



EN

Control

M1.83-B-1

099-M183xB-EW501

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18.7.2022

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General instructions

WARNING



Read the operating instructions!

The operating instructions provide an introduction to the safe use of the products.

- Read and observe the operating instructions for all system components, especially the safety instructions and warning notices!
- Observe the accident prevention regulations and any regional regulations!
- The operating instructions must be kept at the location where the machine is operated.
- Safety and warning labels on the machine indicate any possible risks. Keep these labels clean and legible at all times.
- The machine has been constructed to state-of-the-art standards in line with any applicable regulations and industrial standards. Only trained personnel may operate, service and repair the machine.
- Technical changes due to further development in machine technology may lead to a differing welding behaviour.

In the event of queries on installation, commissioning, operation or special conditions at the installation site, or on usage, please contact your sales partner or our customer service department on +49 2680 181-0.

A list of authorised sales partners can be found at www.ewm-group.com/en/specialist-dealers.

Liability relating to the operation of this equipment is restricted solely to the function of the equipment. No other form of liability, regardless of type, shall be accepted. This exclusion of liability shall be deemed accepted by the user on commissioning the equipment.

The manufacturer is unable to monitor whether or not these instructions or the conditions and methods are observed during installation, operation, usage and maintenance of the equipment.

An incorrectly performed installation can result in material damage and injure persons as a result. For this reason, we do not accept any responsibility or liability for losses, damages or costs arising from incorrect installation, improper operation or incorrect usage and maintenance or any actions connected to this in any way.

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The content of this document has been prepared and reviewed with all reasonable care. The information provided is subject to change; errors excepted.

Data security

The user is responsible for backing up data of all changes from the factory setting. The user is liable for erased personal settings. The manufacturer does not assume any liability for this.

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2 For your safety

2.1 Notes on using these operating instructions

DANGER

Working or operating procedures which must be closely observed to prevent imminent serious and even fatal injuries.

- Safety notes include the "DANGER" keyword in the heading with a general warning symbol.
- The hazard is also highlighted using a symbol on the edge of the page.

WARNING

Working or operating procedures which must be closely observed to prevent serious and even fatal injuries.

- Safety notes include the "WARNING" keyword in the heading with a general warning symbol.
- The hazard is also highlighted using a symbol in the page margin.

CAUTION

Working or operating procedures which must be closely observed to prevent possible minor personal injury.

- The safety information includes the "CAUTION" keyword in its heading with a general warning symbol.
- The risk is explained using a symbol on the edge of the page.



Technical aspects which the user must observe to avoid material or equipment damage.

Instructions and lists detailing step-by-step actions for given situations can be recognised via bullet points, e.g.:

- Insert the welding current lead socket into the relevant socket and lock.

2.2 Explanation of icons

Symbol	Description	Symbol	Description
	Indicates technical aspects which the user must observe.		Activate and release / Tap / Tip
	Switch off machine		Release
	Switch on machine		Press and hold
			Switch
	Incorrect / Invalid		Turn
	Correct / Valid		Numerical value – adjustable
	Input		Signal light lights up in green
	Navigation		Signal light flashes green
	Output		Signal light lights up in red
	Time representation (e.g.: wait 4 s / activate)		Signal light flashes red
	Interruption in the menu display (other setting options possible)		
	Tool not required/do not use		
	Tool required/use		

2.3 Safety instructions

WARNING



Risk of accidents due to non-compliance with the safety instructions!
Non-compliance with the safety instructions can be fatal!

- Carefully read the safety instructions in this manual!
- Observe the accident prevention regulations and any regional regulations!
- Inform persons in the working area that they must comply with the regulations!



Risk of injury from electrical voltage!

Voltages can cause potentially fatal electric shocks and burns on contact. Even low voltages can cause a shock and lead to accidents.

- Never touch live components such as welding current sockets or stick, tungsten or wire electrodes!
- Always place torches and electrode holders on an insulated surface!
- Wear the full personal protective equipment (depending on the application)!
- The machine may only be opened by qualified personnel!
- The device must not be used to defrost pipes!



Hazard when interconnecting multiple power sources!

If a number of power sources are to be connected in parallel or in series, only a technical specialist may interconnect the sources as per standard IEC 60974-9:2010: Installation and use and German Accident Prevention Regulation BVG D1 (formerly VBG 15) or country-specific regulations.

Before commencing arc welding, a test must verify that the equipment cannot exceed the maximum permitted open circuit voltage.

- Only qualified personnel may connect the machine.
- When taking individual power sources out of operation, all mains and welding current leads must be safely disconnected from the welding system as a whole. (Hazard due to reverse polarity voltage!)
- Do not interconnect welding machines with pole reversing switch (PWS series) or machines for AC welding since a minor error in operation can cause the welding voltages to be combined, which is not permitted.



Risk of injury due to radiation or heat!

Arc radiation can lead to skin and eye injuries.

Contact with hot workpieces and sparks can lead to burns.

- Use hand shield or welding helmet with the appropriate safety level (depends on the application).
- Wear dry protective clothing (e.g. hand shield, gloves, etc.) in accordance with the applicable regulations of your country.
- Persons who are not directly involved should be protected with a welding curtain or suitable safety screen against radiation and the risk of blinding!

WARNING



Risk of injury due to improper clothing!

During arc welding, radiation, heat and voltage are sources of risk that cannot be avoided. The user has to be equipped with the complete personal protective equipment at all times. The protective equipment has to include:

- Respiratory protection against hazardous substances and mixtures (fumes and vapours); otherwise implement suitable measures such as extraction facilities.
- Welding helmet with proper protection against ionizing radiation (IR and UV radiation) and heat.
- Dry welding clothing (shoes, gloves and body protection) to protect against warm environments with conditions comparable to ambient temperatures of 100 °C or higher and arcing and work on live components.
- Hearing protection against harming noise.



Explosion risk!

Apparently harmless substances in closed containers may generate excessive pressure when heated.

- Move containers with inflammable or explosive liquids away from the working area!
- Never heat explosive liquids, dusts or gases by welding or cutting!



Fire hazard!

Due to the high temperatures, sparks, glowing parts and hot slag that occur during welding, there is a risk of flames.

- Be watchful of potential sources of fire in the working area!
- Do not carry any easily inflammable objects, e.g. matches or lighters.
- Ensure suitable fire extinguishers are available in the working area!
- Thoroughly remove any residue of flammable materials from the workpiece prior to starting to weld.
- Only further process workpieces after they have cooled down. Do not allow them to contact any flammable materials!

⚠ CAUTION**Smoke and gases!**

Smoke and gases can lead to breathing difficulties and poisoning. In addition, solvent vapour (chlorinated hydrocarbon) may be converted into poisonous phosgene due to the ultraviolet radiation of the arc!

- Ensure that there is sufficient fresh air!
- Keep solvent vapour away from the arc beam field!
- Wear suitable breathing apparatus if appropriate!

**Noise exposure!**

Noise exceeding 70 dBA can cause permanent hearing damage!

- Wear suitable ear protection!
- Persons located within the working area must wear suitable ear protection!



According to IEC 60974-10, welding machines are divided into two classes of electromagnetic compatibility (the EMC class can be found in the Technical data):

Class A machines are not intended for use in residential areas where the power supply comes from the low-voltage public mains network. When ensuring the electromagnetic compatibility of class A machines, difficulties can arise in these areas due to interference not only in the supply lines but also in the form of radiated interference.



Class B machines fulfil the EMC requirements in industrial as well as residential areas, including residential areas connected to the low-voltage public mains network.

**Setting up and operating**

When operating arc welding systems, in some cases, electro-magnetic interference can occur although all of the welding machines comply with the emission limits specified in the standard. The user is responsible for any interference caused by welding.

In order to **evaluate** any possible problems with electromagnetic compatibility in the surrounding area, the user must consider the following: (see also EN 60974-10 Appendix A)

- Mains, control, signal and telecommunication lines
- Radios and televisions
- Computers and other control systems
- Safety equipment
- The health of neighbouring persons, especially if they have a pacemaker or wear a hearing aid
- Calibration and measuring equipment
- The immunity to interference of other equipment in the surrounding area
- The time of day at which the welding work must be carried out

Recommendations for reducing interference emission

- Mains connection, e.g. additional mains filter or shielding with a metal tube
- Maintenance of the arc welding system
- Welding leads should be as short as possible and run closely together along the ground
- Potential equalization
- Earthing of the workpiece. In cases where it is not possible to earth the workpiece directly, it should be connected by means of suitable capacitors.
- Shielding from other equipment in the surrounding area or the entire welding system

**Electromagnetic fields!**

The power source may cause electrical or electromagnetic fields to be produced which could affect the correct functioning of electronic equipment such as IT or CNC devices, telecommunication lines, power cables, signal lines and pacemakers.



- Observe the maintenance instructions > see 6 chapter!
- Unwind welding leads completely!
- Shield devices or equipment sensitive to radiation accordingly!
- The correct functioning of pacemakers may be affected (obtain advice from a doctor if necessary).

CAUTION



Obligations of the operator!

The respective national directives and laws must be complied with when operating the machine!

- Implementation of national legislation relating to framework directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work and associated individual guidelines.
- In particular, directive 89/655/EEC concerning the minimum safety and health requirements for the use of work equipment by workers at work.
- The regulations applicable to occupational safety and accident prevention in the country concerned.
- Setting up and operating the machine as per IEC 60974.-9.
- Brief the user on safety-conscious work practices on a regular basis.
- Regularly inspect the machine as per IEC 60974.-4.



The manufacturer's warranty becomes void if non-genuine parts are used!

- ***Only use system components and options (power sources, welding torches, electrode holders, remote controls, spare parts and replacement parts, etc.) from our range of products!***
- ***Only insert and lock accessory components into the relevant connection socket when the machine is switched off.***

Requirements for connection to the public mains network

High-performance machines can influence the mains quality by taking current from the mains network. For some types of machines, connection restrictions or requirements relating to the maximum possible line impedance or the necessary minimum supply capacity at the interface with the public network (Point of Common Coupling, PCC) can therefore apply. In this respect, attention is also drawn to the machines' technical data. In this case, it is the responsibility of the operator, where necessary in consultation with the mains network operator, to ensure that the machine can be connected.

2.4 Transport and installation

WARNING



Risk of injury due to improper handling of shielding gas cylinders!

Improper handling and insufficient securing of shielding gas cylinders can cause serious injuries!

- Observe the instructions from the gas manufacturer and any relevant regulations concerning the use of compressed air!
- Do not attach any element to the shielding gas cylinder valve!
- Prevent the shielding gas cylinder from heating up.

⚠ CAUTION



Risk of accidents due to supply lines!

During transport, attached supply lines (mains leads, control cables, etc.) can cause risks, e.g. by causing connected machines to tip over and injure persons!

- Disconnect all supply lines before transport!



Risk of tipping!

There is a risk of the machine tipping over and injuring persons or being damaged itself during movement and set up. Tilt resistance is guaranteed up to an angle of 10° (according to IEC 60974-1).

- Set up and transport the machine on level, solid ground.
- Secure add-on parts using suitable equipment.



