Castolin Eutectic®
Eutectic Castolin

CastoTIG

1702/2202 AC/DC - 2201 DC

■ OPERATING MANUAL / SPARE PARTS LIST

Dear Castolin customer

Introduction

These directions are intended to familiarise you with the operation and maintenance of the equipment. It is in your interests to read these directions carefully and to conscientiously apply the instructions given here. If you do this, you will avoid faults and operating errors. The reward will be a piece of equipment, which is always ready for use and which will serve you well for many years.

Please also take special note of the safety rules - and observe them! In this way, you will help to ensure more safety at your workplace. 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 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

General remarks
(continued)

- 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".

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 power source 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.

Likewise Castolin 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)

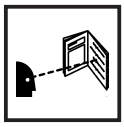
Obligations of owner/operator

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 the sections on “safety rules” and the “warnings“ contained in this manual, 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 the sections on “safety rules” and the “warnings” contained in this manual, 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.

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.

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.

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.

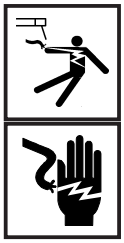
Have a suitable, approved fire extinguisher at the ready.

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 can be fatal. Every electric shock is hazardous to life.

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

In MIG/MAG 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.

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.

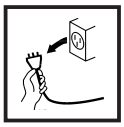
Hazards from mains and welding current (continued)

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.

When working at great heights, wear a safety harness.



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.

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.

EMC precautions

It is the responsibility of the owner/operator to ensure that no electromagnetic interference is caused to electrical and electronic equipment.

If electromagnetic interference is found to be occurring, the owner/operator is obliged to take all necessary measures to prevent this interference.

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
- the health of persons in the vicinity, e.g. users of heart pacemakers and hearing aids
- users of heart pacemakers must take medical advice before going anywhere near welding equipment or welding workplaces

Electromagnetic fields may cause as yet unknown damage to health.

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
- 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.

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.

Particular danger spots
(continued)

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 (MIG/MAG power sources).

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.

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.

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.

When hoisting the machines by crane, only use suitable Castolin-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 units).

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

Safety precautions at the installation site and when being transported (continued)

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 Castolin-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 Castolin coolant is suitable for use in our machines.
- Only use suitable Castolin coolant.
- Do not mix Castolin coolant with other coolants.
- 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 Castolin service centre.
- 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.

Preventive and corrective maintenance
(continued)

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.

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Safety inspection

The owner/operator is obliged to have a safety inspection performed on the machine at least once every 12 months.

Castolin also recommend the same (12-month) interval for regular calibration of power sources.

A safety inspection, by a trained and certified electrician, is prescribed:
- after any alterations
- after any modifications or installations of additional components
- following repairs, care and maintenance
- at least every twelve months.

Observe the relevant national and international standards and directives in connection with the safety inspection.

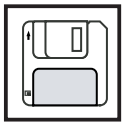
More detailed information on safety inspections and calibration is available from your regional or national Castolin service centre, who will be pleased to provide you with copies of the necessary documents, standards and directives upon request.

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. Castolin is not liable, if personal settings are deleted.

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General remarks

Basic system principle

The CastoTIG 1702 AC/DC, CastoTIG 2202 AC/DC and CastoTIG 2201 DC belong to a new generation of TIG power sources. Among their outstanding features are superlative precision in the welding process, exact replicability of all results, and superb welding properties. Alongside the welding properties, the high degree of efficiency is another key feature of the technology incorporated in the new TIG power sources.

Fig.1 CastoTIG 1702 AC/DC, CastoTIG 2201 DC and CastoTIG 2202 AC/DC power sources

Work with the new power sources is made even easier by their self-explanatory, “intuitive” operating concept. Despite the wealth of features with which the machines are loaded, the welder can see the key functions “at a glance” and adjust them accordingly.

Machine concept

Among the typical features of the new power sources are their very great flexibility and adaptability to many different types of welding task. 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. In addition, there is an extensive selection of remote-control units with digital controls and displays, for a huge spectrum of applications.

Areas of utilisation

In the workshop and industrial fields there are innumerable areas of application for the CastoTIG 1702 AC/DC, CastoTIG 2202 AC/DC and CastoTIG 2201 DC. As regards their suitability for welding different materials, they are just as much “at home” welding unalloyed and low-alloy steel as they are welding high-alloy chrome-nickel steels.

Moreover, the CastoTIG 1702 AC/DC and CastoTIG 2202 AC/DC does sterling service when it comes to welding aluminium, aluminium alloys and magnesium. The AC frequency can be adjusted over a very wide range, permitting optimum adaptation to your particular requirements.

Minimum equipment needed for welding

General remarks

Depending on which weld process you intend to use, a certain minimum level of equipment will be needed in order to work with the power source.
In the section below, you will find lists of what equipment is needed (as a minimum) for welding with each of the weld processes.

TIG-AC welding

- CastoTIG 1702/2202 AC/DC power source
- Grounding (earthing) cable
- TIG welding torch with rocker switch
- Gas connection (for supplying the machine with shielding gas), with pressure regulator
- Filler metal (depending on the application)

TIG-DC welding

- CastoTIG 1702/2202 AC/DC or CastoTIG 2201 DC power source
- Grounding (earthing) cable
- TIG welding torch with rocker switch
- Gas connection (for supplying the machine with shielding gas)
- Filler metal (depending on the application)

Rod electrode (MMA) welding

- CastoTIG 1702/2202 AC/DC or CastoTIG 2201 DC power source
- Grounding (earthing) cable
- Electrode holders
- Rod electrodes (as required by the application)

System components

General remarks

The CastoTIG 1702 AC/DC, CastoTIG 2202 AC/DC and CastoTIG 2201 DC power sources can be run with numerous different system add-ons and options.

Overview

Fig.2 System add-ons and options

Control panel

Overwiew

The key feature of the control panel is the logical way in which the controls are arranged. All the main parameters needed for day-to-day working can easily be

- selected with the buttons
- 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.

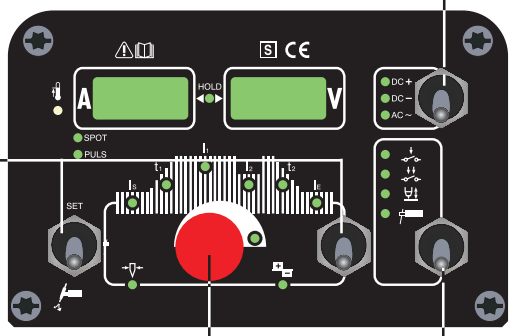
The illustration below shows an overview of the main settings needed for day-to-day working, based on the example of the CastoTIG 1702/2202 AC/DC and CastoTIG 2201 DC control panel. You will find a detailed description of these settings in the following section (“Control panel”).

3. Select the parameter:

- Starting current I_S
- Upslope t_1
- Main current I_1
- Reduced current I_2
- Downslope t_2
- Final current I_E
- Balance (only with TIG-AC)
- Electrode diameter

2. Choose which process:
(only on CastoTIG 1702/2202 AC/DC)

- DC+ / DC– / AC~ — AC welding
- DC+ / DC– / AC~ — DC- welding
- DC+ / DC– / AC~ — DC+ welding (only with rod electrode)



4. Alter the parameter

1. Select the operating mode:

- 2-step mode
- 4-step mode
- Contact ignition (Lift-arc)
- Rod electrode (MMA)

General remarks

In this section, the control panels of the CastoTIG 1702/2202 AC/DC and CastoTIG 2201 DC power sources will be dealt with separately.

CastoTIG 1702/ 2202 AC/DC 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 rules"

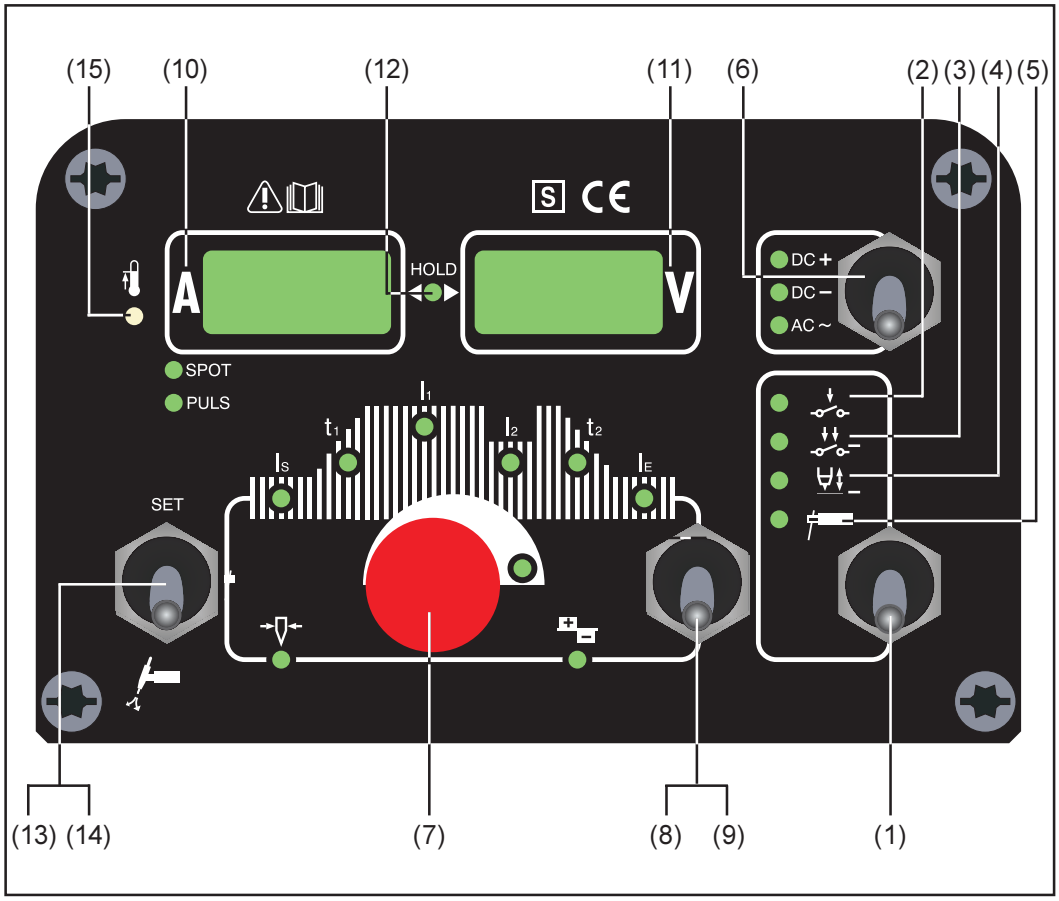


Fig.3 CastoTIG 1702/2202 AC/DC control panel

(1) **Mode button** ... for selecting the operating mode

- (2) 2-step mode
- (3) 4-step mode
- (4) Contact ignition (Lift-arc)
- (5) Rod electrode (MMA) welding

Important! If you select the “Rod electrode (MMA) welding” mode (5), the welding voltage will only be available after a 3-second time-lag.

CastoTIG 1702/ 2202 AC/DC control panel (continued)

(6) **Process button** ... for selecting the process, depending upon which operating mode has been selected

If 2-step / 4-step mode has been selected:

● DC +	is not selectable in the 2-step / 4-step mode
● DC –	TIG-DC- welding
○ AC ~	TIG-AC welding

If “Rod electrode (MMA) welding mode” has been selected:

● DC +	Rod electrode DC+ welding
● DC –	Rod electrode DC- welding
○ AC ~	Rod electrode AC welding

(7) **Adjusting dial** ... for altering parameters. If the indicator is lit up on the adjusting dial, then the selected parameter can be altered.

(8) and (9) **Parameter selection buttons** ... for selecting the parameters

It is also possible to change parameters by means of the parameter selection buttons (8) and (9) while the welding operation is in progress.

Available parameters where 2-step mode (2) has been selected:

Starting current I_S ..... 0 to 100 % of main current I_1
Factory setting: 35%

Important! The starting current I_S is saved separately for the “TIG-AC welding” and “TIG DC- welding” operating modes.

Up-Slope t_1 ..... 0.0 to 9.9 s, factory setting: 0.1 s

Important! The upslope t_1 is saved separately for the 2-step and 4-step operating modes.

Main current I_1 ..... CastoTIG 1702 AC/DC: 3 to 170 A
CastoTIG 2202 AC/DC: 3 to 220 A

Important! On welding torches with Up/Down functionality, the entire setting range is available for selection while the machine is idling. During welding, the main current can be corrected by +/-20 A.

Down-Slope t_2 ..... 0,0 bis 9,9 s, Werkseinstellung: 1 s

Important! The downslope t_2 is saved separately for the 2-step and 4-step operating modes.

Final current I_E ..... 0 to 100 % of main current
Factory setting: 30 %

CastoTIG 1702/ 2202 AC/DC control panel (continued)

Balance (only with TIG-AC) ... -5 / +5, factory setting: 0
-5 highest fusing power, lowest cleaning action
+5 highest cleaning action, lowest fusing power

Electrode diameter ..... 0 to 4.0 mm (0.158 in.)
factory setting: 2.4 mm (0.095 in.)

Available parameters where 4-step mode (3) has been selected:

Starting current I_S ..... 0 to 100 % of main current I_1
Factory setting: 35%

Important! The starting current I_S is saved separately for the “TIG-AC welding” and “TIG DC- welding” operating modes.

Upslope t_1 ..... 0.0 to 9.9 s, factory setting: 0.1 s

Important! The upslope t_1 is saved separately for the 2-step and 4-step operating modes.

Main current I_1 ..... CastoTIG 1702 AC/DC: 3 to 170 A
CastoTIG 2202 AC/DC: 3 to 220 A

Important! On welding torches with Up/Down functionality, the entire setting range is available for selection while the machine is idling. During welding, the main current can be corrected by +/-20 A.

Reduced current I_2 ..... 0 to 100 % of main current I_1
Factory setting: 50%

Downslope t_2 ..... 0.0 to 9.9 s, factory setting: 1 s

Important! The downslope t_2 is saved separately for the 2-step and 4-step operating modes.

Final current I_E ..... 0 to 100 % of main current
Factory setting: 30 %

Balance (only with TIG-AC) . -5 / +5, factory setting: 0
-5 .... highest fusing power, lowest cleaning action
+5 ... highest cleaning action, lowest fusing power

Electrode diameter ..... 0 to 4.0 mm, (0.158 in.)
factory setting: 2.4 mm (0.095 in.)

Available parameters where the “Rod electrode (MMA) welding” mode (5) has been selected:

Main current I_1 ..... CastoTIG 1702 AC/DC: 10 to 140 A
CastoTIG 2202 AC/DC: 10 to 180 A

Balance (only with AC) ..... -5 / +5, factory setting: 0

CastoTIG 1702/ 2202 AC/DC control panel (continued)

(10) **Welding current display** ... for indicating the welding current for the parameters:

- I_S (starting current)
- I_1 (main current)
- I_2 (reduced current)
- I_E (final current)

Before the start of welding, the left-hand display shows the command value. For I_S, I_2 and I_E , the right-hand display also shows the respective %-age of the main current I_1.

After the start of welding, the parameter I_1 is automatically selected. The left-hand display shows the present actual value of the welding current.

The control panel indicates which position has been reached in the welding process by means of a dimmed display of the parameters (I_S, t_1, ...).

(11) **Welding voltage display** ... for indicating the actual welding-voltage value on the right-hand display.

Where one of the TIG-welding modes has been selected, the right-hand display reads “0.0” before the start of welding. Where the “Rod electrode (MMA) welding” mode has been selected, there is first a 3-second time-lag, after which the value for the open-circuit voltage “50V” is displayed.

Important! The value of 50 V indicated where the “Rod electrode (MMA)” process has been selected refers to the mean value of the pulsed open-circuit voltage.

(12) **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.

The “Hold” indicator refers to the last value reached by the Main current I_1. As soon as any other parameter is selected, the “Hold” indicator goes out. The “Hold” values will continue to be available, however, if Parameter I_1 is selected once again.

The “Hold” indicator is cancelled whenever:
- a new welding operation is started
- the Main current I_1 is adjusted
- the operating mode is changed
- the process is changed

Important! If the main-current phase was never reached, or if a pedal remote-control unit was being used, no “Hold” values are outputted.

(13) **Set button** ... is used for accessing the Set-up menu.

CastoTIG 1702/ 2202 AC/DC control panel (continued)

(14) **Gas-test button** ... for setting the required gas-flow rate on the pressure regulator. After you press this button, gas will flow out for 30 s. Press the button again to stop the gas test-flow before the 30 seconds are up.

