Fronius

TÄYDELLISTÄ HITSAUSTA

TRANSPOCKET 4000/5000

/ Operating Instructions
/ Spare Parts List

v.01/2013 ENG

Dear Reader

Introduction

Thank you for choosing Fronius - and congratulations on your new, technically high-grade Fronius product! This instruction manual will help you get to know your new machine. Read the manual carefully and you will soon be familiar with all the many great features of your new Fronius product. This really is the best way to get the most out of all the advantages that your machine has to offer.

Please also take special note of the safety rules - and observe them! In this way, you will help to ensure more safety at your product location. And of course, if you treat your product carefully, this definitely helps to prolong its enduring quality and reliability - things which are both essential prerequisites for getting outstanding results.

Safety rules

DANGER!

"DANGER!" indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations. This signal word is not used for property damage hazards unless personal injury risk appropriate to this level is also involved.

WARNING!

"WARNING!" indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. This signal word is not used for property damage hazards unless personal injury risk appropriate to this level is also involved.

CAUTION!

"CAUTION!" indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices that may cause property damage.

NOTE!

"NOTE!" indicates a situation which implies a risk of impaired welding result and damage to the equipment.

Important!

"Important!" indicates practical hints and other useful special-information. It is no signal word for a harmful or dangerous situation.

Whenever you see any of the symbols shown above, you must pay even closer attention to the contents of the manual!

General remarks

This equipment has been made in accordance with the state of the art and all recognised safety rules. Nevertheless, incorrect operation or misuse may still lead to danger for

- the life and well-being of the operator or of third parties,
- the equipment and other tangible assets belonging to the owner/operator,
- efficient working with the equipment.

All persons involved in any way with starting up, operating, servicing and maintaining the equipment must

- be suitably qualified
- know about welding and
- read and follow exactly the instructions given in this manual.

The instruction manual must be kept at the machine location at all times. In addition to the instruction manual, copies of both the generally applicable and the local accident prevention and environmental protection rules must be kept on hand, and of course observed in practice.

All the safety instructions and danger warnings on the machine itself:

- must be kept in a legible condition
- must not be damaged, must not be removed
- must not be covered, pasted or painted over

For information about where the safety instructions and danger warnings are located on the machine, please see the section of your machine's instruction manual headed "General remarks".

General remarks
(continued)

Any malfunctions which might impair machine safety must be eliminated immediately - meaning before the equipment is next switched on.

It's your safety that's at stake!

Utilisation for intended purpose only

The machine may only be used for jobs as defined by the "Intended purpose".

The machine may ONLY be used for the welding processes stated on the rating plate.
Utilisation for any other purpose, or in any other manner, shall be deemed to be "not in accordance with the intended purpose". The manufacturer shall not be liable for any damage resulting from such improper use.

Utilisation in accordance with the "intended purpose" also comprises
- complete reading and following of all the instructions given in this manual
- complete reading and following of all the safety instructions and danger warnings
- performing all stipulated inspection and servicing work.

The appliance must never be used for the following:
- Thawing pipes
- Charging batteries/accumulators
- Starting engines

The machine is designed to be used in industrial and workshop environments. The manufacturer shall not be liable for any damage resulting from use of the machine in residential premises.

ikewise the manufacturer will accept no liability for defective or faulty work results.

Ambient conditions

Operation or storage of the power source outside the stipulated range is deemed to be "not in accordance with the intended use". The manufacturer shall not be liable for any damage resulting herefrom.

Temperature range of ambient air:
- when operating: - 10 °C to + 40 °C (14 °F to 104 °F)
- when being transported or stored: - 25 °C to + 55 °C (-13 °F to 131 °F)

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

Ambient air: Free of dust, acids, corrosive gases or substances etc.

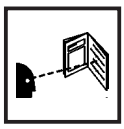
Elevation above sea level: Up to 2000 m (6500 ft)

Obligations of owner/operator

The owner/operator undertakes to ensure that the only persons allowed to work with the machine are persons who
- are familiar with the basic regulations on workplace safety and accident prevention and who have been instructed in how to operate the machine
- have read and understood this operating manual particulary the sections on "Safety rules", and have confirmed as much with their signatures
- be trained in such a way that meets with the requirements of the work results

Regular checks must be performed to ensure that personnel are still working in a safety-conscious manner.

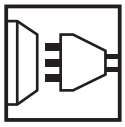
Obligations of personnel



Before starting work, all persons to be entrusted with carrying out work with (or on) the machine shall undertake
- to observe the basic regulations on workplace safety and accident prevention
- to read this operating manual particulary the sections on “Safety rules” and to sign to confirm that they have understood these and will comply with them.

Before leaving the workplace, personnel must ensure that there is no risk of injury or damage being caused during their absence.

Mains connection



High-performance devices can affect the quality of the mains power 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 or not the device is allowed to be connected, where appropriate through discussion with the power supply company.

Protection for yourself and other persons

When welding, you are exposed to many different hazards such as:
- flying sparks and hot metal particles
- arc radiation which could damage your eyes and skin

- harmful electromagnetic fields which may put the lives of cardiac pacemaker users at risk

- electrical hazards from mains and welding current

- increased exposure to noise

- noxious welding fumes and gases.

Anybody working on the workpiece during welding must wear suitable protective clothing with the following characteristics:
- flame-retardant
- isolating and dry
- must cover whole body, be undamaged and in good condition
- protective helmet
- trousers with no turn-ups

Protection for yourself and other persons (continued)

"Protective clothing" also includes:
- protecting your eyes and face from UV rays, heat and flying sparks with an appropriate safety shield containing appropriate regulation filter glass
- wearing a pair of appropriate regulation goggles (with sideguards) behind the safety shield
- wearing stout footwear that will also insulate even in wet conditions
- protecting your hands by wearing appropriate gloves (electrically insulating, heat-proof)
- To lessen your exposure to noise and to protect your hearing against injury, wear ear-protectors!

Keep other people - especially children - well away from the equipment and the welding operation while this is in progress. If there are still any other persons nearby during welding, you must
- draw their attention to all the dangers (risk of being dazzled by the arc or injured by flying sparks, harmful welding fumes, high noise immission levels, possible hazards from mains or welding current ...)
- provide them with suitable protective equipment and/or
- erect suitable protective partitions or curtains.

Information on noise emission values

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

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

Hazards from noxious gases and vapours

The fumes given off during welding contain gases and vapors that are harmful to health.

Welding fumes contain substances which may cause birth defects and cancers.

Keep your head away from discharges of welding fumes and gases.

Do not inhale any fumes or noxious gases that are given off.
Extract all fumes and gases away from the workplace, using suitable means.

Ensure a sufficient supply of fresh air.

Where insufficient ventilation is available, use a respirator mask with an independent air supply.

If you are not sure whether your fume-extraction system is sufficiently powerful, compare the measured pollutant emission values with the permitted threshold limit values.

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

Hazards from noxious gases and vapours (continued)

The harmfulness of the welding fumes will depend on e.g. the following components:
- the metals used in and for the workpiece
- the electrodes
- coatings
- cleaning and degreasing agents and the like

For this reason, pay attention to the relevant Materials Safety Data Sheets and the information given by the manufacturer regarding the components listed above.

Keep all flammable vapors (e.g. from solvents) well away from the arc radiation.

Hazards from flying sparks

Flying sparks can cause fires and explosions!

Never perform welding anywhere near combustible materials.

Combustible materials must be at least 11 meters (35 feet) away from the arc, or else must be covered over with approved coverings.

Have a suitable, approved fire extinguisher at the ready.

Sparks and hot metal particles may also get into surrounding areas through small cracks and openings. Take suitable measures here to ensure that there is no risk of injury or fire.

Do not perform welding in locations that are at risk from fire and/or explosion, or in enclosed tanks, barrels or pipes, unless these latter have been prepared for welding in accordance with the relevant national and international standards.

Welding must NEVER be performed on containers that have had gases, fuels, mineral oils etc. stored in them. Even small traces of these substances left in the containers are a major explosion hazard.

Hazards from mains and welding current

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

Do not touch any live parts, either inside or outside the machine.

In MIG/MAG and TIG welding, the welding wire, the wire spool, the drive rollers and all metal parts having contact with the welding wire are also live.

Always place the wirefeeder on an adequately insulated floor or base, or else use a suitable insulating wirefeeder holder.

Ensure sufficient protection for yourself and for other people by means of a dry base or cover that provides adequate insulation against the ground/frame potential. The base or cover must completely cover the entire area between your body and the ground/frame potential.

All cables and other leads must be firmly attached, undamaged, properly insulated and adequately dimensioned. Immediately replace any loose connections, scorched, damaged or underdimensioned cables or other leads.

Hazards from mains and welding current
(continued)

Do not loop any cables or other leads around your body or any part of your body.

Never immerse the welding electrode (rod electrode, tungsten electrode, welding wire, ...) in liquid in order to cool it, and never touch it when the power source is ON.

Twice the open-circuit voltage of one single welding machine may occur between the welding electrodes of two welding machines. Touching the potentials of both electrodes simultaneously may be fatal.

Have the mains and the machine supply leads checked regularly by a qualified electrician to ensure that the PE (protective earth) conductor is functioning correctly.

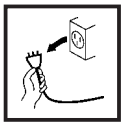
Only run the machine on a mains network with a PE conductor, and plugged into a power outlet socket with a protective-conductor contact.

If the machine is run on a mains network without a PE conductor and plugged into a power outlet socket without a protective-conductor contact, this counts as gross negligence and the manufacturer shall not be liable for any resulting damage.

Wherever necessary, use suitable measures to ensure that the workpiece is sufficiently grounded (earthed).

Switch off any appliances that are not in use.

Wear a safety harness if working at height.



Before doing any work on the machine, switch it off and unplug it from the mains.

Put up a clearly legible and easy-to-understand warning sign to stop anybody inadvertently plugging the machine back into the mains and switching it back on again.

After opening up the machine:
- discharge any components that may be storing an electrical charge
- ensure that all machine components are electrically dead.

If work needs to be performed on any live parts, there must be a second person on hand to immediately switch off the machine at the main switch in an emergency.

Stray welding currents

If the following instructions are ignored, stray welding currents may occur. These can cause:
- fires
- overheating of components that are connected to the workpiece
- destruction of PE conductors
- damage to the machine and other electrical equipment

Ensure that the workpiece clamp is tightly connected to the workpiece.

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

On electrically conductive floors, the machine must be set up in such a way that it is sufficiently insulated from the floor.

Stray welding currents
(continued)

When using current supply distributors, twin head wire feeder fixtures etc., please note the following: The electrode on the unused welding torch/welding tongs is also current carrying. Please ensure that there is sufficient insulating storage for the unused welding torch/tongs.

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

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 as per the rating plate or technical specifications

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.

Examine and evaluate any possible electromagnetic problems that may occur on equipment in the vicinity, and the degree of immunity of this equipment, in accordance with national and international regulations:
- safety features
- mains, signal and data-transmission leads
- IT and telecoms equipment
- measurement and calibration devices

Ancillary measures for preventing EMC problems:

a) Mains supply
- If electromagnetic interference still occurs, despite the fact that the mains connection is in accordance with the regulations, take additional measures (e.g. use a suitable mains filter).

b) Welding cables
- Keep these as short as possible
- Arrange them so that they run close together (to prevent EMI problems as well)
- Lay them well away from other leads.

c) Equipotential bonding

d) Workpiece grounding (earthing)
- where necessary, run the connection to ground (earth) via suitable capacitors.

e) Shielding, where necessary
- Shield other equipment in the vicinity
- Shield the entire welding installation.

EMI Precautions

Electromagnetic fields may cause as yet unknown damage to health.
- Effects on the health of persons in the vicinity, e.g. users of heart pace-makers and hearing aids
- Users of heart pacemakers must take medical advice before going anywhere near welding equipment or welding workplaces
- Keep as much space as possible between welding cables and head/body of welder for safety reasons
- Do not carrywelding cables and hose pack over shoulder and do not loop around body or or any part of body

Particular danger spots

Keep your hands, hair, clothing and tools well away from all moving parts, e.g.:
- fans
- toothed wheels, rollers, shafts
- wire-spools and welding wires

Do not put your fingers anywhere near the rotating toothed wheels of the wirefeed drive.0

Covers and sideguards may only be opened or removed for as long as is absolutely necessary to carry out maintenance and repair work.

While the machine is in use:
- ensure that all the covers are closed and that all the sideguards are properly mounted ...
- ... and that all covers and sideguards are kept closed.

When the welding wire emerges from the torch, there is a high risk of injury (the wire may pierce the welder's hand, injure his face and eyes ...). For this reason, when feeder-inching etc., always hold the torch so that it is pointing away from your body (machines with wirefeeder).

Do not touch the workpiece during and after welding - risk of injury from burning!

Slag may suddenly "jump" off workpieces as they cool. For this reason, continue to wear the regulation protective gear, and to ensure that other persons are suitably protected, when doing post-weld finishing on workpieces.