Risk of accidents due to incorrectly installed leads!

Incorrectly installed leads (mains, control and welding leads or intermediate hose packages) can present a tripping hazard.

- Lay the supply lines flat on the floor (avoid loops).
- Avoid laying the leads on passage ways.



Risk of injury from heated coolant and its connections!

The coolant used and its connection or connection points can heat up significantly during operation (water-cooled version). When opening the coolant circuit, escaping coolant may cause scalding.

- Open the coolant circuit only when the power source or cooling unit is switched off!
- Wear proper protective equipment (protective gloves)!
- Seal open connections of the hose leads with suitable plugs.



The units are designed for operation in an upright position!

Operation in non-permissible positions can cause equipment damage.

- ***Only transport and operate in an upright position!***



Accessory components and the power source itself can be damaged by incorrect connection!

- ***Only insert and lock accessory components into the relevant connection socket when the machine is switched off.***
- ***Comprehensive descriptions can be found in the operating instructions for the relevant accessory components.***
- ***Accessory components are detected automatically after the power source is switched on.***



Protective dust caps protect the connection sockets and therefore the machine against dirt and damage.

- ***The protective dust cap must be fitted if there is no accessory component being operated on that connection.***
- ***The cap must be replaced if faulty or if lost!***

3 Intended use

WARNING



Hazards due to improper usage!

The machine has been constructed to the state of the art and any regulations and standards applicable for use in industry and trade. It may only be used for the welding procedures indicated at the rating plate. Hazards may arise for persons, animals and material objects if the equipment is not used correctly. No liability is accepted for any damages arising from improper usage!

- The equipment must only be used in line with its designated purpose and by trained or expert personnel!
- Do not improperly modify or convert the equipment!

3.1 Use and operation solely with the following machines

This description may only be applied to machines with the machine control M1.83-B-1 (Picomig Synergic TKG).

3.2 Software version

The software version of the machine control can be displayed in the machine configuration menu (menu Srv) > see 5.5 chapter.

3.3 Documents which also apply

3.3.1 Warranty

For more information refer to the "Warranty registration" brochure supplied and our information regarding warranty, maintenance and testing at www.ewm-group.com!

3.3.2 Declaration of Conformity



This product corresponds in its design and construction to the EU directives listed in the declaration. The product comes with a relevant declaration of conformity in the original.

The manufacturer recommends carrying out the safety inspection according to national and international standards and guidelines every 12 months.

3.3.3 Welding in environments with increased electrical hazards



Power sources with this marking can be used for welding in an environment with increased electrical hazard (e.g. boilers). For this purpose, appropriate national or international regulations must be followed. The power source must not be placed in the danger zone!

3.3.4 Service documents (spare parts and circuit diagrams)

WARNING



No improper repairs and modifications!

To prevent injuries and damage to the machine, only competent personnel (authorised service personnel) are allowed to repair or modify the machine.

Unauthorised manipulations will invalidate the warranty!

- Instruct competent personnel (authorised service personnel) to repair the machine.

Original copies of the circuit diagrams are enclosed with the unit.

Spare parts can be obtained from the relevant authorised dealer.

3.3.5 Calibration/Validation

An original certificate is enclosed with the product. The manufacturer recommends calibration / validation at intervals of 12 months.

3.3.6 Part of the complete documentation

This document is part of the complete documentation and valid only in combination with all other parts of these instructions! Read and observe the operating instructions for all system components, especially the safety instructions!

The illustration shows a general example of a welding system.

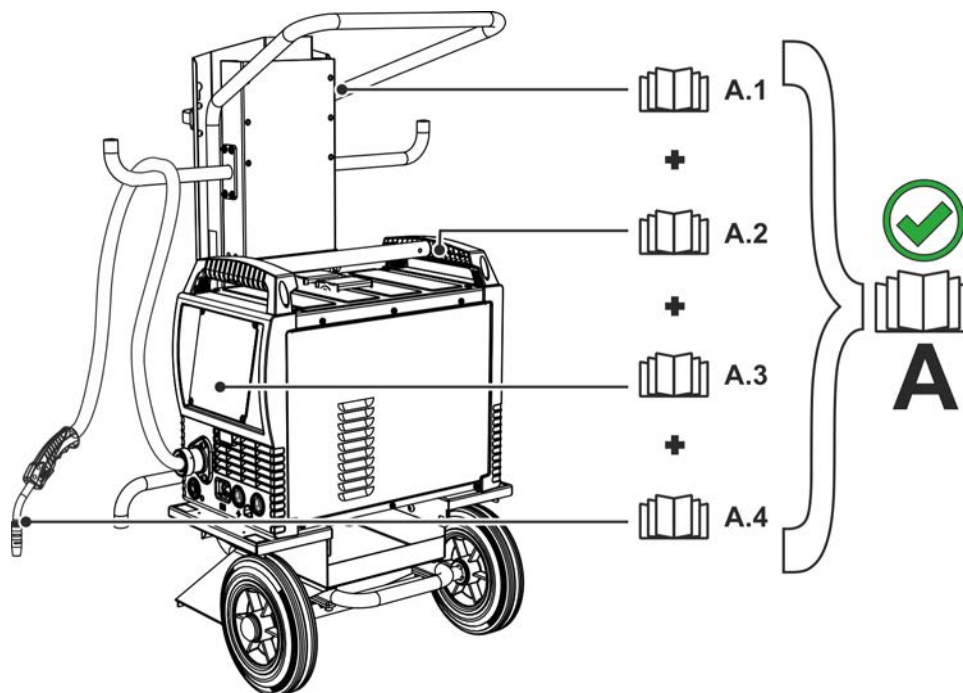


Figure 3-1

Item	Documentation
A.1	Transport cart
A.2	Power source
A.3	Controller
A.4	Welding torch
A	Complete documentation

4 Machine description – quick overview

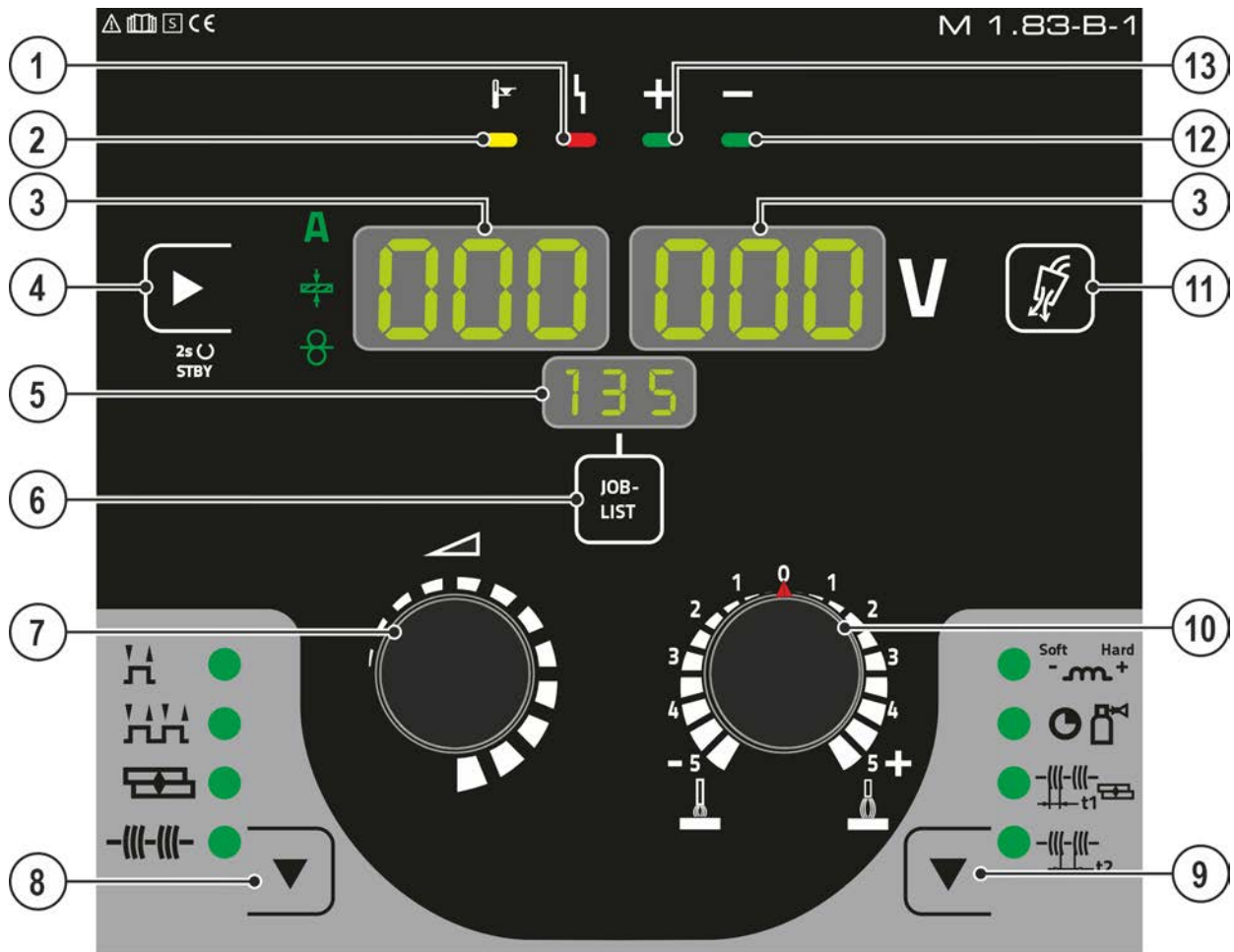


Figure 4-1

Item	Symbol	Description
1		“Collective interference” signal light
2		“Excess temperature” signal light
3		Welding data display (3-digit) Displays the welding parameters and the corresponding values > see 4.1 chapter
4		Push-button for welding parameter display mode / power-saving mode A ----- Welding current + ----- Material thickness ⊗ ----- Wire feed speed Press for 2 s to put the machine into power-saving mode. To reactivate, operate any control element > see 5.6 chapter.
5		Display, JOB Shows the currently selected welding task (JOB number).
6	JOB-LIST	Welding task push-button (JOB) Select the welding task from the welding task list (JOB-LIST). The list can be found inside the protective cap on the wire feeder and in the appendix to these operating instructions.
7		Welding parameter setting dial For setting the welding performance, for selecting the JOB (welding task) and for setting other welding parameters.

Item	Symbol	Description
8		Operating mode button ----- Non-latched ----- Latched ----- Spots ----- Interval
9		Runtime parameters button For selecting the parameters to be set. Also for entering and exiting the menus for advanced settings. ----- Choke effect/dynamics ----- Gas post-flow time ----- Spot time ----- Pause time
10		Rotary knob for correcting the arc length (voltage correction)
11		Push-button gas test / rinse hose package > see 5.1 chapter
12		Signal light polarity setting
13		Signal light polarity setting

4.1 Welding data display

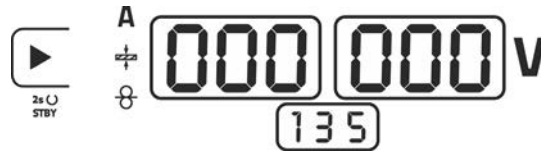


Figure 4-2

The push-button for the welding parameter display mode is next to the display.