(15) **Overtemperature indicator** ... lights up if the power source overheats (e.g. because the duty cycle has been exceeded). For more information on this, see the “Troubleshooting” section.

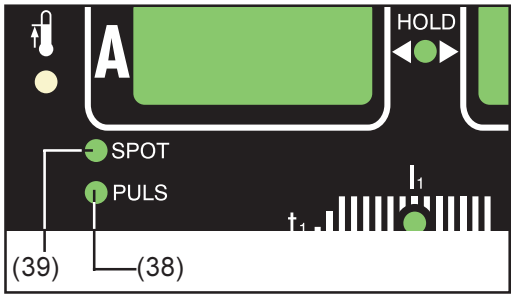


Fig.3b Additional indicators

The indicators shown in Fig.3b glow for as long as the respective functions remain activated. The following description will give you an overview of these functions. In some cases, they will be described in even greater detail in the in-depth sections dealing with the function or parameter in question, to be found in:

- The set-up menu: Level 1
- The set-up menu: Level 2
- Special functions

(38) Pulsing is activated ... Set-up parameter “F-P” has been set to a certain pulsing frequency

(39) Spot welding is activated ... Set-up parameter “SPt” has been set to a certain spot-welding time

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"

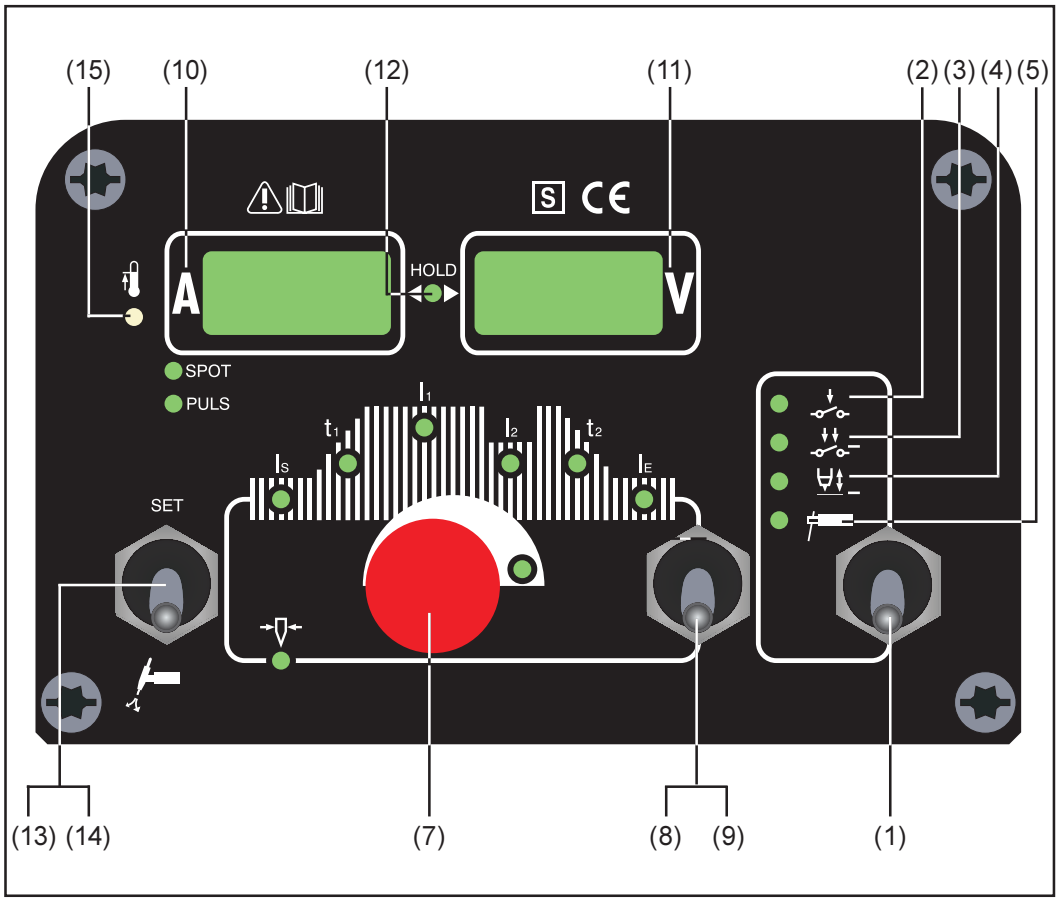


Fig.4 CastoTIG 2201 DC control panel

On the CastoTIG 2201 DC power source, the TIG-DC and rod electrode DC welding processes are available. The following processes and functions are not available and cannot be retro-fitted:

- TIG-AC welding
- rod-electrode AC welding
- switchover facility between the rod electrode DC- and rod electrode DC+ welding processes

Important! To change over from the rod electrode DC- welding process to the rod electrode DC+ welding process on the CastoTIG 2201 DC power source, reconnect the electrode holder and the earthing (grounding) cable to the opposite welding sockets (i.e. swap them over - see the section headed “Rod electrode (MMA) welding”).

(1) **Mode button** ... for selecting the operating mode:

- (2) 2-step mode
- (3) 4-step mode
- (4) Contact ignition (Lift-arc)
- (5) Rod electrode (MMA) welding

Important! If you select the “Rod electrode (MMA) welding” mode (5), the welding voltage will only be available after a 3-second time-lag.

CastoTIG 2201 DC control panel (continued)

(7) **Adjusting dial** ... for altering parameters. If the indicator is lit up on the adjusting dial, then the selected parameter can be altered.

(8) and (9) **Parameter selection buttons** ... for selecting the parameters

It is also possible to change parameters by means of the parameter selection buttons (8) and (9) while the welding operation is in progress.

Available parameters where 2-step mode (2) has been selected:

Starting current I_S ..... 0 to 100 % of main current I_1
Factory setting: 35%

Upslope t_1 ..... 0.0 to 9.9 s, factory setting: 0.1 s

Important! The upslope t_1 is saved separately for the 2-step and 4-step operating modes.

Main current I_1 ..... CastoTIG 2201 DC: 3 to 220 A

Important! On welding torches with Up/Down functionality, the entire setting range is available for selection while the machine is idling. During welding, the main current can be corrected by +/-20 A.

Downslope t_2 ..... 0.0 to 9.9 s, factory setting: 1 s

Important! The downslope t_2 is saved separately for the 2-step and 4-step operating modes.

Final current I_E ..... 0 to 100 % of main current
Factory setting: 30 %

Electrode diameter ..... 0 to 4.0 mm (0.158 in.)
factory setting: 2.4 mm (0.095 in.)

Available parameters where 4-step mode (3) has been selected:

Starting current I_S ..... 0 to 100 % of main current I_1
Factory setting: 35%

Upslope t_1 ..... 0.0 to 9.9 s, factory setting: 0.1 s

Important! The upslope t_1 is saved separately for the 2-step and 4-step operating modes.

Main current I_1 ..... CastoTIG 2201 DC: 3 to 220 A

Important! On welding torches with Up/Down functionality, the entire setting range is available for selection while the machine is idling. During welding, the main current can be corrected by +/-20 A.

Reduced current I_2 ..... 0 to 100 % of main current I_1
Factory setting: 50%

CastoTIG 2201
DC control panel
(continued)

Downslope t_2 ..... 0.0 to 9.9 s, factory setting: 1 s

Important! The downslope t_2 is saved separately for the 2-step and 4-step operating modes.

Final current I_E ..... 0 to 100 % of main current
Factory setting: 30 %

Electrode diameter ..... 0 to 4.0 mm (0.158 in.)
factory setting: 2.4 mm (0.095 in.)

Available parameters where the “Rod electrode (MMA) welding” mode (5) has been selected:

Main current I_1 ..... CastoTIG 2201 DC: 10 to 180 A

(10) **Welding current display** ... for indicating the welding current for the parameters:

I_S (starting current)

I_1 (main current)

Important! On welding torches with Up/Down functionality, the entire setting range is available for selection while the machine is idling. During welding, the main current can be corrected by +/-20 A.

I_2 (reduced current)

I_E (final current)

Before the start of welding, the left-hand display shows the command value. For I_S, I_2 and I_E , the right-hand display also shows the respective %-age of the main current I_1.

After the start of welding, the parameter I_1 is automatically selected. The left-hand display shows the present actual value of the welding current.

The control panel indicates which position has been reached in the welding process by means of a dimmed display of the parameters (I_S, t_1, ...).

CastoTIG 2201
DC control panel
(continued)

(11) **Welding voltage display** ... for indicating the actual welding-voltage value on the right-hand display.

Where one of the TIG-welding modes has been selected, the right-hand display reads “0.0” before the start of welding. Where the “Rod electrode (MMA) welding” mode has been selected, there is first a 3-second time-lag, after which the value for the open-circuit voltage “50V” is displayed.

Important! The value of 50 V indicated where the “Rod electrode (MMA)” process has been selected refers to the mean value of the pulsed open-circuit voltage.

(12) **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.

The “Hold” indicator refers to the last value reached by the Main current I_1. As soon as any other parameter is selected, the “Hold” indicator goes out. The “Hold” values will continue to be available, however, if Parameter I_1 is selected once again.

The “Hold” indicator is cancelled whenever:
- a new welding operation is started
- the Main current I_1 is adjusted
- the operating mode is changed
- the process is changed

Important! If the main-current phase was never reached, or if a pedal remote-control unit was being used, no “Hold” values are outputted.

(13) **Set button** ... is used for accessing the Set-up menu.

(14) **Gas-test button** ... for setting the required gas-flow rate on the pressure regulator. After you press this button, gas will flow out for 30 s. Press the button again to stop the gas test-flow before the 30 seconds are up.

(15) **Overtemperature indicator** ... lights up if the power source overheats (e.g. because the duty cycle has been exceeded). For more information on this, see the “Troubleshooting” section.

CastoTIG 2201
DC control panel
(continued)

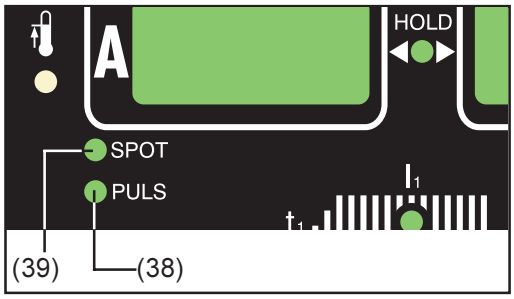


Fig.4b Additional indicators

The indicators shown in Fig.4b glow for as long as the respective functions remain activated. The following description will give you an overview of these functions. In some cases, they will be described in even greater detail in the in-depth sections dealing with the function or parameter in question, to be found in:
- The set-up menu: Level 1
- The set-up menu: Level 2
- Special functions

(38) Pulsing is activated ... Set-up parameter “F-P” has been set to a certain pulsing frequency

(39) Spot welding is activated ... Set-up parameter “SPt” has been set to a certain spot-welding time

Connections, switches and system add-ons

CastoTIG 1702/ 2202 AC/DC

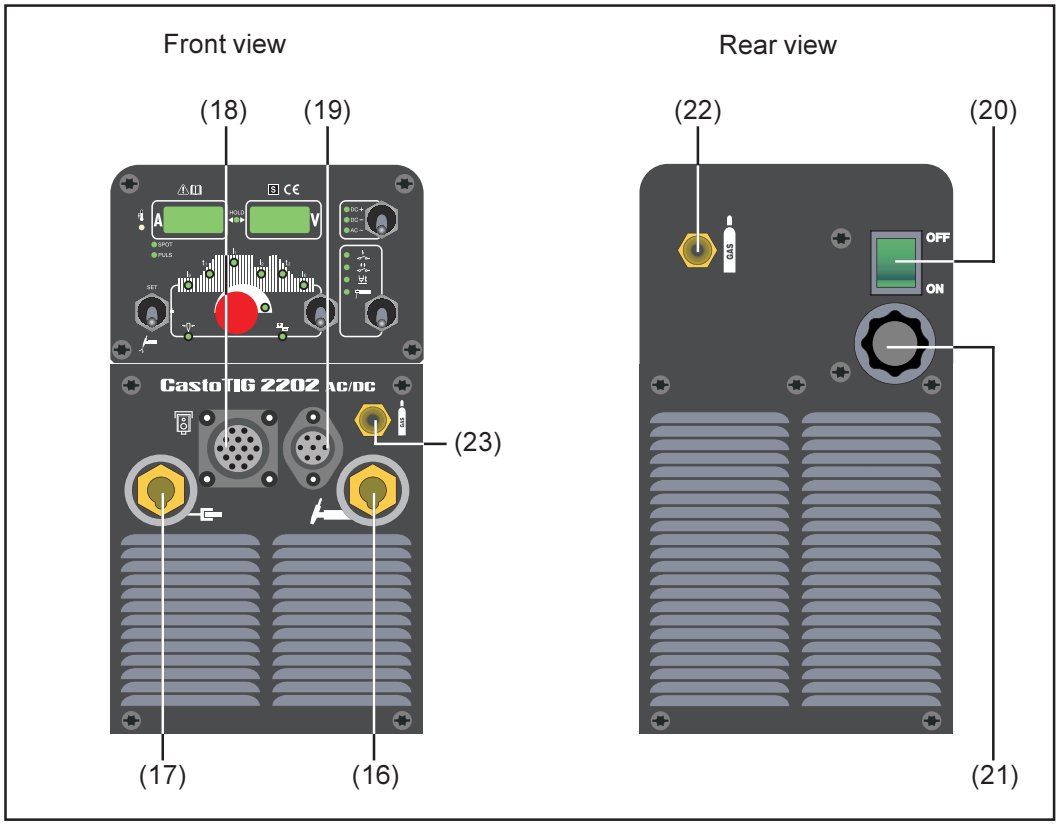


Fig.5 Connections and switches on CastoTIG 2202 AC/DC power source

(16) **- welding torch current socket** ... for
- connecting the welding cable of the TIG welding torch
- connecting the electrode (or grounding/earthing) cable in rod electrode (MMA) welding, depending on the type of electrode being used

(17) **- ground (earthing) socket with bayonet latch** ... dient zum
- connecting the grounding (earthing) cable in TIG welding
- connecting the electrode (or grounding/earthing) cable in rod electrode (MMA) welding, depending on the type of electrode being used

(18) **Remote control connection socket** ... standardised connection socket for system add-ons (e.g. remote controls)

(19) **Torch control connection socket** ... for connecting the control plug of a conventional welding torch

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

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

(22) **Shielding gas connection socket**

(23) **Gas “quick-connector”** ... for connecting up the torch shielding-gas hose

CastoTIG 2201 DC

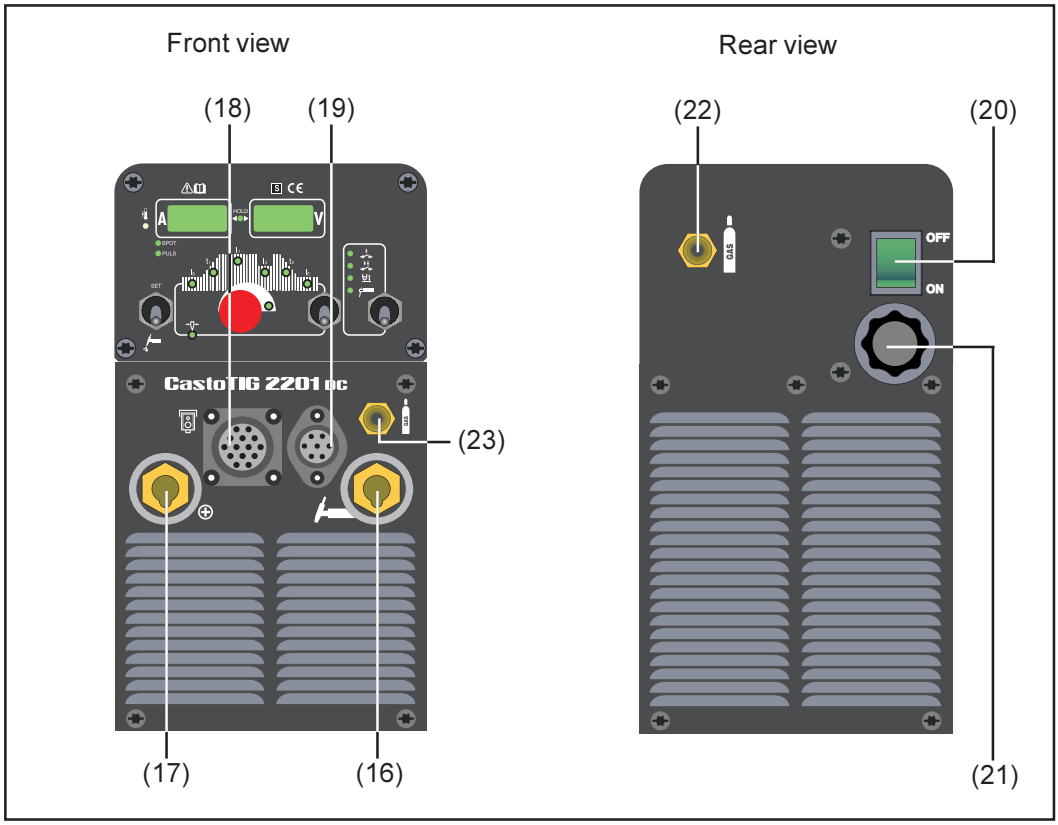


Fig.5b Connections and switches on CastoTIG 2201 DC power source (as example)

(16) **- "minus" current socket with bayonet latch** ... for
- connecting the welding cable of the TIG welding torch
- connecting the electrode (or grounding/earthing) cable in rod electrode (MMA) welding, depending on the type of electrode being used

(17) ⊕ **- "plus" current socket with bayonet latch** ... for
- connecting the grounding (earthing) cable in TIG welding
- connecting the electrode (or grounding/earthing) cable in rod electrode (MMA) welding, depending on the type of electrode being used

(18) **Remote control connection socket** ... standardised connection socket for system add-ons (e.g. remote controls)

(19) **Torch control connection socket** ... for connecting the control plug of a conventional welding torch

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

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

(22) **Shielding gas connection socket**

(23) **Gas "quick-connector"** ... for connecting up the torch shielding-gas hose

Before putting the power source into service

Safety

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"

Utilisation for intended purpose only

The power source may ONLY be used for TIG welding and rod electrode (MMA) welding. Utilisation for any other purpose, or in any other manner, shall be deemed to be "not in accordance with the intended purpose". The manufacturer shall not be liable for any damage resulting from such improper use.

