



EN

Welding machine

Picomig 355 Synergic TKM

099-005512-EW501

30.03.2017

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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](http://www.ewm-group.com).***

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.

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## 2 For your safety

### 2.1 Notes on the use of 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.



#### **Special technical points which users must observe.**

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 keep pressed
			Switch
	Wrong		Turn
	Correct		Numerical value – adjustable
	Menu entry		Signal light lights up in green
	Navigating the menu		Signal light flashes green
	Exit menu		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 Part of the complete documentation

**These operating instructions are 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.

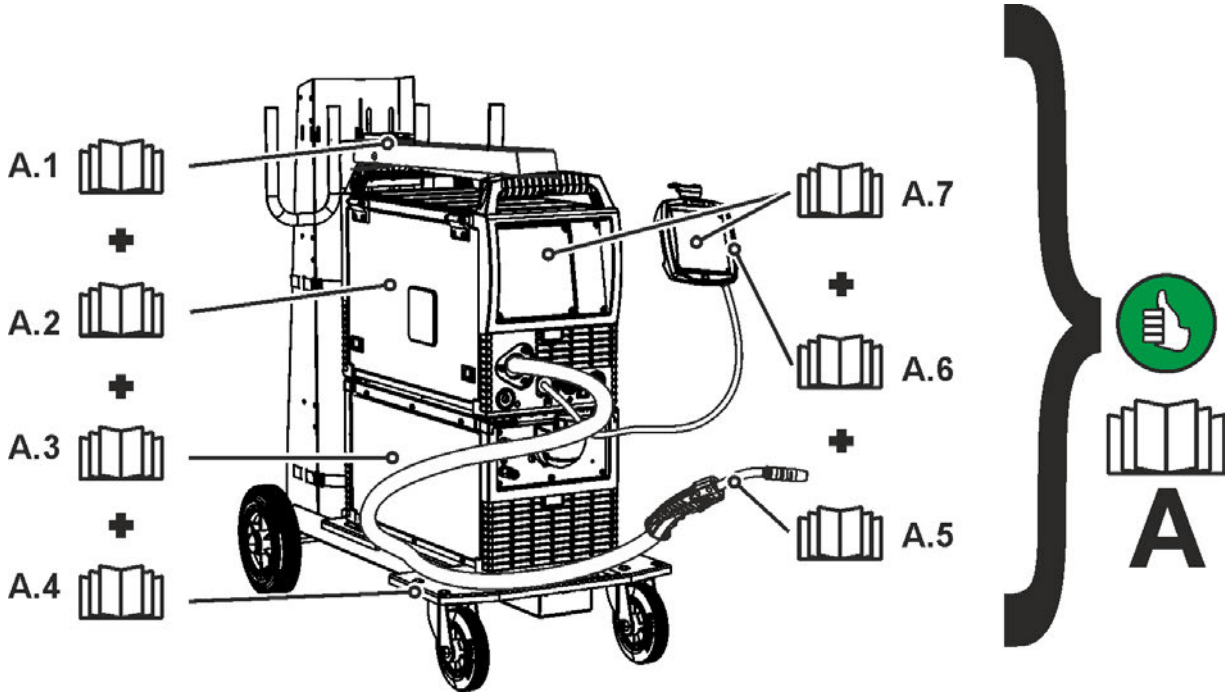


Figure 2-1

Item	Documentation
A.1	Conversion instructions for optional equipment
A.2	Power source
A.3	Cooling unit, voltage converter, tool box etc.
A.4	Transport cart
A.5	Welding torch
A.6	Remote control
A.7	Control
A	Complete documentation

## 2.4 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!



**⚠ WARNING****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 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.

**Risk of injury due to radiation or heat!**

**Arc radiation results in injury to skin and eyes.**

**Contact with hot workpieces and sparks results in burns.**

- Use welding shield or welding helmet with the appropriate safety level (depending on the application)!
- Wear dry protective clothing (e.g. welding shield, gloves, etc.) according to the relevant regulations in the country in question!
- Protect persons not involved in the work against arc beams and the risk of glare using safety curtains!

**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!



### 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.*

## ⚠ CAUTION



### 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 6.3 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**

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) > see 8 chapter:



**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

## 2.5 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.

-  ***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 Applications

Arc welding machine for GMAW welding with TIG welding and lift arc (touch starting) or MMA welding as secondary process. It may be possible to expand the functionality by using accessories (see the documentation in the relevant chapter).

#### 3.2 Documents which also apply

##### 3.2.1 Warranty



*For more information refer to the "Warranty registration" brochure supplied and our information regarding warranty, maintenance and testing at [www.ewm-group.com](http://www.ewm-group.com)!*

##### 3.2.2 Declaration of Conformity



The labelled machine complies with the following EC directives in terms of its design and construction:

- Low Voltage Directive (LVD)
- Electromagnetic Compatibility Directive (EMC)
- Restriction of Hazardous Substance (RoHS)

In case of unauthorised changes, improper repairs, non-compliance with specified deadlines for "Arc Welding Equipment – Inspection and Testing during Operation", and/or prohibited modifications which have not been explicitly authorised by EWM, this declaration shall be voided. An original document of the specific declaration of conformity is included with every product.

##### 3.2.3 Welding in environments with increased electrical hazards



In compliance with IEC / DIN EN 60974, VDE 0544 the machines can be used in environments with an increased electrical hazard.

##### 3.2.4 Service documents (spare parts and circuit diagrams)

#### WARNING



**Do not carry out any unauthorised repairs or modifications!**

**To avoid injury and equipment damage, the unit must only be repaired or modified by specialist, skilled persons!**

**The warranty becomes null and void in the event of unauthorised interference.**

- Appoint only skilled persons for repair work (trained service personnel)!

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

Spare parts can be obtained from the relevant authorised dealer.

##### 3.2.5 Calibration/Validation

We hereby confirm that this machine has been tested using calibrated measuring equipment, as stipulated in IEC/EN 60974, ISO/EN 17662, EN 50504, and complies with the admissible tolerances. Recommended calibration interval: 12 months

## 4 Machine description – quick overview

### 4.1 Front view

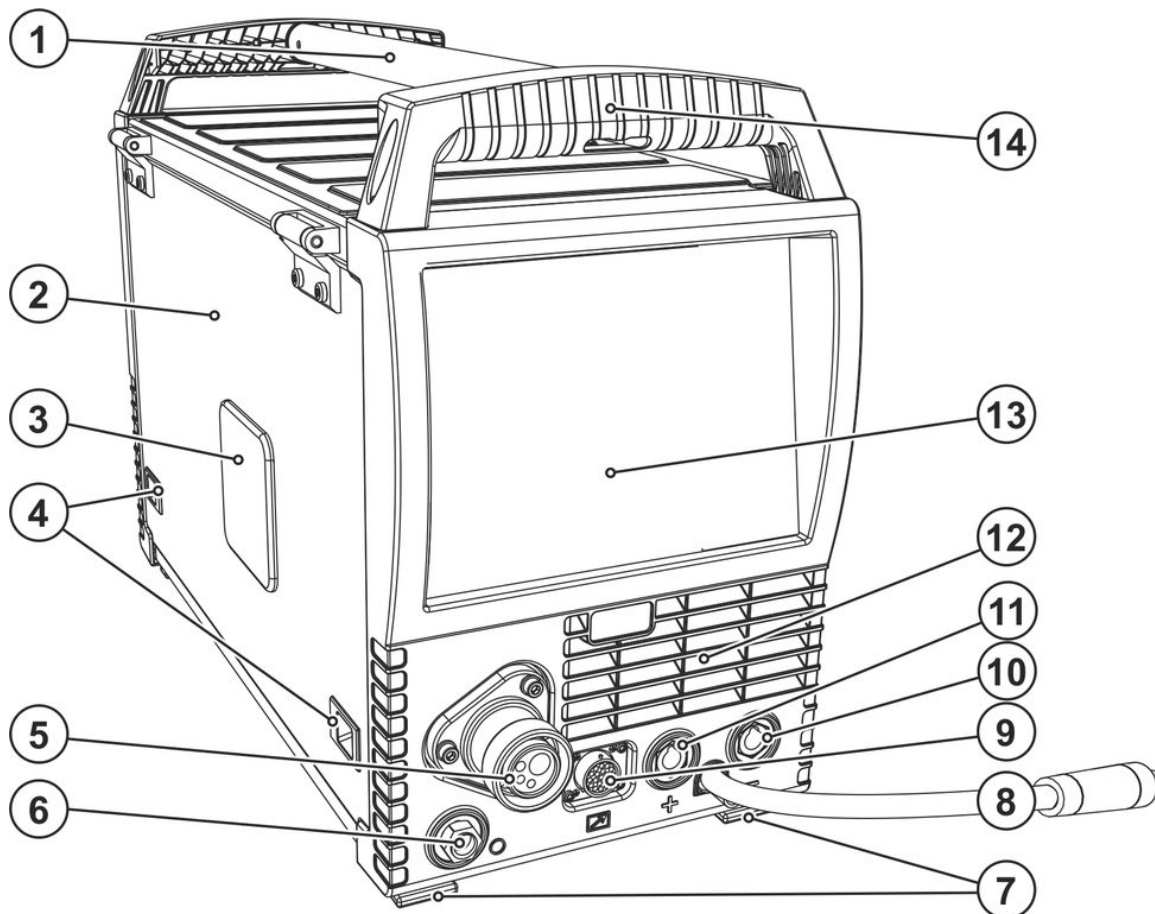


Figure 4-1

Item	Symbol	Description
1		<b>Transport bar</b>
2		<b>Protective cap</b> Cover for the wire feed mechanism and other operating elements. Depending on the machine series, additional stickers with information on the replacement parts and JOB lists will be located on the inside.
3		<b>Wire spool inspection window</b> Check wire supply
4		<b>Slide latch, lock for the protective cap</b>
5		<b>Welding torch connection (Euro or Dinse torch connector)</b> Welding current, shielding gas and torch trigger integrated
6		<b>Park socket, polarity selection plug</b> Retainer for the polarity selection plug in MMA mode or for transport.
7		<b>Machine feet</b>
8		<b>Welding current cable, polarity selection</b> Welding current to Euro torch connector/torch, for polarity selection <ul style="list-style-type: none"> <li>• ----- MIG/MAG: Connection socket for "+" welding current</li> <li>• ----- Self-shielding flux cored wire/TIG: Connection socket, "-" welding current</li> <li>• ----- MMA: Park socket</li> </ul>
9		<b>19-pole connection socket (analogue)</b> For connecting analogue accessory components (remote control, welding torch control lead, etc.)

Item	Symbol	Description
10		<b>"-" welding current connection socket</b> •----- MIG/MAG welding: Workpiece connection •----- TIG welding: Welding current connection for welding torch •----- MMA welding: electrode holder connection
11		<b>Connection socket, "+" welding current</b> •----- MIG/MAG cored wire welding: Workpiece connection •----- TIG welding: Workpiece connection •----- MMA welding: Workpiece connection
12		<b>Cooling air inlet</b>
13		<b>Machine control &gt; see 4.4 chapter</b>
14		<b>Carrying handle</b>

## 4.2 Rear view

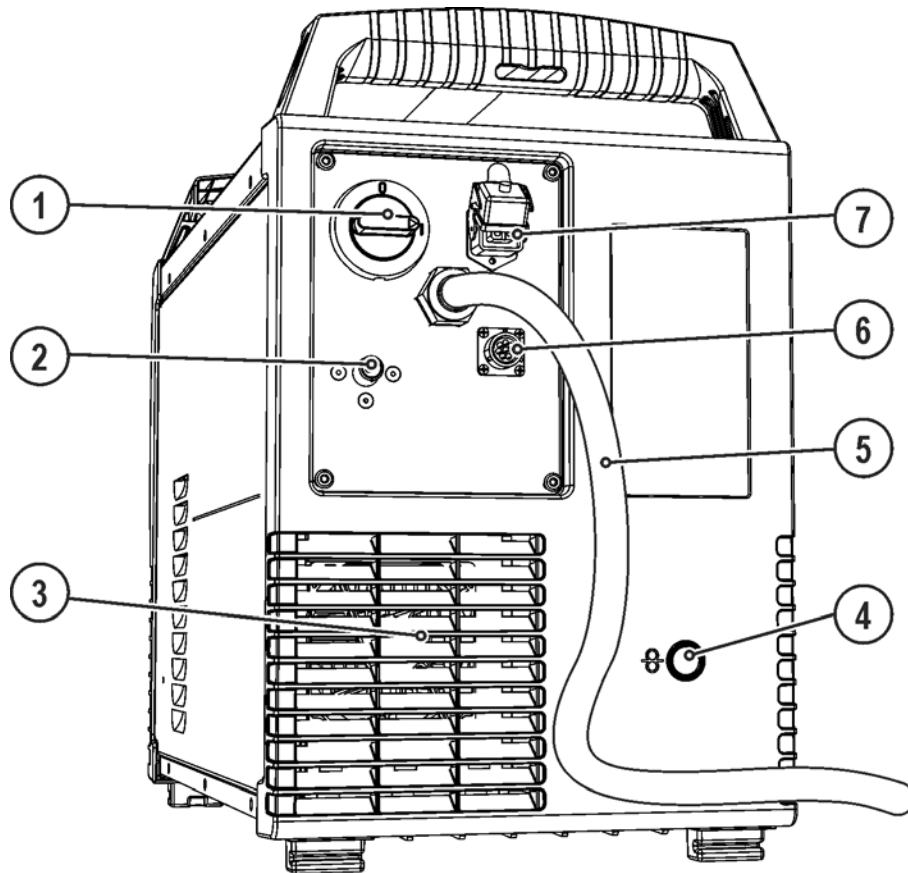


Figure 4-2

Item	Symbol	Description
1		<b>Main switch, machine on/off</b>
2		<b>Connecting nipple G<sup>1</sup>/<sub>4</sub>, shielding gas connection</b>
3		<b>Cooling air outlet</b>
4		<b>External wire feed inlet</b> Pre-cut casing inlet for external wire feed.
5		<b>Mains connection cable &gt; see 5.1.6 chapter</b>
6		<b>8-pole connection socket</b> Cooling unit control lead

Item	Symbol	Description
7		<b>4-pole connection socket</b> Cooling unit voltage supply

## 4.3 Inside view

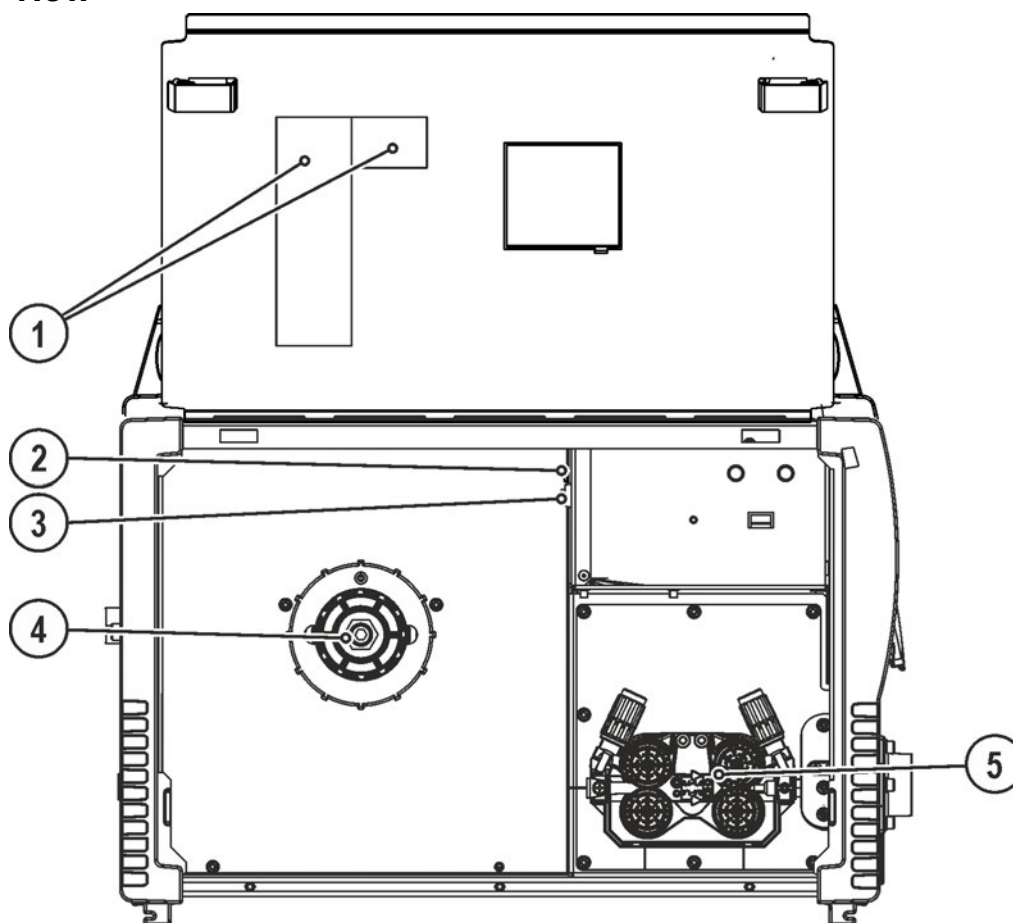


Figure 4-3

Item	Symbol	Description
1		<b>Sticker, JOB List &gt; see 11.1 chapter</b>
2		<b>Key button, Automatic cutout</b> Wire feed motor supply voltage fuse (press to reset a triggered fuse)
3		<b>Push-button, wire inching</b> Potential- and gas-free inching of the wire electrode through the hose package to the welding torch > see 5.3.4.4 chapter.
4		<b>Wire spool holder</b>
5		<b>Wire feed unit</b>



## 4.4 Machine control – Operating elements

The setting ranges for the parameter values are summarised in the Parameter overview section > see 12.1 chapter.

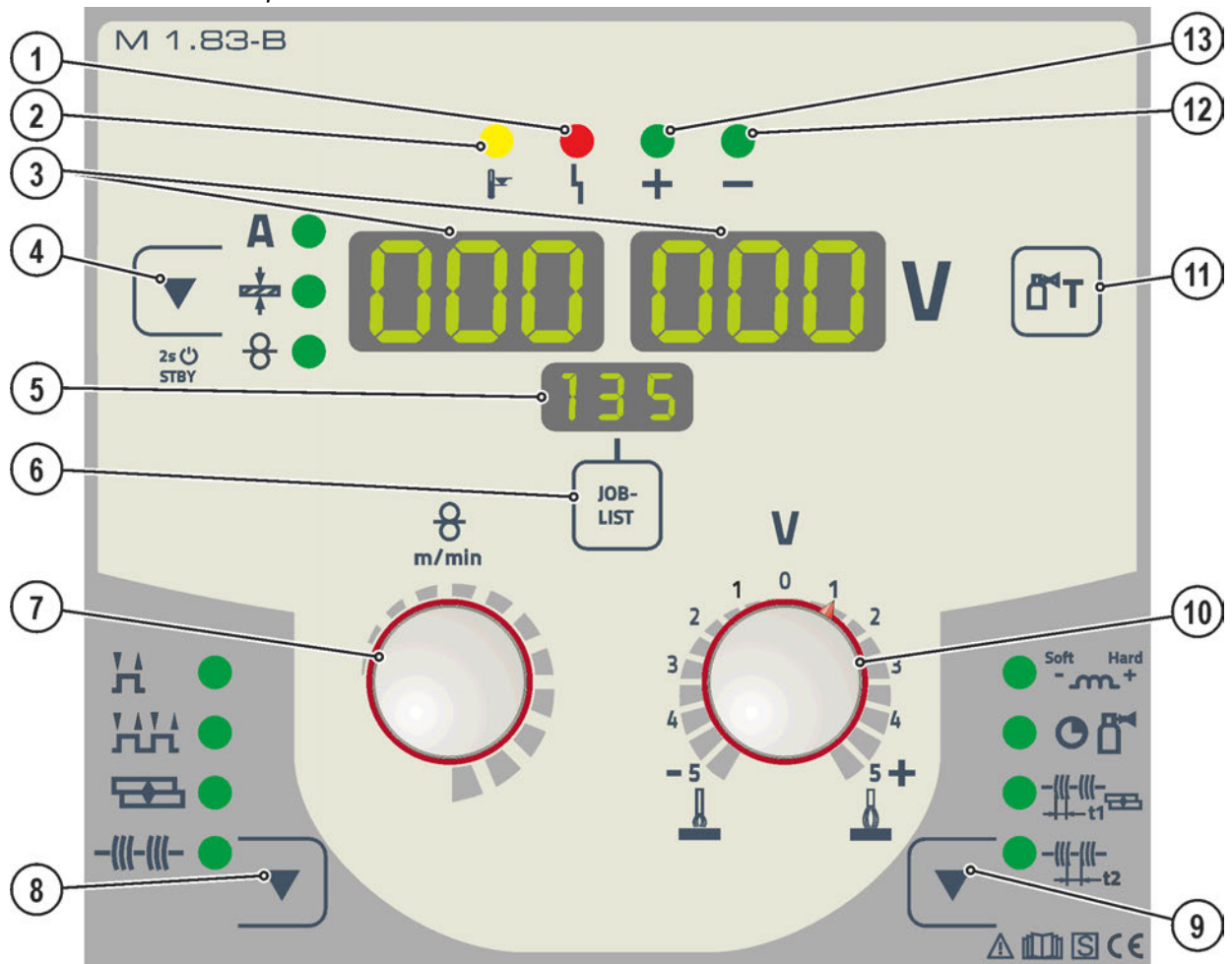










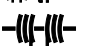






Figure 4-4

Item	Symbol	Description
1		“Collective interference” signal light
2		“Excess temperature” signal light
3		<b>Welding data display (3-digit)</b> Displays the welding parameters and the corresponding values > see 5.2 chapter
4		<b>Welding parameter display mode/power-saving mode push-button</b> <b>A</b> -----Welding current -----Material thickness -----Wire feed speed Press for 2 s to put the machine into power-saving mode. Activate one of the operating elements to reactivate > see 5.8.3 chapter.
5		<b>Display, JOB</b> Shows the currently selected welding task (JOB number).

