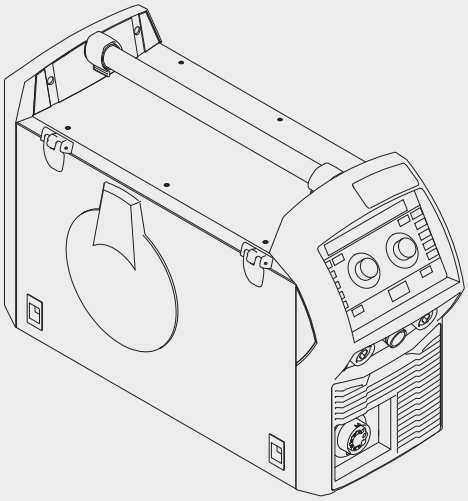
TPS 270i C

EN

Operating Instructions

MIG/MAG Power source



42,0426,0206,EN 008-04052017

Dear reader,

Introduction

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

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

Contents

Safety rules

Explanation of safety symbols

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

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

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

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

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

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

General

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

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

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

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

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

All safety and danger notices on the device

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

For the location of the safety and danger notices on the device, refer to the section headed "General" in the operating instructions for the device.
Before switching on the device, rectify any faults that could compromise safety.
This is for your personal safety!

Proper use

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

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

Proper use includes:
- carefully reading and following all the instructions given in the operating instructions
- studying and obeying all safety and danger notices carefully
- performing all stipulated inspection and maintenance work.

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

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

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

Environmental conditions

Operation or storage of the device outside the stipulated area will be deemed as not in accordance with the intended purpose. The manufacturer shall not be held liable for any damage arising from such usage.

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

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

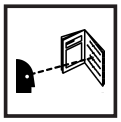
The surrounding air must be free from dust, acids, corrosive gases or substances, etc.
Can be used at altitudes of up to 2000 m (6561 ft. 8.16 in.)

Obligations of the operator

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

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

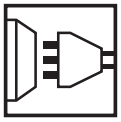
Obligations of personnel



Before using the device, all persons instructed to do so undertake:
- to observe the basic instructions regarding safety at work and accident prevention
- to read these operating instructions, especially the "Safety rules" section and sign to confirm that they have understood them and will follow them.

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

Mains connection



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

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

*) at the interface with the public grid
see Technical Data

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

NOTE! Ensure that the mains connection is earthed properly

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

Persons involved with welding expose themselves to numerous risks, e.g.:
- flying sparks and hot pieces of metal
- arc radiation, which can damage eyes and skin

- hazardous electromagnetic fields, which can endanger the lives of those using cardiac pacemakers

- risk of electrocution from mains current and welding current

- greater noise pollution

- harmful welding fumes and gases

Anyone working on the workpiece while welding is in progress must wear suitable protective clothing with the following properties:
- flame-resistant
- insulating and dry
- covers the whole body, is undamaged and in good condition
- safety helmet
- trousers with no turn-ups

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

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

Noise emission values

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

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

Danger from toxic gases and vapours

The fumes produced during welding contain harmful gases and vapours.

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

Keep your face away from welding fumes and gases.

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

Ensure an adequate supply of fresh air with a ventilation rate of at least 20 m³/hour.

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

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

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

Amongst others, the following components are responsible for the degree of toxicity of welding fumes:
- Metals used for the workpiece
- Electrodes
- Coatings
- Cleaners, degreasers, etc.

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

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

Danger from flying sparks

Flying sparks may cause fires or explosions.

Never weld close to flammable materials.

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

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

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

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

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

Risks from mains current and welding current

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

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

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

Always set the 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 temporary backing or cover for the earth or ground potential. This temporary backing or cover must extend over the entire area between the body and the earth or ground potential.

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

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.

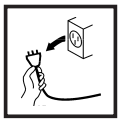
The device must only be operated on a mains supply with a ground conductor and a socket with a ground conductor contact.

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

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

Switch off unused devices.

Wear a safety harness if working at height.



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

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

After opening the device:
- Discharge all live components
- Ensure that all components in the device are de-energised

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

Meandering welding currents

If the following instructions are ignored, meandering welding currents can develop with the following consequences:
- Fire hazard
- Overheating of parts connected to the workpiece
- Irreparable damage to ground conductors
- Damage to device and other electrical equipment

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

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

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

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

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

EMC Device Classifications

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

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

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

EMC measures

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

Check and evaluate the immunity to interference of nearby devices according to national and international regulations. Examples of equipment that may be susceptible to interference from the device include:
- Safety devices
- Power, signal and data transfer lines
- IT and telecommunications devices
- Measuring and calibrating devices

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

EMF measures

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

Specific hazards

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

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

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

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

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

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

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

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

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

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

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

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

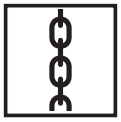
Observe the information on the coolant safety data sheet when handling coolant. The coolant safety data sheet may be obtained from your service centre or downloaded from the manufacturer's website.

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

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

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

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



All lifting accessories (straps, handles, chains, etc.) used in connection with the device or its components must be tested regularly (e.g. for mechanical damage, corrosion or changes caused by other environmental factors).
The testing interval and scope of testing must comply with applicable national standards and directives as a minimum.

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

Factors affecting welding results

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

Filters must be used if necessary.

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

Danger from shielding gas cylinders

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

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

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

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

Never hang a welding torch on a shielding gas cylinder.

Never touch a shielding gas cylinder with an electrode.

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

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

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

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

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

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

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 if all safety devices are fully functional. If the safety devices are not fully functional, there is a risk of

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

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

Never bypass or disable safety devices.

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

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

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

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

Only use suitable original coolant from the manufacturer.

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

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

The coolant can ignite under certain conditions. Transport the coolant only in its original, sealed containers and keep well away from any sources of ignition.

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

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

Commissioning, maintenance and repair

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

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

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

Safety inspection

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

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

A safety inspection should be carried out by a qualified electrician

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

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

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

Disposal

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

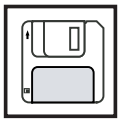
Safety symbols

Devices with the CE mark satisfy the essential requirements of the low-voltage and electromagnetic compatibility 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

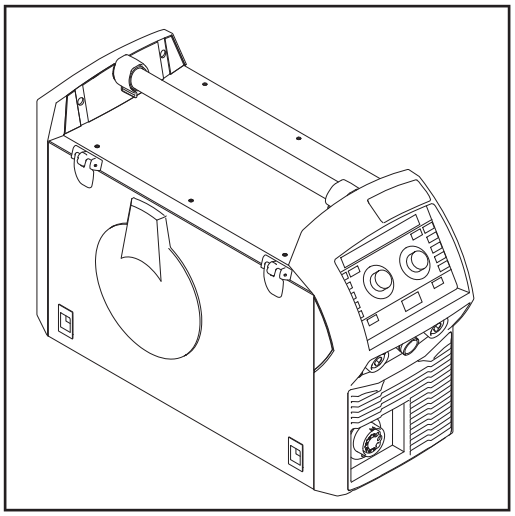
Copyright of these operating instructions remains with the manufacturer.

The text and illustrations are all technically correct at the time of printing. We reserve the right to make changes. The contents of the operating instructions shall not provide the basis for any claims whatsoever on the part of the purchaser. If you have any suggestions for improvement, or can point out any mistakes that you have found in the instructions, we will be most grateful for your comments.

General 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 operating the device incorrectly, 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 wire-feed unit 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 or removed for as long as maintenance or repair work is being carried out.

Welding processes, processes and welding characteristics

General

TPSi power sources contain a selection of welding processes, procedures and welding characteristics that enable a wide range of materials to be processed in the most effective way.

Welding characteristics

When selecting the filler metal, various process-optimised welding characteristics are available depending on the welding process and shielding gas combination.
The supplementary label for the welding process provides information about certain properties and the use of the welding characteristic:

Special welding characteristic properties

arc blow	Characteristic with improved arc break properties by deflecting the external magnetic fields
arcing	Characteristic for hardfacing (e.g. grinding rollers in the sugar and ethanol industries)
braze	Characteristic for brazing processes (high brazing speed, reliable wetting and good flow of braze material)
cladding	Characteristic for cladding with low penetration, low dilution and wide weld seam flow for improved wetting
dynamic	Characteristic for high welding speeds with concentrated arc
galvanized	Characteristic for galvanised sheet surfaces (low zinc pore risk, reduced zinc melting loss)
pipe	Characteristic for pipe applications and positional welding on narrow gap applications
root	Characteristic for root passes with powerful arc
universal	Characteristic for conventional welding tasks

Mixed process characteristics

mix	Characteristic with process switch between pulsed and dip transfer arc Specifically for welding vertical-up seams with cyclic change between a hot and cold supporting process phase.
PCS	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.

Special welding characteristic properties provided by additional hardware

CMT mix	Additional hardware: CMT drive unit Characteristic with process switch between pulsed and CMT, where the CMT process is initiated by wire movement reversal.
mix drive	Additional hardware: PushPull drive unit Characteristic with process switch between pulsed and dip transfer arc, where the dip transfer arc is initiated by wire movement reversal.
ripple drive	Additional hardware: CMT drive unit, RA Drive Characteristic that behaves like interval mode for clear weld rippling, especially with aluminium

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

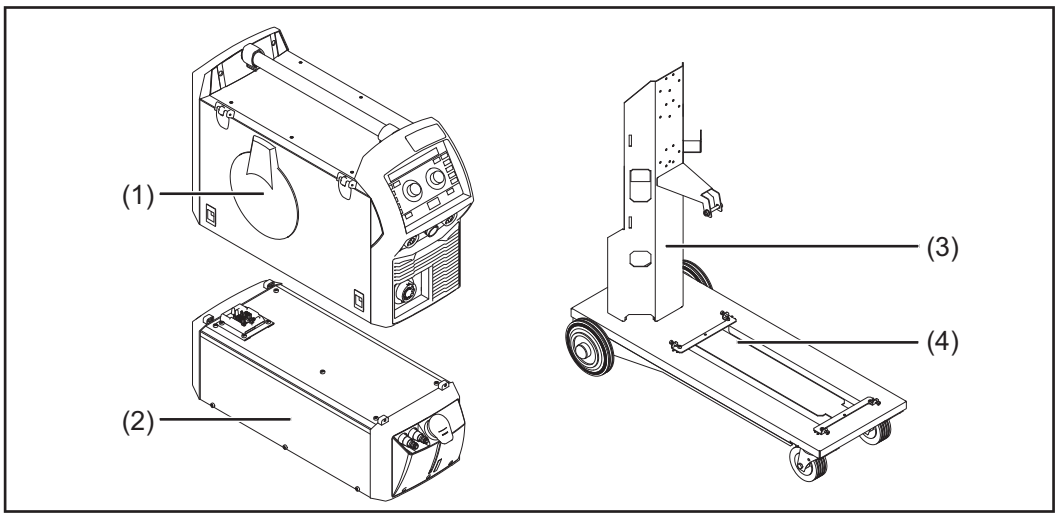
NOTE! A CMT reference book is available complete with typical applications; see ISBN 978-3-8111-6879-4.

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 (earthing) 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 270i C TIG
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.

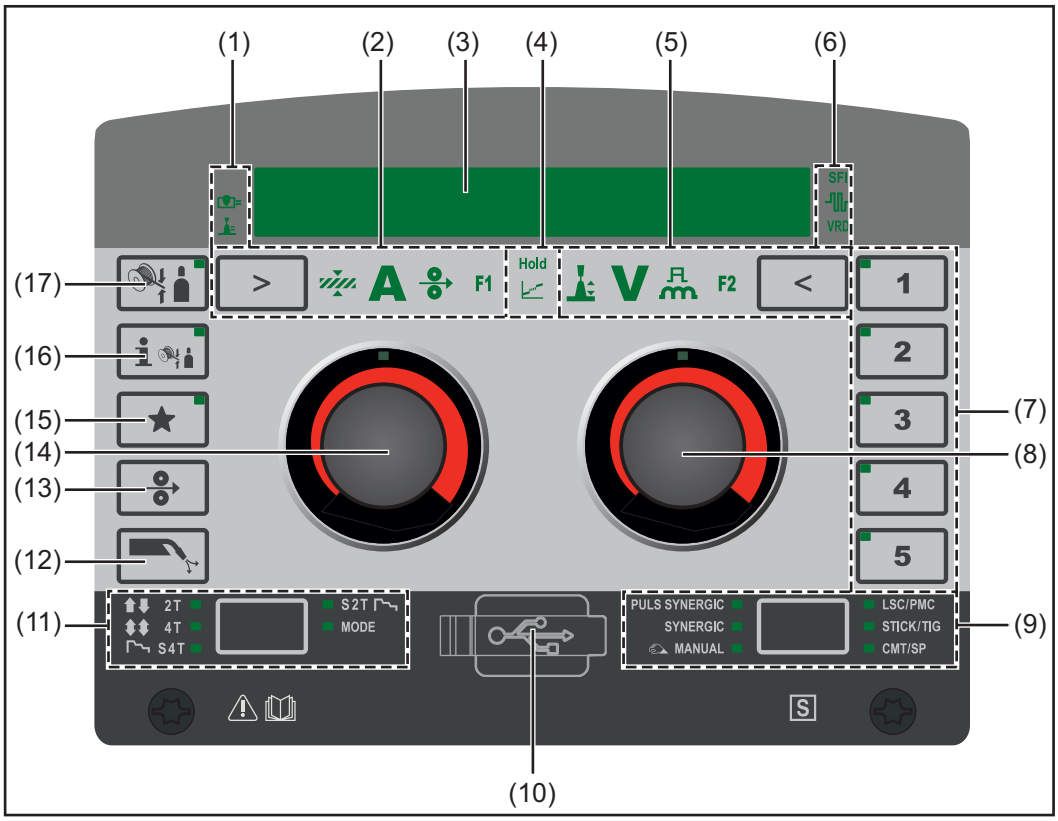
NOTE! As a result of firmware updates, you may find that your device has certain functions that are not described in these operating instructions, or vice versa. Certain illustrations may also differ slightly from the actual controls on your device, but these controls function in exactly the same way.

Safety

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

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

Control panel



No.	Function
(1)	**Process control parameter indicator** For the LSC and PMC welding processes
	Penetration stabilizer indicator Lights up when 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
A	**Welding current *** in A Before the start of welding, the machine automatically displays a standard value based on the programmed parameters. During welding, the actual value is displayed.
	Wire speed * in m/min or ipm
F1	**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 showing 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.

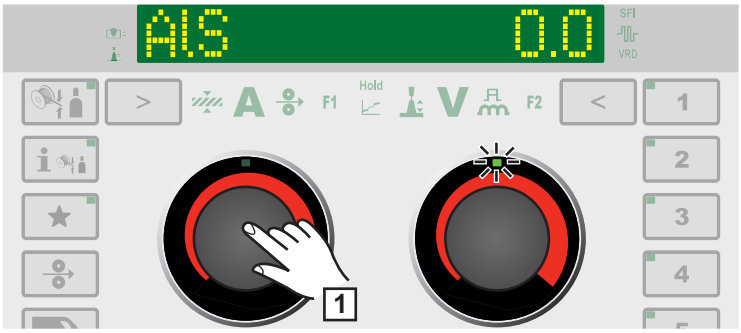
No.	Function
(5)	**Right parameter selection**  The corresponding indicator lights up when a parameter is selected. The following parameters can be selected by pressing the button: **Arc length correction** For correcting the arc length **Welding voltage *** in V Before the start of welding, the machine automatically displays a standard value based on the programmed parameters. During welding, the actual value is displayed. **Pulse/dynamic correction** Has a different function assigned to it, depending on the welding process being used. A description of the various functions can be found in the "Welding mode" chapter under the corresponding process. **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 indicator** Lights up when SFI (Spatter Free Ignition) is active **SynchroPulse indicator** Lights up when SynchroPulse is active **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

No.	Function
(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 connection socket** 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 test flow before the end of this period.
(13)	**Wire threading button** For threading 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.

