# Operating instructions





**Control** 

T5.01 - DC Comfort 3.0

099-00T501-EW501

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1.2.2023

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## **General instructions**

#### **MARNING**



#### Read the operating instructions!

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

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

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

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

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

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

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

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

#### **Data security**

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



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# 2 For your safety

## 2.1 Notes on using these operating instructions

#### **▲ DANGER**

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

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

#### **⚠** WARNING

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

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

#### **▲ CAUTION**

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

- The safety information includes the "CAUTION" keyword in its heading with a general warning symbol.
- The risk is explained using a symbol on the edge of the page.
- Technical aspects which the user must observe to avoid material or equipment damage.

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

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



#### **Explanation of icons** 2.2

Symbol	Description	Symbol	Description
rg (	Indicates technical aspects which the user must observe.		Activate and release / Tap / Tip
	Switch off machine		Release
0	Switch on machine		Press and hold
<b>(X)</b>	Incorrect / Invalid		Switch
	Correct / Valid	@ <u>@</u>	Turn
	Input		Numerical value – adjustable
<b>①</b>	Navigation		Signal light lights up in green
F	Output	••••	Signal light flashes green
45	Time representation (e.g.: wait 4 s / actuate)		Signal light lights up in red
-11-	Interruption in the menu display (other setting options possible)	•••••	Signal light flashes red
*	Tool not required/do not use	->	Signal light lights up in blue
Î	Tool required/use	•	Signal light flashes blue



## 2.3 Safety instructions

# Risk of accidents due





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

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



Risk of injury from electrical voltage!

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

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



Hazard when interconnecting multiple power sources!

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

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

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



Risk of injury due to radiation or heat!

Arc radiation can lead to skin and eye injuries.

Contact with hot workpieces and sparks can lead to burns.

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







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
- Dry welding clothing (shoes, gloves and body protection) to protect against warm environments with conditions comparable to ambient temperatures of 100 °C or higher and arcing and work on live components.
- Hearing protection against harming noise.



#### **Explosion risk!**

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

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



#### Fire hazard!

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

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



#### **▲ CAUTION**



#### Smoke and gases!

Smoke and gases may lead to shortness of breath and poisoning! The ultraviolet radiation of the arc may also convert solvent vapours (chlorinated hydrocarbon) into poisonous phosgene.

- · Ensure sufficient fresh air!
- · Keep solvent vapours away from the arc beam field!
- Wear suitable respiratory protection if necessary!
- To prevent the formation of phosgene, residues of chlorinated solvents on workpieces must first be neutralised using appropriate measures.



#### Noise exposure!

#### Noise exceeding 70 dBA can cause permanent hearing damage!

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









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

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

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

#### Setting up and operating

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

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

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

#### Recommendations for reducing interference emission

- · Mains connection, e.g. additional mains filter or shielding with a metal tube
- · Maintenance of the arc welding system
- · Welding leads should be as short as possible and run closely together along the ground
- Potential equalization

**Electromagnetic fields!** 

- 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





The power source can create electrical or electromagnetic fields that may impair the function of electronic systems such as EDP and CNC devices, telecommunication, power and signal lines as well as pacemakers and defibrillators.

- Follow the maintenance instructions > see 6 chapter!
- Unwind the welding leads completely!
- Shield radiation-sensitive equipment or facilities appropriately!
- The function of pacemakers may be impaired (seek medical advice if necessary).



## **A** CAUTION



Obligations of the operator!

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

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



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

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

Requirements for connection to the public mains network

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

## 2.4 Transport and installation



#### **▲ WARNING**

Risk of injury due to improper handling of shielding gas cylinders! Improper handling and insufficient securing of shielding gas cylinders can cause serious injuries!

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



#### **▲ CAUTION**



Risk of accidents due to supply lines!

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

Disconnect all supply lines before transport!



#### Risk of tipping!

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

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



Risk of accidents due to incorrectly installed leads!

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

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



Risk of injury from heated coolant and its connections!

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

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

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!



#### Intended use 3



#### **⚠** WARNING



Hazards due to improper usage!

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

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

#### 3.1 Use and operation solely with the following machines

Tetrix XQ 230 puls DC

#### 3.2 Software version

The software version of the machine control can be displayed in the machine configuration menu (menu Srv) > see 5.10 chapter.



# 3.3 Documents which also apply

#### 3.3.1 Warranty

For more information refer to the "Warranty registration" brochure supplied and our information regarding warranty, maintenance and testing at <a href="https://www.ewm-group.com">www.ewm-group.com</a>!

#### 3.3.2 Declaration of Conformity



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

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

## 3.3.3 Welding in environments with increased electrical hazards



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

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



#### **⚠** WARNING

No improper repairs and modifications!

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

Unauthorised manipulations will invalidate the warranty!

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

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

Spare parts can be obtained from the relevant authorised dealer.

#### 3.3.5 Calibration/Validation

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



#### 3.3.6 Part of the complete documentation

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

The illustration shows a general example of a welding system.

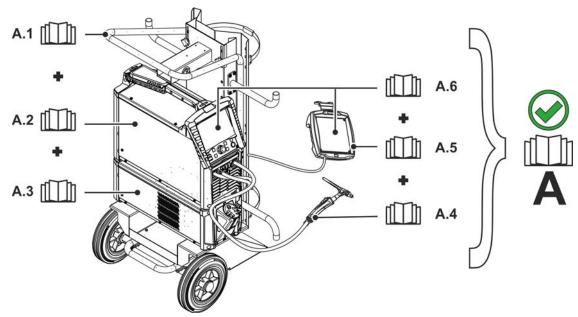


Figure 3-1

ltem	Documentation
A.1	Transport vehicle
A.2	Power source
A.3	Cooling unit
A.4	Welding torch
A.5	Remote control
A.6	Control
Α	Complete documentation



# 4 Machine control – Operating elements

# 4.1 Overview of control sections

For description purposes, the machine control has been divided into three sections (A, B, C) to ensure maximum clarity. The setting range for the parameter values are summarised in the parameter overview section > see 8.1 chapter.

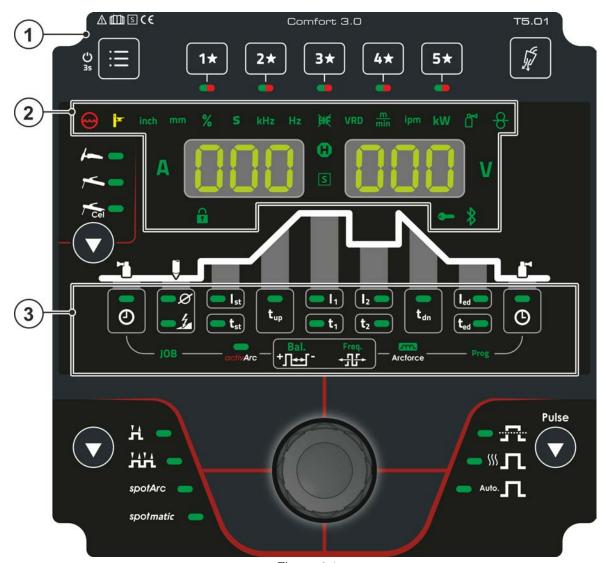
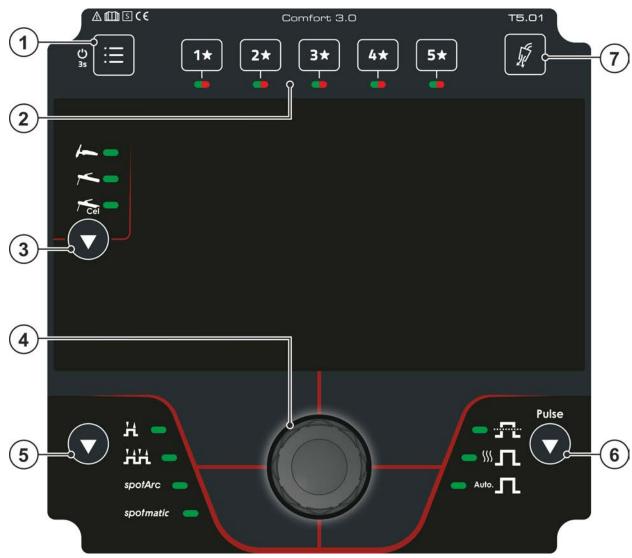


Figure 4-1

Item	Symbol	Description
1		Control section A
		> see 4.1.1 chapter
2		Control section B
		> see 4.1.2 chapter
3		Control section C
		> see 4.1.3 chapter



#### 4.1.1 **Control section A**



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-	u	11	₩.	4-	~

Item	Symbol	Description
1	·-	System push-button
		• Quick access to various device configuration parameters. For the complete
		parameter list, see the machine configuration menu > see 5.10 chapter
		• Lock function - protection against accidental adjustment > see 4.3.6 chapter
2	5*	push-button - JOB Favourites > see 5.4 chapter
	1*	•Pressing the push-button briefly: Loading Favourites
		•Press and hold the push-button (>2 s): Saving as a Favourite
		•Press and hold the push-button (>12 s): Deleting a Favourite
3		Push-button for welding procedure
	•	/— TIG-welding
		MMA welding
		MMA Cel welding (characteristics for cellulose electrode)
4		Click wheel
	$((\mathcal{E}))$	Setting the welding power
		Navigate through menu and parameters
		• Setting the parameter values depending on the preselection.



# Machine control – Operating elements Overview of control sections

ltem	Symbol	Description			
5	HLatched 남남Non-latched				
		<pre>spotArcSpot welding procedure spotArc spotmatic Spot welding procedure spotmatic</pre>			
6	•	Pulsing push-button > see 5.1.10 chapter Average value pulses Thermal pulsing Automated pulsing			
7	55	Push-button gas test / rinse hose package > see 5.1.1 chapter			



#### 4.1.2 **Control section B**

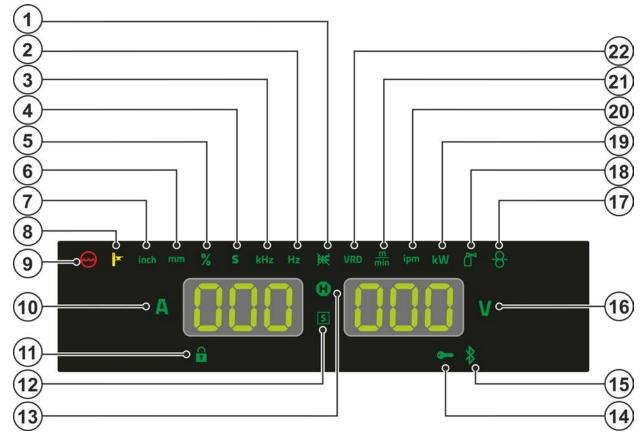


Figure 4-3

Item	Symbol	Description		
1	ÞÆ	TIG ignition type signal light		
		Signal light on: Lift arc ignition active/HF start off. You can switch the ignition type in the		
		Expert menu (TIG) > see 5.1.6 chapter.		
2	Hz	Signal light - display value in hertz		
3	kHz	Signal light - display value in kilohertz		
4	S	Signal light - display value in seconds		
5	%	Signal light - display value in per cent		
6	mm	Signal light - display value in millimetres		
7	inch	Signal light - display value in inch		
8		Excess temperature signal light In case of excess temperature, temperature monitors de-activate the power unit, and the excess temperature control lamp comes on. Once the machine has cooled down, welding can continue without any further measures.		
9	(	Coolant fault signal light Signals pressure loss or low coolant level in the coolant circuit.		
10	А	Welding current signal light Display of the welding current in amperes.		
11		Signal light for lock function > see 4.3.6 chapter		
12	Character S function signal light Indicates that it is possible to weld in an environment with major electric hazards, s as in boilers. Service must be informed if this signal light is not on.			