Item	Symbol	Description
6	JOB-LIST	<b>Welding task push-button (JOB)</b> 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		<b>Welding parameter setting dial</b> For setting the welding performance, for selecting the JOB (welding task) and for setting other welding parameters.
8		<b>Operating mode button</b>  ----- Non-latched  --- Latched  -- Spots  ----- Interval
9		<b>Runtime parameters button</b> 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  -t2- Pause time
10		<b>Arc length correction rotary dial</b>
11		<b>Push-button gas test / rinse hose package &gt; see 5.1.8.5 chapter</b>
12		<b>Signal light polarity setting</b>
13		<b>Signal light polarity setting</b>

## 5 Design and function

### ⚠ WARNING



**Risk of injury from electric shock!**

**Contact with live parts, e.g. welding current sockets, is potentially fatal!**

- Follow safety instructions on the opening pages of the operating instructions.
- Commissioning may only be carried out by persons who have the relevant expertise of working with arc welding machines!
- Connection and welding leads (e.g. electrode holder, welding torch, workpiece lead, interfaces) may only be connected when the machine is switched off!

### ⚠ CAUTION



**Risk from electrical current!**

**If welding is carried out alternately using different methods and if a welding torch and an electrode holder remain connected to the machine, the open-circuit/welding voltage is applied simultaneously on all cables.**

- The torch and the electrode holder should therefore always be placed on an insulated surface before starting work and during breaks.

## 5.1 Transport and installation

### ⚠ WARNING



**Risk of accident due to improper transport of machines that must not be lifted!**

**Do not lift or suspend the machine! The machine can drop and cause injuries! The handles, straps or brackets are suitable for transport by hand only!**

- The machine must not be suspended or lifted using a crane.

 **Read and observe the documentation to all system and accessory components!**

### 5.1.1 Ambient conditions

 **The machine must not be operated in the open air and must only be set up and operated on a suitable, stable and level base!**

- **The operator must ensure that the ground is non-slip and level, and provide sufficient lighting for the place of work.**
- **Safe operation of the machine must be guaranteed at all times.**

 **Unusually high quantities of dust, acid, corrosive gases or substances may damage the equipment.**

- **Avoid high volumes of smoke, vapour, oil vapour and grinding dust!**
- **Avoid ambient air containing salt (sea air)!**

#### 5.1.1.1 In operation

**Temperature range of the ambient air:**

- -25 °C to +40 °C

**Relative air humidity:**

- Up to 50% at 40 °C
- Up to 90% at 20 °C

#### 5.1.1.2 Transport and storage

**Storage in an enclosed space, temperature range of the ambient air:**

- -30 °C to +70 °C

**Relative air humidity**

- Up to 90% at 20 °C

## 5.1.2 Machine cooling

- Insufficient ventilation results in a reduction in performance and equipment damage.**
- **Observe the ambient conditions!**
  - **Keep the cooling air inlet and outlet clear!**
  - **Observe the minimum distance of 0.5 m from obstacles!**

## 5.1.3 Workpiece lead, general

**⚠ CAUTION**

**Risk of burning due to incorrect welding current connection!**  
**If the welding current plugs (machine connections) are not locked or if the workpiece connection is contaminated (paint, corrosion), these connections and leads can heat up and cause burns when touched!**

- Check welding current connections on a daily basis and lock by turning to the right when necessary.
- Clean workpiece connection thoroughly and secure properly. Do not use structural parts of the workpiece as welding current return lead!

## 5.1.4 Welding torch cooling system

### 5.1.4.1 Cooling module connection

- Read and observe the documentation to all system and accessory components!**

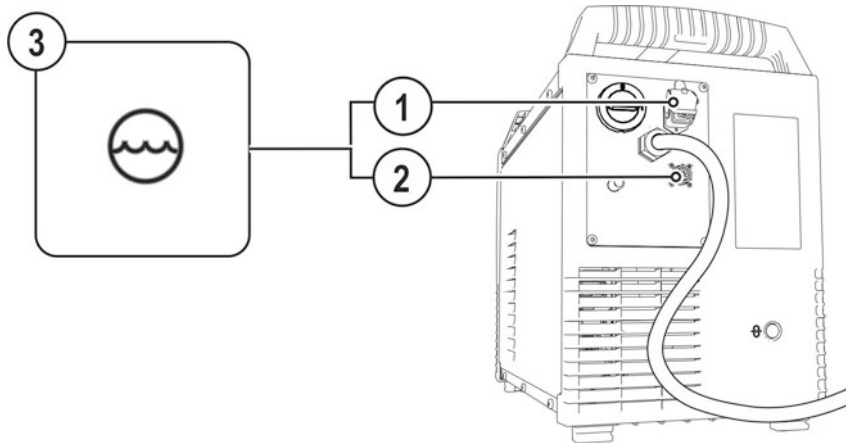


Figure 5-1

Item	Symbol	Description
1		<b>4-pole connection socket</b> Cooling unit voltage supply
2		<b>8-pole connection socket</b> Cooling unit control lead
3		<b>Cooling module</b>

- Insert and lock the 4-pole supply plug on the cooling unit into the 4-pole connection socket on the welding machine.
- Insert and lock the 8-pole control lead plug on the cooling unit into the 8-pole connection socket on the welding machine.

## 5.1.5 Notes on the installation of welding current leads



**Incorrectly installed welding current leads can cause faults in the arc (flickering).**

**Lay the workpiece lead and hose package of power sources without HF igniter (MIG/MAG) for as long and as close as possible in parallel.**

**Lay the workpiece lead and hose package of power sources with HF igniter (TIG) for as long as possible in parallel with a distance of 20 cm to avoid HF sparkover.**

**Always keep a distance of at least 20 cm to leads of other power sources to avoid interferences**  
**Always keep leads as short as possible! For optimum welding results max. 30 m (welding lead + intermediate hose package + torch lead).**

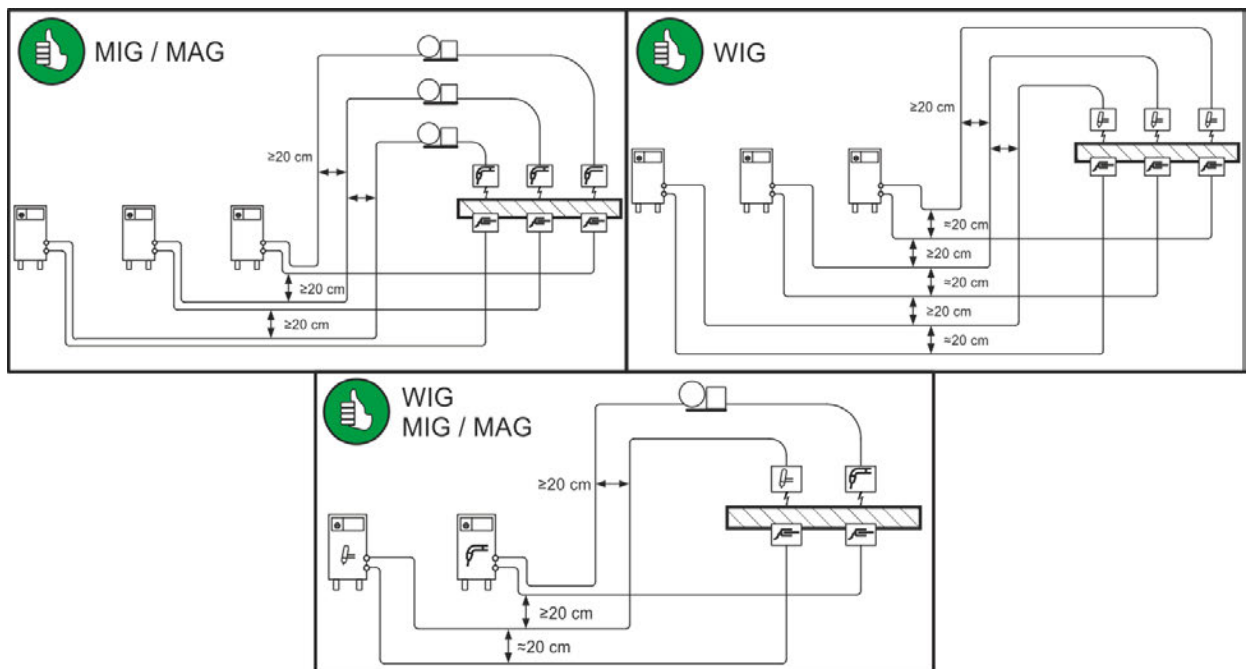


Figure 5-2



**Use an individual welding lead to the workpiece for each welding machine!**

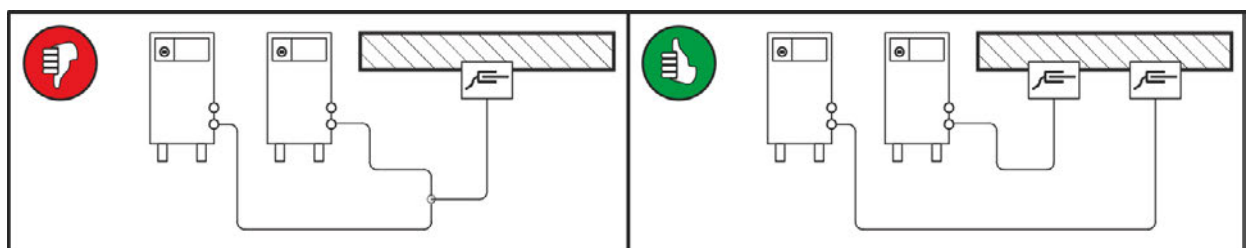


Figure 5-3



**Fully unroll welding current leads, torch hose packages and intermediate hose packages. Avoid loops!**



**Always keep leads as short as possible!**



**Lay any excess cable lengths in meanders.**

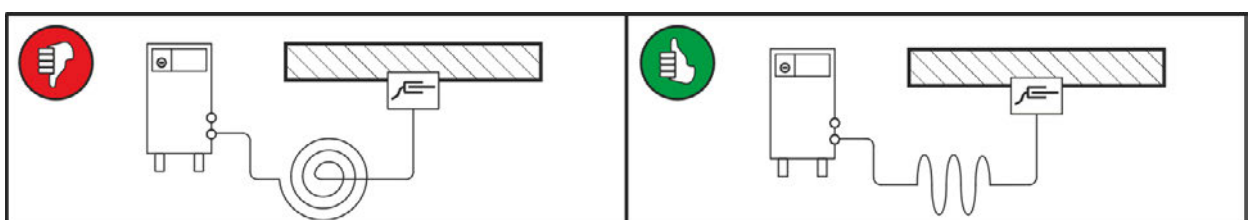


Figure 5-4

## 5.1.5.1 Stray welding currents

### ⚠ WARNING



#### Risk of injury due to stray welding currents!

Stray welding currents can destroy protective earth conductors, damage machines and electronic devices and cause overheating of components, leading to fire.

- Check that all welding current connections are firmly secured and electrical connections are in perfect condition.
- Set up, attach or suspend all conductive power source components such as casing, transport vehicles and crane frames so they are insulated.
- Do not place any other electronic devices such as drills or angle grinders on the power source, transport vehicle or crane frames unless they are insulated.
- Always put welding torches and electrode holders on an insulated surface when they are not in use.

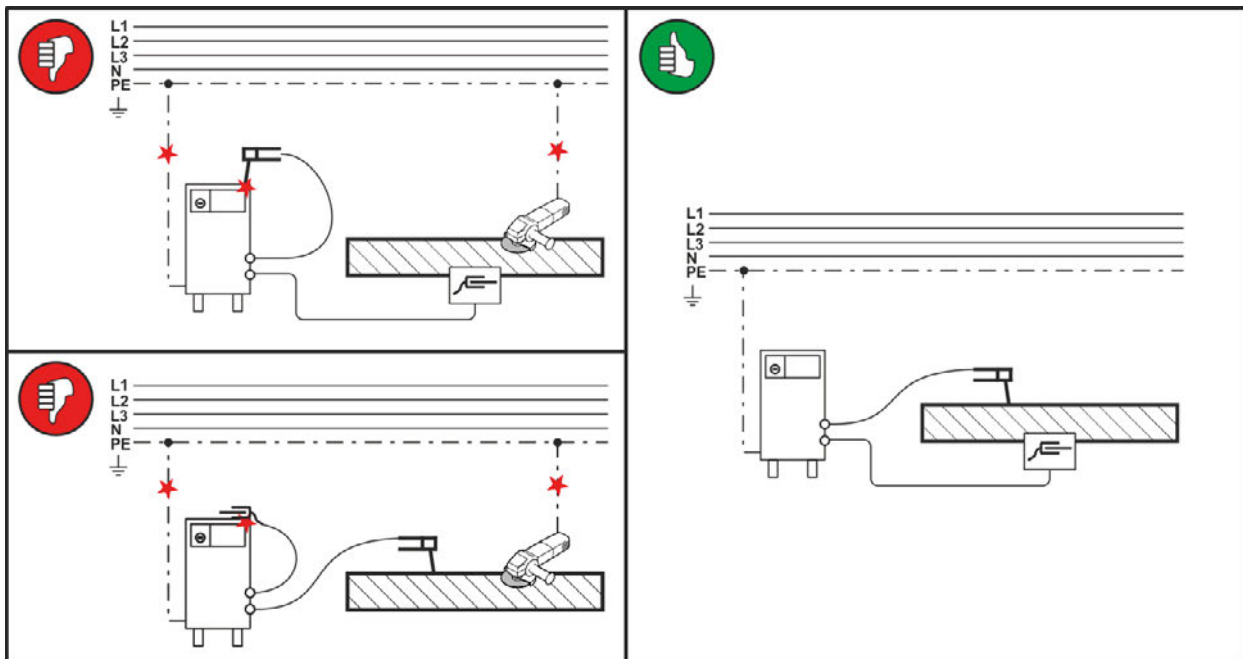


Figure 5-5

## 5.1.6 Mains connection

### ⚠ DANGER



#### Hazards caused by improper mains connection!

An improper mains connection can cause injuries or damage property!

- Only operate machine using a socket that has correctly fitted protective earth.
- The mains voltage indicated on the rating plate must match the supply voltage.
- If a new mains plug must be fitted, only an electrician may do so as per the relevant national legislation or regulations.
- Mains plug, socket and lead must be checked by an electrician on a regular basis.
- When operating the generator, always ensure it is earthed as stipulated in the operating instructions. The network created must be suitable for operating machines according to protection class I.

## 5.1.6.1 Mains configuration



The machine may be connected to:

- a three-phase system with four conductors and an earthed neutral conductor
- a three-phase system with three conductors of which any one can be earthed, e.g. the outer conductor

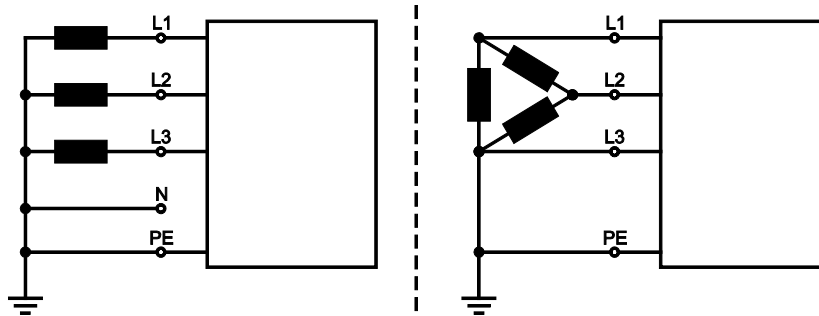


Figure 5-6

## Legend

Item	Designation	Colour code
L1	Outer conductor 1	brown
L2	Outer conductor 2	black
L3	Outer conductor 3	grey
N	Neutral conductor	blue
PE	Protective conductor	green-yellow

- Insert mains plug of the switched-off machine into the appropriate socket.

## 5.1.7 Welding torch holder

The item described in the following is part of the machine's scope of delivery.

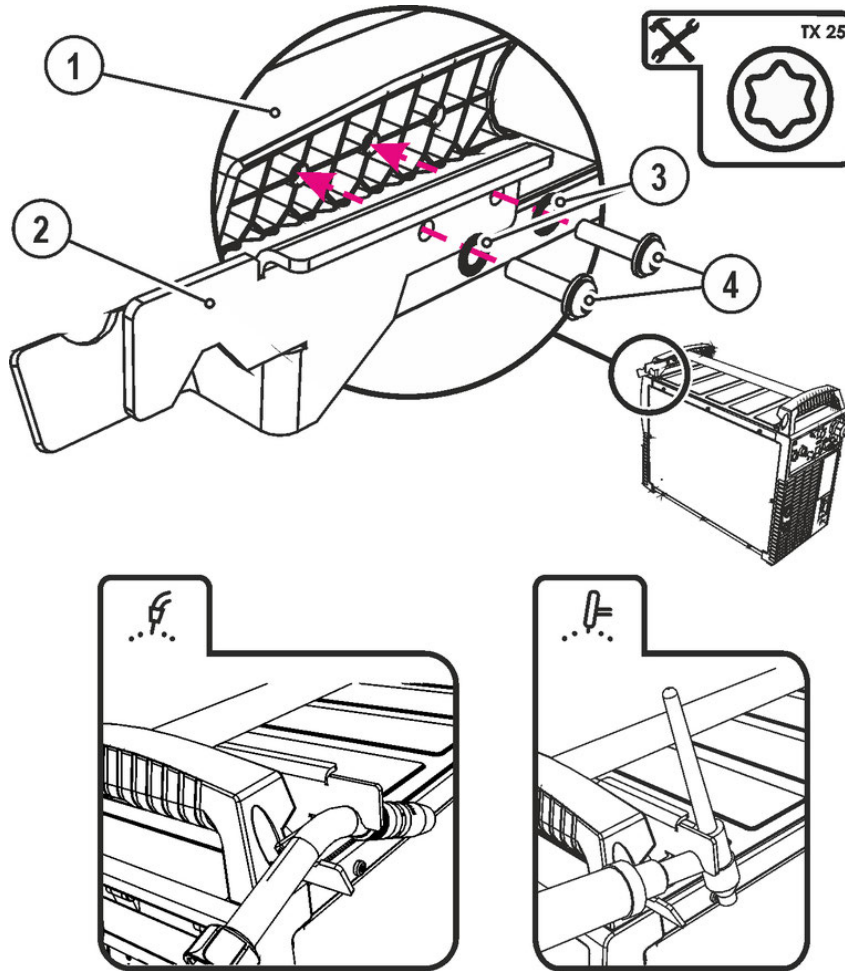


Figure 5-7

Item	Symbol	Description
1		Crossmember of the transport handle
2		Torch holder
3		Fan-type lock washers
4		Fixing screws (x 4)

- Use the mounting screws to screw the torch holder onto the crossmember of the transport handle.
- Insert the welding torch into the welding torch holder as shown.