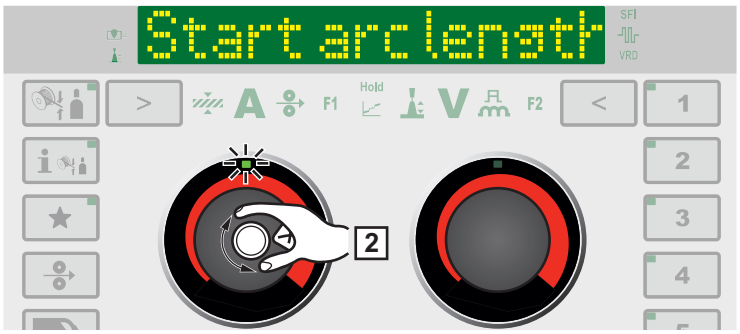
Example:



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

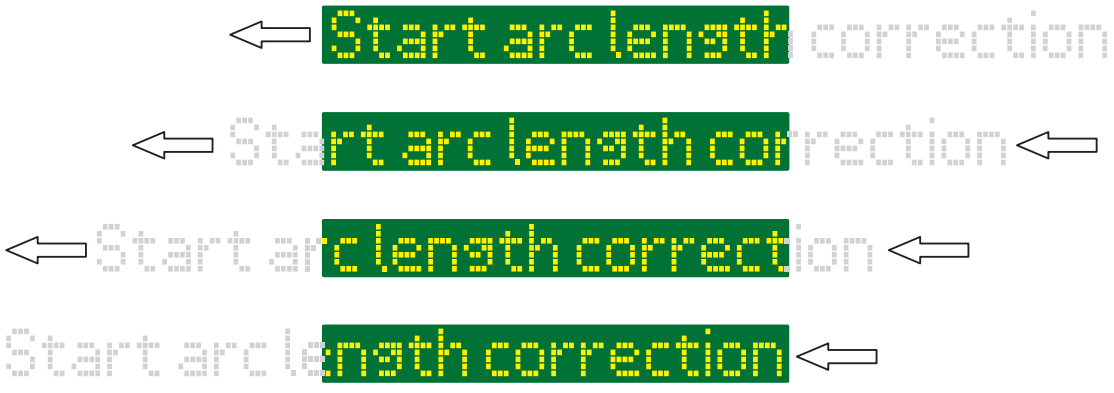
1 Press the left adjusting dial

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.

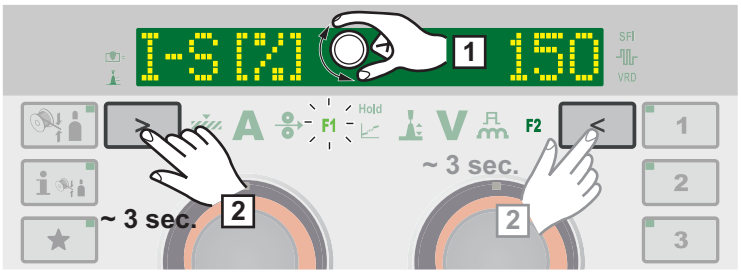


3 To make another selection, turn the right adjusting dial

F1/F2 special function parameters, Favourites button

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 83

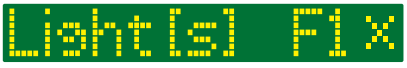
2 To assign the selected parameter to F1 or F2, press the parameter selection button for approx. 3 seconds:
F1 ... left parameter selection
F2 ... right parameter selection

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:

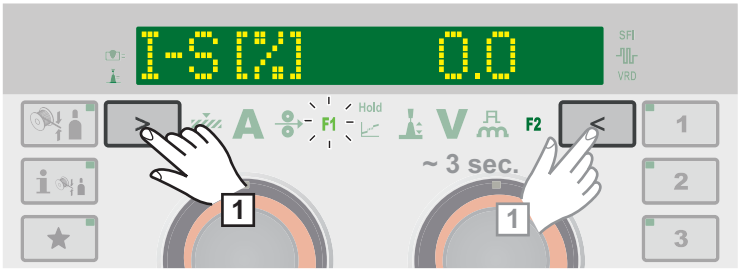
The selected parameter is now stored under F1.

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:



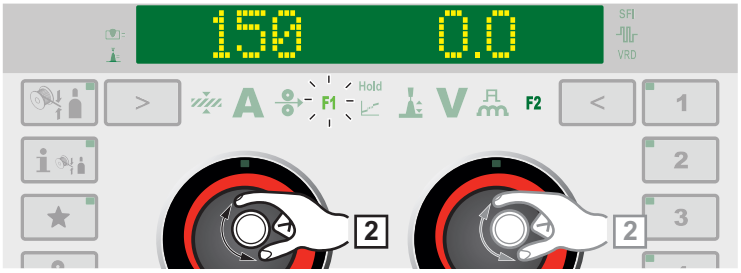
This deletes an existing stored parameter.

Retrieving F1 and F2 special function parameters



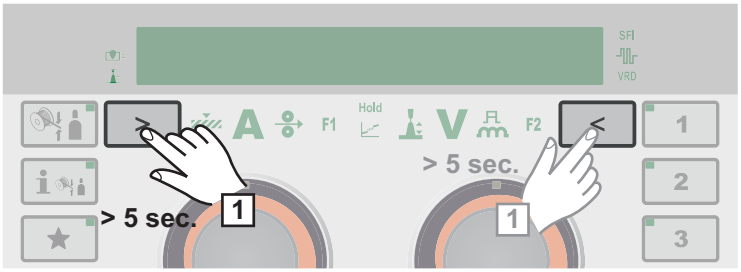
1 Press the parameter selection button until F1 or F2 lights up:
F1 ... left parameter selection
F2 ... right parameter selection

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

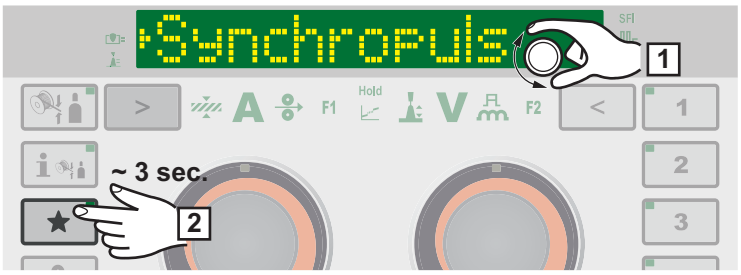
The stored parameter is deleted, F1 (for example) and X is shown on the display:

The F1 and F2 special function parameters can also be set in the Setup menu (page 106).

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 83

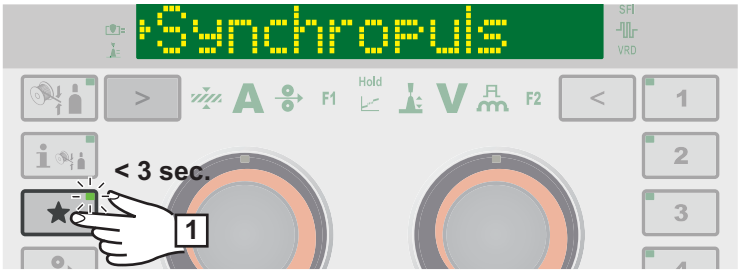
2 To assign the selected parameter or folder to the Favourites button, press the Favourites button for approx. 3 seconds

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.



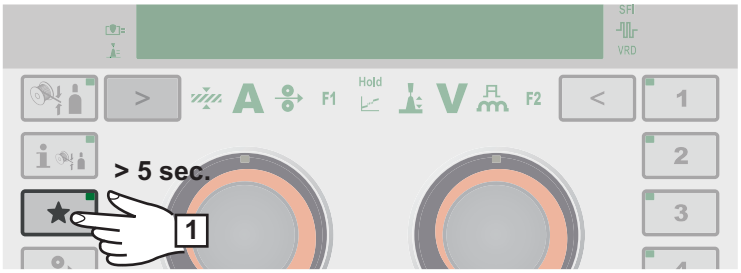
1 Briefly press the "Favourites" button (< 3 seconds)

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



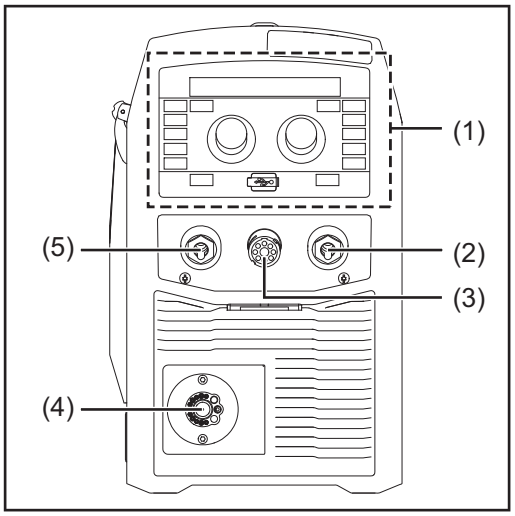
1 Press the Favourites button for at least 5 seconds:

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

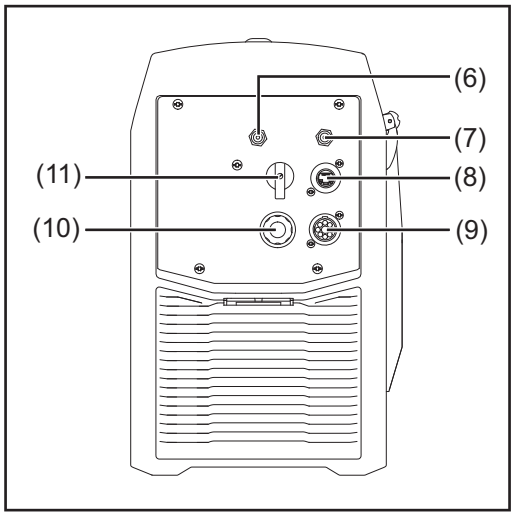
The Favourites button can also be assigned in the Setup menu (page 107).

Connections, switches and mechanical components

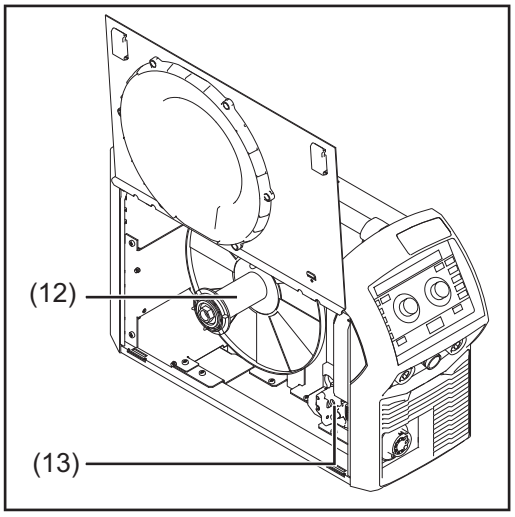
Connections, switches and mechanical components



Front



Rear



Side view

No.	Function
(1)	**Control panel with display** For operating the power source
(2)	**(+) current socket with bayonet latch**
(3)	**SpeedNet connection socket** For connecting external system components (e.g. remote controls, etc.)
(4)	**Welding torch connection socket** For connecting the welding torch
(5)	**(-) current socket with bayonet latch** For: - connecting the return lead cable during MIG/MAG welding
(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)**

No.	Function
(10)	**Mains cable with strain relief device**
(11)	**Mains switch** For switching the power source on and off
(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

- 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! Operating the equipment incorrectly can cause serious injury and damage. Do not use the functions described until you have thoroughly read and understood the following documents:
- these operating instructions
- all the operating instructions for the system components, especially the safety rules

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 cable is indicated in the technical data.

NOTE! An inadequately dimensioned electrical installation can cause serious damage. The mains cable 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:	Single-phase devices:
$S_{1max} = I_{1max} \times U_1 \times \sqrt{3}$	$S_{1max} = I_{1max} \times U_1$

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

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

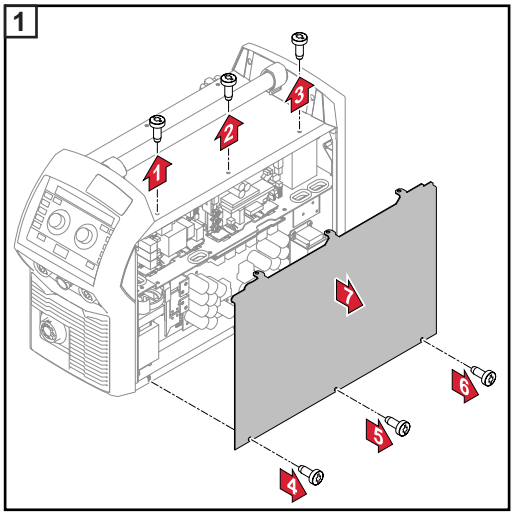
AWG = **A**merican **w**ire **g**auge

Connecting the mains cable - general

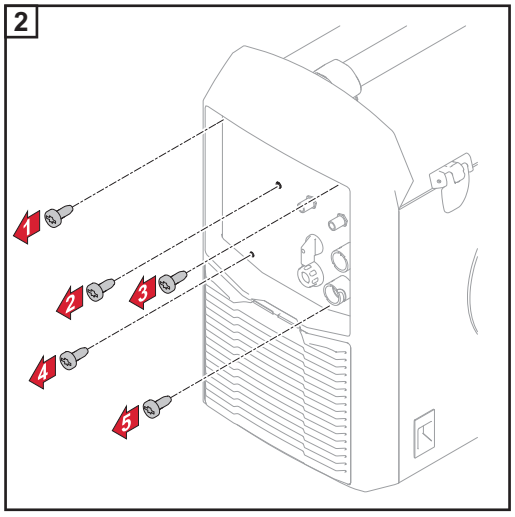
CAUTION! Risk of injury and material damage due to short circuits.
Short circuits can occur between the phase conductors or between the phase conductors and the ground conductor unless ferrules are used.
Fit ferrules to all phase conductors in an exposed mains cable as well as the ground conductor.

NOTE! Mains cables must be connected to devices in compliance with national standards and guidelines and the work must be carried out by a qualified person.

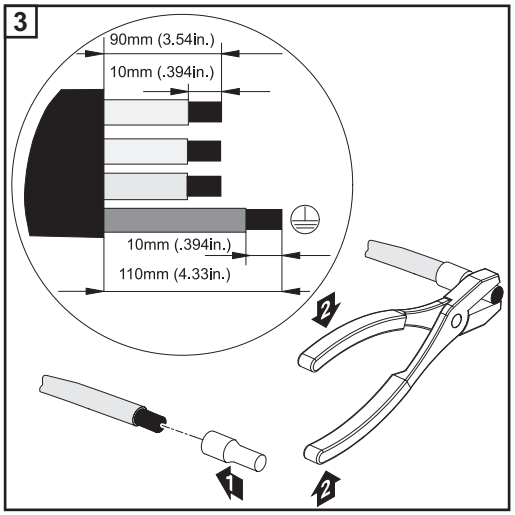
IMPORTANT! The ground conductor should be approx. 20 - 25 mm (0.8 - 1 in.) longer than the phase conductors.

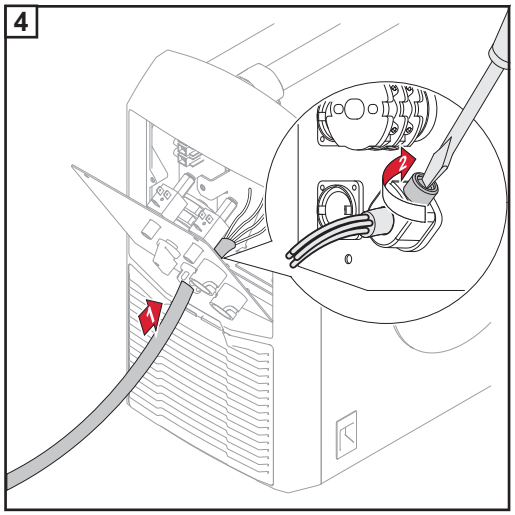


6 x TX25



5 x TX25

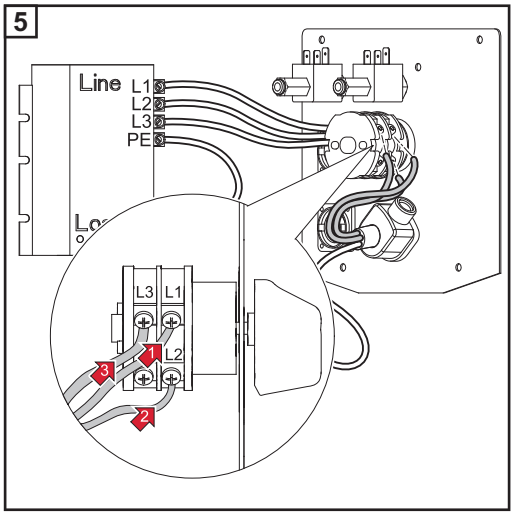




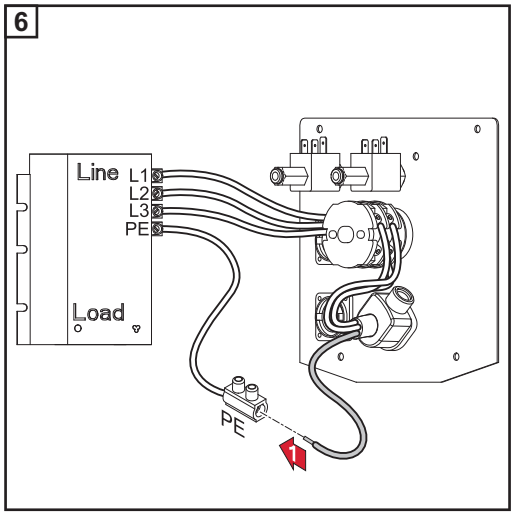
Tightening torque = 1.2 Nm

IMPORTANT! When connecting the cable to the switch, ensure:

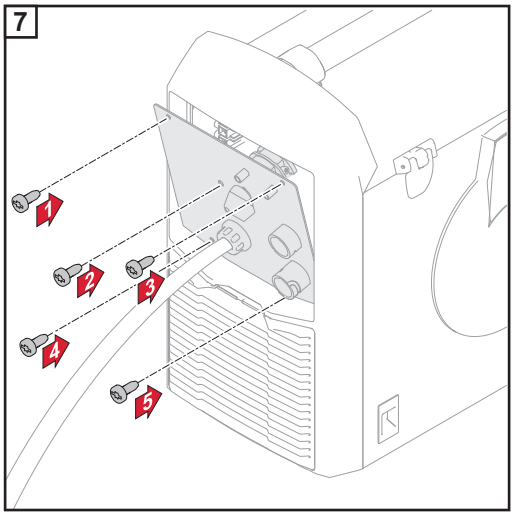
- To route the conductors near to the switch
- Not to make the conductors unnecessarily long
- To fit the protective hose supplied over the cable and insert the covered cable into the strain-relief device if cable diameters are small



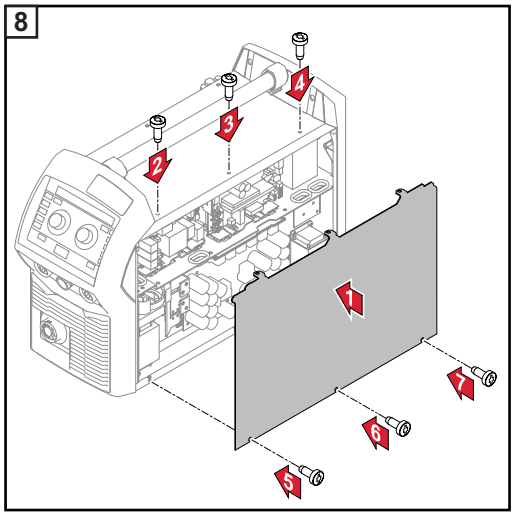
Tightening torque = 1.2 Nm



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
- the power source is unplugged from the mains

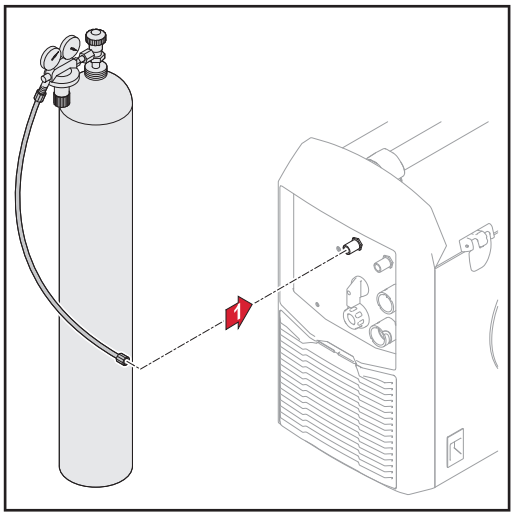
General

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 gas cylinders on a solid, level surface so that they remain stable. Secure gas cylinders to prevent them from toppling over.

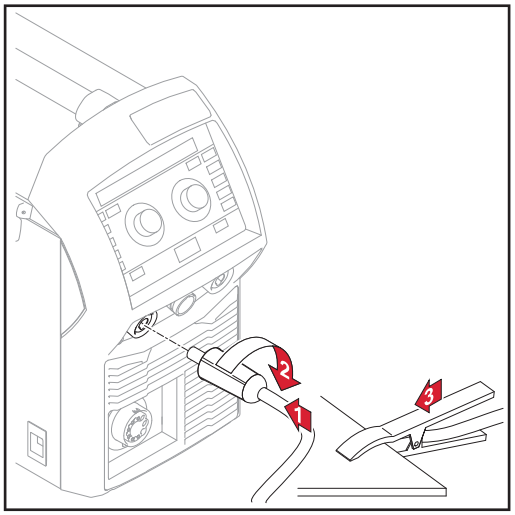
Observe the safety rules of the gas cylinder manufacturer.



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

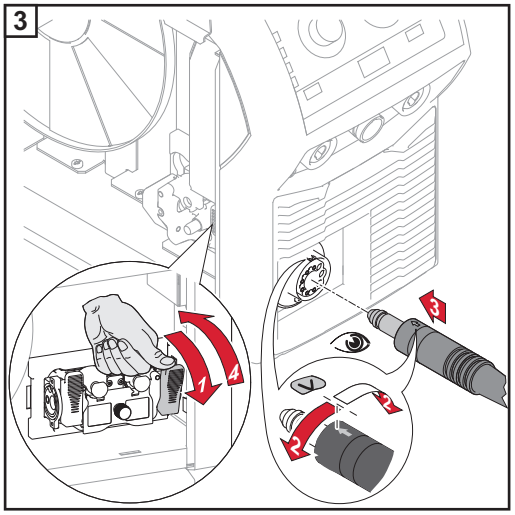


Connecting the grounding cable

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.

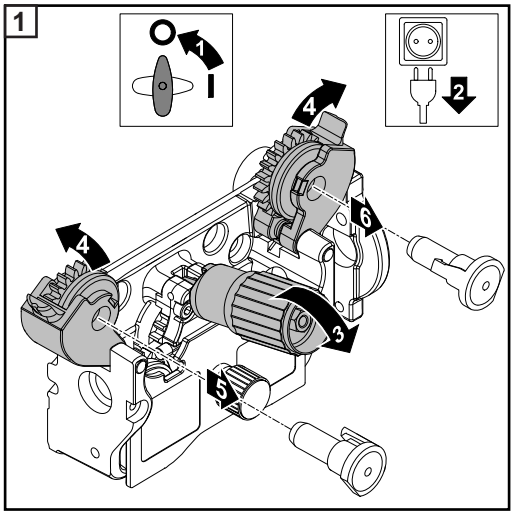


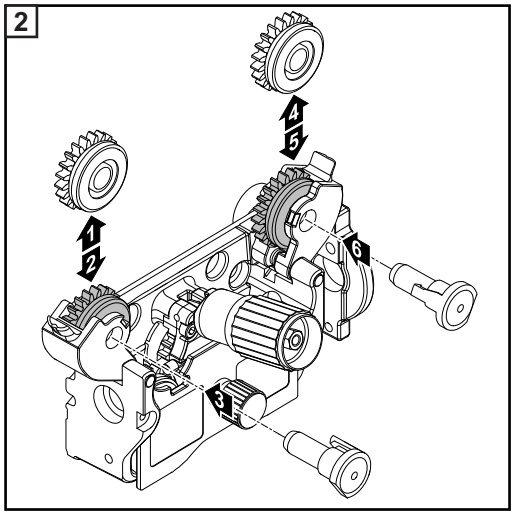
Inserting/replacing feed rollers

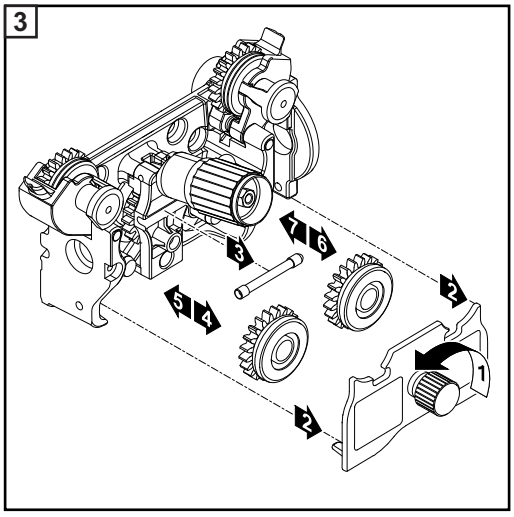
In order to achieve optimum wire electrode feed, the feed rollers must be suitable for the diameter and alloy of the wire being welded.

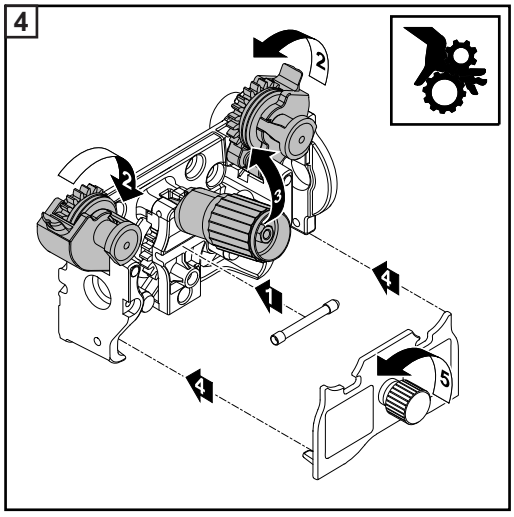
NOTE! Only use feed rollers that are suitable for the wire electrode.
An overview of the feed rollers available and their possible areas of use can be found in the spare parts lists.

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.







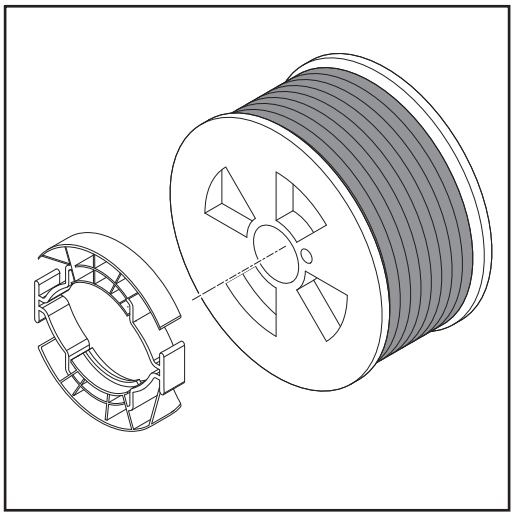


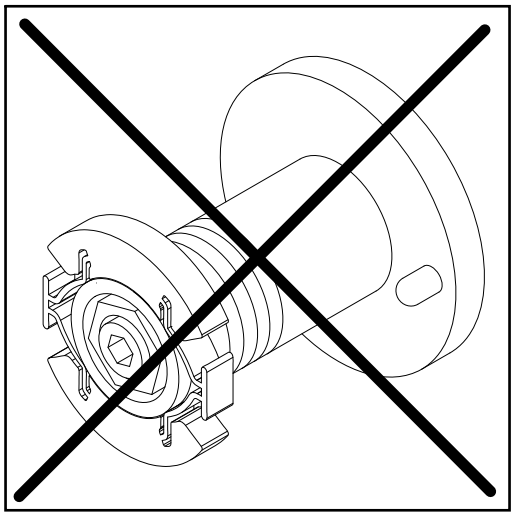
Inserting the wire-spool

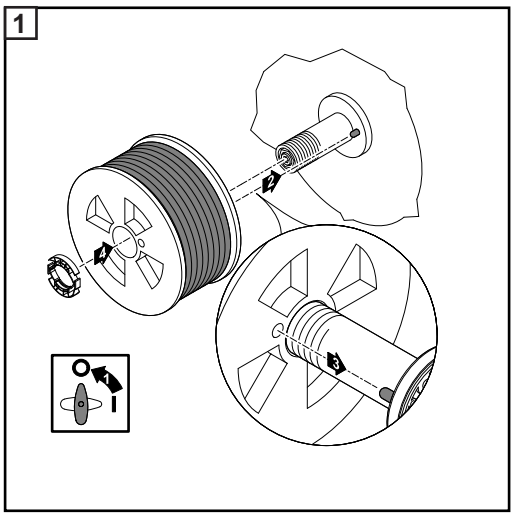
CAUTION! Risk of injury from springiness of spooled wire electrode. While inserting the wirespool, hold the end of the wire electrode firmly to avoid injuries caused by the wire springing back.

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 place the locking ring as shown in the diagram on the left.







Inserting the basket-type spool

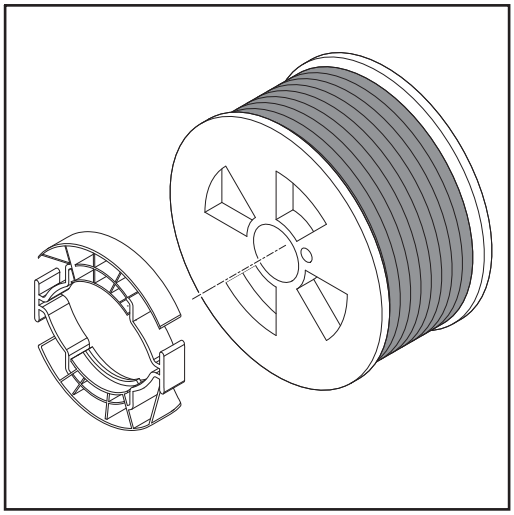
CAUTION! Risk of injury from springiness of spooled wire electrode. While inserting the basket-type spool, hold the end of the wire electrode firmly to avoid injuries caused by the wire springing back.

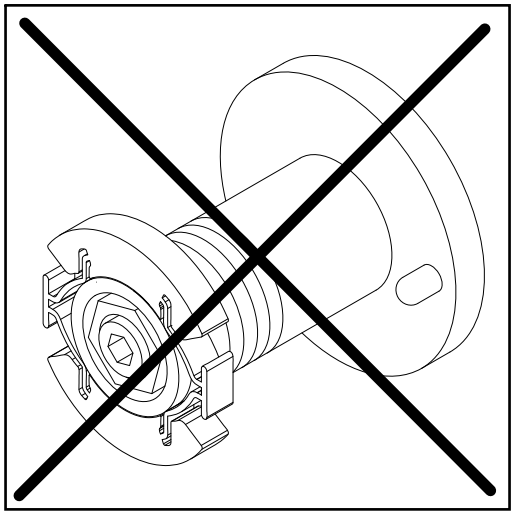
CAUTION! Risk of injury from falling basket-type spool. Make sure that the basket-type spool and basket-type spool adapter are fitted securely to the wirespool holder.

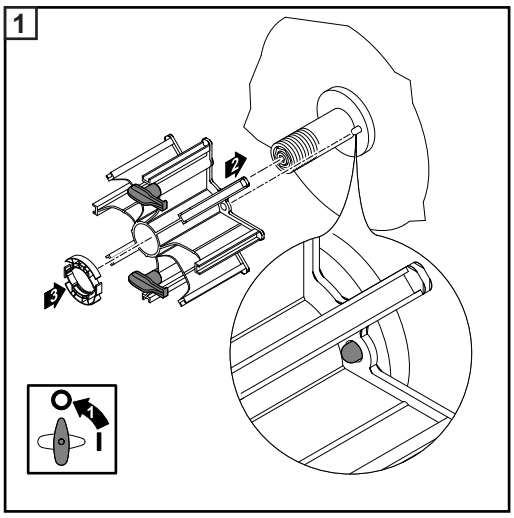
NOTE! When working with basket-type spools, only use the basket-type spool adapter included in the scope of supply.

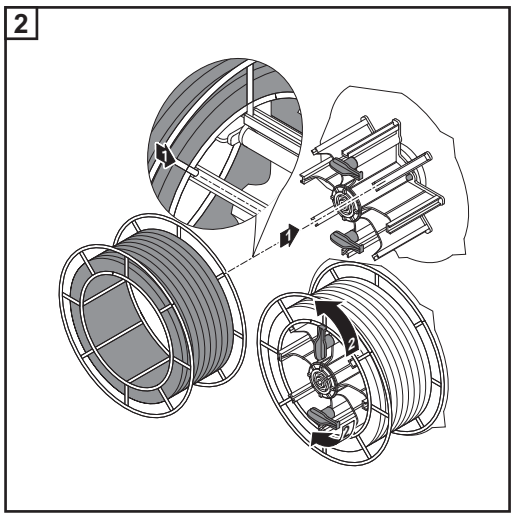
CAUTION! Risk of injury from falling basket-type spool. Place the basket-type spool on the adapter provided in such a way that the bars on the spool are inside the adapter guideways.

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 place the locking ring as shown in the diagram on the left.







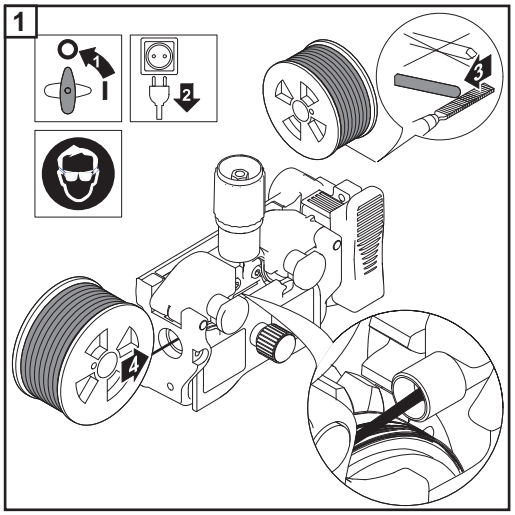


Feeding in the wire electrode

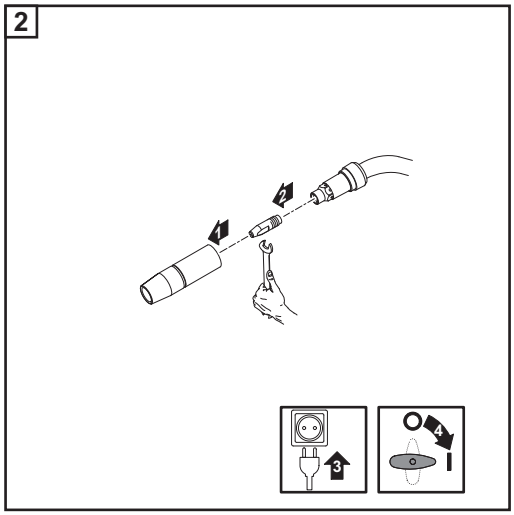
CAUTION! Risk of injury from springiness of spooled wire electrode. When inserting the wire electrode into the 4-roller drive, hold the end of the wire electrode firmly to avoid injuries caused by the wire springing back.