# Machine control – Operating elements Overview of control sections

ltem	Symbol	Description	
13	Hold	Signal light Status display After each completed welding task, the last values used in the welding process for the welding current and welding voltage are shown on the displays, and the signal light will be on	
14		Access control active signal light  Signal light is on when access control is active on the machine control > see 5.7 chapter.	
15		Without function in this machine version.	
16	V	Signal light welding voltage Illuminates when the welding voltage is displayed in volts.	
17		Without function in this machine version.	
18		Without function in this machine version.	
19	kW	Signal light display value in units of kilowatts	
20	ipm	Signal light - display value in Inches per minute	
21	<u>m</u> min	Signal light - display value in metres per minute	
22	VRD	Voltage reduction device (VRD) signal light > see 5.8 chapter	



#### 4.1.3 **Control section C**

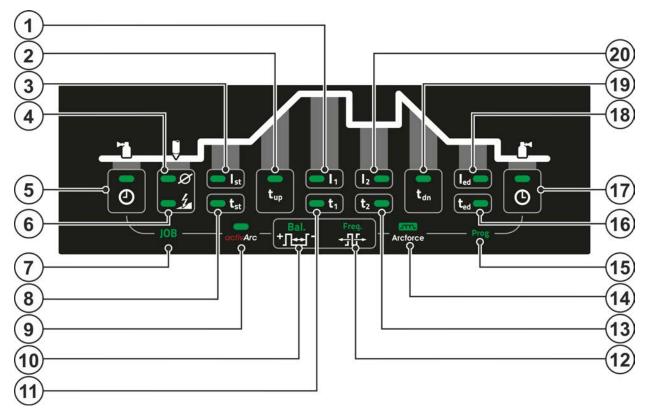
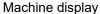


Figure 4-4

Item	Symbol	Description
1	I <sub>1</sub>	Signal light for main current / / pulse current / PL
2	tup	Signal light for up-slope time EUP
3	I <sub>st</sub>	Signal light for start current [5]
4	Ø	Signal light for electrode diameter ndfl
5	(-)	Signal light for gas pre-flow time [Pr]
6	4	Signal light for ignition optimisation (TIG)
7	JOB	Signal light for welding task (JOB)
8	<b>t</b> st	Signal light for start current time £5₺
9	activArc	Signal light activArc RR > see 5.1.8 chapter
10	Bal. +∏ <del></del> [-	Signal light for balance [682]
11	t <sub>1</sub>	Signal light for pulse time
12	Freq.	Signal light for frequency FrE
13	t <sub>2</sub>	Signal light for pulse time 🖂
14	Arcforce	Signal light for Arcforce (welding characteristics) > see 5.2.4 chapter
15	Prog	Signal light for the welding program > see 5.1.5 chapter
		Display of the current program number in the welding data display.
16	<b>t</b> ed	Signal light for end current time LEd
17	<u>(1)</u>	Signal light for gas post-flow time [[P]]
18	l <sub>ed</sub>	Signal light for end current [Ed]
19	t <sub>dn</sub>	Signal light for down-slope time Edn
20	l <sub>2</sub>	Signal light for secondary current []







#### Machine display

The following welding parameters can be displayed before (nominal values), during (actual values) or after welding (hold values). The display of the hold values is indicated by the signal light 🤀:

Parameter	Before welding (nominal values)	During welding (actual values)	After welding (hold values)
Welding current	<b>⊘</b>	<b>⊘</b> [2]	<b>⊘</b> [3]
Parameter times	<b>⊘</b>	<b>②</b>	<b>®</b>
Parameter currents	<b>⊗</b>	<b>③</b>	<b>®</b>
Frequency, balance	<b>⊘</b>	<b>③</b>	<b>③</b>
JOB number	<b>⊗</b>	*	<b>③</b>
Welding voltage	<b>⊘</b> [1]	<b>⊘</b>	<b>⊘</b>

<sup>[1]</sup> not for MMA welding

The parameters that can be set in the machine control function sequence are dependent on the welding task selected. This means that if no pulse variant was selected, for example, no pulse parameters will be available to set in the function sequence.

#### 4.3 Operating the machine control

#### 4.3.1 Main screen

After switching on the machine or finishing a setting, the machine control changes to the main screen. This means that the previously selected settings are accepted (if necessary, indicated by signal lights) and the nominal value of the current (A) is shown in the welding data display on the left. The welding data display on the right shows the nominal value for the preselected welding voltage (V). The control changes back to the main screen after 4 s.

#### 4.3.2 Setting the welding current (absolute/percentage)

The welding current is set with the control button (click wheel).

The welding current setting can be made as a percentage (dependent on the main current) or as an absolute value:

TIG: Start current, secondary current or end current and lower limit of foot-operated remote control.

MMA: Hot start current.

The selection is made in the machine configuration menu using the parameter  $\mathbb{R}b5$  > see 5.10 chapter.

#### 4.3.3 Welding parameter setting in the operation sequence

Set a welding parameter in the functional sequence by clicking (select) and turning the click wheel (navigate to the desired parameter). Press again to apply the selected parameter as the setting (corresponding parameter value and signal light flash). Then turn to set the parameter value.

During welding parameter setting, the parameter value to be set flashes in the left hand display. A parameter abbreviation or a deviation in the specified parameter value upwards or downwards is shown on the right-hand display:

Display	Meaning
רים מי	Increase the parameter value To return to the factory settings.
<u> </u>	Factory setting (example value = 20) Parameter is set to optimum value
30 [-0	Decrease the parameter value To return to the factory settings.

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<sup>[2]</sup> The actual value display of the welding current for MMA can be switched on or off with the parameter ccd.

The behaviour of the hold value display can be set with the parameters <u>LLE</u> for TIG and <u>LLE</u> for MMA. The settings are made in the machine configuration menu > see 5.10 chapter.

# **Machine control – Operating elements**

Operating the machine control



## 4.3.4 Setting advanced welding parameters (Expert menu)

The Expert menu contains functions and parameters that cannot be set directly on the machine control or for which regular settings are not required. The number and display of these parameters depend on the previously selected welding procedure or functions.

To select, press and hold the click wheel (> 2 s). Select the appropriate parameter / menu item by turning (navigating) and pressing (confirming) the click wheel.

#### 4.3.5 Changing basic settings (machine configuration menu)

The basic welding system functions can be adjusted in the machine configuration menu. Only experienced users should change the settings > see 5.10 chapter.

#### 4.3.6 Lock function

The lock function protects against accidental changes to the machine settings. All operating elements are deactivated when the function is activated and the signal light of the lock function is on. Press and hold (> 2 s) the push-button  $\equiv$  to enable or disable the function.



## **Functional characteristics**

#### 5.1 TIG welding

#### 5.1.1 Setting the shielding gas volume (gas test)/rinse hose package

- Slowly open the gas cylinder valve.
- · Open the pressure regulator.
- Switch on the power source at the main switch.
- Set the relevant gas quantity for the application on the pressure regulator.
- Press the push-button "gas test / flush" fto activate the gas test > see 5.1.1 chapter.

Setting the shielding gas quantity (gas test)

Shielding gas flows for 20 s or until the push-button is pressed again.

Purging long hose packages (purging)

Press push-button for about 5 s. • Shielding gas flows for approx. 5 min. or until the push-button is pressed again.

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

Setting instructions: The gas nozzle diameter in mm corresponds to the gas flow in I/min.

#### Helium-rich gas mixtures require a higher gas volume!

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

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

For connecting the shielding gas supply and handling the shielding gas cylinder refer to the power source operating instructions.

#### 5.1.1.1 Automatic gas post-flow

When the function is enabled, the machine control adjusts the gas post-flow time depending on the output. The adjustable gas post-flow time relates to the maximum possible current of the power source and decreases linearly.

Example: With the automatic gas post-flow function enabled, a gas post-flow time of 10 s has been set. This means that with a welding current of 230 A, the gas post-flow time is 10 s. At a welding current of 115 A, the gas post-flow time is reduced to 5 s.

The automatic gas post-flow function [LPR] can be enabled or disabled in the machine configuration menu > see 5.10 chapter. With the function enabled, the parameters LPL and RUL for automatic are displayed alternately when the gas post-flow time is selected.

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## 5.1.2 Welding task selection

By setting the tungsten electrode diameter <u>ndfl</u>, the TIG ignition behaviour (ignition energy), machine functions and minimum current limit are preset optimally. Smaller electrode diameters require less ignition energy than larger electrode diameters.

If necessary, the ignition energy > see 5.1.3 chapter can also be adapted to each welding task (for example to reduce the ignition energy when using thin sheet metal). With the selection of the electrode diameter, a minimum current limit is set that in turn affects the start, main and secondary currents. Minimum current limits prevent an unstable arc at impermissibly low currents. If necessary, the minimum current limits can be disabled with the parameter <code>clf</code> in the machine configuration menu > see 5.10 chapter. When using a foot-operated remote control, the minimum current limits are disabled by default.

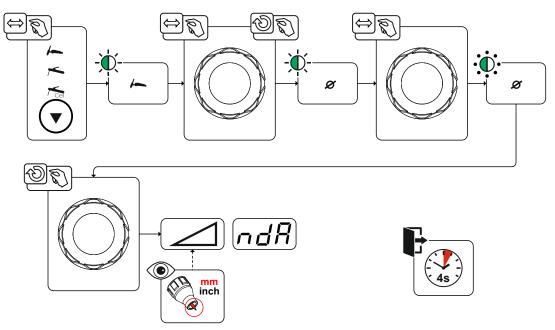


Figure 5-1

## 5.1.3 Ignition correction

The ignition energy can be optimised for the welding task using the ignition correction <code>cor</code> parameter. Should it be necessary to set the ignition energy outside the existing correction limits, this can also be configured manually for ignition current and ignition current time > see 5.1.4 chapter.

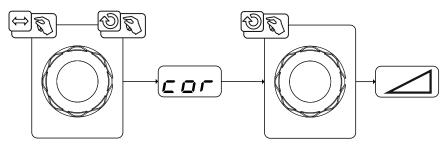


Figure 5-2



#### 5.1.4 Manual ignition setting

When the special ignition is selected, the dependency of the minimum current limits on the electrode diameter is disabled. The ignition energy can now be set independently with the parameters ignition current  $\[ \]$  and ignition time  $\[ \]$ . The ignition time is set absolutely in milliseconds. The setting of the ignition current differs in the setting variants  $\[ \]$  and  $\[ \]$  and  $\[ \]$  and  $\[ \]$  and  $\[ \]$ 

- In the variant 591, the ignition current is set absolutely in ampere [A].
- In the variant [592], the ignition current is set as a percentage of the set main current.

The parameters for manual setting of the ignition energy are selected and enabled with "left stop" when setting the electrode diameter (minimum value >  $\frac{5P!}{}$  >  $\frac{5P?}{}$ ).

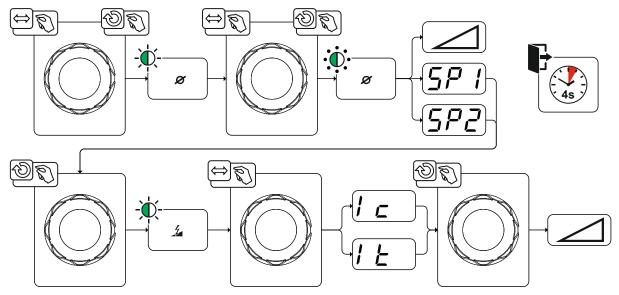


Figure 5-3



#### 5.1.4.1 Recurring welding tasks (JOB 1-100)

The user has 100 additional memory locations at their disposal to save recurring or different welding tasks on a permanent basis. To do so, simply select the required memory location (JOB 1-100) and set the welding task as described previously.