Utilisation in accordance with the “intended purpose” also comprises
- following all the instructions given in this manual
- performing all stipulated inspection and servicing 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 Ø 12,5 mm (.49 in.)
- Protection against spraywater up to an angle of 60° to the upright

Caution! 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.

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 louvres 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.

Mains connection

The equipment is designed to run on the mains voltage given on the respective rating plates. If your version of the machine does not come with the mains cables and plugs ready-mounted, these must be mounted in accordance with your national regulations and Standards. 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 supply lead, and its fuse protection, must be dimensioned accordingly. The technical data shown on the rating plate shall apply.

Generator-powered operation

The CastoTIG 1702 / 2202 AC/DC and CastoTIG 2201 DC power sources are suitable for being run on generator power, provided that the maximum apparent power delivered by the generator is at least 10 kVA.

Note! The voltage delivered by the generator must NEVER undershoot or overshoot the mains-voltage tolerance range. Details of the mains-voltage tolerance are given in the section headed “Technical data”.

Putting the machine into service

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 any work on the machine if
- the mains switch is in the "OFF" position, and
- the machine is unplugged from the mains.

This section describes how to put the power source into service
- for the principal application (TIG welding)
- with reference to a standard configuration for a TIG welding installation.

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

The steps set out below will give you an overview of how to put the power source into service.
For detailed information on each of these steps, please refer to the instruction manuals for the appliances in question.

Remarks on the cooling unit

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

The cooling unit is powered from the power source. As soon as the mains switch of the power source is shifted into the “ON” position, the cooling unit is ready for operation.

Connecting up the gas cylinder

Caution! Risk of injury from gas cylinder toppling over.
- Always use a safety strap
- Fix the safety strap at the same height as the top part of the cylinder
- Never fix the safety strap around the neck of the cylinder

- Fix the gas cylinder to the trolley
- Connect up the gas cylinder:
  - Take off the protective cap from the gas cylinder
  - Briefly turn the gas-cylinder valve anticlockwise, to blow off any dust and dirt
  - Inspect the seal on the pressure regulator
  - Screw the pressure regulator onto the gas cylinder and tighten it

Connecting up the gas cylinder (continued)

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

- On the rear of the power source, connect the pressure regulator to the Shielding gas connection socket (22) by means of the gas hose
- Tighten the swivel nut

Establishing a connection to the workpiece

- Shift the mains switch into the “0FF” position
- Plug the grounding (earthing) cable into the grounding (earthing) socket / “plus” current socket (17) and twist it to fasten it
- With the other end of the grounding (earthing) cable, establish a connection to the workpiece

Mounting the welding torch

- Shift the mains switch into the “0FF” position
- Plug the welding cable of the TIG torch into the welding torch current socket / “minus” current socket (16) and twist it clockwise to latch it into place
- Connect up the torch shielding-gas hose to the gas “quick-connector” (23)
- Plug the control plug of the welding torch onto the torch control connection (19) and twist it to fasten it
- Tool up the welding torch (see the instruction manual for the torch)

Only when using a water-cooled torch and cooling unit:

- Plug in the welding-torch water connectors to the water forward-flow (*black*) and return-flow (*red*) connections on the cooling unit.

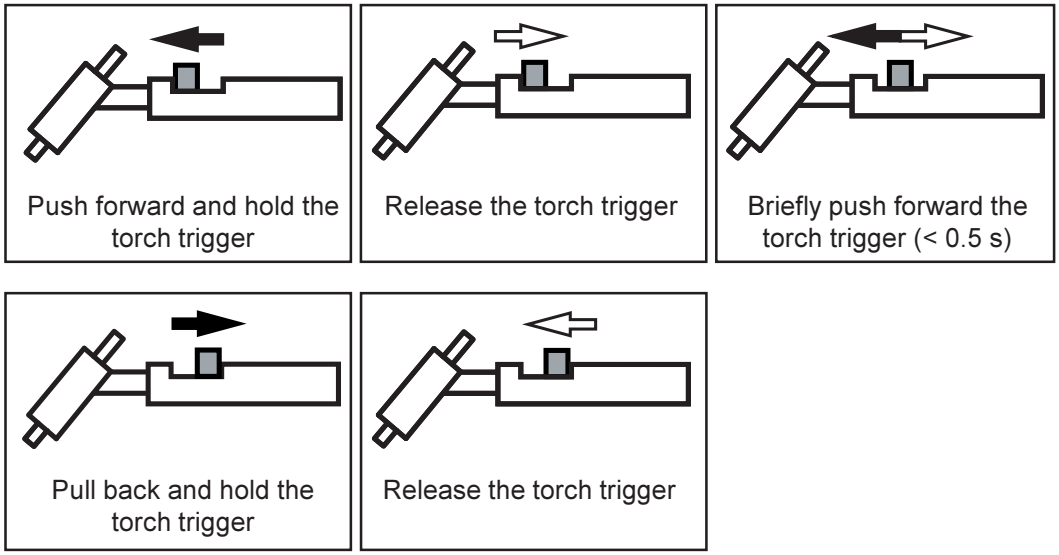
TIG operating modes

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"

Please see the section headed “The Set-up menu: Level 1” for information on the settings, setting range and units of measurement of the available parameters.

Symbols and their explanations



Symbol	Explanation
GPr	**Gas pre-flow time**
I_S	**Starting-current phase:** The temperature is raised gently, at low welding amperage, so that the filler metal can be positioned correctly
t_{up}	**Upslope phase:** The starting current is continuously increased, until it reaches the welding amperage
I_1	**Welding-current phase:** Uniform thermal input into the base metal, whose temperature is raised by the advancing heat
I_2	**Reduced-current phase:** Intermediate lowering of the welding amperage, in order to prevent any local overheating of the base metal
t_2	**Downslope phase:** The welding current is continuously lowered, until it reaches the final current.
I_E	**End-crater (final-current) phase:** To prevent any local overheating of the base metal due to heat build-ups towards the end of welding. This eliminates any risk of weld drop-through.
SPt	**Spot-welding time**
G-H/G-L	**Gas post-flow time**
	G-H Gas post-flow time at maximum welding amperage **G-L** Gas post-flow time at minimum welding amperage

2-step

● Select 2-step mode (2)

●SPOT Spot-welding status indicator: If the spot-welding status indicator is lit up, set the set-up parameter SPt to “OFF” (see: “The Set-up menu: Level 1”)

Important! When 2-step mode has been selected, the spot-welding status indicator on the control panel must not be lit up.

The factory setting (i.e. in which the power source is delivered) is: Parameter Spt “OFF”.

- Welding: Push forward and hold the torch trigger
- End of welding: Release the torch trigger

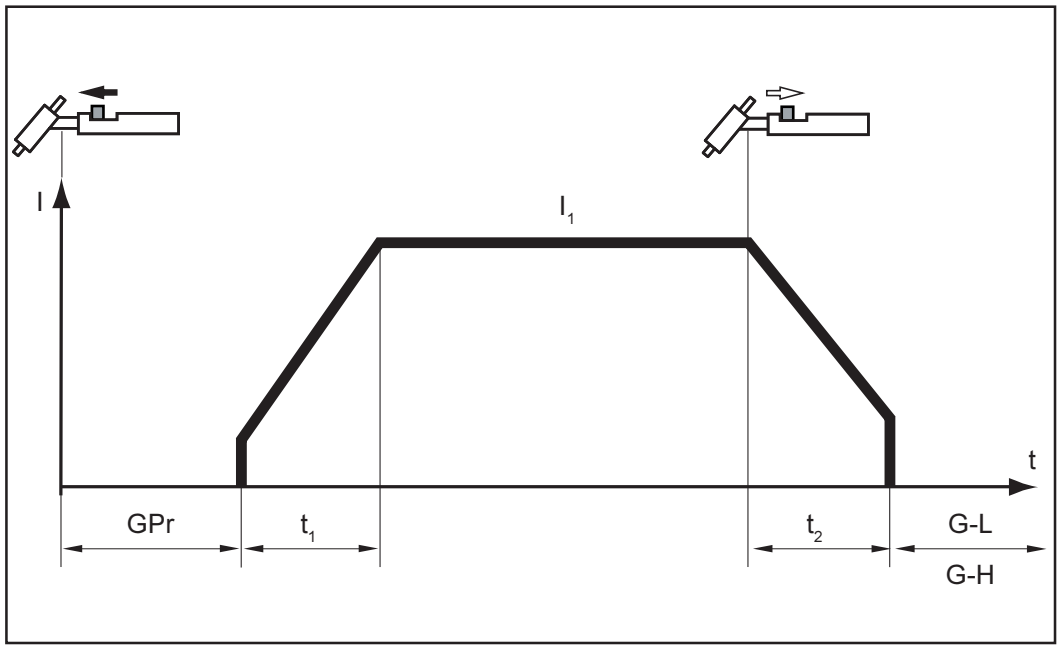


Fig.6 2-step mode

Spot welding

For information on setting the “Spot-welding time” set-up parameter (SPt), see the section headed “The Set-up menu: Level 1”.

If a value has been set for the “SPt” set-up parameter, the operating mode “2-step mode” (2) will have the function of the spot-welding mode.

● SPOT Spot-welding status indicator: Remains lit up as long as a value has been specified for the spot-welding time.

- Select 2-step mode (2)
- In the “Set-up menu: Level 1”, set the “SPt” set-up parameter to the desired spot-welding time.
- Welding: Briefly push forward the torch trigger

To abort this procedure, push forward the torch trigger once again.

Important! When using a remote-control pedal unit: The spot-welding time starts to elapse as soon as you actuate the remote-control pedal unit. It is not possible to regulate the power using the remote-control pedal unit.

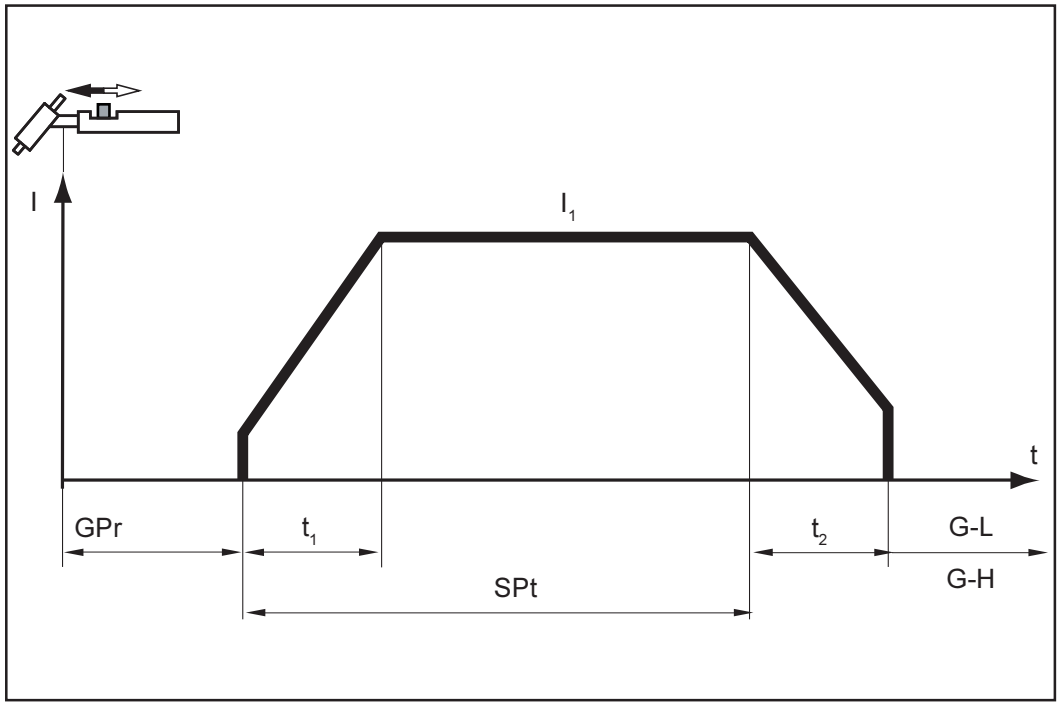


Fig.7 Spot welding

4-step

- Select 4-step mode (3)

Important! The set-up parameter SFS must be set to “OFF” (see: “The Set-up menu: Level 2”). The factory setting (i.e. in which the power source is delivered) is: Parameter SFS = “OFF”.

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

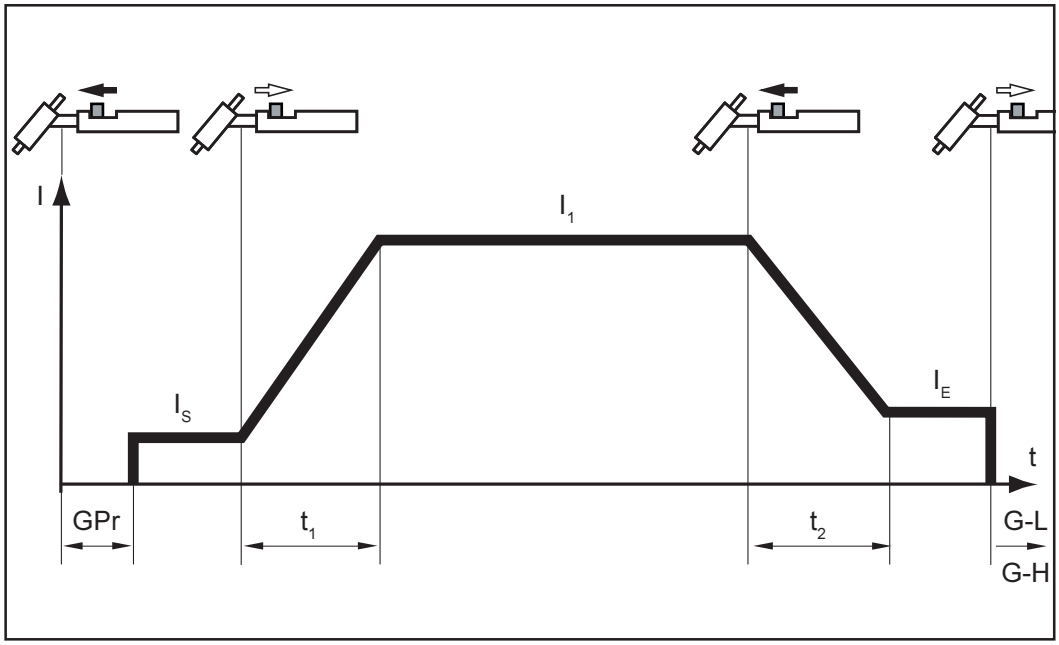


Fig.8 4-step mode

4-step with intermediate lowering

In the variant of the 4-step mode illustrated below, an “intermediate lowering” of the welding current takes place. This is initiated by pull back and holding the trigger.