Allow welding torches - and other items of equipment that are used at high operating temperatures - to cool down before doing any work on them.

Special regulations apply to rooms at risk from fire and/or explosion. Observe all relevant national and international regulations.

Power sources for use in spaces with increased electrical danger (e.g. boilers) must be identified by the S (for "safety") mark.
However, the power source should not be in such rooms.

Risk of scalding from accidental discharge of hot coolant. Before unplugging the connectors for coolant forward flow and return flow, switch off the cooling unit.

Particular danger spots
(continued)

When hoisting the machines by crane, only use suitable manufacturer-supplied lifting devices.

- Attach the chains and/or ropes to **all** the hoisting points provided on the suitable lifting device.
- The chains and/or ropes must be at an angle which is as close to the vertical as possible.
- Remove the gas cylinder and the wirefeed unit (from MIG/MAG and TIG units).

When hoisting the wirefeed unit by crane during welding, always use a suitable, insulating suspension arrangement (MIG/MAG and TIG units).

If a machine is fitted with a carrying strap or carrying handle, remember that this strap is ONLY to be used for lifting and carrying the machine by hand. The carrying strap is NOT suitable for transporting the machine by crane, fork-lift truck or by any other mechanical hoisting device.

Danger of colourless and odourless inert gas escaping unnoticed, when using an adapter for the inert gas protection. Seal the adapter thread for the inert gas connection using Teflon tape before assembly.

Danger from shielding-gas cylinders

Shielding-gas cylinders contain pressurized gas and may explode if they are damaged. As shielding-gas cylinders are an integral part of the overall welding outfit, they also have to be treated with great care.

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

Mount the shielding-gas cylinders in the vertical and fasten them in such a way that they cannot fall over (i.e. as shown in the instruction manual).

Keep shielding-gas cylinders well away from welding circuits (and, indeed, from any other electrical circuits).

Never hang a welding torch on a shielding-gas cylinder.

Never touch a shielding-gas cylinder with a welding electrode.

Explosion hazard - never perform welding on a pressurized shielding-gas cylinder.

Use only shielding-gas cylinders that are suitable for the application in question, together with matching, suitable accessories (pressure regulators, hoses and fittings, ...). Only use shielding-gas cylinders and accessories that are in good condition.

When opening the valve of a shielding-gas cylinder, always turn your face away from the outlet nozzle.

Close the shielding-gas cylinder valve when no welding is being carried out.

When the shielding-gas cylinder is not connected up, leave the cap in place on the shielding-gas cylinder valve.

Observe the manufacturer’s instructions and all relevant national and international rules applying to shielding-gas cylinders and accessories.

Safety precautions at the installation site and when being transported

A machine that topples over can easily kill someone! For this reason, always place the machine on an even, firm floor in such a way that it stands firmly.
- An angle of inclination of up to 10° is permissible.

Special regulations apply to rooms at risk from fire and/or explosion. Observe all relevant national and international regulations.

By means of internal instructions and checks, ensure that the workplace and the area around it are always kept clean and tidy.

The appliance must only be installed and operated in accordance with the protection type stated on the specifications plate.

When installing the appliance, please ensure a clearance radius of 0.5 m (1.6ft.) , so that cool air can circulate freely.

When transporting the appliance, please ensure that the valid national and regional guidelines and accident protection regulations are followed. This applies in particular to guidelines in respect of dangers during transportation and carriage.

Before transportation, completely drain any coolant and dismantle the following components:
- Wire feed
- Wire wound coil
- Gas bottle

Before commissioning and after transportation, a visual check for damage must be carried out. Any damage must be repaired by trained service personnel before commissioning.

Safety precautions in normal operation

Only operate the machine if all of its protective features are fully functional. If any of the protective features are not fully functional, this endangers:
- the life and well-being of the operator or other persons
- the equipment and other tangible assets belonging to the owner/operator
- efficient working with the equipment.

Any safety features that are not fully functional must be put right before you switch on the machine.

Never evade safety features and never put safety features out of order.

Before switching on the machine, ensure that nobody can be endangered by your doing so.

- At least once a week, check the machine for any damage that may be visible from the outside, and check that the safety features all function correctly.
- Always fasten the shielding-gas cylinder firmly, and remove it altogether before hoisting the machine by crane.
- Owing to its special properties (in terms of electrical conductivity, frost-proofing, materials-compatibility, combustibility etc.), only original coolant of the manufacturer is suitable for use in our machines.
- Only use suitable original coolant of the manufacturer.
- Do not mix original coolant of the manufacturer with other coolants.

Safety precautions in normal operation
(continued)

- If any damage occurs in cases where other coolants have been used, the manufacturer shall not be liable for any such damage, and all warranty claims shall be null and void.
- Under certain conditions, the coolant is flammable. Only transport the coolant in closed original containers, and keep it away from sources of ignition.
- Used coolant must be disposed of properly in accordance with the relevant national and international regulations. A safety data sheet is available from your service centre and on the manufacturer's homepage.
- Before starting welding - while the machine is still cool - check the coolant level.

Preventive and corrective maintenance

With parts sourced from other suppliers, there is no certainty that these parts will have been designed and manufactured to cope with the stressing and safety requirements that will be made of them. Use only original spares and wearing parts (this also applies to standard parts).

Do not make any alterations, installations or modifications to the machine without getting permission from the manufacturer first.

Replace immediately any components that are not in perfect condition.

When ordering spare parts, please state the exact designation and the relevant part number, as given in the spare parts list. Please also quote the serial number of your machine.

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 be returned to our agent, or find out about 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 markings

Equipment with CE-markings fulfils the basic requirements of the Low-Voltage and Electromagnetic Compatibility Guideline (e.g. relevant product standards according to EN 60 974). .

Equipment marked with the CSA-Test Mark fulfils the requirements made in the relevant standards for Canada and the USA.

Data security

The user is responsible for the data security of changes made to factory settings. The manufacturer is not liable, if personal settings are deleted.

Copyright

Copyright to this instruction manual remains the property of the manufacturer.

The text and illustrations are all technically correct at the time of going to print. The right to effect modifications is reserved. The contents of the instruction manual shall not provide the basis for any claims whatever on the part of the purchaser. If you have any suggestions for improvement, or can point out to us any mistakes which you may have found in the manual, we should be most grateful for your comments.

Contents

General remarks

Principle of the digital family of machines

Fig.1 The TP 4000 CEL / TP 5000 CEL power sources

The TP 4000 CEL / 5000 CEL is a further member of the new generation of all-digital power sources. What is more, the TP 4000 CEL / 5000 CEL is the first-ever fully digital power source to be designed specifically for the rod electrode and TIG (with touchdown ignition) welding processes.

The new power sources are completely digitalised, microprocessor controlled inverter power sources. An interactive power-source manager is coupled with a digital signal processor, and together they control and regulate the entire welding process. The actual data are measured continuously, and the machine responds immediately to any changes. The control algorithms developed by Fronius ensure that the specified target status that is desired is maintained.

This leads to a hitherto unique and incomparable precision in the weld process, exact replicability of all results, and superlative welding properties.

Machine concept

Typical features of the new machines are their tremendous flexibility and extremely easy adaptability to many varied tasks. The reasons for these welcome characteristics may be found not only in the modular product design, but also in the scope that the system gives for troublefree system extensions.

You can adapt your machine to practically any specific situation. For example, the TP 4000 CEL / TP 5000 CEL power sources come with a polarity reverser with which you can quickly and easily change over the polarity at the welding-current sockets. In particular if CEL electrodes are used, this makes for very controlled, gentle root fusion when welding root passes.

Thanks to the wide selection of remote-control units and TIG welding torches, and the space-saving design of the trolley, perfect welding results can be achieved in practically every situation, with optimum ergonomical convenience for the user, and in the shortest possible time.

The remote-control units are available in a number of different user-specific operating formats. In addition, the compact wireless remote-control unit TP 08 is available for rod electrode welding. This remote control unit facilitates wireless correction of the set welding current during welding breaks.

Areas of use

In the workshop and industrial fields, there are innumerable areas of application for the TP 4000 CEL / TP 5000 CEL. In terms of materials, they are of course also suitable for classical steel as well as chromium/nickel.

With their 380 and 480 amps of power respectively, the TP 4000 CEL / 5000 CEL easily meet even the most stringent demands of industrial users. They are designed for use in the fields of apparatus construction and chemical plant engineering, in the construction of machinery and rolling stock, and in shipyards.

Description of control panel

General remarks

The functions on the control panel are all arranged in a very logical way. The various parameters needed for welding are easy to select, by pressing the appropriate button, and can easily be

- altered with the adjusting dial
- shown on the display during welding

NOTE! Owing to software updates, you may find that your machine has certain functions that are not described in these Operating Instructions, or vice-versa. Also, certain illustrations may be very slightly different from the actual controls on your machine. However, these controls function in exactly the same way.

Description of the control panel

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

- these Operating Instructions
- all operating instructions for the system components, especially the “Safety

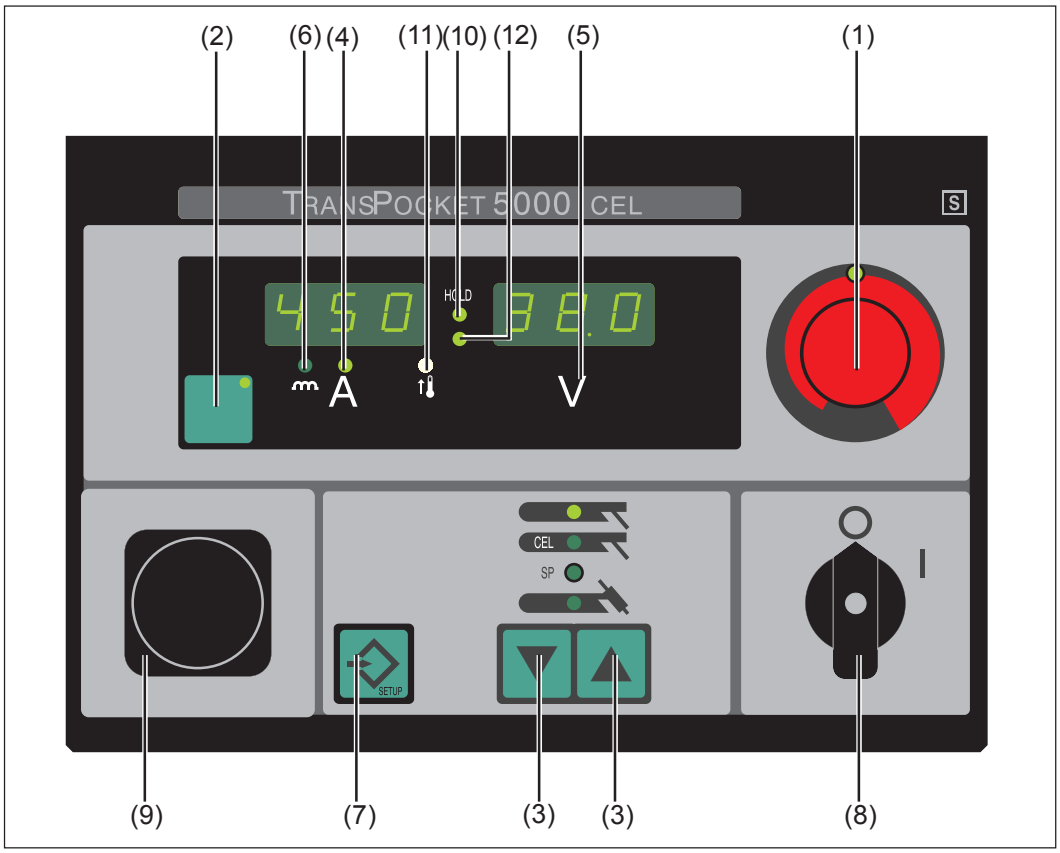


Fig.2 Control panel

Description of the control panel
(continued)

(1) **Adjusting dial** ... for altering parameters. If the indicator next to the adjusting dial is lit up, then the selected parameter is one that can be altered.

(2) **Parameter selection button** ... for selecting the following parameters:
- welding current
- arc-forcek

If the indicator is lit up on the parameter selection button and on the adjusting dial, then the indicated / selected parameter can be altered with the adjusting dial.

The parameters can be set separately for each of the processes that can be selected with the “Process” button (3). The parameter settings remain stored in the memory until the next time any change is made to the setting in question.

(3) **Process button(s)** ... for selecting the welding process
- Rod electrode welding
- Rod electrode welding with CEL-electrode
- Special processes
- TIG welding with touch-down ignition

(4) **Welding current parameter** ... for selecting the welding amperage. Before the start of welding, the machine automatically displays a guideline value based on the programmed parameters. During welding, the actual value is displayed.

(5) **Welding voltage parameter** ... for selecting the welding voltage. Before the start of welding, the machine automatically displays a guideline value based on the programmed parameters. During welding, the actual value is displayed.