With the JOB manager > see 5.5 chapter, welding tasks can be copied to any preset or reset to the factory settings.

The desired JOB can also be assigned to a quick access button (favourites button) > see 5.4 chapter. Switching a JOB is only possible if no welding current flows. Up-slope and down-slope times can be set individually for latched and non-latched operation.

#### Selection

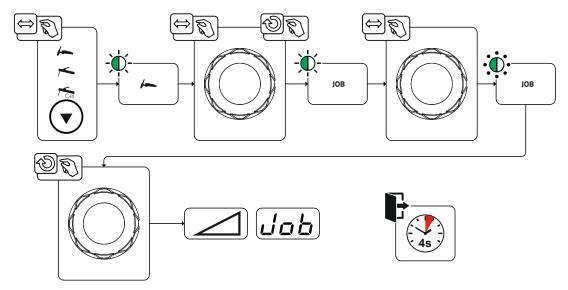


Figure 5-4

When one or more of the recurring welding tasks has been selected, the JOB signal light comes on.



#### 5.1.5 Welding programs

The welding programs function is factory set to disabled and must be activated for use with the parameter  $P^{p,q}$  in the machine configuration menu > see 5.10 chapter.

In each selected welding task (JOB), > see 5.1.2 chapter, 16 programs can be set, saved and called up. In program "0" (default setting) the welding current can be infinitely adjusted across the entire range. In programs 1-15, 15 different welding currents (incl. operating mode and pulse function) are defined.

The welding machine has 16 programs, which you can change during welding.

Changes made to the other welding parameters during the course of the program have the equivalent effect on all programs.

The change to the welding parameters is saved immediately in the JOB.

#### Example:

Program number	Welding current	Operating mode	Pulse function
1	80A	Non-latched	Pulses on
2	70A	latched	Pulses off

The operating mode cannot be changed during the welding process. If welding is started with program 1 (non-latched operating mode), program 2 controls the setting of ignition program 1 despite the latched setting and is implemented to the end of the welding process.

The pulse function (pulses off, pulses on) and the welding currents are transferred from the corresponding programs.

#### 5.1.5.1 Selection and adjustment

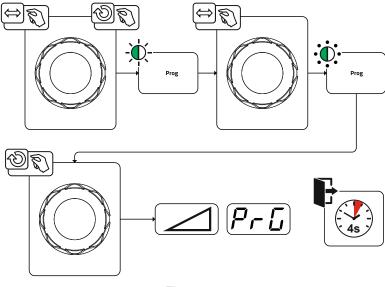


Figure 5-5

#### 5.1.5.2 Specifying max. no. of accessible programs

This function can be used to specify the maximum number of programs which can be called up (only applies to the welding torch). According to the factory setting, all 16 programs can be called up. If necessary these can be limited to a specific number.

To limit the number of programs, the welding current needs to be set to 0A for the next, unused program. For example, if only programs 0 to 3 are being used, the welding current is set to 0A in program 4. A maximum of programs 0 to 3 can then be called up on the welding torch.

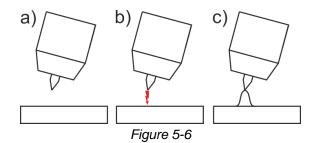
#### 5.1.6 Arc ignition

The type of ignition (parameter f) can be set in the system menu (push-button f). The HF intensity (parameter f) can be adjusted in the machine configuration menu if necessary > see 5.10 chapter.

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#### 5.1.6.1 HF ignition

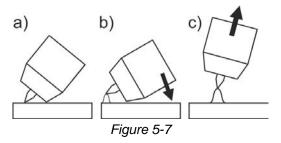


The arc is started without contact using high-voltage ignition pulses:

- a) Position the welding torch in the welding position above the workpiece (distance between the electrode tip and the workpiece approx. 2-3 mm).
- b) Press the torch trigger (high-voltage ignition pulses start the arc).
- Depending on the selected operating mode, the welding current flows with the set start or main current.

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

#### 5.1.6.2 Liftarc



The arc is ignited on contact with the workpiece:

- a) 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).
- b) 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.
- c) 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.

#### 5.1.6.3 Automatic cut-out

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

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

You can disable or set the time for re-ignition after an arc interruption in the machine configuration menu > see 5.10 chapter (parameter [LER]).

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# 5.1.7 Operating modes (functional sequences)

# 5.1.7.1 Explanation of symbols

Symbol	Meaning
	Press torch trigger 1
	Release torch trigger 1
ı	Current
t	Time
•	Gas pre-flow
[Pr	
[ 5E	Start current
£5£	Start time
EUP	Up-slope time
E P	Spot time
1 1	Main current (minimum to maximum current)
AMP	
1 2	Secondary current
AMP%	
<u>E</u> I	Pulse time
<u> </u>	Pulse pause time
I PL	Pulse current
<u>E5 1</u>	Latched operating mode: Slope time from main current (AMP) to secondary current (AMP%) TIG - thermal pulsing: Slope time from pulse current to pulse pause current
<u> </u>	Latched operating mode: Slope time from secondary current (AMP%) to main current (AMP) TIG - thermal pulsing: Slope time from pulse pause current to pulse current
Edn	Down-slope time
I Ed	End-crater current
FEA	End-crater time
•	Gas post-flow
₽	
GPE	
ЬЯL	Balance
FrE	Frequency



# 5.1.7.2 Non-latched mode Sequence

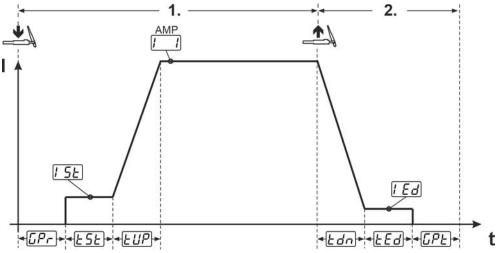


Figure 5-8

#### 1st cycle:

- · Press and hold torch trigger 1.
- The gas pre-flow time [Pr] expires (shielding gas flows).
- The arc is ignited (HF ignition).
- The start current <u>I 5Ł</u> flows for the start time <u>Ł5Ł</u> (the HF ignition shuts down).

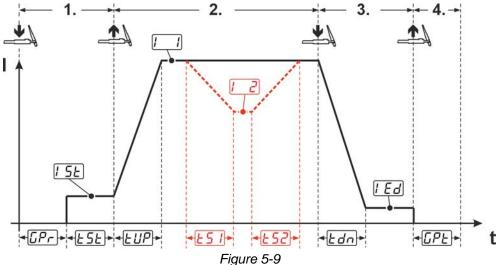
#### 2<sup>nd</sup> cycle:

- · Release torch trigger 1.
- The main current I drops during the down-slope time Edn to the end current IEd.

  When the 1st torch trigger is pressed during the down-slope time Edn, the current increases back to the main current I.
- The end current [Ed] flows for the end current time [Ed].
- The arc extinguishes.
- The gas post-flow time <u>LPE</u> expires (the shielding gas is shut down).

## 5.1.7.3 Latched mode

#### Sequence



rigule 5-3



#### 1st cycle

- · Press the torch trigger 1
- The gas pre-flow time [Pr expires (shielding gas flows).
- The arc is ignited (HF ignition).
- The start current [5] flows as long as the torch trigger is held, but at least for the start time [5] (the HF ignition shuts down).

#### 2<sup>nd</sup> cycle

- Release torch trigger 1.
- The welding current increases in the up-slope time EUP to the main current [\_\_].

During the main current phase, you can switch to the secondary current [ ] in two ways: Either tap torch trigger 1 or press and hold torch trigger 2. Lowering to the secondary current [ ] takes place using the slope time [ 5].

By tapping torch trigger 1 again or releasing torch button 2, the welding current increases with the slope time £52 back to the main current [1]. The slope times £51 and £52 are set in the Expert menu > see 5.1.13 chapter).

#### 3<sup>rd</sup> cycle

- Press torch trigger 1.
- The main current I drops during the down-slope time Lan to the end current I La.

#### 4th cycle

- · Release torch trigger 1.
- · The arc extinguishes.
- The gas post-flow time [IPE] expires (the shielding gas is shut down).

#### Alternative welding start (tap start):

The tap start function  $\frac{\lfloor P \rfloor}{\rfloor}$  must be switched on before using it. With the alternative welding start, the duration of the first and second cycle is only specified by the set process times (tapping the torch trigger in the gas pre-low phase  $\frac{\lfloor P \rfloor}{\rfloor}$ ).

#### Alternative welding end (tap end):

The tap end function *EPE* must be switched on before using it (this disables tapping on the secondary current). When the function is switched on, the welding process is ended immediately by tapping during the main current phase.

#### 5.1.7.4 spotArc

This process is suitable for tack welding or joint welding of metal sheets made from steel and CrNi alloys up to a thickness of approximately 2.5 mm. Metal sheets of different thicknesses can also be welded on top of one another. As this is a one-sided process, it is also possible to weld metal sheets onto tubular sections such as round or square pipes. In arc spot welding, the arc melts through the upper metal sheet and the lower metal sheet is melted onto it. This produces flat, fine-textured welding tacks which require little or no post weld work, even in visible areas.

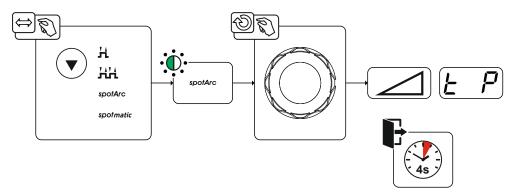
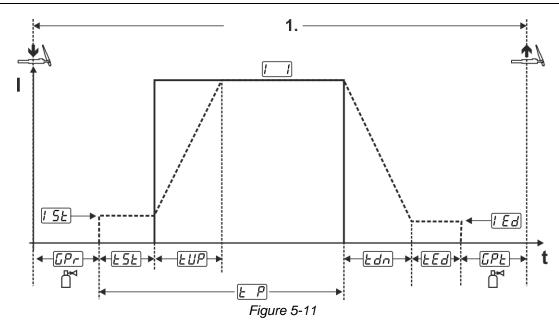


Figure 5-10

The up-slope and down-slope times should be set to "0" to achieve an effective result.





As an example the process is shown with HF ignition. Arc ignition with lift arc is also possible, however > see 5.1.6 chapter.

#### Sequence:

- · Press torch trigger and hold down.
- · The gas pre-flow time elapses.
- HF start pulses jump from the electrode to the workpiece. The arc ignites.

The welding current flows and immediately assumes the value of the start current [5]

- · HF switches off.
- The welding current ramps up to the main current [ (AMP) within the set up-slope time [ UP .

The process ends when the set spotArc.time elapses or by releasing the torch trigger. With the spotArc function enabled, the Automatic Puls pulse variant is activated as well. If required, the function can be disabled by pressing the pulsed welding push-button.



#### **5.1.7.5** spotmatic

In contrast to the spotArc operating mode, the arc is not ignited by pressing the torch trigger as is usual, but by briefly touching the tungsten electrode against the workpiece. The torch trigger is used for welding process activation. Activation is indicated by flashing of the spotArc/spotmatic signal light. The process can be activated separately for each spot or also on a permanent basis. The setting is controlled using the \$55P\$ process activation parameter in the configuration menu > see 5.10 chapter.