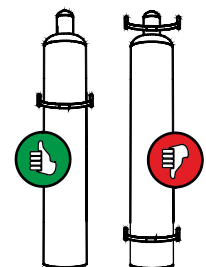
## 5.1.8 Shielding gas supply (shielding gas cylinder for welding machine)

### 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!**

- Place shielding gas cylinder into the designated holder and secure with fastening elements (chain/belt)!
- Attach the fastening elements within the upper half of the shielding gas cylinder!
- The fastening elements must tightly enclose the shielding gas cylinder!





**An unhindered shielding gas supply from the shielding gas cylinder to the welding torch is a fundamental requirement for optimum welding results. In addition, a blocked shielding gas supply may result in the welding torch being destroyed.**

- Always re-fit the yellow protective cap when not using the shielding gas connection.
- All shielding gas connections must be gas tight.

### 5.1.8.1 Pressure regulator connection

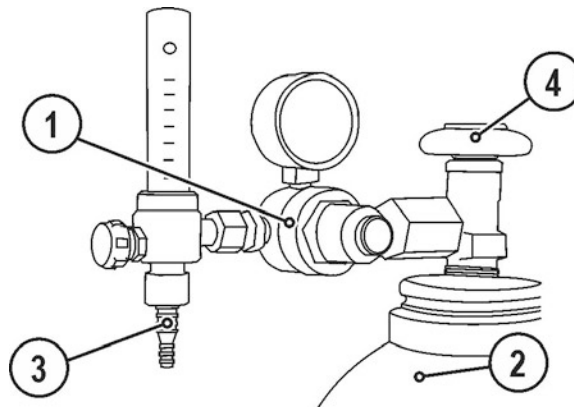


Figure 5-8

Item	Symbol	Description
1		Pressure regulator
2		Shielding gas cylinder
3		Output side of the pressure regulator
4		Cylinder valve

- Before connecting the pressure regulator to the gas cylinder, open the cylinder valve briefly to blow out any dirt.
- Tighten the pressure regulator screw connection on the gas bottle valve to be gas-tight.
- Screw gas hose connection crown nut onto the output side of the pressure regulator.

### 5.1.8.2 Shielding gas hose connection

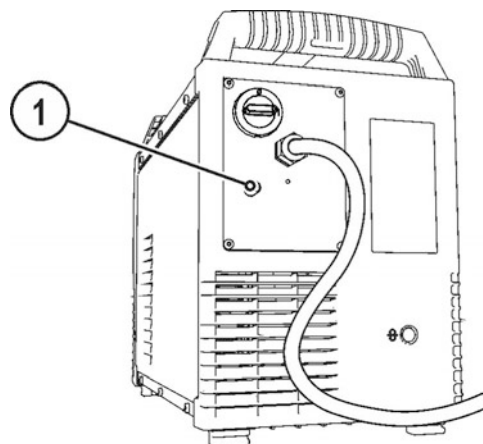


Figure 5-9

Item	Symbol	Description
1		Connecting nipple G $\frac{1}{4}$ " , shielding gas connection

- Connect crown nut of the shielding gas line to the G $\frac{1}{4}$ " connecting nipple.



## 5.2 Welding data display

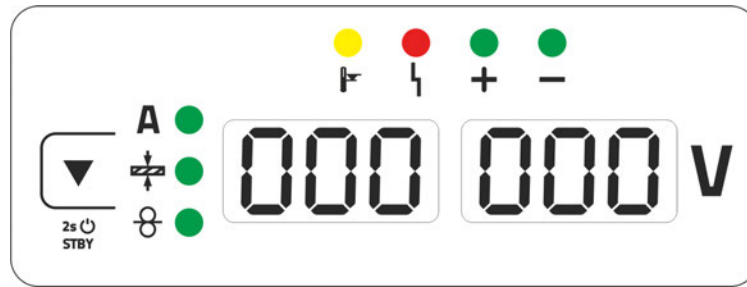


Figure 5-12

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

### 5.2.1 Polarity setting

The polarity setting displays the polarity required for the selected JOB on the machine control > see 4.4 chapter. The required polarity can then be set with the polarity selection plug.

## 5.3 MIG/MAG welding

### 5.3.1 Welding torch and workpiece line connection

 **On delivery, the Euro torch connector is fitted with a capillary tube for welding torches with a steel liner. Conversion is necessary if a welding torch with a liner is used!**

- Operate welding torches with a liner > with a guide tube.
- Operate welding torches with a steel liner > with a capillary tube.

 **For connection, observe the operating instructions for the welding torch.**

**Some wire electrodes (e.g. self-shielding cored wire) are welded using negative polarity. In this case, the welding current lead should be connected to the "-" welding current socket, and the workpiece lead should be connected to the "+" welding current socket. Observe the information from the electrode manufacturer!**

Depending on the wire electrode diameter or type, either a steel liner or liner with the correct inner diameter must be inserted in the torch!

Recommendation:

- Use a steel liner when welding hard, unalloyed wire electrodes (steel).
- Use a chrome nickel liner when welding hard, high-alloy wire electrodes (CrNi).
- Use a plastic or teflon liner when welding or brazing soft wire electrodes, high-alloy wire electrodes or aluminium materials.

**Preparation for connecting welding torches with a spiral guide:**

- Check that the capillary tube is correctly positioned in relation to the central connector!

**Preparation for connecting welding torches with a liner:**

- Push forward the capillary tube on the wire feed side in the direction of the Euro torch connector and remove it there.
- Insert the liner guide tube from the Euro torch connector side.
- Carefully insert the welding torch connector with as yet too long a liner into the Euro torch connector and secure with a crown nut.
- Cut off the liner with a liner cutter > see 9 chapter just before the wire feed roller.
- Loosen the welding torch connector and remove.
- Carefully chamfer the cut off end of the liner with a liner sharpener > see 9 chapter and sharpen.

**Choose welding current connection socket according to the signal light for the polarity setting!**

- **Select JOB > see 5.3.6 chapter**
- **Polarity selection "+" or polarity selection "-" signal lights show the polarity setting.**

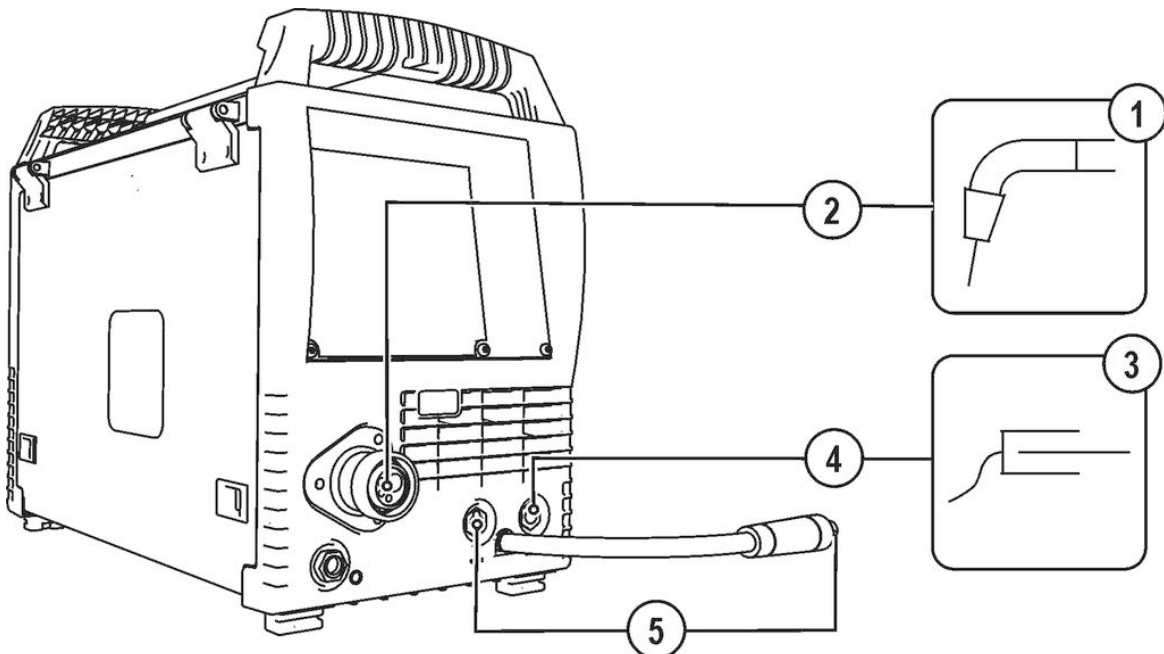


Figure 5-13

Item	Symbol	Description
1		Welding torch
2		Welding torch connection (Euro or Dinse torch connector) Welding current, shielding gas and torch trigger integrated
3		Workpiece

Item	Symbol	Description
4		"-" welding current connection socket •----- MIG/MAG welding: Workpiece connection
5		<b>Polarity selector plug, welding current cable</b> Internal welding current cable for central connection/welding torch. •----- Connection socket for "+" welding current

- Insert the central plug for the welding torch into the central connector and screw together with crown nut.
- Insert the plug of the workpiece lead in the respective welding current connection socket and lock in place by turning to the right.
- Insert the polarity selection plug in the respective welding current connection socket and lock in place by turning to the right.

### 5.3.2 MIG/MAG function torch

The torch trigger on the MIG welding torch is generally used to start and finish the welding process. Function torches feature additional operating elements to set the wire feed speed and voltage correction. Welding torches with one rotary knob, one rocker or one pair of buttons only must be configured on the machine control appropriately. For this purpose, set the FRC special parameter to the corresponding accessory component > see 5.7 chapter.

### 5.3.3 MIG/MAG Push/Pull welding torch

#### 5.3.3.1 Pin assignment

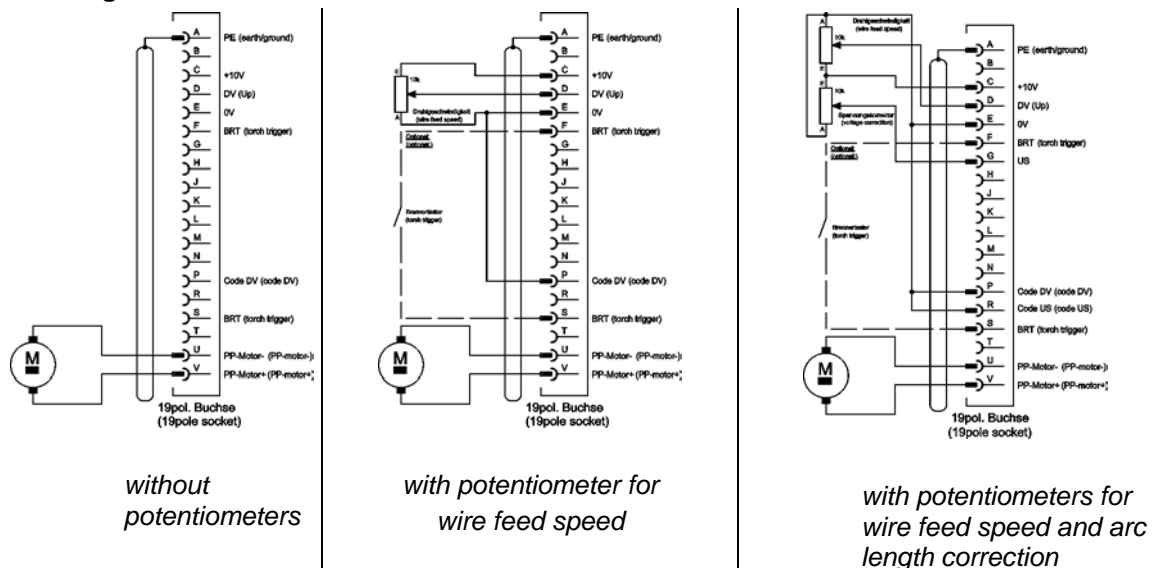


Figure 5-14

### 5.3.4 Wire feed

#### CAUTION



**Risk of injury due to moving parts!**

The wire feeders are equipped with moving parts, which can trap hands, hair, clothing or tools and thus injure persons!

- Do not reach into rotating or moving parts or drive components!
- Keep casing covers or protective caps closed during operation!



**Risk of injury due to welding wire escaping in an unpredictable manner!**

Welding wire can be conveyed at very high speeds and, if conveyed incorrectly, may escape in an uncontrolled manner and injure persons!

- Before mains connection, set up the complete wire guide system from the wire spool to the welding torch!
- Check wire guide at regular intervals!
- Keep all casing covers or protective caps closed during operation!

### 5.3.4.1 Open the protective flap of the wire feeder

To perform the following steps, the protective flap of the wire feeder needs to be opened. Make sure to close the protective flap again before starting to work.

- Unlock and open protective flap.

### 5.3.4.2 Inserting the wire spool

#### CAUTION



**Risk of injury due to incorrectly secured wire spool.**

If the wire spool is not secured properly, it may come loose from the wire spool support and fall to the ground, causing damage to the machine and injuries.

- Make sure to correctly fasten the wire spool to the wire spool support.
- Before you start working, always check the wire spool is securely fastened.

Standard D300 wire spool holder can be used. Adapters > see 9 chapter are required when using standardised basket coils (DIN 8559).

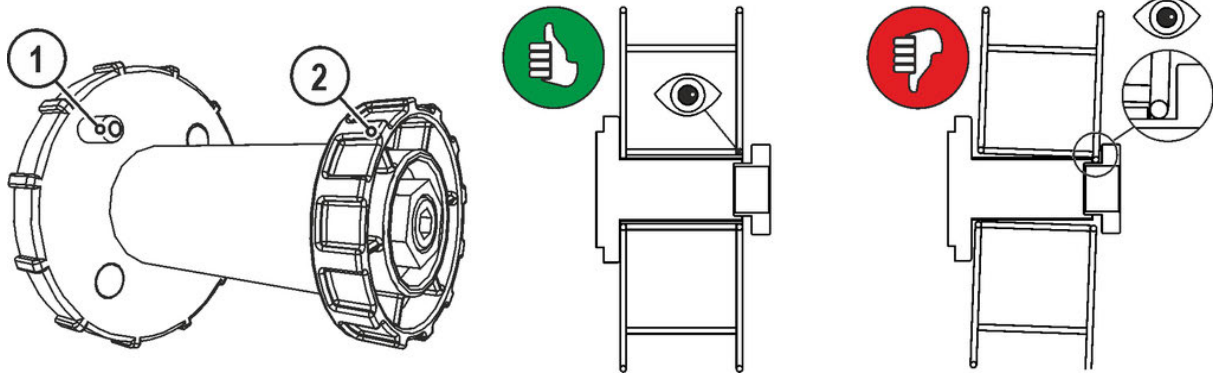


Figure 5-15

Item	Symbol	Description
1		<b>Carrier pin</b> For fixing the wire spool
2		<b>Knurled nut</b> For fixing the wire spool

- Loosen knurled nut from spool holder.
- Fix welding wire reel onto the spool holder so that the carrier pin locks into the spool bore.
- Fasten wire spool using knurled nut.

### 5.3.4.3 Changing the wire feed rollers

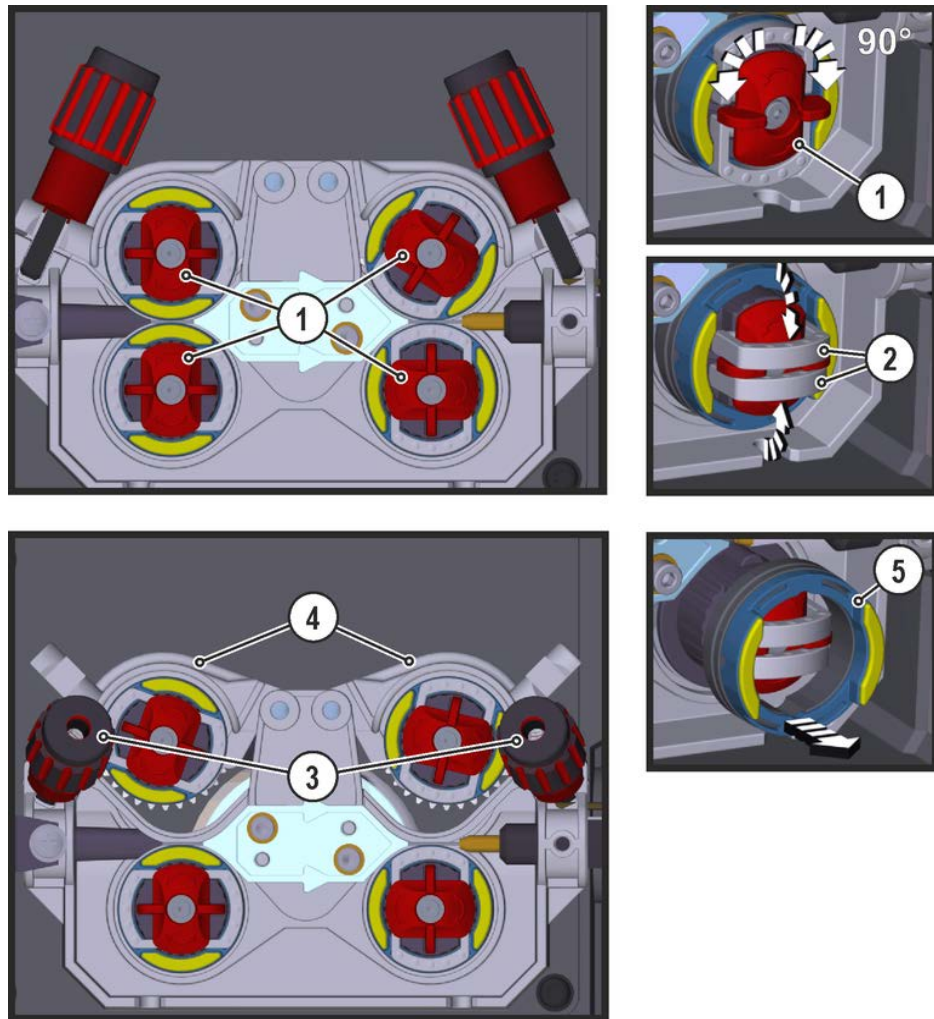


Figure 5-16

Item	Symbol	Description
1		<b>Tommy</b> The tommy is used to secure the closure brackets of the wire feed rollers.
2		<b>Closure bracket</b> The closure brackets are used to secure the wire feed rollers.
3		<b>Feed roll tensioner</b> Fixing the clamping unit and setting the pressure.
4		<b>Clamping unit</b>
5		<b>Wire feed roller</b> see the Wire feed roller overview table

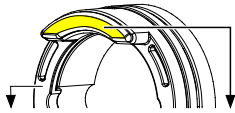
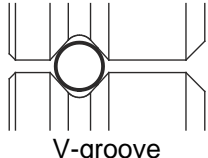

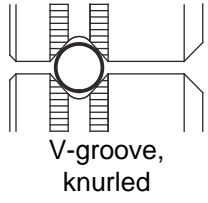
- Rotate the tommy by 90° clockwise or anti-clockwise (tommy locks into place).
- Fold the closure brackets outwards by 90°.
- Unfasten pressure units and fold out (clamping units and pressure rollers will automatically flip upwards).
- Remove the wire feed rollers from the roller support.
- Select new wire feed rollers according to the Wire feed roller overview table and reassemble the wire feed mechanism in reverse order.