NOTE! The power source has a pulsating open-circuit voltage. Before the welding process is initiated (open circuit), the display indicates a welding voltage mean value of approx. 60V.
However, a welding voltage of max. 95V is available for welding start and the welding process. Optimised ignition properties are guaranteed.

(6) **Param eter: Arc-force**
Rod electrode welding ... for influencing the short-circuiting amperage at the instant of droplet transfer
0 soft and low-spatter arc
100 harder and more stable arc

NOTE! When the “TIG welding” process has been selected, it is not possible to select the “Arc force” parameter.

(7) **Setup / Store button** ... for accessing the Setup Menu

NOTE! If you press the Setup / Store button (7) and the Parameter Selection Button (2) at the same time, the display gives you a read-out of the software version. To exit, press the Setup / Store button (7).

(8) **Mains switch** ... for switching the power source on and off

(9) **LocalNet connection socket** ... standardised connection socket for system extensions (e.g. remote control, robot interface, et al.)

(10) **HOLD indicator** ... every time you finish a welding operation, the actual values for welding current and voltage are stored, and the “Hold” indicator lights up.

(11) **Overtemperature indicator** ... lights up when the power source heats up too much (e.g. because the duty cycle has been exceeded). For more information on this, see the section headed “troubleshooting“.

Description of the control panel
(continued)

(12) **TP 08 indicator** ... lights up when a TP 08 remote-control unit is connected to the power source.

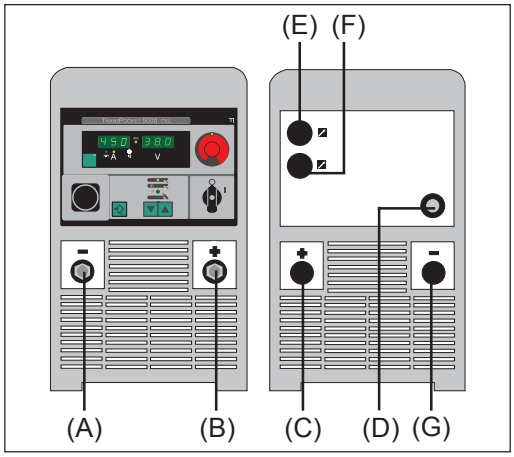
The TP 08 indicator continues to glow even after the TP 08 remote-control unit has been disconnected.

As long as the TP 08 indicator is lit up, it is only possible to set the amperage and the arc-force dynamic from the TP 08 remote-control unit.

To make it possible to set the amperage and the arc-force dynamic from the power source once again, as well as from other system add-ons:
- Disconnect the TP 08
- Switch off the power source, then switch it back on again
- The TP 08 indicator remains dark

Connections

TP 4000 CEL / TP 5000 CEL power source



F ig.3 Front and rear view of TP 4000 CEL / TP 5000 CEL power source

(A) **(-)-Current socket with bayonet latch** ... for
- connecting rod electrode or the earth cable in manual electrode welding (depending on electrode type being used)
- current connection for TIG welding torch

(B) **(+)-Current socket with bayonet latch** ... for
- connecting for rod electrode or earth cable in manual electrode welding (depending on electrode type being used)
- connecting the earth cable in TIG welding

NOTE! If the remote-control TR 3000 is used, always connect the rod electrode cable to the (+) current socket.

(C) **Blanking cover**

(D) **Blanking cover**

(E) **Blanking cover** (intended for LocalNet connection socket)

(F) **Blanking cover** (intended for LocalNet connection socket)

(G) **Mains cable with strain-relief device**

TR 2000 remote control unit

Fig.4 TR 2000 remote control unit

(24) **Welding current setting dial** ... for selecting the welding current

(25) **Arc-force setting dial**
Manual electrode welding..for influencing the short-circuiting amperage at the instant of droplet transfer
0 soft. low-spatter arc
100 harder, more stable arc

NOTE! Parameters that can be set on the remote-control unit cannot be changed on the power source. Parameter changes can only be made on the remote-control unit.

TR 3000 remote-control unit

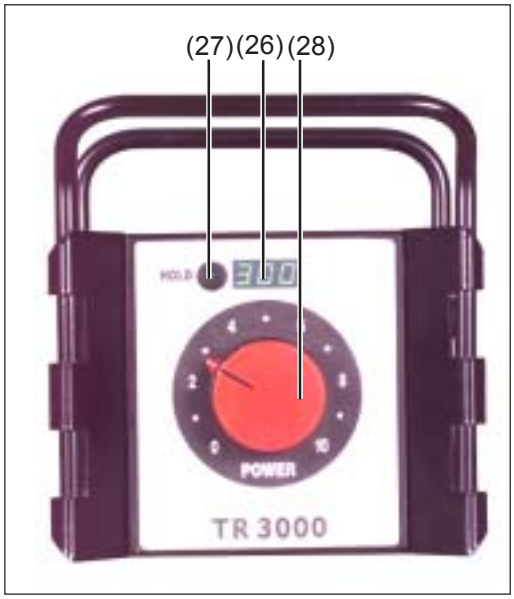


Fig.5 TR 3000 remote-control unit - front view

(26) **Welding current indicator** ... for selecting the welding amperage. Before the start of welding, the machine automatically displays a guideline value based on the programmed parameters. During welding, the actual value is displayed.

(27) **HOLD indicator** ... every time you finish a welding operation, the actual values for welding current and voltage are stored, and the “Hold” indicator lights up.

(28) **Welding-current setting dial** ... for selecting the welding current .

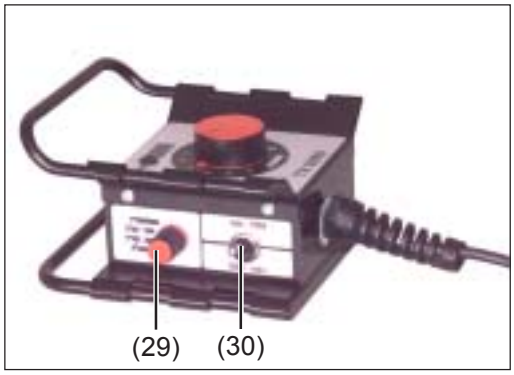


Fig.6 TR 3000 remote-control unit - view from the left side

(29) **Process selector switch** ... for selecting the welding process
- Rod electrode welding
- Rod electrode welding with CEL-electrode
- Special processes
- TIG welding with touch-down ignition

(30) **Welding-current range selector switch** for selecting the welding-current range within which the welding current can be set using the welding-current setting dial(28)

- **min - 150 A:**
  0 ls owest possible welding current
  10 welding current is 150 A
- **100 A - max:**
  0 welding current is 100 A
  10 highest possible welding current

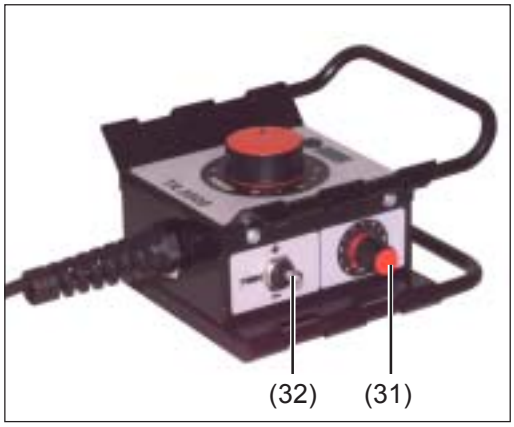


Fig.7 TR 3000 remote-control unit - view from the right side

(31) **Arc-force setting dial**
Manal-electrode welding ... for influencing the short-circuiting amperage at the instant of droplet transfer
0 soft, low-spatter arc
100 harder, more stable arc

(32) **Change-over switch for polarity reverser** ... for actuating the polarity reverser (optional)
+ Positive welding potential at the (+) current socket
- Negative welding potential at the (-)current socket

TR 3000 remote-control unit
(continued)

NOTE! Parameters that can be set on the remote-control unit cannot be changed on the power source. Parameter changes can only be made on the remote-control unit.

TR 4000 remote-control unit

Fig.8 TR 4000 remote-control unit

(33) **Parameter switchover button** ... for selecting and displaying the parameters “Welding voltage” and “Welding current” on the digital display

NOTE! When you change a parameter, the value for this parameter is brie-fly indicated - for control purposes - on the digital display of the r.c. unit.

(34) **Welding-current setting dial** ... for selecting the welding current

(35) **Hot start setting dial**
Manual electrode welding ... influences the welding current during the ignition phase
0 no influence
10 100% increase in welding current during the ignition phase

(36) **Arc-force setting dial**
Manual electrode welding ... for influencing the short-circuiting amperage at the instant of droplet transfer
0 soft, low-spatter arc
100 harder, more stable arc

NOTE! Parameters that can be set on the remote- control unit cannot be changed on the power source. Parameter changes can only be made on the remote-control unit.

TR 1000 / TR 1100 REMOTE-CONTROL UNIT

Fig.9 TR 1000 remote-control unit

Fig.10 TR 1100 remote-control unit

TR 1000 / TR 1100 remote-control unit (continued)

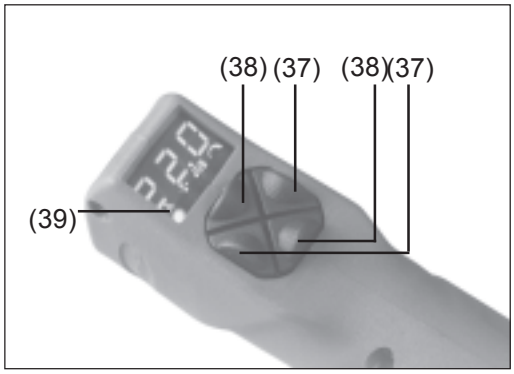


Fig.11 TR 1000 / TR 1100 control panel

(37) **Parameter-display button(s)** ... for selecting the parameter to be displayed (welding current, ...)

(38) **Parameter-setting button(s)** ... for altering the selected parameter

(39) **Welding current parameter**

TP 08 remote-control unit

System requirements:
- Software version 2.81.1

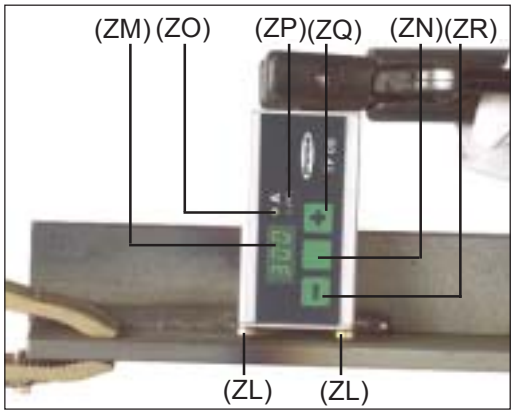


Fig.12 TP 08 remote-control unit

1. With the “Process” button (3), select the rod-electrode (MMA) welding process
2. Attach the earth clamp to the workpiece and clamp the electrode holder to the TP 08 remote-control unit
3. Place the TP 08 down on the workpiece in such a way that there is a solid, firm connection between the workpiece and the two contacts (ZL)

NOTE! The welding voltage is switched to the welding sockets after a 3 sec time-lag. The TP 08 remote-control unit is then supplied with welding voltage, and indicator (ZM) lights up.

If the TP 08 remote-control unit has been connected up since the power source was last switched on, it is only possible to set the amperage and arc-force dynamic on the TP 08 remote-control unit.

To make it possible to set the amperage and the arc-force dynamic from the power source once again, as well as from other system add-ons:
- Disconnect the TP 08
- Switch off the power source, then switch it back on again

TP 08 remote-control unit (continued)

(ZN) **Parameter selection button** ... For selecting the parameters
- ● A Welding current (ZO)
- ● Arc-force dynamic (ZP)

(ZQ) **(+) button** ... Increases the value for the selected parameter

(ZR) **(-) button** ... Decreases the value for the selected parameter

NOTE! Irrespective of the service codes given in the “Troubleshooting” section, the following service codes may be displayed on the TP 08 remote-control unit:

Service-Code: -OFF-

Cause: Poor contact with the workpiece
Remedy: Create a solid, firm connec-tion to the workpiece

Service-Code: -E62-

Cause: Overtemperature on the TP 08 r.-c. unit
Remedy: Allow the TP 08 to cool down

As long as a service code is displayed on the power source or any other system add-on, the TP 08 remote-control unit is out of action.

Options

“LocalNet passive“ distributor

Fig.13 LocalNet distributor - passive

The “LocalNet passive” distributor makes it possible to connect up and run several system add-ons on the LocalNet connection jack of the power source or of the wirefeeder at the same time - e.g. TR 3000 and TR 1100 simultaneously.

NOTE! The “LocalNet passive” distributor only functions properly if both ends of the distributor are in use / connected.