Each time the push-button is pressed the display changes to the next parameter. After the last parameter is reached the display continues with the first parameter.

The display shows:

- Nominal values (before welding)
- Actual values (during welding)
- Hold values (after welding)

MIG/MAG

Parameter	Nominal values	Actual values	Hold values
Welding current	<input checked="" type="checkbox"/> / <input type="checkbox"/> [1]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Material thickness	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wire feed speed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Welding voltage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

[1] traditional MIG/MAG

TIG/MMA

Parameter	Nominal values	Actual values	Hold values
Welding current	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Welding voltage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

After the welding, the display switches from hold values to nominal values by

- pressing the push-buttons or turning the rotary knobs of the control
- waiting for about 5 seconds


4.1.1 Polarity setting

The polarity setting displays the polarity required for the selected JOB on the machine control > see 4 chapter. The required polarity can then be set with the polarity selection plug.

5 Functional characteristics

5.1 Gas test – setting the shielding gas volume

If the shielding gas setting is too low or too high, this can introduce air to the weld pool and may cause pores to form. Adjust the shielding gas quantity to suit the welding task!

- Slowly open the gas cylinder valve.
- Open the pressure regulator.
- Switch on the power source at the main switch.
- Set the relevant gas quantity for the application on the pressure regulator.
- Press the push-button “gas test / flush”  to activate the gas test > see 4 chapter.

Shielding gas flows for around 25 seconds or until the button is pressed again.

Repeat rinsing process several times.

Setting instructions

Welding process	Recommended shielding gas quantity
MAG welding	Wire diameter x 11.5 = l/min
MIG brazing	Wire diameter x 11.5 = l/min
MIG welding (aluminium)	Wire diameter x 13.5 = l/min (100 % argon)
TIG	Gas nozzle diameter in mm corresponds to l/min gas throughput

Helium-rich gas mixtures require a higher gas volume!

The table below can be used to correct the gas volume calculated where necessary:

Shielding gas	Factor
75% Ar/25% He	1.14
50% Ar/50% He	1.35
25% Ar/75% He	1.75
100% He	3.16

5.2 MIG/MAG welding

5.2.1 Definition of MIG/MAG welding tasks

This machine range features simple operation with a very wide range of functions.

- JOBS (welding tasks consisting of welding process, type of material, wire diameter and type of shielding gas) are pre-defined for all common welding tasks.
- Simple JOB selection from a list of pre-defined JOBS (sticker on the machine).
- The required process parameters are calculated by the system depending on the operating point specified (single-dial operation via wire speed rotary dial).
- Conventional welding task definition using wire speed and welding voltage is also possible.

The welding task definition described below applies when defining MIG/MAG and cored wire welding tasks.

Pay attention to the signal light for the polarity setting!

It may be necessary to change the welding current polarity depending on the JOB selected or the welding process.

- Reconnect the polarity selection plug if necessary.

5.2.2 Welding task selection

The following steps have to be carried out to select the welding job:

- Select basic parameters (material type, wire diameter and shielding gas type) and welding procedures (select and enter JOB number by means of JOB-List > see 8.1 chapter).
- Select operating and welding type
- Adjust welding power
- Correct arc length and dynamics if necessary
- Adjust expert parameters for special applications

5.2.3 Basic welding parameters

The user must first determine the basic parameters (material type, wire diameter and shielding gas type) of the welding system. These basic parameters are then compared with the welding job list (JOB-LIST). The combination of the basic parameters gives a JOB number, which must now be entered on the control unit. This basic setting must be rechecked or adjusted only when changing the wire or gas.

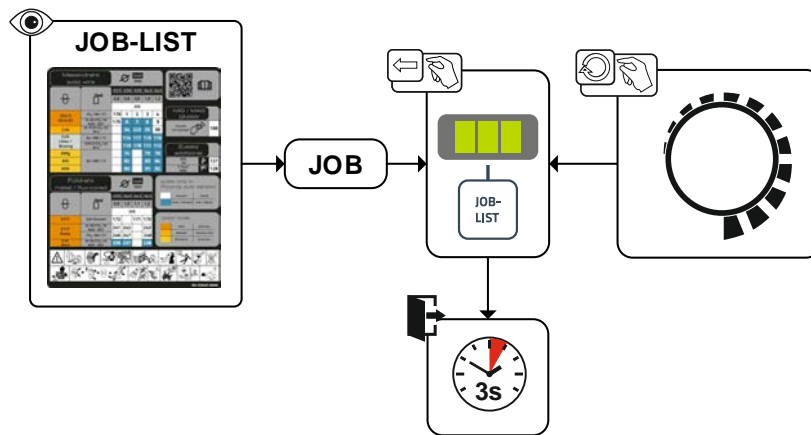


Figure 5-1

The settings for spot time, pause time and wire feed speed apply to all JOBS. All other parameter values are stored separately in each JOB. Changes are permanently saved in the currently selected JOB.

If required, these parameter values can be reset to the factory settings > see 7.5 chapter.

5.2.4 Operating mode

The operating mode determines the process sequence controlled by the welding torch. Detailed descriptions of the operating modes > see 5.2.8 chapter.

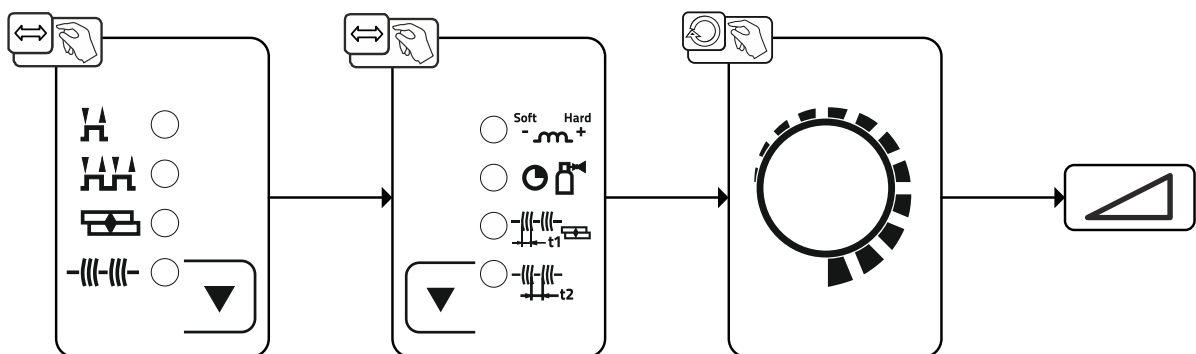


Figure 5-2

5.2.5 Welding power (operating point)

5.2.5.1 Selecting the welding parameter display mode

The operating point (welding power) can be displayed or set as the welding current, material thickness or wire speed.

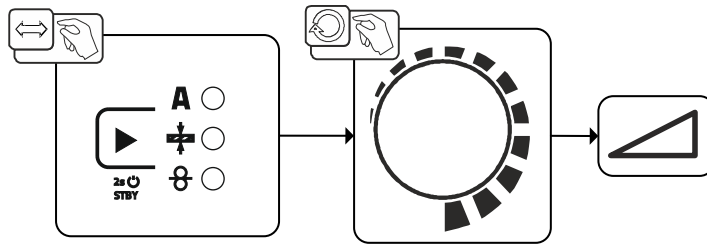


Figure 5-3

5.2.6 Arc length

If required, the arc length (welding voltage) can be corrected from -5 V to +5 V for the individual welding task.

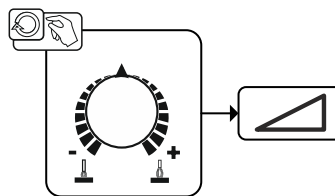


Figure 5-4

The basic settings are now completed. Other welding parameters have already been set optimally in the factory; they can, however, be modified to suit individual requirements.

5.2.7 Arc dynamics (choke effect)

This function can be used to adjust the arc between a narrow, hard arc with deep penetration (positive values) and a wide and soft arc (negative values).

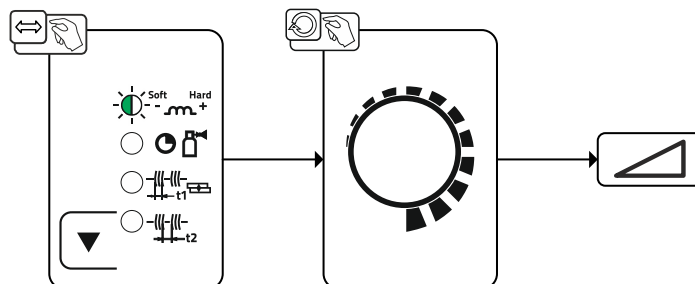
















Figure 5-5

5.2.8 Operating modes (functional sequences)

5.2.8.1 Explanation of signs and functions

Symbol	Meaning
	Press torch trigger
	Release torch trigger
	Shielding gas flowing
	Welding output
	Wire electrode is being conveyed
	Wire creep
	Wire burn-back
	Gas pre-flows
	Gas post-flows
	Non-latched
	Latched
	Time
	Spot time
	Pause time

5.2.8.2 Automatic cut-out

Once the fault periods have elapsed, the automatic cut-out stops the welding process when it has been triggered by one of two states:

- During ignition
5 s after the start of the welding process, no welding current flows (ignition error).
- During welding
The arc is interrupted for more than 5 s (arc interruption).

Non-latched mode

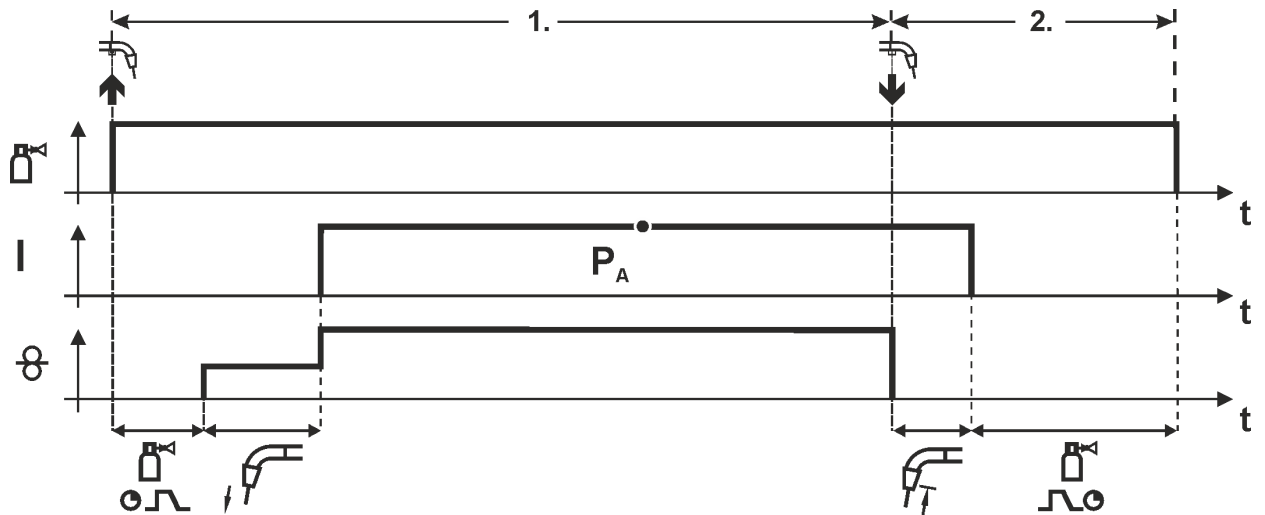


Figure 5-6

Step 1

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows).
- Wire feed motor runs at "creep speed".
- Arc ignites after the wire electrode makes contact with the workpiece; welding current flows.
- Change over to pre-selected wire speed.