- Separate process activation (55P > on):
  The welding process has to be reactivated for every arc ignition by pressing the torch trigger. Process activation is automatically terminated after 30 s of inactivity.
- Permanent process activation (\$\overline{55P} > \overline{\rho}E)\$:

  The welding process is activated by pressing the torch trigger once. The following arc ignitions are initiated by shortly touching the tungsten electrode against the workpiece. Process activation is terminated either by pressing the torch trigger again or automatically after 30 s of inactivity.

For spotmatic the separate process activation and the short spot time setting range are enabled by default.

Ignition by touching the tungsten electrode against the workpiece can be disabled in the machine configuration menu with parameter [577]. In this case the function works as with spotArc, but the spot time setting range can be selected in the machine configuration menu.

The duration is set in the machine configuration menu using parameter 555 > see 5.10 chapter

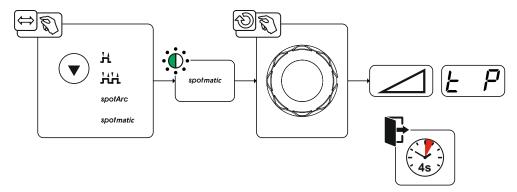
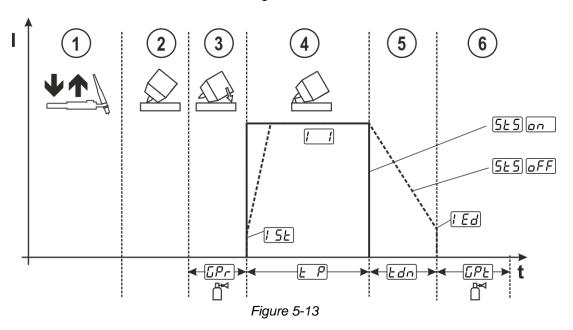


Figure 5-12





As an example the process is shown with HF ignition. Arc ignition with lift arc is also possible, however > see 5.1.6 chapter.

Selecting the process activation type for the welding process > see 5.10 chapter.

Up-slope and down-slope times possible for long spot time setting range (0.01–20.0 s) only.

- ① Press and release torch trigger (tap) to activate the welding process.
- ② Touch the torch gas nozzle and tungsten electrode tip carefully against the workpiece.
- ③ Incline the welding torch over the torch gas nozzle until there is a gap of approx. 2–3 mm between the electrode tip and the workpiece. Shielding gas flows during the set gas pre-flow time [Fr]. The arc ignites and the previously set start current [5] flows.
- ④ The main current phase ☐ ends when the set ☐ spot time elapses.
- S For long-time spot welding only (parameter 5£5 = aFF):
  The welding current decreases to the end-crater current \(\frac{\varepsilon}{\varepsilon}\) within the set down-slope time \(\frac{\varepsilon}{\varepsilon}\).
- The gas post-flow time elapses and the welding process ends.

Press and release the torch trigger (tap) to reactivate the welding process (only for separate process activation). Touching the welding torch with the tungsten electrode tip against the workpiece again will initiate the next welding processes.

#### 5.1.7.6 Non-latched operation, version C

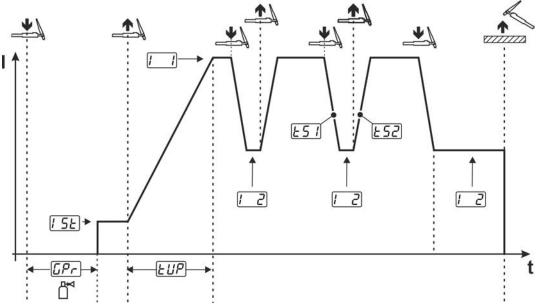


Figure 5-14

#### 1st cycle

- Press and hold torch trigger 1. The gas pre-flow time [Fr] elapses.
- The HF ignition pulses jump from the electrode to the workpiece. The arc ignites.
- The welding current flows and immediately moves to the preselected start current value [5] (search arc at minimum setting). The HF start is switched off.

#### 2<sup>nd</sup> cycle

- Release torch trigger 1.
- The welding current increases at the set up-slope time EUP to the main current [\_\_\_\_].

Pressing torch trigger 1 starts the slope £51 from the main current 1 to the secondary current 12. Releasing the torch trigger starts the slope £52 from the secondary current 12 and back to the main current 11. This process can be repeated any number of times.

The welding process is stopped by interrupting the arc in the secondary current (remove the welding torch from the workpiece until the arc is extinguished, no re-ignition of the arc).

The slope times £51 and £52 can be set in the Expert menu > see 5.1.13 chapter.

This operating mode must be enabled (parameter  $2 \pm c$ ) > see 5.10 chapter.

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#### 5.1.8 TIG activArc welding

The EWM activArc process, thanks to the highly dynamic controller system, ensures that the power supplied is kept virtually constant in the event of changes in the distance between the welding torch and the weld pool, e.g. during manual welding. Voltage losses as a result of a shortening of the distance between the torch and molten pool are compensated by a current rise (ampere per volt - A/V), and vice versa. This helps prevents the tungsten electrode sticking in the molten pool and the tungsten inclusions are reduced.

#### Selection

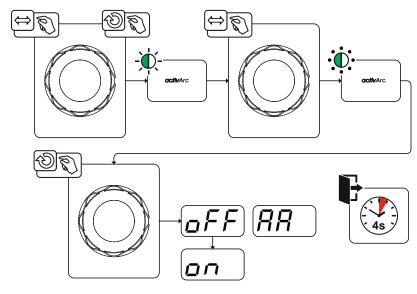


Figure 5-15

#### Setting

#### Parameter setting

The activArc parameter (control) can be adjusted specifically for the welding task (panel thickness) > see 5.1.13 chapter.

#### 5.1.9 TIG antistick

The function prevents uncontrolled re-ignition following the sticking of the tungsten electrode in the weld pool by switching off the welding current. In addition, wear at the tungsten electrode is reduced.

After triggering the function the machine immediately switches to the gas post-flow process phase. The welder starts the new process again at the first cycle. The user can switch the function on or off (parameter EBS) > see 5.10 chapter.



#### 5.1.10 Pulse welding

The following pulse types can be selected:

- Average value pulses
- MI Thermal pulsing
- Auto. Automated pulsing

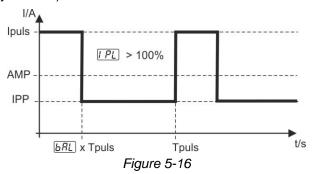
#### 5.1.10.1 Average value pulse welding

A special feature with average value pulses is that the power source will always maintain the preset average value. This makes this method especially suitable for welding according to welding procedure specifications.

For average value pulsing, switching takes place periodically between two currents whereby an average current value (AMP), a pulse current (Ipuls), pulse balance  $(\underline{bRL})$  and pulse frequency  $(\underline{FrE})$  must be specified. The set average current value in ampere is decisive; the pulse current (Ipuls) is specified with the parameter  $\underline{FFL}$  as a percentage of the average current (AMP).

The pulse pause current (IPP) is not set. This value is calculated by the machine control to ensure that the average value of the welding current (AMP) is maintained.

With the parameter [PFo], the waveform of the pulse can be adapted in the Expert menu to the existing welding task. Especially in the lower frequency range, the adjustable pulse shapes show their effect on the arc characteristics (only TIG DC).



#### Setting the pulse frequency and pulse balance

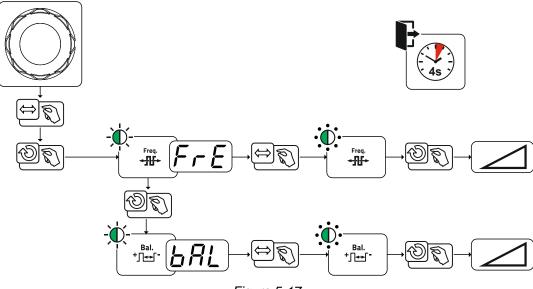


Figure 5-17

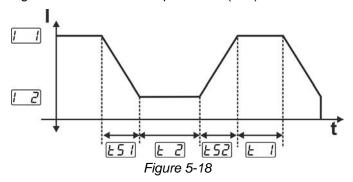
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#### 5.1.10.2 Thermal pulsing

The operation sequences basically match the standard welding sequences, but there is an additional switching back and forth between the main current AMP (pulse current) and the secondary current AMP% (pulse pause current) at the set times. Pulse and pause times and the pulse edges (E51 and E52) are entered in seconds on the control.

The  $\boxed{151}$  and  $\boxed{152}$  pulse edges can be set in the Expert menu (TIG) > see 5.1.13 chapter.



#### Setting the pulse and pulse pause time

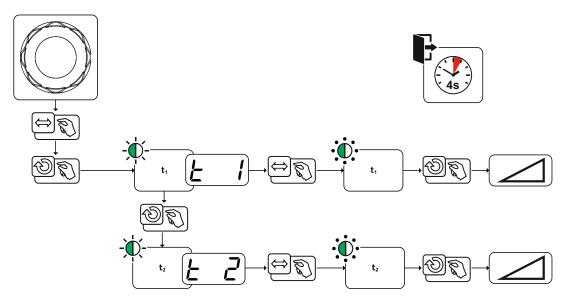


Figure 5-19

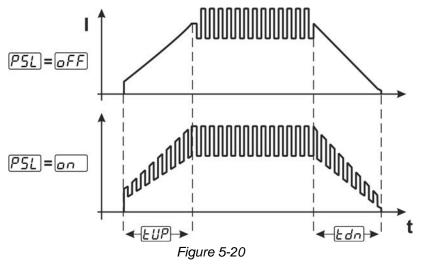
#### 5.1.10.3 Automated pulses

The automated pulsing pulse variant is only activated for DC welding in combination with the spotArc operating mode. The current-dependent pulse frequency and balance create vibrations in the weld pool that have a positive effect on the gap bridging. The required pulse parameters are automatically defined by the machine control. If required, the function can be disabled by pressing the pulsed welding push-button.



#### 5.1.10.4 Pulsing in an upslope/downslope

The pulse function can also be deactivated if necessary during the up-slope and down-slope phases (parameter P5L) > see 5.10 chapter.



### 5.1.11 Welding torch (operating variants)

### 5.1.11.1 Welding torch mode

The operating elements (torch triggers or rockers) and their function can be individually adapted using various torch modes. Up to six modes are available to the user. The tables for the corresponding torch types describe the functional options.

### **Explanation of symbols for welding torch:**

Symbol	Description
$\overline{\mathbb{T}}$	Press torch trigger
<u> </u>	Tap torch trigger
	Tap torch trigger and then press
BRT 1, 2	Torch trigger 1 or 2
UP	Torch trigger UP - increase the value
DOWN	Torch trigger DOWN - decrease the value

The torch modes are set using the torch configuration parameters " $\[\[\]$ " in the machine configuration menu > torch mode " $\[\]$ " > see 5.10 chapter.

Only the modes listed are suitable for the corresponding torch types.

