Fronius

TÄYDELLISTÄ HITSAUSTA

TRANS STEEL 3500 C0MPACT

/ Operating Instructions
/ Spare Parts List

v.01/2012 ENG

Dear reader,

GB

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", 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
- 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 kept in a legible state
- must not be damaged/marked
- 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 remarks" in the operating instructions for the device. Before switching on the device, remove any faults that could compromise safety.
Your personal safety is at stake!

Intended purpose

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

The device is intended for the welding process described on the rating plate only.
Any use above and beyond this purpose is deemed improper. The manufacturer shall not be liable for any damage resulting from such improper use.

Utilisation in accordance with the "intended purpose" also comprises
- reading carefully and following all operating instructions to the letter
- studying and obeying all safety and danger notices carefully
- performing all stipulated inspection and servicing work.

Never use the device for the following purposes:
- Thawing out pipes
- Charging batteries/accumulators
- 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 unexpected 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 liable for any damage resulting from such improper use.

Ambient temperature:
- during operation: -10 °C to + 40 °C (14 °F to 104 °F)
- during transport and storage: -25 °C to +55 °C (-13 °F to 131 °F)

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

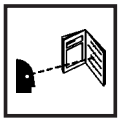
Ambient air: free from dust, acids, corrosive gases and substances, etc.
For use at altitudes above sea level: up to 2000 m (6500 ft)

Obligations of the operator

The operator undertakes only to allow persons to work with the device who:
- are familiar with the fundamental instructions regarding safety and accident prevention, and have been instructed 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.

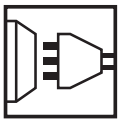
Obligations of personnel



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 work area, 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 input.

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

*)at the interface with the public mains network

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.

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 safety 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 danger from mains or welding current, etc.),
- provide suitable protective equipment or
- erect suitable safety screens/curtains.

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.

If this cannot be provided, a protective mask with an air supply must be worn.

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

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

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

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

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

Danger from flying sparks

Flying sparks may cause fires or explosions.

Never weld close to flammable materials.

Flammable materials must be at least 11 metres (35 ft) 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 life threatening and can be fatal.

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

During MIG/MAG or TIG welding, the welding wire, the wirespool, the drive rollers and all metal parts that are in contact with the welding wire are live.

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

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

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

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

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

Arrange for the mains and device supply to be checked regularly by a qualified electrician to ensure the PE conductor is functioning properly.

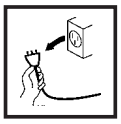
The device must only be operated on a mains supply with a PE conductor and a socket with an earth contact.

If the device is operated on a mains without a PE conductor and in a socket without an earth contact, this will be deemed gross negligence. The manufacturer shall not be liable for any damage resulting from such improper use.

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 reconnecting it to the mains and switching it on again.

After opening the device:
- discharge all components holding an electric charge
- ensure that all components in the device are de-energised.

If work on live parts cannot be avoided, 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 PE 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 with emission class A:
- are only designed for use in an industrial setting
- can cause conducted and emitted interference in other areas.

Devices with emission class B:
- satisfy the emissions criteria for residential and industrial areas. This also applies to residential areas in which power is supplied from the public low-voltage grid.

EMC device classification according to the rating plate or the 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 for possible problems, and check and evaluate neighbouring devices' resistance to interference according to national and international requirements:
- Safety features
- power, signal and data transfer lines
- IT and telecommunications devices
- measuring and calibrating devices

Supporting measures for avoidance of EMC problems:
a) Mains supply
   - if electromagnetic interference arises despite correct mains connection, additional measures are necessary (e.g. use a suitable line filter).
b) Welding leads
   - must be kept as short as possible
   - must run close together (to avoid EMF problems)
   - must be kept well apart from other leads
c) Equipotential bonding
d) Earthing the workpiece
   - if necessary, establish an earth connection using suitable capacitors.
e) 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 danger points

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.

When in use:
- ensure that all covers are closed and all side panels are fitted properly.
- keep all covers and side panels closed.

A high risk of injury exists when the welding wire emerges from the welding torch (piercing of the hand, injuries to the face and eyes, etc.). Always keep the torch well away from the body (devices with a wire-feed unit).

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

Slag can sometimes fly off workpieces as they cool down. 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 that are to be used in rooms/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.

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

- Hook chains and/or ropes onto the suspension points provided on the load-carrying equipment.
- Chains/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 wire-feed unit holder (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, fork-lift or other mechanical hoist.

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 shielding gas connection using suitable Teflon tape.

Danger from shielding gas cylinders

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

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

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

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

Never hang a welding torch on a shielding gas cylinder.

Never touch a shielding gas cylinder with an electrode.

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

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

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

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

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

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

Safety measures at the installation location and during transport

A device that topples over can easily kill someone. Place the device on a solid, level surface in such a way that it remains stable
- The maximum permissible slope is 10°.

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

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 a gap of 0.5 m (1 ft. 7.69 in.) all round so that cooling air can enter and exit unhindered.

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

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

After transporting the device, and before commissioning, you MUST carry out a visual inspection to check whether it has been damaged in any way. Any damage must be repaired by trained service technicians before commissioning takes place.

Safety measures in normal operation

Only operate the device when all protection devices are fully functional. If the protection 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 protection devices.

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

- Check the device at least once a week for obvious damage and proper functioning of safety devices.
- Always fasten the shielding gas cylinder securely and remove it beforehand if the device is to be transported by crane.
- Only the manufacturer's original coolant is suitable for use with our devices due to its properties (electrical conductivity, frost protection, material compatibility, flammability, etc.)
- Only use suitable original coolant from the manufacturer.
- Do not mix the manufacturer's original coolant with other coolants.
- If damage results from using a different coolant, the manufacturer accepts no liability. In addition, no warranty claims will be entertained.
- 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. A safety data sheet may be obtained from your service centre or downloaded from the manufacturer's website.
- Check the coolant level before you start to weld while the system is still cool.

Maintenance and repair

It is impossible to guarantee that bought-in parts are designed and manufactured to meet the demands made on them, or that they satisfy safety requirements. Use only original replacement 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 changed 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.

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

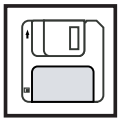
Do not dispose of this device with normal domestic waste! To comply with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and its implementation as national law, electrical equipment that has reached the end of its life must be collected separately and returned to an approved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

Safety symbols

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

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

Data protection



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

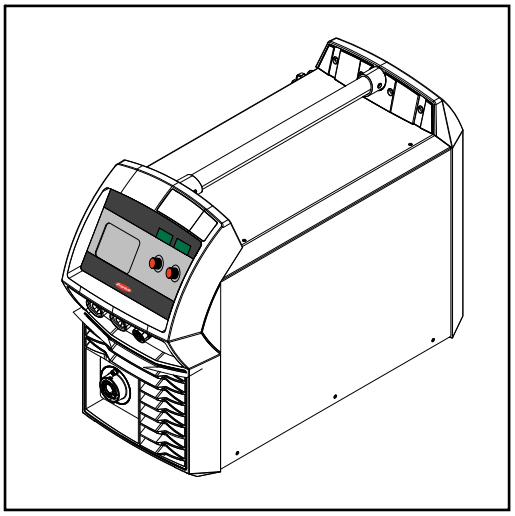
Copyright

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 TransSteel (TSt) 3500c power sources are completely digitised, microprocessor-controlled inverter power sources.

The modular design and potential for system add-ons ensure a high degree of flexibility. The devices are designed for the welding of steel.

All devices are suitable for:
- MIG/MAG welding
- Manual metal arc welding

Functional principle

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

The device has a "Power limitation" safety feature. This means that the power source can be operated at the power limit without compromising process safety. For more information, see the "Welding mode" section.

This results in:
- A precise welding process
- A high degree of reproducibility of all results
- Excellent weld properties.

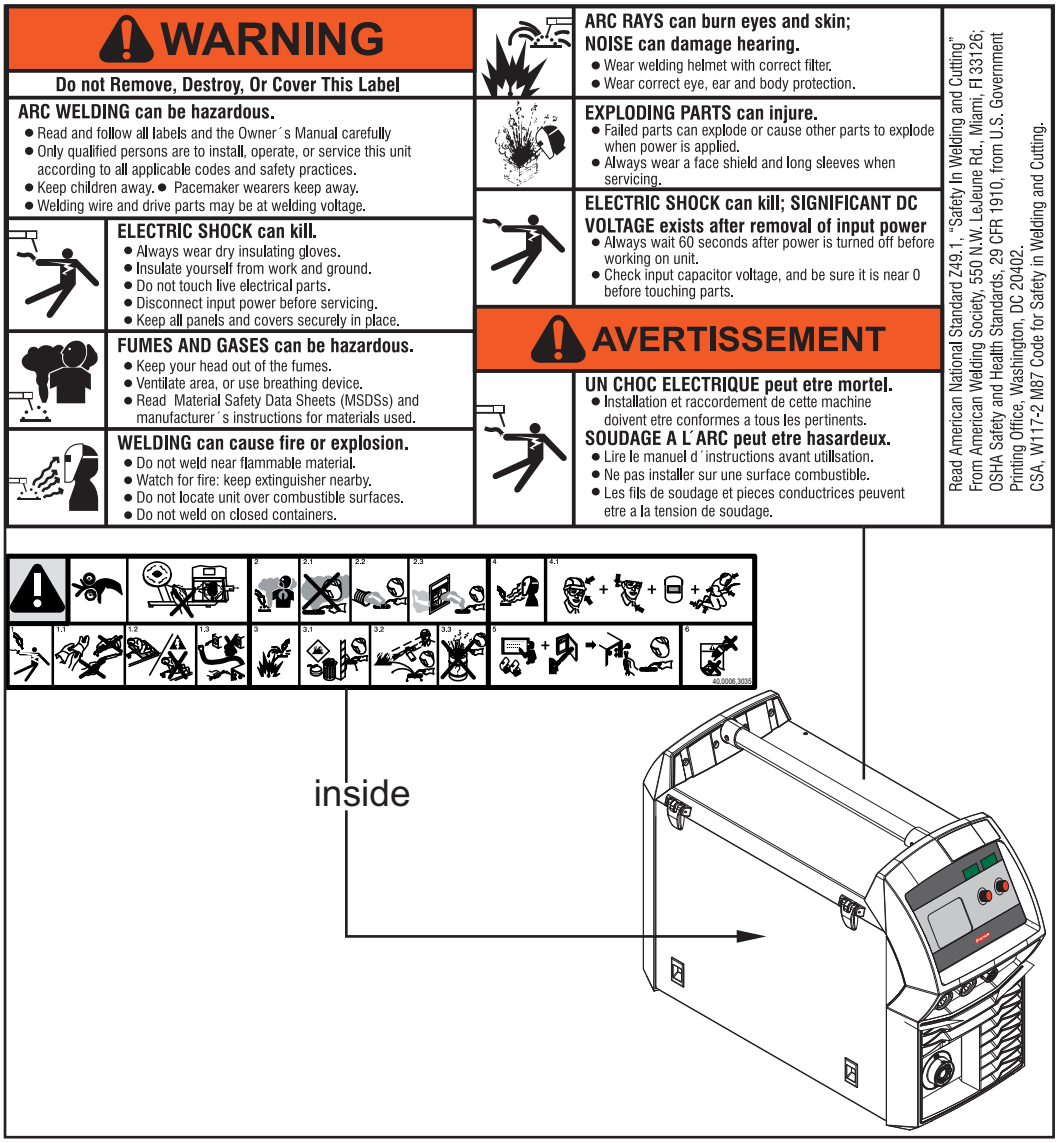
Application areas

The devices are used in workshops and industry for manual applications with classical steel and galvanised sheets.

The TSt 3500c power sources are designed for:
- Machine and equipment construction
- Steelwork
- Plant and container construction
- Metal and gantry construction
- Rail vehicle construction

Warning notices on the device

Warning notices and safety symbols are affixed to the power sources. These warning notices and safety symbols must not be removed or painted over. They warn against operating the equipment incorrectly, as this may result in serious injury and damage.



Safety symbols on the rating plate

Welding is dangerous. The following basic requirements must be met:

- Welders must be sufficiently qualified
- Suitable protective equipment must be used
- Keep all persons not involved in the welding process at a safe distance

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

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

System components

General

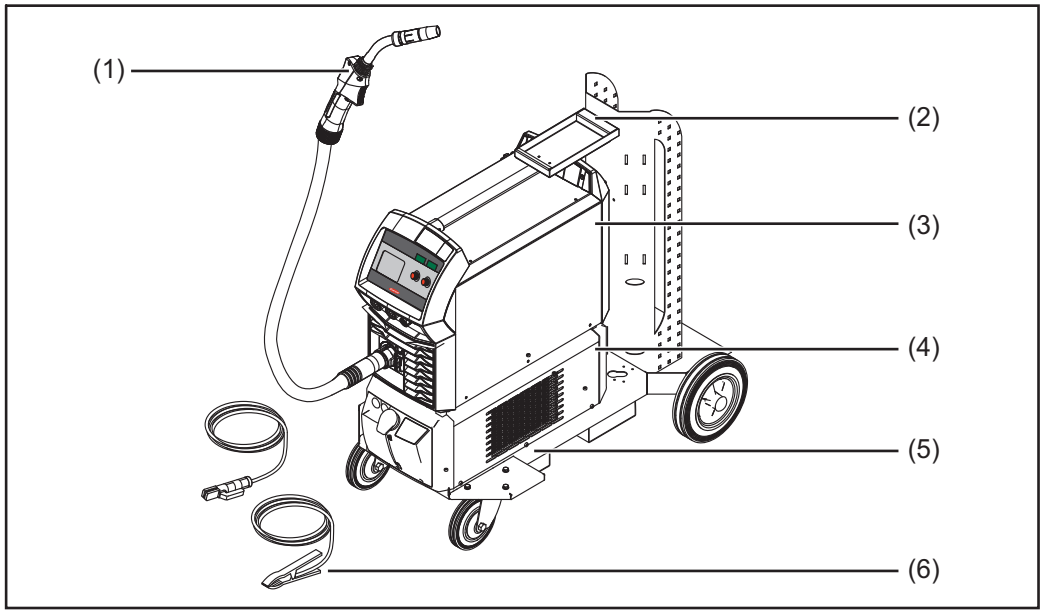
The power sources can be operated with various system components and options. This makes it possible to optimise procedures and to simplify machine handling and operation, as necessitated by the particular field of application in which the power source is to be used.