Step 2

- Release torch trigger.
- WF motor stops.
- Arc is extinguished after the preselected wire burn-back time expires.
- Gas post-flow time elapses.

Special, non-latched

The activation or setting of this operating mode is described in the chapter Program sequence > see 5.2.9 chapter.

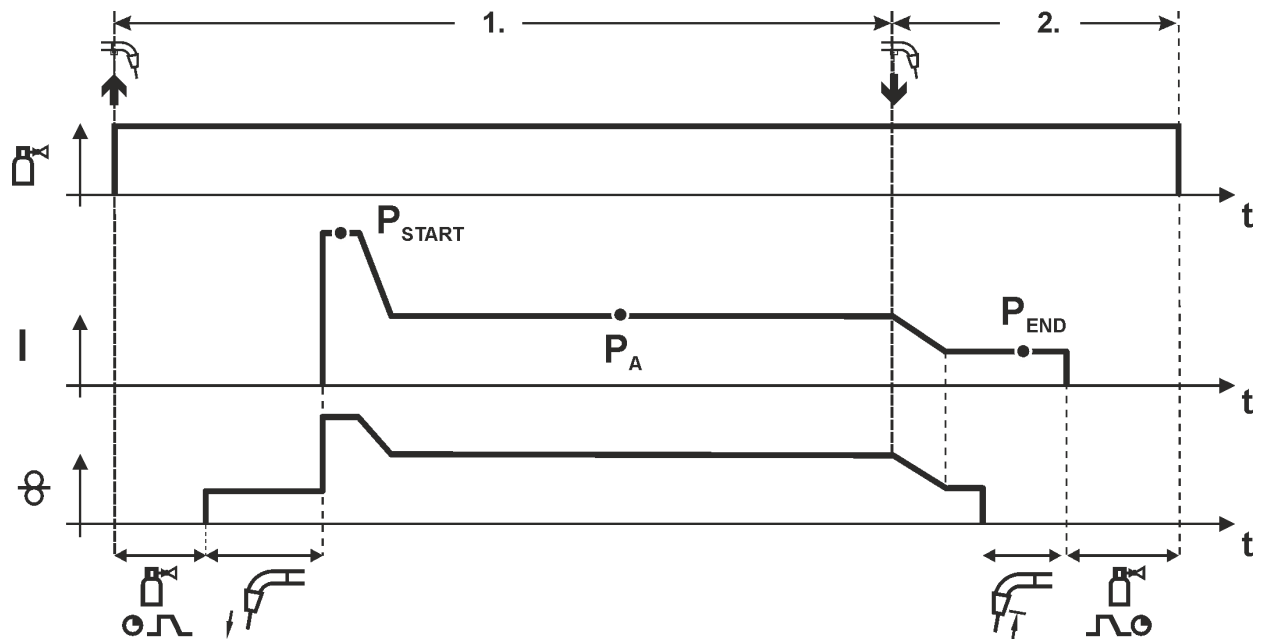


Figure 5-7

Step 1

- Press and hold torch trigger
- Shielding gas is expelled (gas pre-flows)
- Wire feed motor runs at "creep speed".
- Arc ignites after the wire electrode makes contact with the workpiece, welding current is flowing (start program P_{START} for the time t_{start})
- Slope to main program P_A .

Step 2

- Release torch trigger
- Slope to end program P_{END} for the time t_{end} .
- WF motor stops.
- Arc is extinguished after the preselected wire burn-back time expires.
- Gas post-flow time elapses.

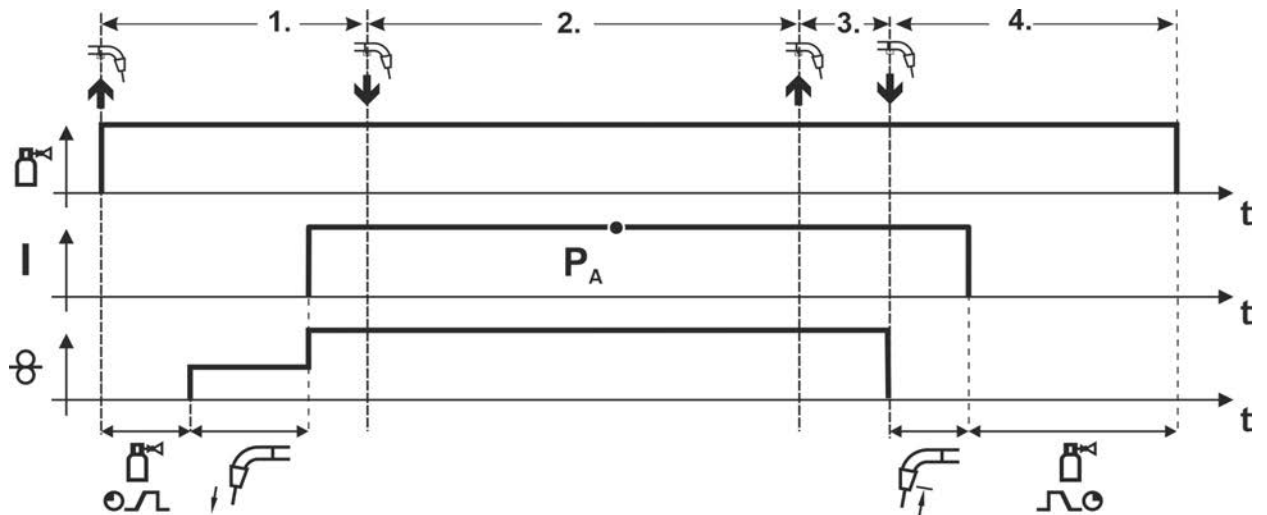
Latched mode


Figure 5-8

1. cycle

- Press and hold torch trigger
- Shielding gas is expelled (gas pre-flows)
- Wire feed motor runs at "creep speed"
- Arc ignites when the wire electrode makes contact with the workpiece
Welding current flows
- Wire feed speed increases to the set nominal value

2. cycle

- Release torch trigger (no effect)

3. cycle

- Press torch trigger (no effect)

4. cycle

- Release torch trigger
- Wire feed motor stops
- Arc is extinguished after the pre-selected wire burn-back time elapses
- Gas post-flow time elapses

Latched special

The activation or setting of this operating mode is described in the chapter Program sequence > see 5.2.9 chapter.

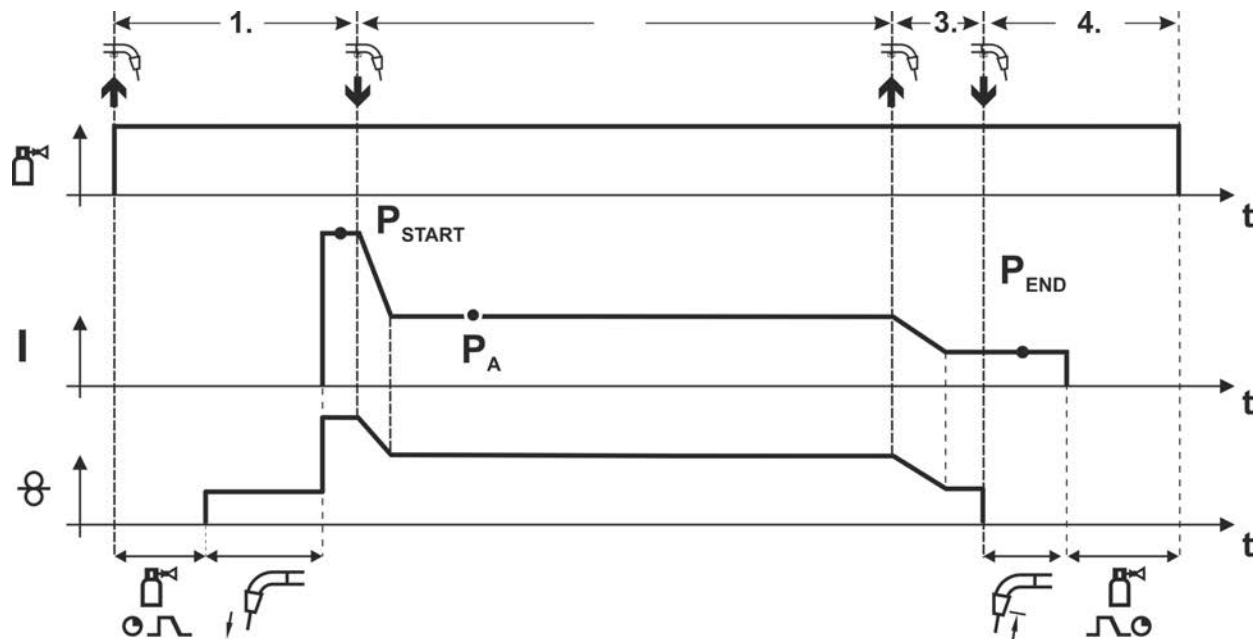


Figure 5-9

1st cycle

- Press and hold torch trigger.
- Shielding gas is flowing (gas pre-flow).
- Wire feed motor runs at "wire creep speed".
- Arc ignites when the wire electrode makes contact with the workpiece, welding current is flowing (start program P_{START}).

2nd cycle

- Release torch trigger.
- Slope to main program P_A .

3rd cycle

- Press and hold torch trigger.
- Slope to end program P_{END} .

4th cycle

- Release torch trigger.
- Wire feed motor stops.
- The arc is extinguished once the wire burn-back time has elapsed.
- Gas post-flow time elapses.