- Select the 4-step operating mode (3)

Important! The set-up parameter SFS must be set to “OFF” (see: “The Set-up menu: Level 2”). The factory setting (i.e. in which the power source is delivered) is: Parameter SFS = “OFF”.

- For intermediate lowering of the welding current to the pre-set reduced current I_2 during the main-current phase: Pull back and hold the torch trigger
- To return to the main current: Release the torch trigger

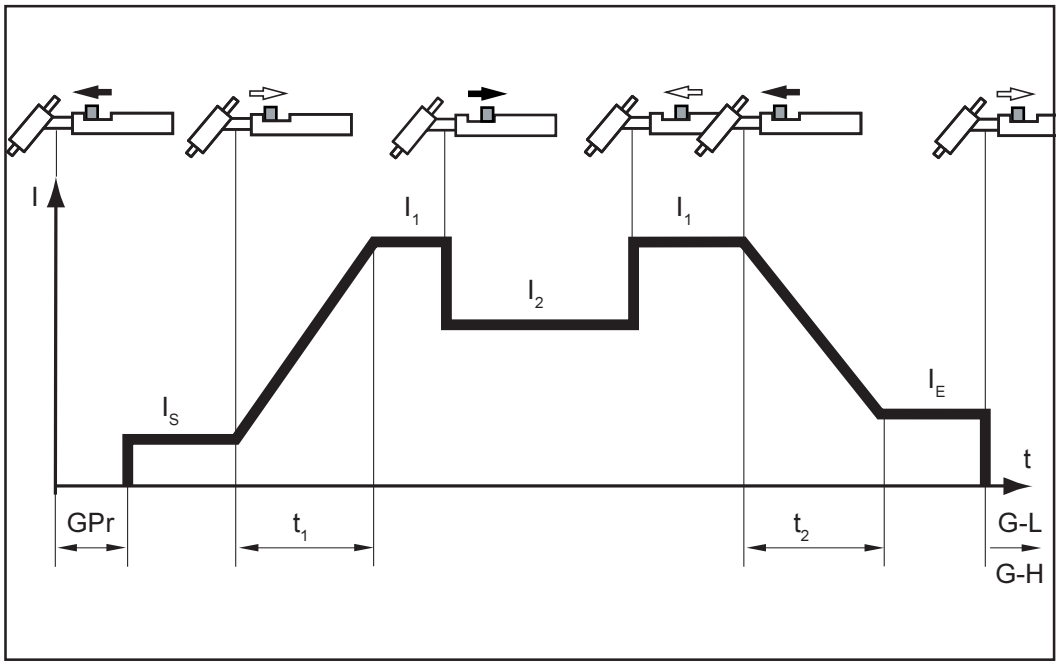


Fig.9 4-step mode with intermediate lowering: Variant 1

Special 4-step: Variant 1

In the variant of the “Special 4-step” mode illustrated below, intermediate lowering to the pre-set reduced current I_2 is effected by briefly pushing forward the torch trigger. When the torch trigger is briefly pushed forward a second time, the amperage returns to the Main current I_1.

- Select the 4-step operating mode (3)
- Set the “SFS” set-up parameter to “1”
  (see: “The Set-up menu: Level 2” - Sub-section: “TIG set-up parameters”)

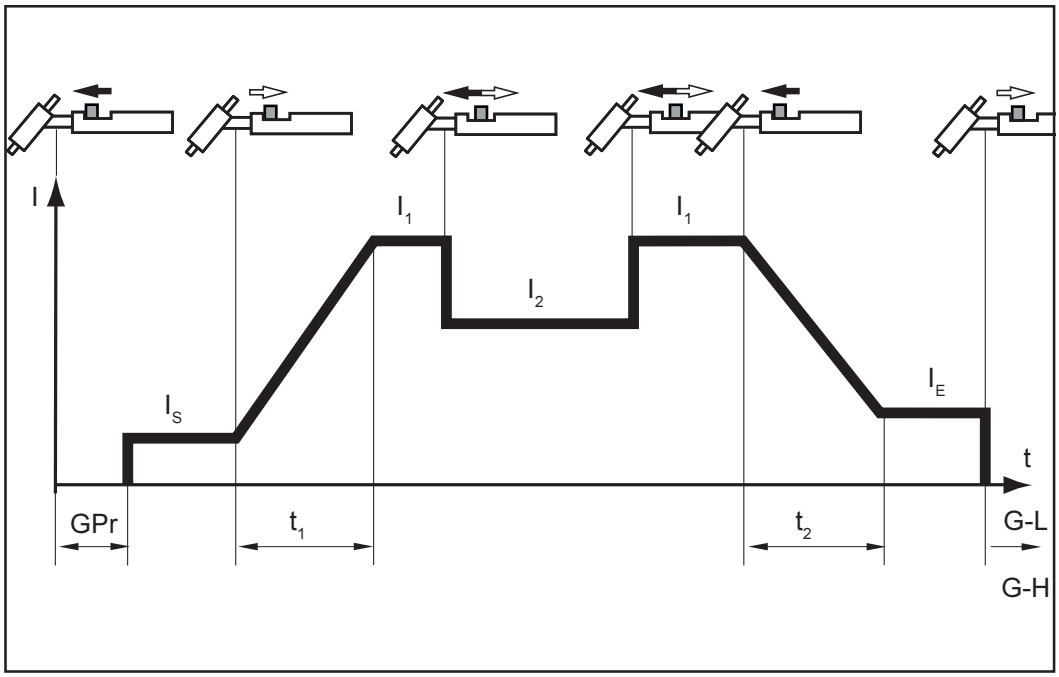


Fig.10 Special 4-step mode: Variant 1

Welding torch with standard functionality

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 the whole of the “Operating Instructions” manual.

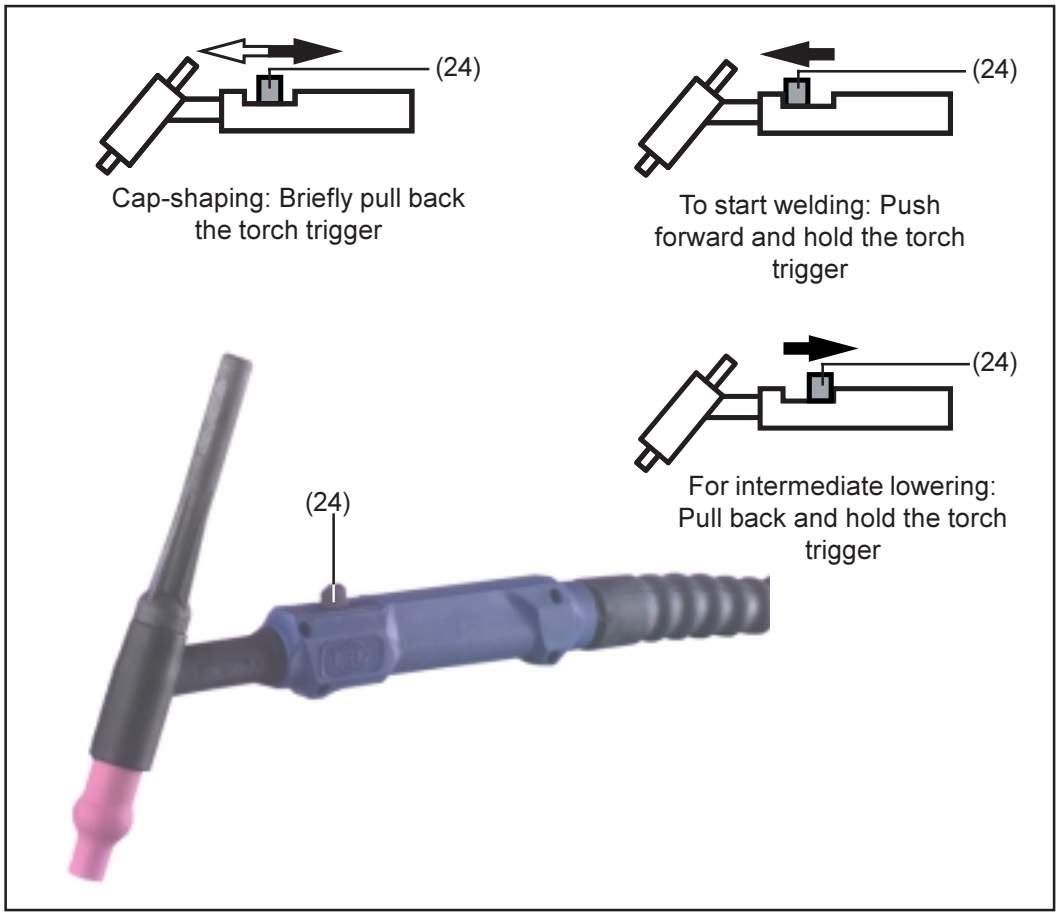


Fig.11 Welding torch with standard functionality

- **Cap-shaping** ... Briefly pull back the torch trigger (24)

  Before starting welding, activate the cap-shaping function by briefly pulling back the torch trigger (24). Precondition: The TIG-AC welding process must have been selected.

  Important! The cap-shaping function cannot be activated during welding. For more information on the cap-shaping function, see the “TIG welding” section in the “Operating Instructions” manual for the power source.

- **Starting welding** ... Pull back and hold the torch trigger (24)

  Important! More information on how to control the welding operation from the torch trigger may be found in the section of the power-source manual headed “TIG operating modes”.

- **Intermediate lowering** ... Pull back and hold the torch trigger (24)

  Important! The facility for obtaining an “intermediate lowering” of the welding current by pulling back and holding the trigger is available in Standard 4-step mode. The set-up parameter SFS must be set to “OFF” (see: “The Set-up menu: Level 2” in the instruction manual for the power source). The factory setting (i.e. in which the power source is delivered) is: Parameter SFS = “OFF”.

- To return to the main current: Release the torch trigger (24)

Welding torch with up / down functionality

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 the whole of the “Operating Instructions” manual.

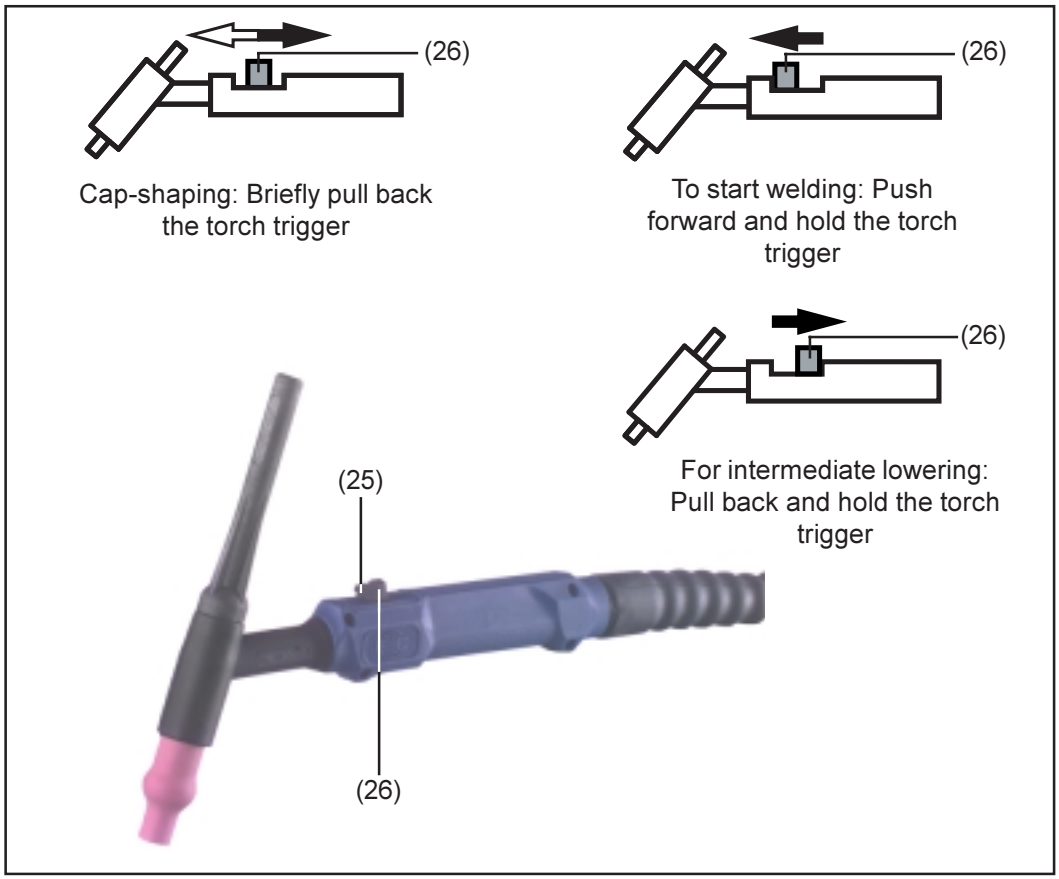


Fig.12 Welding torch with up / down functionality

- **To alter the selected parameter** ... Use the Parameter settings button (25)
  - To increase the parameter: Push the parameter settings button forward
  - To decrease the parameter: Pull the parameter settings button back

- **Cap-shaping** (only on CastoTIG 1702 / 2202 AC/DC)... Briefly pul back the torch trigger (26)
  Before starting welding, activate the cap-shaping function by briefly pulling back the torch trigger (26). Precondition: The TIG-AC welding process must have been selected.

  Important! The cap-shaping function cannot be activated during welding. For more information on the cap-shaping function, see the “TIG welding” section in the “Operating Instructions” manual for the power source.

- **Starting welding** ... Push forward and hold the torch trigger (26)

  Important! More information on how to control the welding operation from the torch trigger may be found in the section of the power-source manual headed “TIG operating modes”.

- **Intermediate lowering** ... Pull back and hold the torch trigger (26)

  Important! The facility for obtaining an “intermediate lowering” of the welding current by pushing forward and holding the trigger is available in Standard 4-step mode. The set-up parameter SFS must be set to “OFF” (see: “The Set-up menu: Level 2” in the instruction manual for the power source). The factory setting (i.e. in which the power source is delivered) is: Parameter SFS = “OFF”.

- To return to the main current: Release the torch trigger (26)

TIG welding

Safety

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 any work on the machine if
- the mains switch is in the "OFF" position, and
- the machine is unplugged from the mains.

Tooling up

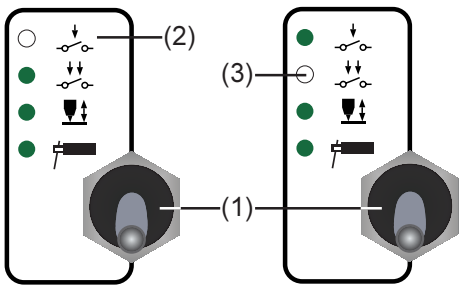
- Unplug the machine from the mains
- Shift the mains switch (20) to the “0FF” position
- Plug the grounding (earthing) cable into the grounding (earthing) socket / “plus” current socket (17) and latch it
- With the other end of the grounding (earthing) cable, establish a connection to the workpiece
- Plug the welding cable of the TIG torch into the welding torch current socket / “minus” current socket (16) and twist it clockwise to latch it into place
- Plug the control plug of the welding torch onto the torch control connection (19) and twist it to fasten it
- Tool up the welding torch (see the instruction manual for the torch)
- Screw the pressure regulator onto the shielding-gas cylinder and tighten it
- On the rear of the power source, connect the pressure regulator to the Shielding gas connection socket (22) by means of the gas hose
- Tighten the swivel nut
- Connect up the torch shielding-gas hose to the gas “quick-connector” (23)

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

Selecting the operating mode

Caution! Risk of injury and damage from electric shock. As soon as the mains switch is in the "ON" 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.)

- Shift the mains switch (20) into the “ON” position



Press the “Mode” button (1) to select either:
- 2-step mode (2) or
- 4-step mode (3)

Note! Do not use any pure tungsten electrodes (colour-coded green) on the CastoTIG 2201 DC power source.

Selecting the process (CastoTIG 1702 /2202 AC/DC)

- Press the “Process” button (6) to select:

● DC +
● DC –
○ AC ~ AC welding process or

● DC +
○ DC – DC welding process
● AC ~

Cap-shaping (CastoTIG 1702 / 2202 AC/DC)

The cap-shaping function can be activated by pulling the torch trigger back. Precondition: The TIG-AC welding process must have been selected.