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

Overview



No.	Function
(1)	Welding torch
(2)	Stabilising the gas cylinder holder
(3)	Power source
(4)	Cooling unit
(5)	Trolley and gas cylinder holder
(6)	Grounding (earthing) cable and electrode cable

Control elements and connections

Description of the control panel

General

The functions on the control panel are all arranged in a logical way. The individual parameters required for welding can be

- selected easily using buttons
- altered using buttons or the adjusting dial
- displayed on the digital display during welding

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

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

Safety

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

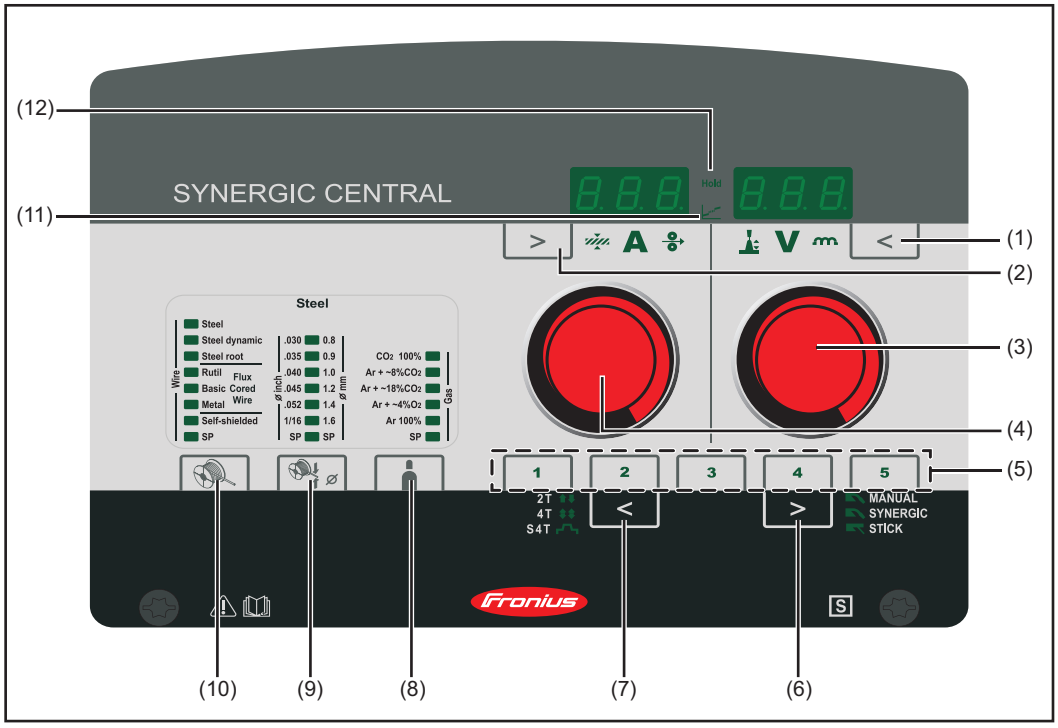
- these operating instructions
- all the operating instructions for the system components, especially the safety rules

Synergic control panel

General

The power source uses the Synergic control panel and certain general items of data, such as sheet thickness, filler metal, wire diameter and shielding gas, to calculate the best welding parameters. As a result, stored knowledge is available at all times. All the parameters can be adjusted manually. The Synergic control panel also allows parameters to be set manually.

Synergic control panel



No.	Function
(1)	**"Parameter selection" button (right)** a) for selecting the following welding parameters

Arc length correction
for correcting the arc length

V **Welding voltage *)**
Welding voltage in V.
Before the start of welding, the system automatically displays a standard value based on the programmed parameters. During welding, the actual value is

displayed.

Dynamic
for influencing the short-circuiting dynamic at the moment of droplet transfer
- ... harder, more stable arc
0 ... neutral arc
+ ... soft, low-spatter arc

The relevant symbol lights up when a welding parameter is selected.

*) In the MIG/MAG standard synergic welding process, if one of these parameters is selected then the synergic function ensures that all other parameters, including the welding voltage parameter, are adjusted automatically.

b) for changing parameters in the set-up menu

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(2) **"Parameter selection" button (left)**
a) for selecting the following welding parameters

Sheet thickness
Sheet thickness in mm or in.
If the welding current to be selected is not known it is sufficient to enter the sheet thickness. The required welding current and any other parameters marked with *) will then be adjusted automatically.

Welding current *)
Welding current in A
Before the start of welding, the system automatically displays a standard value based on the programmed parameters. During welding, the actual value is displayed.

Wire feed speed *)
Wire feed speed (m/min or ipm).

The relevant symbol lights up when a welding parameter is selected.

*) In the MIG/MAG standard synergic welding process, if one of these parameters is selected then the synergic function ensures that all other parameters, including the welding voltage parameter, are adjusted automatically.

b) for changing parameters in the set-up menu

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(3) **Adjusting dial (right)**
for changing the arc length correction, welding voltage and dynamic welding parameters
for changing welding parameters in the set-up menu

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(4) **Adjusting dial (left)**
for changing the sheet thickness, welding current and wire feed speed welding parameters
for selecting welding parameters in the set-up menu

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(5) **"Save" buttons (Easy Job)**
for saving up to 5 operating points

(6) **"Process" button**

for selecting the welding process

- MANUAL - MIG/MAG standard manual welding
- SYNERGIC - MIG/MAG standard synergic welding
- STICK - MMA welding

(7) **"Mode" button**

for selecting the mode

- 2 T - 2-step mode
- 4 T - 4-step mode
- S 4 T - Special 4-step mode

(8) **"Protective gas shield" button**

For selecting the shielding gas to be used. The SP parameter is intended for additional shielding gases.

When a shielding gas is selected, the LED behind the relevant shielding gas lights up.

(9) **"Wire diameter" button**

For selecting the wire diameter to be used. The SP parameter is intended for additional wire diameters.

When a wire diameter is selected, the LED behind the relevant wire diameter lights up.

(10) **"Material" button**

For selecting the filler metal to be used. The SP parameter is intended for additional filler metals.

When a material is selected, the LED behind the relevant filler metal lights up.

(11) **Intermediate arc indicator**

A spatter-prone intermediate arc forms between the short circuit arc and the spray arc. The intermediate arc indicator lights up to alert you to this critical area.

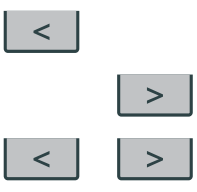
(12) **HOLD indicator**

Whenever welding stops, the actual values for welding current and welding voltage are stored, and the “Hold” indicator lights up.

Service parameters

Various service parameters can be retrieved by pressing the "Parameter selection" buttons at the same time.

Opening the display



1 Press and hold the "Parameter selection" button (left)

2 Press the "Parameter Selection" button (right)

3 Release the "Parameter selection" buttons

The first "firmware version" parameter is displayed, e.g. "1.00 | 4.21"

Selecting parameters

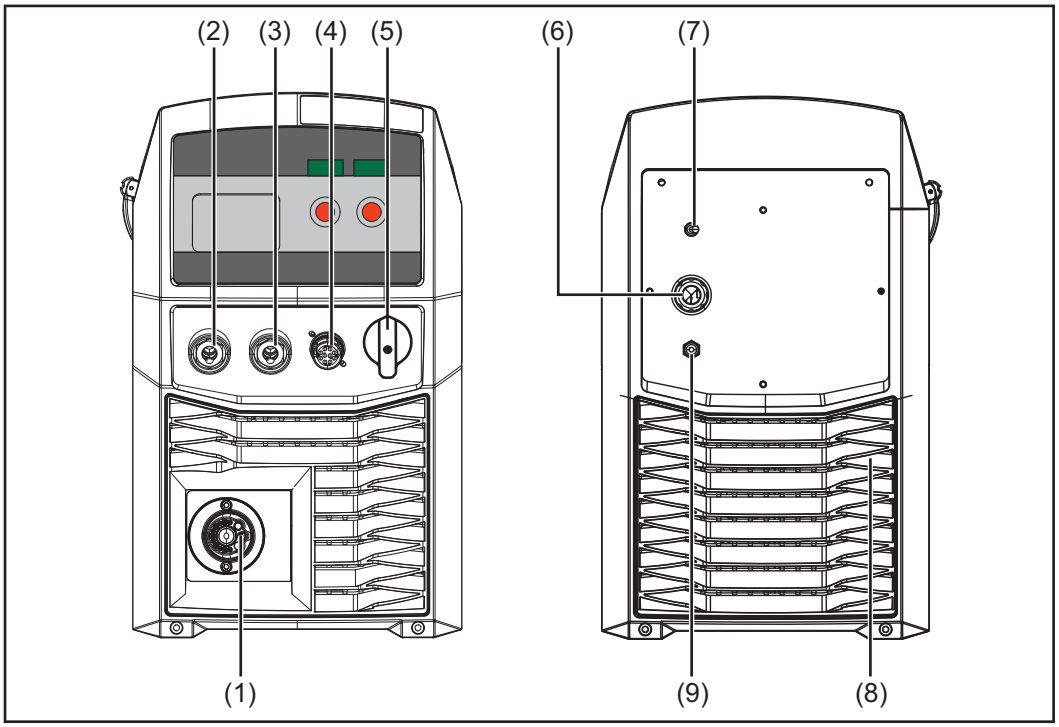
< > 1 Select the required setup parameter using the "Mode" and "Process" buttons or the left adjusting dial

Available parameters

< + >	**Explanation**
Example: 1.00 | 4.21	Firmware version
Example: 2 | 491	Welding program configuration
Example: r 2 | 290	Number of the currently selected welding program
Example: iFd | 0.0	Motor current for wire drive in A The value changes as soon as the motor is running.
2nd	2nd menu level for service engineers

Connections, switches and mechanical components

Front and rear



No.	Function
(1)	**Welding torch connection** for connecting the welding torch
(2)	**(-) - Current socket with bayonet latch** used for - connecting the grounding (earthing) cable during MIG/MAG welding - connecting the electrode cable or grounding (earthing) cable during MMA welding (depending on the type of electrode used)
(3)	**(+) - Current socket with bayonet latch** used for - connecting the electrode cable or grounding (earthing) cable during MMA welding (depending on the type of electrode used)
(4)	**LocalNet connection** Standardised connection socket for remote control
(5)	**Mains switch** for switching the power source on and off
(6)	**Mains cable with strain relief device**
(7)	**"Feeder inching"/"Gas test" button** Push button downwards and hold: for threading the wire electrode into the torch hosepack with no accompanying flow of gas. While the button is being held down, the wire drive runs at wire threading

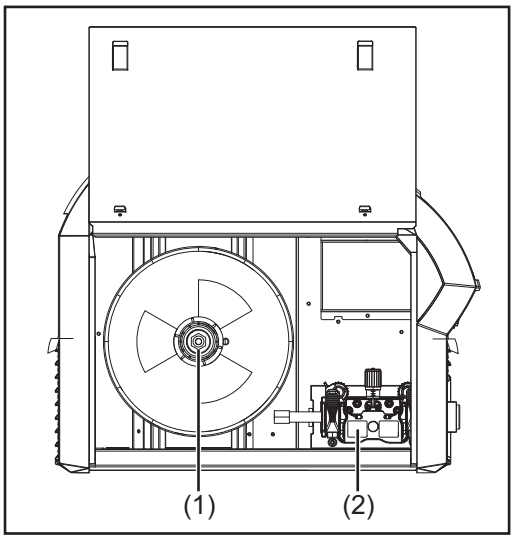
speed.

Push button upwards:
to set the required gas flow rate at the pressure regulator.
Tap button once: shielding gas flows out
Tap button again: shielding gas flow stops

If the "Gas test" button is not tapped again, the shielding gas flow will stop after 30 s.

(8)	**Air filter**
(9)	**Shielding gas connection**

Page



No.	Function
(1)	**Wirespool holder with brake** for holding standard wirespools with a max. diameter of 300 mm (11.81 in.) and a max. weight of up to 19 kg (41.89 lbs.)
(2)	**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 welding, gas-cooled

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

MIG/MAG welding, water-cooled

- Power source
- Cooling unit including coolant
- Grounding (earthing) cable
- MIG/MAG welding torch, water-cooled
- Gas connection (shielding gas supply)
- Wire electrode

Manual metal arc welding

- Power source
- Grounding (earthing) cable
- Electrode holder
- Rod electrode

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

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

Utilisation for intended purpose only

The power source may only be used for MIG/MAG and MMA welding.
Any other form of usage is deemed "not in accordance with the intended purpose".
The manufacturer shall not be held liable for any damages arising from such usage.

Utilisation in accordance with the "intended purpose" also comprises
- 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, meaning:
- protection against penetration by solid foreign bodies with diameters > 12 mm (0.49 in.)
- protection against water sprayed directly at any angle up to 60° from the vertical

The device can be set up and operated outdoors in accordance with degree of protection IP 23.
Avoid direct wetting (e.g. from rain).

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

CAUTION! Electroconductive metallic dust may damage the device. The air filter is a very important safety feature for achieving IP 23. Always fit the air filter when operating the device.

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. Electroconductive metallic dust (e.g. from grinding work) must not be allowed to get sucked into the device.

Mains connection

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

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

Connecting the mains cable

General

A strain-relief device for the following cable cross-sections is fitted to the power source:

Power source	Cable cross-section Canada/US	Europe
TSt 3500c	AWG 12 *)	4G2.5

*) Canada/US cable type: extra-hard usage

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

Stipulated mains cables and strain-relief devices

Power source	Mains voltage	Cable cross-section Canada/US	Europe
TSt 3500c	3 x 380 / 400 V	AWG 12 *)	4G2.5
	3 x 460 V	AWG 12 *)	4G2.5

*) Canada/US cable type: extra-hard usage

The item numbers of the different cables can be found in the spare parts list towards the end of the document.

American **w**ire **g**auge

Connecting the mains cable

If no mains cable is connected, a mains cable that is suitable for the connection voltage must be fitted before commissioning.

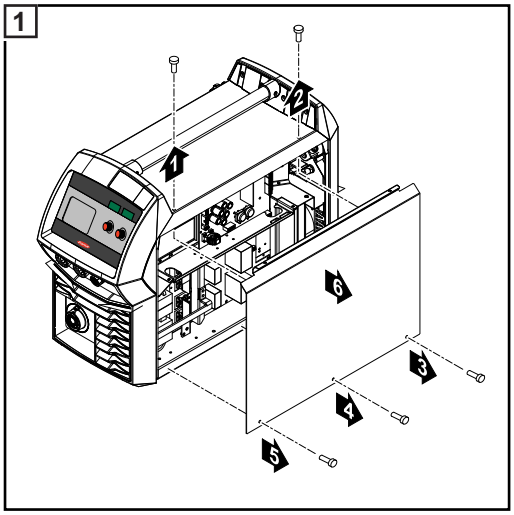
CAUTION! If no ferrules are used, there is a risk of injury and damage from short circuits between the phase conductors or between the phase conductors and the PE conductor. Fit ferrules to all phase conductors and the PE conductor of the stripped mains cable.

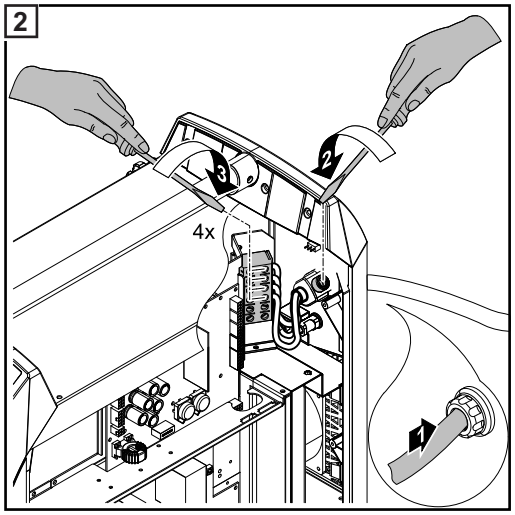
The PE conductor should be approx. 10 - 15 mm (0.4 - 0.6 in.) longer than the phase conductors.