“LocalNet active” splitter

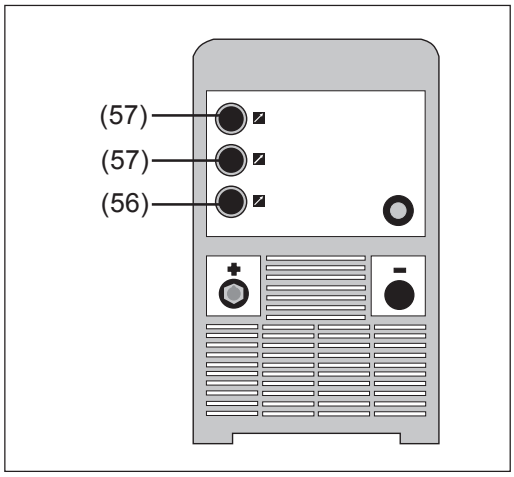


Fig.14 Rear view of TP 4000 / 5000 CEL with LocalNet active splitter

The LocalNet active splitter provides a total of three LocalNet jacks at the rear of the power source. This permits simultaneous operation of numerous system add-ons.

NOTE! If individual connection jacks are left unassigned, it is preferable to use the metal LocalNet jack (56).

(56) **Metal LocalNet jack**

(57) **Plastic LocalNet jacks**

A particular advantage of LocalNet active over the “LocalNet passive” splitter is found when working with temporarily connected LocalNet users such as the RCU 4000 remote control panel. Unlike with the “LocalNet passive” splitter, it is possible here to leave individual connection jacks unassigned when the extra users are no longer needed

Polarity reverser

System requirements:
- Software version 2.81.1
- TR 3000 remote-control unit

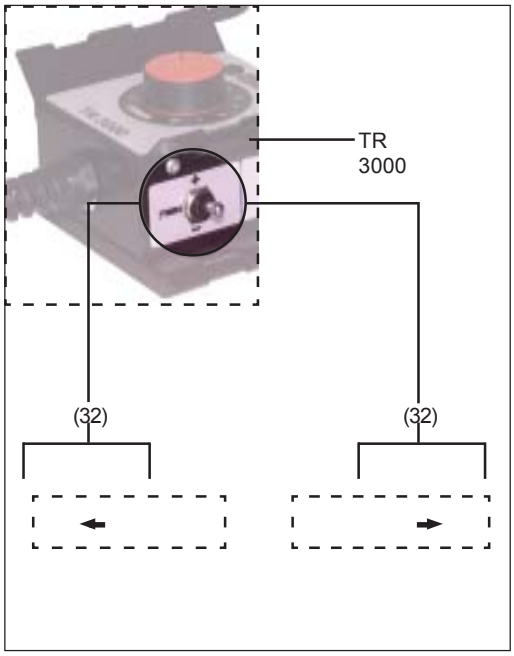


Fig.15 Addressing the polarity reverser in conjunction with the TR 3000

(32) **Changeover switch for polarity reverser** ... For addressing the pol arity reverser (optional)
- \+ Positive welding potential at the ⊕ current socket
- \- Negative welding potential at the ⊕ current socket

EN

Starting to use the power source

General remarks

WARNING! Operating the equipment incorrectly can cause serious injury and damage. Do not use the functions described here until you have read and completely understood all of the following documents:
- these Operating Instructions
- all operating instructions for the system components, especially the “Safetyrules”

Utilisation for intended purpose only

The power source is intended to be used SOLELY for rod electrode welding, TIG welding as well as gouging.
Any other use, or any use going beyond the above, is deemed to be “not for the intended purpose” and the manufacturer shall not be liable for any damage resulting therefrom.

“Utilisation for the intended purpose” shall also be deemed to encompass:
- the observance of all instructions in the operating manual
- the carrying out of all prescribed inspection and maintenance work

Machine set-up regulations

The power source is tested to “Degree of protection IP23”, meaning:
- Protection against penetration by solid foreign bodies with diameters larger than 12.5 mm (.49 in.)
- Protection against spraywater up to an angle of 60° to the upright

The power source can be set up and operated outdoors in accordance with IP23.
However, the built-in electrical components must be protected against direct wetting.

WARNING! A machine that topples over or falls from its stand can easily kill someone. Place equipment on an even, firm floor in such a way that it stands firmly.

Mains connection

The venting duct is a very important safety feature. When choosing the machine location, make sure that it is possible for the cooling air to enter and exit unhindered through the louvers on the front and back of the machine. Any electroconductive metallic dust from e.g. grinding-work must not be allowed to get sucked into the machine.

The power source is designed to run on the mains voltage given on the rating plate. The mains cable and plug are ready-mounted. For details of fuse protection of the mains supply lead, please see the Technical Data.

NOTE! Inadequately dimensioned electrical installations can lead to serious damage. The mains lead, and its fuse protection, must be dimensioned in accordance with the local power supply. The technical data shown on the rating plate shall apply.

Mounting the “Everywhere” trolley

General remarks

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. Only carry out work on the machine when
-the mains switch is in the - O - position,
-the machine is unplugged from the mains.

Mount the power source on the trolley

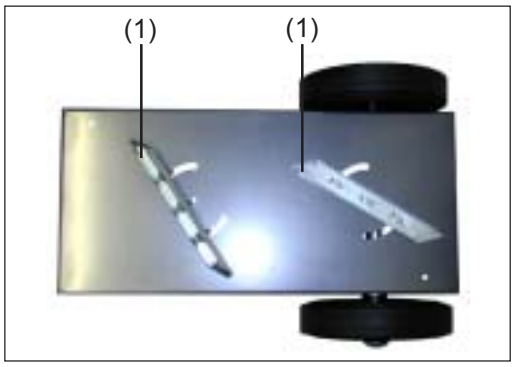


Fig.16 Insert the catches

1. Insert the catches (1) into the boreholes on the base of the trolley
2. Angle the catches (1) obliquely as far as they will go

Fig.17 Power source and trolley

NOTE! When placing the power source up on end, make sure that you do not kink or pinch the mains cable, or subject it to tensile strain.

3. Carefully place the power source up on end
4. Carefully place the trolley up on end
5. Push the trolley up against the power source so that the trolley and the power source are exactly facing one another

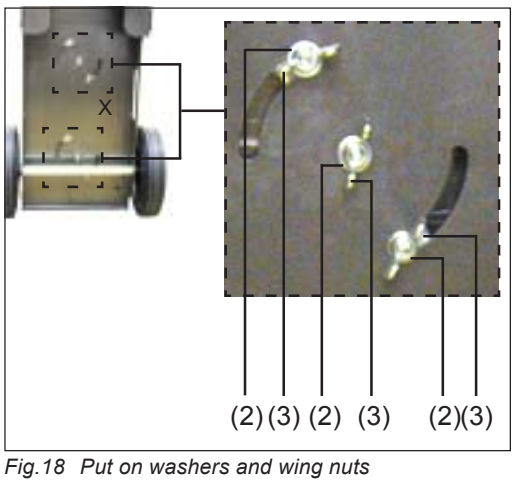


Fig.18 Put on washers and wing nuts

6. Push washers (2) onto the six threaded bolts and slightly tighten the wing nuts (3)

Mount the power source on the trolley
(continued)

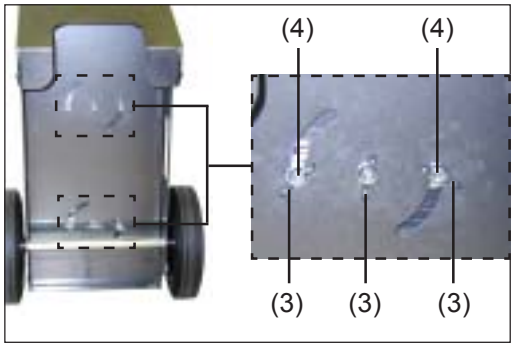


Fig.19 Straighten and fix the catches

7. Straighten the catches by moving each of the outermost threaded bolts (4) as far as it will go
8. Tighten the six wing nuts (3)
9. Carefully place the trolley, complete with the power source, down onto its wheels

Mount the handle piece to the power source

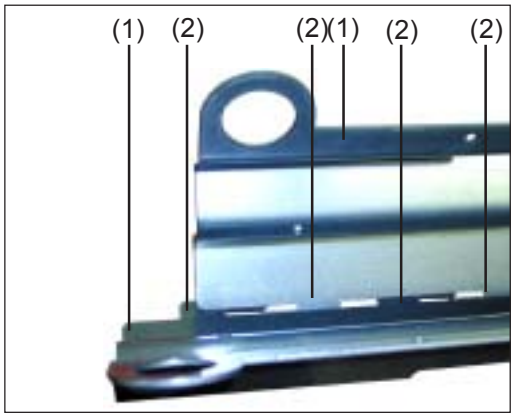


Fig.20 Slot the handle plates into place

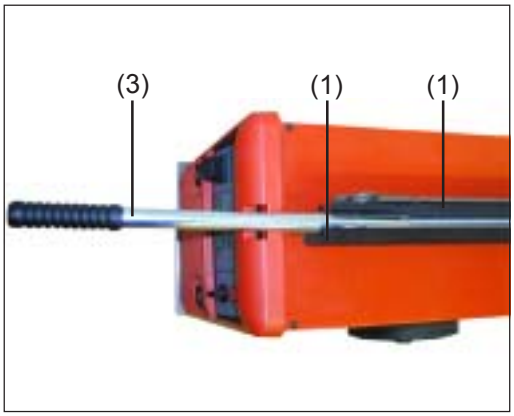


Fig.21 Handle plates and handle tube

NOTE! When fitting the two handle plates together (1), make sure that the catches (2) on the underside of the handle plates (1) slot completely into place (Fig.16 and Fig.17)

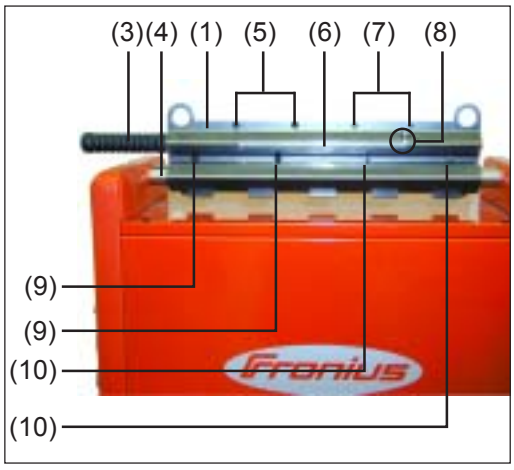


Fig.22 Fix the handle plates and handle tube with "Extrude-Tite" screws

1. On the handle (4) of the power source, use the catches (2) to slot the handle plates (1) into one another (Fig.20 and Fig.21)
2. Insert the cotter pin (8) of the handle tube (3) into the guides (6) of both handle plates

NOTE! When fixing the two handle plates (1) at the top, insert two Extrude-Tite screws (5) from one side and two Extrude-Tite screws (7) from the other side, so that in each case the heads of the screws are on the side with the larger borehole.

3. Fix the handle plates (1) to one another at the top using four Extrude-Tite screws (5) and (7)

NOTE! When fixing the two handle plates (1) in the middle, insert two Extrude-Tite screws (9) from one side and two Extrude-Tite screws (10) from the other side, so that in each case the heads of the screws are on the side with the larger borehole.

4. Fix the handle plates (1) to one another in the middle using four Extrude-Tite screws (9) and (10)

How to use the handle piece

NOTE! When the handle piece (1) is pushed all the way in, you must lock it by turning it anti-clockwise.

1. To push the handle piece (1) all the way in:
   - Twist the handle piece (1) anti-clockwise (to unlock it)
   - Push in the handle piece (1) as far as it will go
   - Twist the handle piece (1) anti-clockwise again (this time, to lock it)

Fig.23 Pull out the handle tube

NOTE! When the handle piece (1) is pulled all the way out, you must lock it by turning it clockwise

2. To pull the handle piece (1) all the way out:
   - Twist the handle piece (1) clockwise (to unlock it)
   - Pull out the handle piece (1) as far as it will come
   - Twist the handle piece (1) clockwise again (this time, to lock it)

.

Rod electrode welding

General remarks

WARNING! Operating the equipment incorrectly can cause serious injury and damage. Do not use the functions described here until you have read and completely understood all of the following documents:
- these Operating Instructions
- all 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. Only carry out work on the machine when
- the mains switch is in the - O - position,
- the machine is unplugged from the mains.

1. Shift the mains switch (8) into the - O - position
2. Unplug the machine from the mains
3. Plug the welding potential cable and the earth cable into current sockets (A) and (B) (which way round will depend on the type of e le
4. Plug the machine back into the mains

Rod electrode welding

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

1. Shift the mains switch (8) into the - I - position (all the indicators on the control panel briefly light up)
2. Using the Process button (3), select one of the following processes
   - Rod electrode welding
   - Rod electrode welding with CEL-electrode
   - Special processes

The welding voltage to the welding socket is switched on after a 3 s time-lag.

NOTE! Parameters that can be set on the remote-control unit TR 2000 / 3000 / 4000 cannot be changed on the power source. Parameter changes can only be made on the remote-control unit TR 2000 / 3000 / 4000.