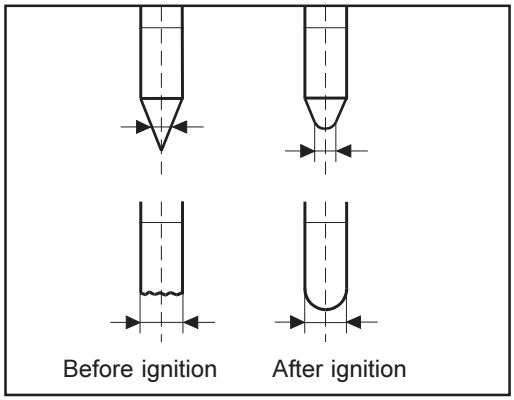


Fig.13 Cap-shaping

The cap-shaping function ensures that the optimum shape of electrode tip is formed automatically during the welding start-up. A separate cap-shaping operation on a test workpiece is no longer necessary.

Important! No further cap-shaping is needed at the next welding start-up. After the cap-shaping function has been performed once, it is deactivated for every subsequent welding start-up.

Note! The cap-shaping function is not necessary if there is already a sufficiently large cap at the tip of the tungsten electrode.

Setting the parameters

A list of all the available parameters may be found in the section headed: “The control panel”.

Select the desired parameters with the parameter selection buttons (8) and (9), and alter them with the adjusting dial (7).

Important! All parameter command values that have been set by means of the adjusting dial (7) 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.

Setting the shielding-gas flow rate

When using any other TIG welding torch:
- Press the gas-test button (14)
- Set the desired shielding-gas flow rate

Important! The test gas-flow lasts for a maximum of 30 seconds. Press the button again to abort the procedure.

Arc ignition - generalremarks

For an optimised ignition sequence where the TIG-AC welding process has been selected, the CastoTIG 1702 / 2202 AC/DC power source takes account of the diameter of the electrode. It also takes account of the electrode’s actual temperature, computed with reference to the preceding welding and weld-off times.

HF ignition

For details of how to adjust the set-up parameter “HFt”, please refer to the section headed “The set-up menu: Level 2” - sub-section “TIG set-up parameters”.

Use the HFt parameter to set the time interval of the HF impulses to 0.01 s. The factory setting (i.e. in which the power source is delivered) is: Parameter HFt = “0.01s”.

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

As compared with touchdown ignition, HF ignition eliminates the risk of contamination of the electrode and of the workpiece.

HF ignition
(continued)

To ignite the arc, proceed as follows:

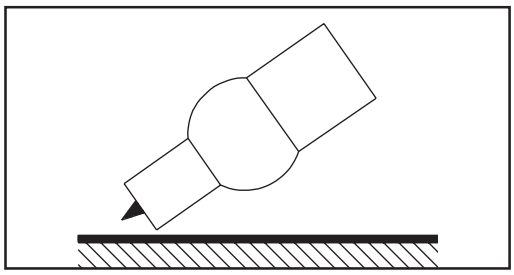


Fig.14 Place the gas nozzle down

- Place the gas nozzle down on the ignition location in such a way that there is a gap of approx. 2 to 3 mm (0.08 to 0.12’’) between the tungsten electrode and the workpiece .

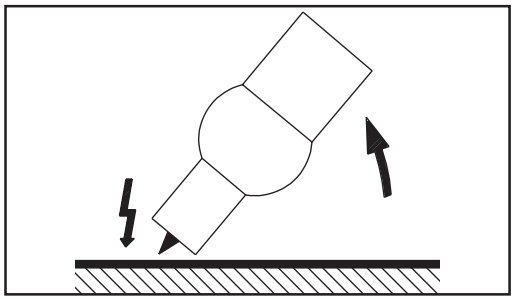


Fig.15 Non-contacting HF ignition

- Increase the tilt angle of the torch, and actuate the torch trigger in the sequence required for the operating mode you have selected (see the section headed “TIG operating modes”)
- The arc ignites, without the electrode touching down on the workpiece

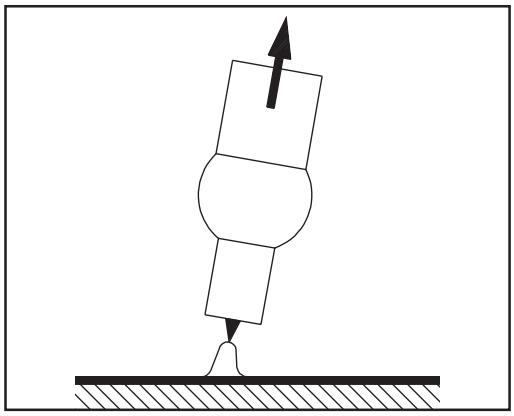
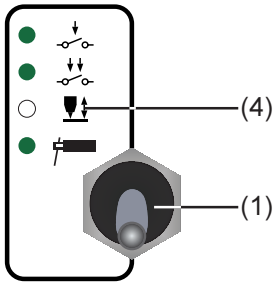


Fig.16 Welding

- Tilt the torch back into the normal position

Touchdown ignition

To ignite the arc, proceed as follows:



Press the “Mode” button (1) to select:
- ”Contact ignition” mode (4)

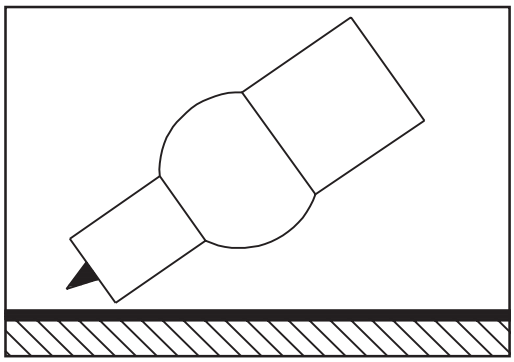


Fig.17 Place the gas nozzle down

- Place the gas nozzle down on the ignition location in such a way that there is a gap of approx. 2 to 3 mm (0.08 to 0.12’’) between the tungsten electrode and the workpiece .

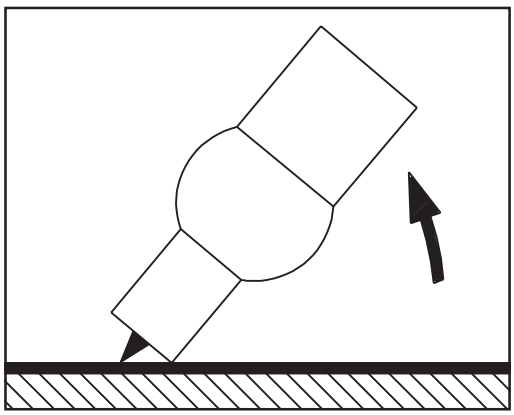


Fig.18 Arc ignites when electrode is touched down on workpiece

- Actuate the torch trigger - the shielding gas starts to flow
- Gradually tilt up the torch until the tungsten electrode touches the workpiece

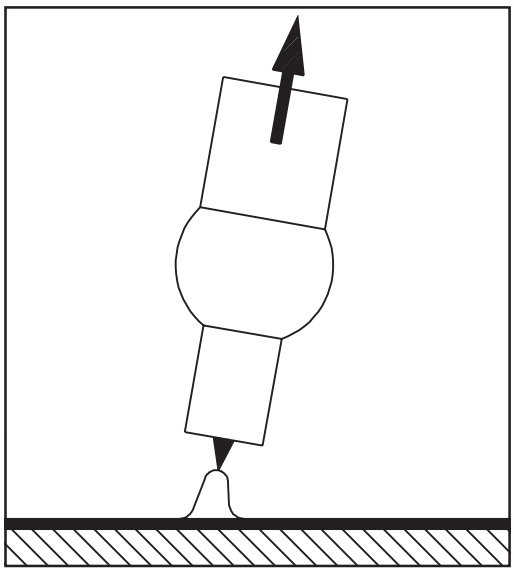


Fig.19 Welding

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

Ignition time-out function

For details of how to adjust the set-up parameter Ignition Time-Out (Ito), please refer to the section headed “The set-up menu: Level 2” - sub-section “TIG set-up parameters”.

If no arc ignites before the end of the period specified in the set-up menu, the power source cuts out automatically and the error message “no|IGn” appears on the control panel.

To make another attempt to achieve ignition, press the torch trigger again.

To dismiss the “no|IGn” message is also possible by:
- Press the Set button (13)

Arc-break watch-dog function

For details of how to adjust the “Arc-break watchdog function” set-up parameter (Arc), please refer to the section headed “The set-up menu: Level 2” - sub-section “TIG set-up parameters”.

The power source cuts out automatically if:
- the arc breaks
- no current starts to flow within the time-span specified for “Arc”

The message “no|Arc” appears on the control panel.

To make another attempt to achieve ignition, press the torch trigger again.

To dismiss the “no|Arc” message is also possible by:
- Press the Set button (13)

TIG pulsing

The diagram below illustrates TIG pulsing in cases where the DC welding process has been selected.

For details of how to adjust the parameters referred to here, please see the section headed “The set-up menu: Level 1” - sub-section “TIG set-up parameters”.

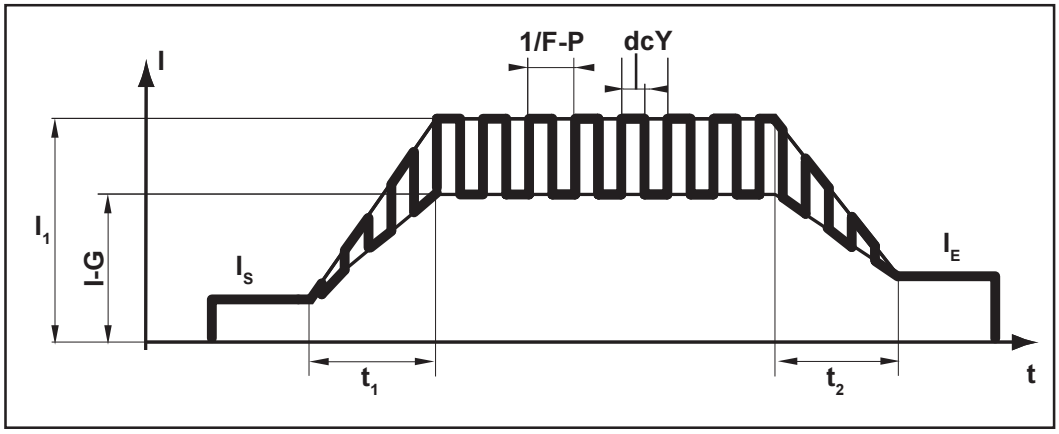


Fig.20 TIG pulsing - chronology of the welding-current curve

Legend:
- **I_S** ..... Starting current
- **I_E** ..... Final (i.e. “end”) current
- **t_1** ..... Upslope
- **t_2** ..... Downslope
- **F-P** ..... Pulsing frequency (1/F-P = time interval between 2 pulses)
- **dcY** ..... Duty cycle
- **I-G** ..... Background current
- **I_1** ..... Main current

Rod electrode (MMA) welding

Safety

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"

Switch off all cooling units (see the section headed “The set-up menu: Level 2”, “TIG parameters”, C-C ... Cooling unit control)

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 any work on the machine if
- the mains switch is in the "OFF" position, and
- the machine is unplugged from the mains.

Tooling up

- Unplug the machine from the mains
- Shift the mains switch (20) into the “OFF” position
- Dismount the TIG welding torch

Important! The CastoTIG 2201 DC power source has no switchover facility between the rod electrode DC- and rod electrode DC+ welding processes.

To change over from the rod electrode DC- welding process to the rod electrode DC+ welding process on the CastoTIG 2201 DC power source, reconnect the electrode holder and the earthing (grounding) cable to the opposite welding sockets (i.e. swap them over).

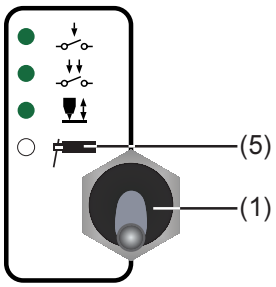
- Plug the grounding (earthing) cable into the grounding (earthing) connecting socket / “plus” current socket (17), and latch it in firmly
- With the other end of the grounding (earthing) cable, establish a connection to the workpiece
- Plug the welding cable into the welding torch connecting socket / “minus” current socket (16) and twist it clockwise to latch it into place
- Plug the machine back into the mains

Selecting the operating mode

Caution! Risk of injury and damage from electric shock. As soon as the mains switch is in the "ON" 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.)

- Shift the mains switch (20) into the “ON” position

Selecting the operating mode (continued)



Press the “Mode” button (1) to select:
- “Rod-electrode (MMA) welding” mode (5)

Selecting the process (Casto-TIG 1702/2202 AC/DC)

- Press the “Process” button (6) to select:

DC + DC+ welding or

DC − DC- welding or

AC ~ AC welding

Setting the parameters

A list of all the available parameters may be found in the section headed: “The control panel”.

- Select the desired parameters with the parameter selection buttons (8) and (9), and alter them with the adjusting dial (7).
- Start welding.

Important! All parameter command values that have been set by means of the adjusting dial (7) 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 obtain optimum welding results, it will sometimes be necessary to set or adjust the Hot-Start 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 parameters, please see the section headed “The set-up menu: Level 1” - sub-section “Rod-electrode set-up parameters”.

Hot-Start function
(continued)

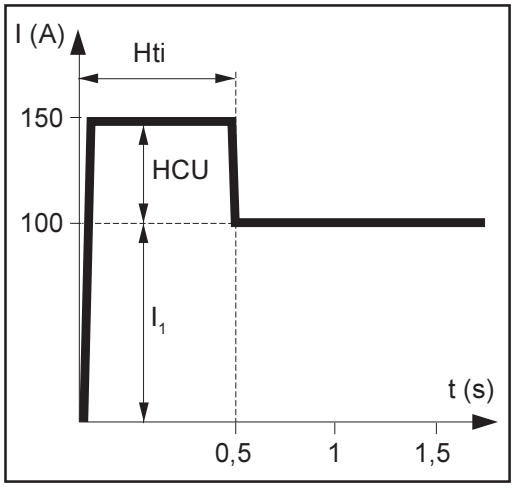


Fig.21 Example of "Hot-Start" function

Legend
Hti ..... Hot-current time, 0-2 s, factory setting: 0.5 s
HCU .. Hot-start current, 0-100%, factory setting: 50 %
I_1 ..... Main current = Pre-set welding current

Mode of functioning
During the pre-set hot-current time (Hti), the welding current is increased to a certain value. This value (HCU) is 0-100% higher than the pre-set welding current (I_1).

GB

Dynamic (arc force) function

In order to obtain optimum welding results, it will sometimes be necessary to set or adjust the "Dynamic (arc-force)" function. For details on setting the "dYn" parameter, please see "The Set-up menu: Level 1" - sub-section "Rod-electrode set-up parameters".

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

Setting-range of the dYn parameter
0 ..... soft, low-spatter arc
100 .... harder, more stable arc

"Eln" characteristic-selection function

Important! For details on setting the "Eln" set-up parameter, please see "The set-up menu: Level 2" - sub-section "Rod-electrode set-up parameters".

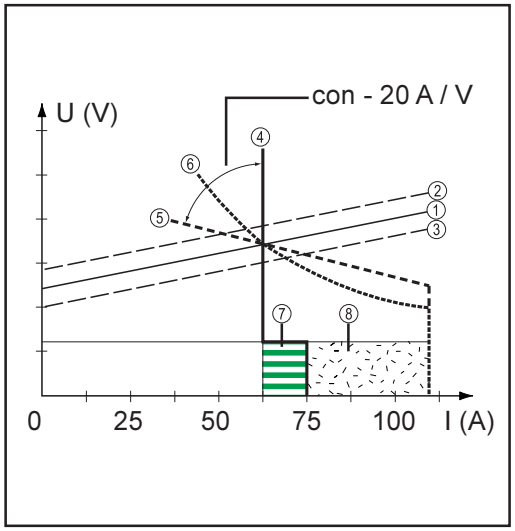


Fig.22 Characteristics that can be selected using the Eln function

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 dynamic where characteristic ④ is selected
⑧ ... Ex. of preset arc force dynamic where characteristic ⑤ or ⑥ is selected

"Eln" characteristic-selection function
(continued)

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

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

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

"P" parameter (constant welding power)
- If the "P" parameter has been set, the welding power is kept constant, irrespective of the welding voltage and welding current. This results in a hyperbolic characteristic ⑥ (Fig. 23).
- The "P" parameter is particularly suitable for cellulose electrodes.