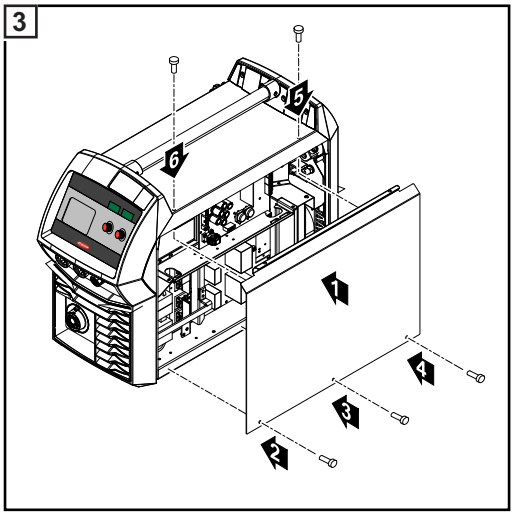
An illustration of the mains cable connection can be found in the following sections: "Fitting the strain-relief device" or "Fitting the strain-relief device for Canada / US". To connect the mains cable, proceed as follows:

1. Remove the side panel from the device
2. Push the mains cable in far enough to make it possible to connect the PE conductor and the phase conductors to the block terminal properly.
3. Fit ferrules to the PE conductor and phase conductors
4. Connect the PE conductor and phase conductors to the block terminal
5. Use the strain-relief device to secure the mains cable
6. Fir the side panel of the device

Fit the strain-relief device

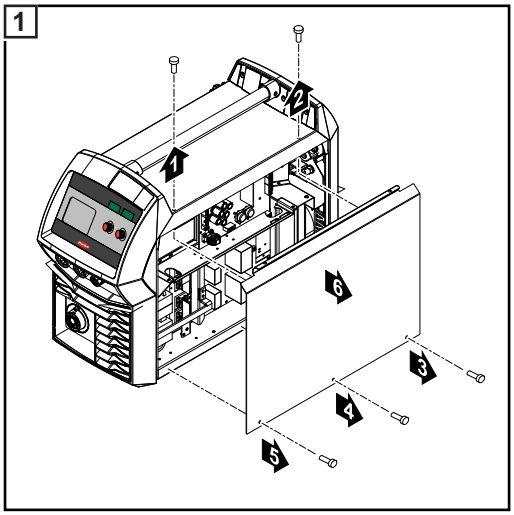


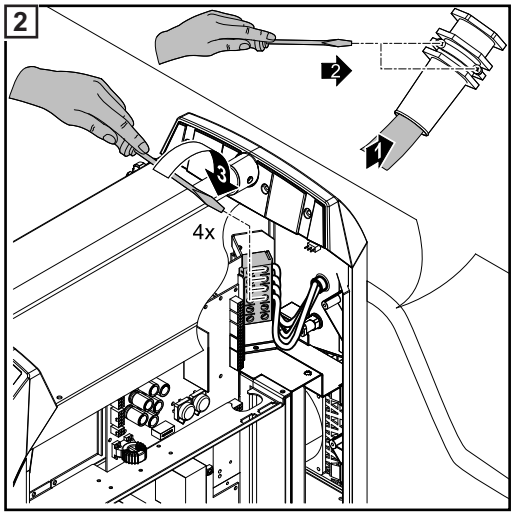


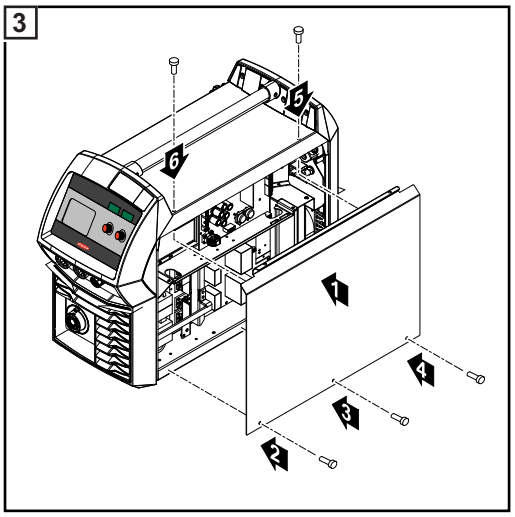


IMPORTANT! Tie the phase conductors near the luster terminal using cable ties.

Fit the Canada/US strain-relief device







IMPORTANT! Tie the phase conductors near the luster terminal using cable ties.

System components

Information on system components

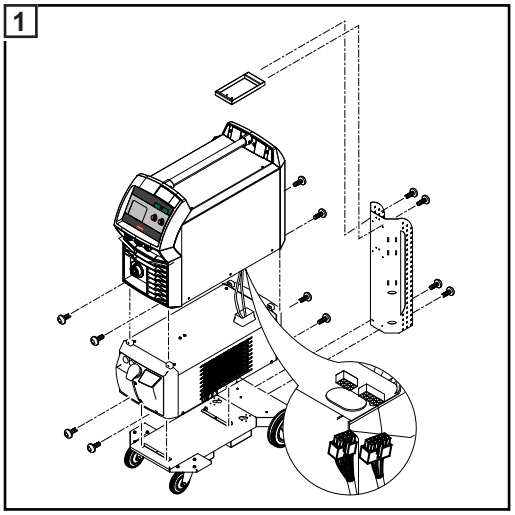
The steps and activities described below include references to various system components, including:
- Trolleys
- Cooling units
- Welding torches, etc.

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

Fitting the system components (overview)

WARNING! Work that is carried out incorrectly can cause serious injury and damage. The following activities must only be carried out by trained and qualified personnel. All instructions in the section headed "Safety rules" must be observed.

1



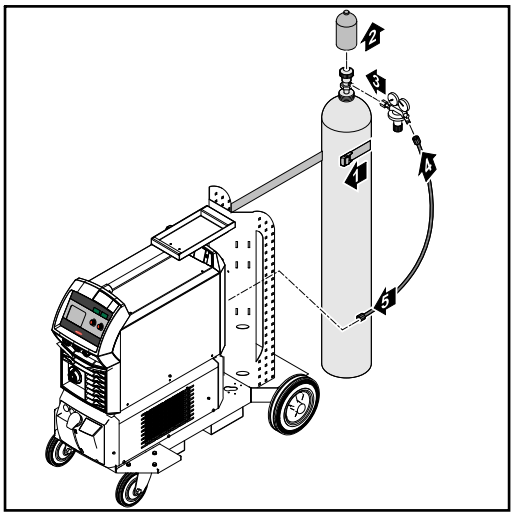
The diagram below provides an overview of how to fit the individual system components.
For detailed information about the individual steps, please refer to the relevant operating instructions for the system components.

Connect the gas cylinder

Connect the gas cylinder

WARNING! If gas cylinders topple over, there is a risk of very serious injury and damage. When using gas cylinders:
- Place them on a solid, level surface in such a way that they remain stable
- Secure the gas cylinders to prevent them from falling over
- Fit the VR holder option

Follow the gas cylinder manufacturer's safety rules.



1 Secure the gas cylinder with a belt

2 Briefly open the gas cylinder valve to remove any dust or dirt

3 Check the seal on the pressure regulator

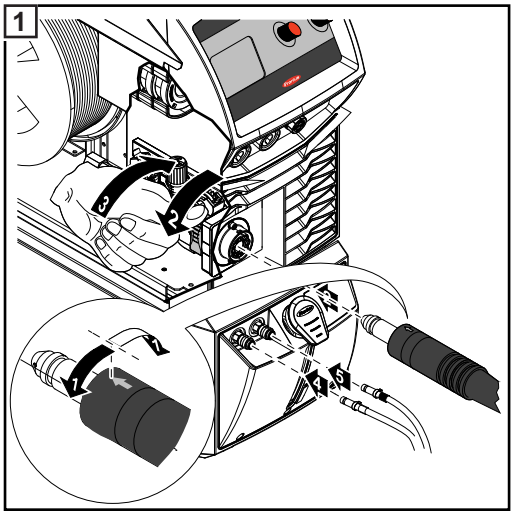
NOTE! US devices are supplied with an adapter for the gas hose:
- Seal male thread spacers on the gas solenoid valve using suitable equipment before screwing on the adapter.
- Test the adapter to ensure that it is gas-tight.

Connecting the welding torch and establishing a ground (earth) connection

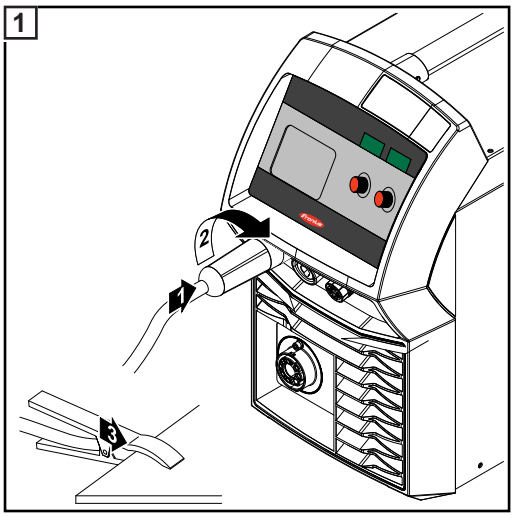
Safety

NOTE! When connecting the welding torch, check that
- all connections are connected properly
- all cables, leads and hosepacks are undamaged and correctly insulated.

Connecting MIG/ MAG manual welding torches



Establishing a ground (earth) connection



Inserting/replacing feed rollers

General

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

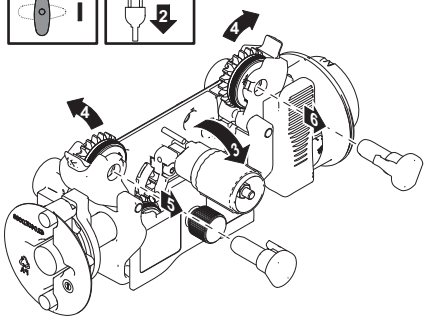
IMPORTANT! Only use feed rollers that match the wire electrode.

An overview of the feed rollers available and their possible areas of use can be found in the spare parts lists.

Inserting/replacing feed rollers

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.

1



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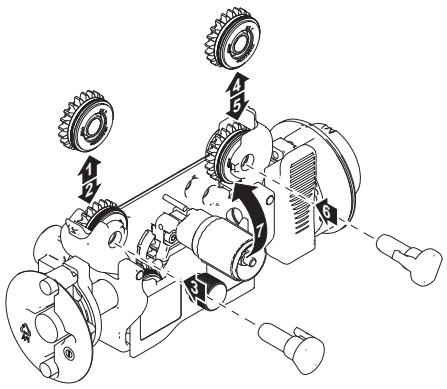

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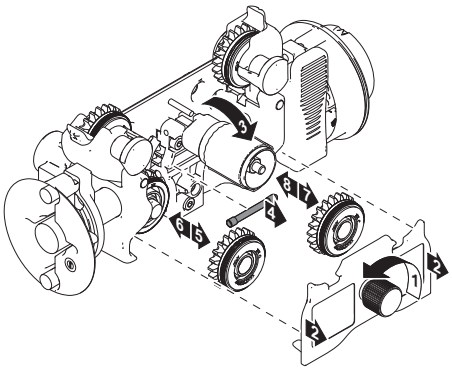

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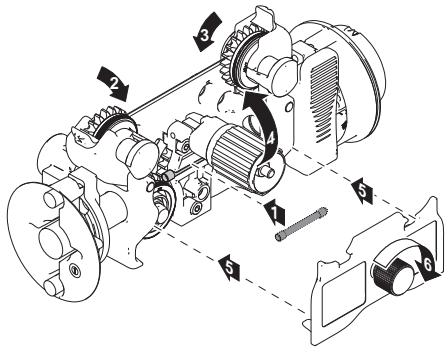


Inserting the wirespool, inserting the basket-type spool

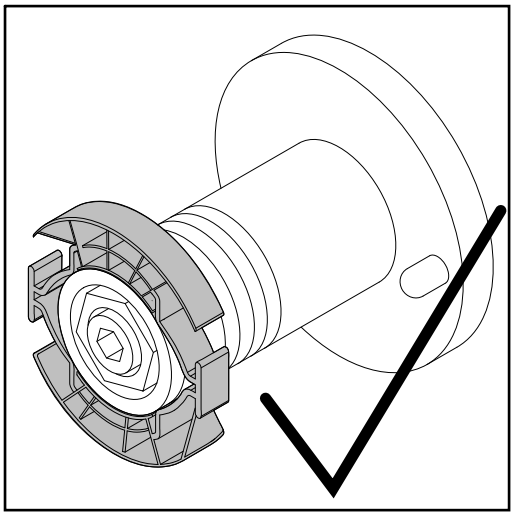
Safety

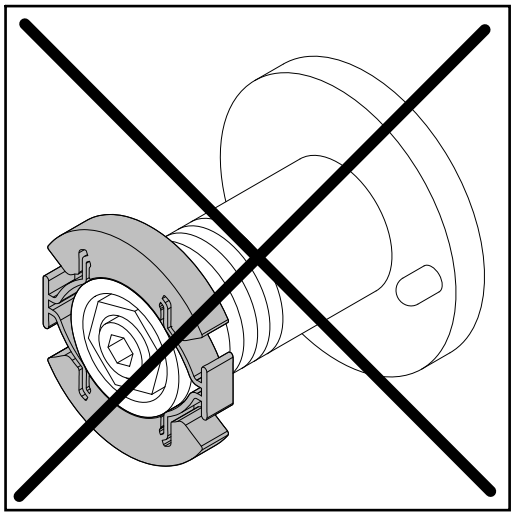
CAUTION! Risk of injury from springiness of spooled wire electrode. When inserting the wirespool/basket-type spool, hold the end of the wire electrode firmly to avoid injuries caused by the wire electrode springing back.

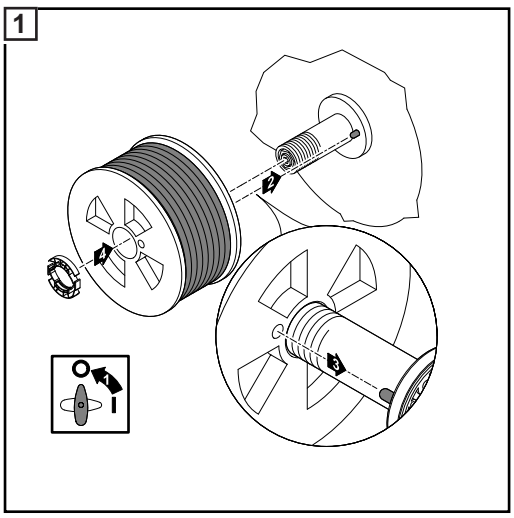
CAUTION! Risk of injury from falling wirespool / basket-type spool. Make sure that the wirespool or basket-type spool with adapter is fitted securely to the wirespool holder.

Inserting the wirespool

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.





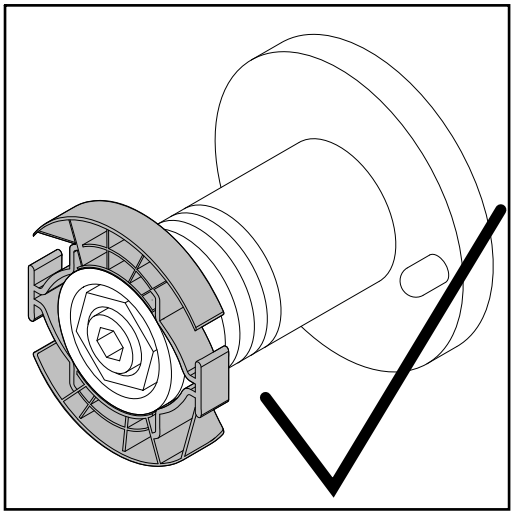


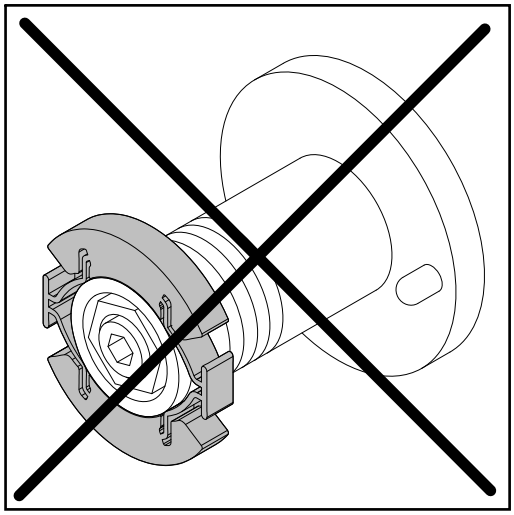
Inserting the basket-type spool

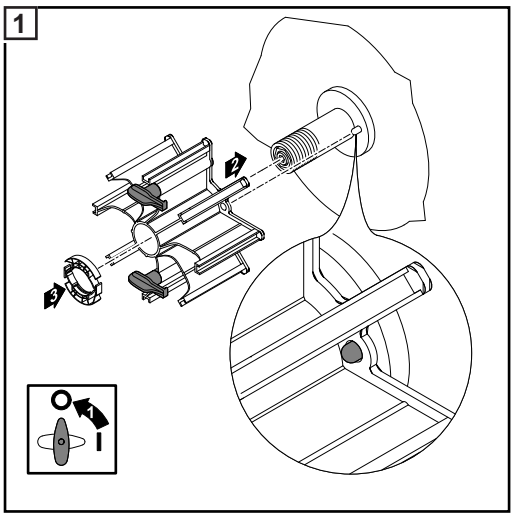
NOTE! When working with basket-type spools, only use the basket-type spool adapter included in the scope of supply.