**Unsatisfactory welding results due to faulty wire feeding!**

*The wire feed rolls must be suitable for the diameter of the wire and the material. The wire feed rolls are colour-coded to facilitate distinction (see the Wire feed roll overview table). When working with a wire diameter of > 1.6 mm the drive has to be converted for the wire feed kit ON WF 2,0-3,2MM EFEED > see 10 chapter.*

Wire feed roller overview table

Material	Diameter		Colour code		Groove form	
	Ø mm	Ø inch				
Steel Stainless steel Brazing	0.6	.023	monochrome	light pink	-	 V-groove
	0.8	.030		white		
	0.9/1.0	.035/.040		blue		
	1.2	.045		red		
	1.4	.052		green		
	1.6	.060		black		
	2.0	.080		grey		
	2.4	.095		brown		
	2.8	.110		Light green		
	3.2	.125		purple		
Aluminium	0.8	.030	bichrome	white	yellow	 U-groove
	0.9/1.0	.035/.040		blue		
	1.2	.045		red		
	1.6	.060		black		
	2.0	.080		grey		
	2.4	.095		brown		
	2.8	.110		Light green		
	3.2	.125		purple		
Flux cored wire	0.8	.030	bichrome	white	orange	 V-groove, knurled
	0.9	.035		blue		
	1.0	.040		red		
	1.2	.045		green		
	1.4	.052		black		
	1.6	.060		grey		
	2.0	.080		brown		
	2.4	.095		purple		

### 5.3.4.4 Inching the wire electrode

#### ⚠ CAUTION



**Risk of injury due to welding wire escaping from the welding torch!**  
 The welding wire can escape from the welding torch at high speed and cause bodily injury including injuries to the face and eyes!

- Never direct the welding torch towards your own body or towards other persons!



**Incorrect contact pressure will cause extensive wear of the wire feed rollers!**

- With the adjusting nuts of the pressure units set the contact pressure so that the wire electrode is conveyed but will still slip through if the wire spool jams.
- Set the contact pressure of the front rollers (in wire feed direction) to a higher value!



**The inching speed is infinitely adjustable by simultaneously pressing the wire inching push-button and turning the wire speed rotary knob. The left display shows the wire feed speed selected, the right display shows the current motor current of the wire feed mechanism.**



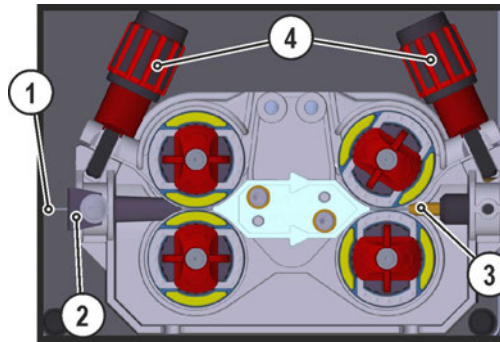


Figure 5-17

Item	Symbol	Description
1		Welding wire
2		Wire feed nipple
3		Guide tube
4		Adjusting nut

- Extend and lay out the torch hose package.
- Carefully unwind the welding wire from the wire spool and insert through the wire feed nipples up to the wire feed rollers.
- Press the inching push-button (the drive catches the welding wire and automatically guides it to the welding torch outlet) > see 4.3 chapter.

**A prerequisite for the automatic inching process is the correct preparation of the wire guide, especially in the capillary and wire guide tube area > see 5.3.1 chapter.**

- The contact pressure has to be adjusted separately for each side (wire inlet/outlet) at the feed roll tensioner setting nuts depending on the welding consumable used. A table with the setting values can be found on a sticker near the wire drive.

### Version 1: left hand mounting

### Version 2: right hand mounting

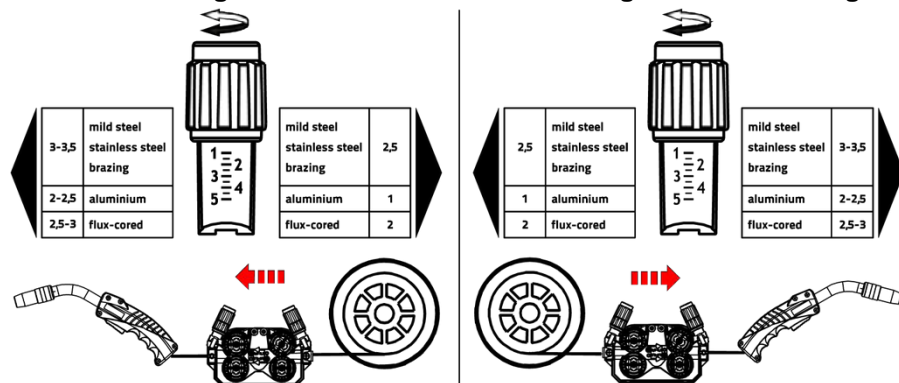


Figure 5-18

### Automatic inching stop

Touch the welding torch against the workpiece during inching. Inching of the welding wire will stop as soon it touches the workpiece.

## 5.3.4.5 Spool brake setting

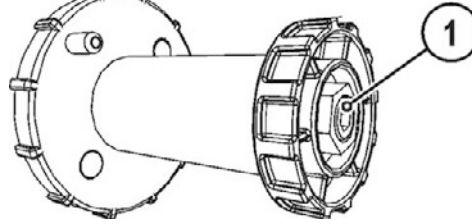


Figure 5-19

Item	Symbol	Description
1		<b>Allen screw</b> Securing the wire spool retainer and adjustment of the spool brake

- Tighten the Allen screw (8 mm) in the clockwise direction to increase the braking effect.



***Tighten the spool brake until the wire spool no longer turns when the wire feed motor stops but without it jamming during operation!***

## 5.3.5 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.***

### 5.3.6 Welding task selection

The settings for the respective welding parameters are defined by the different JOBS. The right JOB can be determined quickly with the JOB list > see 11.1 chapter.

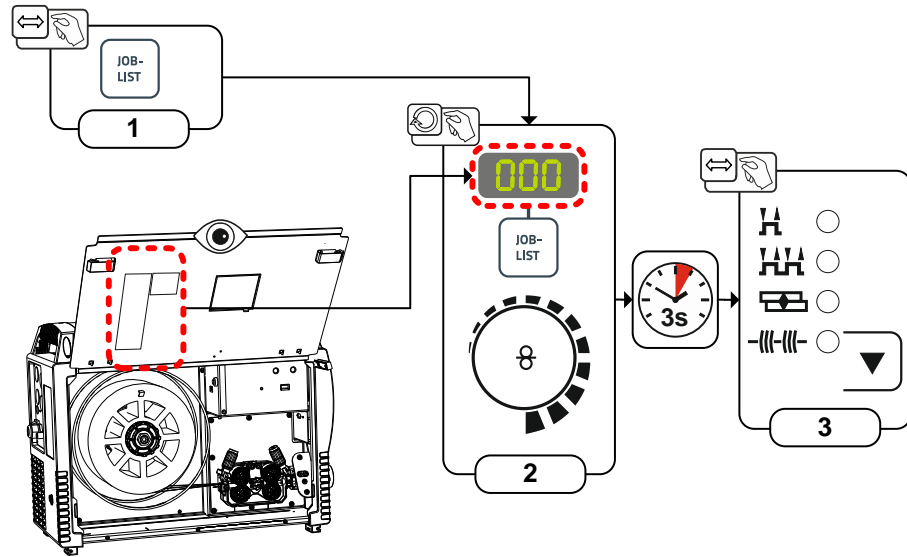


Figure 5-20

Item	Symbol	Description
1	JOB-LIST	<b>Welding task push-button (JOB)</b> 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.
2		<b>Welding parameter setting dial</b> For setting the welding performance, for selecting the JOB (welding task) and for setting other welding parameters.
3		<b>Operating mode button</b> ----- Non-latched ---- Latched -- Spots ----- Interval



**Validity of the settings.**

**Spot time, pause time and wire feed speed settings apply to all JOBS. Throttling effect/dynamics, gas post-flow time, gas pre-flow time and wire burn-back correction are stored for each JOB individually.**

**Changes are stored permanently in the JOB that is currently selected.**

**If required, these parameter values can be reset to the factory settings > see 7.4 chapter.**

## 5.3.6.1 Choke effect / dynamics

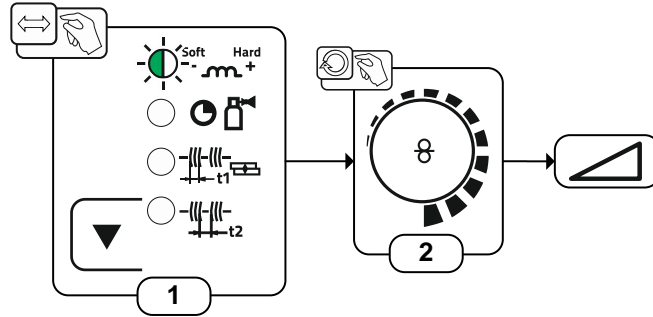


Figure 5-21

Item	Symbol	Description
1		<b>Runtime parameters button</b> For selecting the parameters to be set. Also for entering and exiting the menus for advanced settings. Soft Hard -m+ -- Choke effect/dynamics -- Gas post-flow time --- Spot time -t2 - Pause time
2		<b>Welding parameter setting dial</b> For setting the welding performance, for selecting the JOB (welding task) and for setting other welding parameters.

## 5.3.7 MIG/MAG operating point

### 5.3.7.1 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.

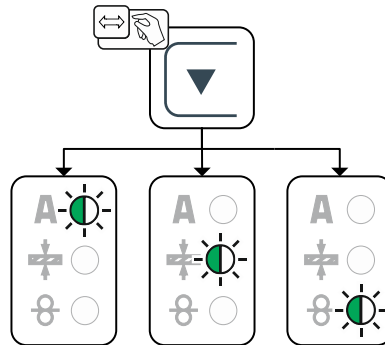


Figure 5-22

### 5.3.7.2 Operating point setting using material thickness



#### Automatic display mode switching:

If the wire speed or the voltage is changed, the display will switch briefly to show the respective parameter. This means that you don't have to change the display mode before setting the parameter.

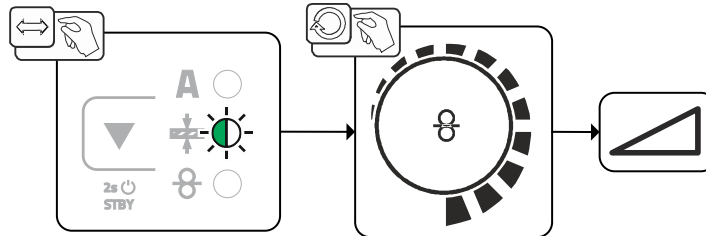


Figure 5-23

### 5.3.7.3 Arc length correction setting

Setting range: -5 V to +5 V

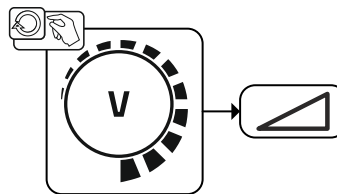


Figure 5-24



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.

### 5.3.8 Further welding parameters

- Preselection: Select a MIG/MAG JOB > see 5.3.6 chapter.

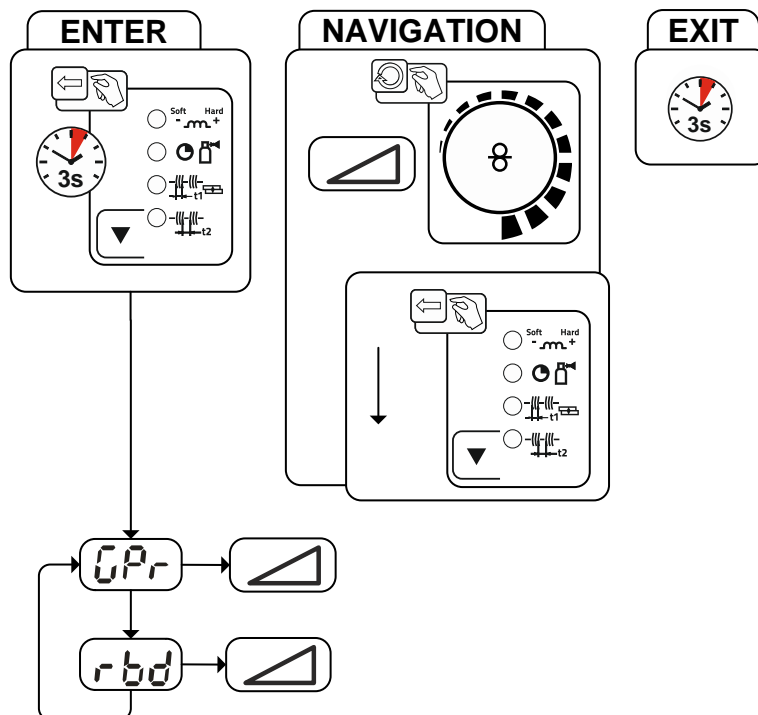


Figure 5-25

Display	Setting/selection
	Gas pre-flow time

Display	Setting/selection
	Burn-back correction

### 5.3.8.1 forceArc

Low-heat, directionally stable and powerful high-performance arc with deep fusion penetration for the upper power range Unalloyed, low-alloy and high-alloy steels as well as high-tensile fine-grained steels.

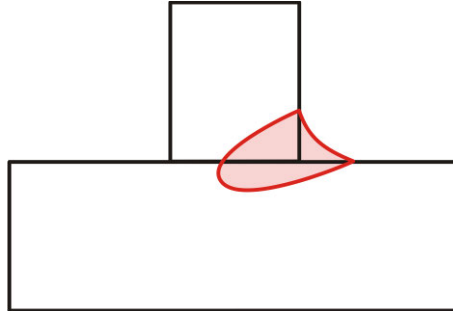


Figure 5-26

- Smaller included angle due to deep penetration and directionally stable arc
- Excellent root and sidewall fusion
- Secure welding also with very long stick-outs
- Reduced undercuts
- Un-, low- and high-alloyed steels as well as high-tensile fine-grained building steels
- Manual and automated applications

forceArc welding from:		Wire Ø (mm)							
		0.8		1		1.2		1.6	
Material	Gas	JOB		JOB		JOB		JOB	
Steel	Ar 91–99%	190	17.0	254	12.0	255	9.5	256	7.0
	Ar 80–90%	189	17.0	179	12.0	180	9.5	181	6.0
CrNi	Ar 91–99%	-	-	251	12.0	252	12.0	253	6.0

You can make use of these properties after selecting the forceArc process > see 5.3.6 chapter.

#### As with pulse arc welding, it is important to make sure of a good welding current connection.

- Keep welding current cables as short as possible and ensure that cable cross-sections are adequate!
- Fully unroll welding current cables, torch hose packages and, if applicable, intermediate hose packages. Avoid loops!
- Use welding torches, preferably water-cooled, that are suitable for the higher power range.
- Use welding wire with adequate copper coating when welding steel. The wire spool should have layer spooling.



#### Unstable arc!

**Welding current cables that are not fully unrolled can cause faults in the arc (flickering).**

- **Fully unroll welding current cables, torch hose packages and, if applicable, intermediate hose packages. Avoid loops!**

### 5.3.8.2 rootArc

Short arc with perfect weld modelling capabilities for effortless gap bridging, especially for positional welding

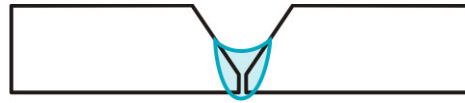


Figure 5-27

- Reduced spatter compared to standard short arc
- Good root formation and secure sidewall fusion
- Un-alloyed and low-alloy steels
- Manual and automated applications

rootArc welding up to:		Wire Ø (mm)											
		0.6		0.8		0.9		1		1.2		1.6	
Material	Gas	JOB	Ø	JOB	Ø	JOB	Ø	JOB	Ø	JOB	Ø	JOB	Ø
Steel	CO <sub>2</sub>	-	-	-	-	-	-	204	7.0	205	5.0	-	-
	Ar 80–90%	-	-	-	-	-	-	206	8.0	207	6.0	-	-



#### Unstable arc!

**Welding current cables that are not fully unrolled can cause faults in the arc (flickering).**

- Fully unroll welding current cables, torch hose packages and, if applicable, intermediate hose packages. Avoid loops!

### 5.3.9 MIG/MAG functional sequences / operating modes

#### 5.3.9.1 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
t	Time
t <sub>1</sub>	Spot time
t <sub>2</sub>	Pause time