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.

1



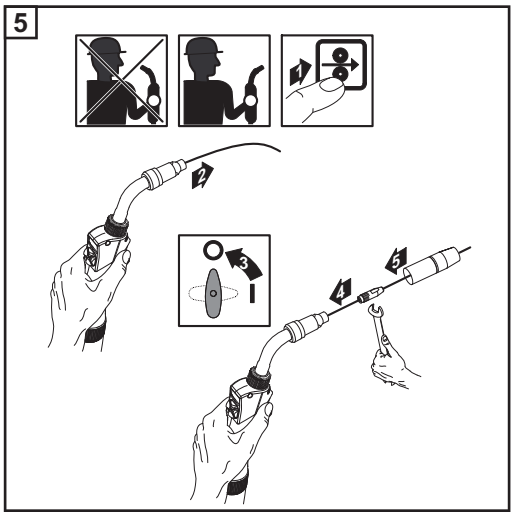
2



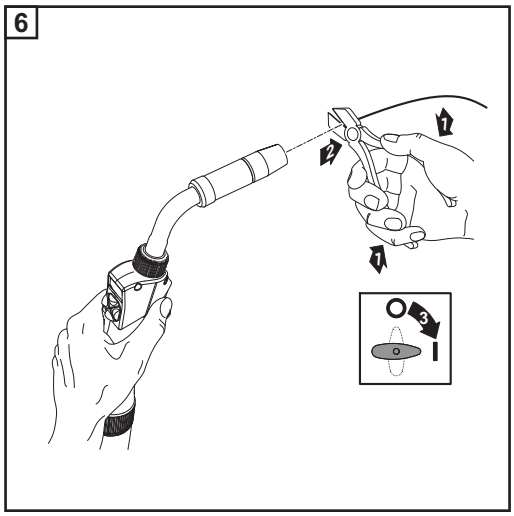
CAUTION! Risk of injury and damage from electric shock and from the wire electrode emerging from the torch.

- 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

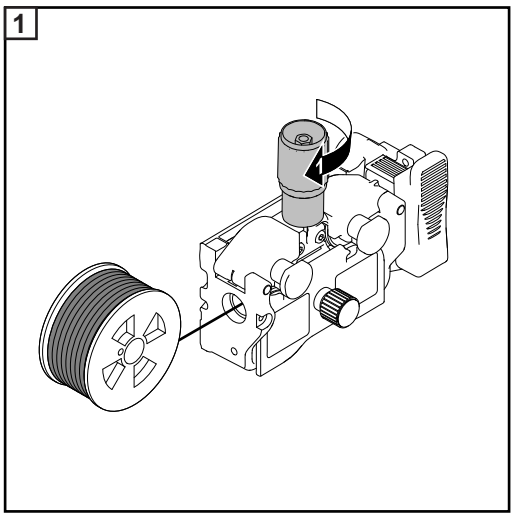


6



Setting the contact pressure

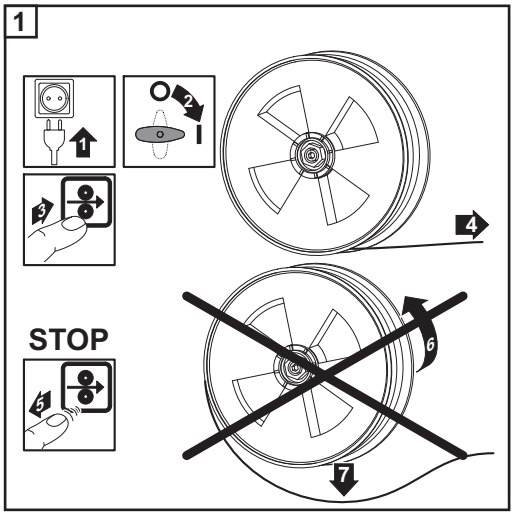
NOTE! Set the contact pressure in such a way that the wire electrode is not deformed but nevertheless ensures proper wirefeed.

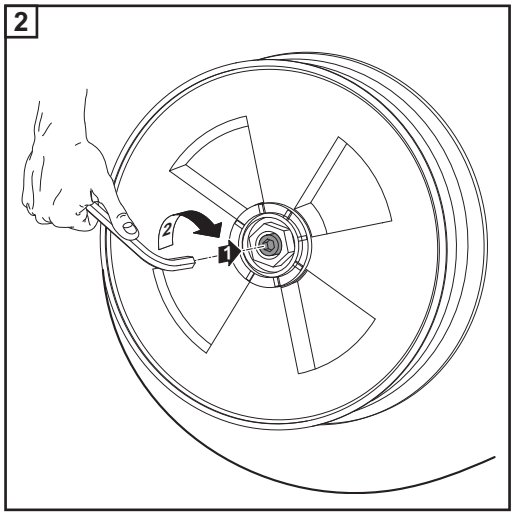


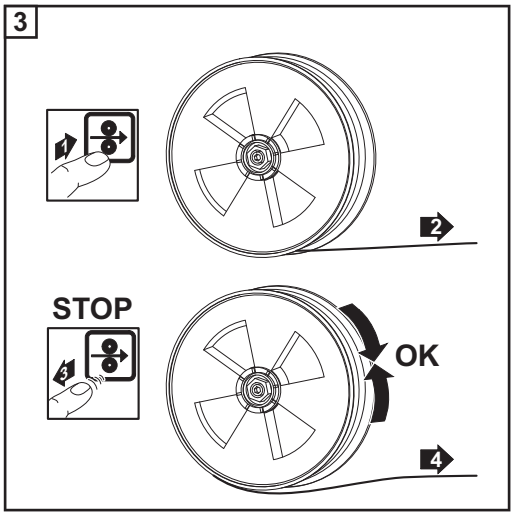
Contact pressure standard values	U-slot rollers
Steel	4 - 5
CrNi	4 - 5
Tubular cored electrodes	2 -3

Adjusting the brake

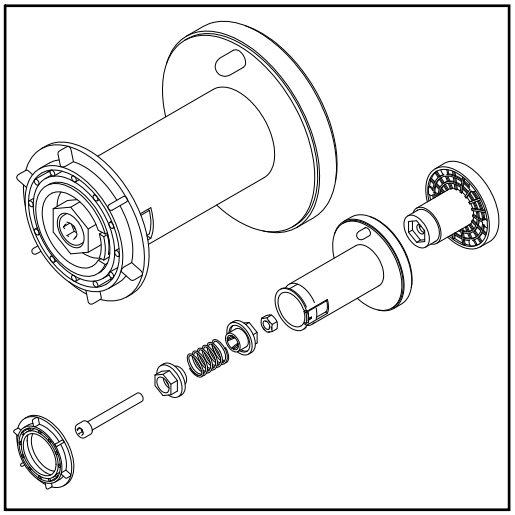
NOTE! After releasing the torch trigger the wirespool should stop unreeling. Adjust brake if necessary.







Design of the brake



WARNING! Fitting the equipment incorrectly can cause serious injury and damage.
- 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

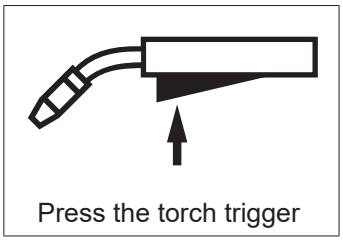
General

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

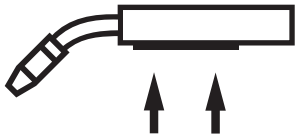
- these operating instructions
- all the operating instructions for the system components, especially the safety rules

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

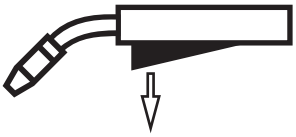
Symbols and their explanations



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"

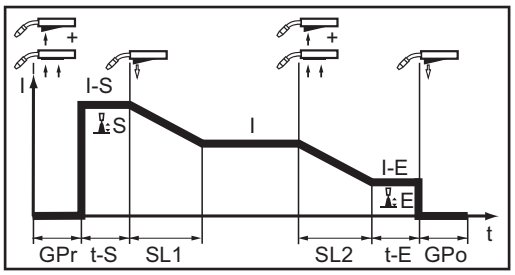
2-step mode

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

4-step mode

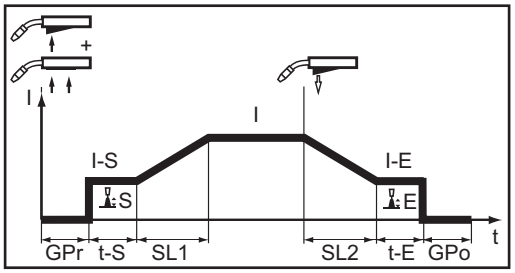
"4-step mode" is suitable for longer weld seams.

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! Operating the equipment incorrectly can cause serious injury and damage. Do not use the functions described until you have thoroughly read and understood the following documents:
- these operating instructions
- all the operating instructions for the system components, especially the safety rules

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

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

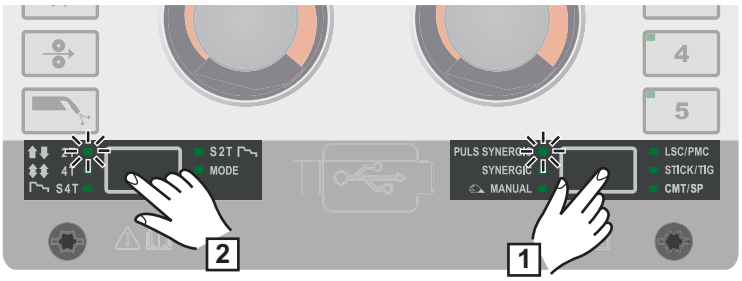
Switching on the power source

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.

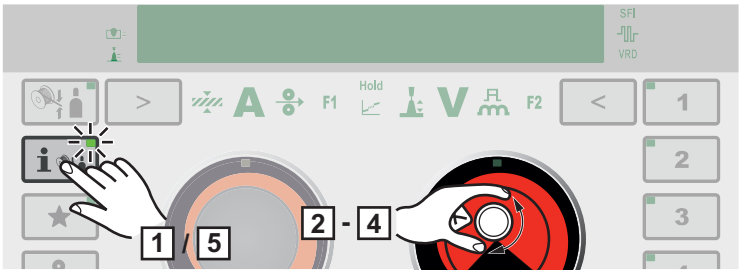
Setting the welding process and operating mode



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

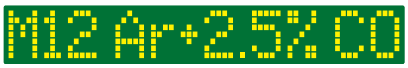
The LED on the button lights up and the currently set filler metal is shown on the display:

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:



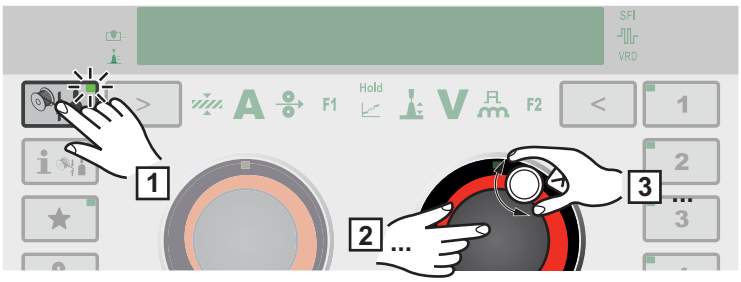
5 Turn the right adjusting dial

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

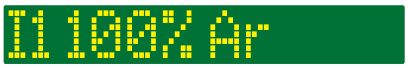
The first available wire diameter is displayed:

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:

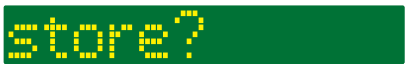


9 Select the desired shielding gas by turning the right adjusting dial
10 Press the right adjusting dial

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: *

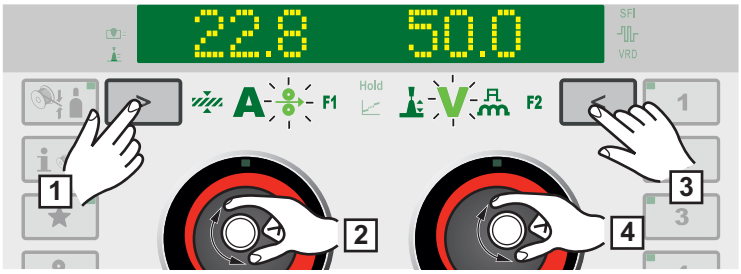


13 Press the right adjusting dial

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
- A Welding current
- Wire feed speed
- F1 Special function

2 To change the welding parameter value, turn the left adjusting dial

3 If necessary:
Press the button until the desired welding parameter lights up

- Arc length correction
- V Welding voltage
- Pulse/dynamic correction
- F2 Special function

4 To change the welding parameter value, turn the right adjusting dial

Adjusted parameter values are applied immediately.
If one of the wire feed 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)]

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

Welding current[1)]

Unit	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. During welding, the actual value is displayed.

Wire speed[1)]

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

Special function

Any parameter can be assigned to this (see page 38)

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

Penetration stabilizer[4)] (see page 90)

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

Arc length stabilizer[4)] (see page 92)

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)]

Unit	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. During welding, the actual value is displayed.

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
+	higher droplet detachment force

F2 Special function

Any parameter can be assigned to this (see page 38)

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)]

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

Welding current[1)]

Unit	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. During welding, the actual value is displayed.

Wire speed[1)]

For setting a harder, more stable arc

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

Special function

Any parameter can be assigned to this (see page 38)

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

Penetration stabilizer[4)] (see page 90)

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

Arc length stabilizer[4)] (see page 92)

Setting range	0 - 2
Factory setting	0

using the right adjusting dial

Arc length correction

For correcting the arc length, which is preset by the characteristic or the synergic program

Setting range	-10 - +10
Factory setting	0

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

Welding voltage[1)]

Unit	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. During welding, the actual value is displayed.

Pulse/dynamic correction

For influencing the short-circuiting dynamic at the moment of droplet transfer

Setting range	-10 - +10
Factory setting	0

-	harder, more stable arc
0	neutral arc
+	soft, low-spatter arc

F2 Special function

Any parameter can be assigned to this (see page 38)

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

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

F1 Special function

Any parameter can be assigned to this (see page 38)

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

using the right adjusting dial

V Welding voltage[1)]

Unit	V
Setting range	Depends on the welding process and welding program selected

Pulse/dynamic correction

For influencing the short-circuiting dynamic at the moment of droplet transfer

Setting range	0 - 10
Factory setting	0
0	harder, more stable arc
10	soft, low-spatter arc

F2 Special function

Any parameter can be assigned to this (see page 38)

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.

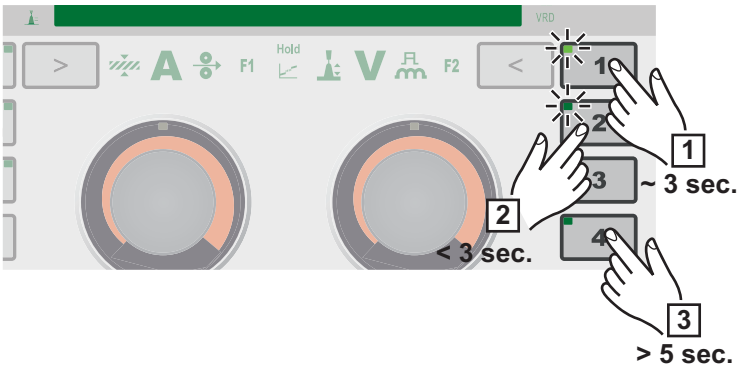
2) The actual setting range depends on the welding program selected.
3) The maximum value depends on the wirefeeder used.
4) Only in the LSC and PMC welding processes

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.:

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.

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.:

The EasyJob operating point has been deleted.