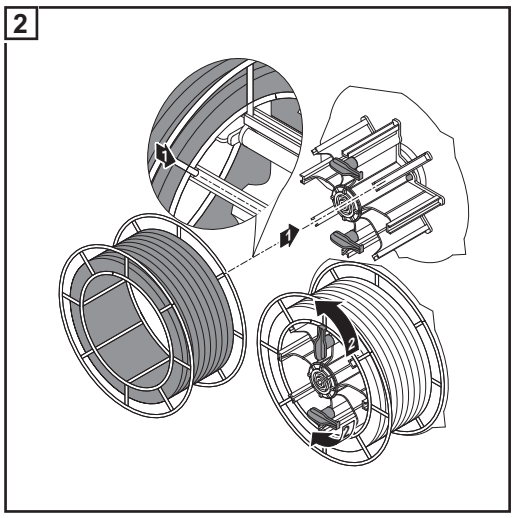
CAUTION! Risk of injury from falling basket-type spool. Place the basket-type spool on the adapter provided in such a way that the bars on the spool are inside the adapter guideways.

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.









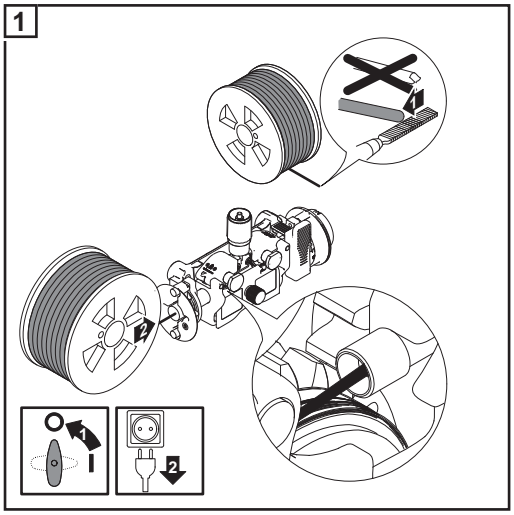
Feeding in the wire electrode

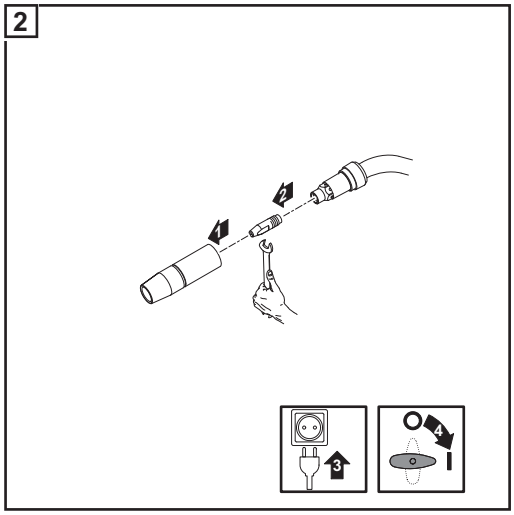
GB

Feed 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.

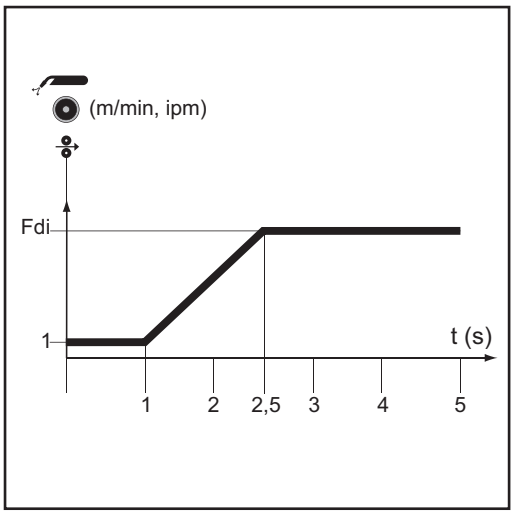
CAUTION! Risk of damage to the welding torch from sharp end of wire electrode. Deburr the end of the wire electrode well before feeding in.





CAUTION! Risk of injury from wire electrode emerging at speed. Keep the welding torch away from your face and body when pressing the "Feeder inching" button or torch trigger.

IMPORTANT To facilitate the exact positioning of the wire electrode, the following sequences are possible when the "Feeder inching" button is pressed and held down.



- Hold the button for up to **one second** ... the wire feed speed stays at 1 m/min or 39.37 ipm for the first second.
- Hold the button for up to **2.5 seconds** ... after one second has elapsed, the wire feed speed increases at a uniform rate over the next 1.5 seconds.
- Hold the button for **longer than 2.5 seconds** ... After a total of 2.5 seconds, the wire is fed at a constant rate equal to the wire feed speed set for the Fdi welding parameter.

If you release the "Feeder inching" button and press it again before one second has elapsed, the sequence starts again from the beginning. This makes it possible to continuously position the wire at a low wire feed speed of 1 m/min or 39.37 ipm. where necessary.

If there is no "Feeder inching"/"Gas test" button, the **torch trigger** can be used in the same way. Before using the torch trigger for wire threading, proceed as follows:

1 Press the "Mode" button to select 2-step mode

2 Set the "Ito" parameter to "Off" in the set-up menu

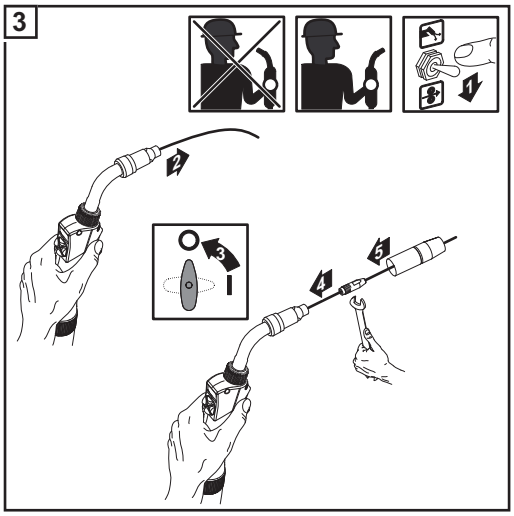
CAUTION! Risk of injury and damage from electric shock and from the wire electrode emerging from the torch. When pressing the torch trigger:
- keep the welding torch away from your face and body
- do not point the welding torch at people
- make sure that the wire electrode does not touch any conductive or earthed (grounded) parts, such as the housing, etc.

IMPORTANT If the **torch trigger** is pressed instead of the "Feeder inching"/"Gas test" button, the welding wire runs at the feeder creep speed (depending on the welding program) for the first 3 seconds. After these 3 seconds, wirefeeding is briefly interrupted.

The welding system detects that the welding process should not start, but that the wire is to be fed in. At the same time, the shielding gas solenoid valve closes, and the welding voltage on the wire electrode is switched off.

If the torch trigger is kept pressed, wire feeding restarts immediately without shielding gas and welding voltage, and the process continues as described above.

3



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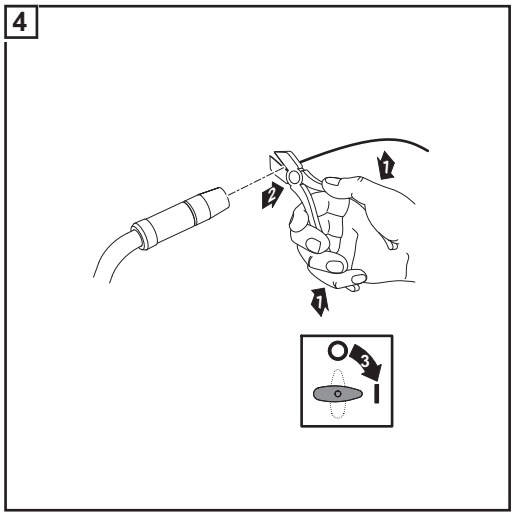
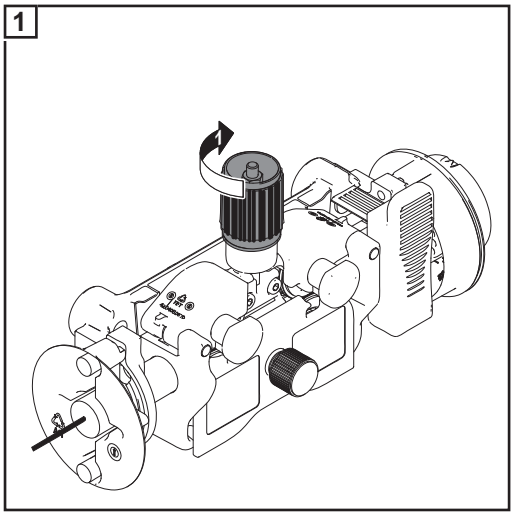


Set the contact pressure

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

1



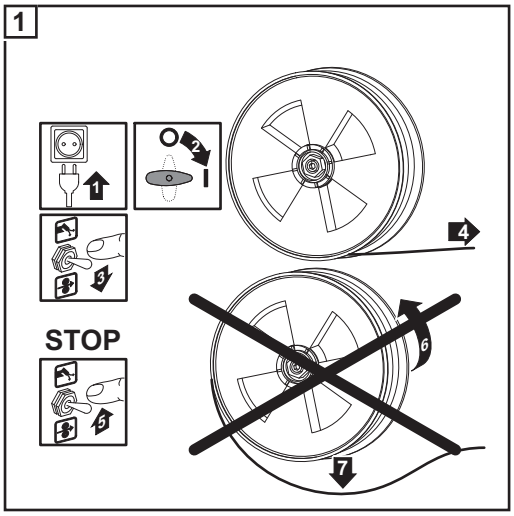
Contact pressure standard values	U-grooved rollers
Steel	4 - 5
CrNi	4 - 5
Tubular cored electrodes	2 - 3

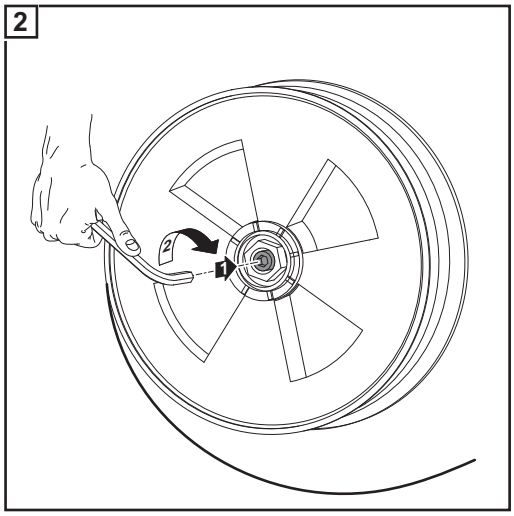
Adjust the brake

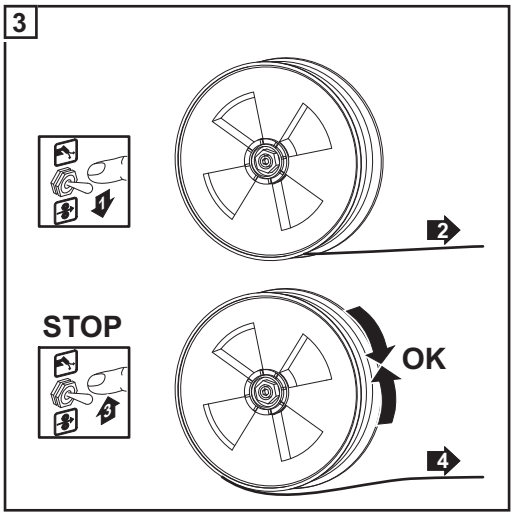
General

NOTE! After releasing the torch trigger the wirespool must stop unreeling. If it continues unreeling, readjust the brake.

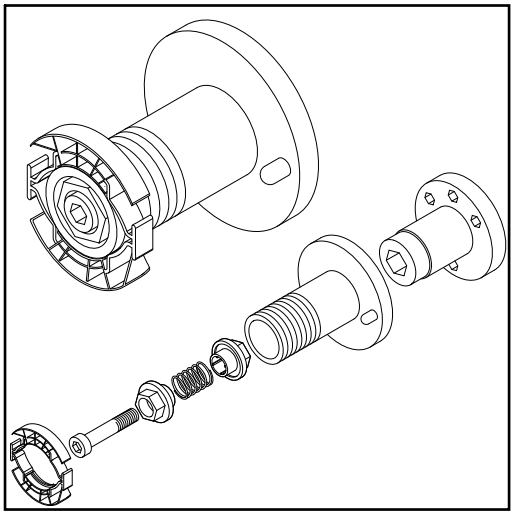
Adjusting the brake







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.

Start-up

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

The device is started up by pressing the torch trigger (for manual applications).

Prerequisites

The following conditions must be satisfied before the device is started:
- Welding torch connected
- Feed rollers inserted
- Wirespool or basket-type spool with adapter inserted
- Wire electrode fed in
- Brake adjusted
- Feed roller contact pressure set
- All covers closed, all side panels in place, all protection devices intact and in their proper place
- Where applicable, water connections connected

Starting up

Before proceeding further as described in the "Welding mode" section, the following activities are required for "MIG/MAG standard synergic welding" and "MIG/MAG standard manual welding":

1 Plug in the mains plug
2 Turn the mains switch to the "I" position

Welding

Power limitation

Safety function

"Power limitation" is a safety function for MIG/MAG welding. This means that the power source can be operated at the power limit whilst maintaining process safety.

Wire feed speed is a determining parameter for welding power. If it is too high, the arc gets smaller and smaller and may be extinguished. In order to prevent this, the welding power is lowered.

For the "MIG/MAG standard synergic welding" process, the symbol for the "wire feed speed" parameter flashes as soon as the safety function trips. The flashing continues until the next welding start-up, or until the next parameter change.

If the "Wire feed speed" parameter is selected, the reduced value for wire feed speed is displayed.

MIG/MAG modes

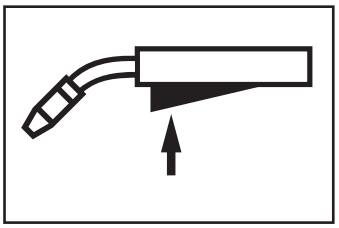
General

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:

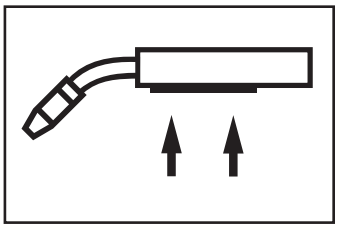
- these operating instructions
- all the operating instructions for the system components, especially the safety rules

For details of the meaning, settings, setting range and units of the available welding parameters (e.g. gas pre-flow time), please refer to the "Set-up parameters" section.