### Welding torch with one torch trigger

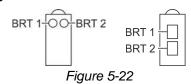


Function	Operation		Mode
Welding current On / Off	BRT 1	$\overline{\Gamma}$	4
Secondary current (in latched operation)	DKII	<u> </u>	'

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### Welding torch with two torch triggers or rocker



Function	Operation		Mode
Welding current On / Off	BRT 1	$\overline{\mathbb{T}}$	
Secondary current (in latched operation)	BRT 2	$\overline{\mathbb{T}}$	1
Secondary current (in latched operation)	BRT 1	<u> </u>	
Welding current On / Off	BRT 1	$\overline{\mathbb{T}}$	
Increase welding current (up/down speed)	BRT 2	<u> </u>	2
Decrease welding current (up/down speed)  BRT 2		3	
Secondary current (in latched operation)	BRT 1	Ţĵ	]

### Welding torch with one torch trigger and up/down push-buttons

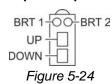
Decrease welding current in steps (current jump)



Function	Operation		Mode
Welding current On / Off	BRT 1	$\overline{\mathbb{T}}$	
Secondary current (in latched operation)		<u> </u>	
Increase welding current (up/down speed)		] '	
Decrease welding current (up/down speed) DOWN			
Welding current On / Off	BRT 1	$\overline{\mathbb{T}}$	
Secondary current (in latched operation)		<u> </u>	]
Increase welding current in steps (current jump)	UP	Û	4

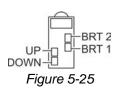


# Welding torch with two torch triggers and up/down push-buttons



Function	Operation		Mode
Welding current On / Off	DDT 4	$\overline{\Gamma}$	
Secondary current (in latched operation)	BRT 1	<u> </u>	
Secondary current (in latched operation)	BRT 2	$\overline{\Gamma}$	1
Increase welding current (up/down speed)	UP	$\overline{\Gamma}$	
Decrease welding current (up/down speed)	DOWN	$\overline{\mathbb{T}}$	
Welding current On / Off BRT 1		$\overline{\mathbb{T}}$	
Secondary current (in latched operation)		<u> </u>	
Secondary current (in latched operation) BRT 2		$\overline{\mathbb{T}}$	
Increase welding current in steps (current jump) UP UP		4	
Decrease welding current in steps (current jump)	DOWN	$\overline{\mathbb{T}}$	
Gas test	BRT 2	<u> </u>	

### TIG function torch, Retox XQ



Function	Operation		Mode
Welding current On / Off	DDT 4	$\overline{\mathbb{T}}$	
Secondary current (in latched operation)	BRT 1	<u> </u>	
Secondary current (in latched operation)	BRT 2	$\overline{\mathbb{T}}$	1
Increase welding current (up/down speed)	UP	$\overline{\mathbb{T}}$	
Decrease welding current (up/down speed)	DOWN	$\overline{\mathbb{T}}$	
Welding current On / Off	DDT 4	$\overline{\mathbb{T}}$	
Secondary current (in latched operation)	BRT 1	<u> </u>	
Secondary current (in latched operation)	BRT 2	$\overline{\mathbb{T}}$	
Increase welding current in steps (current jump)	UP	$\overline{\mathbb{T}}$	
Decrease welding current in steps (current jump)	DOWN	$\overline{\mathbb{T}}$	4
Switching between current jump and JOB	BRT 2	<u> </u>	
Increase JOB number	UP	$\overline{\mathbb{T}}$	
Decrease JOB number	DOWN	$\overline{\mathbb{T}}$	
Gas test	BRT 2	<u> </u>	



Function	Operation		Mode
Welding current On / Off	DDT 4	$\overline{\mathbb{T}}$	
Secondary current (in latched operation)	BRT 1	Ţĵ	
Secondary current (in latched operation)	BRT 2	$\overline{\mathbb{I}}$	
Increase program number	UP	$\overline{\mathbb{T}}$	
Decrease program number	DOWN	$\overline{\mathbb{T}}$	5
Switching between program and JOB	BRT 2	<u> </u>	
Increase JOB number	UP	$\overline{\mathbb{T}}$	
Decrease JOB number	DOWN	$\overline{\mathbb{T}}$	
Gas test	BRT 2	⊥ <sub>3s</sub>	
Welding current On / Off	DDT 4	$\overline{\mathbb{T}}$	
Secondary current (in latched operation)	BRT 1	<u> </u>	
Secondary current (in latched operation)	BRT 2	$\overline{\mathbb{T}}$	
Infinitely variable increase of welding current (up/down speed)	UP	$\overline{\mathbb{T}}$	
Infinitely variable decrease of welding current (up/down speed)	DOWN	$\overline{\mathbb{T}}$	6
Switching between up/down speed and JOB number	BRT 2	<u> </u>	
Increase JOB number	UP	$\overline{\mathbb{T}}$	
Decrease JOB number	DOWN	$\overline{\mathbb{T}}$	
Gas test	BRT 2	<u> </u>	

### 5.1.11.2 Tapping function (tap torch trigger)

Tapping function: Swiftly tap the torch trigger to change the function. The set torch mode determines the operating mode.

The tapping function can be selected separately for each torch mode for the start of welding with parameter  $\frac{\lfloor PE \rfloor}{L}$  and for the end of welding with parameter  $\frac{\lfloor PE \rfloor}{L}$ . If parameter  $\frac{\lfloor EPE \rfloor}{L}$  is activated, there is no need to tap the secondary current.

#### 5.1.11.3 Up/down speed

#### **Functionality**

Press and hold the up push-button:

Increase current up to the maximum value (main current) set in the power source.

Press and hold the down push-button:

Decrease current to the minimum value.

Use the machine configuration menu > see 5.10 chapter to set the up/down speed parameter which determines the speed with which a current change becomes effective.

#### 5.1.11.4 Current jump

By tapping the corresponding torch trigger the welding current can be determined in an adjustable jump range. Each tap will cause the welding current to jump up or down by the defined value.

The "current jump" parameter [at ] is set in the machine configuration menu > see 5.10 chapter.



### 5.1.12 RTF 1 foot-operated remote control

Upon connection of the foot-operated remote control, the basic settings below apply:

- The non-latched operating mode is activated (the operating modes latched, spotArc® and spotmatic are disabled).
- Start/stop operation and the end program are deactivated.
- The start program is activated.

### 5.1.12.1 Working area

The working area of the foot-operated remote control can be freely defined within the power source limits. The lower limit "FTT" is used to set the starting point. The upper limit is used to set the start point and upper limit (main current "[--]") of the end point of the foot-operated remote control. The entire pedal travel is distributed according to the set limits. The parameter "Welding current setting" "Rb5" can be used to set the lower limit as a percentage of the upper limit (factory setting) or as an absolute value.

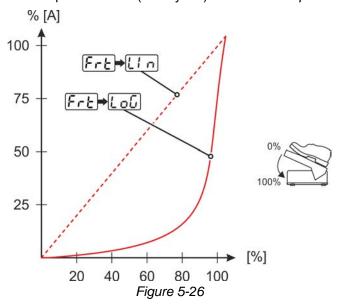
#### Application example:

Lower limit		Working area of the foot-operated remote control 0 %-100 %
≥ 60 %	100 A	between 60 A and 100 A
≥ 60 %	200 A	between 120 A and 200 A

#### 5.1.12.2 Response

This function controls the responsiveness of the welding current during the main current phase. The user can choose between linear and logarithmic responsiveness. The logarithmic setting is particularly suitable for welding with low current, e.g., for thin panels as the logarithmic responsiveness enables better control of the welding current.

The responsiveness function can be switched in the machine configuration menu between the parameters for linear and logarithmic responsiveness (factory set) > see 5.10 chapter.



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#### 5.1.12.3 Start program

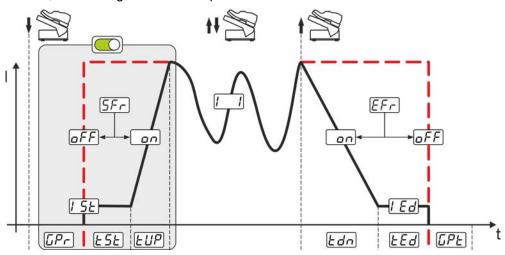
The start program "5Fr" can be enabled or disabled in the machine configuration menu > see 5.10 chapter.

#### **Enabled start program**

At the start of the process, the start program ensures the necessary arc stability until the main current "[\_\_\_\_\_]" is reached. The start current "[\_\_\_\_\_]", the ignition current time "[\_\_\_\_\_]" and the ramp "[\_\_\_\_\_]" can be adjusted individually according to the welding task. In the main program, the welding current can be freely regulated using the foot-operated remote control (factory setting).

#### Disabled start program

Without the start program, the current jumps immediately to the main current (according to the specification of the foot-operated remote control). The start current "[5]" can be used for arc stabilisation. In this case, the operation with the foot-operated remote control is only enabled when the start current is exceeded. Until then, the welding current corresponds to the start current "[5]".



#### **5.1.12.4 End program**

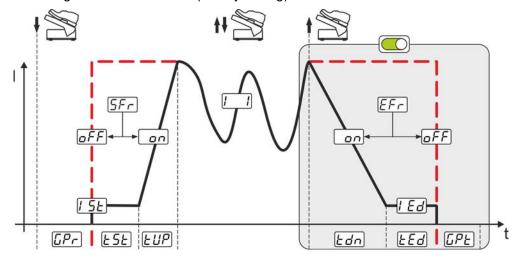
The end program "EFr" can be enabled or disabled in the machine configuration menu > see 5.10 chapter.

#### **Enabled end program**

The activation of the end program is suitable for adjusting the working area (lower limit increased) for the end-crater fill. The down-slope time "<code>[-Ed]</code>", the end current "<code>[-Ed]</code>" and the end current time "<code>[-Ed]</code>" can be adjusted individually. The end program starts with the down-slope time on ending the control by using foot-operated remote control (release).

#### Disabled end program

When the end program is deactivated after releasing the foot-operated remote control, the welding process ends according to the set lower limit (factory setting).





#### 5.1.12.5 Start/stop operation

Start/stop operation "Fto" can be enabled or disabled in the machine configuration menu > see 5.10 chapter.

### **Enabled start/stop operation**

The foot-operated remote control is no longer used to specify the welding current, but rather starts or ends the welding process (see torch trigger). As in normal operation, the welding current is specified using the power source control or the welding torch with the up/down function. All operating modes (non-latched, latched, etc.) can be selected.

#### Disabled start/stop operation

The welding current is specified using the foot-operated remote control. In this setting, only the non-latched operating mode is possible. (factory setting).

### 5.1.13 Expert menu (TIG)

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

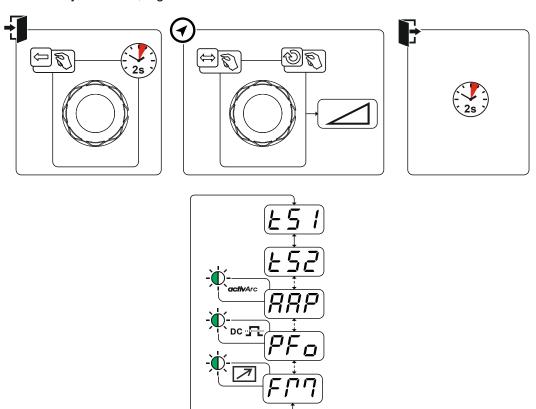


Figure 5-27

Display	Setting/selection
E5 1	Slope time (main current to secondary current)
£52	Slope time (secondary current to main current)
000	Parameter activArc > see 5.1.8 chapter
ППГ	Setting the intensity
PFo	Pulse shape
	welding tasks
FP7	Remote control for lower current limit > see 5.1.12.1 chapter

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### 5.1.14 Aligning the cable resistance

To ensure optimum welding properties, the electric cable resistance should be aligned again whenever an accessory component such as the welding torch or the intermediate hose package (AW) has been changed. The resistance value of the cables can be set directly or can be aligned by the power source. In the delivery state the cable resistance is set to the optimum values. To optimise the welding properties for other cable lengths, an alignment process (voltage correction) is necessary.