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

Further explanations of the "Eln" characteristic-selection function

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

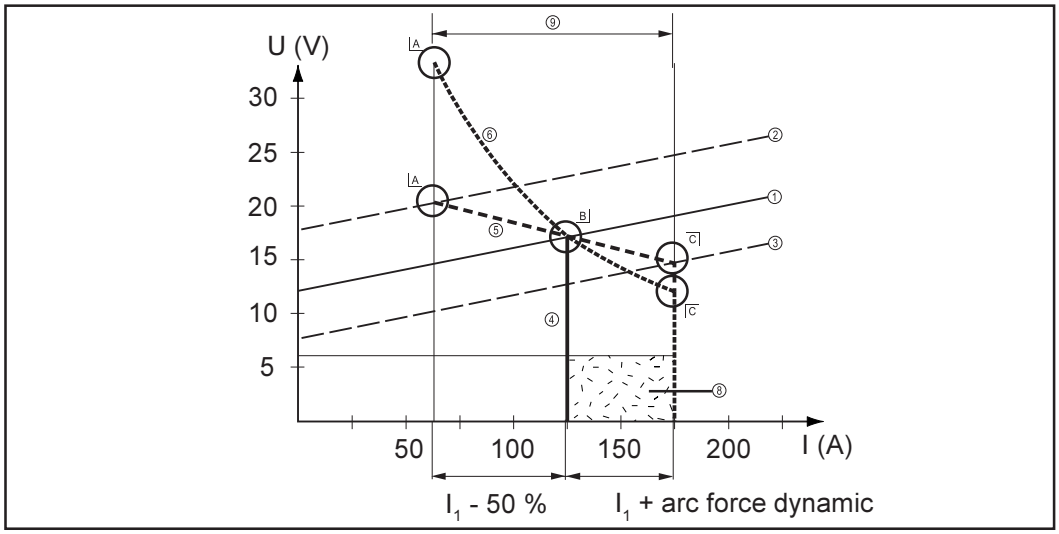


Fig.23 Settings example: I_1 = 125 A, arc-force dynamic = 50

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… Ex. of preset arc force dynamic where characteristic ⑤ or ⑥ is selected
⑨… Possible change in the current where characteristic ⑤ or ⑥ is selected, as a function of the welding voltage (arc length)
A… Operating point where arc-length is long
B… Operating point where welding current I_1 is set
C… Operating point where arc-length is short

Further explanations of the "Eln" characteristic-selection function
(continued)

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

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

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

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

Anti-stick function

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

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 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 continued without difficulty.

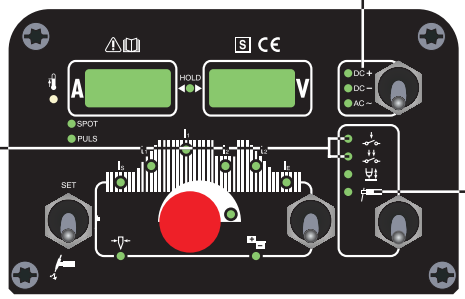
The set-up menu

Overview

The picture below shows an overview of the set-up settings, taking the control panel of the CastoTIG 1702 / 2202 AC/DC as an example. A detailed description of these settings will be found in the following sections: “The set-up menu: Level 1” and “The set-up menu: Level 2”.
“Set-up menu: Level 1” contains all the set-up parameters that have an immediate effect upon the welding process.
“Set-up menu: Level 2” contains all the set-up parameters needed for making the preliminary settings on the welding machine.

AC / polarity reversal set-up parameters:
ACF .... AC-frequency
2nd ..... 2nd level

2nd ..... 2nd level:
PoS .... Positive half-wave
nEG .... Negative half-wave



Rod-electrode set-up parameters:
dYn ..... Dynamic (arc-force) correction
HCU ... HotStarting current
Hti ..... HotStart time
FAC .... Reset the welding machine
2nd ..... Second level

2nd ..... Second level
ASt ..... Anti-stick
ELn ..... Characteristic-selection function

TIG set-up parameters:
GPr ..... Gas pre-flow
G-L ..... Gas post-flow at minimum welding amperage
G-H ..... Gas post-flow at maximum welding amperage
SPt ..... Spot-welding time
F-P ..... Pulsing frequency
dcY ..... Ratio of pulse duration to background current duration*)
I-G ..... Background current *)
FAC .... Reset
2nd ..... Second level

2nd ..... Second level:
SFS .... Special 4-step mode
C-C ..... Cooling-unit control
HFt ..... High-frequency ignition
Ito ..... Ignition time-out until safety cut-out after abortive ignition attempt
Arc ..... Time-out until safety cut-out after arc-break

*) Only selectable when F-P is not set to “OFF”

The set-up menu: Level 1

General remarks

The set-up menu makes it easy for you to adapt the parameters to many very different types of welding task.

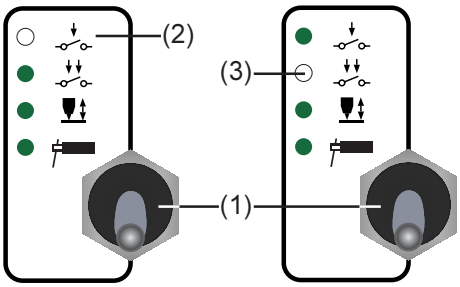
"Set-up menu: Level 1" contains all the set-up parameters that have an immediate effect upon the welding process. The parameters are arranged in logical groups. Each of these groups is called up by pressing a different combination of buttons.

On the following pages you will find a detailed description of the settings that can be made in the set-up menu, and of the parameters that are available in it.

Level 1: TIG set-up parameters

Accessing

- Press the "Mode" button (1) to select either 2-step mode (2) or 4-step mode (3)



- While pressing and holding the Set button (13), press the "Mode" button (1)
- The first set-up parameter is displayed (e.g. "SPt")

Important! The first parameter to be displayed is always the one that was the last to be selected the last time the set-up menu was accessed.

Selecting and altering the set-up parameter

- Select the desired set-up parameter with the parameter selection buttons (8) and (9).
- Alter the value of the set-up parameter with the adjusting dial (7)

Saving and exiting

- Press the Set button (13)

Available set-up parameters

GPr ..... **G**as **pr**e-flow time ... 0.0 to 9.9 s
Factory setting: 0.4 s

Gas-**L**ow ... Gas post-flow at minimum welding amperage (minimum gas post-flow time)
... 0 to 25 s; factory setting: 5 s

G-H ..... **G**as-**H**igh ... Increase in the gas post-flow time at maximum welding amperage
... 0 to 25 s; factory setting: 15 s

The value set for G-H only applies if the maximum welding current really has been set. The actual value is derived from the instantaneous welding amperage. With a medium welding amperage, for example, the actual value will be one-half of the value set for G-H.

Important! The values for the set-up parameters G-L and G-H are added together. For example, if both parameters are on maximum (25 s), the gas post-flow will last:
- 25 s at minimum welding amperage
- 50 s at maximum welding amperage
- 37.5 s where the welding amperage is e.g. exactly half of the maximum

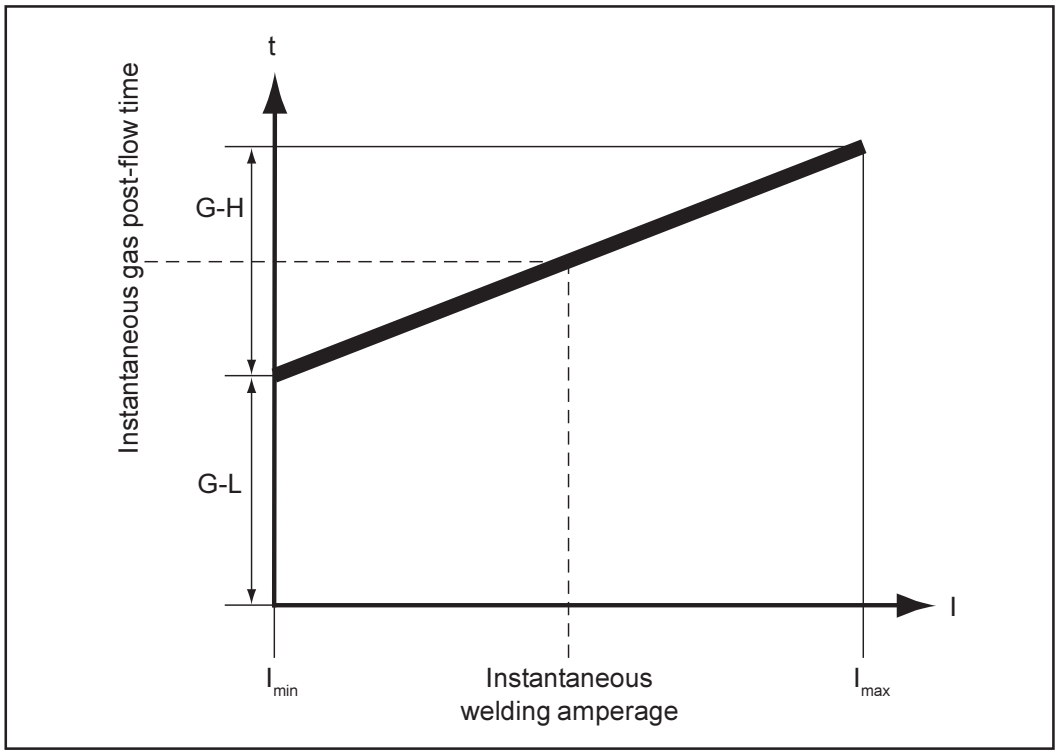


Fig.24 Gas post-flow time as a function of the welding amperage

SPt ..... **Sp**ot-welding **t**ime ... OFF / 0.1 to 9.9 s, factory setting: OFF

If a value has been set for the “SPt” set-up parameter, the operating mode “2-step mode” (2) will have the function of the spot-welding mode.

SPOT Spot-welding status indicator: Remains lit up as long as a value has been specified for the spot-welding time.

Available set-up parameters (continued)

F-P ..... **F**requency-**p**ulsing ... (pulsing frequency) ... OFF / 0.20 Hz to 990 Hz
Factory setting: OFF

The pre-set pulsing frequency is also used for the reduced current I_2 .

Important! If F-P is set to “OFF”, the set-up parameters dcY and I-G (described below) cannot be selected.

● PULS Pulsing status indicator: Remains lit up as long as a value has been specified for the “F-P” parameter.

dcY ..... **D**uty **cy**cle ... Where a pulsing frequency has been set, ratio of pulse duration to background-current duration .... 10 to 90 %, factory setting: 50 %

I-G ..... **I** (current)-**G**round ... (background current) ... 0 to 100 % of main current I_1 I.
Factory setting: 50 %

FAC .... **Fac**tory ... To reset the welding machine
Press and hold the Set button (13) for 2 s to reset the machine to the factory settings. When the display reads “PrG”, the welding machine has been reset.

Important! When the welding machine is reset, all the personal settings in Level 1 of the set-up menu are lost. The parameter settings in the second level of the set-up menu (2nd) are not deleted either.

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

Level 1: AC / polarity reversal set-up parameters

General remarks

The AC / polarity reversal set-up parameters are only available on the CastoTIG 1702 / 2202 AC/DC power sources.

Accessing

- Press the “Process” button (6) to select the AC welding process

  ● DC +
  ● DC –
  ○ AC ~ ————(6)

- While pressing and holding the Set button (13), press the “Process” button (6)
- The first set-up parameter is displayed (e.g. “ACF”)

Important! The first parameter to be displayed is always the one that was the last to be selected the last time the set-up menu was accessed.

Selecting and altering the set-up parameter

- Select the desired set-up parameter with the parameter selection buttons (8) and (9).
- Alter the value of the set-up parameter with the adjusting dial (7)

Saving and exiting

- Press the Set button (13)

Available set-up parameters

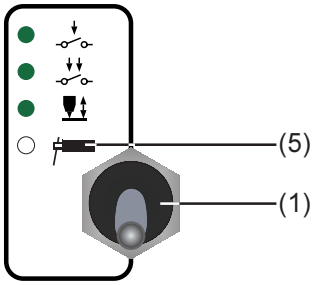
ACF .... **AC-f**requency ... Syn / 40 to 250 Hz, factory setting: 60 Hz

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

Level 1: Rod-electrode set-up parameters

Accessing

- Press the “Mode” button (1) to select the “Rod-electrode (MMA) welding” mode (5)



- While pressing and holding the Set button (13), press the “Mode” button (1)
- The first set-up parameter is displayed (e.g. “HCU”)

Important! The first parameter to be displayed is always the one that was the last to be selected the last time the set-up menu was accessed.

Selecting and altering the set-up parameter

- Select the desired set-up parameter with the parameter selection buttons (8) and (9).
- Alter the value of the set-up parameter with the adjusting dial (7)

Saving and exiting

- Press the Set button (13)

Available set-up parameters

HCU ... **H**ot-start **cu**rrent ... 0 to 100 %, factory setting: 50 %

Hti ..... **H**ot-current **ti**me ... 0 to 2.0 s, factory setting: 0.5 s

dYn .... **dyn**amic ... arc-force dynamic correction ... 0 to 100, factory setting: 20

FAC .... **Fac**tory ... To reset the welding machine
Press and hold the Set button (13) for 2 s to reset the machine to the factory settings. When the display reads “PrG”, the welding machine has been reset.

Important! When the welding machine is reset, all the personal settings in Level 1 of the set-up menu are lost. The parameter settings in the second level of the set-up menu (2nd) are also not deleted.

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

The set-up menu: Level 2

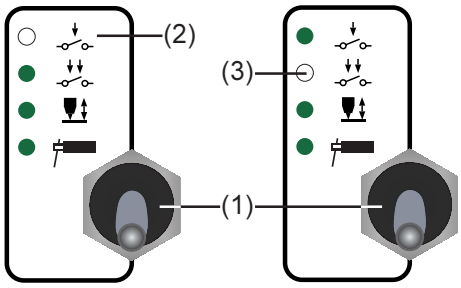
General remarks

“Set-up menu: Level 2” contains all the set-up parameters needed for making the preliminary settings on the welding machine. The parameters are arranged in logical groups. Each of these groups is called up by pressing a different combination of buttons.

Level 2: TIG set-up parameters

Select “Parameter 2nd”

- Press the “Mode” button (1) to select either 2-step mode (2) or 4-step mode (3)



- While pressing and holding the Set button (13), press the “Mode” button (1)
- The first set-up parameter is displayed (e.g. “SPt”)

Important! The first parameter to be displayed is always the one that was the last to be selected the last time the set-up menu was accessed.

- Select the set-up parameter “2nd” with the parameter selection buttons (8) and (9).

Accessing

Once the set-up parameter “2nd” has been selected:
- While pressing and holding the Set button (13), press the “Mode” button (1)
- The first set-up parameter of Level 2 is displayed (e.g. “SFS”)

Important! The first parameter to be displayed is always the one that was the last to be selected the last time the set-up menu was accessed.

Selecting and altering the set-up parameter

- Select the desired set-up parameter with the parameter selection buttons (8) and (9).
- Alter the value of the set-up parameter with the adjusting dial (7)

Exiting and saving

- Press the Set button (13) twice

Available set-up parameters

SFS .... **S**pecial **f**our-**s**tep ... OFF / 1 (Variant 1)
Factory setting: OFF

Variant 1 of the special 4-step operating is described in the section headed: “TIG operating modes”.

C-C ..... **C**ooling unit **c**ontrol ... (optional) ... Aut / ON / OFF
Factory setting: Aut

“Aut” position ..... Cooling unit is switched off 2 minutes after the end of welding

Important**!** If the coolant unit is provided with the optional “temperature limit controller”, the coolant return-flow temperature is checked all the time. If the return-flow temperature is less than 50 °C, the cooling unit is switched off automatically.

“ON” position ..... Cooling unit is ON all the time
“OFF” position ..... Cooling unit is OFF all the time

HFt ..... **H**igh **F**requency **t**ime ... (for HF ignition): Time interval between the HF impulses ... 0.01 s to 0.4 s, factory setting: 0.01 s

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

Ito ..... **I**gnition **T**ime-**O**ut ... Time until safety cut-out following an abortive ignition attempt ... 0.1 to 9.9 s, factory setting: 5 s

Important! “Ignition Time-Out” is a safety function and so cannot be deactivated. A description of the “Ignition Time-Out” function may be found in the section headed “TIG welding”.

Arc ..... Arc-break watchdog: Time until safety cut-out following an arc break ... 0.1 to 9.9 s, factory setting: 2 s

Important! The arc-break watchdog is a safety function and so cannot be deactivated. A description of the arc-break watchdog function may be found in the section headed “TIG welding”.