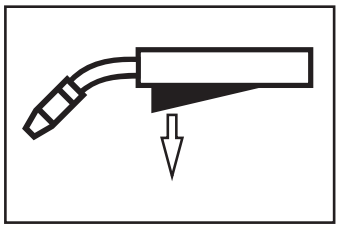
Symbols



Press the torch trigger



Hold the torch trigger

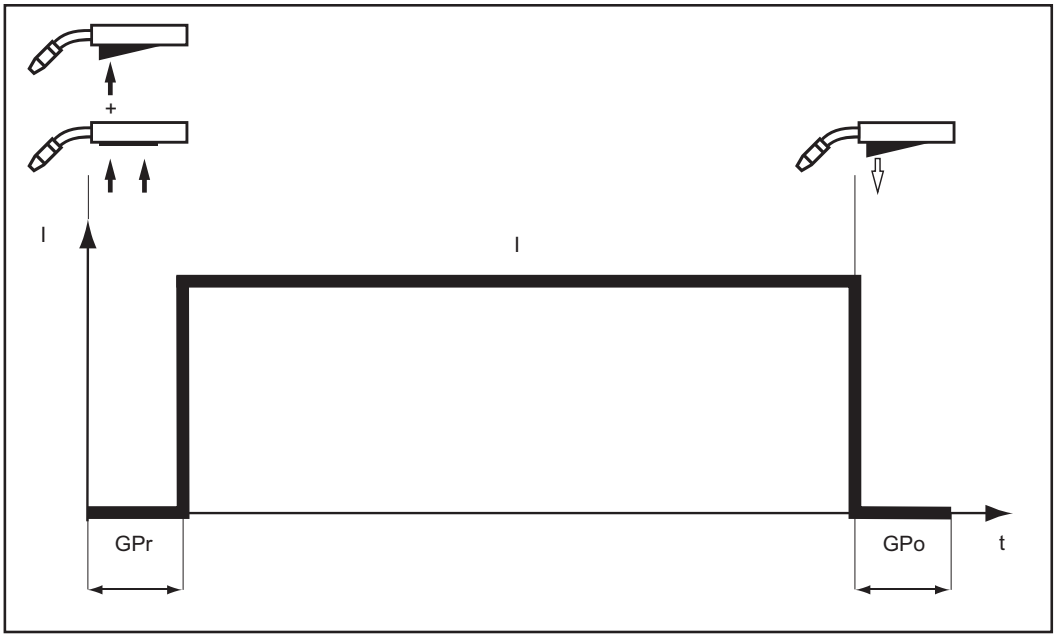


Release the torch trigger

2-step mode

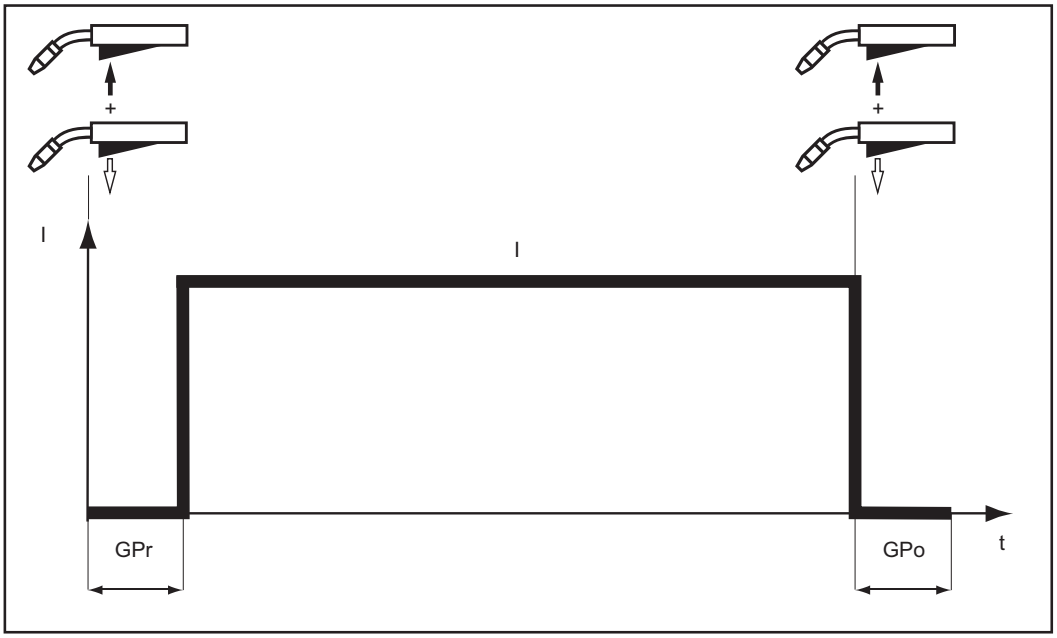
“2-step mode“ is suitable for

- Tacking work
- Short weld seams



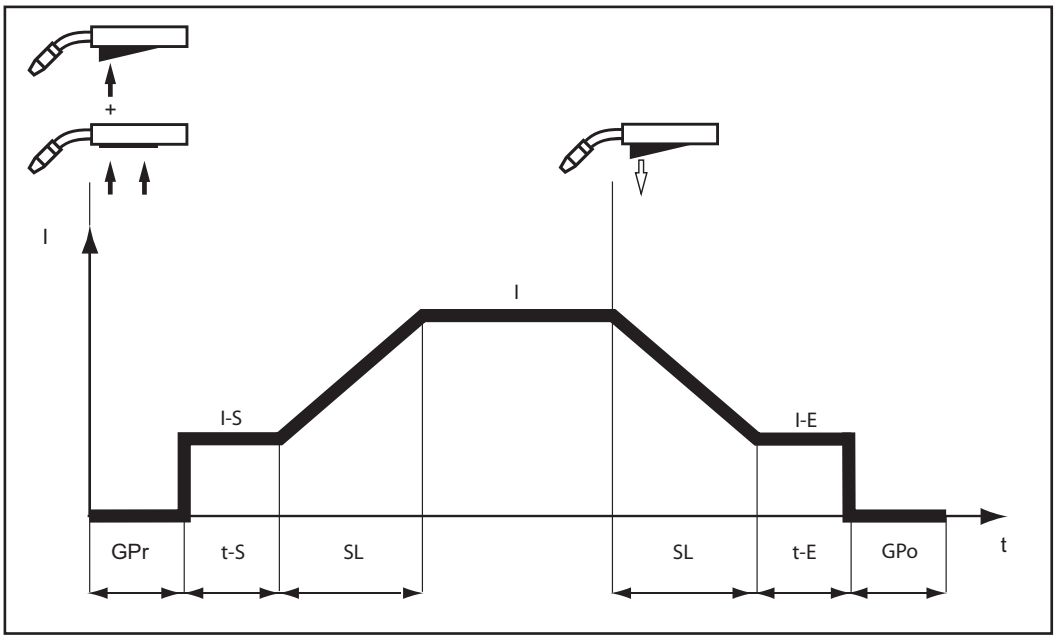
4-step mode

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



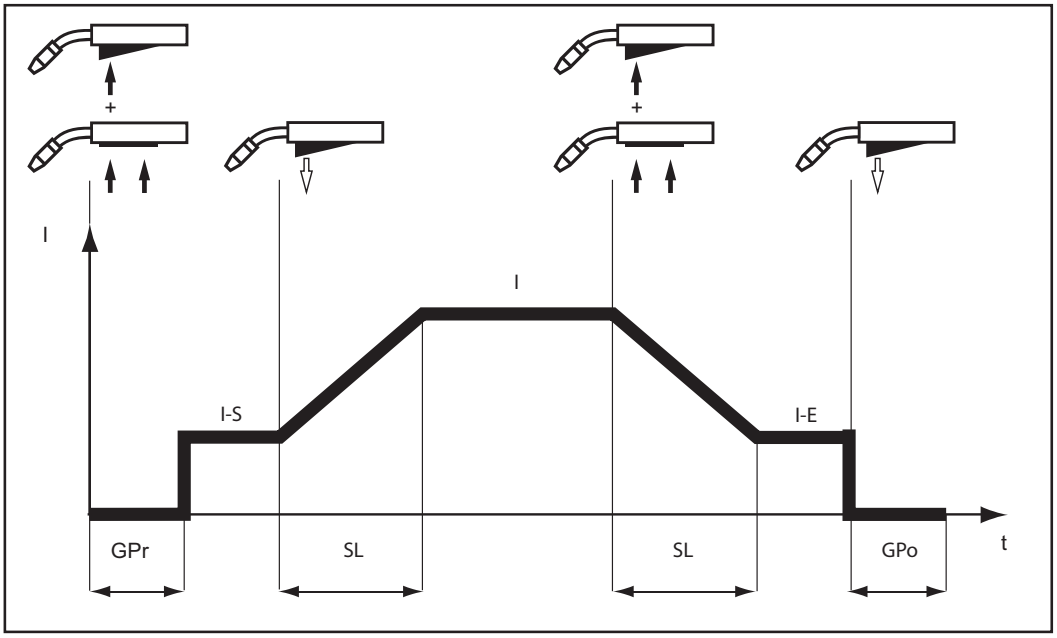
Special 2-step mode

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



Special 4-step mode

"Special 4-step mode" is particularly suitable for welding in higher power ranges. In special 4-step mode, the arc starts at a low power, which makes it easier to stabilise.


+
+
I
I
I-S
I-E
GPr
SL
SL
GPo
t

MIG/MAG 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

Overview

MIG/MAG welding is composed of the following sections:
- MIG/MAG standard synergic welding
- Special functions and options

MIG/MAG standard Synergic welding

MIG/MAG standard synergic welding

1 Press the "Material" button to select the filler metal to be used.

Assignment of the SP position depends on the welding database used for the power source.

2 Press the "Wire diameter" button to select the diameter of the wire electrode to be used.

Assignment of the SP position depends on the welding database used for the power source.

3 Press the "Protective gas shield" button to select the shielding gas to be used.

Assignment of the SP position depends on the welding database used for the power source.

4 Press the "Process" button to select the desired welding process:

MIG/MAG standard synergic welding

5 Press the "Mode" button to select the desired MIG/MAG mode:

2-step mode

4-step mode

Special 4-step mode

IMPORTANT! Under certain circumstances, welding parameters that have been set on a system component control panel (TR 2000 and TR 3000 remote control units or robot interface) may not be changed on the control panel of the power source.

6 Press the "Parameter selection" buttons to select the welding parameters to be used to specify the welding power:

Sheet thickness

A Welding current

Wire feed speed

V Welding voltage

7 Use the appropriate adjusting dial to set the relevant welding parameters.

The welding parameter values are shown in the digital display located above them.

All welding parameter set values remain stored until the next time they are changed. This applies even if the power source is switched off and on again in the meantime.

To display the actual welding current during welding:
- Press the "Parameter selection" button to select the welding current parameter
- The actual welding current is shown in the digital display during welding.

8 Open the gas cylinder valve

9 Set the shielding gas flow rate:

If there is a "Feeder inching"/"Gas test" button:
- Press the "Feeder inching" / "Gas test" button upwards and release
- Turn the adjusting screw on the underside of the pressure regulator until the pressure gauge shows the required gas flow rate
- Press the "Feeder inching" / "Gas test" button upwards again and release

10 If there is no "Feeder inching"/"Gas test" button:
- Press the "Mode" button to select 2-step mode
- Set the "Ito" parameter to "Off" in the set-up menu
- Disengage the feed rollers

CAUTION! Risk of injury and damage from electric shock and from the wire electrode emerging from the torch. When pressing the torch trigger:
- keep the welding torch away from your face and body
- 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.

- press and hold the torch trigger
- turn the adjusting screw on the underside of the pressure regulator until the pressure gauge shows the required shielding gas flow rate
- release the torch trigger
- engage the feed rollers

CAUTION! Risk of injury and damage from electric shock and from the wire electrode emerging from the torch. When pressing the torch trigger:
- keep the welding torch away from your face and body
- 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.

11 Press the torch trigger and start welding

Corrections during welding

To obtain the best possible welding results, the arc length correction and dynamic welding parameters will sometimes need to be corrected.

1 Press the "Parameter selection" buttons to select the parameters you wish to correct.

2 Use the adjusting dials to set the selected welding parameters to the required values.

Welding parameter values are shown in the indicators located above them.

Arc length correction
for correcting the arc length
- shorter arc length
0 neutral arc length
+ longer arc length

Dynamic
for influencing the short-circuiting dynamic at the moment of droplet transfer
- harder, more stable arc
0 neutral arc
+ soft, low-spatter arc

MIG/MAG standard manual welding

General remarks

The MIG/MAG standard manual welding process is a MIG/MAG welding process with no Synergic function.
Changing one parameter does not result in any automatic adjustments to the other parameters. All of the variable parameters must therefore be adjusted individually, as dictated by the welding process in question.

Available parameters

The following parameters are available in manual welding:

Wire feed speed
1 m/min (39.37 ipm) - maximum wire feed speed, e.g. 25 m/min (984.25 ipm)

Welding voltage
TSt 3500c: 15.5 - 31.5 V

Dynamic
... for influencing the short-circuiting dynamic at the moment of droplet transfer

Welding current
only for displaying the actual value

MIG/MAG standard manual welding

1 Press the "Process" button to select the desired welding process:

MIG/MAG standard manual welding

2 Press the "Mode" button to select the desired MIG/MAG mode:

2-step mode

4-step mode

In MIG/MAG standard manual welding, special 4-step mode corresponds to conventional 4-step mode.

IMPORTANT! Under certain circumstances, welding parameters that have been set on a system component control panel (TR 2000 and TR 3000 remote control units or robot interface) may not be changed on the control panel of the wire-feed unit.

3 Press the "Parameter selection" button to select the wire feed speed parameter

4 Use the adjusting dial to set the desired value for the wire feed speed

5 Press the "Parameter selection" button to select the welding voltage parameter

6 Use the adjusting dial to set the desired value for the welding voltage

The welding parameter values are shown in the digital display located above them.

All welding parameter set values remain stored until the next time they are changed. This applies even if the power source is switched off and on again in the meantime.

To display the actual welding current during welding:
- Press the "Parameter selection" button to select the welding current parameter
- The actual welding current is shown in the digital display during welding.

7 Open the gas cylinder valve

8 Set the shielding gas flow rate:

If there is a "Feeder inching"/"Gas test" button:
- Press the "Feeder inching" / "Gas test" button upwards and release
- Turn the adjusting screw on the underside of the pressure regulator until the pressure gauge shows the required gas flow rate
- Press the "Feeder inching" / "Gas test" button upwards again and release

If there is no "Feeder inching"/"Gas test" button:
- Press the "Mode" button to select 4-step mode
- Set the "Ito" parameter to "Off" in the set-up menu
- Disengage the feed rollers

CAUTION! Risk of injury and damage from electric shock and from the wire electrode emerging from the torch. When pressing the torch trigger:
- keep the welding torch away from your face and body
- 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.

- press the torch trigger briefly
- turn the adjusting screw on the underside of the pressure regulator until the pressure gauge shows the required shielding gas flow rate
- press the torch trigger again briefly
- engage the feed rollers

CAUTION! Risk of injury and damage from electric shock and from the wire electrode emerging from the torch. When pressing the torch trigger:
- keep the welding torch away from your face and body
- 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.

9 Press the torch trigger and start welding

Corrections during welding

To obtain the best possible welding results, the dynamic welding parameter will sometimes need to be adjusted.

1 Press the "Parameter selection" button to select the dynamic welding parameter

2 Use the adjusting dial to set the desired dynamic value

The welding parameter value is shown in the digital display located above it.

Dynamic

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

0 harder, more stable arc

10 soft, low-spatter arc

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

Preparation

1 Move the mains switch to the "O" position

2 Disconnect the mains plug

IMPORTANT! Check the rod electrode packaging to determine whether the rod electrodes are for (+) or (-) welding.

3 Plug the grounding (earthing) cable into the (-) or (+) current socket (depending upon which type of electrode is to be used) and latch it by turning it clockwise

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

5 Plug the electrode holder cable bayonet plug into the free current socket with the opposite polarity, according to the type of electrode, and turn it clockwise to latch it in place

6 Plug in the mains plug

Manual metal arc 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 conducting or earthed parts (e.g. the housing etc.).

1 Move the mains switch to the "I" position: - all the indicators on the control panel will briefly light up

2 Press the "Process" button to select the MMA welding process:

The welding voltage is connected to the welding socket with a 3-second time lag.

If the MMA welding process is selected, any cooling unit present is automatically deactivated. It is not possible to switch it on.

IMPORTANT! Under certain circumstances, welding parameters that have been set on a system component control panel (TR 2000 and TR 3000) may not be changed on the control panel of the power source.

3 Press the "Parameter selection" button to select the amperage parameter.

4 Use the adjusting dial to set the desired amperage.

The amperage value is shown in the left-hand digital display.

All welding parameter set values remain stored until the next time they are changed. This applies even if the power source is switched off and on again in the meantime.

5 Start welding

To display the actual welding current during welding:
- Press the "Parameter selection" button to select the welding current parameter
- The actual welding current is shown in the digital display during welding.

Corrections during welding

To obtain the best possible welding results, the dynamic welding parameter will sometimes need to be adjusted.