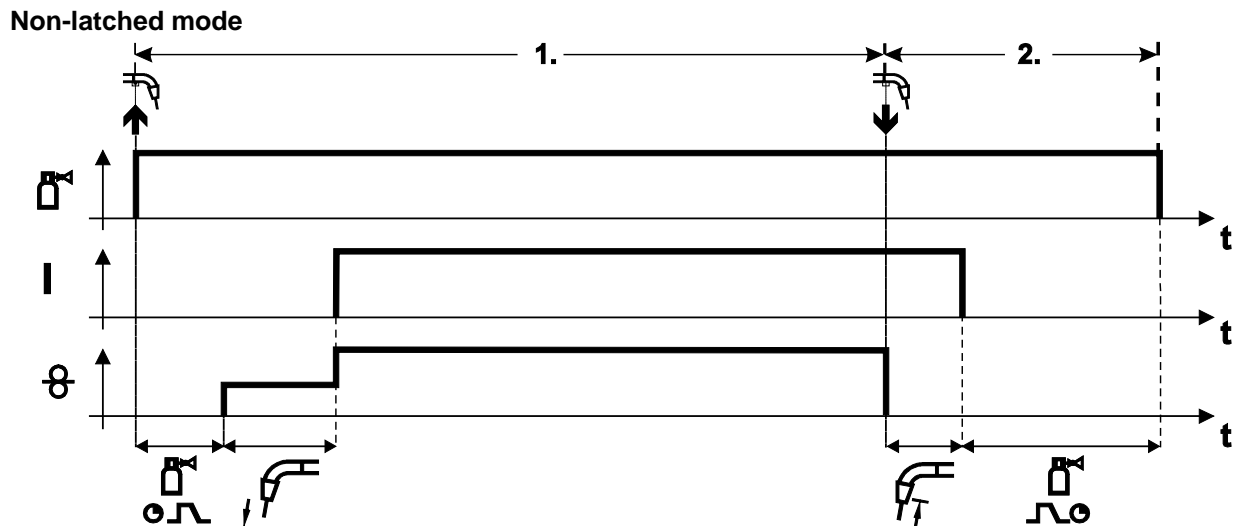


Figure 5-28

### 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.



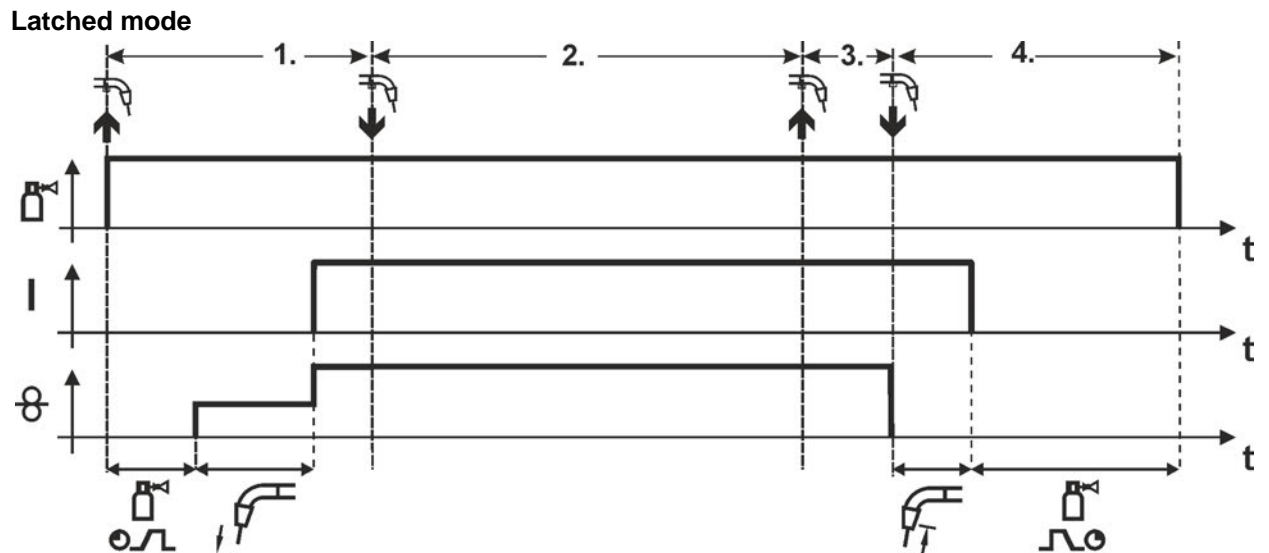


Figure 5-29

**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

## Spot welding

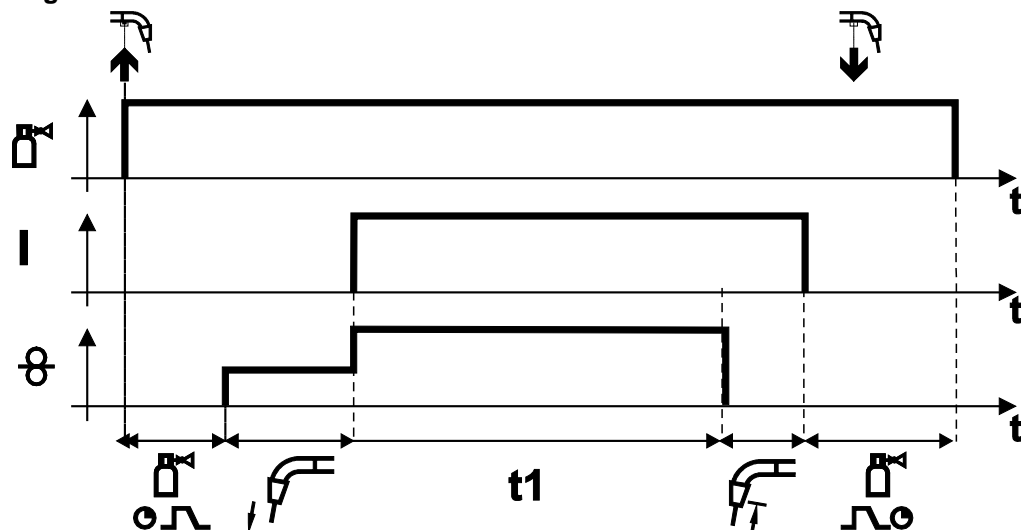


Figure 5-30

### 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.

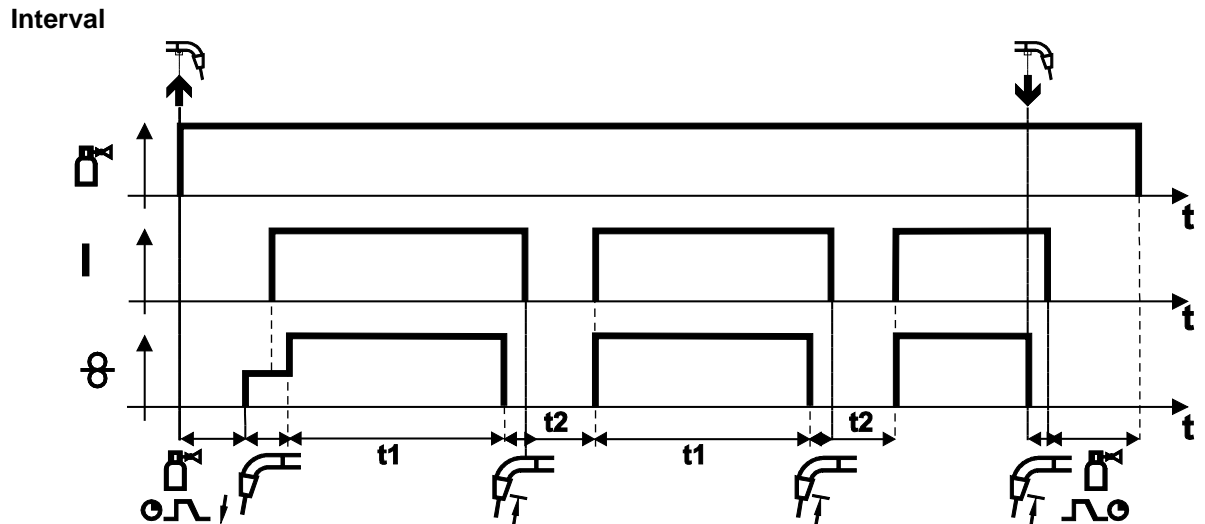


Figure 5-31

### 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.

## 5.3.10 Conventional MIG/MAG Welding (GMAW non synergic)

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

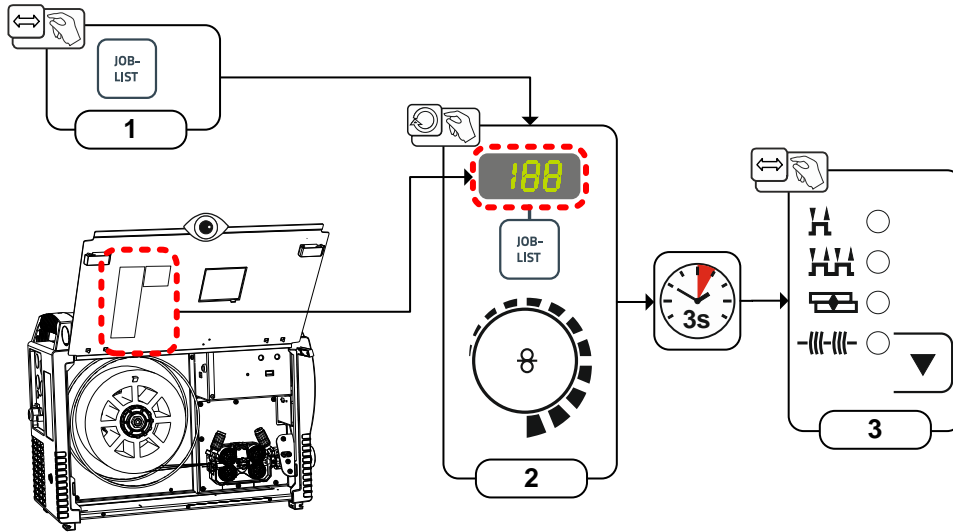


Figure 5-32

Item	Symbol	Description
1	<b>JOB-LIST</b>	<b>Welding task push-button (JOB)</b> 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.
2		<b>Welding parameter setting dial</b> For setting the welding performance, for selecting the JOB (welding task) and for setting other welding parameters.
3		<b>Operating mode button</b> ----- Non-latched --- Latched -- Spots ----- Interval

## 5.3.10.1 Setting the operating point (welding output)

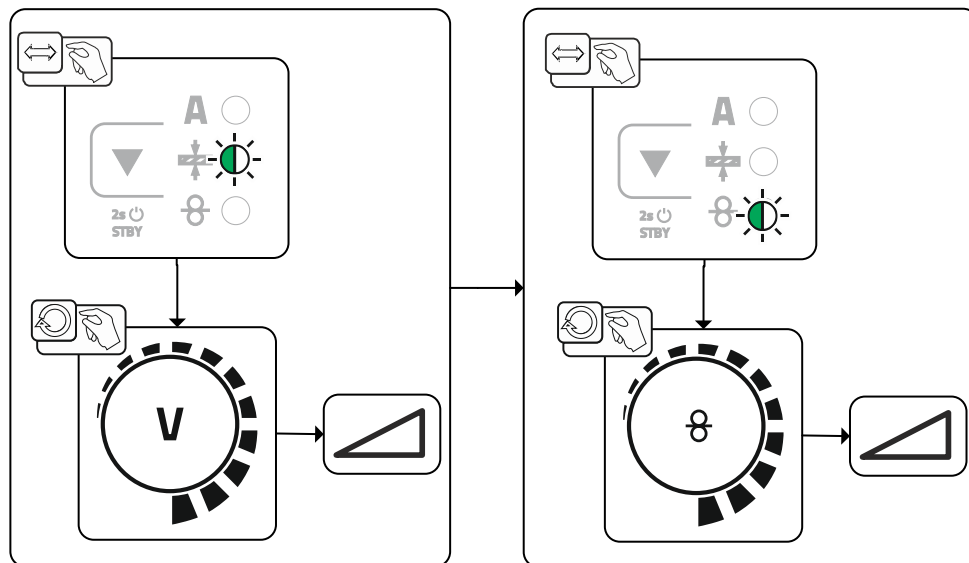



Figure 5-33

## 5.3.11 MIG/MAG automatic cut-out

-  **The welding machine ends the ignition process or the welding process with an**
- **ignition fault (no welding current flows within 5 s after the start signal)**
  - **arc interruption (arc is interrupted for longer than 5 s)**

## 5.4 MMA welding

### ⚠ CAUTION



**Risk of being crushed or burnt.**

**When replacing spent or new stick electrodes**

- Switch off machine at the main switch
- Wear appropriate safety gloves
- Use insulated tongs to remove spent stick electrodes or to move welded workpieces and
- Always put the electrode holder down on an insulated surface.

### 5.4.1 Connecting the electrode holder and workpiece lead

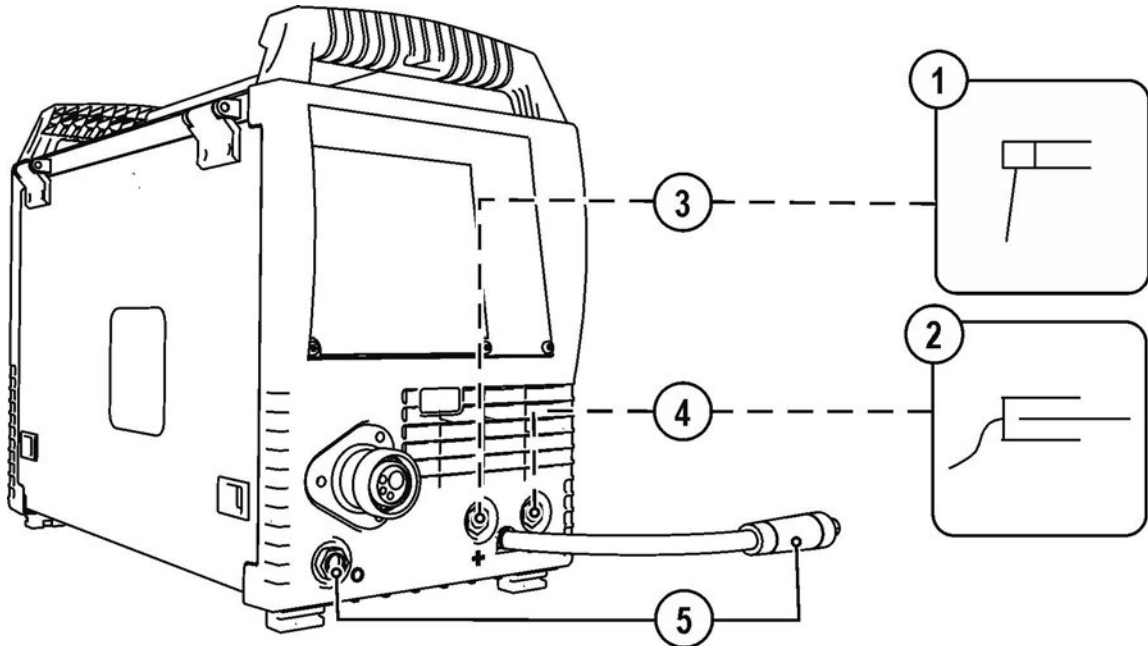


Figure 5-34

Item	Symbol	Description
1		Electrode holder
2		Workpiece
3		<b>Connection socket for "+" welding current</b> Electrode holder or workpiece lead connection
4		<b>Connection socket, "-" welding current</b> Electrode holder or workpiece lead connection
5		<b>Polarity selector plug, welding current cable</b> • Connect to the park socket.

- Insert the polarity selection plug in the park socket and lock in place by turning to the right.
- Insert cable plug of the electrode holder into either the "+" or "-" welding current connection socket and lock by turning to the right.
- Insert cable plug of the workpiece lead into either the "+" or "-" welding current connection socket and lock by turning to the right.



**Polarity depends on the instructions from the electrode manufacturer given on the electrode packaging.**

## 5.4.2 Welding task selection

- Select MMA JOB 128 > see 11.1 chapter.

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

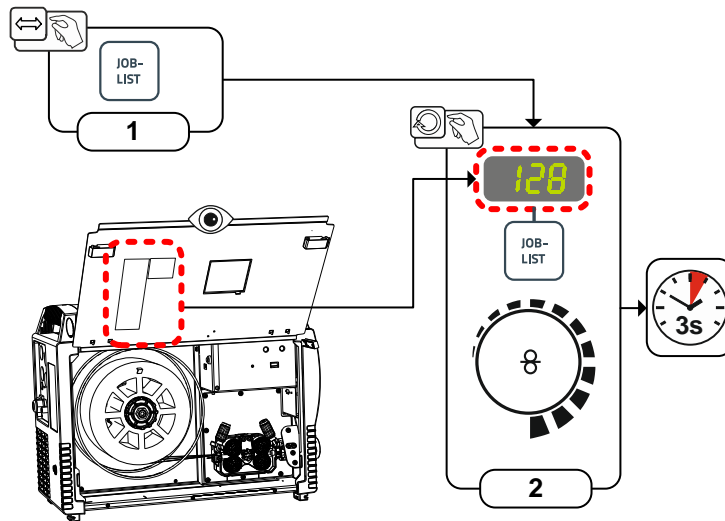



Figure 5-35

Item	Symbol	Description
1	JOB-LIST	<b>Welding task push-button (JOB)</b> 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.
2		<b>Welding parameter setting dial</b> For setting the welding performance, for selecting the JOB (welding task) and for setting other welding parameters.

## 5.4.3 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.

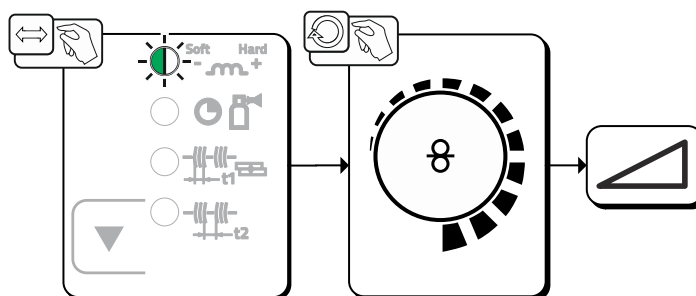


Figure 5-36

## 5.4.4 Hotstart

The hot start function improves the arc striking.

After striking the stick electrode, the arc ignites at the increased hot start current and decreases to the set main current once the hot start time has elapsed.

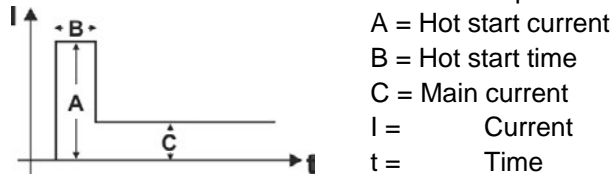


Figure 5-37

For parameter setting, > see 5.4.4.1 chapter.

### 5.4.4.1 Hotstart settings

The setting ranges for the parameter values are summarised in the Parameter overview section > see 12.1 chapter.

- Select MMA JOB 128 > see 5.4.2 chapter.

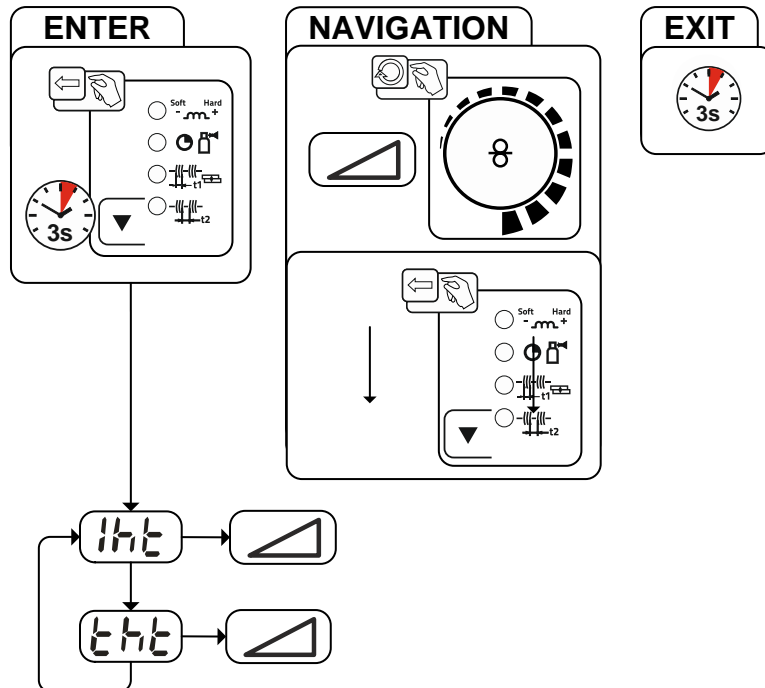
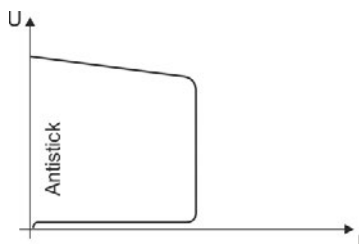


Figure 5-38

Display	Setting/selection
	Hotstart current
	Hotstart time

## 5.4.5 Antistick



**Anti-stick prevents the electrode from annealing.**

If the electrode sticks in spite of the Arcforce device, the machine automatically switches over to the minimum current within about 1 second to prevent the electrode from overheating. Check the welding current setting and correct according to the welding task!

Figure 5-39



## 5.5 TIG welding

### 5.5.1 Preparing the TIG welding torch

The TIG welding torch is to be equipped to suit the relevant welding task!

- Fit suitable tungsten electrodes and
- an appropriate shielding gas nozzle.
- Observe the operating instructions for the TIG welding torch!

### 5.5.2 Welding torch and workpiece line connection

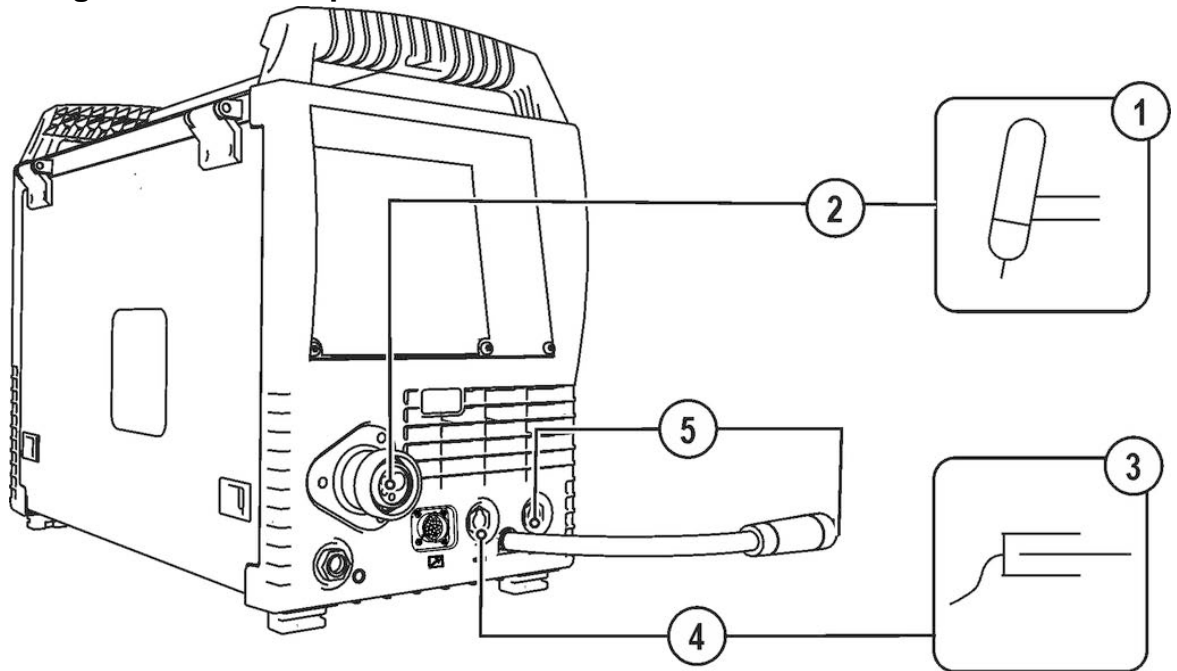


Figure 5-40

Item	Symbol	Description
1		<b>Welding torch</b>
2		<b>Welding torch connection (Euro or Dinse torch connector)</b> Welding current, shielding gas and torch trigger integrated
3		<b>Workpiece</b>
4		<b>Connection socket, "+" welding current</b> • TIG welding: Workpiece connection
5		<b>Polarity selector plug, welding current cable</b> Internal welding current cable for central connection/welding torch. • Connection socket for "-" welding current

- Insert the central plug for the welding torch into the central connector and screw together with crown nut.
- Insert the polarity selection plug into the "-" welding current connection socket and lock in place by turning to the right.
- Insert the plug of the workpiece lead into the "+" welding current connection socket and lock in place by turning to the right.