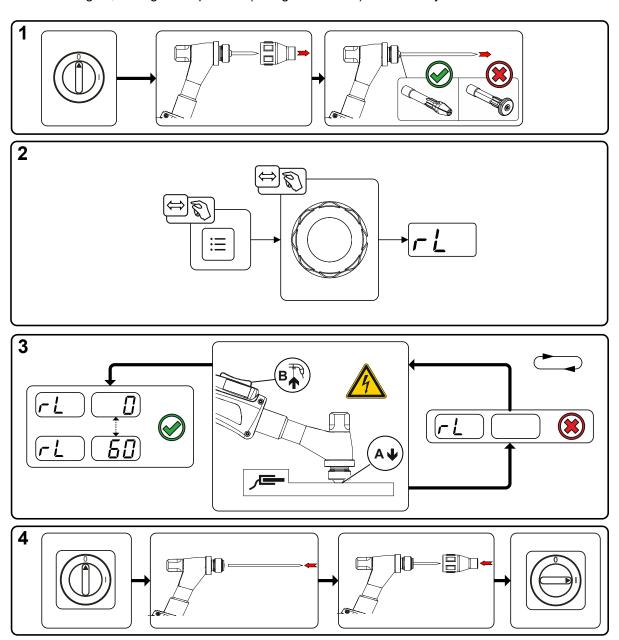


Figure 5-28

# **Functional characteristics**

TIG welding



#### 1 Preparation

- Switch off the welding machine.
- · Unscrew the gas nozzle from the welding torch.
- Unfasten the tungsten electrode and extract.
- Switch on the welding machine.

### 2 Configuration

- Press push-button
- Press the rotary button and select parameter <u>----</u>.

#### 3 Alignment / Measurement

• Applying slight pressure, press the welding torch with the collet against a clean, purged location on the workpiece and then press the torch trigger for approx. 2 seconds. A short-circuit current will flow briefly, which is used to determine and display the cable resistance. The value can be between 0 m $\Omega$  and 60 m $\Omega$ . The new value is immediately saved without requiring further confirmation. If no value is shown on the right-hand display, then measurement failed. The measurement must be repeated.

### 4 Restoring welding standby mode

- · Switch off the welding machine.
- Lock the tungsten electrode in the collet again.
- · Screw the gas nozzle onto the welding torch.
- · Switch on the welding machine.

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# 5.2 MMA welding

### 5.2.1 Welding task selection

It is only possible to change the basic parameters when no welding current is flowing and any possible access control is disabled > see 5.7 chapter.

The following welding task selection is an example of use. In general, the selection process always has the same sequence. Signal lights (LED) will show the selected combination.

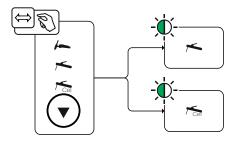


Figure 5-29

### 5.2.2 Hotstart

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

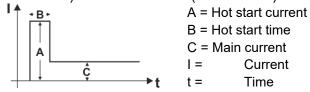
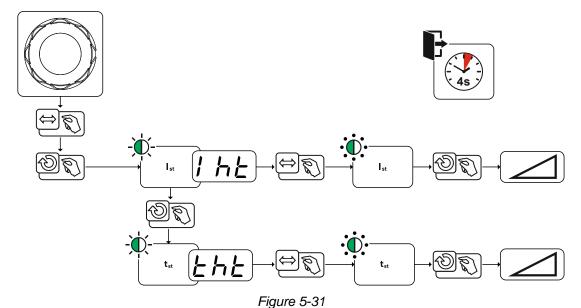


Figure 5-30

### 5.2.3 Selection and adjustment



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### 5.2.4 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.

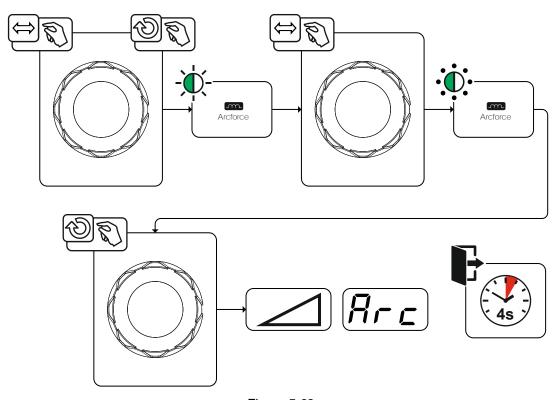
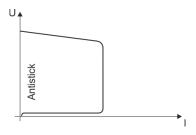


Figure 5-32

### 5.2.5 Antistick



### The Antistick feature prevents the electrode from annealing.

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

Figure 5-33

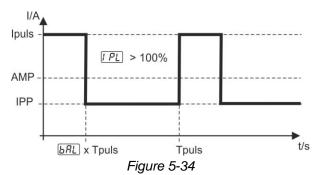
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### 5.2.6 Pulse welding

### 5.2.6.1 Average value pulse welding

Average value pulse welding means that two currents are switched periodically, a current average value (AMP), a pulse current (Ipuls), a balance (bal) and a frequency (Fre) having been defined first. The predefined ampere current average value is decisive, the pulse current (Ipuls) is defined by the Fel parameter as a percentage of the current average value (AMP). The pulse pause current (IPP) requires no setting. This value is calculated by the machine control, so that the welding current average value (AMP) is maintained at all times.



AMP = Main current; e.g. 100 A

Ipuls = Pulse current = [PL] x AMP; e.g. 140% x 100 A = 140 A

IPP = Pulse pause current

Tpuls = Duration of one pulse cycle =  $1\sqrt{F_r E}$ ; e.g. 1/1 Hz = 1 s

*BRL* = Balance

### 5.3 Arc length restriction (USP)

The arc length restriction [15] function stops the welding process when an excessive arc voltage is detected (unusually large gap between electrode and workpiece). The function can be switched on or off depending on the process > see 5.10 chapter.

#### 5.4 JOB favourites

Favourites are additional locations for storing and loading frequently used welding tasks, programs and their settings. The status of the Favourites (loaded, changed, not loaded) is indicated by signal lights.

- · Five Favourites are available to save any settings.
- · As required, the access control can be adjusted with the key switch or Xbutton function.

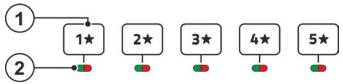


Figure 5-35

Item	Symbol	Description
1	5 ★	push-button - JOB Favourites > see 5.4 chapter
	1*	•Pressing the push-button briefly: Loading Favourites
		•Press and hold the push-button (>2 s): Saving as a Favourite
		•Press and hold the push-button (>12 s): Deleting a Favourite
2		Signal light of Favourite status
		*Signal light is green: Favourite loaded, settings of the Favourite and the current device settings are identical
		*Signal light is red: Favourite loaded, but settings of the Favourite and the current device settings are not identical (for example, the operating point has been changed)
		Signal light is off: Favourite not loaded (e.g. JOB number has been changed)

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### 5.4.1 Saving current settings to Favourites

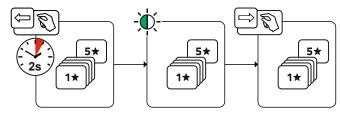


Figure 5-36

 Press and hold the favourite memory push-button for 2 s (the signal light of the favourite status is green).

### 5.4.2 Loading saved Favourites

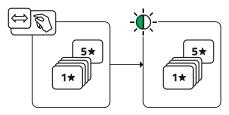


Figure 5-37

• Press the favourite memory push-button (the signal light of the favourite status is green).

### 5.4.3 Deleting saved Favourites

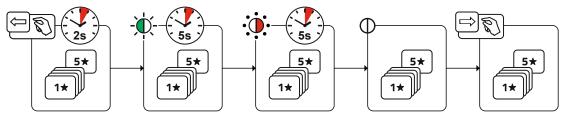


Figure 5-38

- Press and hold the favourite memory push-button.
   After 2 seconds, the signal light of the favourite status turns green after another 5 s, the signal light starts flashing red after another 5 s the signal light goes out
- Release the favourite memory push-button.



# 5.5 Managing welding tasks (JOB manager)

### 5.5.1 Copying welding tasks (JOB)

Use this function to copy the JOB data of the currently selected JOB to a target -JOB to be specified.

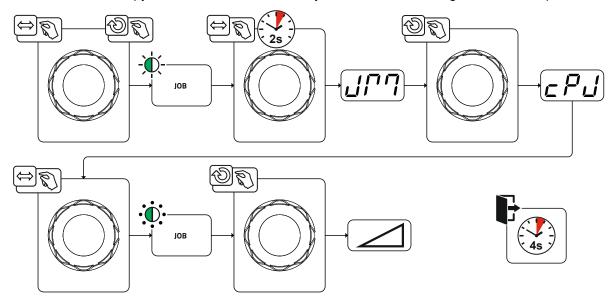


Figure 5-39

## 5.5.2 Reset welding task (JOB) to the factory setting

This function resets the JOB data of a welding task (JOB) to be selected to the factory settings.

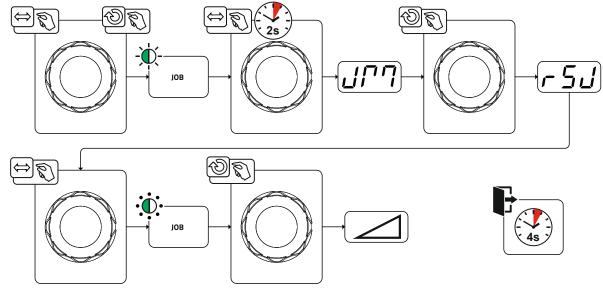


Figure 5-40

# 5.6 Power-saving mode (Standby)

Using the parameter 56 in the machine configuration menu, the time for the power-saving mode can be set or the mode can be deactivated > see 5.10 chapter.

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

Actuating any operating element (e.g., turning a rotary knob) cancels the power-saving mode and the machine switches back to ready-to-weld mode.



### 5.7 Access control

The machine control can be locked to secure it against unauthorised or unintentional adjustment. The access block has the following effect:

- The parameters and their settings in the machine configuration menu, Expert menu and operation sequence can only be viewed but not changed.
- Welding procedure and welding current polarity cannot be changed.

The parameters for setting the access block are configured in the machine configuration menu > see 5.10 chapter.

#### **Enabling access block**

- Assign the access code for the access block: Select parameter and select a number code (0–999).
- Enable access block: Set parameter Loc to access block enabled on.

The access block activation is indicated by the "Access block active" signal light > see 4.1.2 chapter.

#### Disabling access block

- Enter the access code for the access block: Select parameter and enter the previously selected number code (0–999).
- Disable access block: Set parameter Loc to access block disabled FF. The only way to disable the access block is to enter the selected number code.

# 5.8 Voltage reducing device

The voltage reduction device (VRD) is used to increase safety, especially in dangerous environments (such as shipbuilding, pipeline construction, mining).

The use of a voltage reduction device is mandatory in some countries and specified in many in-house safety regulations for welding power sources.

The VRD > see 4.1.2 chapter signal light lights up when the voltage reducing device is working properly and the output voltage has been reduced to the values specified in the relevant standard (technical data).

# 5.9 Dynamic power adjustment

This requires use of the appropriate mains fuse.

#### Observe mains fuse specification!

This function enables aligning the machine to the mains connection fusing. This may counteract frequent tripping of the mains fuse. The maximum input power of the machine is limited with an exemplary value for the existing mains fuse (infinitely variable).

You can predefine this value in the machine configuration menu > see 5.10 chapter using parameter FUS. The function automatically adjusts the welding power to an uncritical level for the corresponding mains fuse.