1 Press the "Parameter selection" button to select the dynamic welding parameter

2 Use the adjusting dial to set the desired dynamic value

The welding parameter value is shown in the digital display located above it.

Dynamic

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

0 harder, more stable arc

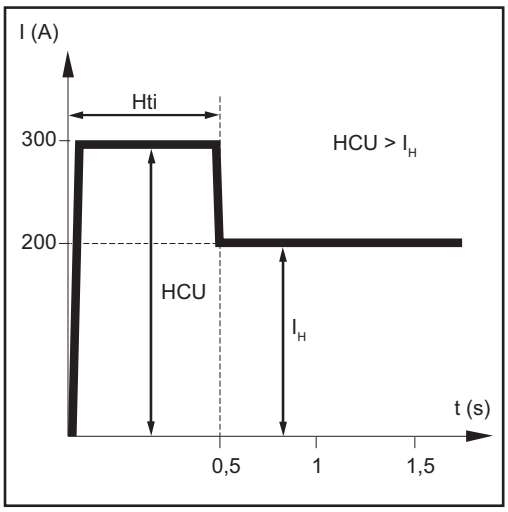
100 soft, low-spatter arc

HotStart function

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

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

For details on setting the available welding parameters, please refer to "Setup parameters", "Setup menu - level 2".



Legend:
Hti: Hot-current time,
0 - 2 s, factory setting: 0.5 s
HCU: HotStart current,
100 - 200 %, factory setting 150 %
I_H: Main current = set welding current

How it works
During the specified hot-current time (Hti), the welding current is increased to a certain value. This value (HCU) is higher than the selected welding current (I_H).

Anti-stick function

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

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

The anti-stick (Ast) function can be activated and deactivated in the Setup parameters in "Setup menu: level 2".

Saving and retrieving operating points

GB

General

The "Save" buttons allow up to 5 operating points to be saved. Every operating point matches the settings on the control panel.

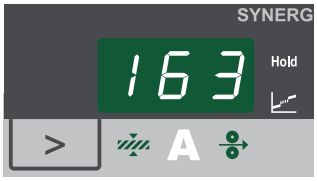
IMPORTANT! Setup parameters are not saved at this time.

Saving operating points

1 Press and hold one of the "Save" buttons to save the current settings on the control panel, e.g.:

The left indicator displays "Pro".

After a short time, the left indicator switches to the original value, e.g.:

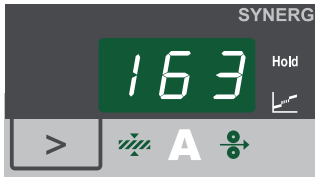


2 Release the "Save" button

Retrieving operating points

1 To retrieve saved settings, press the corresponding "Save" button briefly, e.g.:

The control panel will display the saved settings, e.g.:



Deleting operating points

1 Press and hold the relevant "Save" button to delete the memory content of that "Save" button, e.g.:

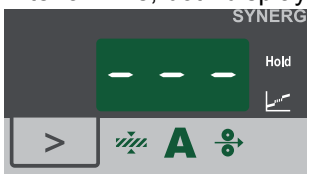
The left indicator displays "Pro".

After a short time, the left indicator switches to the original value, e.g.:

2 Keep the "Save" button held down

3 The left display shows "CLr".

After a while, both displays show "---"



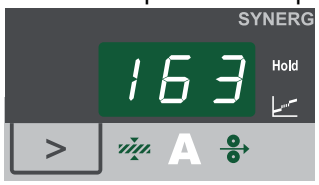
4 Release the "Save" button

Retrieving operating points on the up/down welding torch

One of the "Save" buttons on the control panel must be pressed to retrieve the saved settings using the up/down welding torch.

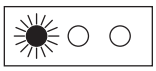
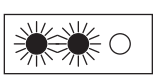
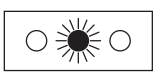
1 Press one of the "Save" buttons on the control panel, e.g.:

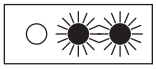
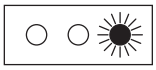
The control panel will display the saved settings, e.g.:



The "Save" buttons can now be selected using the buttons on the up/down welding torch. Vacant "Save" buttons are skipped.

In addition to the "Save" button number lighting up, a number is displayed directly on the up/down welding torch:

	Number 1
	Number 2
	Number 3

	Number 4
	Number 5

Setup settings

Setup menu

General remarks

The Setup menu provides simple access to expert knowledge in the power source and to additional functions. The Setup menu can be used to make simple adjustments of the parameters to suit the various job settings.

Setting the set-up parameters

Setting the set-up parameters is described here with reference to the "MIG/MAG standard synergic welding" process. The procedure for changing other set-up parameters is identical.

Opening the set-up menu

1 use the "Process" button to select the "MIG/MAG standard synergic welding" process

2 Press and hold the "Mode" button

3 Press the "Process" button

4 Release the "Mode" and "Process" buttons

The control panel is now in the set-up menu for the "MIG/MAG standard synergic welding" process - the last set-up parameter that was selected is displayed.

Changing welding parameters

5 select the required set-up parameter using the "Mode" and "Process" buttons or the left-hand adjusting dial

6 change the value of the set-up parameter using the "Parameter selection" button or the right-hand adjusting dial

Exiting the set-up menu

7 Press and hold the "Mode" button

8 Press the "Process" button

9 Release the "Mode" and "Process" buttons

Set-up parameters for MIG/MAG standard manual welding

"Min." and "max." are used for setting ranges that differ according to power source, welding program, etc.

GPr

Gas pre-flow time
Unit: s
Setting range: 0 - 9.9
Factory setting: 0.1

GPo

Gas post-flow time
Unit: s
Setting range: 0 - 9.9
Factory setting: 0.1

Fdi

Wire threading speed
Unit: m/min (ipm.)
Setting range: 1 - max. (39.37 - max.)
Factory setting: 10 (393.7)

bbc

Burn-back time correction
Unit: ms
Setting range: 0 - 20
Factory setting: 0

IGC

Ignition current
Unit: A
Setting range: 100 - 650
Factory setting: 500

Ito

Ignition time-out - length of wire that is fed before the safety cut-out trips
Unit: mm (in.)
Setting range: Off, 5 - 100 (Off, 0.2 - 3.94)
Factory setting: Off

NOTE! The "Ignition time-out" function (ito) is a safety function. The length of wire that is fed before the safety cut-out trips may differ from the pre-set wire length, particularly when the wire is being fed at fast wire feed speeds.

The "Ignition time-out" function (ito) is explained in the "Special functions and options" section.

FAC

Reset power source to factory setting
Press and hold down one of the "Parameter selection" buttons for 2 s to restore the factory settings

- when "PrG" appears on the digital display, the power source has been reset

IMPORTANT! When the power source is reset, all the personal settings in the set-up menu are lost.

Operating points that were saved using the "Save" buttons are retained when the power source is reset. The functions in the second level of the set-up menu (2nd) are also not deleted. Exception: Ignition time-out (ito) parameter.

2nd

second level of the set-up menu (see "Set-up menu - Level 2")

Set-up parameters for MIG/MAG standard synergic welding

"Min." and "max." are used for setting ranges that differ according to power source, welding program, etc.

GPr

Gas pre-flow time
Unit: s
Setting range: 0 - 9.9
Factory setting: 0.1

GPo

Gas post-flow time
Unit: s
Setting range: 0 - 9.9
Factory setting: 0.1

SL

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

I-S

I (current) - Starting - Starting current
Unit: % (of welding current)
Setting range: 0 - 200
Factory setting: 100

I-E

I (current) - End: final current
Unit: % (of welding current)
Setting range: 0 - 200
Factory setting: 50

t-S

t (time) - Starting - Starting current duration
Unit: s
Setting range: OFF, 0.1 - 9.9
Factory setting: OFF

t-E

t (time) - End - Final current duration
Unit: s
Setting range: OFF, 0.1 - 9.9
Factory setting: OFF

Fdi

Wire threading speed
Unit: m/min (ipm.)
Setting range: 1 - max. (39.37 - max.)
Factory setting: 10 (393.7)

bbc

Burn-back time correction -
Burn-back effect due to wire withdrawal at the end of welding
Unit: s
Setting range: Aut, 0 - 0.3

Factory setting: Aut

Ito

Ignition time-out - length of wire that is fed before the safety cut-out trips
Unit: mm (in.)
Setting range: Off, 5 - 100 (Off, 0.2 - 3.94)
Factory setting: Off

NOTE! The "Ignition time-out" function (ito) is a safety function. The length of wire that is fed before the safety cut-out trips may differ from the pre-set wire length, particularly when the wire is being fed at fast wire feed speeds.

The "Ignition time-out" function (ito) is explained in the "Special functions and options" section.

FAC

Reset power source to factory setting
Press and hold down one of the "Dynamic" (manual control panel) or "Parameter Selection" (Synergic A control panel) buttons for 2 s to restore the factory settings.
- when "PrG" is shown on the digital display, the power source has been reset.

IMPORTANT! When the power source is reset, all the personal settings in the set-up menu are lost.

When the power source is reset, operating points that were saved using the "Save" buttons are not deleted, but are retained in the memory. The functions in the second level of the set-up menu (2nd) are also not deleted. Exception: Ignition time-out (ito) parameter.

2nd

second level of the set-up menu (see "Set-up menu - Level 2")

Set-up parameters for MMA welding

IMPORTANT! If you reset the power source using the FAC factory set-up parameter, the hot-current time (Hti) and HotStart current (HCU) set-up parameters are also reset.

HCU

HotStart current
Unit: %
Setting range: 100 - 200
Factory setting: 150

Hti

Hot-current time
Unit: s
Setting range: 0 - 2.0
Factory setting: 0.5

Ast

Anti-stick
Unit: -
Setting range: On, Off
Factory setting: Off

FAC

Reset power source to factory setting
Press and hold down one of the "Parameter selection" buttons for 2 s to restore the factory settings
- when "PrG" appears on the digital display, the power source has been reset.

IMPORTANT! When the power source is reset, all personal settings are lost.

When the power source is reset, operating points that were saved using the "Save" buttons are not deleted, but are retained in the memory. The functions in the second level of the set-up menu (2nd) are also not deleted. Exception: Ignition time-out (ito) parameter.

2nd

second level of the set-up menu (see "Set-up menu - Level 2")

Setup menu - Level 2

Restrictions

In conjunction with the Level 2 set-up menu, the following restrictions occur:

The Level 2 set-up menu cannot be selected:
- during welding
- if the "Gas test" function is active
- if the "Wire threading" function is active
- if the "Wire withdrawal" function is active
- if the "Blow through" function is active

If the Level 2 set-up menu is selected, the following functions are not available, even in robot mode:
- Welding start-up - the "Power source ready" signal will not be emitted
- Gas testing
- Wire threading
- Wire withdrawal
- Blow-through

Setting the set-up parameters

Opening the set-up menu

< 1 Press and hold the "Mode" button

> 2 Press the "Process" button

< > 3 Release the "Mode" and "Process" buttons

The control panel is now in the set-up menu - the last set-up parameter that was selected is displayed.

Select "2nd" welding parameter

< > 4 use the "Mode" and "Process" buttons or the left adjustment dial to select the set-up parameter "2nd"

Accessing the Level 2 set-up menu

< 5 Press and hold the "Mode" button

> 6 Press the "Process" button

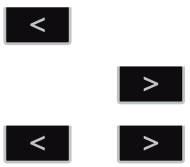
< > 7 Release the "Mode" and "Process" buttons

Changing welding parameters

< > 8 select the required set-up parameter using the "Mode" and "Process" buttons or the left adjusting dial

9 change the value of the set-up parameter using the "Dynamic" button or the right adjusting dial

Exiting the Level 2 set-up menu

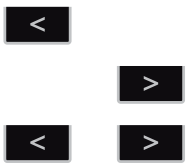


10 Press and hold the "Mode" button

11 Press the "Process" button

12 Release the "Mode" and "Process" buttons

Exiting the set-up menu



13 Press and hold the "Mode" button

14 Press the "Process" button

15 Release the "Mode" and "Process" buttons

Welding parameters for MIG/MAG welding in the Level 2 set-up menu

C-C

Cooling unit control

Unit: -
Setting range: Aut, On, Off
Factory setting: Aut

Aut: The cooling unit cuts out after a 2-minute welding off-time.

IMPORTANT! If the coolant temperature and flow monitoring options have been installed in the cooling unit, the cooling unit cuts out as soon as the return-flow temperature drops below 50°C, but at the earliest after a 2-minute welding off-time.

On: The cooling unit is permanently switched on
Off: The cooling unit is permanently switched off

IMPORTANT! If the FAC welding parameter is used, the C-C parameter is not restored to the factory setting. If the MMA welding process is selected, the cooling unit is always switched off, even if the switch is in the "On" position.

C-t

Cooling time - time from when the rate-of-flow watchdog trips until output of the "no | H2O" service code. For example, if there are air bubbles in the cooling system,

the cooling unit will not cut out until the end of this pre-set time.

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

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

SEt

Setting - country-specific setting (standard/USA) ... Std/US

Unit	-
Setting range	Std, US (standard/USA)
Factory setting	Standard version: Std (measurements: cm/mm) USA version: US (measurements: in.)

---

r

r (resistance) - welding circuit resistance (in mOhm)
see "Measuring welding circuit resistance r"

L

L (inductivity) - welding circuit inductivity (in microhenry)
see "Displaying welding circuit inductivity L"

Measuring welding circuit resistance r

General

Measuring the welding circuit resistance "r" makes it possible to have a constant welding result at all times, even with hosepacks of different lengths. The welding voltage at the arc is then always precisely regulated, regardless of the length and cross-sectional area of the hosepack. Adjustment using the arc length correction parameter is no longer necessary.

The calculated welding circuit resistance is shown on the display.

r ... welding circuit resistance in mOhm

If the welding circuit resistance r has been measured correctly, the welding voltage will correspond exactly to the welding voltage at the arc. If you manually measure the voltage on the output jacks of the power source, this voltage will be higher than the welding voltage at the arc - that is, higher by the same amount as the voltage drop of the hosepack.

NOTE! The welding circuit resistance r depends on the hosepack used:
- if the length or cross-sectional area of the hosepack has changed, measure the welding circuit resistance r again
- measure the welding circuit resistance for every welding process separately with the appropriate welding leads

Measuring welding circuit resistance r

NOTE! In order to obtain good welding results, it is essential to measure the welding circuit resistance correctly. Make sure that the contact between the earthing clamp and the workpiece is on a cleaned workpiece surface.

1. Make a ground earth connection to the workpiece
2. Access the setup menu level 2 (2nd)
3. Select parameter “r”
4. Remove the gas nozzle from the welding torch
5. Screw on the contact tube

NOTE! Make sure that the contact between the contact tube and the workpiece is on a cleaned workpiece surface.

6. Place the contact tube down firmly on the surface of the workpiece
7. Briefly press the torch trigger or the "Wire threading" button

   The welding circuit resistance is calculated. "run" is shown on the display during the measurement.

The measurement is finished when the welding circuit resistance is shown on the display in mOhm (e.g. 11.4).

8. Fit the gas nozzle back onto the welding torch

Displaying welding circuit inductivity L

General

Laying of the hosepacks has a significant effect on welding circuit inductivity and therefore affects the welding process. It is important to lay the hosepacks correctly in order to obtain the best possible welding result.