## 5.5.3 Welding task selection

- Select TIG JOB 127 > see 11.1 chapter.

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

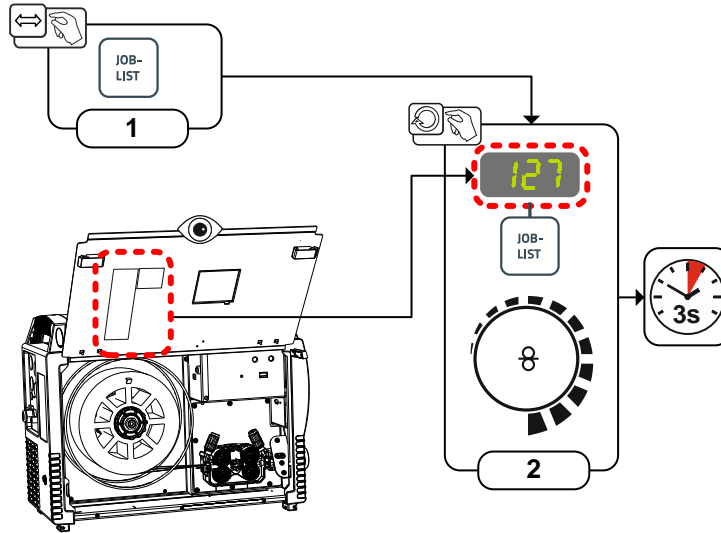


Figure 5-41

Item	Symbol	Description
1	JOB-LIST	<b>Welding task push-button (JOB)</b> 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.
2		<b>Welding parameter setting dial</b> For setting the welding performance, for selecting the JOB (welding task) and for setting other welding parameters.

## 5.5.4 Adjusting the gas post-flow time

- Preselection: Select TIG JOB 127 > see 5.5.3 chapter.

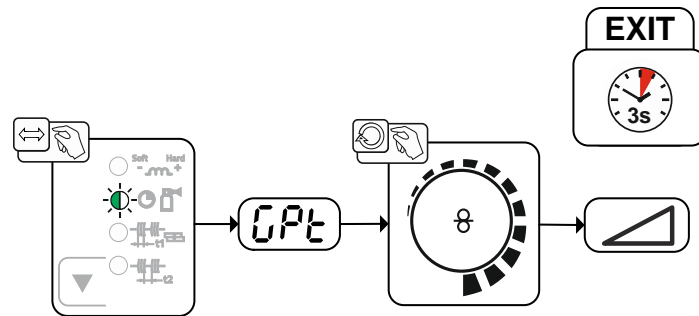


Figure 5-42

Display	Setting/selection
	Gas post-flow time

### 5.5.5 Further welding parameters

The setting ranges for the parameter values are summarised in the Parameter overview section > see 12.1 chapter.

- Preselection: Select TIG JOB 127 > see 5.5.3 chapter.

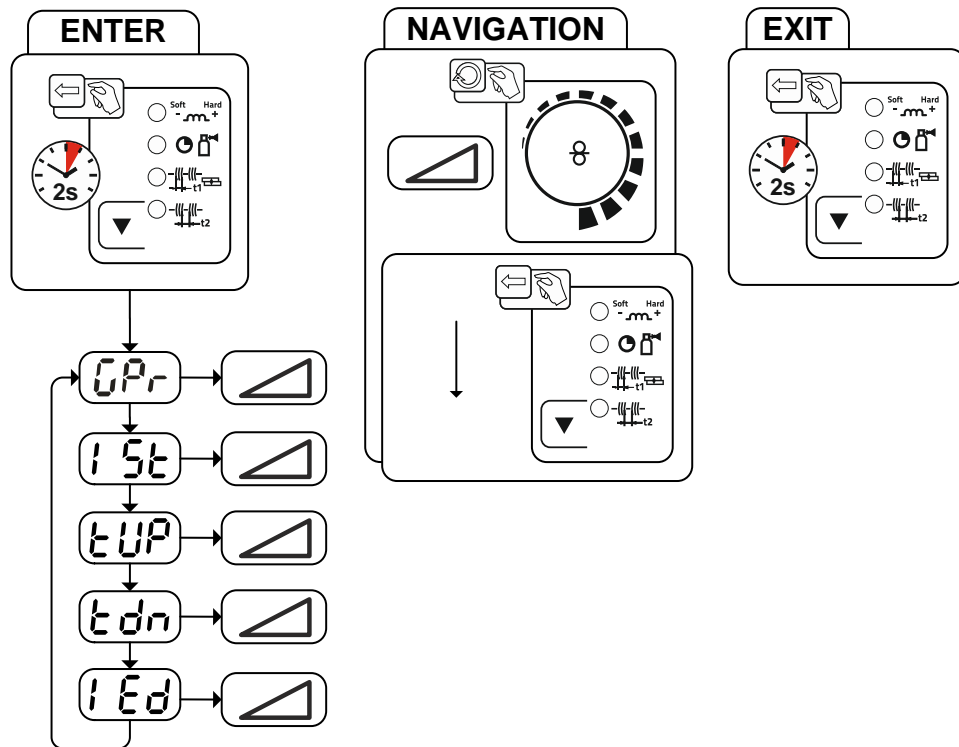


Figure 5-43

Display	Setting/selection
	Gas pre-flow time
	Ignition current
	Up-slope time
	Down-slope time
	End current

## 5.5.6 TIG arc ignition

### 5.5.6.1 Liftarc

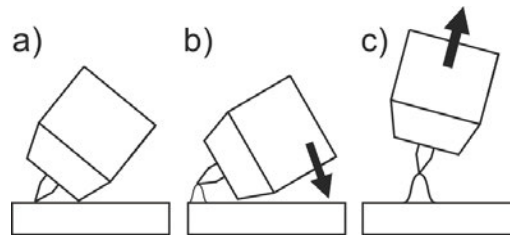


Figure 5-44

**The arc is ignited on contact with the workpiece:**

- Carefully place the torch gas nozzle and tungsten electrode tip onto the workpiece and press the torch trigger (liftarc current flowing, regardless of the main current set).
- Incline the torch over the torch gas nozzle to produce a gap of approx. 2-3 mm between the electrode tip and the workpiece. The arc ignites and the welding current is increased, depending on the operating mode set, to the ignition or main current set.
- Lift off the torch and swivel to the normal position.

**Ending the welding process: Release or press the torch trigger depending on the operating mode selected.**

## 5.5.7 Function sequences/operating modes

### 5.5.7.1 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
$I_{start}$	Ignition current
$I_{end}$	End-crater current

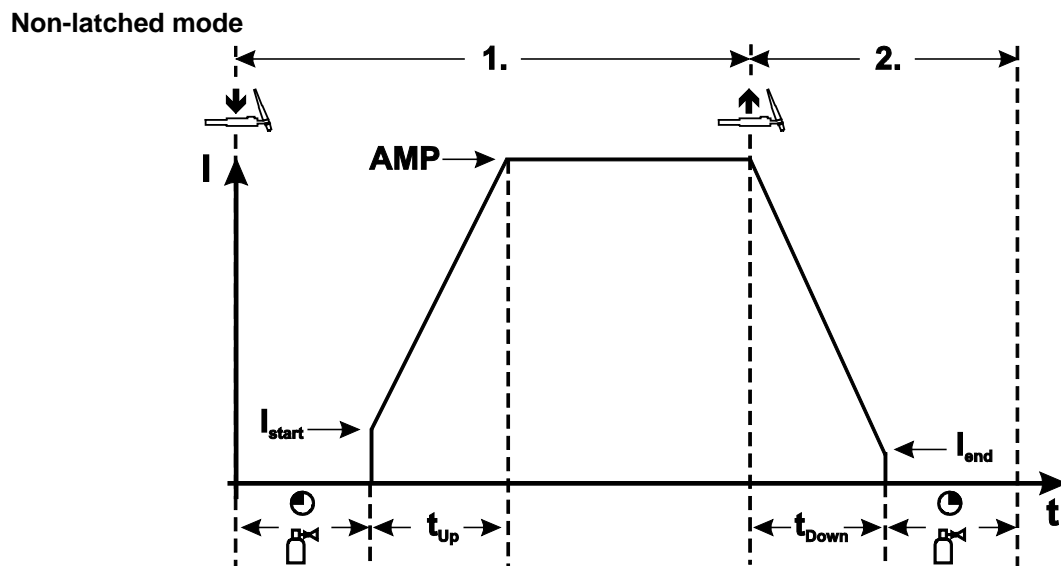


Figure 5-45

**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.

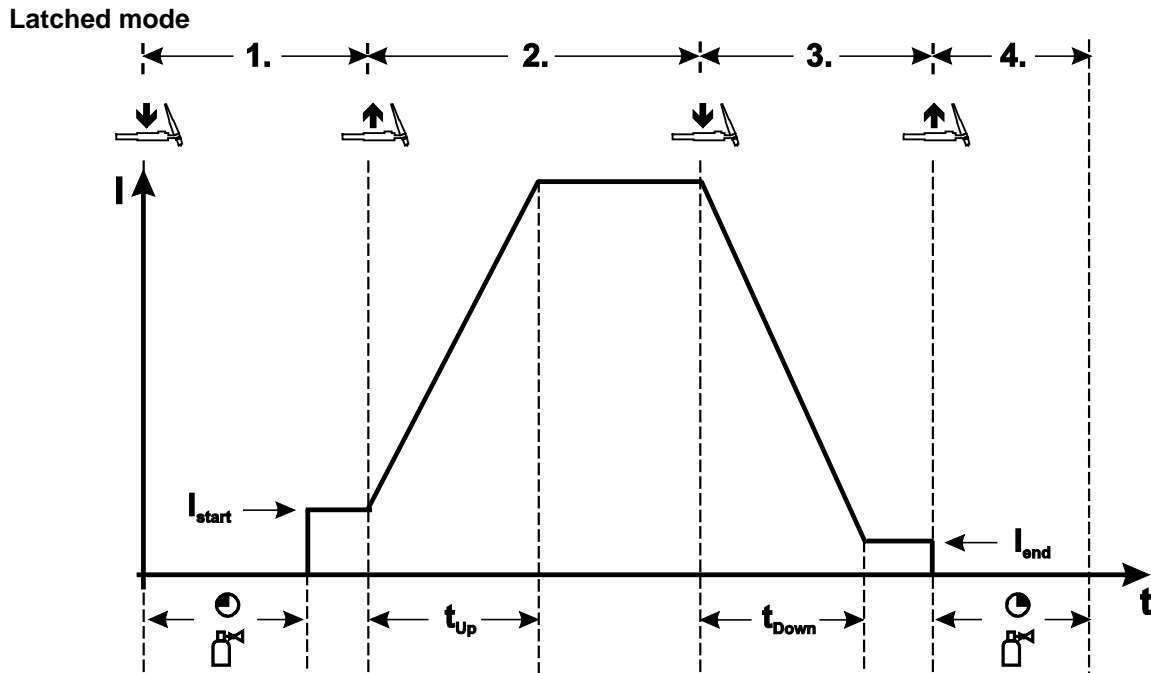


Figure 5-46

### 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.

## 5.5.8 TIG automatic cut-out



**The welding machine ends the ignition process or the welding process with an**

- **ignition fault (no welding current flows within 5 s after the start signal)**
- **arc interruption (arc is interrupted for longer than 5 s)**

## 5.6 Remote control



**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.**



**The remote controls are operated on the 19-pole remote control connection socket (analogue).**



**Read and observe the documentation to all system and accessory components!**

## 5.7 Special parameters (advanced settings)

Special parameters (P1 to Pn) are applied for customer-specific configuration of machine functions. This allows the user maximum flexibility in optimising their requirements.

These settings are not configured directly on the machine control since a regular setting of the parameters is generally not required. The number of selectable special parameters can deviate between the machine controls used in the welding system (also see the relevant standard operating instructions). If required, the special parameters can be reset to the factory settings > see 7.4 chapter.

### 5.7.1 Selecting, changing and saving parameters

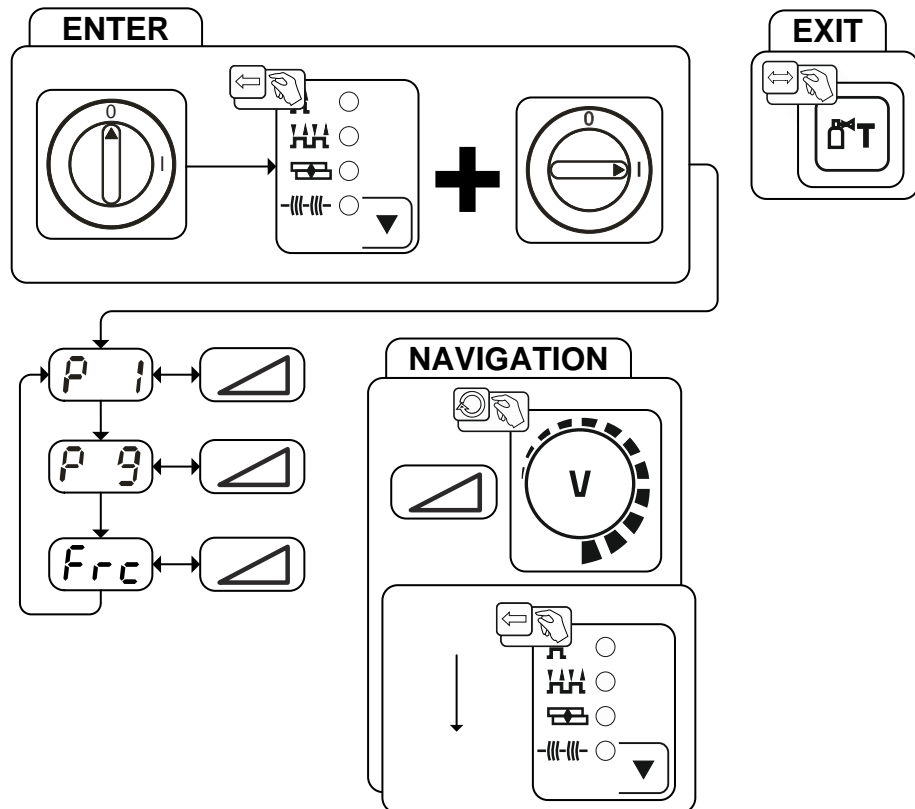


Figure 5-47

Display	Setting/selection
<b>P 1</b>	<b>Ramp time for wire inching</b> 0 -----normal inching (10s ramp time) 1 -----fast inching (3s ramp time) (Ex works)
<b>P 9</b>	<b>Lat. and sp. lat. tapping start</b> 0 -----no latched tapping start (Ex works) 1 -----latched tapping start possible
<b>Frc</b>	<b>Remote control encoding (Frc)</b> 0-----Automatic remote control detection (ex works) 2-----Remote control encoding for accessory components with a single rotary knob only 9-----Remote control encoding for accessory components with a single pair of buttons or a rocker only 1, 3-8----No remote control encoding 10-15----No remote control encoding

## 5.7.1.1 Special parameters in detail

### Ramp time for wire inching (P1)

The wire inching starts with a speed 1.0 m/min for 2 secs. It is subsequently increased to a ramp function to 6.0 m/min. The ramp time can be set between two ranges.

During wire inching, the speed can be changed by means of the welding parameter setting rotary dial. Changing the speed has no effect on the ramp time.

### Latched/special-latched tap start (P9)

In latched – tap start – operating mode it is possible to switch straight to the second step by tapping the torch trigger; it is not necessary for current to be flowing.

The welding can be halted by pressing the torch trigger for a second time.

## 5.7.1.2 Reset to factory settings



**All special parameters saved by the user will be overwritten by the factory settings!**

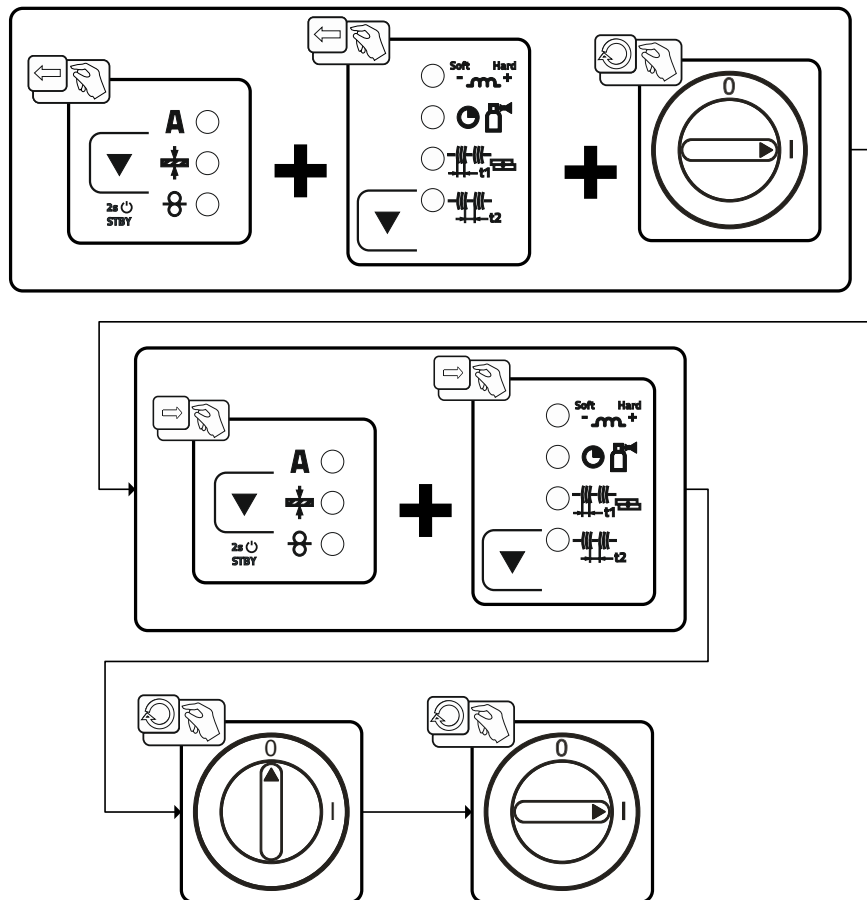


Figure 5-48



## 5.8 Machine configuration menu

### 5.8.1 Selecting, changing and saving parameters

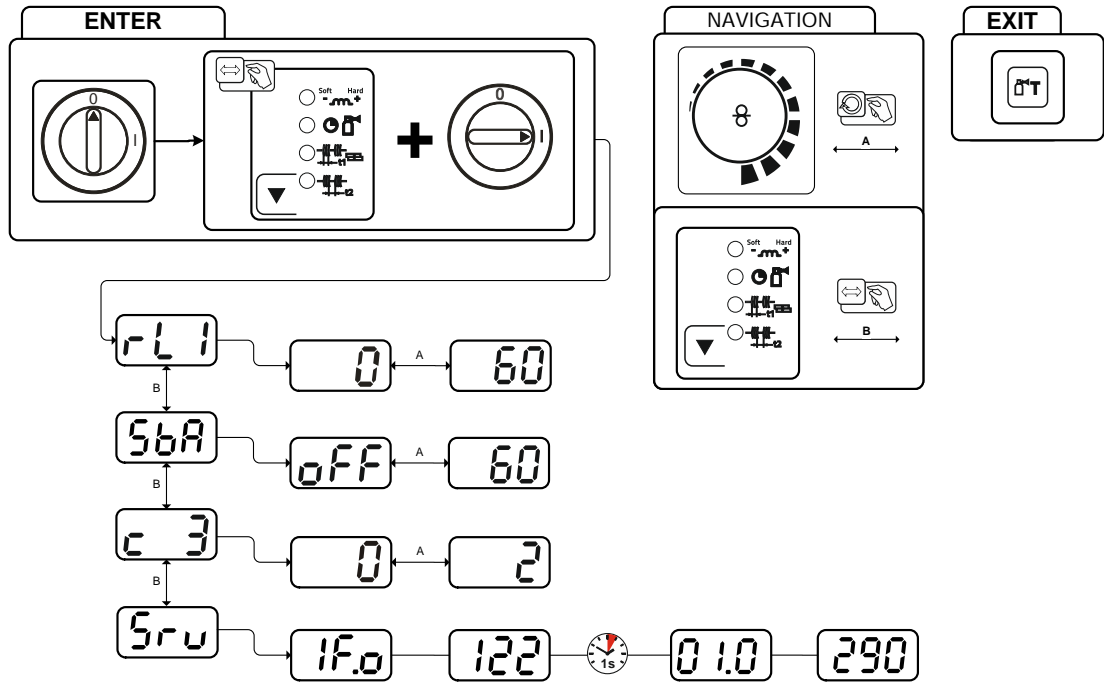


Figure 5-49

Display	Setting/selection
<b>rL1</b>	<b>Lead resistance 1</b> Lead resistance for the first welding circuit 0 mΩ–60 mΩ (8 mΩ ex works).
<b>SbA</b>	<b>Time-based power-saving mode &gt; see 5.8.3 chapter</b> 5 min.–60 min. = Time to activation of power-saving mode in case of inactivity. <b>OFF</b> -----inactivated
<b>c 3</b>	<b>Only qualified service personnel may change the parameters!</b>
<b>Sru</b>	<b>Service menu</b> Any changes to the service menu should be agreed with the authorised service personnel.