TIG welding

Safety

WARNING! Operating the equipment incorrectly can cause serious injury and damage. Do not use the functions described until you have thoroughly read and understood the following documents:
- these operating instructions
- all the operating instructions for the system components, especially the safety rules

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

Preparations

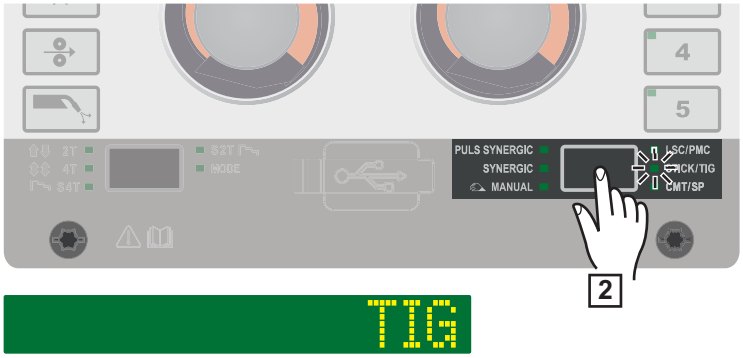
1. Move the mains switch to the "O" position
2. Disconnect the mains plug
3. Remove the MIG/MAG welding torch
4. Disconnect the grounding (earthing) cable from the (-) current socket
5. Plug the grounding (earthing) cable into the 2nd (+) current socket and twist to fasten it
6. Use the other end of 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

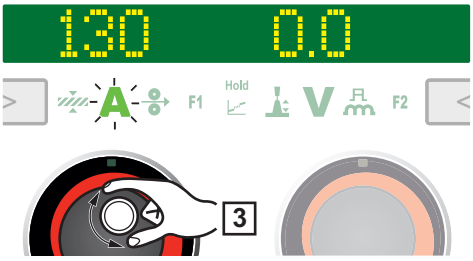
IMPORTANT! For optimum welding results, the manufacturer recommends performing an R/L alignment when starting the device for the first time and when any changes are made to the welding system.



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 3-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

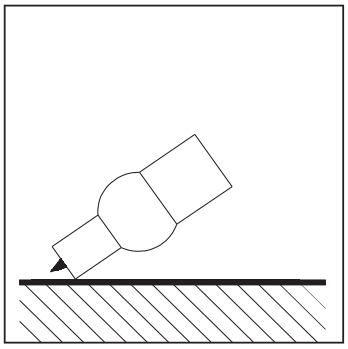
5 Open the gas stop valve on the TIG gas-valve torch

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

7 Start welding (ignite the arc)

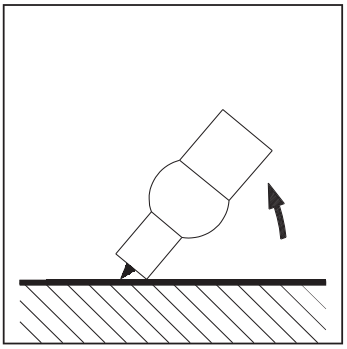
Igniting the arc

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



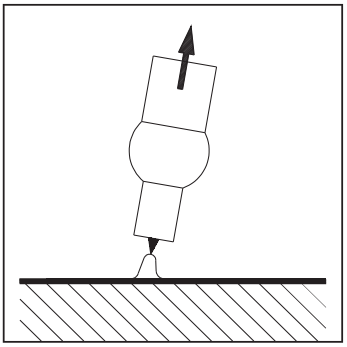
Placing the gas nozzle down

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



Arc ignites when electrode is touched down on workpiece

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



Arc ignited - welding commences

3 Raise the welding torch and pivot it into the normal position - the arc 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! Operating the equipment incorrectly can cause serious injury and damage. Do not use the functions described until you have thoroughly read and understood the following documents:
- these operating instructions
- all the operating instructions for the system components, especially the safety rules

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

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.

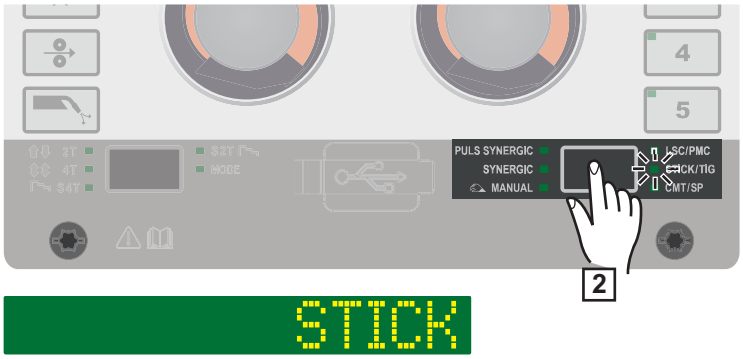
4. Plug the grounding (earthing) cable into either the (-) or the (+) current socket depending on the type of electrode, and twist to fasten it
5. Use the other end of the grounding (earthing) cable to establish a connection to the workpiece
6. Plug the bayonet current plug of the electrode holder cable 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

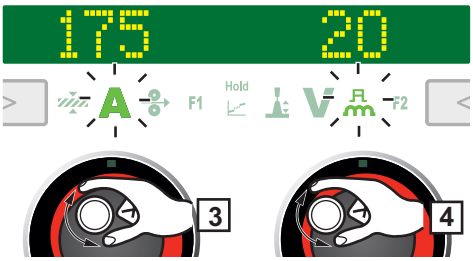
IMPORTANT! For optimum welding results, the manufacturer recommends performing an R/L alignment when starting the device for the first time and when any changes are made to the welding system.



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 3-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

A Main current[1)]

Unit	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. During welding, the actual value is displayed.

using the right adjusting dial

Dynamic

For influencing the short-circuiting dynamic at the moment of droplet transfer

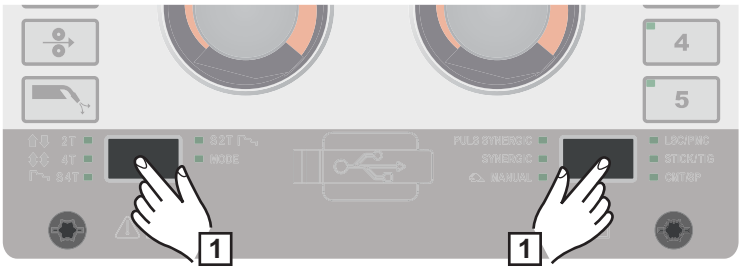
Setting range	0 - 100
Factory setting	20

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

Setup settings

Setup menu - overview

Entering/exiting the Setup menu

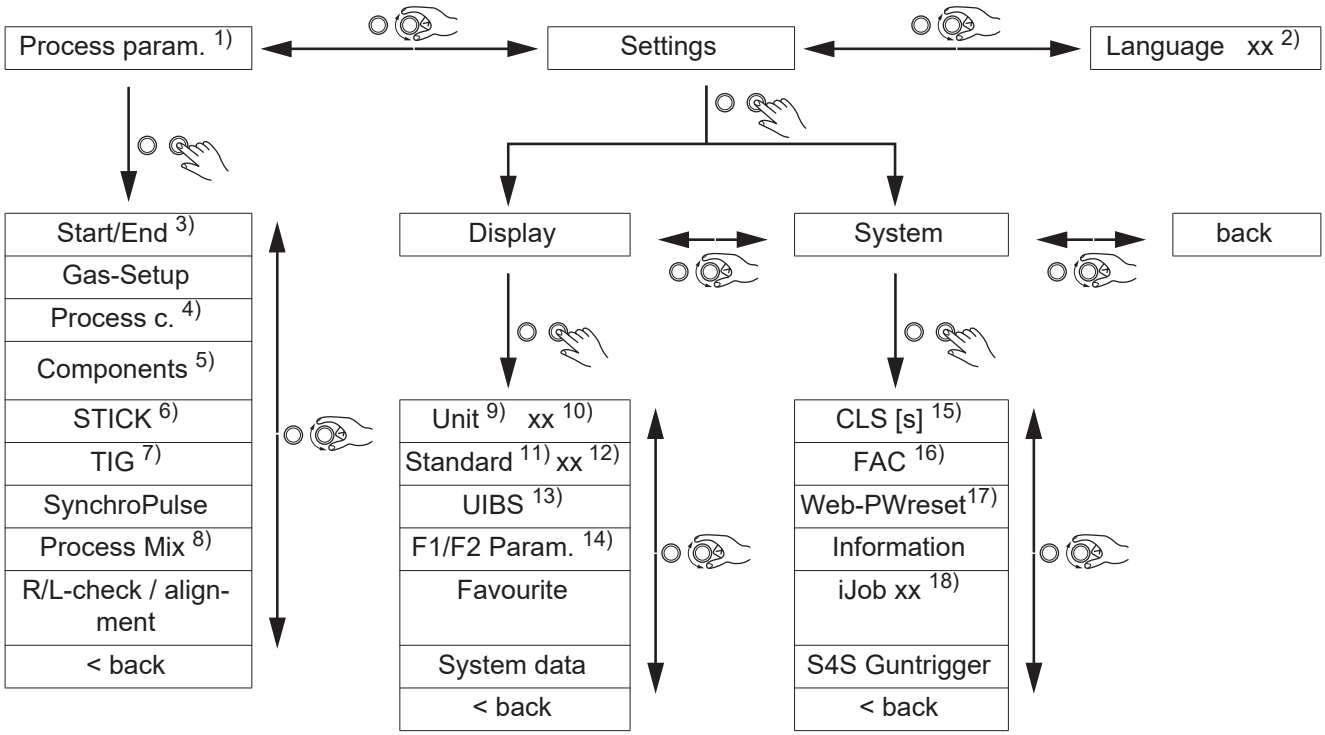


1 To enter the Setup menu, press the "Welding process" and "Mode" buttons at the same time

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

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)

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

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

Unit	% (of welding voltage)
Setting range	-10 - +10
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

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

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

Unit	s
Setting range	0 - 9.9
Factory setting	1

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

Unit	s
Setting range	0 - 9.9
Factory setting	1

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 is filled (in the case of aluminium)

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

AIE
End arc length correction

For correcting the arc length at the end of welding

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

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

t-E
Final current time

For setting the length of time the final current is to be active

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

SFI

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

Unit	-
Setting range	off / on
Factory setting	off

SFI-HS
SFI HotStart

For setting a HotStart time in conjunction with the 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.

Unit	s
Setting range	off / 0.01 - 2.00
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.

Unit	-
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

Unit	A
Setting range	100 - 450
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.

Unit	-
Setting range	0.0 - 10.0
Factory setting	0.0

Process parameters for Gas-Set-up

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

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

Unit	s
Setting range	0 - 9.9
Factory setting	0.1

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

Unit	s
Setting range	0 - 9.9
Factory setting	0.5

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 stabiliser

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

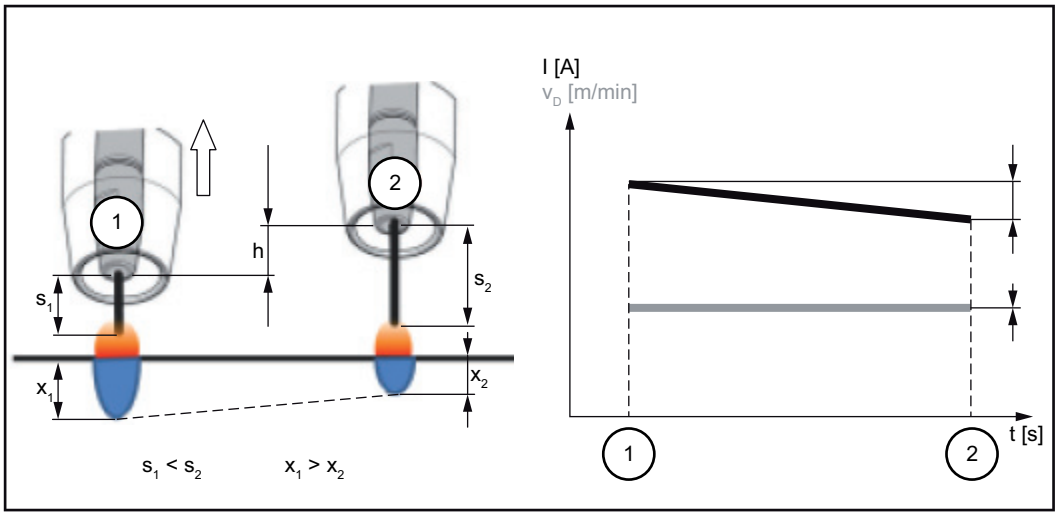
The penetration stabiliser parameter is only available when the WP PMC (Welding Process Pulse Multi Control) or WP LSC (Welding Process Low Spatter Control) option has been enabled on the power source.

Unit	m/min (ipm)
Setting range	0 - 10.0
Factory setting	0

0	The penetration stabiliser is not activated. The wire feed speed remains constant.
0.1 - 10.0	The penetration stabiliser is activated. The welding current remains constant.

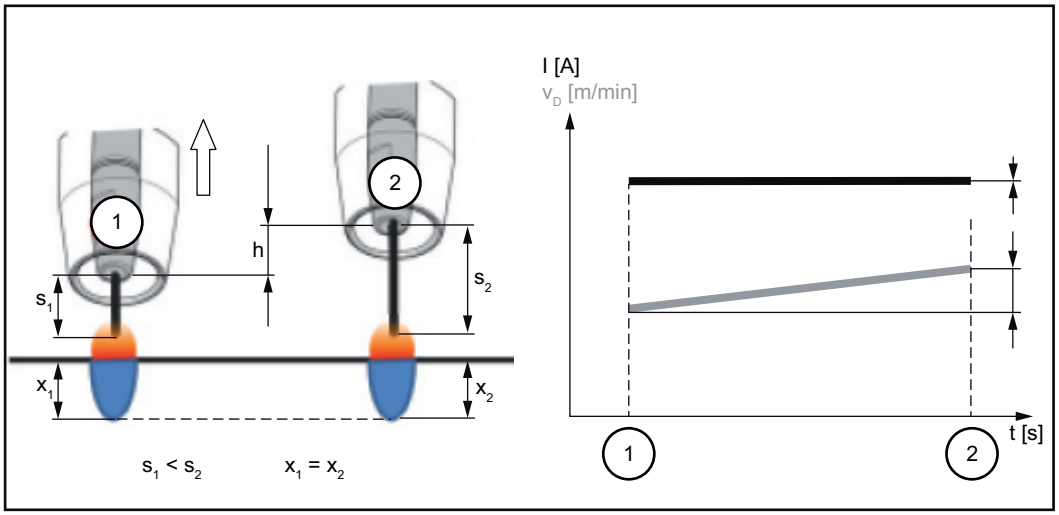
Application examples

Penetration stabiliser = 0 m/min (not activated)



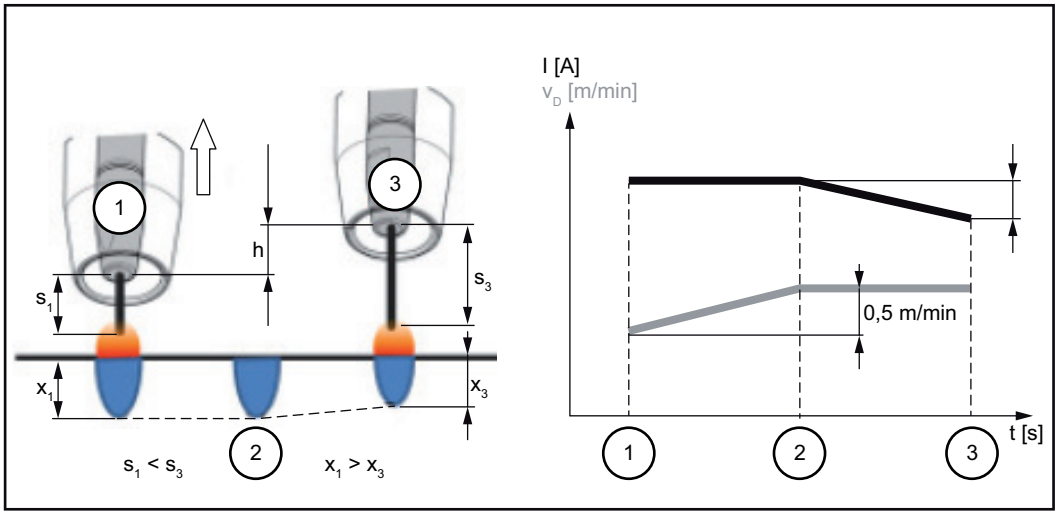
Changing the contact tube distance (h) alters the resistance in the welding circuit due to the longer stick out (s_2).
The constant voltage control for constant arc length causes a reduction in the mean current value and hence a smaller penetration (x_2).

Penetration stabiliser = n m/min (activated)



Specifying a value for the penetration stabiliser 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 stabiliser = 0.5 m/min (activated)



To minimise the change in welding current if the stick out is changed (s_1 ==> s_3), the wire feed 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 feed 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 on the power source if the WP PMC (Welding Process Pulse Multi Control) option has been enabled.