Level 2: AC / polarity reversal set-up parameters

Select “Parameter 2nd”

- Press the “Process” button (6) to select the AC welding process

  ● DC +
  ● DC –
  ○ AC ~ ————(6)

- While pressing and holding the Set button (13), press the “Process” button (6)
- The first set-up parameter is displayed (e.g. “ACF”)

Important! The first parameter to be displayed is always the one that was the last to be selected the last time the set-up menu was accessed.

- Select the set-up parameter “2nd” with the parameter selection buttons (8) and (9).

Accessing

Once the set-up parameter “2nd” has been selected:

- While pressing and holding the Set button (13), press the “Process” button (6)
- The first set-up parameter of Level 2 is displayed (e.g. “PoS”)

Important! The first parameter to be displayed is always the one that was the last to be selected the last time the set-up menu was accessed.

Selecting and altering the set-up parameter

- Select the desired set-up parameter with the parameter selection buttons (8) and (9).
- Alter the value of the set-up parameter with the adjusting dial (7)

Exiting and saving

- Press the Set button (13) twice

Available set-up parameters

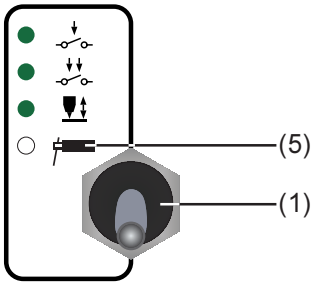
PoS .... **po**sitive ... positive half-wave ... tri / Sin / rEc / OFF, factory setting: Sin
- tri ..... **tri**angular waveform
- Sin ..... **Sin**us ... sinusoidal waveform (the standard setting for a low-noise, stable arc)
- rEc ..... **rec**tangular waveform with decreased edge steepness, for reducing the noise-levels as against those that occur with the 100% rectangular waveform
- OFF ... 100% rectangular waveform (stable but loud arc)

nEG .... **neg**ative ... negative half-wave tri / Sin / rEc / OFF, factory setting: rEc
- tri ..... **tri**angular waveform (recommended for welding fillet-welds)
- Sin ..... **Sin**us ... sinusoidal waveform
- rEc ..... **rec**tangular waveform with decreased edge steepness, for reducing the noise-levels as against those that occur with the 100% rectangular waveform
- OFF ... 100% rectangular waveform (stable but loud arc)

Level 2: Rod-electrode set-up parameters

Select "Parameter 2nd"

- Press the "Mode" button (1) to select the "Rod-electrode (MMA) welding" mode (5)



- While pressing and holding the Set button (13), press the "Mode" button (1)
- The first set-up parameter is displayed (e.g. "HCU")

Important! The first parameter to be displayed is always the one that was the last to be selected the last time the set-up menu was accessed.

- Select the set-up parameter "2nd" with the parameter selection buttons (8) and (9).

Accessing

Once the set-up parameter "2nd" has been selected:
- While pressing and holding the Set button (13), press the "Mode" button (1)
- The first set-up parameter of Level 2 is displayed (e.g. "ASt")

Important! The first parameter to be displayed is always the one that was the last to be selected the last time the set-up menu was accessed.

Selecting and altering the set-up parameter

- Select the desired set-up parameter with the parameter selection buttons (8) and (9).
- Alter the value of the set-up parameter with the adjusting dial (7)

Exiting and saving

- Press the Set button (13) twice

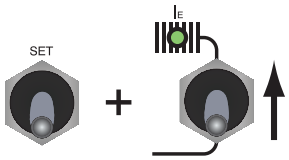
Available set-up parameters

ASt ..... **A**nti-**St**ick ... On / OFF ... factory setting: On
See the section headed: "Rod electrode (MMA) welding"

ELn .... **E**lectrode-**l**i**n**e ... characteristic-selection function ... con / 0.1 - 20 / P
Factory setting: con
See the section headed: "Rod electrode (MMA) welding"

Special function

Indicating the software version



Indicating the software version:
While pressing and holding the Set button (13), press the parameter selection button (8). The software version now appears on the displays. To exit, press the Set button (13) again.

Troubleshooting

General remarks

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

Warning! An electric shock can be fatal. Before opening up the machine
- Shift the mains switch into the "OFF" position
- Unplug the 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 earthing (grounding) the housing and must NOT be replaced by any other screws which do not provide a reliable PE conductor connection.

Displayed service codes

If any error message that is not described here appears on the displays, 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, giving them a detailed description of the error.

no | Prg

Cause: No pre-programmed program has been selected
Remedy: Select a pre-programmed program

tP1 | xxx, tP2 | xxx, tP3 | xxx, tP4 | xxx, tP5 | xxx, tP6 | xxx

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

Displayed service codes
(continued)

tS1 | xxx, tS2 | xxx, tS3 | xxx

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

tSt | xxx

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

Err | 051

Cause: Mains undervoltage: The mains voltage has dropped below the tolerance range (see chapter “Technical data”)
Remedy: Check the mains voltage

Err | 052

Cause: Mains overvoltage: The mains voltage has risen above the tolerance range (see chapter “Technical data”)
Remedy: Check the mains voltage

no | IGn

Cause: “Ignition time-out” function is active: No current started flowing before the end of the time specified in the set-up menu. The safety cut-out of the power source has been triggered.
Remedy: Press the torch trigger repeatedly; clean the surface of the workpiece; if necessary, increase the time-period specified in “Set-up menu: Level 2” before the safety cut-out is triggered.

Err | IP

Cause: Primary overcurrent
Remedy: Contact After-Sales Service

Err | bPS

Cause: Fault in power module
Remedy: Contact After-Sales Service

dSP | Axx, dSP | Cxx, dSP | Exx, dSP | Sy, dSP | nSy

Cause: Fault in central control and regulation unit
Remedy: Contact After-Sales Service

no | Arc

Cause: Arc-break
Remedy: Press the torch trigger repeatedly; clean the surface of the workpiece

no | H2O

Cause: Cooling-unit flow watchdog has been triggered
Remedy: Check the cooling unit; if necessary, top up the coolant and/or vent the water forward-flow hose as described in “Putting the cooling unit into service”

hot | H2O

Cause: Thermostat on cooling unit has been tripped
Remedy: Wait until the end of the cooling phase, i.e. until “Hot | H2O” is no longer displayed. Automatic interface AUT 2: Before resuming welding, initialise the “Source error reset” signal.

Displayed service codes
(continued)

-St | oP- (where the power source is being operated with a robot interface)

Cause: Robot not ready
Remedy: Initialise “Robot ready” signal, initialise “Source error reset” signal (N.B. “Source error reset” only available in conjunction with Automatic interface AUT 2)

GB

CastoTIG 1702 / 2202 AC/DC, CastoTIG 2201 DC power source

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

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

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

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

Cause: Mains fuse is faulty
Remedy: Change the mains fuse

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

Cause: Overloading; the duty cycle has been exceeded
Remedy: Do not exceed the duty cycle

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

Cause: The fan in the power source is defective
Remedy: Change the fan

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

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

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

The machine does not function when the torch trigger is pressed
Mains switch is ON and indicators are lit up

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

Cause: The welding torch or torch control lead is defective
Remedy: Exchange the torch

No shielding gas
All other functions are OK

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

Cause: The gas pressure regulator is faulty
Remedy: Change the gas pressure regulator

CastoTIG 1702 / 2202 AC/DC, CastoTIG 2201 DC
(continued)

Cause: The gas hose is not mounted, or is damaged
Remedy: Mount / change the gas hose

Cause: The welding torch is defective
Remedy: Change the welding torch

Cause: The gas solenoid valve is defective
Remedy: Change the gas solenoid valve

Poor welding properties

Cause: Incorrect welding parameters
Remedy: Check the settings

Cause: Incorrect earth (ground) connection
Remedy: Check the earth (ground) connection and the clamp for correct polarity

---

The welding torch becomes very hot

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

Cause: Only on water-cooled machines: Water through-flow is insufficient
Remedy: Check the coolant level, through-flow rate, cleanliness of coolant etc. If the coolant pump is blocked: Use a screwdriver - placed on the bushing - to turn the shaft of the coolant pump.

Cause: Only on water-cooled machines: The set-up parameter C-C is set to "OFF".
Remedy: In the set-up menu, set parameter C-C to "Aut" or "ON" position.

Care, maintenance and disposal

General remarks

Under normal operating conditions the power source requires only a minimum of care and maintenance. However, it is indispensable to follow some important points to ensure the operationality of the welding machine for many years.

Warning! An electric shock can be fatal. Before opening up the machine
- Shift the mains switch into the "OFF" position
- Unplug the 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

Every start-up

- Check mains plug, mains cable, welding torch, interconnection cable assembly and bondings for damage
- Check whether the allround distance of 0.5 m (1.6 ft.) is kept to ensure that the cooling air can easily flow and escape.

Note! Furthermore, air inlets and outlets must in no case be covered, not even covered partly.

Every 2 months

- Optional: clean air filter

Every 6 months

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

Note! Risk of damage to electronic components. Clean electronic components from a certain distance only.

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

Disposal

Carry out disposal in accordance with the valid national and local regulations.

Technical data

Special voltages

Note! Inadequately dimensioned electrical installations can lead to serious damage. The mains supply lead, and its fuse protection, must be dimensioned accordingly. The technical data shown on the rating plate shall apply.

CastoTIG 1702 AC/DC / 2202 AC/DC

		1702 AC/DC	**2202 AC/DC**
Mains voltage		230 V	230 V
Mains voltage tolerance		-20% / +15%	-20% / +15%
Mains fuse protection (slow-blow)		16 A	16 A
Primary contin. power (100% d.c.)		3.0 kVA	3.0 kVA
Cos phi		0.99	0.99
Welding current range			
WIG		3 - 170 A	3 - 220 A
Elektrode		10 - 140 A	10 - 180 A
Welding current at:			
10 min/25°C (77°F)	35% d.c.	170 A	-
10 min/25°C (77°F)	40% d.c.	-	220 A
10 min/25°C (77°F)	60% d.c.	120 A	180 A
10 min/25°C (77°F)	100% d.c.	100 A	150 A
10 min/40°C (104°F)	30% d.c.	170 A	220 A
10 min/40°C (104°F)	60% d.c.	110 A	160 A
10 min/40°C (104°F)	100% d.c.	90 A	130 A
Open-circuit voltage		90 V	93 V
Working voltage:			
TIG		10.1 - 16.8 V	10.1 - 18.8 V
Rod electrode (MMA)		20.4 - 25.6 V	20.4 - 27.2 V
Degree of protection		IP 23	IP 23
Type of cooling		AF	AF
Insulation class		B	B
Dimensions L x W x H mm (with handle)		500/175/410	500/175/410
Weight		15 kg	17.3 kg
Marks of conformity		S, CE	S, CE

CastoTIG 2201 DC

		2201 DC
Mains voltage		230 V
Mains voltage tolerance		-20% / +15%
Mains fuse protection (slow-blow)		16 A
Primary contin. power (100% d.c.)		2.7 kVA
Cos phi		0.99
Welding current range		
WIG		3 - 220 A
Rod electrode (MMA)		10 - 180 A
Welding current at:		
10 min/25°C (77°F)	50% d.c.	220 A
10 min/25°C (77°F)	60% d.c.	200 A
10 min/25°C (77°F)	100% d.c.	170 A
10 min/40°C (104°F)	35% d.c.	220 A
10 min/40°C (104°F)	60% d.c.	170 A
10 min/40°C (104°F)	100% d.c.	140 A
Open-circuit voltage		84 V
Working voltage:		
TIG		10.1 - 18.8 V
Rod electrode (MMA)		20.4 - 27.2 V
Degree of protection		IP 23
Type of cooling		AF
Insulation class		B
Dimensions L x W x H mm (with handle)		500/175/410
Weight		16.8 kg
Marks of conformity		S, CE

Terms and abbreviations used

General remarks

The terms and abbreviations listed here are used in connection with functions that are either included in the standard scope of supply or that are available as optional extras.

Terms and abbreviations

Arc ..... Arc-break watchdog

ASt ..... Anti-stick ... For reducing the effect of a “sticking” rod electrode (MMA welding)

C-C ..... Cooling unit control

dcY ..... Duty-cycle ... Ratio of pulse duration to background current duration (in TIG-AC welding)

dYn ..... Dynamic ... Arc-force dynamic correction for rod electrode (MMA) welding

ELn ..... Electrode-line ... Characteristic selection (rod electrode [MMA] welding)

F-P ..... Frequency-Pulse ... Pulsing frequency

FAC .... Factory ... for resetting the welding machine

G-L ..... Gas post-flow time low ... Gas post-flow time at minimum welding amperage

G-H ..... Gas post-flow time high ... Gas post-flow time at maximum welding amperage

GPr ..... Gas pre-flow time

HFt ..... High-frequency time ... High-frequency ignition

HCU ... Hot-start current ... (for rod electrode [MMA] welding)

Hti ..... Hot-current time ... (for rod electrode [MMA] welding)

I-E ..... I (current) - End ... Final current

I-S ..... I (current) - Starting ... Starting current

Ito ..... Ignition Time-Out

nEG .... Negative ... Negative half-wave (in TIG-AC welding)

Pos ..... Positive ... Positive half-wave (in TIG-AC welding)