3. Press the Parameter Selection button (2) (indicator on the button must light up)
4. Set the desired amperage, using the adjusting dial (1) (value can be read off from the left-hand indicator)
5. Press the Parameter Selection button (2) (indicator on the button must light up)
6. Using the adjusting dial (1), set the desired arc force (value can be read off from the left-hand indicator)
7. Start welding

All parameter command values that have been set by means of the adjusting dial (1) will remain stored until the next time they are changed. This is true even if the power source is switched off and on again in the meantime.

Hot-Start function

In order to achieve an optimum welding result, it is necessary in some cases to set the Hot-Start function. The information required to set the Hot-Start function is found in the ”Hot-Start Function” chapter below.

Benefits:
- Improved ignition properties, even for electrodes with inherently bad ignition properties
- Better smelting of the base material during the starting phase, therefore fewer cold points.
- Largely avoids slag inclusions.

NOTE! Please refer to the chapter ”Set-up menu: Level 1” for an explanation of the settings of the available parameters.

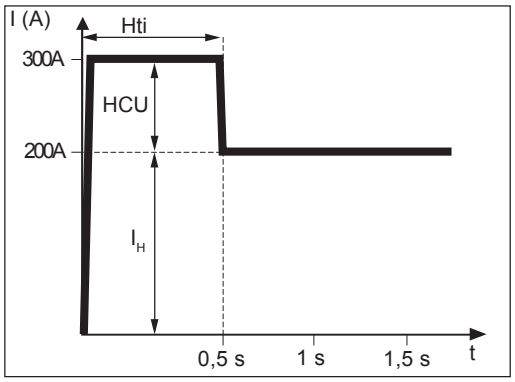


Fig. 25 Example for the ”Hot-Start” function

Legend:

I_H	Primary current = set welding current
HCU	Hot-start current ... 0 - 100 %, factory setting: 50 %
Hti	Hot-current time ... 0 - 2,0 s, factory setting: 0,5 s

Function
During the selected hot-current time (Hti), the welding current is increased to a certain value. This value exceeds the selected welding current (I_H) by 0 to 100% (HCU).

Example: The welding current setting (I_H) is 200A. The hot-start current setting is 50%. During the hot-start time (Hti, e.g. 0.5s), the actual welding current is 200A + (50% of 200A) = 300A.

ELN function (electrode-line selection)

The Eln function can be parametrised separately for each of the proces-ses “Rod electrode welding”, “Rod electrode welding with CEL electrode” and “Special processes”.

NOTE! For information on how to set the available parameters, please see the section headed “Set-up menu: Level 1”.

“con” parameter (constant welding current)
If the “con” parameter has been set, the welding current is kept constant, regardless of the welding voltage. The result is a vertical characteristic (4) (Fig.25).

The “con” parameter is especially suitable for rutile and basic electrodes, as well as gouging. This is why the “con” parameter is also the factory setting if the process “Rod electrode welding” is selected.

For gouging, set dynamics to ”100”.

Parameter “0.1 - 20” (falling characteristic with adjustable slope)
Parameter “0.1-20 ” is used for setting a falling characteristic (5) (Fig.25). The setting range extends from 0.1 A / V (very steep) to 20 A / V (very shallow).

Setting a shallow characteristic (5) is only advisable for cellulose electrodes.

ELN function (electrode-line selection)
(continued)

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

Parameter “P” (constant welding power)
If the parameter “P” has been set, the welding power is kept constant, regardless of the welding voltage and welding current. The result is a hyperbolic characteristic (6) (Fig.25).

The parameter “P” is particularly suitable for cellulose electrodes. This is why the “con” parameter “P” is also the factory setting if the process “Rod electrode welding with CEL electrode” is selected.

NOTE! If you have problems with a rod electrode tending to “stick”, set the arc force to a higher value.

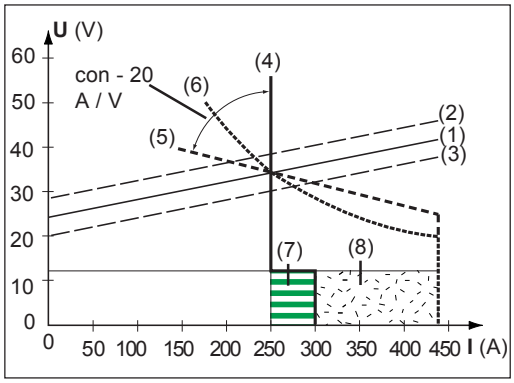


Fig.26 Characteristics that can be selected using the “Eln” function

Legend:
(1) load line for rod electrode
(2) load line for rod electrode where arc length is increased
(3) load line for rod electrode where arc length is reduced
(4) characteristic where “con” parameter is selected (constant welding current)
(5) characteristic where “0.1 - 20” parameter is selected (falling characteristic with adjustable slope)
(6) characteristic where “P” parameter is selected (constant welding power)
(7) example of pre-set arc force where characteristic (4) is selected
(8) example of arc force (when set to a sufficient value) where characteristic (5) or (6) is selected

Additional explanations (fig.26)
The characteristics (4), (5) and (6) shown here apply when a rod electrode is being used whose characteristic corresponds to the load line (1) at a given arc length.

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

If a fixed welding current (I_H) is set, the point of intersection (operating point) may migrate along the characteristics (4), (5) and (6) depending on the current welding voltage. The welding voltage U depends on the arc length.
If the arc length changes, e.g. in accordance with the load line (2), the resulting operating point will be the point where the corresponding characteristic (4), (5) or (6) intersects with the load line (2).

Applies to characteristics (5) and (6): depending on the welding voltage (arc length), the welding current (I) will also decrease or increase while the I_H setting remains the same.

ELN function (electrode-line selection)
(continued)

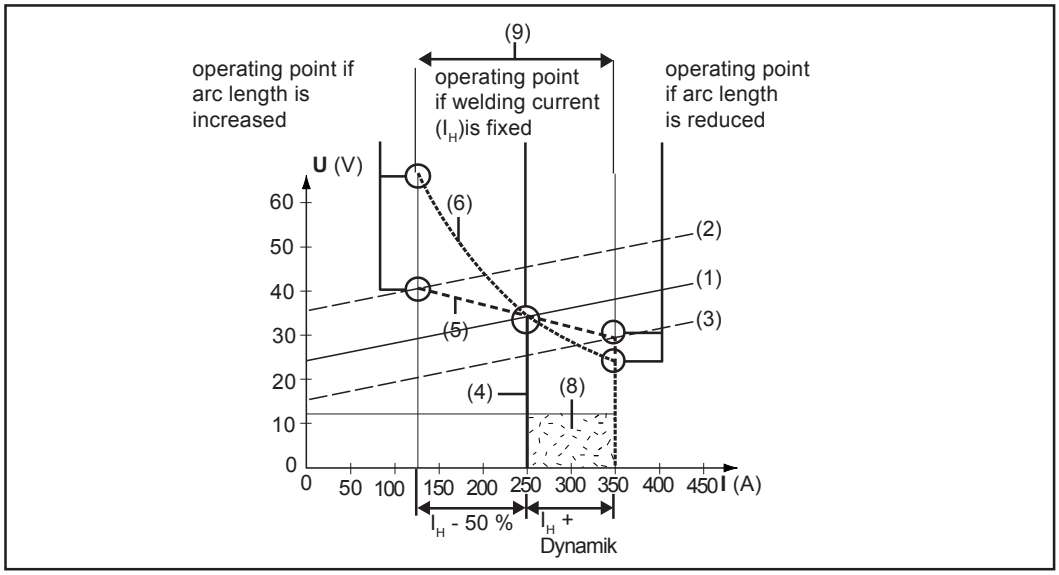


Fig. 27 Settings example: I_H = 250A, dynamics = 50

Legend:
(1) Load line for rod electrode
(2) Load line for rod electrode where arc length is increased
(3) Load line for rod electrode where arc length is reduced
(4) Characteristic where ”con” parameter is selected (constant welding current)
(5) Characteristic where ”0.1 - 20” parameter is selected (falling characteristic with adjustable slope)
(6) Characteristic where ”P” parameter is selected (constant welding power)
(8) Example for dynamics setting if characteristic (5) or (6) is selected
(9) Possible current change if characteristic (5) or (6) is selected, depending on the welding voltage (arclength)

The welding current (I) in zone (9) can be max 50% lower than the selected welding current (I_H). The upper limit of the welding current (I) is given by the dynamics setting.

Anti-Stick function

NOTE! The anti-stick function can be activated and deactivated in “Set-up menu: Level 2” (see the section headed: “Set-up menu: Level 2”).

Where the arc becomes shorter, the welding voltage may drop so far that the rod electrode tends to “stick”. This may also cause “burn-out” of the rod electrode.

Electrode burn-out i s prevented if the anti-stick function has been activated. 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 con-tinued without difficulty.

TIG welding

General remarks

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

WARNING! If the power source is plugged into the mains electricity during installation, there is a high risk of very serious injury an damage. Before putting the machine into service, read the section headed „Safety rules“. Only carry ut these preparations if
- the mains switch is in the - O - positionn and
- the mains cable is unplugged from the mains.

1. Shift the mains switch (8) into the - O - position
2. Unplug the machine from the mains
3. Dismount the welding potential cable
4. Plug the earth cable into the current socket (B) and latch it in firmly
5. Connect the other end of the earth cable to the workpiece
6. Plug the welding cable of the TIG gas-valve welding torch into the current socket (-) (A) and latch it by turning it clockwise
7. Screw the pressure regulator onto the argon shielding-gas cylinder and tighten it
8. Attach the gas hose to the pressure regulator
9. Plug the machine back into the mains

TIG welding

CAUTION! As soon as the process “TIG welding” is selected, the tungsten electrode of the TIG welding torch is live. Make sure that the tungsten electrode is not touching any electrically conductive or earthed parts such as e.g. the workpiece or housing.

1. Shift the mains switch (8) into the - I - position (all the indicators on the control panel briefly light up)

2. Use the Process button (3) to select the process “TIG welding” - the welding voltage to the welding socket is switched on after a 3 s time-lag.

NOTE! Parameters that can be set on the remote-control unit TR 2000 / 3000 / 4000 cannot be changed on the power source. Parameter changes can only be made on the remote-control unit TR 2000 / 3000 / 4000.

3. Press the Parameter Selection button (2)(indicator on the button must light up)
4. Set the desired amperage, using the adjusting dial (1) (value can be read off from the left-hand indicator)
5. Open the gas cut-off valve on the TIG gas-valve torch and set the desired shielding-gas flow rate on the pressure regulator

NOTE! Ignition of the welding arc is effected by touching down the tungsten electrode onto the workpiece.

TIG welding
(continued)

6. Place the the gas nozzle on the ignition location so that there is a gap of 2 -3 mm between the tungsten tip and the workpiece (Fig.28a)
7. Gradually tilt up the welding toch until the tungsten tip touches the workpiece (Fig.28b)
8. Raise the torch and pivot it into the normal position - the arc ignites (Abb.28c)

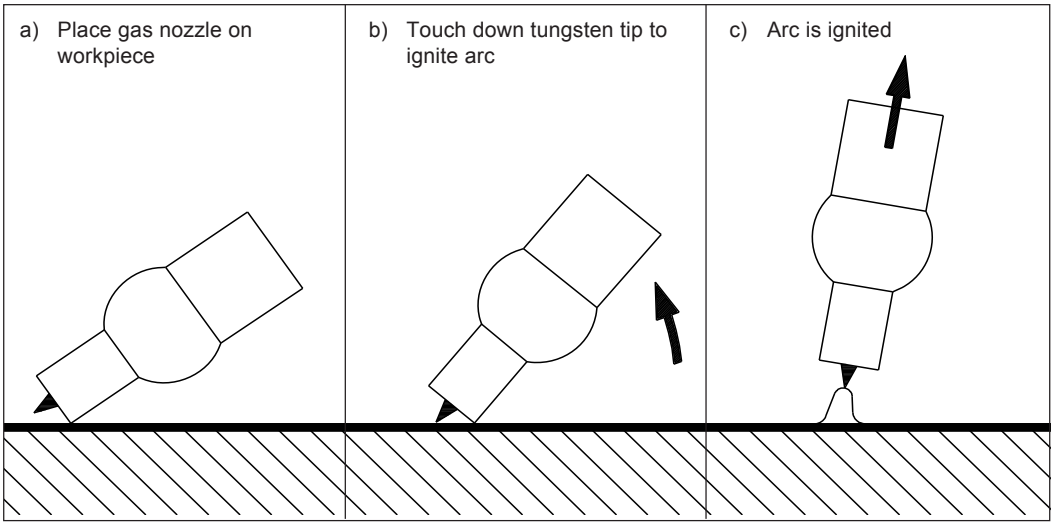


Fig.28 Arc ignition

9. Start welding

NOTE! When the weld is finished, the gas post-flow time required to protect the tungsten electrode and the weld depends on the welding current

Welding current	gas post-flow time
50 A	6 s
100 A	7 s
150 A	8 s
200 A	9 s
250 A	12 s
300 A	13 s
350 A	14 s
400 A	16 s

10. To finish the welding operation, take off the TIG gas-valve torch from the component, untill arc extinguishes.
11. At the end of the welding operation, wait the gas post-flow time
12. Close the gas shut-off valve on the TIG gas-valve torch

All parameter command values that have been set by means of the adjusting dial (1) will remain stored until the next time they are changed. This is true even if the power source is switched off and on again in the meantime.