Displaying welding circuit inductivity L

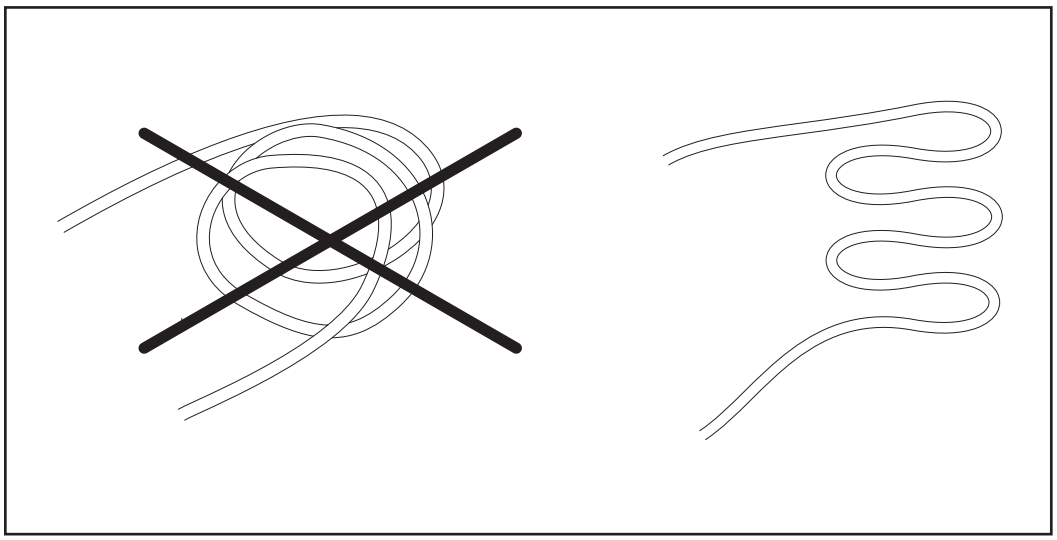
The setup parameter "L" is used to display the most recently calculated welding circuit inductivity. The welding circuit inductivity is calibrated at the same time as the welding circuit resistance r is calculated. Detailed information can be found in the "Measuring welding circuit resistance r" section.

1 Access the setup menu level 2 (2nd)
2 Select parameter “L”

The most recently calculated welding circuit inductivity L is shown on the right-hand digital display.

L ... Welding circuit inductivity (in microhenry)

Laying the hosepacks correctly



Troubleshooting and maintenance

Troubleshooting

General

The devices are equipped with an intelligent safety system. This means that to a large extent it has been possible to dispense with melting-type fuses. Melting-type fuses therefore no longer need to be replaced. After a possible malfunction has been remedied, the device is ready for use again.

Safety

WARNING! Work that is carried out incorrectly can cause serious injury or damage. The following activities must only be carried out by trained and qualified personnel. Observe the safety rules in the power source operating instructions.

WARNING! An electric shock can be fatal. Before opening the unit
- Turn the mains switch to the "O" position
- Unplug the device from the mains
- Put up an easy-to-understand warning sign to stop anybody inadvertently switching it back on again
- Using a suitable measuring device, 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.

Fault diagnosis

Make a note of the serial number and configuration of the device and contact our After-Sales Service team with a detailed description of the error, if:
- errors occur that are not listed below
- the troubleshooting measures listed are unsuccessful

Power source has no function

Mains switch is on, but indicators are not lit up

Cause:	There is a break in the mains lead; the mains plug is not plugged in
Remedy:	Check the mains lead, ensure that the mains plug is plugged in
Cause:	Mains socket or mains plug faulty
Remedy:	Replace faulty parts
Cause:	Mains fuse protection
Remedy:	Change the mains fuse protection

Nothing happens when the torch trigger is pressed

Power source mains switch is ON and indicators are lit up

Cause:	Control plug not connected in the case of a welding torch with an external control plug
Remedy:	Plug in the control plug
Cause:	Welding torch or welding torch control line is faulty
Remedy:	Change the welding torch

Nothing happens when the torch trigger is pressed

Power source mains switch is on, power source ON indication is lit up on the power source, indications on wire-feed unit are not lit up

Cause: The interconnecting hosepack is faulty or not connected properly

Remedy: Check interconnecting hosepack

No welding current

Mains switch is on, one of the overtemperature service codes "to" is displayed. Detailed information on the service codes "to0" to "to6" can be found in the section "Displayed service codes".

Cause: Overload

Remedy: Take the duty cycle into account

Cause: Thermostatic safety cut-out has tripped

Remedy: Wait until the power source automatically comes back on after the end of the cooling phase

Cause: Limited supply of cooling air

Remedy: Remove air filter on the rear of the housing from the side and clean. Ensure that the cooling air ducts are accessible.

Cause: The fan in the power source is faulty

Remedy: Contact After-Sales Service

No welding current

Mains switch is on and indicators are lit up

Cause: Grounding (earthing) connection is incorrect

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

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

Remedy: Change the welding torch

No shielding gas

All other functions are OK

Cause: Gas cylinder is empty

Remedy: Change the gas cylinder

Cause: Gas pressure regulator is faulty

Remedy: Change the gas pressure regulator

Cause: Gas hose is not fitted or is damaged

Remedy: Fit or change the gas hose

Cause: Welding torch is faulty

Remedy: Change the welding torch

Cause: Gas solenoid valve is faulty

Remedy: Contact After-Sales Service

Irregular wire feed speed

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

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

Cause: Wire feed liner in the welding torch is faulty
Remedy: Check the wire feed 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 applications with long welding torch hosepacks

Cause: Incorrect arrangement of welding torch hosepack
Remedy: Arrange the welding torch hosepack in as straight a line as possible, avoiding bends

---

The welding torch becomes very hot

Cause: The design dimensions of the welding torch are not sufficient for this task
Remedy: Observe the duty cycle and loading limits

Cause: Only on water-cooled machines: water flow is insufficient
Remedy: Check the water level, water flowrate, its cleanliness, etc.

Poor weld properties

Cause: Incorrect welding parameters
Remedy: Check the settings

Cause: Poor grounding (earthing) connection
Remedy: Ensure good contact to workpiece

Cause: Inadequate protective gas shield, or none at all
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 tube, or contact tube is worn out
Remedy: Replace contact tube

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

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

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

Displayed service codes

If an error message that is not described here appears on the displays, proceed as follows to resolve the problem:

1 Turn the power source mains switch to the "O" position
2 Wait 10 seconds
3 Move the mains switch to the I position

If the error occurs again despite several attempts to eliminate it, or if the troubleshooting measures listed here are unsuccessful.

1 Make a note of the error message displayed
2 Note down the configuration of the power source
3 Contact our After-Sales Service team with a detailed description of the error

---

ESr | 20

Cause: The selected cooling unit is not compatible with the power source
Remedy: Connect compatible cooling unit

Cause: An invalid welding process was called up on the robot interface (no. 37) or an empty flag was selected (no. 32)
Remedy: Call up a valid welding process or select assigned "Save" button

---

ELn | 12

Cause: Different control panels for selecting materials are in the system

Remedy: Connect similar control panels to select materials

ELn | 13

Cause: Illegal change of welding process during welding

Remedy: During welding do not carry out any illegal change of the welding process, reset error message by pressing any button

---

Err | PE

Cause: The earth current watchdog has triggered the safety cut-out of the power source.

Remedy: Switch off the power source
Place the power source on an insulating surface
Connect the grounding (earthing) cable to a section of the workpiece that is closer to the arc
Wait for 10 seconds and then switch the power source on again

If you have tried this several times and the error keeps recurring, contact After-Sales Service

---

E-Stop

Cause: "External stop" has tripped

Remedy: Remedy the event that triggered the external stop

PHA | SE

Cause: Phase failure

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

---

Err | 51

Cause: Mains undervoltage: The mains voltage has fallen below the tolerance range

Remedy: Check the mains voltage

Err | 52

Cause: Mains overvoltage: The mains voltage has risen above the tolerance range

Remedy: Check the mains voltage

EFd 5

Cause: Incorrect wire-feed unit connected

Remedy: Connect correct wire-feed unit

EFd | 81, EFd | 83

Cause: Fault in the wire feed system (overcurrent in wire-feed unit drive)

Remedy: Arrange the hosepack in as straight a line as possible; check that there are no kinks or dirt in the inner liner; check the contact pressure on the 4 roller drive

Cause: Wire-feed unit motor is sticking or defective

Remedy: Check the wire-feed unit motor or contact After-Sales Service

---

to0 | xxx

Note: xxx stands for a temperature value

Cause: Overtemperature in the primary circuit of the power source

Remedy: Allow power source to cool down, check air filter and clean if necessary, check that fan is on

---

to1 | xxx

Note: xxx stands for a temperature value

Cause: Overtemperature on the booster located in the power source

Remedy: Allow power source to cool down, check air filter and clean if necessary, check that fan is on

---

to2 | xxx

Note: xxx stands for a temperature value

Cause: Overtemperature in the secondary circuit of the power source

Remedy: Allow power source to cool down, check that fan is on

---

to3 | xxx

Remark: xxx stands for a temperature value

Cause: Overtemperature in the wire-feed unit motor

Remedy: Allow wire-feed unit to cool down

---

to4 | xxx

Remark: xxx stands for a temperature value

Cause: Overtemperature in welding torch

Remedy: Allow welding torch to cool down

---

to5 | xxx

Note: xxx stands for a temperature value

Cause: Overtemperature in cooling unit

Remedy: Allow cooling unit to cool down, check that fan is on

---

to6 | xxx

Note: xxx stands for a temperature value

Cause: Overtemperature at the output choke of the power source

Remedy: Allow power source to cool down, check air filter and clean if necessary, check that fan is on

---

to7 | xxx

Note: xxx stands for a temperature value

Cause: Overtemperature in the power source

Remedy: Allow power source to cool down, check that fan is on

---

tu0 | xxx

Remark: xxx stands for a temperature value

Cause: Undertemperature in the power source primary circuit

Remedy: Place power source in a heated room and allow to warm up

---

tu1 | xxx

Note: xxx stands for a temperature value

Cause: Undertemperature on the booster located in the power source

Remedy: Place power source in a heated room and allow it to warm up

---

tu2 | xxx

Remark: xxx stands for a temperature value

Cause: Undertemperature in the power source secondary circuit

Remedy: Place power source in a heated room and allow to warm up

---

tu3 | xxx

Remark: xxx stands for a temperature value

Cause: Undertemperature in the wire-feed unit motor

Remedy: Place wire-feed unit in a heated room and allow to warm up

---

tu4 | xxx

Remark: xxx stands for a temperature value

Cause: Undertemperature in the welding torch

Remedy: Place welding torch in a heated room and allow to warm up

---

tu5 | xxx

Remark: xxx stands for a temperature value

Cause: Undertemperature in the cooling unit

Remedy: Place cooling unit in a heated room and allow to warm up

---

tu6 | xxx

Note: xxx stands for a temperature value

Cause: Undertemperature on the output choke of the power source

Remedy: Place power source in a heated room and allow it to warm up

---

tu7 | xxx

Note: xxx stands for a temperature value

Cause: Undertemperature in the power source

Remedy: Place power source in a heated room and allow it to warm up

---

no | H2O

Cause: Coolant flow rate too low

Remedy: Check coolant flow rate and cooling unit, including cooling circuit (for minimum coolant flow, see "Technical Data" section in the device operating instructions)

---

hot | H2O

Cause: The coolant temperature is too high

Remedy: Allow cooling unit and cooling circuit to cool down, until "hot | H2O" is no longer displayed. Open the cooling unit and clean the cooler, check fan is working properly. Robot interface or field bus coupler: before resuming welding, set the "Source error reset" signal.

---

no | Prg

Cause: No preconfigured program has been selected

Remedy: Select a configured program

---

no | IGn

Cause: "Ignition time out" function is active; no current started flowing before the length of wire specified in the set-up menu had been fed. The power source safety cut-out has tripped.

Remedy: Shorten the wire end; press the torch trigger again; clean the surface of the workpiece; if necessary, increase the wire length until the safety cut-out trips in "Set-up menu: Level 2".

EPG | 29

Cause: The required wire-feed unit is not available for the selected characteristic

Remedy: Check plug connections for the hosepack

EPG | 35

Cause: RL calibration failed.

Remedy: Check grounding (earthing) cable, current cable or hosepack and replace if necessary, restart RL calibration

---

no | GAS

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

Remedy: Connect a new gas cylinder or open the gas cylinder valve/pressure regulator, restart "Gas watchdog" option, reset "no | GAS" error message by pressing any button.

Care, maintenance and disposal

General

Under normal operating conditions the welding system 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

WARNING! Work that is carried out incorrectly can cause serious injury and damage. The following activities must only be carried out by trained and qualified personnel. All instructions in the section headed "Safety rules" must be observed.

At every start-up

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

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

If necessary

If a lot of dust has accumulated, remove the air filter on the rear of the housing from the side and clean.

Every 2 months

CAUTION! Risk of damage. The air filter must only be fitted when dry.

- If required, clean air filter using dry compressed air or by washing it.

Every 6 months

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

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

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

Disposal

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

Technical data

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.

TSt 3500c

Mains voltage	+/- 10 %		3 x 380 V / 400 V / 460 V
Mains frequency			50/60 Hz
Mains fuse protection			35 A slow-blow
Mains connection [1]			Z_{max} at PCC [2] = 117 mOhm
Primary continuous current	100% d.c. [3]		16 - 13 A
Primary continuous power			10.3 kVA
Cos phi			0.99
Efficiency at 250 A			90 %
Welding current range			10 - 350 A
Welding current at	10 min / 40 °C (104 °F)	40 % d.c. [3]	350 A
		60 % d.c. [3]	300 A
		100% d.c. [3]	250 A
Max. welding voltage			38.6 / 40.6 / 47.9 V
Open circuit voltage			47 - 59 V
Working voltage			14.5 - 38.6 V
Degree of protection			IP 23
Type of cooling			AF
Insulation class			B
Mark of conformity			CE
Safety symbols			S
Dimensions l x w x h			747 x 300 x 497 mm
Weight			36 kg (79.37 lb.)
Overvoltage category			III
Pollution level according to IEC60664			3
Maximum shielding gas pressure			5 bar 72.49 psi.
Coolant			Original Fronius
Gear ratio			16 : 1
Wire feed speed			1 - 25 m/min 39.37 - 984.25 ipm.
Wire drive			4 roller drive
Wire diameter			0.8 - 1.6 mm .03 - .06 in.

Wirespool diameter	max. 300 mm max. 11.81 in.
Wirespool weight	max. 19 kg max. 41.89 in.

1) connected to public grids with 230 / 400 V and 50 Hz

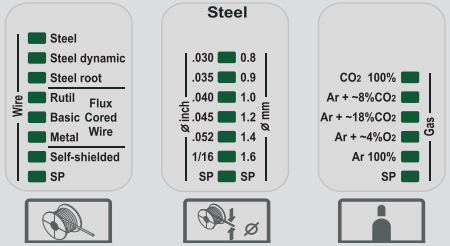
2) PCC = interface to public grid

3) d.c. = duty cycle

TransSteel Synergic

Quick Reference: English

1 Selecting the ller metal and shielding gas



SP ... Special Program

2 Selecting the process

MANUAL	MIG/MAG standard manual
SYNERGIC	Standard synergic
STICK	Manual metal arc welding

3 Setting the mode

2 T	2-step mode
4 T	4-step mode
S 4 T	Special 4-step mode

4 Setting the welding power

Sheet thickness

Welding current

Wire feed speed

> - select desired parameter

- set desired parameter

1 - 5 Start-up sequence

Follow operating instructions

5 Correcting parameters

Arc length correction

Welding voltage

Dynamic

> - select desired parameter

- set desired parameter

Important If external system components are connected, some parameters can be modified on those components. The power source control panel is only for display purposes.