When using a 25-A mains fuse, a suitable mains plug has to be installed by a qualified electrician.

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# 5.10 Machine configuration menu

Basic machine settings are defined in the machine configuration menu.

### 5.10.1 Selecting, changing and saving parameters

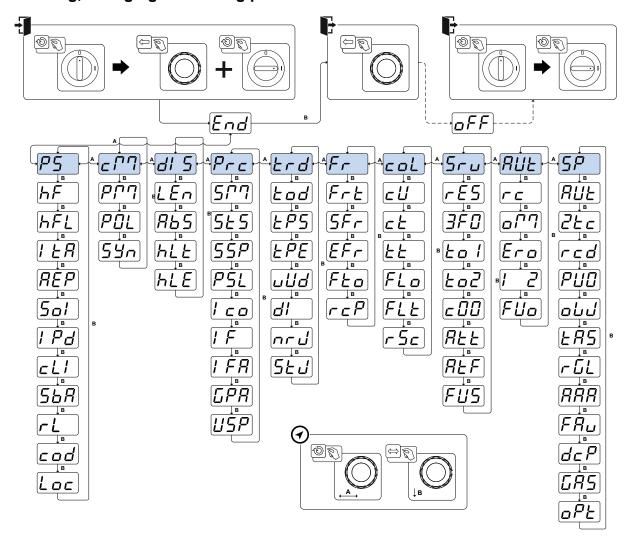


Figure 5-41

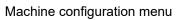
Display	Setting/selection
End	Exit the menu
	Switching the machine off and on Required for applying various configuration parameters
	Required for applying various configuration parameters
<i>P5</i>	Power source menu
hF	Switch ignition mode  HF ignition  Liftarc
HFL	HF intensity  Standard: Maximum value for the high-voltage ignition pulse Up  Reduced: Reduced value for the high-voltage ignition pulse Up
I LA	Re-ignition after arc interruption > see 5.1.6.3 chapter            Job         JOB-dependent time (ex works 5 s).           oFF         Function disabled or numerical value 0.1–5.0 s.



Display	Setting/selection
REP	Reconditioning pulse (tungsten ball stability) <sup>1</sup>
11_1	Cleaning effect of the tungsten ball at the end of welding.
	Function enabled (ex works)  Function disabled
	TIG HF start (soft/hard) switching
امك	soft ignition (factory setting).
	FFhard ignition.
I Pd	Ignition pulse dynamics
, , <u>, , , , , , , , , , , , , , , , , </u>	Function enabled (factory setting)
	©FFFunction disabled
c L I	Minimum current limit (TIG) > see 5.1.2 chapter  Depending on the set tungsten electrode diameter
	DEPENDING OF the set tangsen electrode diameter
	Function enabled (ex works)
SbR	Time-based power-saving mode > see 5.6 chapter
	Time to activation of the power-saving mode in case of inactivity.
	Setting <u>off</u> = disabled or numerical value 5-60 min
r L	Cable resistance alignment > see 5.1.14 chapter
	Access control – access code
ردهم	Setting: 000 to 999 (000 ex works)
Loc	Access control > see 5.7 chapter
(2 2 2 )	<u>or</u> Function enabled <u>orF</u> Function disabled (ex works)
	· · · · · ·
	Operating mode menu
(PP)	Program mode
• • •	<u>oFF</u> Function disabled (factory setting)
	Program lock (P0)
PLL	The program P0 is locked when locking with the key switch. It is only possible to switch
	between programs P1 to P15.
	<u>aFF</u> Function disabled (factory setting)
	On austing principle
54n	Operating principle  synergic parameter setting (factory setting)
	Synergic parameter setting (lactory setting)      FF conventional parameter setting
d: 5	Machine display menu
LEn	Setting the system of units
	Units of length in mm, m/min. (metric system)
	Unit of length in inches, ipm (imperial system)
[ <i>R</i>	Absolute value setting (ignition, secondary, end and hot start current) > see 4.3.2 chapter
	Welding current setting, absolute
	<u>OFF</u> Welding current setting, as a percentage of the main current (ex works)
HLE	Hold value (TIG)
	Hold value is displayed until activated by rotary transducer or welding start (fac-
	tory setting)  Hold value is only displayed for a defined time
	<u>Bub</u> Hold value is only displayed for a defined time <u>off</u> Function disabled
	- I dilotion diodolod

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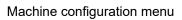
Display	Setting/selection
HLE	Hold value (MMA)  RUE Hold value is only displayed for a defined time (factory setting)  off Function disabled
Prc	Process menu
577	spotmatic operating mode > see 5.1.7.5 chapter Ignition by contact with the workpiece  Function enabled (ex works)  Function disabled
<u> 5£5</u>	Spot time setting > see 5.1.7.5 chapter  Short spot time, setting range 5 ms to 999 ms, increments of 1 ms (ex works)  Long spot time, setting range 0.01 s to 20.0 s, increments of 10 ms (ex works)
<u>55P</u>	Process activation setting > see 5.1.7.5 chapter  Separate process activation (ex works)  FF Permanent process activation
P5L	Pulsing in an upslope/downslope > see 5.1.10.4 chapter  Function enabled (factory setting)  Function disabled
1 0	Commutation optimisation (AC) <sup>1</sup> Function enabled  Function disabled (factory setting)
[ F	Waveform automatic (AC) <sup>1</sup> [TTR] Manual setting of the waveform (factory setting)  [RUL] Synergetic to current (requirement: Xconnect)
! FR	Waveform (AC) - advanced <sup>1</sup> ©FF Function disabled (factory setting)  © Function enabled
[PR	Automatic gas post-flow function > see 5.1.1.1 chapter  Function on  Function off (factory setting)
USP)	Arc length restriction > see 5.3 chapter  Function switched on  FF Function switched off
Erd	Torch configuration menu Set welding torch functions
Lod	Torch mode (ex works 1) > see 5.1.11.1 chapter
<u> </u>	Alternative welding start – tapping start  Available from torch mode 11 (welding stop by tapping remains active).  Function enabled (ex works)  Function disabled
<u>EPE</u>	Tap end > see 5.1.11.2 chapter  Function enabled Function disabled (factory setting)
המק	Up/down speed > see 5.1.11.3 chapter Increase value > rapid current change Decrease value > slow current change
di	Current jump > see 5.1.11.4 chapter Current jump setting in ampere
വെ	Get JOB number Set maximum selectable JOBs for function torch Retox XQ (setting: 1 to 100, factory setting 10).



Display	Setting/selection
[5 <i>LJ</i> ]	Start JOB Set first retrievable JOB (setting: 1 to 100, factory setting 1).
Fr	Remote control menu
FrE	Responsiveness > see 5.1.12.2 chapter  Lin Linear responsiveness  Loū Logarithmic responsiveness (factory setting)
[5Fr]	Start program of foot-operated remote control > see 5.1.12.3 chapter  Function enabled (factory setting).  Function disabled.
EFr	End program of foot-operated remote control > see 5.1.12.4 chapter  Function enabled.  Function disabled (factory setting).
FŁo	Start / stop operation > see 5.1.12.5 chapter
rcP	Welding current polarity switching <sup>1</sup> an polarity switching at the RT PWS 1 19POL remote control (ex works)  aFF polarity switching at the welding machine control
coL	Torch cooling menu
cU	Torch cooling mode  ### Automatic operation (ex works)  ### Permanently enabled  ###################################
cŁ	Welding torch cooling, post-flow time Setting 1–60 min. (ex works 5 min.)
EE	Temperature error limit Setting 50 - 80°C / 122 - 176°F (factory setting 70°C / 158°F)
FLo	Flow monitoring    Flow monitoring  Flow monitoring  Flow monitoring  Flow monitoring  Flow monitoring
FLE	Flow error limit Setting 0.5 I - 2.0 I / 0.13 gal - 0.53 gal (factory setting 0.6 I / 0.16 gal)
r5c	Reset Cool  On Function enabled  OFF Function disabled (factory setting)
5-0	Service menu Any changes to the service menu should be agreed with the authorised service personnel.
r E S	Reset (resetting to factory settings)  ©FF Switched off (factory setting)  ©FF Reset of values in the machine configuration menu  ©PL Complete reset of all values and settings  © Reset of operating time  © Reset of arc time  © Reset of operating time and arc time  Resetting is performed when exiting the menu (End).  Software version query  System bus ID and version number are separated by a dot.
	Example: 07.0040 = 07 (system bus ID) 0.0.4.0 (version number)

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Display	Setting/selection
Lo 1	Operating time/arc time (resettable)
	Lol Display of the resettable operating time in hours and minutes (can be reset using the parameter <u>res</u> ).
	Ell Display of resettable arc time in hours and minutes (can be reset using the parameter F5)
	Operating time/arc time (total)
L02	<u>Eo</u> 2 Display of the operating time in hours and minutes (total)
	EIZ Display of the arc time in hours and minutes (total)
c 00	List of sensors
	Abfrage diverser Gerätesensoren (c00-c31)
REE	Show warnings > see 7.1 chapter
,, <u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	Function disabled (ex works)
	Function enabled
$ R  \vdash  F $	Fuse protection warning  off Function disabled (factory setting)
· · ·	Function disabled (factory setting)
	Dynamic power adjustment > see 5.9 chapter
FUS	by namic power adjustment > see 5.5 chapter
	Automation menu <sup>3</sup>
RUL	
	Automated/Manual (rC on/off) operating mode <sup>3</sup>
	Select machine/function control
	enwith external control voltages/signals
	affwith machine control
0/7	Operating mode switching via interface for automated welding
<u>e</u> , .	ZE     Non-latched       ZES     Special non-latched
	Error output (relay) <sup>3</sup>
Ero	Potential-free relay contact
	Relay contact for error message is open (factory setting)
	Relay contact for error message is closed
l J	Setting for pulse pause current I2 <sup>3</sup>
	The pulse pause current (I2) is set either relative or absolute to the main current (I1).
	ProPercentage setting (factory setting)
	##5Absolute setting
FUo	Function output <sup>3</sup>
	Potential-afflicted open-drain output that can emit various, adjustable signals through active-low levels.
	□FF Switched off (factory setting)
	Ruc Connection to AVC (Arc voltage control)
	ந்து AC synchronisation or hot wire
	<u>USh</u> Notification of a short circuit in the sensor voltage
5 <i>P</i>	Special parameters menu
	Displaying and releasing the automation parameters
RUL	□FF Function disabled (factory setting)
	Function enabled
	Non-latched operation (version C) > see 5.1.7.6 chapter
[2	Function enabled
	<u>oFF</u> Function disabled (ex works)



Display	Setting/selection
	Welding current actual value display > see 4.2 chapter
rcd	an Actual value display
	offNominal value display
	Pulsed TIG welding (thermal)
PUD	Function enabled (ex works)
	aFFFor special applications only
ائام	Filler wire welding, operating mode <sup>2</sup>
	<u>[□-□</u> Filler wire operation for automated applications,
	wire is fed when current flows
	□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
	3£ 3rd cycle operating mode
	प्रि Latched operating mode
LR5	TIG antistick > see 5.1.9 chapter
	function active (factory setting).
	<u>oFF</u> function inactive.
$\lceil -                                   $	Average value controller (AC) 1
	Function enabled (factory setting)
	<i>□FF</i> Function disabled
RRR	activArc voltage measuring
(11111)	Function enabled (ex works)
	<i>□FF</i> Function disabled
FAL	Fast take-over of control voltage (automation) <sup>3</sup>
, , , , ,	Function enabled
	<u>oFF</u> Function disabled (ex works)
dcP	Welding procedure DC+ (TIG) <sup>1</sup>
	Protection against an accidental selection of polarity DC+ and the associated destruction
	of the tungsten electrode (factory setting).
	Polarity switching to DC+ is possible.
	<u>off</u> Polarity switching is disabled (factory setting).
15.851	Gas monitoring
	Depending on where the gas sensor is situated, the use of a pilot static tube and the
	welding process monitoring phase.
	□ FFFunction disabled (ex works). □ Output
	welding torch (with pilot static tube).
	Wording to on (with pilot state tabe).  □□ Monitoring prior to the welding process. Gas sensor between gas valve and
	welding torch (without pilot static tube).
	Permanent monitoring Gas sensor between gas cylinder and gas valve (with
	pilot static tube).
_ O L	Arc detection for welding helmets (TIG)
	Modulated waviness for better arc detection
	Function disabled
	Medium intensity
	High intensity

<sup>&</sup>lt;sup>1</sup> for AC welding machines only.