Option TIG-Comfort-Stop

Important! The activation and the setting of the optional TIG-Comfort-Stop function is carried out by means of the CSS parameter. The CSS parameter is included in the “Setup-Menu - Level 2“.

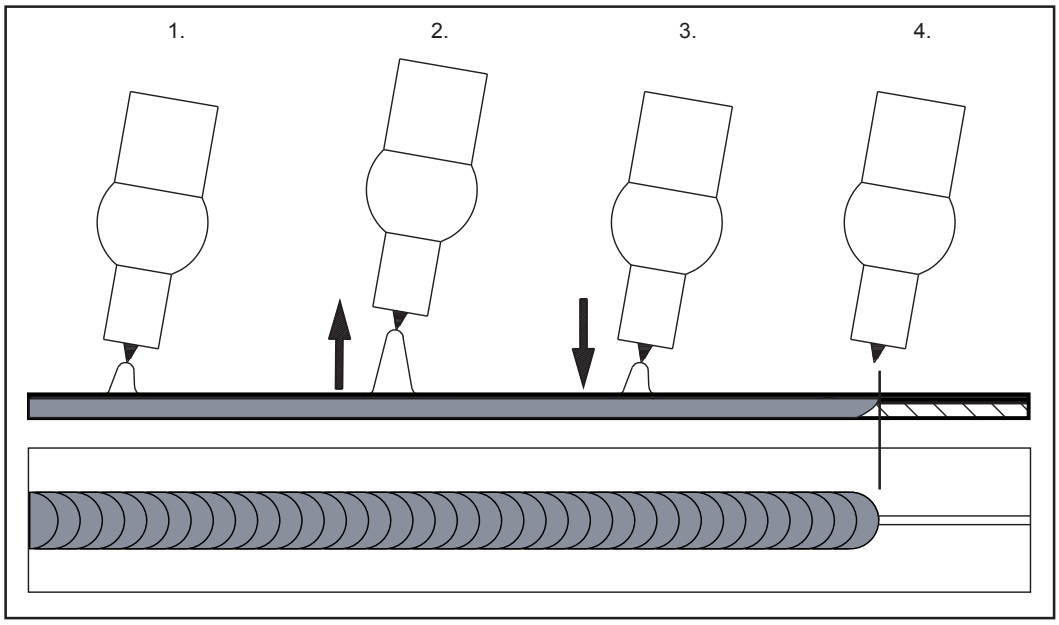


Fig.29 TIG-Comfort-Stop

1. Welding
2. During welding, uplift welding torch: the arc is increased significantly
3. Lower torch:
   - Arc is reduced significantly
   - TIG-Comfort-Stop function triggered
4. Keep torch level
   - Welding current is decreased continuously (downslope)
   - the arc extinguishes
5. Wait the gas post-flow time and remove torch from the component

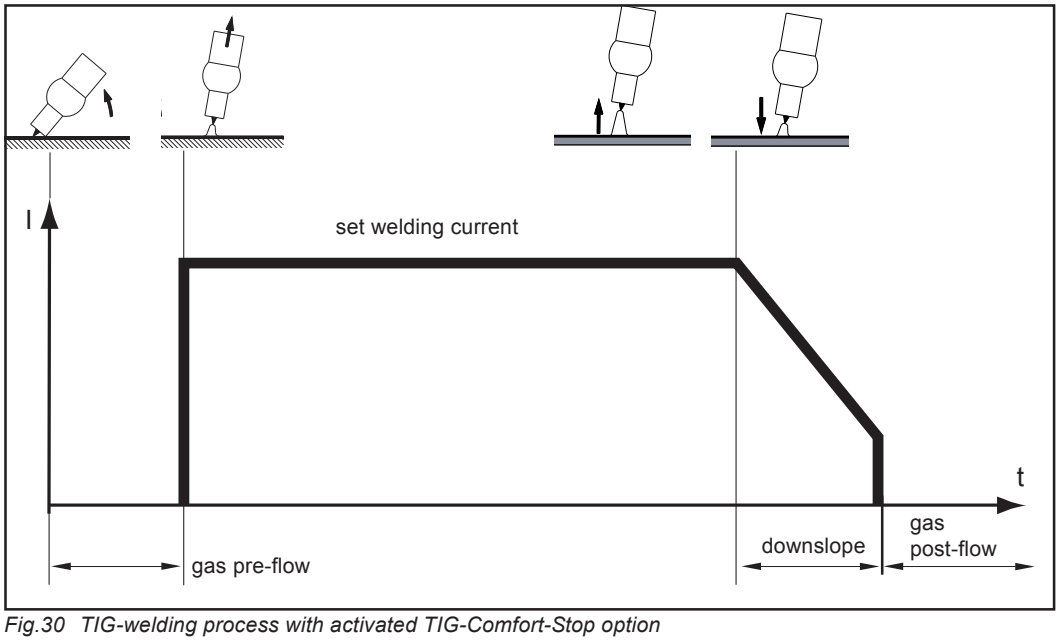


Fig.30 TIG-welding process with activated TIG-Comfort-Stop option

The Set-up Menu: Level 1

General remarks

The digital power sources come with a wealth of expert knowledge already built in! You can retrieve and use any of the optimised parameters stored in the machine whenever you wish.

The set-up menu makes it easy for you to get your hands on this expert knowledge and on some additional functions, and to adapt the parameters to your particular welding tasks.

Accessing the set-up menu for "Process" parameters

NOTE! The mode of functioning is explained here with the reference to the "Rod electrode welding" process. The procedure for changing other "Process" parameters is identical.

The available parameters can be set separately for each of the proces-ses that can be selected with the "Process" button (3). The parameter settings remain stored in the memory until the next time any change is made to the setting in question.

1. Plug in the mains plug
2. Shift the mains switch (8) into the - I - position
3. Use the Process button (3) to select the "Rod electrode welding" process
4. Press and hold the Setup / Store button (7)
5. Press the Process button (3)
6. Release the Setup / Store button (7)

The power source is now in the set-up menu for the "Rod electrode welding" process, and the first parameter HCU (Hot-start current) is displayed.

Changing the parameter

1. Use the Process button (3) to select the desired parameter
2. Use the adjusting dial (1) to alter the value of the parameter

Exit the set-up menu

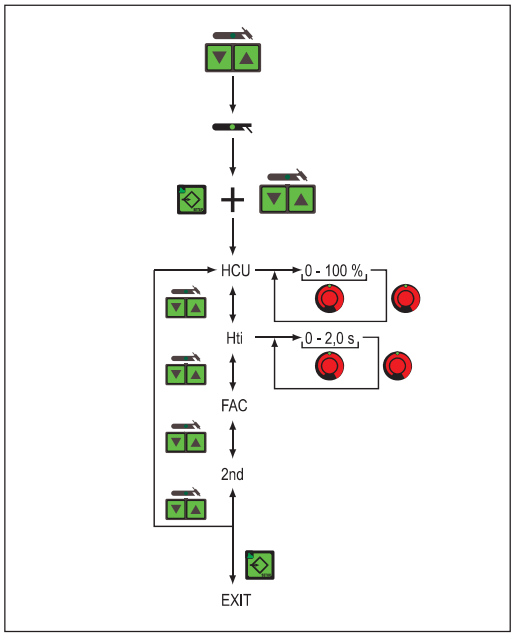


Fig.31 Example for the process "Rod electrode welding"

1. Press the Setup / Store button (7)

NOTE! Any alterations you have made will be stored in the memory when you exit the set-up menu.

The set-up menu for the process "Rod electrode welding with CEL electrode" and "Special processes" is identical with the set-up menu for the process "Rod electrode welding"

NOTE! The comple te list of parameters for the process "Rod electrode welding" is explained in the section headed "Process parameters"

“Process” parameters

Rod electrode welding

The function HCU (Hot-start current) and the available setting range are explained in the section “Rod electrode welding”.

HCU
Hot-start **cu**rrent - 0 - 100 %
Factory setting: 50 %

The function HCU (Hot-start current) and the available setting range are explained in the section ”Rod electrode welding”.

Hti
Hot-current **ti**me - 0 - 2.0 s
Factory setting: 0.5 s

FAC
Factory - Resets the power source to factory settings

Press and hold the Setup / Store button (7) for 2 s to reset the machine to its original (i.e. factory) settings. If the display reads “PrG”, then the power source has been reset.

NOTE! When you reset the power source, all personal settings are lost in Level 1 of the Setup Menu.

The reset functions in the Second Level of the Setup Menu (2nd) are not deleted either.

2nd
Second level of the set-up menu (see the section headed “The set-up menu: Level 2”)

TIG welding

2nd
Second level of the set-up menu (see the section headed “The set-up menu: Level 2”)

The Set-up Menu: Level 2

General remarks

The functions Eln (electrode-line selection), r (welding circuit resistance), L (indication of welding circuit inductivity) and ASt (anti-stick) are located in a second menu level.

Changing to the second menu level (2nd)

- Choose the parameter “2nd”, as described in the section headed “The Set-up menu: Level 1”
- Press and hold the Setup / Store button (7)
- Press process button (3)
- Release the Setup / Store button (7)

The power source is now in the second menu level (2nd) of the setup-menu. The function “Eln” (electrode-line selection) is now displayed.

Changing the parameter

- Use the Process button (3) to select the desired parameter
- Use the adjusting dial (1) to alter the value of the parameter

Exit the set-up menu

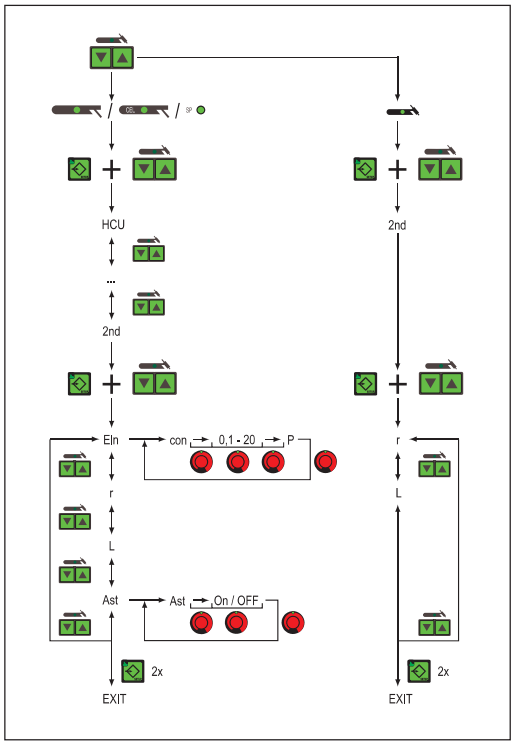


Fig.32 Level 2 of the Set-up Menu (2nd)

1. Press the Setup / Store button (7)

NOTE! Any alterations you have made will be stored in the memory when you exit the Level 2 of the Set-up Menu (2nd).

NOTE! The complete list of parameters for Level 2 of the Set-up Menu (2nd) is explained in the section headed “Parameters 2nd”.

Parameters 2nd

General remarks

NOTE! For the “TIG welding” process, only the parameters r (welding circuit resistance) and L (welding circuit inductivity) are available.

Parameter 2nd

The function Eln (electrode-line selection) can be set separately for the processes “Rod electrode welding”, “Rod electrode welding with CEL electrode” and “Special processes”. The settings remain stored in the memory until the next time any change is made to the setting in question.

The function Eln (electrode-line selection) and the available settings are described in the section headed “Rod electrode welding”.

Eln
Electrode-**l**i**n**e - electrode-line selection - con / 0.1 - 20 / P
Factory setting for “Rod electrode welding” process: con
for “Rod electrode welding with CEL electrode” process: P
for “Special processes”: con

The function r (welding circuit resistance) is described in the section headed “Measuring the welding circuit resistance”.

CSS
Comfort **S**top **S**ensitivity - response sensitivity of the TIG-Comfort-Stop function: 0.5 - 5.0 / OFF
factory setting OFF

NOTE! We recommend a set value of 2.0. However, if the welding process is frequently stopped unintentionally, increase the value for the CSS parameter.

Depending on the set value for the CSS parameter the following is required for triggering the TIG-Comfort-Stop option:

0,5 - 2,0	low increase of the arc
2,0 - 3,5	mean increase of the arc
3,5 - 5,0	high increase of the arc

---

r
r (resistance) - Welding circuit resistance - x milliohms (e.g. 11.4 milliohms)

The function L (welding circuit inductivity) is described in the section headed “Indicating welding circuit inductivity L”.

L
L (inductivity) - Welding circuit inductivity - x mikrohenrys (e.g. 5 mikrohenrys)

The function Ast (anti-stick) is described in the section headed “Rod electrode welding”.