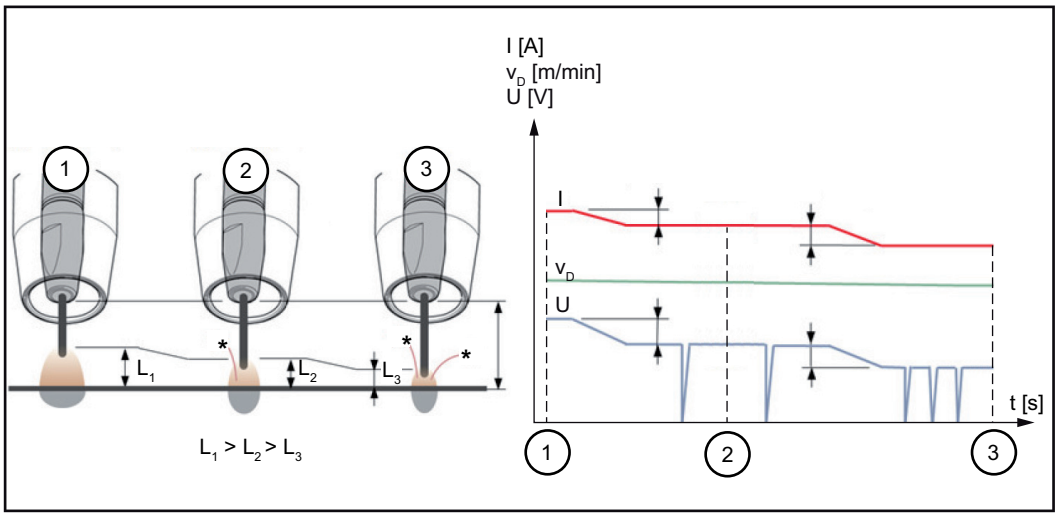
Unit	- (effect of stabilizer)
Setting range	0.0 - 5.0
Factory setting	0.0

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

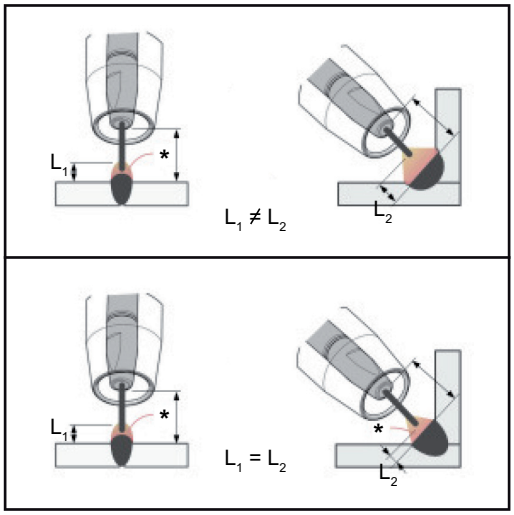
1. Arc length stabilizer = 0
2. Arc length stabilizer = 0.5
3. Arc length stabilizer = 2



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

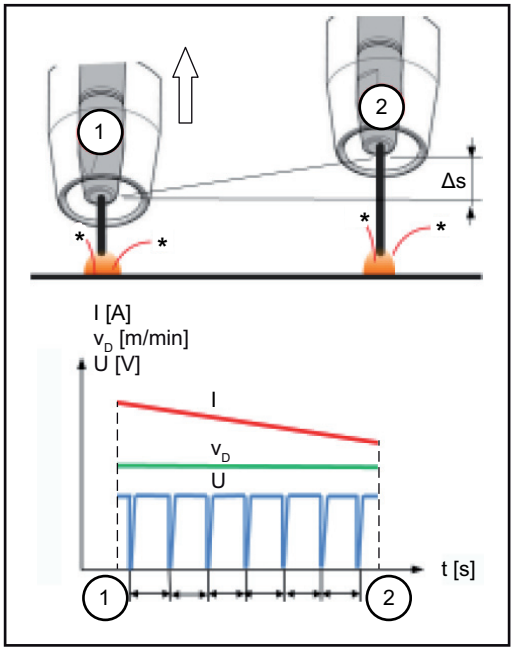
Since the number and duration of the short circuits is controlled, the properties of the arc stay the same if the weld seam profile or welding position is changed.

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

Combination of penetration stabiliser and arc length stabiliser

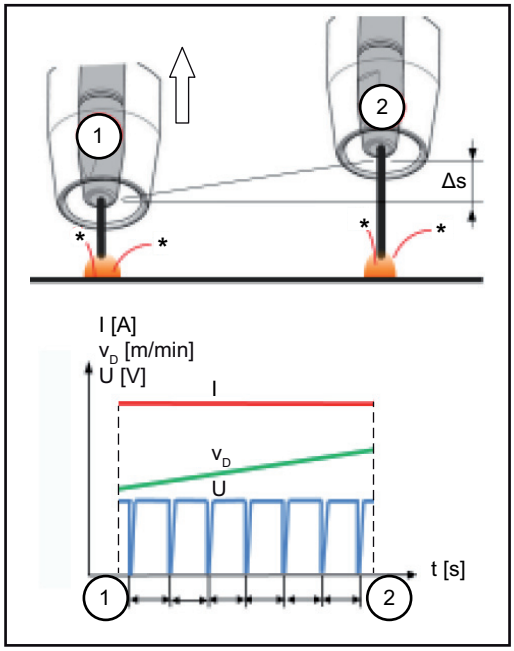
Example: Stick out change

Arc length stabiliser without penetration stabiliser



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 stabiliser



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

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

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

Unit	s
Setting range	5 - 25
Factory setting	10

Fdi
Feeder inching speed
For setting the wire speed at which the wire electrode is fed into the torch hosepack

Unit	m/min (ipm)
Setting range	min. - max. (depending on wirefeeder)
Factory setting	-

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

Unit	mm (in.)
Setting range	off / 5 - 100 (0.2 - 3.94)
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 preset 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. Wire feeding 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.

Process parameters for electrode setup

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

I-S
Starting current
For setting the starting current

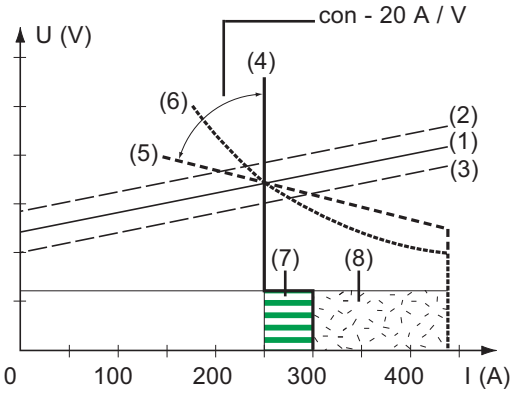
Unit	%
Setting range	0 - 200
Factory setting	150

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

Unit	s
Setting range	0.0 - 2.0
Factory setting	0.5

EIn
Characteristic
For selecting the electrode characteristic

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

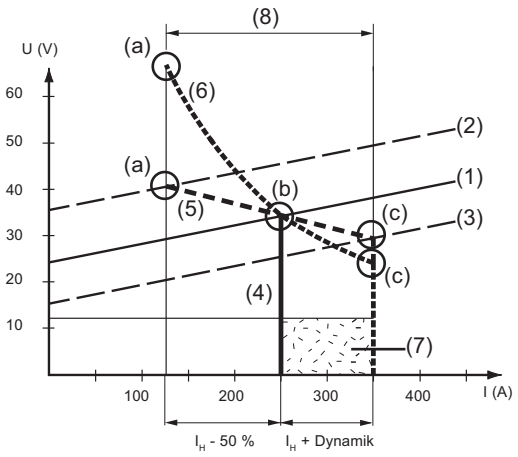


(1) Load line for rod electrode
(2) Load line for rod electrode where arc length is increased
(3) Load line for rod electrode where arc length is reduced
(4) Characteristic where "I-constant" parameter is selected (constant welding current)
(5) Characteristic where "0.1 - 20" parameter is selected (drooping 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 current welding voltage and the current 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
Antistick
To activate/deactivate the anti-stick function

Unit	-
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 Stick
V cut off
For setting a voltage, at which the welding process can be ended by slightly lifting the rod electrode.

Unit	V
Setting range	20.0 - 90.0
Factory setting	90.0

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 V cut off 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 V cut off.

Process parameters for TIG setup

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

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

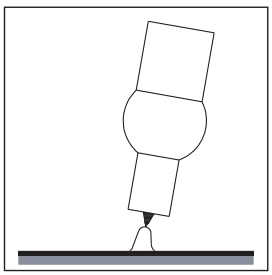
Unit	V
Setting range	10.0 - 30.0
Factory setting	14.0

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

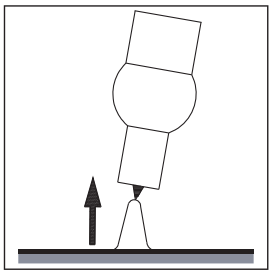
Unit	- / V
Setting range	off / 0.1 - 2.0
Factory setting	0.8

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:

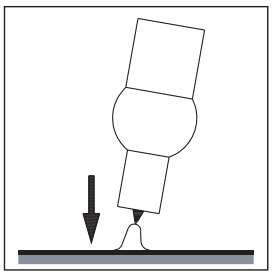


1 Welding

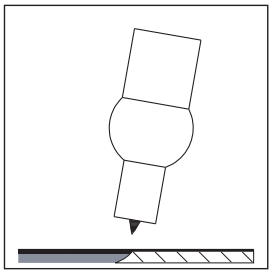


2 At the end of the welding action, briefly raise the welding torch

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 preset 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

Unit	-
Setting range	off / on
Factory setting	off

vd **(1)**
Wire speed

For setting the average wire speed and therefore the welding power for SynchroPulse

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

dFd **(2)**
Delta wire feed

For setting the Delta wire feed:
in SynchroPulse, the set wire speed is alternately increased/reduced by the Delta wire feed. The parameters concerned adapt themselves to this wire speed acceleration/delay accordingly.

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

F **(3)**
Frequency
For setting the frequency for SynchroPulse

Unit	Hz
Setting range	0.5 - 3.0
Factory setting	3.0

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

Unit	%
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)

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

-	short arc
0	uncorrected arc length
+	longer arc

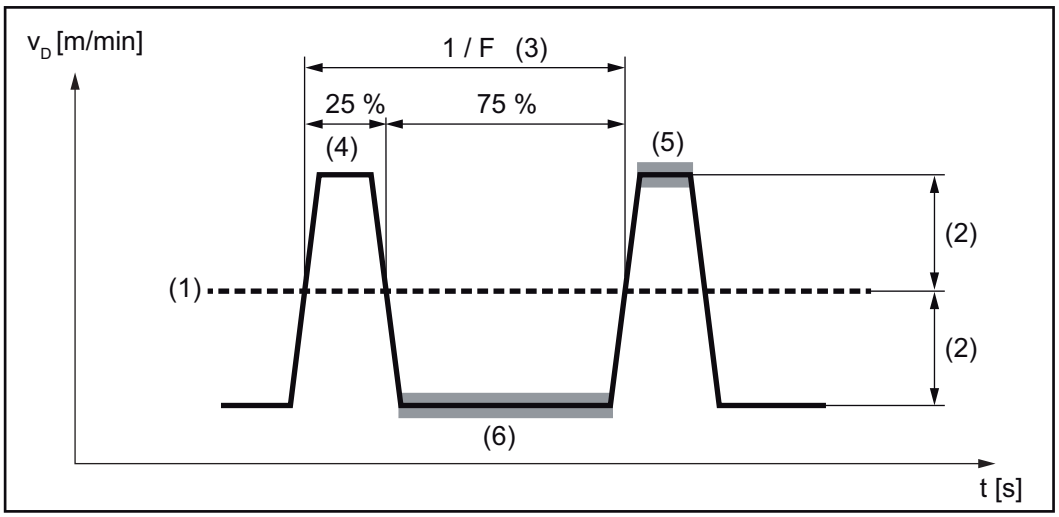
AI-I **(6)**

Arc length correction low

For correcting the arc length for SynchroPulse in the lower operating point (= average wire speed minus Delta wire feed)

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

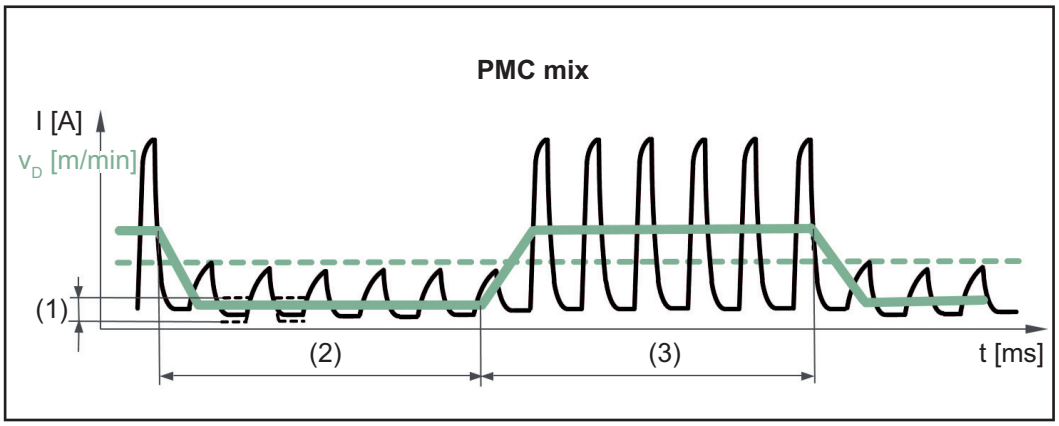
-	short arc
0	uncorrected arc length
+	longer arc



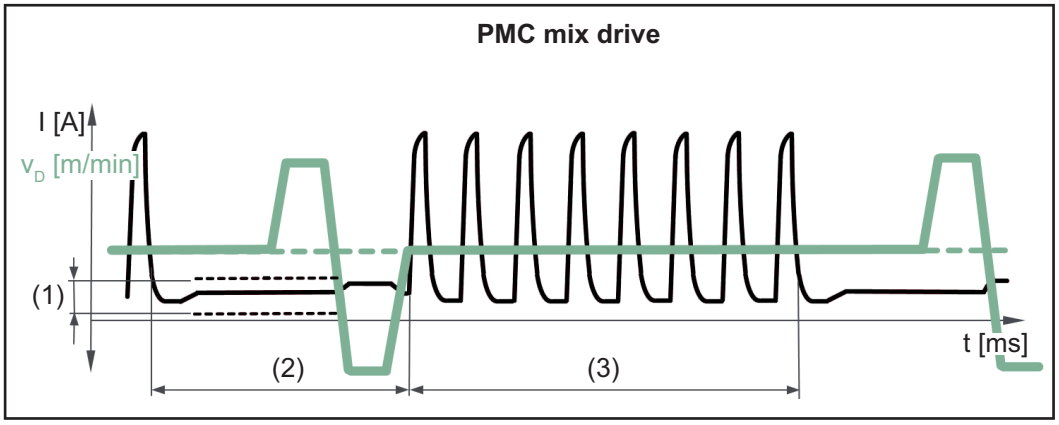
SynchroPulse example, duty cycle (high) = 25%

Process parameters for Process Mix

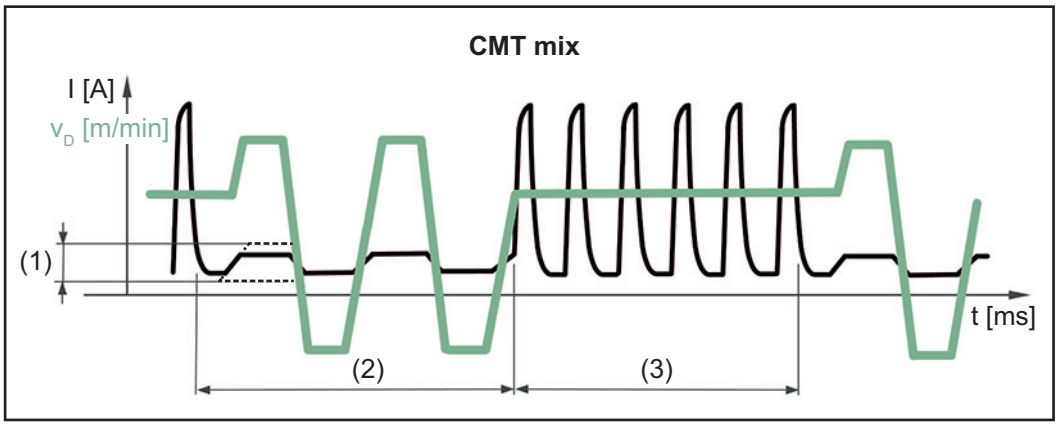
The following process parameters for mixed processes can be set under Process Mix:



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 current charging phase follows a hot PMC process phase with calibration movement.



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
taken from the welding parameters

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

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

AIC
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 the following documents:
- these operating instructions
- 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)
- Setting F1 and F2 special function parameters
- Setting the parameters for the Favourites button
- System data

Under "System"
- Interior lighting setup
- Restoring factory settings
- Reset password for the power source website
- Information
- Mode Setup – Special display for JobMaster
- Special 4-step Guntrigger

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

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

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
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

IMV Image version
SWV Software version
IP IP address

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

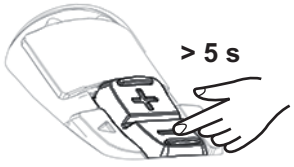
Setting special 4-step mode Guntrigger

1. Select Setup menu / Settings / System / S4S Guntrigger
2. Press the right adjusting dial
3. Activate or deactivate the function by turning the right adjusting dial:
   Standard ... the special display for JobMaster is deactivated
   Guntrigger ... the special 4-step mode Guntrigger 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

With a JobMaster welding torch and with special 4-step mode selected, the Guntrigger function allows you to change jobs via the torch trigger. Job changing takes place within defined job groups.
A job group is defined by the next non-programmed job.