## 5.8.2 Aligning the cable resistance

The resistance value of cables can either be set directly or it can be aligned using the power source. The factory setting of the power sources is 8 mΩ. This value corresponds to a 5 m earth cable, a 1.5 m intermediate hose package and a 3 m water-cooled welding torch. With other hose package lengths, it is necessary to carry out a +/- voltage correction to optimise welding properties. The voltage correction value can be set close to zero by means of realigning the cable resistance. It is recommended to align the electric cable resistance after replacing accessories such as torches or intermediate hose packages.

In case a second wire feeder is used the (rL2) parameter has to be aligned. For all other configurations it is sufficient to align the (rL1) parameter.

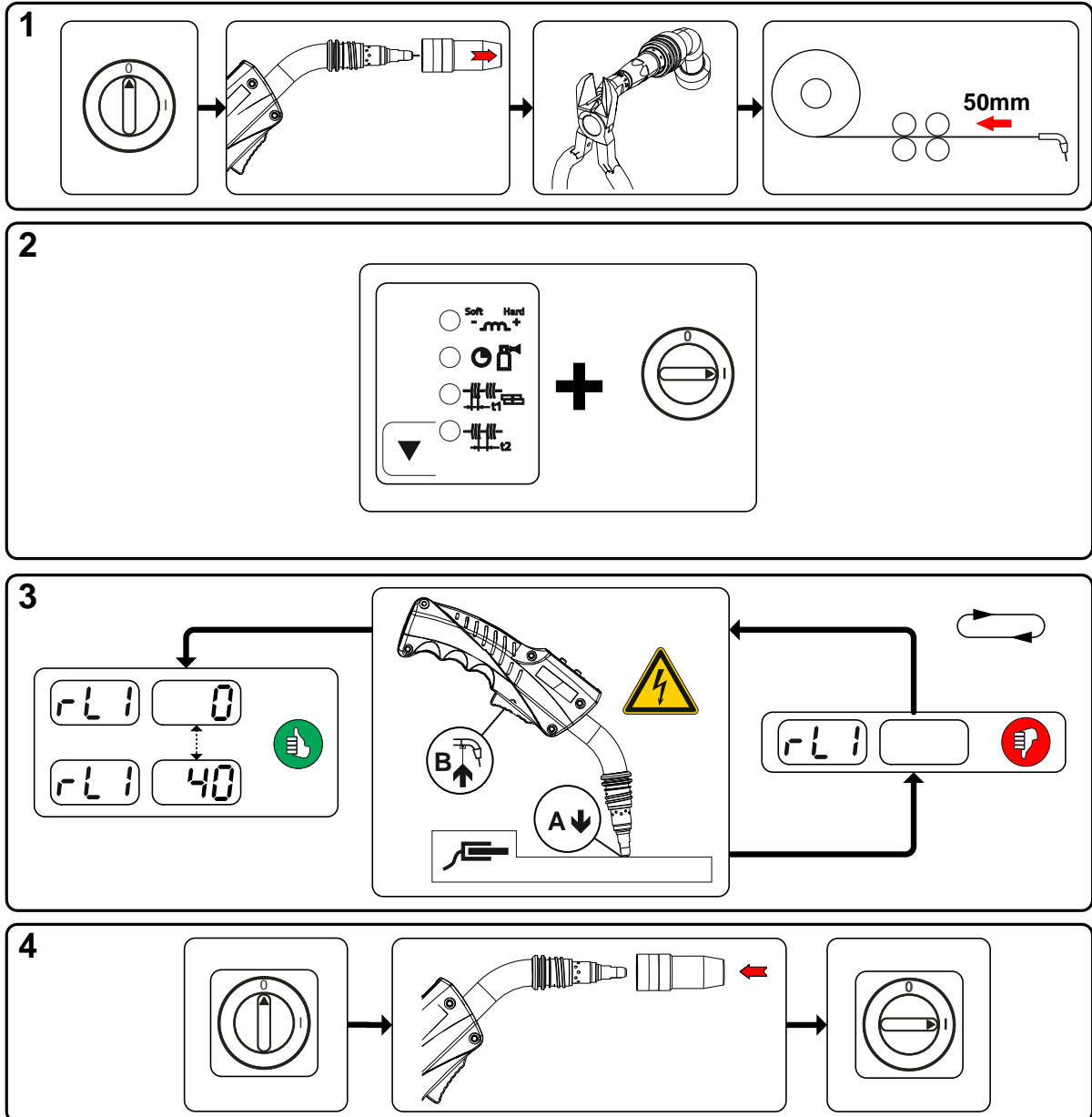


Figure 5-50

### 1 Preparation

- Switch off the welding machine.
- Unscrew the gas nozzle of the welding torch.
- Cut off the welding wire to be flush with the contact tip.
- Retract the welding wire a bit (approx. 50 mm) on the wire feeder. Now there should be no more welding wire in the contact tip.

### 2 Configuration

- Press the "sequence parameter" push-button while simultaneously switching on the welding machine. Release the "sequence parameter" push-button.
- The desired parameter can now be selected using the "sequence parameter" push-button. Parameter rL1 must be aligned for all machine combinations. In case of welding systems with a second power circuit – if two wire feeders are to be operated from a single power source, for example – a second alignment with parameter rL2 must be performed.

### 3 Alignment/measurement

- Applying slight pressure, put the welding torch in place with the contact tip on a clean, purged location on the workpiece and then press the torch trigger for approx. 2 seconds. Short-circuit current flows briefly, which is used to determine and display the cable resistance. The value can be between 0 mΩ and 40 mΩ. The new value is immediately saved without requiring any further confirmation. If no value is shown in the right display, then the measurement failed. The measurement must be repeated.

### 4 Restoring welding standby mode

- Switch off the welding machine.
- Screw the gas nozzle onto the welding torch.
- Switch on the welding machine
- Insert the welding wire.

## 5.8.3 Power-saving mode (Standby)

You can activate the power-saving mode by either pressing the push-button > see 4.4 chapter for a prolonged time or by setting a parameter in the machine configuration menu (time-controlled power-saving mode 5.8.3).



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



##### **Incorrect maintenance and testing!**

The machine may be cleaned, repaired and tested by skilled and qualified personnel only. A qualified person is one who, due to their training, knowledge and experience, can detect any hazards and possible consequential damage when checking the machine, and can take the necessary safety measures.

- Observe the maintenance instructions > see 6.3 chapter!
- The machine may only be put into operation again once the testing has been successful.



##### **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 least 4 minutes until the capacitors have discharged!

#### WARNING



##### **Cleaning, testing and repair!**

**Cleaning, testing and repairing of the welding machine may only be carried out by competent, qualified personnel. A qualified person is one who, because of his or her training, knowledge and experience, is able to recognise the dangers that can occur while testing welding power sources as well as possible subsequent damage, and who is able to implement the required safety procedures.**

- In the event of failure of any one of the following tests, the machine must not be operated again until it has been repaired and a new test has been carried out.

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 Cleaning

- Clean the outer surfaces with a moist cloth (no aggressive cleaning agents).
- Purge the machine venting channel and cooling fins (if present) with oil- and water-free compressed air. Compressed air may overspeed and destroy the machine fans. Never direct the compressed air directly at the machine fans. Mechanically block the fans, if required.
- Check the coolant for contaminants and replace, if necessary.

### 6.3 Maintenance work, intervals

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.

### 6.3.1 Daily maintenance tasks

#### 6.3.1.1 Visual inspection

- Mains supply lead and its strain relief
- Gas cylinder securing elements
- Check hose package and power connections for exterior damage and replace or have repaired by specialist staff as necessary!
- Gas tubes and their switching equipment (solenoid valve)
- Check that all connections and wearing parts are hand-tight and tighten if necessary.
- Check correct mounting of the wire spool.
- Wheels and their securing elements
- Transport elements (strap, lifting lugs, handle)
- Other, general condition

#### 6.3.1.2 Functional test

- Operating, message, safety and adjustment devices (Functional test)
- Welding current cables (check that they are fitted correctly and secured)
- Gas tubes and their switching equipment (solenoid valve)
- Gas cylinder securing elements
- Check correct mounting of the wire spool.
- Check that all screw and plug connections and replaceable parts are secured correctly, tighten if necessary.
- Remove any spatter.
- Clean the wire feed rollers on a regular basis (depending on the degree of soiling).

### 6.3.2 Monthly maintenance tasks

#### 6.3.2.1 Visual inspection

- Casing damage (front, rear and side walls)
- Wheels and their securing elements
- Transport elements (strap, lifting lugs, handle)
- Check coolant tubes and their connections for impurities

#### 6.3.2.2 Functional test

- Selector switches, command devices, emergency stop devices, voltage reducing devices, message and control lamps
- Check that the wire guide elements (inlet nipple, wire guide tube) are fitted securely.
- Check coolant tubes and their connections for impurities
- Check and clean the welding torch. Deposits in the torch can cause short circuits and have a negative impact on the welding result, ultimately causing damage to the torch.

### 6.3.3 Annual test (inspection and testing during operation)



***The welding machine may only be tested by competent, capable persons! A capable person is one who, because of his training, knowledge and experience, is able to recognise the dangers that can occur while testing welding power sources as well as possible subsequent damage and who is able to implement the required safety procedures.***



***For more information refer to the "Warranty registration" brochure supplied and our information regarding warranty, maintenance and testing at [www.ewm-group.com](http://www.ewm-group.com)!***

A periodic test according to IEC 60974-4 "Periodic inspection and test" has to be carried out. In addition to the regulations on testing given here, the relevant local laws and regulations must also be observed.

## 6.4 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!**



### 6.4.1 Manufacturer's declaration to the end user

- According to European provisions (guideline 2012/19/EU of the European Parliament and the Council of July, 4th 2012), 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 is to be placed for disposal or recycling in the waste separation systems provided for this purpose.
- According to German law (law governing the distribution, taking back and environmentally correct disposal of electric and electronic equipment (ElektroG) from 16.03.2005), 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.
- Information about giving back used equipment or about collections can be obtained from the respective municipal administration office.
- EWM participates in an approved waste disposal and recycling system and is registered in the Used Electrical Equipment Register (EAR) under number WEEE DE 57686922.
- In addition to this, returns are also possible throughout Europe via EWM sales partners.

## 6.5 Meeting the requirements of RoHS

We, EWM AG in Mündersbach, Germany, hereby confirm that all products which we supply to you and that are subject to the RoHS directive comply with RoHS requirements (also see applicable EC directives on the Declaration of Conformity on your machine).

## 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 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

#### Coolant error/no coolant flowing

- ↘ Insufficient coolant flow
  - ✘ Check coolant level and refill if necessary
- ↘ Air in the coolant circuit
  - ✘ Vent coolant circuit

#### Wire feed problems

- ↘ Contact tip blocked
  - ✘ Clean, spray with anti-spatter spray and replace if necessary
- ↘ Setting the spool brake > see 5.3.4.5 chapter
  - ✘ Check settings and correct if necessary
- ↘ Setting pressure units > see 5.3.4.4 chapter
  - ✘ Check settings and correct if necessary
- ↘ Worn wire rolls
  - ✘ Check and replace if necessary
- ↘ Wire feed motor without supply voltage (automatic cutout triggered by overloading)
  - ✘ Reset triggered fuse (rear of the power source) by pressing the key button
- ↘ 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

#### Functional errors

- ↘ 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)
- ↘ Several parameters cannot be set (machines with access block)
  - ✘ Entry level is blocked, disable access lock
- ↘ Connection problems
  - ✘ 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
  - ✘ Tighten contact tip correctly

#### Mains fuse triggers

- ↘ Unsuitable mains fuse
  - ✘ Set up recommended mains fuse > see 8 chapter.

## 7.2 Error messages (power source)

 **A welding machine error is indicated by an error code being displayed (see table) on the display on the machine control.**

**In the event of a machine error, the power unit is shut down.**

 **The display of possible error numbers depends on the machine version (interfaces/functions).**

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





Error (Err)	Category			Possible cause	Remedy
	a)	b)	c)		
1	-	-	x	Mains overvoltage	Check the mains voltages and compare with the welding machine connection voltages
2	-	-	x	Mains undervoltage	
3	x	-	-	Welding machine excess temperature	Allow the machine to cool down (mains switch to "1")
4	x	x	-	Low coolant level	Top up the coolant Leak in the coolant circuit > repair the leak and top up the coolant Coolant pump is not working > check excess current trigger on air cooling unit
5	x	-	-	Wire feeder/tachometer error	Check the wire feeder Speedometer is not emitting a signal, M3.51 defective > inform Service.
6	x	-	-	Shielding gas error	Check shielding gas supply (for machines with shielding gas monitoring)
7	-	-	x	Secondary overvoltage	Inverter error > inform Service
8	-	-	x	Earth fault between welding wire and earth line	Separate the connection between welding wire and casing or an earthed object
9	x	-	-	Fast cut-out Triggered by BUSINT X11 or RINT X12	Rectify error on robot
10	-	x	-	Arc interruption Triggered by BUSINT X11 or RINT X12	Check wire feeding
11	-	x	-	Ignition error after 5 s Triggered by BUSINT X11 or RINT X12	Check wire feeding
13	x	-	-	Emergency stop deactivation	Check the emergency stop circuit at the interface for automated welding
14	-	x	-	Wire feeder not detected. Control cable not connected.	Check cable connections.
				Incorrect ID numbers assigned during operation with multiple wire feeders.	Check ID number assignation
15	-	x	-	Wire feeder 2 not detected. Control cable not connected.	Check cable connections.
16	-	-	x	VRD (open circuit voltage reduction error).	Inform Service.
17	-	x	x	Excess current detection on wire feeder	Check wire feeding
18	-	x	x	No speedometer signal from second wire feeder (slave drive)	Check the connection and particularly the speedometer for the second wire feeder (slave drive).
56	-	-	x	Mains phase failure	Check mains voltages



Error (Err)	Category			Possible cause	Remedy
	a)	b)	c)		
59	-	-	x	Machine incompatible	Check machine used
60	-	-	x	Software update required	Inform Service.

### Categories legend (resetting the error)

- a) The error message will disappear once the error has been rectified.  
 b) The error message can be reset by pressing a push-button:

Welding machine control	Push-button
RC1 / RC2	
Expert	
Expert 2.0	
CarExpert / Progress (M3.11)	
alpha Q / Concept / Basic / Basic S / Synergic / Synergic S / Progress (M3.71) / Picomig 355	not possible

- c) The error message can only be reset by switching the machine off and on again.  
 The shielding gas error (Err 6) can be reset by pressing the "Welding parameters" key button.

### 7.3 Welding parameter calibration

In case of deviations between the welding parameters set on the front panel/remote control and those shown on the welding machine, this function allows for easy alignment.