ASt
Anti-**St**ick - ON / OFF
factory setting ON

Measuring the welding circuit resistance r

General remarks

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.

After it has been measured, the welding circuit resistance is indicated on the right-hand display.

r ... Welding circuit resistance ... x milliohms (e.g. 11.4 milliohms)

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 at 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 taking place in the “welding-potential cable”.

NOTE!The welding circuit resistance “r” will depend on the hosepack being used. This means that the measurement to find out the welding circuit resistance “r” must be:

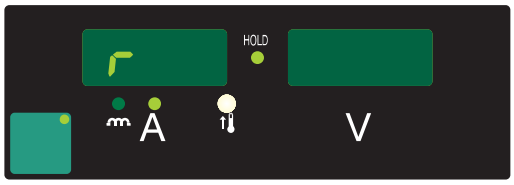
- repeated if there is any change in the length or cross-sectional area of the hosepack;
- carried out separately for each separate welding process (with the respective welding lines)

To measure the welding circuit resistance “r”

1. Make an earth connection to the workpiece

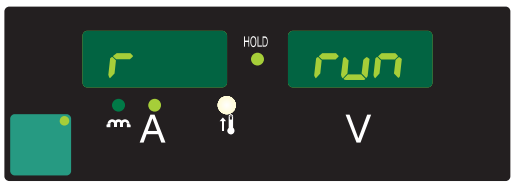
NOTE! Make sure that the contact between the earthing clamp and the workpiece is on a cleaned section of the workpiece.

2. Plug in the machine to the mains
3. Shift the mains switch (8) to the - I - position
4. Select function "r" in the second menu level (2nd)

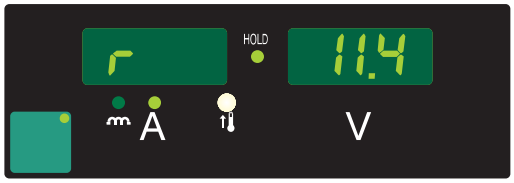


5. Clamp the electrode holder or chuck for the tungsten electrode firmly to the workpiece, resp. press firmly against the workpiece.

NOTE! Make sure that the contact between the rod electrode (i.e. the tungsten electrode) and the workpiece is on a cleaned section of the workpiece.



6. Briefly press the Setup / Store button (7) The welding circuit resistance is now calculated; during the measurement, the right-hand display reads “run”



7. The measurement is finished when the welding circuit resistance is shown on the right-hand display (e.g. 11.4 milliohms)

Indicating the welding circuit inductivity L

Indicating the welding circuit inductivity L

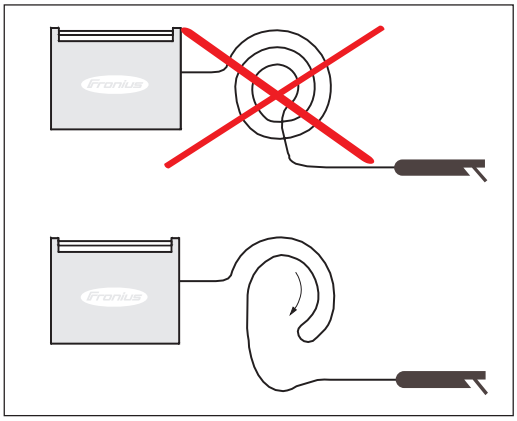


Fig.33 Correct arrangement of the welding cable

The way that the welding cable is arranged has a very significant effect on the welding properties. There may be a high welding circuit inductivity depending on the length of the welding cable and on the way it is arranged. The result is that the current rise during the droplet transfer is limited.

The welding circuit inductivity L is calculated during welding and indicated on the right-hand display.

L ... Welding circuit inductivity ... x microhenrys (e.g. 5 microhenrys)

NOTE! It is not possible to compensate for the welding circuit inductivity. Try to change the welding result by rerouting the welding cables.

Troubleshooting

General remarks

The digital power sources are equipped with an intelligent safety system. This means that there was no need for any melting-type fuses at all. After a possible malfunction or error has been remedied, the power source can be put back into normal operation again without any fuses having to be changed.

WARNING! An electric shock can be fatal. Before opening up the machine
- Switch the mains switch to the - O - position
- Unplug machine from the mains
- Put up an easy-to-understand warning sign to stop anybody inadvertently switching it back on again
- Using a suitable measuring instrument, check to make sure that electrically charged components (e.g. capacitors) have been discharged

CAUTION! Inadequate PE conductor connections can cause serious injury and damage. The housing screws provide a suitable PE conductor connection for grounding (earthing) the housing and must NOT be replaced by any other screws that do not provide a reliable PE conductor connection.

Displayed service codes

NOTE! If any other error message appears on the displays, which is not described here, then the fault is one that can only be put right by a service technician. Make a note of the error message shown in the display, and of the serial number and configuration of the power source, and get in touch with our after-sales service with a detailed desrciption of the error.

---

tP1 | xxx, tP2 | xxx, tP3 | xxx
tP4 | xxx, tP5 | xxx, tP6 | xxx
(xxx stands for a temperature indication)

Cause: Over-temperature in primary circuit of power source
Remedy: Allow the power source to cool down

---

tS1 | xxx, tS2 | xxx, tS3 | xxx
(xxx stands for a temperature indication)

Cause: Over-temperature in secondary circuit of power source
Remedy: Allow the power source to cool down

---

tSt | xxx
(xxx stands for a temperature indication)

Cause: Over-temperature in the control circuit
Remedy: Allow the power source to cool down

Err | 049

Cause: Phase failure
Remedy: Check mains fuse protection, mains supply lead and mains plug

---

Err | 051

Cause: Mains undervoltage: Mains voltage has dropped below the tolerance range (+/- 15%)
Remedy: Check mains voltage

Displayed service codes
(continued)

Err | 052

Cause: Mains overvoltage: Mains voltage has risen above the tolerance range (+/- 15%)
Remedy: Check mains voltage

Err | PE

Cause: The earth-fault current watchdog has triggered the power source's safety cut-out.
Remedy: Switch off the power source, wait for 10 seconds and then switch on again. If you have tried doing this several times and the error continues to occur - contact After Sales Service.

Err | bPS, Err | IP, dSP | Axx
dSP | Cxx, dSP | Exx, dSP | Sy
dSP | nSy

Cause: The earth-fault current watchdog has triggered the power source's safety cut-out.
Remedy: Switch off the power source, wait for 10 sec. and then switch on again. If you have tried doing this several times and the error con-tinues to occur - contact After Sales Service.

r | E30

Cause: r-Adjustment: There is no contact with the workpiece
Remedy: Connect up the earth cable; ensure a tight connection between the electrode holder and the workpiece

r | E31

Cause: r-Adjustment: Procedure has been interrupted by repeated pressing of the Setup / Store (7) button
Remedy: Ensure a tight connection between the electrode holder or chuck for the tungsten electrode and the workpiece – press the Setup / Store (7)

r | E33, r | E34

Cause: r-adjustment: Poor contact between electrode holder or chuck for tungsten electrode and workpiece r-Abgleich: Schlechter Kontakt zwischen Elektrodenhalter bzw. Spannkörper für Wolframelektrode und Werkstück
Remedy: Clean the point of contact, clamp electrode holder or chuck for tungsten electrode firmly, resp. press down on the workpiece, check earth connection

TP 4000 CEL / TP 5000 CEL power source

Power source does not function
Mains switch is ON, but indicators are not lit up

Cause: Break in mains lead, mains plug not plugged in
Remedy: Check mains supply lead, make sure mains plug is plugged in

Cause: Mains fuse is faulty
Remedy: Change mains fuse

Cause: Mains outlet socket or plug is faulty
Remedy: Change faulty components

TP 4000 CEL / TP 5000 CEL power source
(continued)

No welding current
Mains switch is ON, overtemperature indicator is lit up

Cause: Power source is overloaded, duty c. has been exceeded
Remedy: Do not exceed duty cycle

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

No welding current
Mains switch is ON and indicators are lit up

Cause: Earth connection is wrong
Remedy: Check the earth connection and clamp for correct polarity

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 mounted or is damaged
Remedy: Mount / change the gas hose

Cause: TIG gas-valve welding torch is defective
Remedy: Change the TIG gas-valve welding torch

Poor welding properties

Cause: Wrong welding parameters
Remedy: Check settings

Cause: Poor earth connection
Remedy: Ensure good contact to workpiece

Cause: Not enough shielding gas, or none at all
Remedy: Check pressure regulator, gas hose, gas solenoid valve, torch gas connection etc.

Cause: Welding torch is leaking
Remedy: Change the torch

Poor welding properties
additional severe spattering

Cause: Wrong polarity of the electrode
Remedy: Change the polarity of the electrode (see manufacturer's instructions)

Welding torch becomes very hot

Cause: Design dimensions of torch are not sufficient for this task
Remedy: Respect the duty cycle and loading limits

EN

Care and maintenance

General remarks

In order to keep your power source operational for years to come, you should observe the following points:

WARNING! An electric shock can be fatal. Before opening up the machine
- Switch the mains switch to the - O - position
- Unplug machine from the mains
- Put up an easy-to-understand warning sign to stop anybody inadvertently switching it back on again
- Using a suitable measuring instrument, check to make sure that electrically charged components (e.g. capacitors) have been discharged

- Carry out safety inspections at the stipulated intervals (see the section headed “Safety rules”)
- Depending on the machine location, but no less often than twice a year, remove the side panels from the machine and blow the inside of the power source clean with dry, reduced-blow compressed air. Do not aim air-jets at electronic components from too close a range.
- If a lot of dust has accumulated, clean the cooling-air ducts.

Technical Data

General remarks

NOTE! If the machine is designed to run on a special voltage, the Technical Data shown on the rating plate apply. The mains plug and mains supply lead, and their fuse protection, must be dimensioned accordingly.

TP 4000 CEL

Mains voltage			3x400 V
Mains voltage tolerance			+/- 15 %
Mains fuse protection (slow-blow)			35 A
Mains connection [1]			Restrictions possible
Primary continuous power (100% d.c. [2])			12.9 kVA
Cos Phi			0,99
Efficiency			90 %
Welding current range		Rod electrode	10 - 380 A
		TIG	10 - 380 A
Welding current at	10 min / 40°C	40 % d.c. [2]	380 A
	10 min / 40°C	60 % d.c. [2]	360 A
	10 min / 40°C	100 % d.c. [2]	320 A
Standard working voltage		Rod electrode	20.4 - 35.2 V
		TIG	14.5 - 33 V
Max. working voltage		Rod electrode	53 V (380 A) 80 V (10 A)
Open-circuit voltage pulsed		peak value	95 V
		mean value	60 V
Degree of protection			IP 23
Type of cooling			AF
Insulation class			F
Dimensions L x W x H mm			625/290/475
Weight			36.1 kg

1) To 230/400 V, 50 Hz public supply mains
2) d.c. = duty dycle

TP 4000 CEL MV

Mains voltage			3x200-240 V 3x380-460 V
Mains voltage tolerance			+/- 10 %
Mains fuse protection (slow-blow)			200-240 V: 63 A 380-460 V: 35 A
Mains connection [1]			Restrictions possible
Primary continuous power (100% d.c. [2])			12,9 kVA
Cos Phi			0,99
Efficiency			90 %
Welding current range		Rod electrode TIG	10-380 A 10-380 A
Welding current at	10 min / 40°C 10 min / 40°C 10 min / 40°C	40 % d.c. [2] 60 % d.c. [2] 100 % d.c. [2]	380 A 360 A 320 A
Standard working voltage		Rod electrode TIG	20.4 - 35.2 V 14.5 - 33 V
Max. working voltage		Rod electrode	53 V (380 A) 80 V (10 A)
Open-circuit voltage pulsed		peak value mean value	95 V 60 V
Degree of protection			IP 23
Type of cooling			AF
Insulation class			F
Dimensions L x W x H mm			625/290/475
Weight			40 kg

1) To 230/400 V, 50 Hz public supply mains
2) d.c. = duty dycle

TP 5000 CEL

Mains voltage			3x400 V
Mains voltage tolerance			+/- 15 %
Mains fuse protection (slow-blow)			35 A
Mains connection [1]			Restrictions possible
Primary continuous power (100% d.c. [2])			16.3 kVA
Cos Phi			0,99
Efficiency			90 %
Welding current range		Rod electrode TIG	10 - 480 A 10 - 480 A
Welding current at	10 min / 40°C 10 min / 40°C 10 min / 40°C	40 % d.c. [2] 60 % d.c. [2] 100 % d.c. [2]	380 A 360 A 320 A
Standard working voltage		Rod electrode TIG	20.4 - 39.2 V 14.5 - 38 V
Max. working voltage		Rod electrode	48 V (480 A) 80 V (10 A)
Open-circuit voltage pulsed		peak value mean value	95 V 60 V
Degree of protection			IP 23
Type of cooling			AF

TP 5000 CEL
(continued)