SFS .... Special four-step

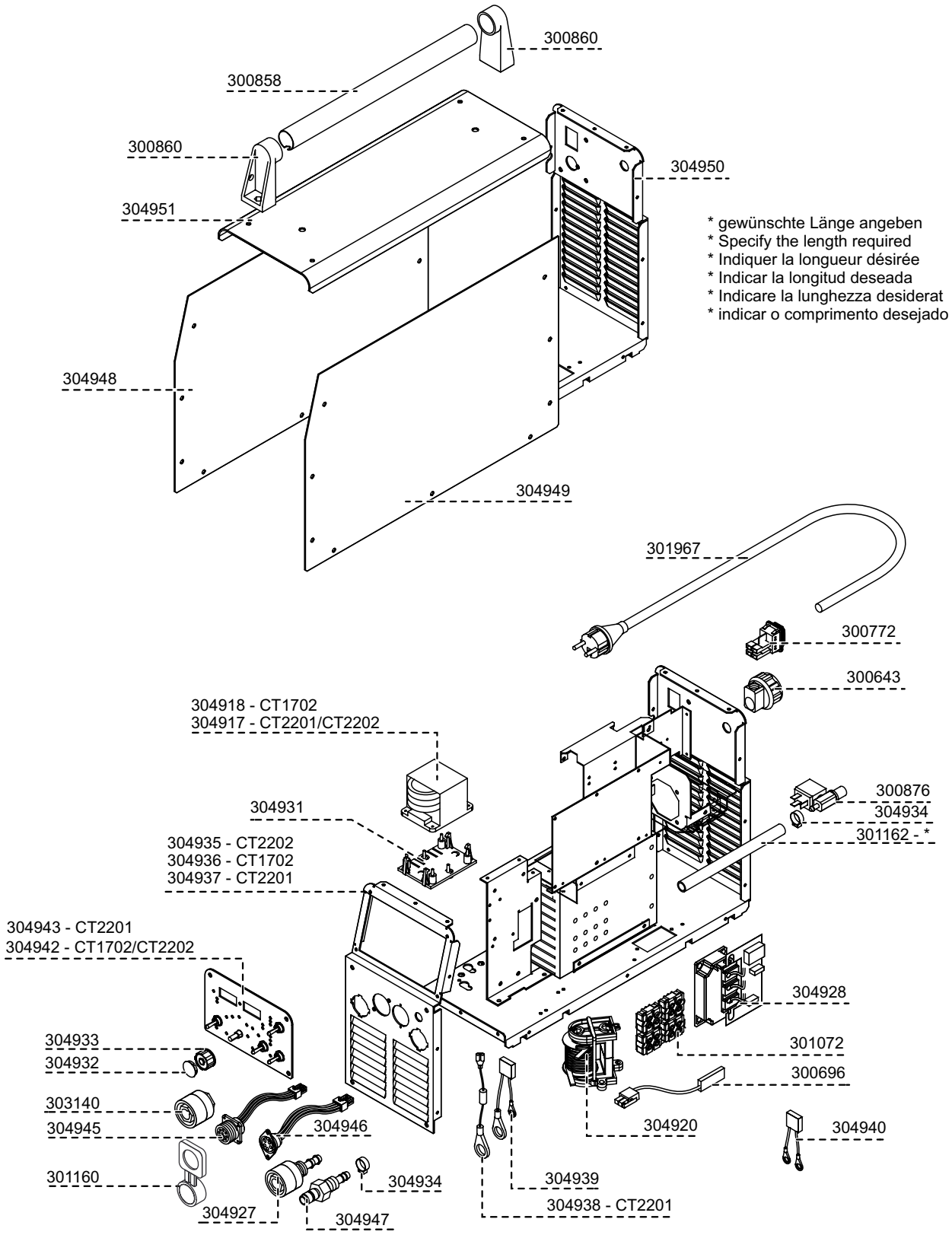
SPt ..... Spot-welding time

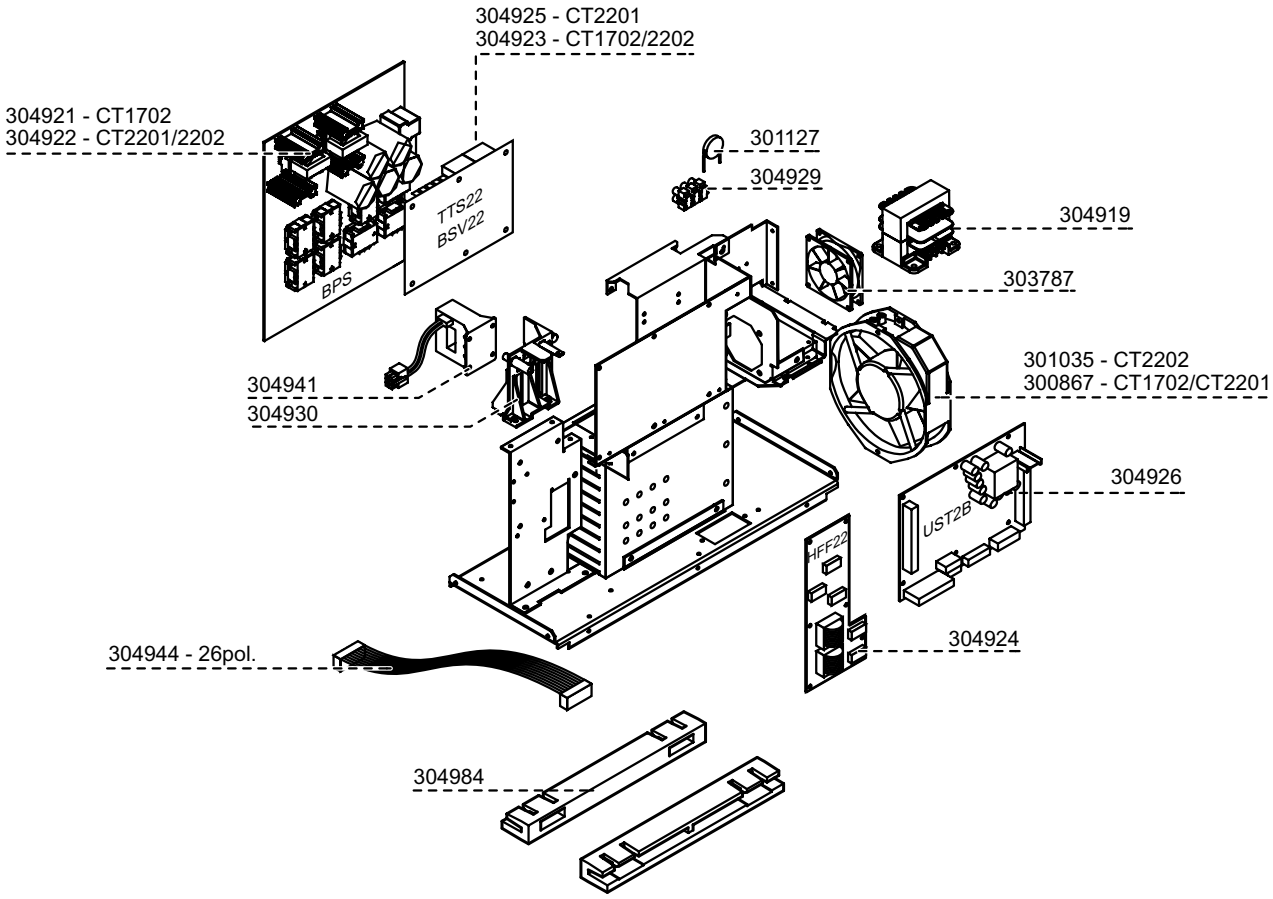
2nd ..... Second level of set-up menu

Schaltplan
Circuit diagram
Schema de connexions
Schemi elettrici
Esquema de conexiones

Ersatzteilliste
Spare parts list
Liste de pièces de rechange
Lista delle parti di ricambio
Lista de repuestos

Castotig 2202 AC/DC	**304902**
Castotig 2201 DC	**304901**
Castotig 1702 AC/DC	**304900**

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304922 - CT2201/2202
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BSV22
BPS
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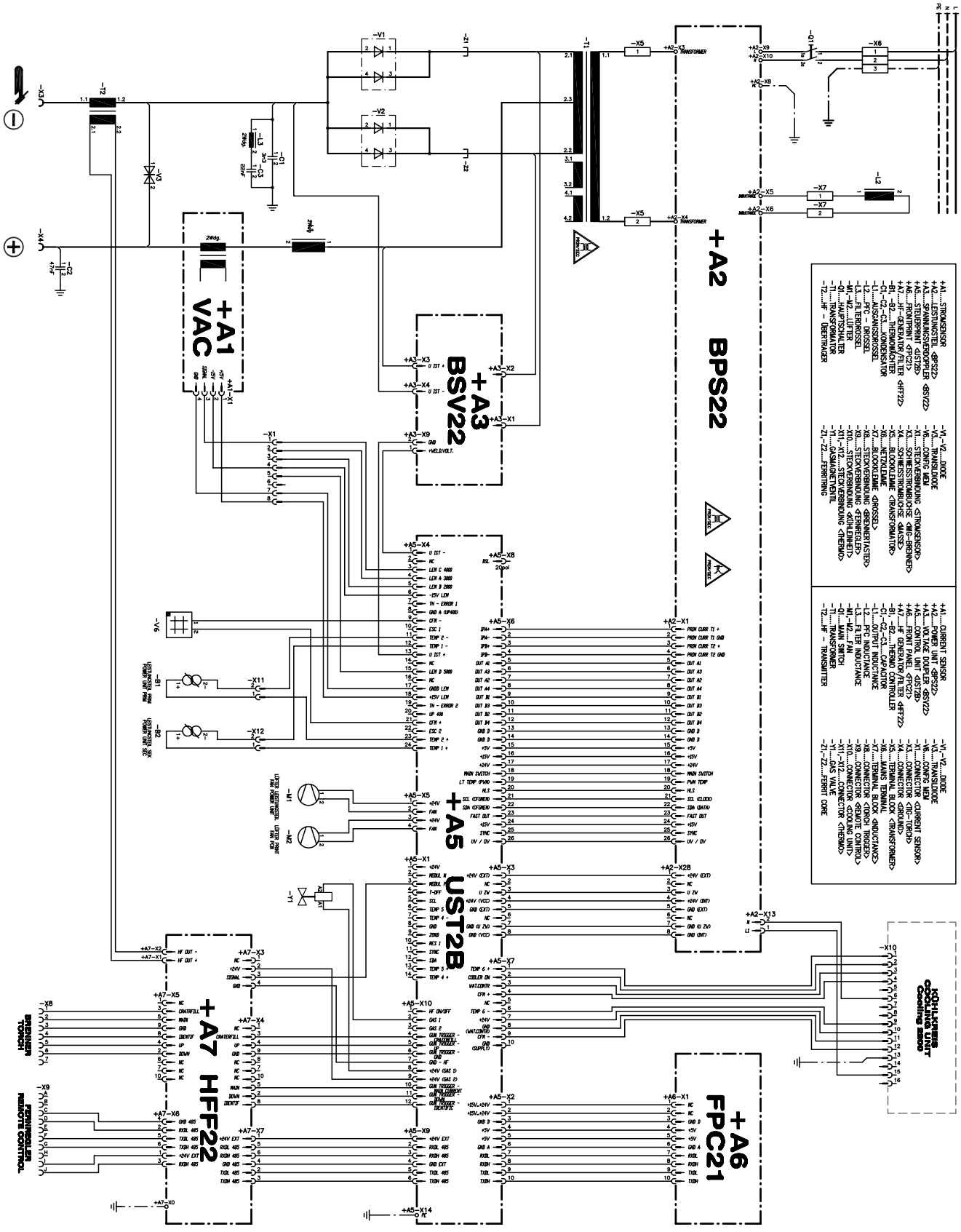
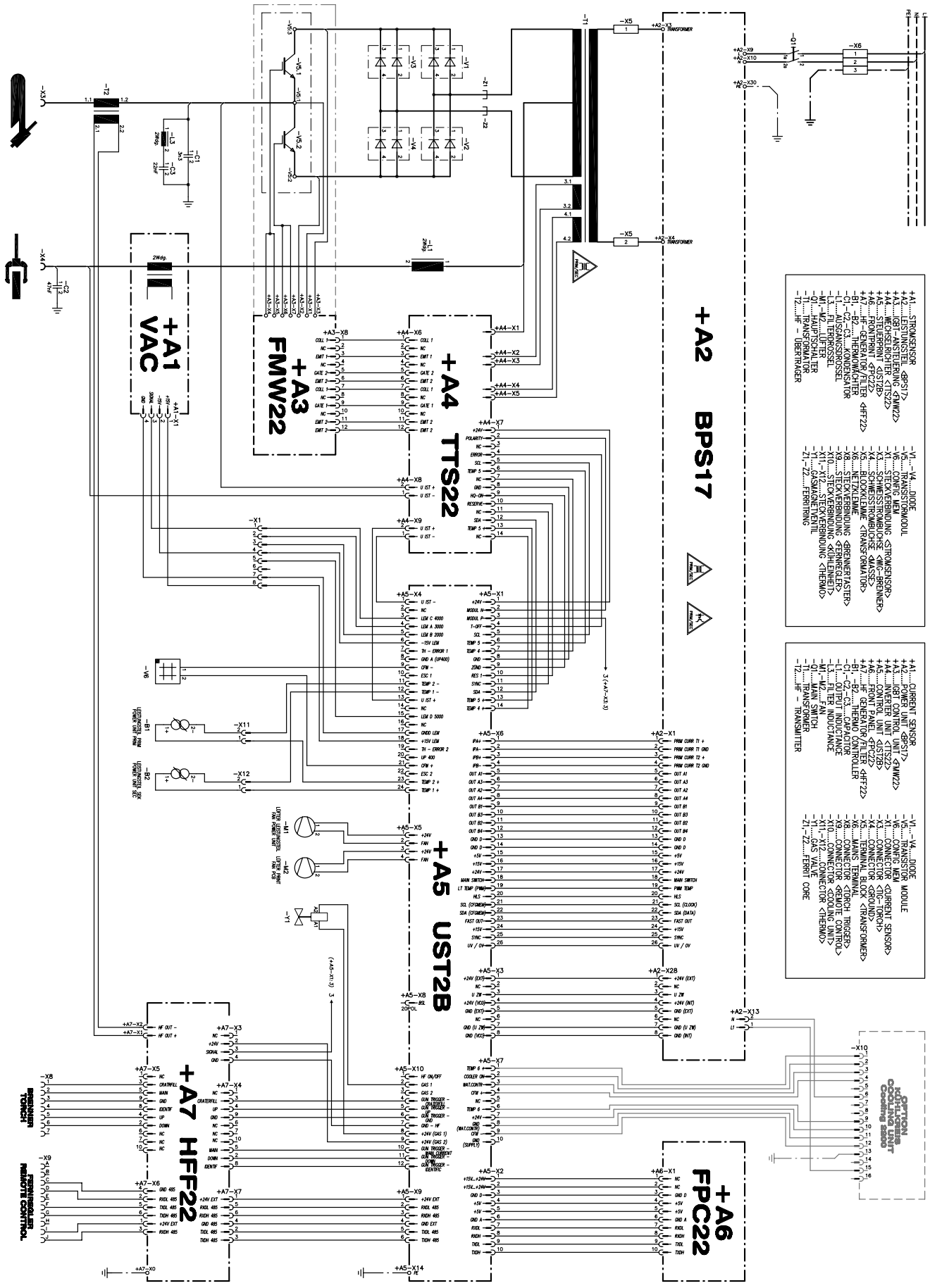
304929
304919
303787
304941
304930
301035 - CT2202
300867 - CT1702/CT2201
304926
UST2B
HFF22
304924
304944 - 26pol.
304984

CastoTIG 2201 DC



CastoTIG 1702 AC/DC



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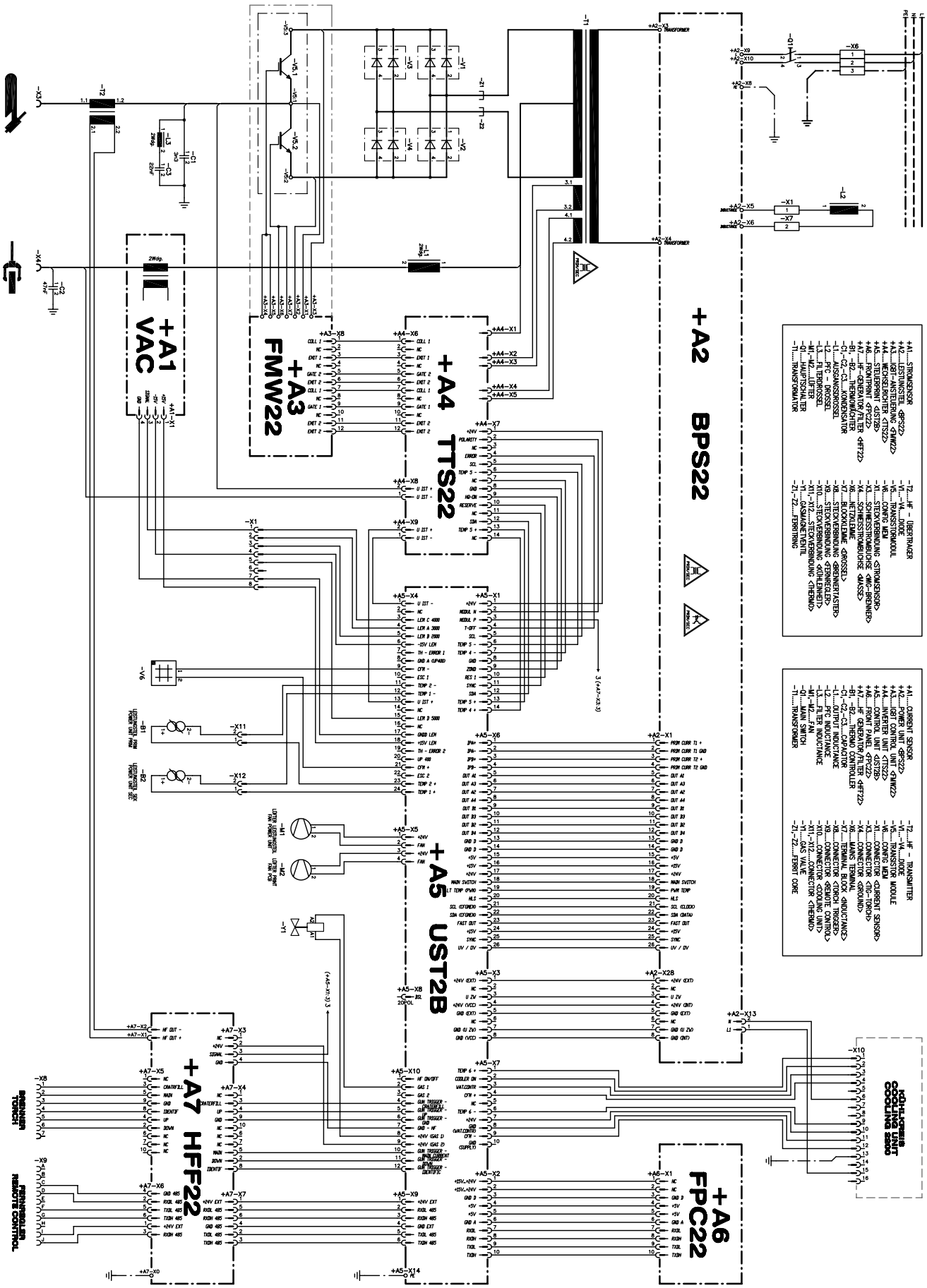

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