300 mm max. 11.8 in.
Wirespool weight	max. 19.0 kg / max. 41.9 lb.

The wirefeeder for the TPS 270i C is integrated in the power source.

Overview with critical raw materials, year of production of the device

Overview with critical raw materials:
An overview of which critical raw materials are contained in this device can be found at the following Internet address.
www.fronius.com/en/about-fronius/sustainability.

To calculate the year of production of the device:
- Each device is provided with a serial number
- The serial number consists of 8 digits - for example 28020099
- The first two digits give the number from which the year of production of the device can be calculated
- This figure minus 11 gives the year of production
  - For example: Serial number = **28**020065, calculation of the year of production = **28** - 11 = 17, year of production = 2017

FRONIUS INTERNATIONAL GMBH
Froniusstraße 1
A-4643 Pettenbach
AUSTRIA
contact@fronius.com
www.fronius.com

Under **www.fronius.com/contact** you will find the addresses of all Fronius Sales & Service Partners and locations.