Insulation class	F
Dimensions L x W x H mm	625/290/475
Weight	37 kg

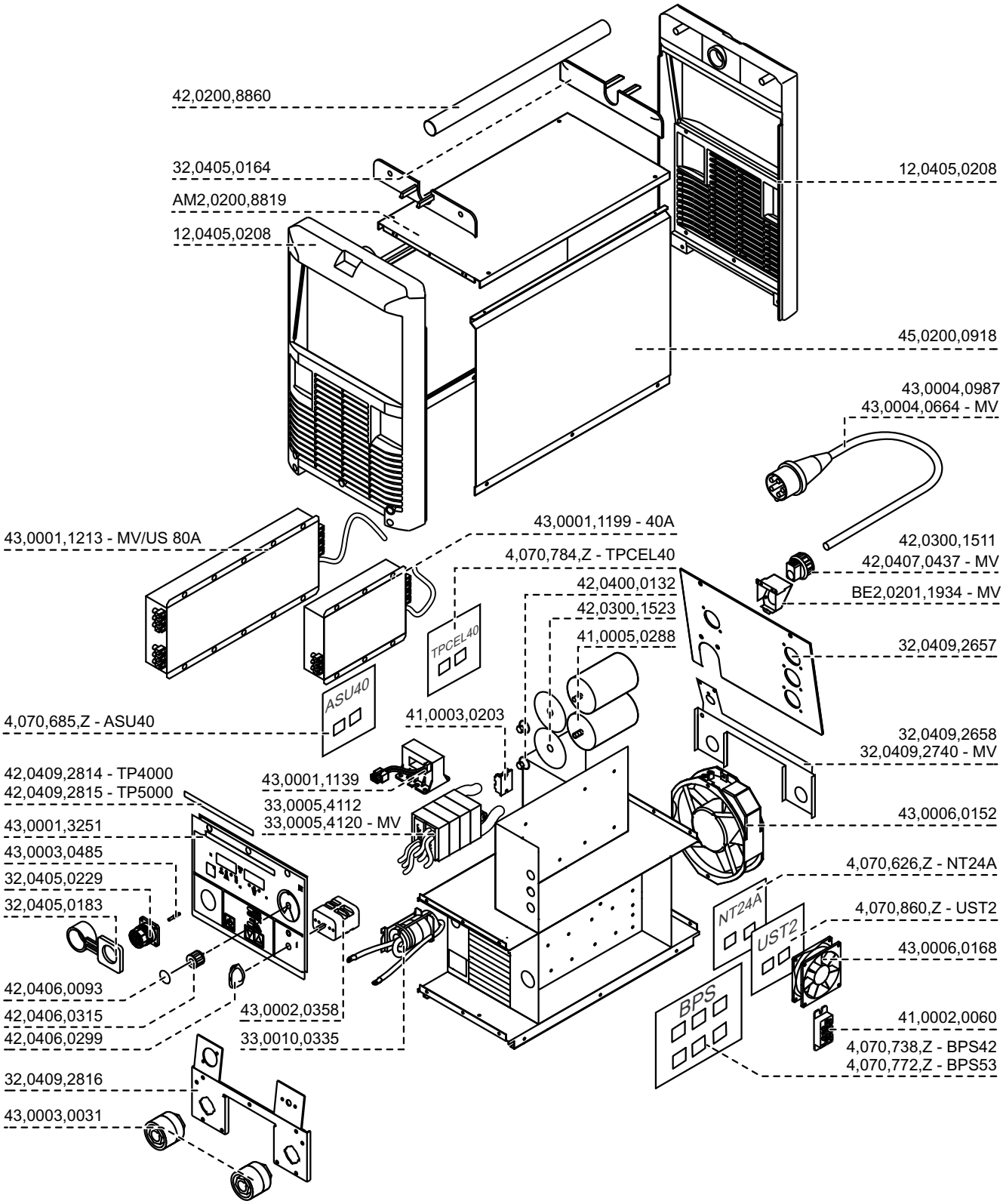
1) To 230/400 V, 50 Hz public supply mains
2) d.c. = duty dycle

TP 5000 CEL MV

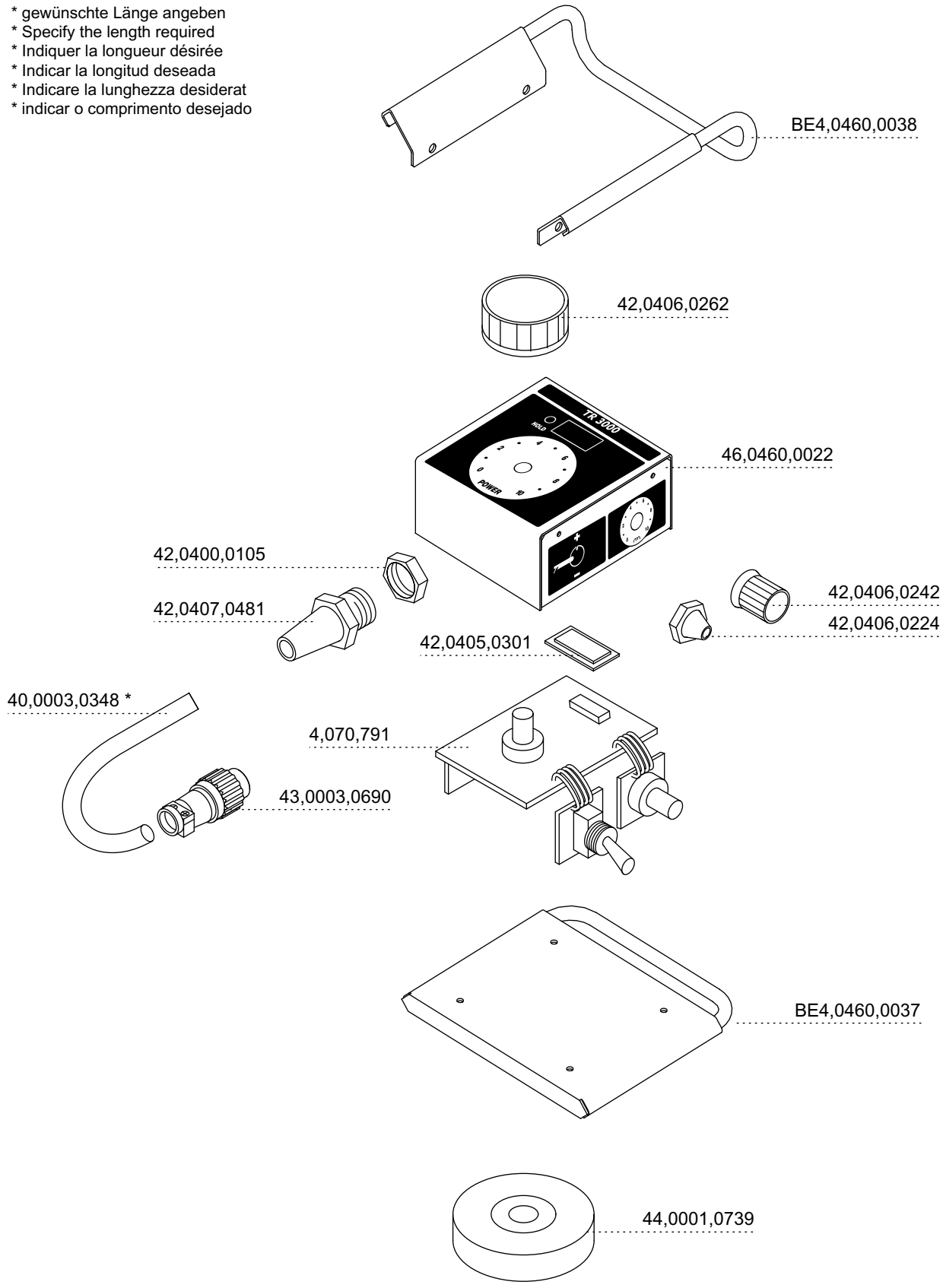
Mains voltage			3x200-240 V 3x380-460 V
Mains voltage tolerance			+/- 10 %
Mains fuse protection (slow-blow)			200-240 V: 63 A 380-460 V: 35 A
Mains connection [1]			Restrictions possible
Primary continuous power (100% d.c. [2])			16.3 kVA
Cos Phi			0,99
Efficiency			90 %
Welding current range		Rod electrode TIG	10 - 480 A 10 - 480 A
Welding current at	10 min / 40°C 10 min / 40°C 10 min / 40°C	40 % d.c. [2] 60 % d.c. [2] 100 % d.c. [2]	480 A 415 A 360 A
Standard working voltage		Rod electrode TIG	20.4 - 39.2 V 14.5 - 38 V
Max. working voltage		Rod electrode	48 V (480 A) 80 V (10 A)
Open-circuit voltage pulsed		peak value mean value	95 V 60 V
Degree of protection			IP 23
Type of cooling			AF
Insulation class			F
Dimensions L x W x H mm			625/290/475
Weight			40.5 kg

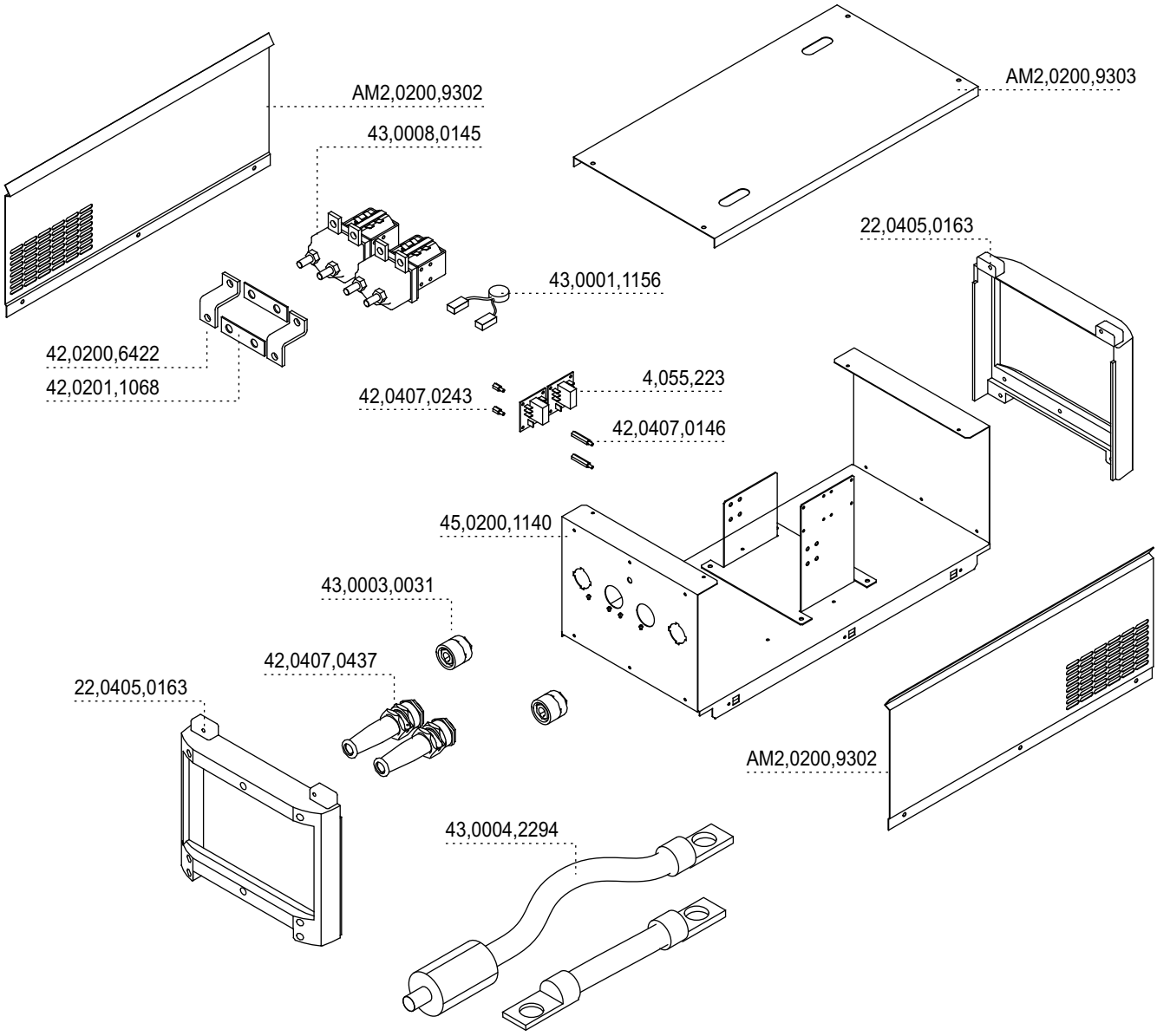
1) To 230/400 V, 50 Hz public supply mains
2) d.c. = duty dycle

Transpocket 4000 CEL **4,075,111**
Transpocket 5000 CEL **4,075,113**
Transpocket 4000 MV CEL **4,075,111,630**
Transpocket 5000 MV CEL **4,075,113,630**



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

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