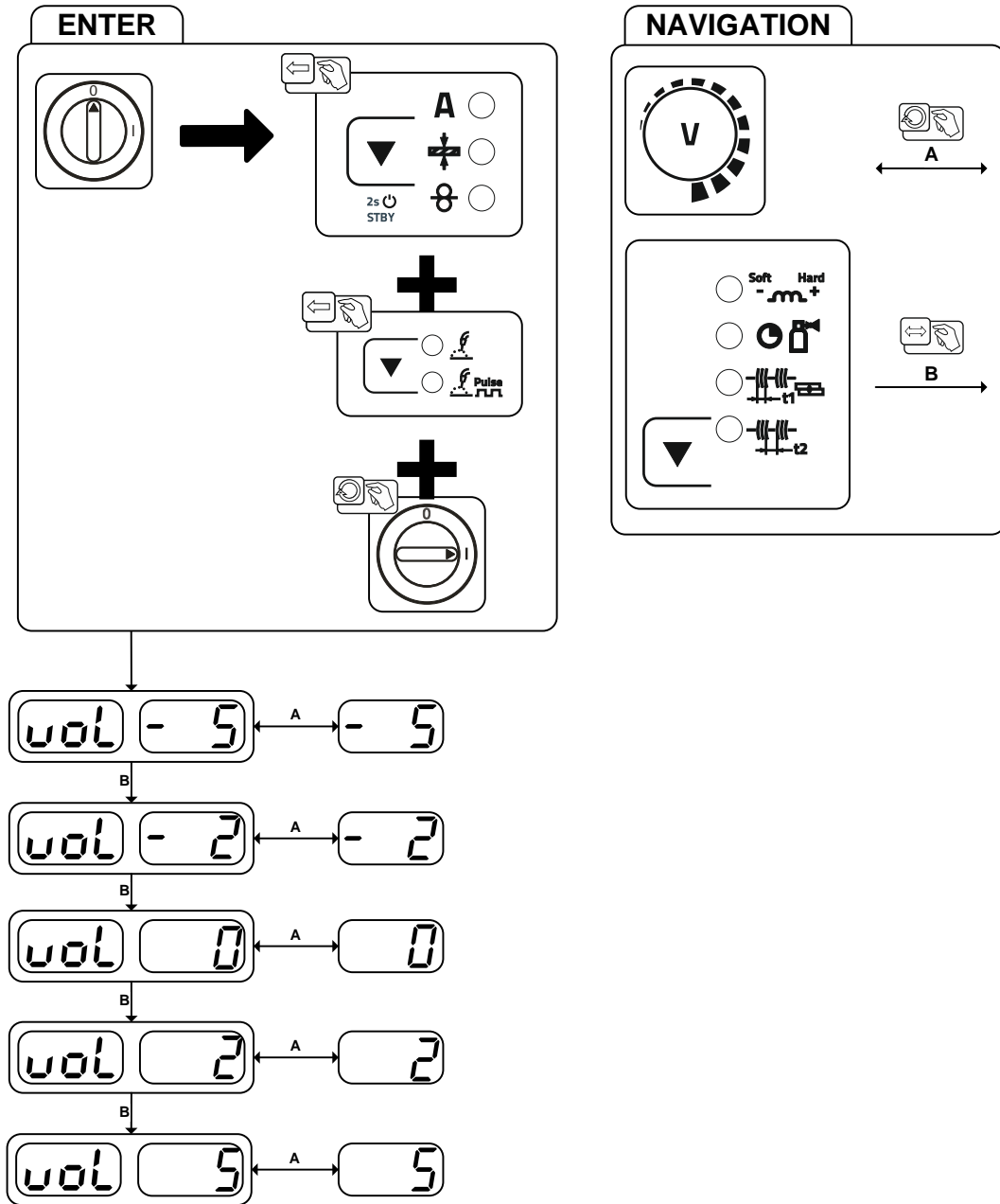


Figure 7-1

## 7.4 Resetting welding parameters to the factory settings

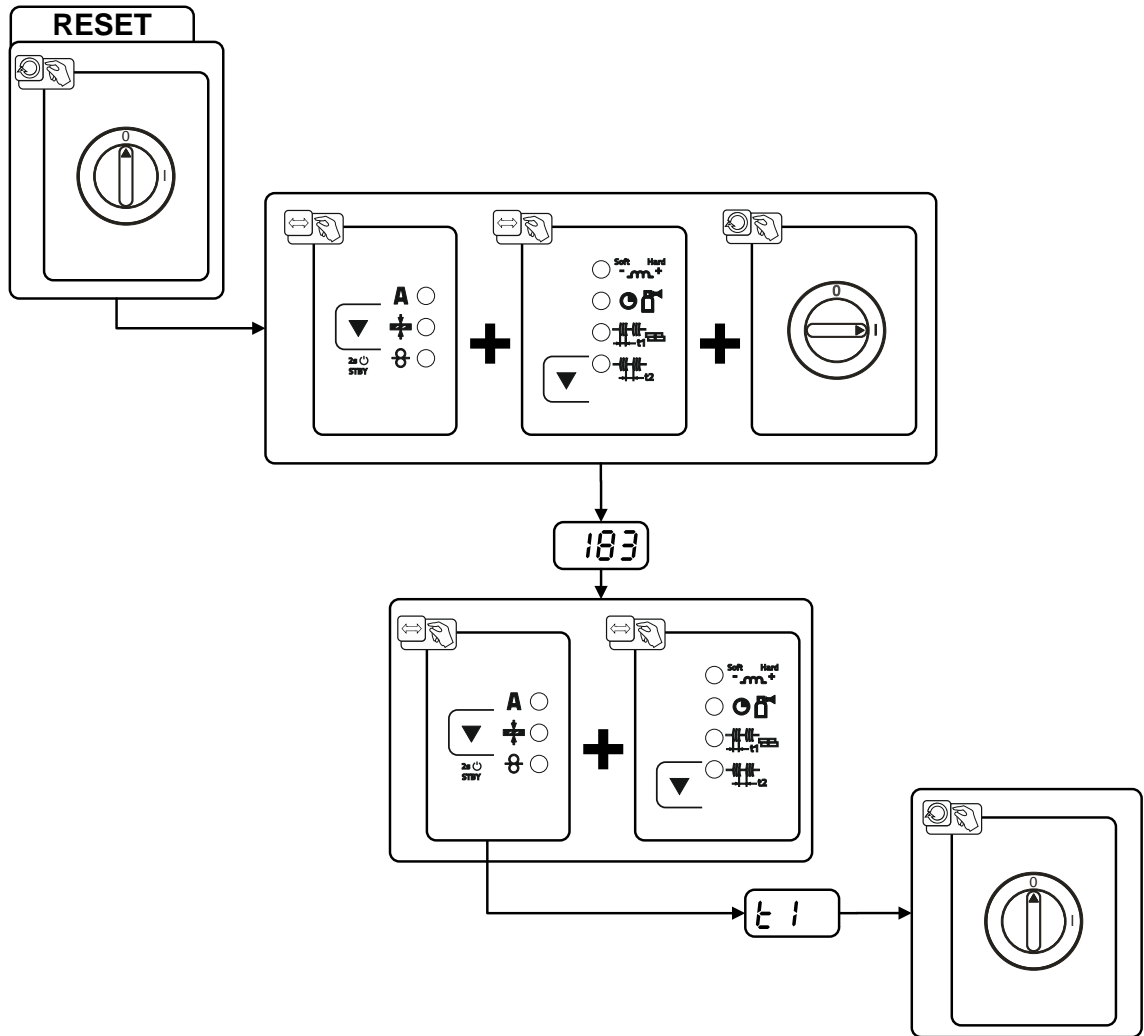


Figure 7-2

Display	Setting/selection
	Code of machine control
	Initialisation complete All customised welding parameters have been overwritten by the factory settings.

## 7.5 Resetting JOBS (welding tasks) to the factory settings

### 7.5.1 Resetting a single JOB

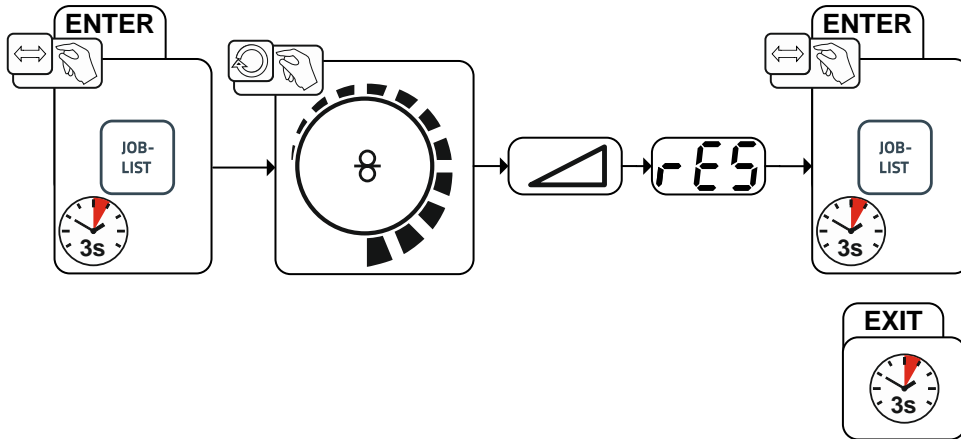


Figure 7-3

Display	Setting/selection
	<b>RESET to factory settings</b> The RESET will be done after pressing the button. The menu will be ended when no changes are done after 3 sec.
	<b>JOB-number (example)</b> The shown JOB will be set to ex works.

### 7.5.2 Resetting all JOBS

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

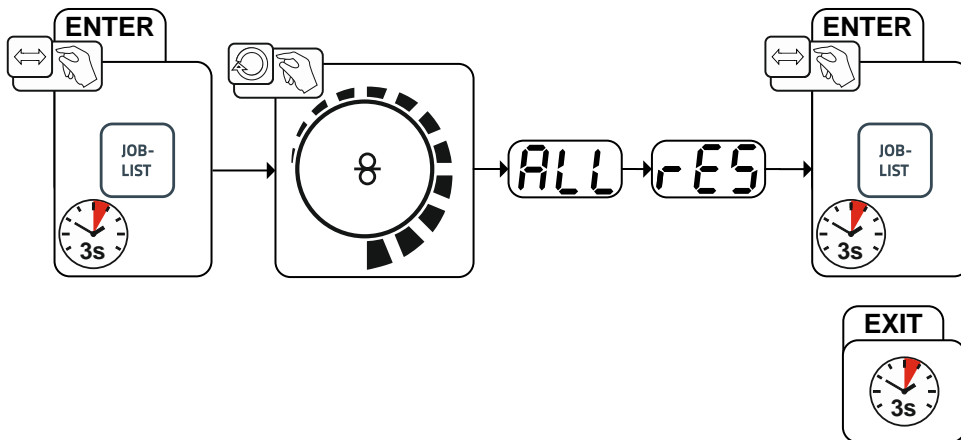





Figure 7-4

Display	Setting/selection
	<b>RESET to factory settings</b> The RESET will be done after pressing the button. The menu will be ended when no changes are done after 3 sec.

## 8 Technical data

### 8.1 Picomig 355 Synergic TKM

 *Performance specifications and guarantee only in connection with original spare and replacement parts!*

Setting range	MIG/MAG	TIG	MMA
Welding current	5 A to 300 A		
Welding voltage	14.3 V to 29 V	10.2 V to 22 V	20.2 V to 32 V
<b>Duty cycle at 40 °C ambient temperature</b>			
45% DC	350 A		
60% DC	300 A		
100% DC	270 A		
Load cycle	10 min. (60% DC $\triangle$ 6 min. welding, 4 min. pause)		
Open circuit voltage	79 V		
Mains voltage (tolerances)	3 x 400 V (-25% to +20%)		
Frequency	50/60 Hz		
Mains fuse (safety fuse, slow-blow)	3 x 16 A		
Mains connection lead	H07RN-F4G2,5		
Max. connected load	13.9 kVA	8.3 kVA	15.0 kVA
Recommended generator rating	20.3 kVA		
cos $\phi$ /efficiency	0.99/88 %		
Insulation class/protection classification	H/IP 23		
Ambient temperature	-25 °C to +40 °C		
Machine/torch cooling	Fan (AF)/gas		
Noise level	< 70 dB(A)		
Workpiece lead	50 mm <sup>2</sup>		
Insulation class/protection classification	H/IP 23		
EMC class	A		
Safety identification	 /  / 		
Harmonised standards used	IEC 60974-1, -5, -10		
Welding torch connection	Euro torch connector		
Wire feed speed	0.5 m/min. to 25 m/min.		
Factory-installed roll equipment	0,9 mm + 1,0 mm (for steel wire)		
Wire feed mechanism	4 rolls (37 mm)		
Wire spool diameter	Standardized wire spools up to 300 mm		
Dimensions L x W x H	636 mm x 298 mm x 482 mm		
	25.0 inch x 11.7 inch x 19.0 inch		
Weight (without mains cable)	34.4 kg		
	75,8 lb		

## 9 Accessories



*Performance-dependent accessories like torches, workpiece leads, electrode holders or intermediate hose packages are available from your authorised dealer.*

### 9.1 General accessories

Type	Designation	Item no.
AK300	Wire spool adapter K300	094-001803-00001
CA D200	Centering adapter for 5-kg spools	094-011803-00000
5POLE/CEE/16A/M	Machine plug	094-000712-00000
DM 842 Ar/CO2 230bar 30l D	Pressure regulator with manometer	394-002910-00030
G1 G1/4 R 3M	Gas hose	094-000010-00003
SPL	Sharpener for plastic liners	094-010427-00000
HC PL	Hose cutter	094-016585-00000
cool50 U40	Cooling module	090-008598-00502

### 9.2 Remote control/connecting and extension cable

#### 9.2.1 19-pole connection

Type	Designation	Item no.
R10 19POL	Remote control	090-008087-00000
RG10 19POL 5M	Remote control to set the wire speed and welding voltage correction	090-008108-00000
RA5 19POL 5M	Remote control e.g. connection cable	092-001470-00005
RA10 19POL 10M	Remote control e.g. connection cable	092-001470-00010
RA20 19POL 20M	Remote control e.g. connection cable	092-001470-00020
RV5M19 19POLE 5M	Extension cable	092-000857-00000
RV5M19 19POL 10M	Extension cable	092-000857-00010
RV5M19 19POL 15M	Extension cable	092-000857-00015
RV5M19 19POL 20M	Extension cable	092-000857-00020

### 9.3 Options

Type	Designation	Item no.
ON Filter xx5	Dirt filter	092-002662-00000
ON WAK xx5	Wheel assembly kit for the xx5 machine series	092-001356-00000
ON CS K	Crane suspension for Picomig 180 / 185 D3 / 305 D3, Phoenix and Taurus 355 compact, drive 4	092-002549-00000

### 9.4 Transport systems

Type	Designation	Item no.
ON TR Trolley 55-5	Cross arm and holder for wire feeder	092-002700-00000
Trolley 35.2-2	Transport vehicle	090-008296-00000
Trolley 39-1	Transport vehicle, power source	090-008708-00000
Trolley 55-5	Transport cart, assembled	090-008632-00000

## 10 Replaceable parts



*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.*

### 10.1 Wire feed rollers

#### 10.1.1 Wire feed rollers for steel wire

Type	Designation	Item no.
FE 4R 0.6 MM/0.023 INCH LIGHT PINK	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00006
FE 4R 0.8 MM/0.03 INCH WHITE	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00008
FE 4R 1,0 MM/0.04 INCH BLUE	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00010
FE 4R 1.2 MM/0.045 INCH RED	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00012
FE 4R 1.4 MM/0.052 INCH GREEN	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00014
FE 4R 1.6 MM/0.06 INCH BLACK	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00016
FE 4R 2.0 MM/0.08 INCH GREY	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00020
FE 4R 2.4 MM/0.095 INCH BROWN	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00024
FE 4R 2.8 MM/0.11 INCH LIGHT GREEN	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00028
FE 4R 3.2 MM/0.12 INCH VIOLET	Drive roll set, 37 mm, 4 rolls, V-groove for steel, stainless steel and brazing	092-002770-00032

#### 10.1.2 Wire feed rollers for aluminium wire

Type	Designation	Item no.
AL 4R 0.8 MM/0.03 INCH WHITE	Drive roll set, 37 mm, for aluminium	092-002771-00008
AL 4R 1.0 MM/0.04 INCH BLUE	Drive roll set, 37 mm, for aluminium	092-002771-00010
AL 4R 1.2 MM/0.045 INCH RED	Drive roll set, 37 mm, for aluminium	092-002771-00012
AL 4R 1.6 MM/0.06 INCH BLACK	Drive roll set, 37 mm, for aluminium	092-002771-00016
AL 4R 2.0 MM/0.08 INCH GREY/YELLOW	Drive roll set, 37 mm, for aluminium	092-002771-00020
AL 4R 2.4 MM/0.095 INCH BROWN/YELLOW	Drive roll set, 37 mm, for aluminium	092-002771-00024
AL 4R 2.8 MM/0.110 INCH LIGHT GREEN/YELLOW	Drive roll set, 37 mm, for aluminium	092-002771-00028
AL 4R 3.2 MM/0.125 INCH VIOLET/YELLOW	Drive roll set, 37 mm, for aluminium	092-002771-00032

#### 10.1.3 Wire feed rollers for cored wire

Type	Designation	Item no.
FUEL 4R 0.8 MM/0.03 INCH WHITE/ORANGE	Drive roll set, 37 mm, 4 rolls, V-groove/knurled for flux cored wire	092-002848-00008

Type	Designation	Item no.
FUEL 4R 1.0 MM/0.04 INCH BLUE/ORANGE	Drive roll set, 37 mm, 4 rolls, V-groove/knurled for flux cored wire	092-002848-00010
FUEL 4R 1.2 MM/0.045 INCH RED/ORANGE	Drive roll set, 37 mm, 4 rolls, V-groove/knurled for flux cored wire	092-002848-00012
FUEL 4R 1.4 MM/0.052 INCH GREEN/ORANGE	Drive roll set, 37 mm, 4 rolls, V-groove/knurled for flux cored wire	092-002848-00014
FUEL 4R 1.6 MM/0.06 INCH BLACK/ORANGE	Drive roll set, 37 mm, 4 rolls, V-groove/knurled for flux cored wire	092-002848-00016
FUEL 4R 2.0 MM/0.08 INCH GREY/ORANGE	Drive roll set, 37 mm, 4 rolls, V-groove/knurled for flux cored wire	092-002848-00020
FUEL 4R 2.4 MM/0.095 INCH BROWN/ORANGE	Drive roll set, 37 mm, 4 rolls, V-groove/knurled for flux cored wire	092-002848-00024

## 10.1.4 Wire guide

Type	Designation	Item no.
SET DRAHTFUERUNG	Wire guide set	092-002774-00000
ON WF 2,0-3,2MM EFEED	Retrofitting option, wire guide for 2.0–3.2 mm wires, eFeed drive	092-019404-00000
SET IG 4x4 1.6mm BL	Inlet guide set	092-002780-00000
GUIDE TUBE L105	Guide tube	094-006051-00000
CAPTUB L108 D1,6	Capillary tube	094-006634-00000
CAPTUB L105 D2,0/2,4	Capillary tube	094-021470-00000



# 11 Appendix A

## 11.1 JOB-List

ewm®		JOB-LIST		094-019170-00500					
Material	Gas	Wire				Job-Nr.			
		0,8	0,9	1,0	1,2	0,8	0,9	1,0	1,2
SG2/3 G3/4 Si1	CO <sub>2</sub> 100 / C1	1	2	3	4				
	Ar80-90 / M2	6	7	8	9				
CrNi	Ar91-99 / M12-M13	34		35	36				
	Ar/He / I3	42		43	44				
CuSi Löten / Brazing	Ar100 / I1	114		115	116				
	Ar91-99 / M12-M13	110		111	112				
CuAl Löten / Brazing	Ar100 / I1	122		123	124				
	Ar91-99 / M12-M13	118		119	120				
AlMg	Ar100 / I1	74		75	76				
	Ar/He / I3	78		79	80				
AlSi	Ar100 / I1	82		83	84				
	Ar/He / I3	86		87	88				
Al99	Ar100 / I1	90		91	92				
	Ar/He / I3	94		95	96				

ewm®		JOB-LIST		094-021250-00500					
Material	Gas	Wire				Job-Nr.			
		0,8	0,9	1,0	1,2	0,8	0,9	1,0	1,2
SG2/3 G3/4 Si1	Ar-82/CO <sub>2</sub> -18 M21	189		179					
	Ar-90/CO <sub>2</sub> -10 M20	190		254					

ewm®		JOB-LIST		094-019170-00500					
Material	Gas	Wire				Job-Nr.			
		0,8	0,9	1,0	1,2	0,8	0,9	1,0	1,2
SG2/3 G3/4 Si1 Metal	Ar80-90 / M2	235		237	238				
SG2/3 G3/4 Si1 Rutil / Basic	Ar80-90 / M2	240		242	243				
CrNi Metal	Ar91-99 / M12-M13	227		228	229				
CrNi Rutil / Basic	Ar98/2 / M13	231		232	233				
	Ar92/8 / M22	210		211	212				

ewm®		JOB-LIST		094-019170-00500					
Material	Gas	Wire				Job-Nr.			
		0,9	1,0	1,1	1,2	0,8	0,9	1,0	1,2
E71T-11	Self-Shielded	172		171	170				

ewm®		JOB-LIST		094-019170-00500					
Material	Gas	Wire				Job-Nr.			
		0,8	0,9	1,0	1,2	0,8	0,9	1,0	1,2
SG2/3 G3/4 Si1	CO <sub>2</sub> 100 / C1			204	205				
	Ar80-90 / M2			206	207				

GMAW non synergic	188
WIG / TIG	127
E-Hand / MMA	128

Figure 11-1

## 12 Appendix B

### 12.1 Parameter overview – setting information

Welding data display (3-digit)	Parameters/function	Setting range			
		Standard (ex works)	Min.	Max.	Unit
<b>MIG/MAG</b>					
<b>SEc</b>	Gas pre-flow time	0,5	0,0 - 20,0		s
<b>dYn</b>	Dynamic correction		-40 - 40		
<b>GPE</b>	Gas post-flow time	0,5	0,0 - 20,0		s
<b>t 1</b>	Spot time	2	0,1 - 20,0		s
<b>t 2</b>	Pause time (interval)	2	0,1 - 20,0		s
<b>rbd</b>	Wire burn-back		0 - 499		
<b>TIG</b>					
<b>GPr</b>	Gas pre-flow time	0,5	0,0 - 20,0		s
<b>i SE</b>	Ignition current		0,0 - 20,0		s
<b>tUP</b>	Up-slope time	1	0,0 - 20,0		s
<b>tDn</b>	Down-slope time		0,0 - 20,0		s
<b>i Ed</b>	End current	20	1 - 200		%
<b>GPE</b>	Gas post-flow time	0,5	0,0 - 20,0		s
<b>MMA</b>					
<b>i hE</b>	Hot start current		0,0 - 20,0		%
<b>t hE</b>	Hot start time	0,5	0,1 - 20,0		s
<b>Basic parameters (independent of procedure)</b>					
<b>cAL</b>	Calibration				
<b>End</b>	Exit menu				
<b>cFG</b>	Machine configuration				
<b>Frc</b>	Remote control encoding	0	0 - 15		
<b>P 1</b>	Wire inching ramp time	1	0 - 1		
<b>P 9</b>	Tapping start for latched and special latched operation	0	0 - 1		
<b>rL 1</b>	Cable resistance 1	8	0 - 60		mΩ
<b>SbA</b>	Time-based power-saving mode	off	5 - 60		min.
<b>Sru</b>	Service menu				
<b>uEr</b>	Software version of the machine control				
<b>-</b>	Power-saving mode active				

## 13 Appendix C

### 13.1 Overview of EWM branches

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