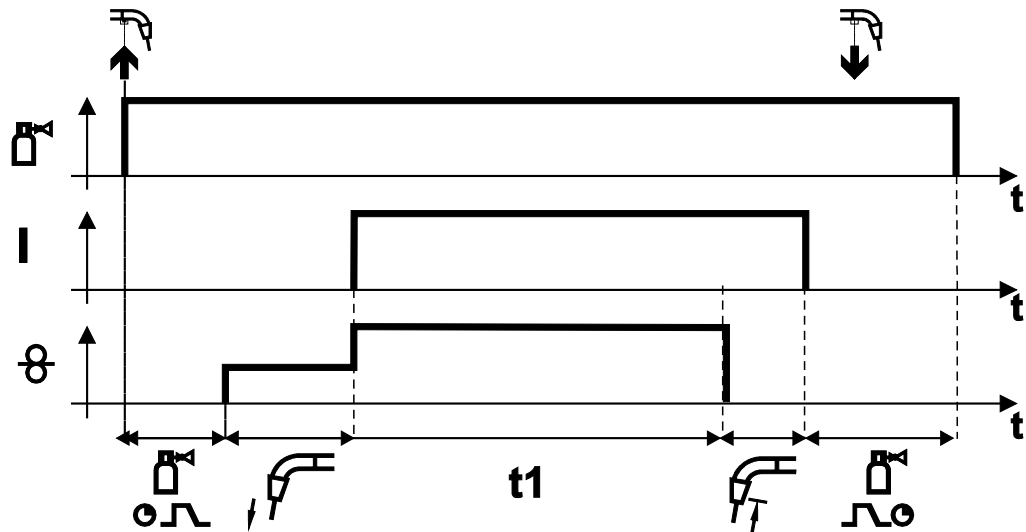
Spot welding


Figure 5-10

Start

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows).
- Arc ignites after the wire electrode makes contact with the workpiece at creep speed.
- Welding current flows.
- Wire feed speed increases to the set nominal value.
- The wire feed stop welding after the spot time elapses.
- Arc is extinguished after the wire burn-back time elapses.
- Gas post-flow time elapses.

Premature termination

- Release torch trigger.

Interval

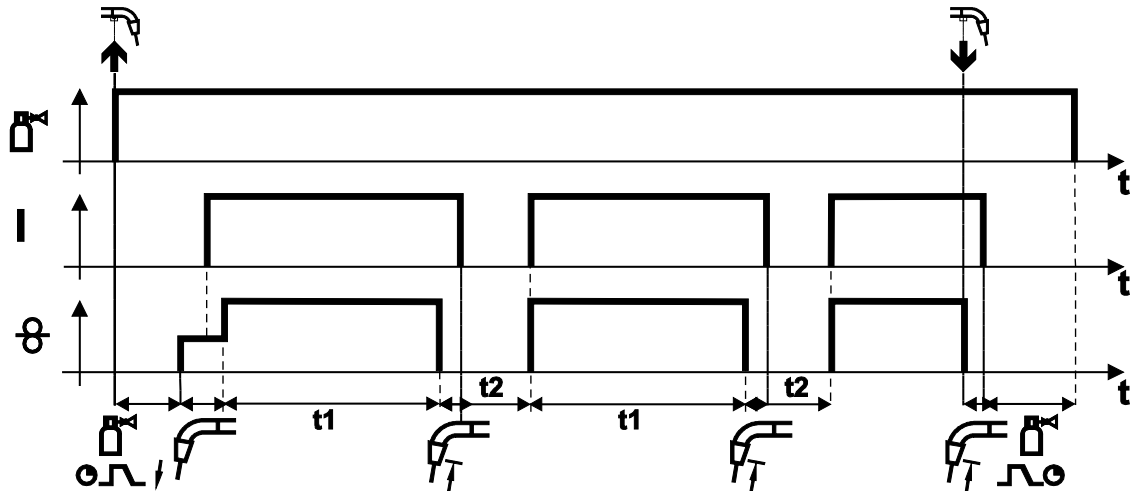


Figure 5-11

Start

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows).

Sequence

- Arc ignites after the wire electrode makes contact with the workpiece at creep speed.
- Welding current flows.
- Wire feed speed increases to the set nominal value.
- The wire feed stops after the spot time elapses.
- Arc is extinguished after the wire burn-back time elapses.
- The process is repeated when the pause time is over.

End

- Release torch trigger, wire feed stops, arc is extinguished, gas post-flow time elapses.

If the pause time is less than 3 s, wire creep only takes place in the first spot phase.

When the torch trigger is released, the welding process is also ended even before the spot time elapses.

5.2.9 Program sequence

Certain materials require additional programs for reliable, high-quality welding. In addition to the main program P_A (continuous welding), a start program P_{START} (prevention of cold welds at the start of the seam) and an end program P_{END} (prevention of end-craters through targeted heat reduction) are used.

By entering a start time t_{SE} and / or end current time t_{EE} , the special operating modes (non-latched or latched special) are activated. Corresponding slope times can also be defined.

The relevant parameters are set in the Expert menu > see 5.2.10 chapter.

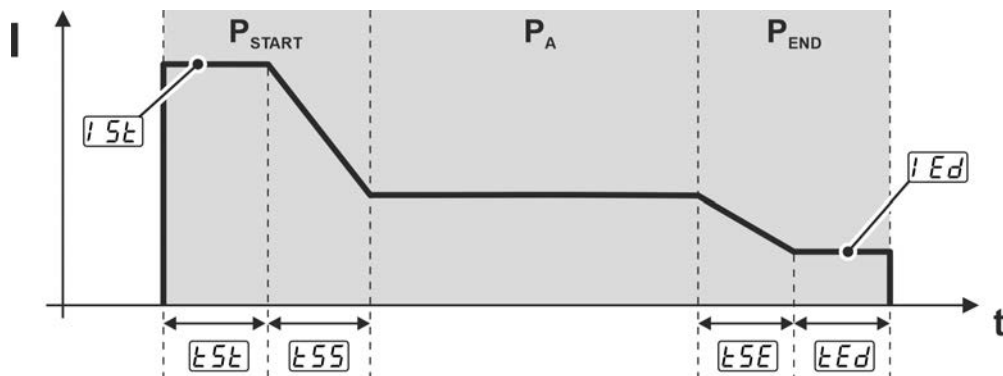


Figure 5-12

Display	Setting/selection
P_{START}	Start program

Display	Setting/selection
P _A	Main program
P _{END}	End program
15t	Start current (as percentage, dependent on main current)
t5t	Start time (duration of start current)
t55	Slope time of start program P _{START} to main program P _A
t5E	Slope time of main program P _A to end program P _{END}
1Ed	End current (as a percentage, dependent on main current)
tEd	End current time (duration of end current)

5.2.10 Expert menu (MIG/MAG)

The Expert menu has adjustable parameters stored that don't require regular setting. The number of parameters shown may be limited, e.g. if a function is deactivated.

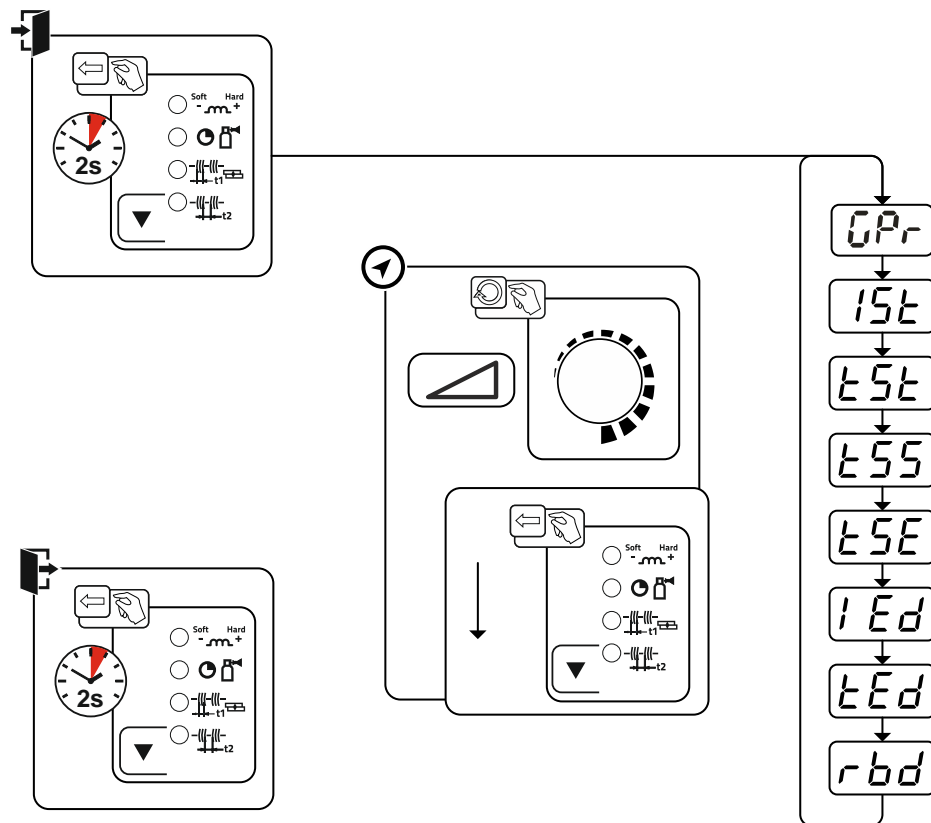


Figure 5-13

Display	Setting/selection
GPr	Gas pre-flow time
15t	Start current (as percentage, dependent on main current)
t5t	Start time (duration of start current)
t55	Slope time of start program P _{START} to main program P _A

Display	Setting/selection
	Slope time of main program P _A to end program P _{END}
	End current (as a percentage, dependent on main current)
	End current time (duration of end current)
	Burn-back correction

5.2.11 Conventional MIG/MAG Welding (GMAW non synergic)

You can only change the JOB number when no welding current is flowing.

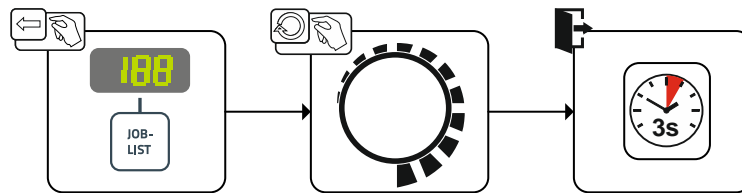


Figure 5-14

5.3 MMA welding

5.3.1 Welding task selection

- Select MMA JOB 128 > see 8.1 chapter.

You can only change the JOB number when no welding current is flowing.

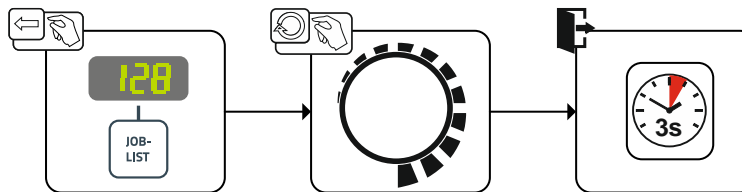


Figure 5-15

5.3.2 Arcforce

During the welding process, arcforce prevents the electrode sticking in the weld pool with increases in current. This makes it easier to weld large-drop melting electrode types at low current strengths with a short arc in particular.

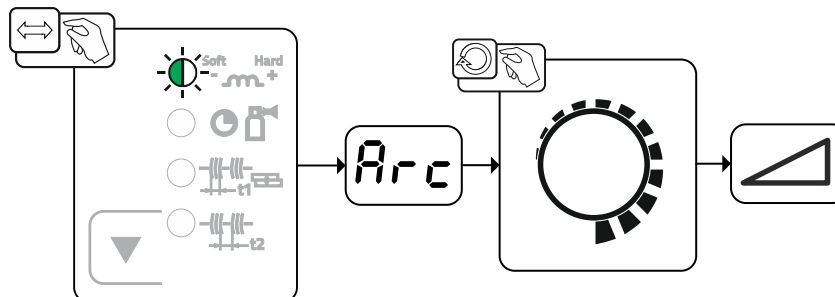


Figure 5-16

Display	Setting/selection
	Arcforce correction <ul style="list-style-type: none"> Increase value > harder arc Decrease value > softer arc

5.3.3 Hotstart

The function hot start ensures a secure igniting of the arc and a sufficient heating to the still cold parent metal at the beginning of the welding process. The ignition takes place here with increased current (hot start current) over a certain time (hot start time).