Example:
Job group 1: Job no. 3 / 4 / 5
Job no. 6 is not assigned ==> End of job group 1
Job group 2: Job no. 7 / 8 / 9

- When welding starts, the job with the lowest number within the job group is automatically selected.
- To change to the job with the next highest number within a job group, press the torch trigger briefly (< 0.5 seconds).
- To stop welding, press the torch trigger for more than 0.5 seconds.
- To change to the next job group, press the parameter setting button on the JobMaster welding torch for more than 5 seconds.



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:

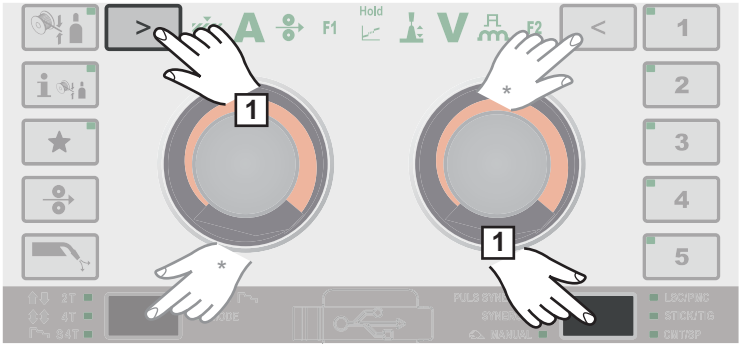
cs	Czech	nl	Dutch
de	German	no	Norwegian
en	English	pl	Polish
es	Spanish	pt	Portuguese (Brazil)
fi	Finnish	ro	Romanian
fr	French	ru	Russian
hr	Croatian	sk	Slovak
hu	Hungarian	sl	Slovenian
it	Italian	sv	Swedish
lt	Lithuanian	tr	Turkish
lv	Latvian	uk	Ukrainian

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:

Power source website

Power source website

General remarks

The power sources have a separate website.
As soon as the power source is integrated into a network, the power source website can be called up via any browser using the power source IP address.

The entries displayed on the website 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
- Signal visualisation
- Overview
- Update
- Function packages
- Synergic lines 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.

User password

The user password can be changed by clicking on this symbol.

Changing the password for the website:

NOTE!
User name = admin (predefined, cannot be edited!)
The password can only be reset on the power source!

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

Settings

The display of characteristics, material specifications and certain welding parameters can be expanded on the power source website by clicking on this symbol.
An alternative unit or standard can also be displayed in addition to the units and standards set on the power source.

Example:
The unit "metric" and the standard "EN" is set on the power source.
Under the settings, the additional display of the alternative unit or standard can now be activated using a selection box.
The values set on the power source are now displayed with a greyed-out selection box and cannot be changed.
If the selection boxes for the alternative unit or standard are activated, characteristics, material specifications and certain welding parameters are displayed with designations corresponding to both standards and with values corresponding to both units.

Language selection

The languages available for the power source website 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

Click on the Fronius logo to open the Fronius homepage:
www.fronius.com

Overview

Overview

In the overview entry, all 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 To start the update process, click the "Search for update file" button.

Searching for an update file (performing the update)

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

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

3 Click "Perform update"

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

The website is not available during the restart.
After the restart the website 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 the "Yes" button

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 is successful, confirmation and the current firmware version are displayed.

Fronius WeldWizard

The Fronius WeldWizard can also be called up in the “Update” entry. The Fronius WeldWizard helps welders, design engineers and work schedulers to estimate various welding parameters.

Fronius WeldWizard

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

Screenshot

Screenshot

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

1 To create a screenshot, click on the "Create screenshot" button.

The screenshot is created with the settings currently appearing on the screen.

Different functions are available for saving the screenshot, depending on the browser being used, and the screen may vary.

Backup & Restore

Backup & Restore

In the Backup & Restore entry,

- all the welding system data can be saved as a backup (e.g. current parameter settings, jobs, user characteristics, defaults, etc.).
- existing backups can be re-saved in the welding system.

Backup (Start back up)

1 To store the welding system data as a backup, click the "Start back up" button

The data is saved by default in the format MCU1-YYYYMMDDHHmm.fbc at a location that can be selected.

YYYY = year
MM = month
DD = day
HH = hour
mm = minute

The date and time information matches the settings on the power source.

Restore (Search restore-file)

1 To transfer an existing backup to the power source, click on the "Search restore-file" button

2 Select the file and click "Open"

The selected backup file will be displayed on the power source website under Restore.

3 Click the "Start restore" button

Once the data has been successfully restored, confirmation is displayed on the screen.

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

The special characteristics present on the power source are displayed under "Special characteristics" 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.

Uploading a function package

1 Organise and save a function package

2 To upload a function package, click the "Search function-package" button

3 Select the desired function package file (*.xml)

4 Click "Open"

The selected function package file will be displayed on the power source website under "Upload function-package".

5 Click on the "Upload function-package" button

Once the function package has been successfully installed, confirmation is displayed on the screen.

Job-Data

Job data

In the “Job data” entry,

- existing welding system jobs can be viewed
- existing welding system jobs can be optimised, provided the OPT/i Jobs option is present on the power source
- jobs stored externally can be transferred to the welding system
- existing jobs in the welding system can be exported as a PDF or CSV file

Job overview

The job overview lists all jobs stored in the welding system.
Clicking on a job displays the data and parameters stored for this job.
Job data and parameters can only be viewed in the job overview. The column width for parameters and values can be easily dragged and adjusted with the mouse pointer.
Other jobs can easily be added to the list with the data listed by clicking on the “Add job” button.

All added jobs are compared to the job that is currently selected.

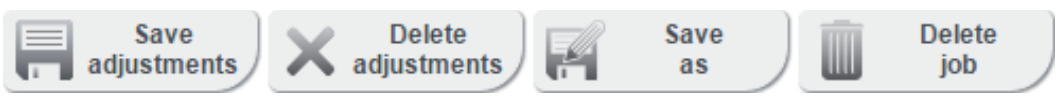
Editing a job

Existing welding system jobs can be optimised, provided the OPT/i Jobs option is present on the power source.

1 Click the "Edit job" button
2 Click the job to be amended in the list of available jobs

The selected job is opened and the following job data is shown:
- **Parameter**
  The parameter currently stored in the job
- **Value**
  The values of the parameter currently stored in the job
- **Change value to**
  For entering the new parameter value
- **Setting range**
  Possible setting range for the new parameter values

3 Amend the values accordingly
4 Save / Delete adjustments, Save as / Delete job



To provide support with editing a job, other jobs can be added with ease to the list with the data displayed by clicking on the "Add job" button.

Creating a new job

1 Click the "Create new job" button

2 Enter job data

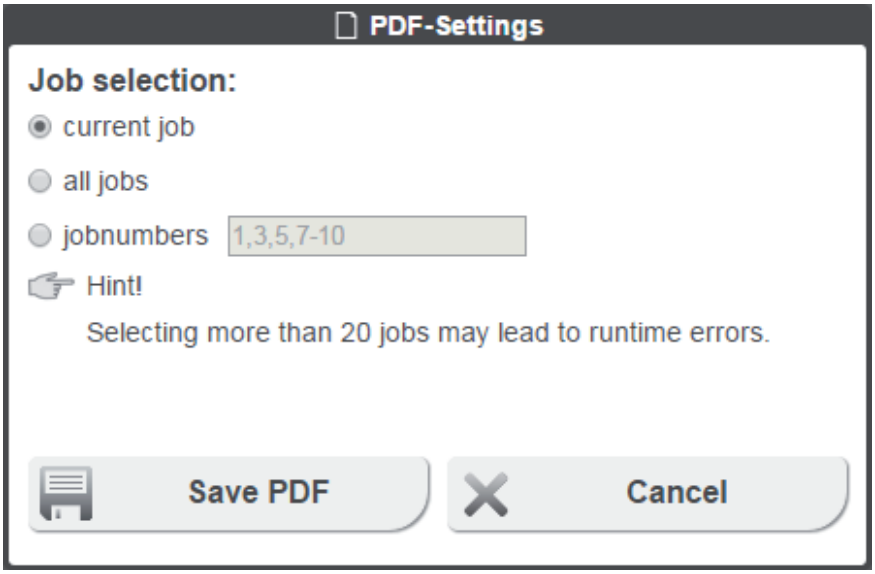
3 Click the "OK" button to accept the new job

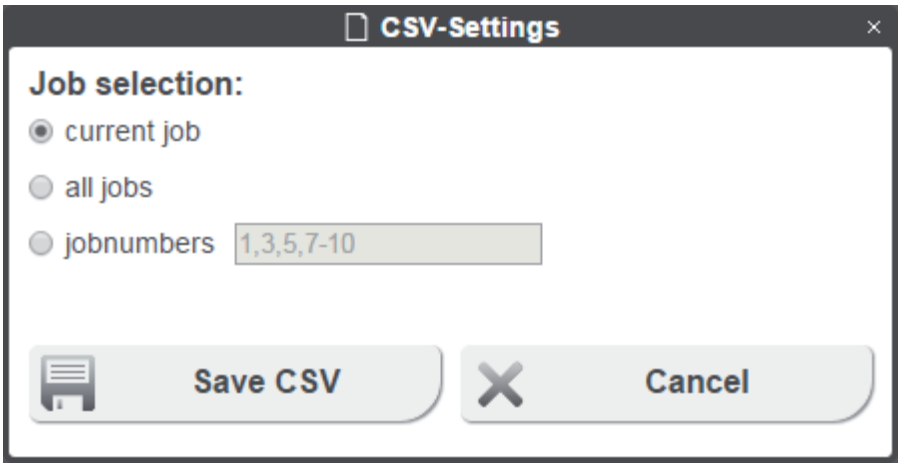
Exporting job(s) as …

Existing jobs in the welding system can be exported as a PDF or CSV file under Job overview and Edit job.

1 Click the "Export job(s) as ..." button

The PDF or CSV settings are displayed.





2 Select the job(s) to be exported:
current job / all jobs / job numbers

3 Click the "Save PDF" or "Save CSV" button

A PDF or CSV file containing the selected jobs is created and saved according to the settings of the browser in question.

Synergic lines overview

Synergic lines overview

In the "Synergic lines overview" entry

- the characteristics available in the welding system can be displayed: ("Available synergic lines" button).

- possible characteristics can be displayed in the welding system: ("Possible synergic lines" button).

The displayed characteristics can each be searched for, sorted and filtered.

The following information about the characteristics is displayed:

- Status
- Materials
- Diameter
- Gas
- Property
- Process
- ID
- replaced by
- Special

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

Column widths are easily adjusted by dragging 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

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 machine from the mains
- Prevent it from being switched on again
- Using a suitable measuring instrument, check to make sure that electrically charged components (e.g. capacitors) have discharged

CAUTION! Inadequate PE conductor connections can cause serious injury and damage. The housing screws provide a suitable PE conductor connection for earthing (grounding) the housing and must NOT be replaced by any other screws which do not provide a reliable PE 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 is faulty
Remedy:	Change the mains fuse protection
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 cut-out system 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:	Replace the fan (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 and terminal for correct polarity
Cause:	There is a break in the current cable in the welding torch
Remedy:	Replace welding torch

Nothing happens when torch trigger is pressed
Mains switch is on and indicators are lit up

Cause:	The control plug is not plugged in
Remedy:	Plug in the control plug
Cause:	Welding torch or welding torch control line is faulty
Remedy:	Replace welding torch

No protective gas shield
All other functions are OK

Cause:	Gas cylinder is empty
Remedy:	Change the gas cylinder
Cause:	Gas pressure regulator is faulty
Remedy:	Change the gas pressure regulator
Cause:	The gas hose is not connected, or is damaged or kinked
Remedy:	Connect/replace the gas hose, or straighten out kinks
Cause:	Welding torch is faulty
Remedy:	Change the welding torch
Cause:	Gas solenoid valve is faulty
Remedy:	Replace gas solenoid valve

Poor weld properties

Cause:	Incorrect welding parameters
Remedy:	Check the settings
Cause:	Poor grounding (earthing) 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; check the weldability of the base metal
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.
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

The 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 machines: Inadequate coolant flow
Remedy:	Check coolant fill level, coolant flow, for coolant contamination, etc.

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 machine from the mains
- Prevent it from being switched on again
- Using a suitable measuring instrument, check to make sure that electrically charged components (e.g. capacitors) have 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

NOTE! Risk of damage to electronic components. Do not bring 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 DownloadCenter)
File format: official_tpsi_x.x.x-xxxx.ffw

2 Establish Ethernet connection between PC/laptop and power source

3 Open the power source website (see page 115)

4 Transfer the firmware to the power source (see page 119)

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

Appendix

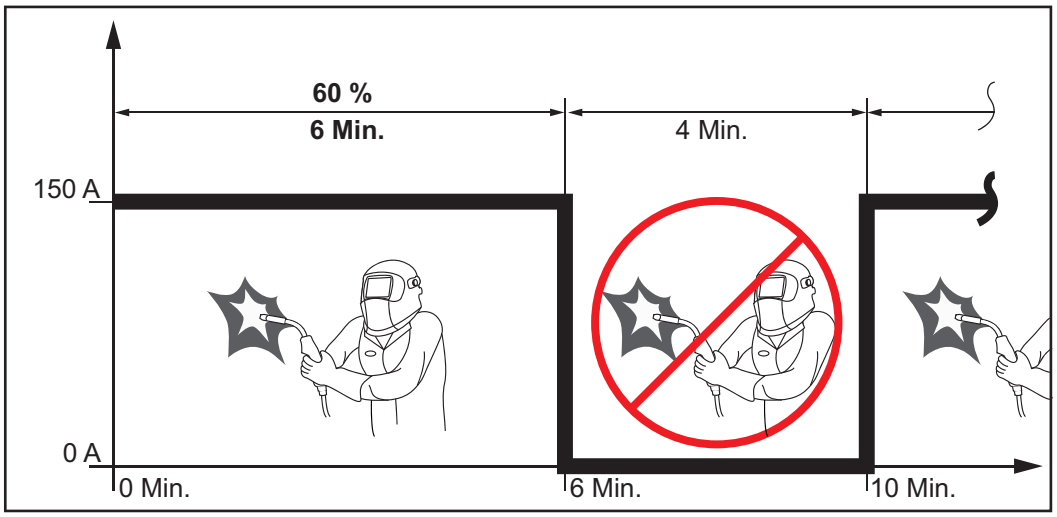
Technical data

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%
Mains frequency	50/60 Hz
Cos phi (1)	0.99
Max. permissible mains impedance Z_{max} at PCC[1)]	117 mOhm
Recommended residual-current circuit breaker	Type B

Welding current range (I_2)				
MIG/MAG				3 - 270 A
TIG				3 - 270 A
Rod electrode				10 - 270 A
Welding current at	10 min/40 °C (104 °F)	40%	60%	100%
		270 A	220 A	190 A
Output voltage range according to standard characteristic (U_2)				
MIG/MAG				14.2 - 27.5 V
TIG				14.1 - 20.8 V
Rod electrode				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 level 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 feed speed	1 - 25 m/min or 40 - 980 ipm
Wire drive	4 roller drive
Wire diameter	0.8 - 1.6 mm or 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 wire-feed unit 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 V	400 V	460 V
Max. effective primary current (I_{1eff})		9.5 A	9.7 A	8.5 A
Max. primary current (I_{1max})		16.0 A	15.3 A	13.4 A
Mains fuse protection				16 A slow-blow

Mains voltage tolerance	-10/+15%
Mains frequency	50/60 Hz
Cos phi (1)	0.99
Max. permissible mains impedance Z_{max} at PCC[1)]	117 mOhm
Recommended residual-current circuit breaker	Type B

Welding current range (I_2)				
MIG/MAG				3 - 270 A
TIG				3 - 270 A
Rod electrode				10 - 270 A
Welding current at	10 min/40 °C (104 °F)	40%	60%	100%
		270 A	220 A	190 A
Output voltage range according to standard characteristic (U_2)				
MIG/MAG				14.2 - 27.5 V
TIG				14.1 - 20.8 V
Rod electrode				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 level 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 feed speed	1 - 25 m/min or 40 - 980 ipm
Wire drive	4 roller drive
Wire diameter	0.8 - 1.6 mm or 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 wire-feed unit 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 V	230 V
Max. effective primary current (I_{1eff})			16.9 A	15.1 A
Max. primary current (I_{1max})			26.5 A	23.7 A
Mains fuse protection				35 A slow-blow

Mains voltage (U_1)	3 x	380 V	400 V	460 V
Max. effective primary current (I_{1eff})		9.5 A	9.7 A	8.5 A
Max. primary current (I_{1max})		16.0 A	15.3 A	13.4 A
Mains fuse protection				16 A slow-blow

Mains voltage tolerance	-10/+15%
Mains frequency	50/60 Hz
Cos phi (1)	0.99
Max. permissible mains impedance Z_{max} at PCC[1)]	117 mOhm
Recommended residual-current circuit breaker	Type B