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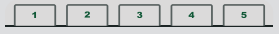
MIG/MAG - setup
Synergic

GPr	Gas pre-flow time
GPo	Gas post-flow time
SL	Slope (2-step, special 4-step)
I-S	Starting current (2-step, special 4-step)
I-E	Final current (2-step, special 4-step)
t-S	Starting current duration (2-step)
t-E	Final current duration (2-step)
Fd,	Threading speed
bbc	Burn-back effect
,to	Length of wire before the safety cut-out trips
FAC	Restoring factory setup
2nd	**2nd menu level**
C-C	Cooling unit control
C-t	Cooling unit watchdog
SEt	Country setting
r	Welding circuit resistance
L	Welding circuit inductivity

Operating points

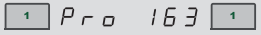


5 „Save“ buttons

retrieve:

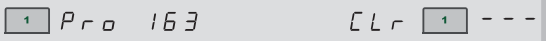
briefly press

save:



press and hold release

delete:



press and hold down for several seconds release

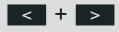
MIG/MAG - setup
Manual

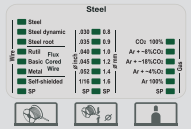
GPr	Gas pre-flow time
GPo	Gas post-flow time
Fd,	Threading speed
bbc	Burn-back effect
IGC	Ignition current
,to	Length of wire before the safety cut-out trips
FAC	Restoring factory setup
2nd	**2nd menu level**
C-C	Cooling unit control
C-t	Cooling unit watchdog
SEt	Country setting
r	Welding circuit resistance
L	Welding circuit inductivity

Rod electrode - setup

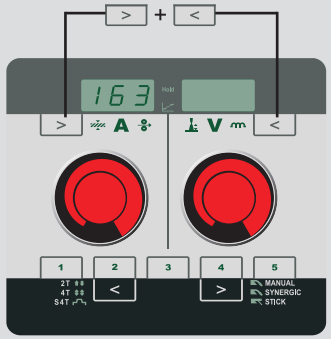
HCU	Hot-start current
Ht,	Hot-current time
ASt	Anti-stick
FAC	Restoring factory setup
2nd	**2nd menu level**
r	Welding circuit resistance
L	Welding circuit inductivity

Exit setup





Display service parameters



e.g.: 100 4.21
firmware version

e.g.: 2 491
welding program configuration

e.g.: r 2 290
number of the currently selected welding program

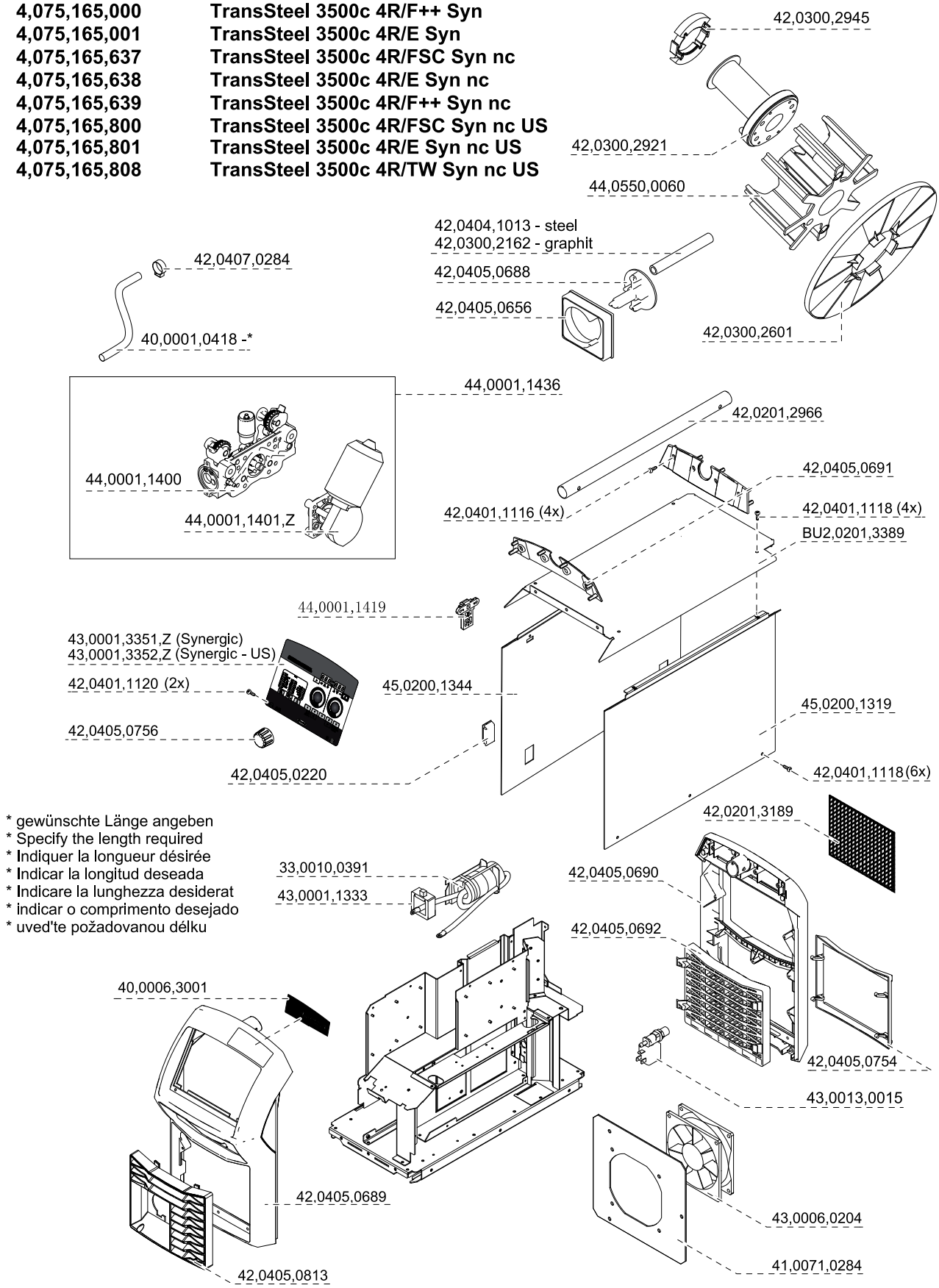
e.g.: ,Fd 0.0
motor current for wire drive in A
The value changes as soon as the motor is running.

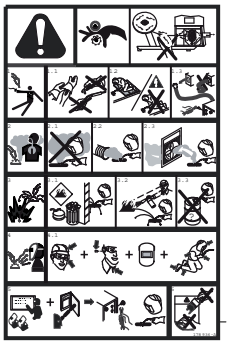
2nd
2. Menu level for service engineers

Annex

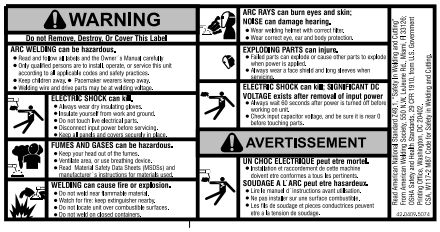
Spare parts list: TransSteel 3500c

4,075,165	**TransSteel 3500c 4R/FSC Syn**
4,075,165,000	**TransSteel 3500c 4R/F++ Syn**
4,075,165,001	**TransSteel 3500c 4R/E Syn**
4,075,165,637	**TransSteel 3500c 4R/FSC Syn nc**
4,075,165,638	**TransSteel 3500c 4R/E Syn nc**
4,075,165,639	**TransSteel 3500c 4R/F++ Syn nc**
4,075,165,800	**TransSteel 3500c 4R/FSC Syn nc US**
4,075,165,801	**TransSteel 3500c 4R/E Syn nc US**
4,075,165,808	**TransSteel 3500c 4R/TW Syn nc US**



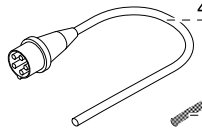


42,0409,5075

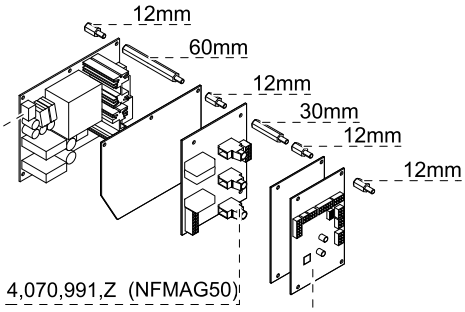


42,0409,5074

43,0004,0507 - 4G2,5mm² 5m
43,0004,0881 - 4G2,5mm² 5m E5 32A
43,0004,4044 - 4G2,5mm² 5m E4 32A
43,0004,2323 - AWG 12



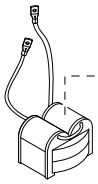
44,0450,1214



4,070,991,Z (NFMAG50)

4,071,282,Z (SRVT-COMP)

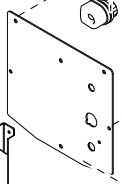
4,071,201,Z (NT2501)



33,0010,0395

42,0401,1120 (3x)

42,0300,1511 - PVC PG16 SW (4G2,5; 4G4)
42,0407,0532 - M25 (AWG 12)



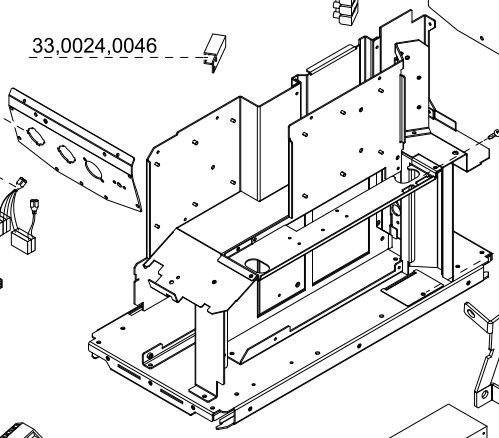
43,0004,4274

42,0401,1115(2x)

42,0409,3330 -PG16
42,0409,5131 -M25

41,0009,0255

33,0024,0046



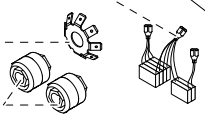
42,0409,3329

43,0001,3369

42,0401,1118

42,0407,0083

43,0003,1241



43,0003,0031

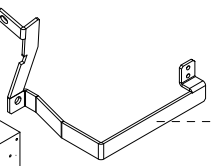
43,0004,4272

42,0401,1113

32,0405,0183

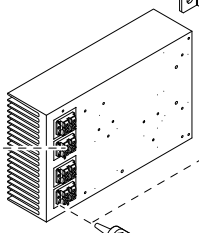
43,0002,0405

42,0406,0294



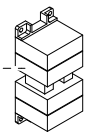
42,0201,3560

41,0003,0320



41,0002,0060

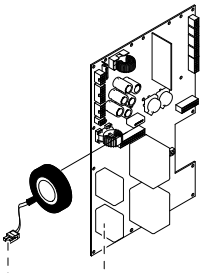
33,0005,4152



40,0009,0043

43,0001,1084

43,0010,0350



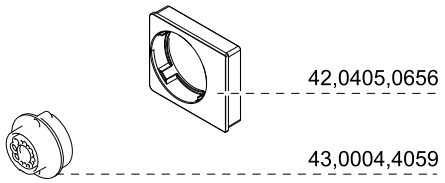
4,071,144,Z (LST MAG 35,Z)

MS		
	M 5x12	42,0407,0664
	M 5x30	42,0407,0488
	M 5x60	42,0407,0489

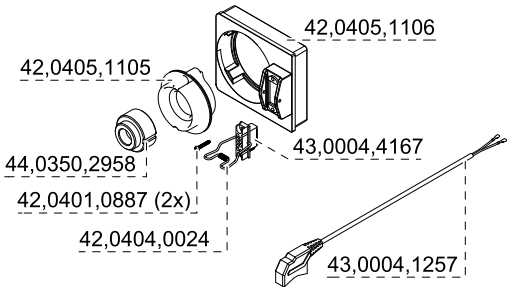
KS		
	M 4x12	42,0407,0546
	M 4x30	42,0407,0146
	M 4x60	42,0407,0490

Connectors

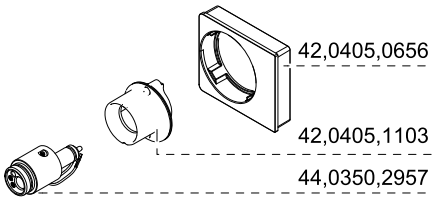
FSC = Fronius system connention



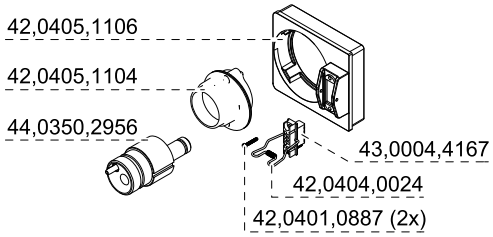
TW = Tweco connection



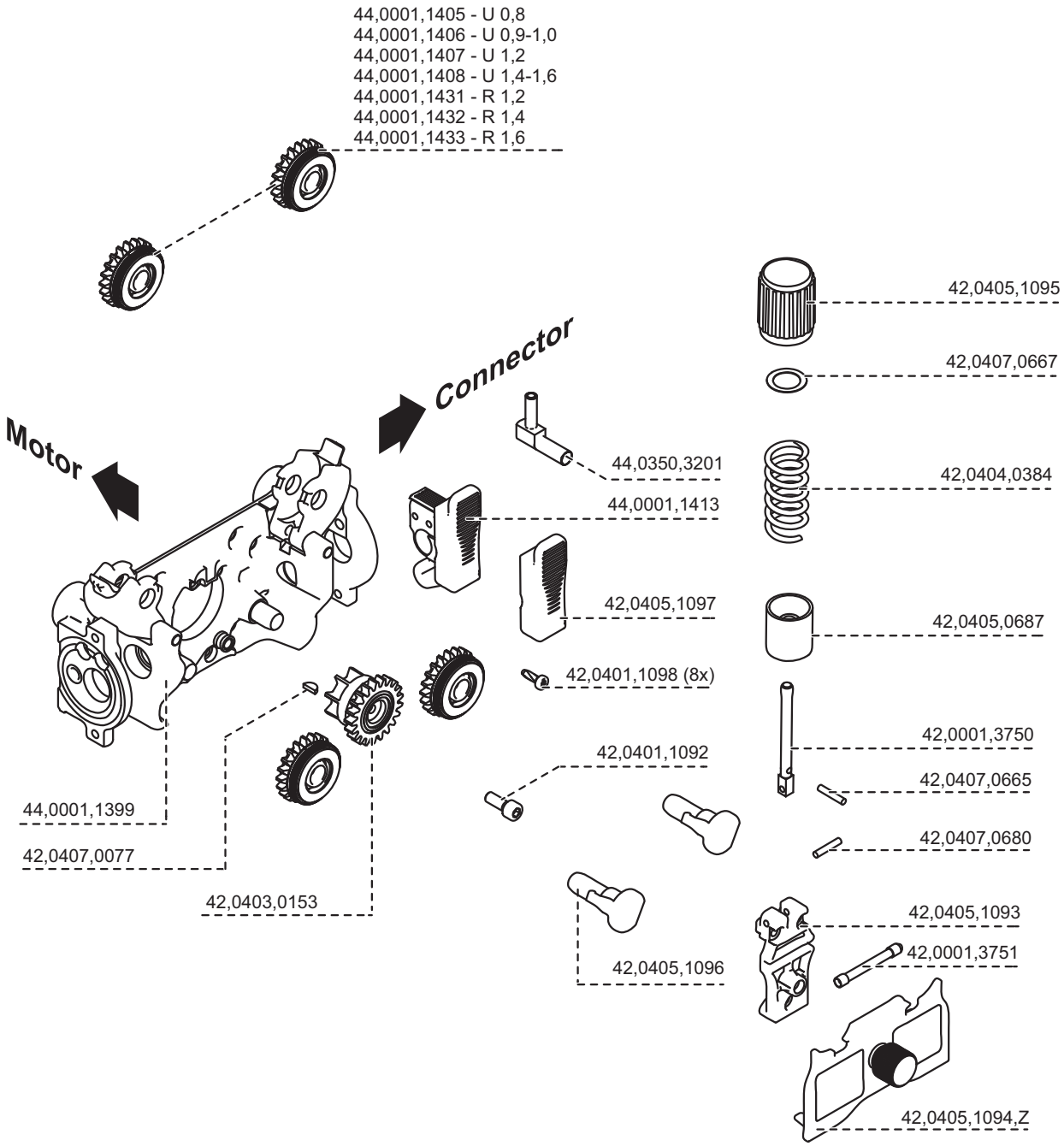
E = Euro connection



F++ = Fronius connection



Motorplatte Alu 4R s



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