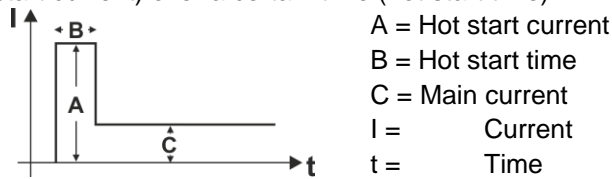


Figure 5-17

5.3.3.1 Hotstart settings

The setting ranges for the parameter values are summarised in the Parameter overview section > see 8.2 chapter.

- Select MMA JOB 128 > see 5.3.1 chapter.

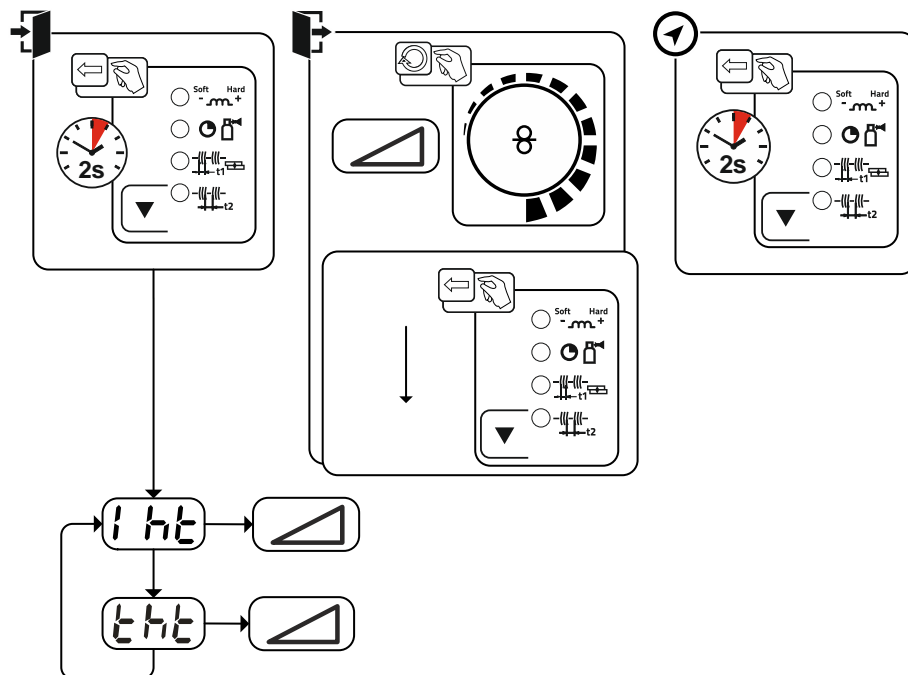
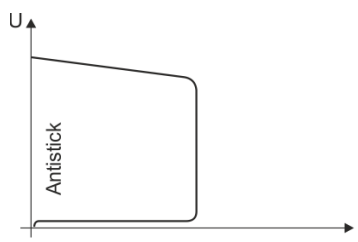


Figure 5-18

Display	Setting/selection
	Hotstart current
	Hotstart time

5.3.4 Antistick



The Antistick feature prevents the electrode from annealing.

Should the electrode stick despite the Arcforce feature, the machine automatically switches to the minimum current within approx. one second. This prevents the electrode from annealing. Check the welding current setting and correct for the welding task in hand.

Figure 5-19

5.4 TIG welding

5.4.1 Welding task selection

- Select TIG JOB 127.

You can only change the JOB number when no welding current is flowing.

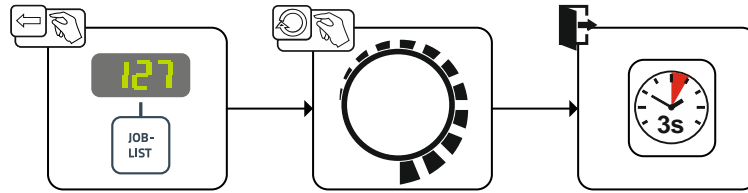


Figure 5-20

5.4.2 Adjusting the gas post-flow time

- Preselection: Select TIG JOB 127 > see 5.4.1 chapter.

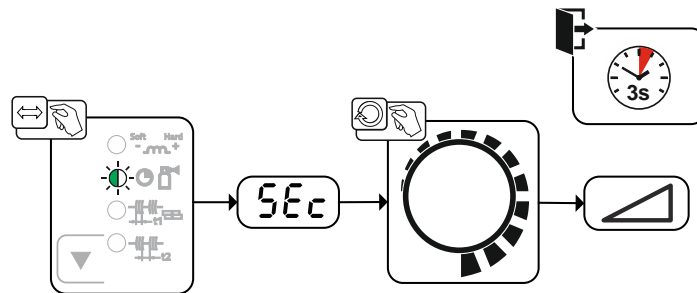


Figure 5-21

Display	Setting/selection
	Gas post-flow time

5.4.3 Expert menu (TIG)

The Expert menu has adjustable parameters stored that don't require regular setting. The number of parameters shown may be limited, e.g. if a function is deactivated.

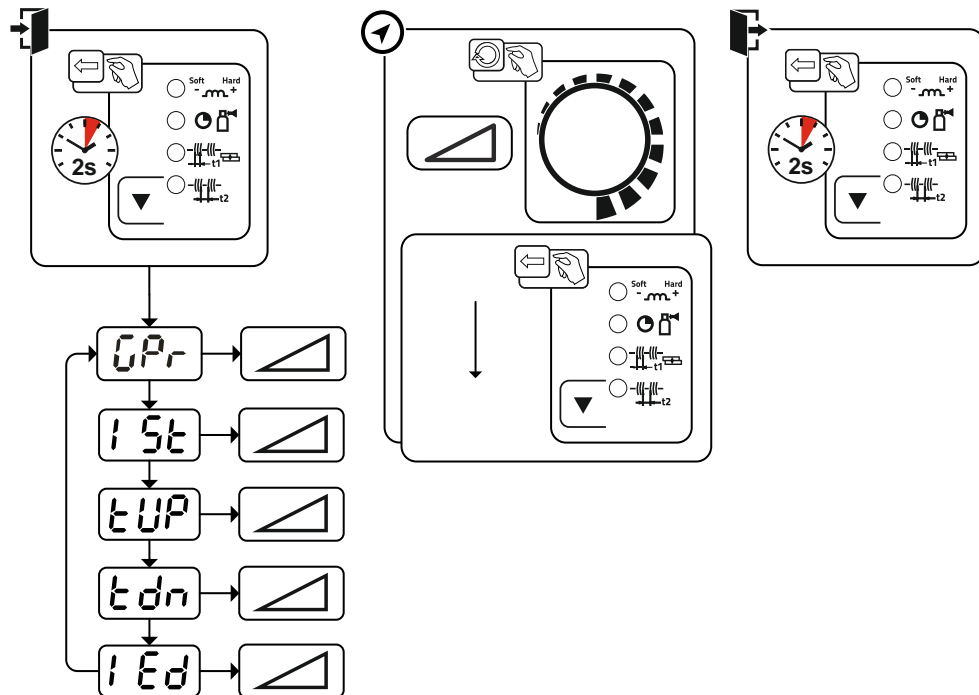


Figure 5-22

Display	Setting/selection
	Gas pre-flow time
	Start current (as percentage, dependent on main current)
	Upslope time to main current
	Downslope time
	End current (as a percentage, dependent on main current)

5.4.4 Arc ignition

5.4.4.1 Liftarc

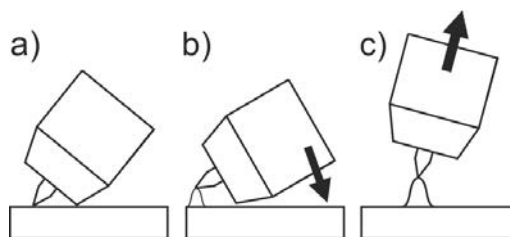


Figure 5-23







The arc ignites through contact with the workpiece:

- Carefully place the torch gas nozzle and tungsten electrode tip against the workpiece (lift arc current flows independent of the set main current)
- Angle the torch above the torch gas nozzle until the distance between electrode tip and workpiece is approx. 2–3 mm (arc ignites, current increases to the set main current).
- Lift the torch off and bring into normal position.

Complete the welding task: Remove the torch from the workpiece so that the arc extinguishes.

5.4.5 Operating modes (functional sequences)

5.4.5.1 Legend

Symbol	Meaning
	Press torch trigger
	Release torch trigger
I	Welding current
	Gas pre-flows
	Gas post-flows
	Non-latched
	Latched
t	Time
t _{Up}	Upslope time
t _{Down}	Downslope time
I _{start}	Start current
I _{end}	End-crater current

5.4.5.2 Automatic cut-out

Once the fault periods have elapsed, the automatic cut-out stops the welding process when it has been triggered by one of two states:

- During ignition
5 s after the start of the welding process, no welding current flows (ignition error).
- During welding
The arc is interrupted for more than 5 s (arc interruption).

Non-latched mode

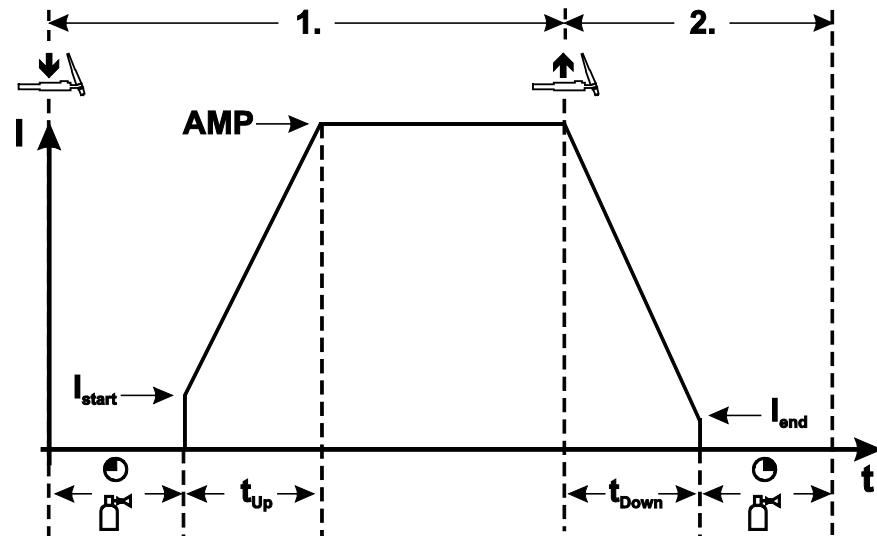


Figure 5-24

1st cycle

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows).