Welding current range (I_2)				
MIG/MAG				3 - 270 A
TIG				3 - 270 A
Rod electrode				10 - 270 A
Welding current at	10 min/40 °C (104 °F)	40%	60%	100%
		270 A	220 A	190 A

Output voltage range according to standard characteristic (U_2)	
MIG/MAG	14.2 - 27.5 V
TIG	14.1 - 20.8 V
Rod electrode	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 level 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 feed 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 wire-feed unit 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 V	575 V
Max. effective primary current (I_{1eff})			9.1 A	7.2 A
Max. primary current (I_{1max})			14.3 A	11.4 A
Mains fuse protection				20 A slow-blow

Mains voltage tolerance	-10/+10%
Mains frequency	50/60 Hz
Cos phi (1)	0.99
Recommended residual-current circuit breaker	Type B

Welding current range (I_2)				
MIG/MAG				3 - 270 A
TIG				3 - 270 A
Rod electrode				10 - 270 A
Welding current at	10 min/40 °C (104 °F)	40%	60%	100%
		270 A	220 A	190 A
Output voltage range according to standard characteristic (U_2)				
MIG/MAG				14.2 - 27.5 V
TIG				14.1 - 20.8 V
Rod electrode				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 level 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)

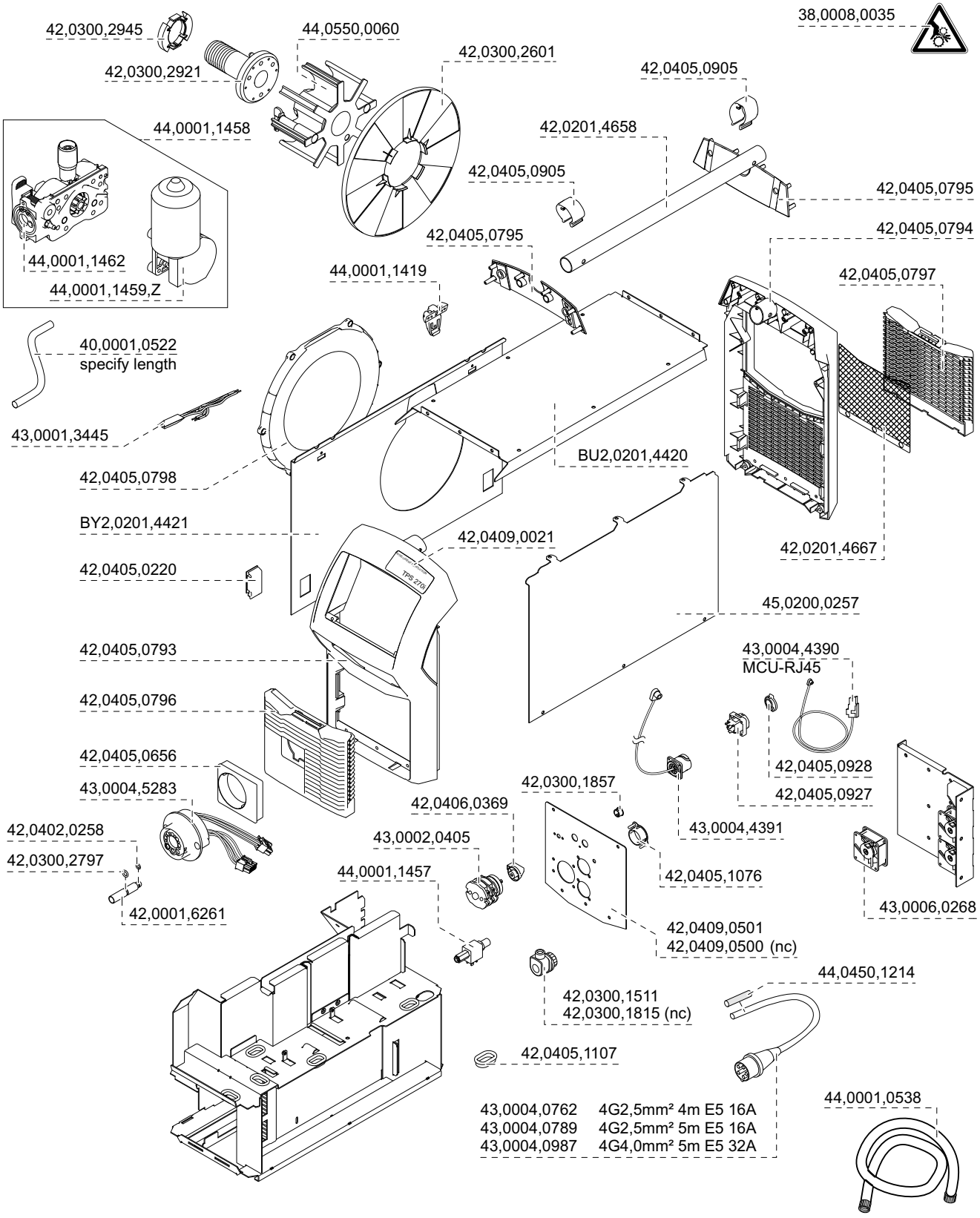
Max. shielding gas pressure	7 bar/101.5 psi
Coolant	Original Fronius

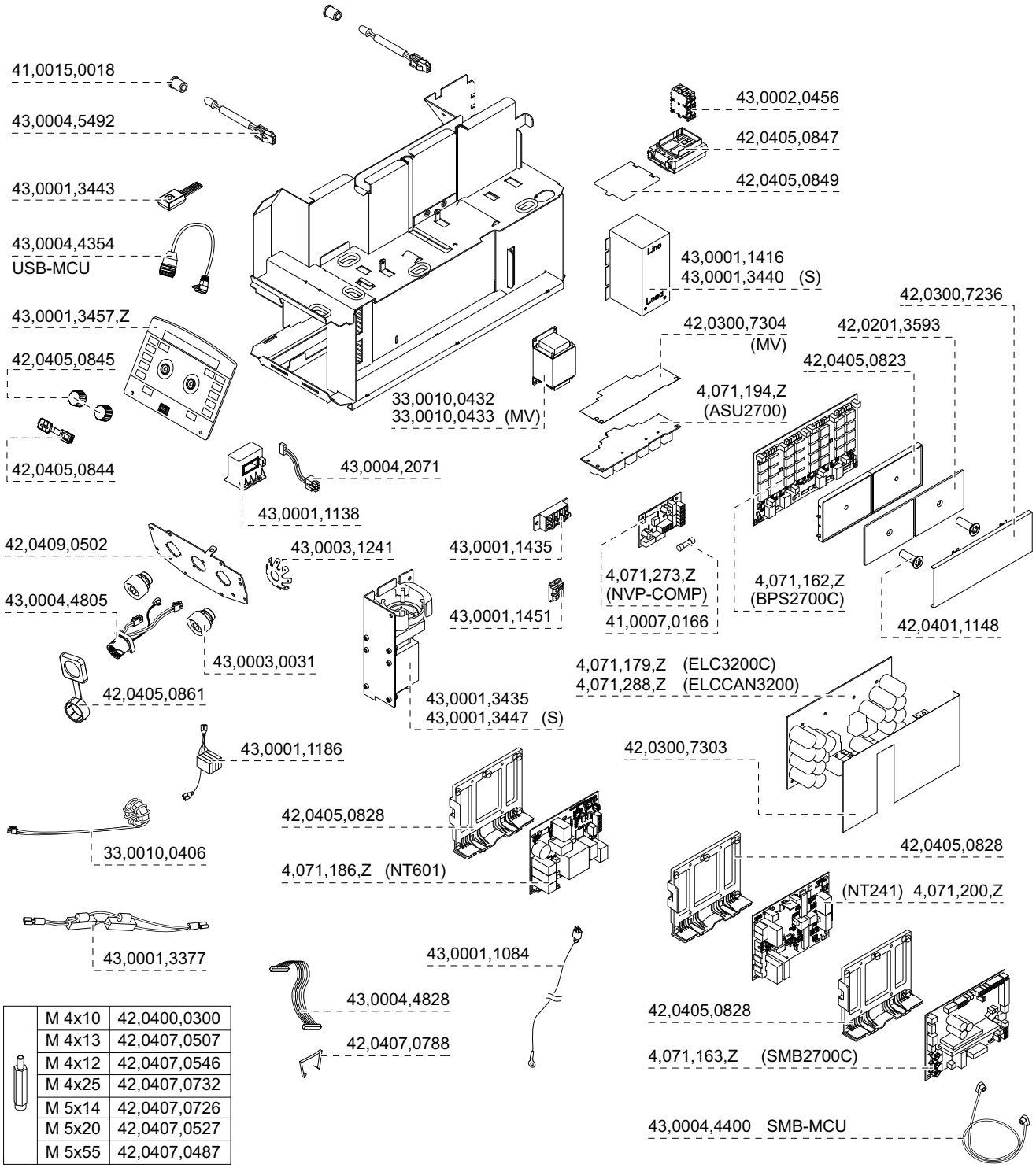
Wire feed speed	1 - 25 m/min or 40 - 980 ipm
Wire drive	4 roller drive
Wire diameter	0.8 - 1.6 mm or 0.03 - 0.06 in.
Wirespool diameter	max. 300 mm/max. 11.8 in.
Wirespool weight	max. 19.0 kg/max. 41.9 lb.

The wire-feed unit for the TPS 270i C is integrated in the power source.

Spare parts list: TPS 270i C

TPS 270i C PULSE /4R/FSC	**4,075,170**
TPS 270i C PULSE /4R/FSC/nc	**4,075,170,800**
TPS 270i C PULSE /4R/FSC/MV/nc	**4,075,170,830**
TPS 270i C PULSE /4R/FSC/S/nc	**4,075,170,970**

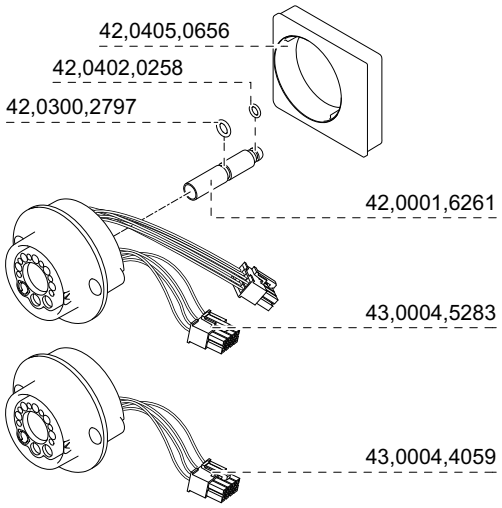




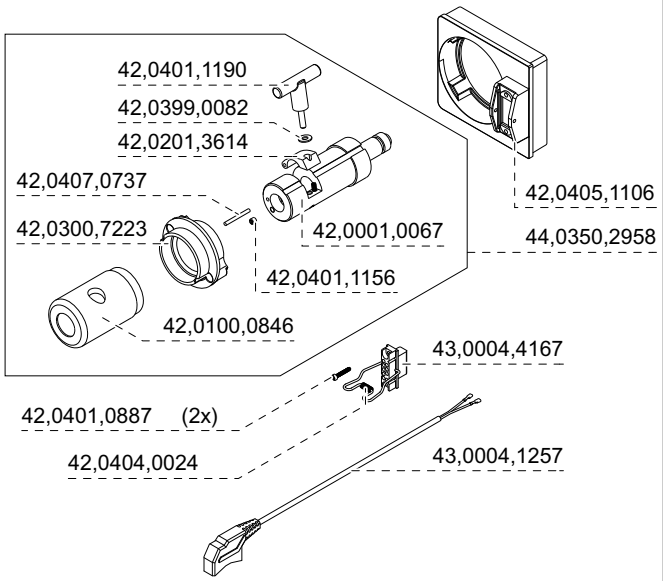
M 4x10	42,0400,0300
M 4x13	42,0407,0507
M 4x12	42,0407,0546
M 4x25	42,0407,0732
M 5x14	42,0407,0726
M 5x20	42,0407,0527
M 5x55	42,0407,0487

Connectors

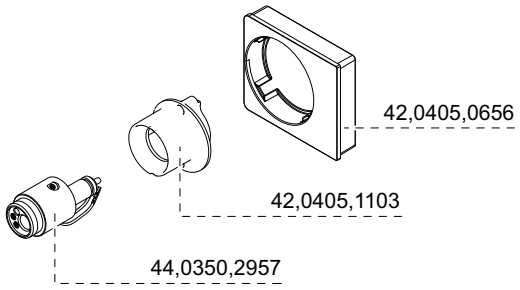
FSC = Fronius system connection



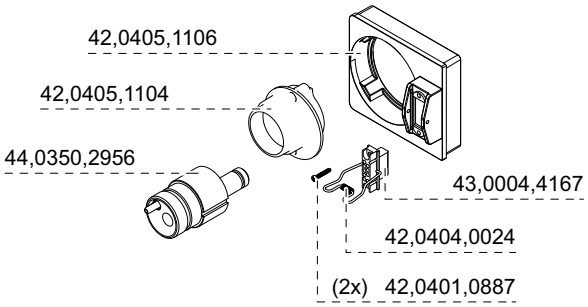
TW = Tweco connection



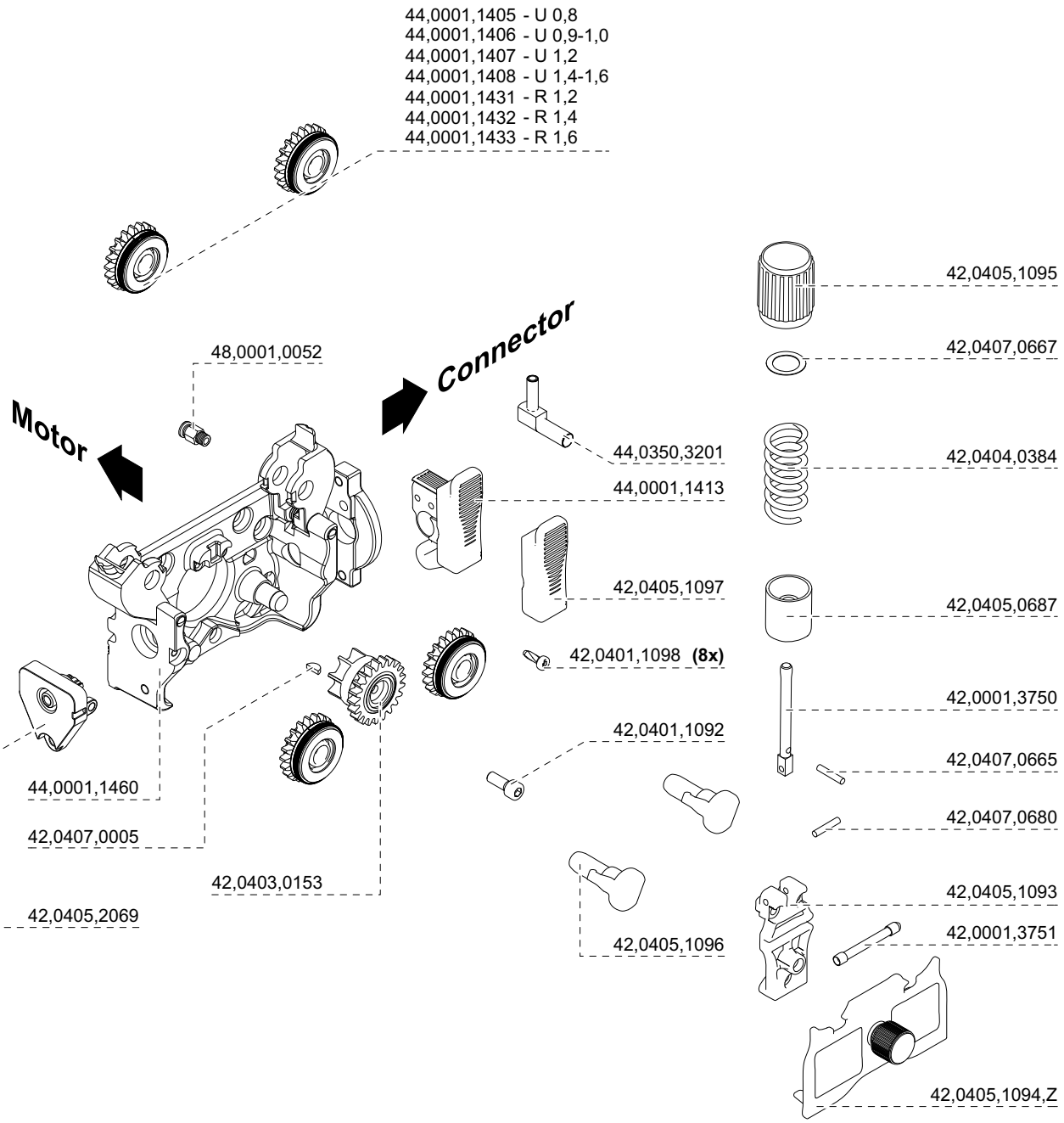
E = Euro connection



F++ = Fronius connection



motor plate alu 4R s - compact



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