The arc is ignited using liftarc.

- The welding current flows with the value set for the starting current I_{start} .
- Welding current increases to the main current in the set upslope time.

2nd cycle

- Release torch trigger.
- The main current falls in the set downslope time to the end-crater current I_{end} .

If the torch trigger is pressed again during the downslope time, the welding current returns to the set main current!

- The main current reaches the end-crater current I_{end} , the arc extinguishes.
- Gas post-flow time elapses.

Latched mode

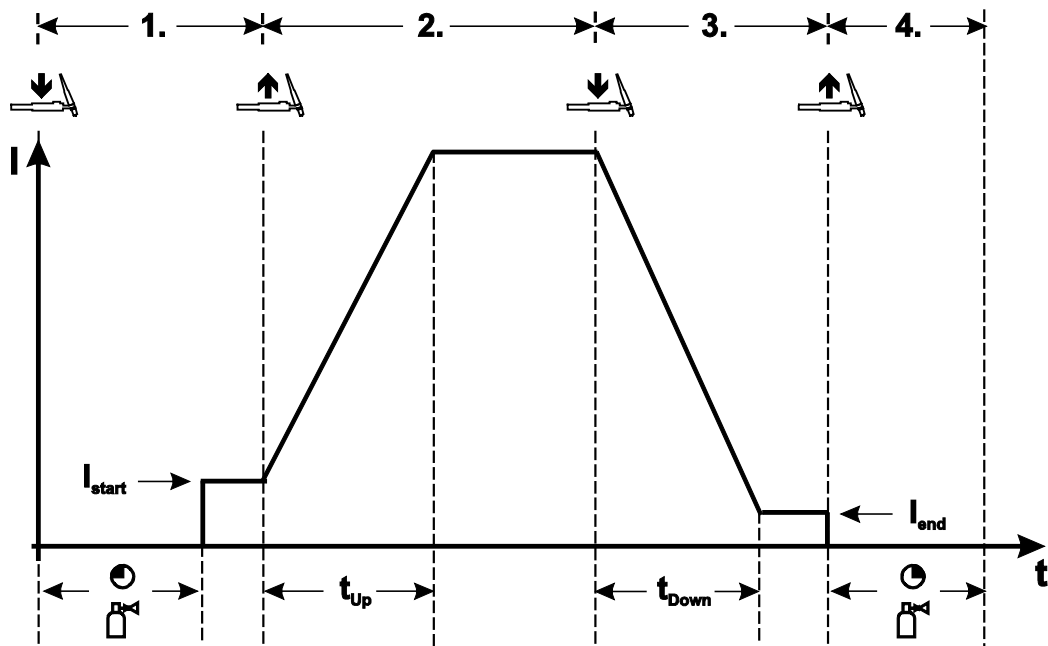


Figure 5-25

1st cycle

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows).

The arc is ignited using liftarc.

- The welding current flows with the value set for the starting current I_{start} .

2nd cycle

- Release torch trigger.
- Welding current increases to the main current in the set upslope time.

3rd cycle

- Press and hold torch trigger.
- The main current falls in the set downslope time to the end-crater current I_{end} .

4th cycle

- Release torch trigger, arc is extinguished.
- Gas post-flow time elapses.

The welding process is terminated immediately if the torch trigger is released during the downslope time.

The welding current drops to zero and the gas post-flow time begins.

5.5 Machine configuration menu

5.5.1 Selecting, changing and saving parameters

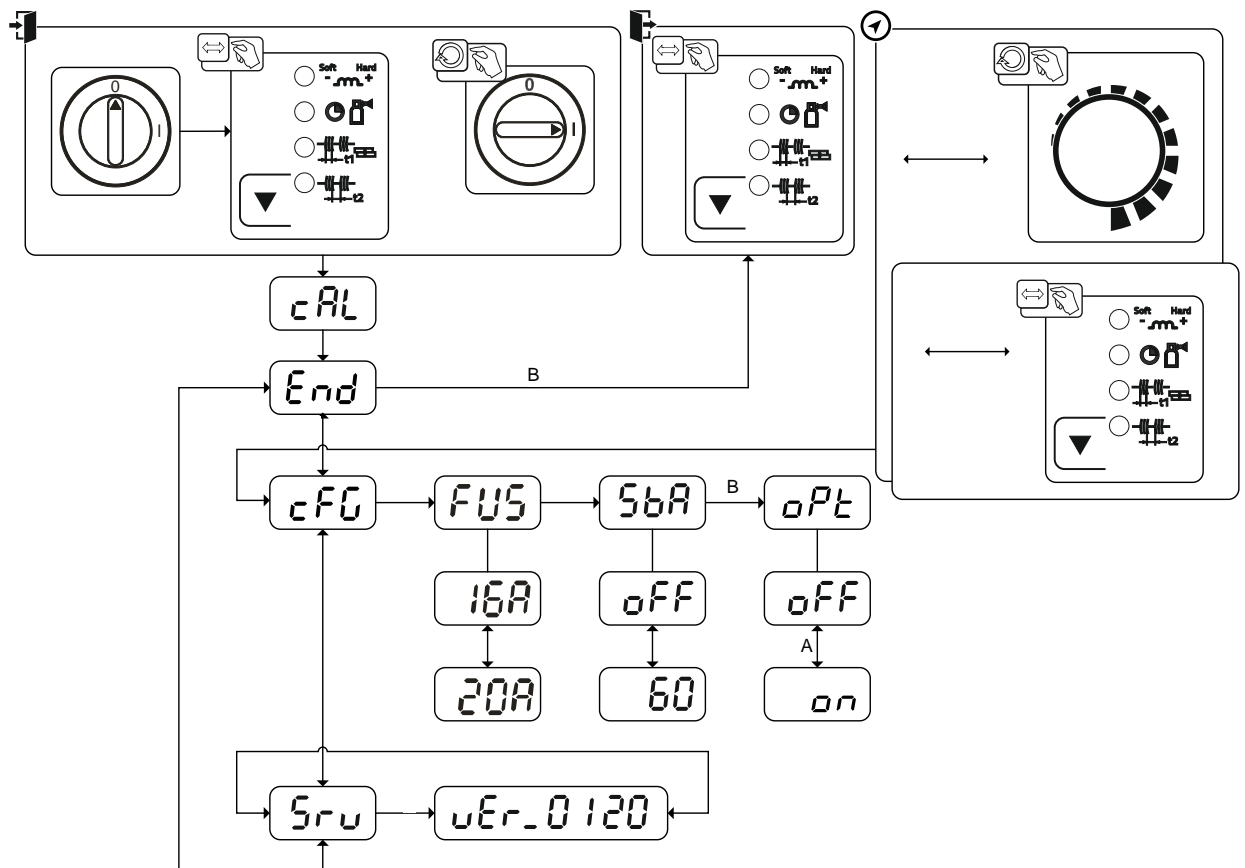
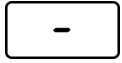


Figure 5-26

Display	Setting/selection
cAL	Calibration The machine will be calibrated for approx 2 seconds each time it is switched on.
End	Exit the menu Exit
cFG	Machine configuration Settings for machine functions and parameter display
FUS	Dynamic power adjustment > see 7.4 chapter
SbA	Time-based power-saving mode > see 5.6 chapter Time to activation of the power-saving mode in case of inactivity. Setting oFF = disabled or numerical value 5-60 min..
oPt	Arc detection for welding helmets (TIG) Modulated waviness for better arc detection on -----Function enabled oFF -----Function disabled
Srv	Service menu Any changes to the service menu should be agreed with the authorised service personnel.
vEr	Software version of the machine control Version display

5.6 Power-saving mode (Standby)

You can activate the power-saving mode by either pressing the push-button > see 4 chapter for a prolonged time or by setting a parameter in the machine configuration menu (time-controlled power-saving mode 5bR) > see 5.5 chapter.



When power-saving mode is activated, the machine displays show the horizontal digit in the centre of the display only.

Pressing any operating element (e.g. turning a rotary knob) deactivates power-saving mode and the machine is ready for welding again.

6 Maintenance, care and disposal

6.1 General

DANGER



Risk of injury due to electrical voltage after switching off!

Working on an open machine can lead to fatal injuries!

Capacitors are loaded with electrical voltage during operation. Voltage remains present for up to four minutes after the mains plug is removed.

1. Switch off machine.
2. Remove the mains plug.
3. Wait for at last 4 minutes until the capacitors have discharged!

WARNING



Improper maintenance, testing and repairs!

Maintenance, testing and repair of the machine may only be carried out by skilled and qualified personnel (authorised service personnel). A competent person is someone who, based on training, knowledge and experience, can recognize the hazards and possible consequential damage that may occur when testing power sources and can take the necessary safety precautions.

- Follow the maintenance instructions > see 6 chapter.
- If any of the test requirements below are not met, the unit must not be put back into operation until it has been repaired and tested again.

Repair and maintenance work may only be performed by qualified authorised personnel; otherwise the right to claim under warranty is void. In all service matters, always consult the dealer who supplied the machine. Return deliveries of defective equipment subject to warranty may only be made through your dealer. When replacing parts, use only original spare parts. When ordering spare parts, please quote the machine type, serial number and item number of the machine, as well as the type designation and item number of the spare part.

Under the specified ambient conditions and normal working conditions this machine is essentially maintenance-free and requires just a minimum of care.

Contamination of the machine may impair service life and duty cycle. The cleaning intervals depend on the ambient conditions and the resulting contamination of the machine. The minimum interval is every six months.

6.2 Disposing of equipment



Proper disposal!

The machine contains valuable raw materials, which should be recycled, and electronic components, which must be disposed of.

- **Do not dispose of in household waste!**
- **Observe the local regulations regarding disposal!**
- According to European provisions (Directive 2012/19/EU on Waste of Electrical and Electronic Equipment), used electric and electronic equipment may no longer be placed in unsorted municipal waste. It must be collected separately. The symbol depicting a waste container on wheels indicates that the equipment must be collected separately.
This machine has to be disposed of, or recycled, in accordance with the waste separation systems in use.

According to German law (law governing the distribution, taking back and environmentally correct disposal of electrical and electronic equipment (ElektroG)), used machines are to be placed in a collection system separate from unsorted municipal waste. The public waste management utilities (communities) have created collection points at which used equipment from private households can be disposed of free of charge.

The deletion of personal data is the responsibility of the end user.

Lamps, batteries or accumulators must be removed and disposed of separately before disposing of the device. The type of battery or accumulator and its composition is marked on the top (type CR2032 or SR44). The following EWM products may contain batteries or accumulators:

- **Welding helmets**
Batteries or accumulators are easy to remove from the LED cassette.
- **Device controls**
Batteries or accumulators are located on the back of these in corresponding sockets on the circuit board and are easy to remove. The controls can be removed using standard tools.

Information on returning used equipment or collections can be obtained from the respective municipal administration office. Devices can also be returned to EWM sales partners across Europe.

Further information on the topic of the disposal of electrical and electronic equipment can be found on our website at: <https://www.ewm-group.com/de/nachhaltigkeit.html>.

7 Rectifying faults


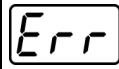
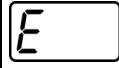
All products are subject to rigorous production checks and final checks. If, despite this, something fails to work at any time, please check the product using the following flowchart. If none of the fault rectification procedures described leads to the correct functioning of the product, please inform your authorised dealer.

7.1 Software version of the machine control

The query of the software versions only serves to inform the authorised service staff. It is available in the machine configuration menu > see 5.5 chapter.

7.2 Error messages (power source)

Depending on the options of the machine display, a fault is shown as follows:

Display type - machine control	Display
Graphic display	
two 7-segment displays	
one 7-segment display	

The possible cause of the fault is signalled by a corresponding fault number (see table). In the case of an error, the power unit shuts down.

The possible error numbers displayed depend on the machine series and version!

- Document machine errors and inform service staff as necessary.
- If multiple errors occur, these are displayed in succession.

Error message	Possible cause	Remedy
E 0	Start signal set in the event of errors	Do not press the torch trigger or the foot-operated remote control
E 4	Temperature error	Allow the machine to cool down
E 5	Mains overvoltage	Switch off the machine and check the mains voltage
E 6	Mains undervoltage	
E 7	Electronics error	Switch the machine off and on again. If the error persists, notify service department
E 9	Secondary overvoltage	
E12	Voltage reduction error (VRD)	
E13	Electronics error	
E14	Alignment error in current recording	Switch off the machine, place the electrode holder in an insulated position and switch the machine back on. If the error persists, notify service department
E15	Error in one of the electronics supply voltages	Switch the machine off and on again. If the error persists, notify service department
E23	Temperature error	Allow the machine to cool down
E32	Electronics error	Switch the machine off and on again. If the error persists, notify service department
E33	Alignment error in voltage recording	Switch off the machine, place the electrode holder in an insulated position and switch the machine back on. If the error persists, notify service department

Error message	Possible cause	Remedy
E34	Electronics error	Switch the machine off and on again. If the error persists, notify service department
E37	Temperature error	Allow the machine to cool down
E40	Motor fault	Check wire feed mechanism, switch the machine off and on again, inform the service department if the fault persists.
E51	Earth fault (PE error)	Connection between welding wire and machine casing
E55	Failure of a mains phase	Switch off the machine and check the mains volt- age
E58	Short circuit in welding circuit	Switch off the machine and check welding current leads for correct installation, e.g. by placing the electrode holder in an insulated position; detach current lead from degaussing.

7.3 Checklist for rectifying faults

The correct machine equipment for the material and process gas in use is a fundamental requirement for perfect operation!

Legend	Symbol	Description
	↗	Fault/Cause
	✘	Remedy

Collective interference signal light illuminates

- ↗ Excess temperature, welding machine
 - ✘ Allow the machine to cool down whilst still switched on
- ↗ Welding current monitoring device triggered (stray welding currents flowing across the protective earth). The error must be reset by switching the machine off and on again.
 - ✘ Welding wire is touching electrically conductive casing parts (check wire guide, has the welding wire sprung off the wire spool?).
 - ✘ Check for a correct mounting of the welding lead. Fit the feeder clamp of the welding lead as close as possible to the arc.

Excess temperature signal light illuminates

- ↗ Excess temperature, welding machine
 - ✘ Allow the machine to cool down whilst still switched on

Functional errors

- ✓ Mains fuse triggers - unsuitable mains fuse
 - ✗ Set up recommended mains fuse.
- ✓ Machine does not start up after switching on (device fan and possibly coolant pump have no function).
 - ✗ Connect the control cable of the wire feeder.
- ✓ All machine control signal lights are illuminated after switching on
- ✓ No machine control signal light is illuminated after switching on
- ✓ No welding power
 - ✗ Phase failure > check mains connection (fuses)
- ✓ Machine restarts continuously
- ✓ Wire feeder without function
- ✓ System does not start up
 - ✗ Make control lead connections and check that they are fitted correctly.
- ✓ Loose welding current connections
 - ✗ Tighten power connections on the torch and/or on the workpiece
 - ✗ Properly fasten the contact tip and contact tip holder.

Wire feed problems

- ✓ Contact tip blocked
 - ✗ Clean and, if necessary, replace.
- ✓ Setting the spool brake
 - ✗ Check settings and correct if necessary
- ✓ Setting pressure units
 - ✗ Check settings and correct if necessary
- ✓ Worn wire rolls
 - ✗ Check and replace if necessary
- ✓ Kinked hose packages
 - ✗ Extend and lay out the torch hose package
- ✓ Wire guide core or spiral is dirty or worn
 - ✗ Clean core or spiral; replace kinked or worn cores

7.4 Dynamic power adjustment

This requires use of the appropriate mains fuse.

Observe mains fuse specification!

The dynamic power adjustment automatically adjusts the welding performance to an uncritical level for the fuse.

The dynamic power adjustment can be set in two increments in the machine configuration menu using parameter "FUS": 20 A, 16 A > see 5.5 chapter.

The currently selected value will be shown on the "cal" section of the display for three seconds after the machine has been switched on.

7.5 Resetting welding parameters to the factory settings

All customised welding parameters that are stored will be replaced by the factory settings.

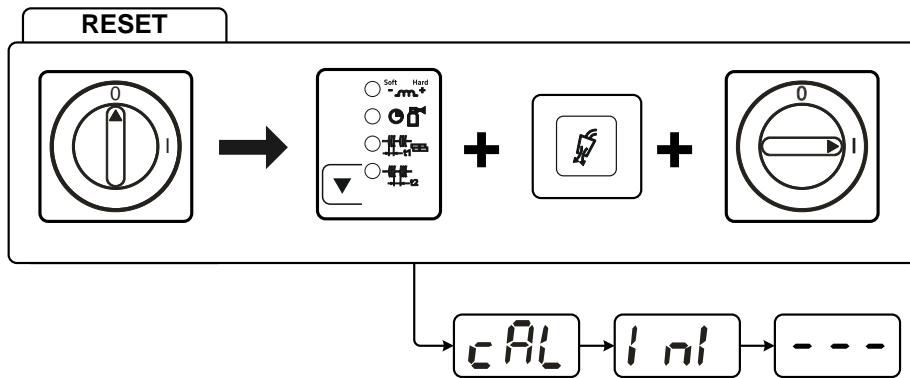


Figure 7-1

Display	Setting/selection
	Calibration The machine will be calibrated for approx 2 seconds each time it is switched on.
	Initialising Keep the push-button pressed until is shown on the display.

8 Appendix

8.1 JOB-List

Machine version Picomig puls:

MIG/MAG pulse arc welding can be selected for the JOBS 6-8, 34, 35, 74-76, 82-84, 90-92, 110-112, 114-116, 177, 178, 233 and 236-238. If an attempt is made to set another JOB to pulse, “noP” = “no Puls” appears briefly in the display and the system switches back to standard arc welding.

Massivdraht solid wire		Ø inch mm				
⊗		.023	.030	.035	.040	.045
		0,6	0,8	0,9	1,0	1,2
JOB						
SG2/3 G3/4 Si1	CO ₂ -100 / C1	176	1	2	3	4
	Ar-82/CO ₂ -18 M20 - M21	175	6	7	8	9
CrNi	Ar-97,5/CO ₂ -2,5 M12		34	223	35	36
CuSi Löten / Brazing	Ar-100 / I1		114	177	115	116
	Ar97,5/CO ₂ -2,5 M12		110	178	111	112
AlMg			74		75	76
AlSi	Ar-100 / I1		82		83	84
Al99			90		91	92

Fülldraht metal / flux-cored		Ø inch mm			
⊗		.035	.040	.043	.045
		0,9	1,0	1,1	1,2
JOB					
E71T	Self-Shielded	172		171	170
E71T Rutile	Ar-82/CO ₂ -18 M20 - M21	241	242		243
	CO ₂ -100 / C1	246	247		248
E70C Metal	Ar-82/CO ₂ -18 M20 - M21	236	237		238

MIG / MAG GMAW	
manual non synergic	188

Zusatz additional	
WIG TIG	127
E-Hand MMA	128

pulse only in Picomig puls Version	
 Standard	 default
 Pulse / Standard	 puls / default

color-code	
 Stahl	 mild steel
 Edelstahl	 stainless steel
 Aluminium	 aluminium

094-028483-00000

Figure 8-1

8.2 Parameter overview – setting ranges

Welding data display (3-digit)	Parameter / function	Setting range			
		Standard (factory set)	min.	max.	Unit
MIG/MAG					
<u>GPr</u>	Gas pre-flow time	0,2	0,0 - 20,0		s
<u>iSE</u>	Start current (percentage of main current)	JOB ^[1]	0 - 200		%
<u>ESE</u>	Ignition current time	JOB ^[1]	0,0 - 20,0		s
<u>E55</u>	Slope time (duration from start current to main current)	JOB ^[1]	0,0 - 20,0		s
<u>E5E</u>	Slope time (duration from main current to end current)	JOB ^[1]	0,0 - 20,0		s
<u>iEd</u>	End current (percentage of main current)	JOB ^[1]	0 - 200		%
<u>EEd</u>	End current time	JOB ^[1]	0,0 - 20,0		s
<u>dYn</u>	Dynamic correction	JOB ^[1]	-40 - 40		
<u>SEc</u>	Gas post-flow time	JOB ^[1]	0,0 - 20,0		s
<u>SEc</u>	Spot time	1,0	0,1 - 20,0		s
<u>SEc</u>	Pause time (interval)	1,0	0,1 - 20,0		s
<u>rbd</u>	Wire burn-back	JOB ^[1]	-50 - 50		%
TIG					
<u>GPr</u>	Gas pre-flow time	0,5	0,0 - 5,0		s
<u>iSE</u>	Start current	20	1 - 200		%
<u>EUP</u>	Up-slope time	1,0	0,0 - 20,0		s
<u>Edn</u>	Down-slope time	1,0	0,0 - 20,0		s
<u>iEd</u>	End current	20	1 - 200		%
<u>SEc</u>	Gas post-flow time	4,0	0,0 - 20,0		s
MMA					
<u>Brc</u>	Arcforce correction	0	-10 - 10		
<u>iHE</u>	Hot start current	120	50 - 200		%
<u>EHE</u>	Hot start time	0,5	0,1 - 20,0		s
Basic parameters (independent of the procedure)					
<u>ERL</u>	Calibration				
<u>End</u>	Exit menu				
<u>CFG</u>	Machine configuration				
<u>FUS</u>	Dynamic power adjustment	16	16 - 20		A
<u>SbR</u>	Time-based energy-saving function	20	5 - 60		min.
<u>oPE</u>	Arc detection for welding helmets (TIG)	off	off - on		
<u>Srv</u>	Maintenance menu				
<u>WEr</u>	Software version of the machine control				
<u>-</u>	Power-saving mode is active				

^[1] Values are or will be saved separately in each JOB .

8.3 Searching for a dealer

Sales & service partners
www.ewm-group.com/en/specialist-dealers



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