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<sup>&</sup>lt;sup>2</sup> For machines with filler wire (AW) only.

<sup>&</sup>lt;sup>3</sup> only for machines with an interface for automated welding or appropriate automation components.



# 6 Maintenance, care and disposal

### 6.1 General

### **M** DANGER



Risk of injury due to electrical voltage after switching off!

Working on an open machine can lead to fatal injuries!

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

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

### **△ WARNING**



Improper maintenance, testing and repairs!

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

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

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

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

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

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# Maintenance, care and disposal

Disposing of equipment



# 6.2 Disposing of equipment



### Proper disposal!

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

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

This machine has to be disposed of, or recycled, in accordance with the waste separation systems in use.

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

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

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

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

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

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

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# 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 Warnings

Depending on the display options of the machine display, a warning message is displayed as follows:

Display type - machine control	Display
Graphic display	$\triangle$
two 7-segment displays	ALL
one 7-segment display	R

The cause of the warning is indicated by a corresponding warning number (see table).

- In case of multiple warnings, these are displayed in sequence.
- Document machine warning and inform service personnel, if required.

Warnin	ng	Potential cause / remedy
1	Excess temperature	A shutdown is imminent due to excess temperature.
2	Half-wave failures	Check process parameters.
3	Torch cooling warning	Check coolant level and top up if necessary.
4	Shielding gas	Check shielding gas supply.
5	Coolant flow	Check min. flow rate. [2]
6	Wire reserve	Only a small amount of wire is left on the spool.
7	CAN bus failure	Wire feeder not connected; automatic circuit-breaker of wire feed motor (reset the tripped automatic circuit-breaker by actuating).
8	Welding circuit	The inductance of the welding circuit is too high for the selected welding task.
9	WF configuration	Check WF configuration.
10	Partial inverter	One of several partial inverters is not supplying welding current.
11	Excess temperature of the coolant [1]	Check temperature and switching thresholds. [2]
12	Welding monitoring	The actual value of a welding parameter is outside the specified tolerance field.
13	Contact error	The resistance in the welding circuit is too high. Check earth connection.
14	Alignment error	Switch the machine off and on. If the error persists, notify Service.
15	Mains fuse	The power limit of the mains fuse is reached and the welding power is reduced. Check the fuse setting.
16	Shielding gas warning	Check the gas supply.
17	Plasma gas warning	Check the gas supply.
18	Forming gas warning	Check the gas supply.
19	Gas warning 4	reserved



Warnin	g	Potential cause / remedy
20	Coolant temperature warning	Check coolant level and top up if necessary.
21	Excess temperature 2	reserved
22	Excess temperature 3	reserved
23	Excess temperature 4	reserved
24	Coolant flow warning	Check coolant supply. Check coolant level and top up if necessary. Check flow and switching thresholds. [2]
25	Flow 2	reserved
26	Flow 3	reserved
27	Flow 4	reserved
28	Wire stock warning	Check wire feeding.
29	Low wire 2	reserved
30	Low wire 3	reserved
31	Low wire 4	reserved
32	Tacho error	Fault of wire feeder - permanent overload of the wire drive.
33	Excess current on the wire feed motor	Excess current detected on wire feed motor.
34	JOB unknown	JOB selection was not carried out because the JOB number is unknown.
	Excess current on the wire feed motor slave	Excess current detected on wire feed motor slave (push/push system or intermediate drive).
36	Slave tacho error	Fault of wire feeder - permanent overload of the wire drive (push/push system or intermediate drive).
37	FAST bus failure	Wire feeder not connected (reset by actuating the automatic circuit-breaker of the wire feed motor).
38	Incomplete component information	Check the XNET component management.
39	Mains half-wave failure	Check supply voltage.
40	Weak power grid	Check supply voltage.
41	Cooling unit not recognised	Check the cooling unit connection.
47	Battery (remote control, type BT)	Battery level is low (replace battery)

<sup>[1]</sup> only for the XQ machine series

<sup>[2]</sup> See technical data for values and other switching thresholds.



# 7.2 Error messages (power source)

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

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

Display type - machine control	Display
Graphic display	4
two 7-segment displays	Err
one 7-segment display	E

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

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

#### Reset error (category legend)

- A The error message disappears when the error is eliminated.
- B The error message can be reset by pressing a push-button ◀.

All other error messages can only be reset by switching the machine off and on again.

### Error 3: Tacho error

Category A, B

- ✓ Fault in the wire feeder.
  - \* Check the electrical connections (connectors, lines).
- Permanent overload of the wire drive.
  - Do not lay the liner in tight radii.
  - \$\text{Check the wire in the liner for ease of movement.}

### **Error 4: Excess temperature**

Category A

- ✓ The power source is overheating.
  - \* Allow the switched-on machine to cool.
- ✓ Fan is blocked, dirty or defective.
  - Check the fan and clean or replace.
- Air inlet or outlet is blocked.
  - Check the air inlet and outlet.

### **Error 5: Mains overvoltage**

- Mains voltage is too high.
  - \* Check the mains voltages and compare them with the connection voltages of the power source.

#### Error 6: Mains undervoltage

- Mains voltage is too low.
  - \* Check the mains voltages and compare them with the connection voltages of the power source.



#### Error 7: Low coolant level

#### Category B

- Low flow rate.
  - ★ Fill with coolant.
  - ★ Check coolant flow remove kinks in the hose package.
  - ★ Adjust the flow threshold [1].
  - Clean the cooler.
- ✓ Pump does not turn.
  - Turn the pump shaft.
- ✓ Air in the coolant circuit.
  - ★ Vent the coolant circuit.
- ✓ The hose package is not filled with coolant.
  - Switch the machine off and on > pump running > filling process.
- ✓ Operation with a gas-cooled welding torch.
  - ★ Deactivate the torch cooling.
  - \* Connect the coolant feed and return with a hose bridge.

#### Error 8: Shielding gas error

Category A, B

- ✓ No gas.
  - Check the gas supply.
- ✓ The pre-pressure is too low.
  - Remove kinks in the hose package (nominal value: 4-6 bar pre-pressure).

#### **Error 9: Secondary overvoltage**

- Overvoltage at the output: Inverter error.
  - Request service.

#### **Error 10: Earth fault (PE error)**

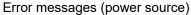
- ✓ Connection between welding wire and machine casing.
  - \* Remove the electrical connection.
- ✓ Connection between welding circuit and machine casing.
  - \* Check the connection and routing of the earth wire / welding torch.

#### **Error 11: Fast shut-down**

Category A, B

- - Eliminate errors on the higher-level control.







#### Error 16: Pilot arc power source - collective error

#### Category A

- ✓ The external emergency stop circuit has been interrupted.
  - \* Check the emergency stop circuit and eliminate the cause of the error.
- - ★ Deactivate the emergency stop circuit.
- ✓ The power source is overheating.
  - \* Allow the switched-on machine to cool.
- ✓ Fan is blocked, dirty or defective.
  - Check the fan and clean or replace.
- ✓ Air inlet or outlet is blocked.
  - Check the air inlet and outlet.
- ✓ Short circuit on welding torch.
  - \* Check the welding torch.
  - \* Request service.

#### Error 17: Cold wire error

#### Category B

- ✓ Fault in the wire feeder.
  - ★ Check the electrical connections (connectors, lines).
- Permanent overload of the wire drive.
  - ★ Do not lay the liner in tight radii.
  - Check the liner for ease of movement.

### Error 18: Plasma gas error

#### Category B

- ✓ No gas.
  - Check the gas supply.
- ✓ The pre-pressure is too low.
  - Remove kinks in the hose package (nominal value: 4-6 bar pre-pressure).

#### Error 19: Shielding gas error

### Category B

- ✓ No gas.
  - Check the gas supply.
- - Remove kinks in the hose package (nominal value: 4-6 bar pre-pressure).



#### Error 20: Low coolant level

#### Category B

- Low flow rate.
  - ★ Fill with coolant.
  - ★ Check coolant flow remove kinks in the hose package.
  - ★ Adjust the flow threshold [1].
  - Clean the cooler.
- Pump does not turn.
  - Turn the pump shaft.
- ✓ Air in the coolant circuit.
  - ★ Vent the coolant circuit.
- ✓ The hose package is not filled with coolant.
  - ★ Switch the machine off and on > pump running > filling process.
- Operation with a gas-cooled welding torch.
  - ★ Deactivate the torch cooling.
  - ★ Connect the coolant feed and return with a hose bridge.

#### Error 22: Excess coolant temperature

#### Category B

- ✓ Coolant is overheating [1].
  - \* Allow the switched-on machine to cool.
- ✓ Fan is blocked, dirty or defective.
  - ★ Check, clean or replace the fan.
- Air inlet or outlet is blocked.
  - Check the air inlet and outlet.

#### Error 23: Excess temperature of the HF choke

#### Category A

- ✓ External XF ignition unit is overheating.
  - \* Allow the switched-on machine to cool.

### Error 24: Pilot arc ignition error

#### Category B

- ✓ The pilot arc cannot ignite.
  - \* Check the welding torch equipment.

#### Error 25: Forming gas error

### Category B

- ✓ No gas.
  - Check the gas supply.
- ✓ The pre-pressure is too low.
  - Remove kinks in the hose package (nominal value: 4-6 bar pre-pressure).

### Error 26: Excess pilot arc module temperature

### Category A

- ✓ The power source is overheating.
  - \* Allow the switched-on machine to cool.
- Fan is blocked, dirty or defective.
  - ★ Check the fan and clean or replace.
- Air inlet or outlet is blocked.
  - \* Check the air inlet and outlet.



#### Error 32: Error I>0

- ✓ Current recording is faulty.
  - Request service.

#### **Error 33: Error UIST**

- ✓ Voltage recording is faulty.
  - Eliminate the short circuit in the welding circuit.
  - Remove the external sensor voltage.
  - \* Request service.

#### **Error 34: Electronics error**

- - ★ Switch the machine off and on.
  - \* Request service.

#### **Error 35: Electronics error**

- ✓ Slope error
  - Switch the machine off and on.
  - \* Request service.

### Error 36: Serrors

- ✓ S conditions violated.
  - Switch the machine off and on.
  - \* Request service.

#### **Error 37: Electronics error**

- ✓ The power source is overheating.
  - \* Allow the switched-on machine to cool.
- ✓ Fan is blocked, dirty or defective.
  - \* Check the fan and clean or replace.
- Air inlet or outlet is blocked.
  - \* Check the air inlet and outlet.

#### **Error 38: Error IIST**

- Short circuit in the welding circuit before welding.
  - 🛠 Eliminate the short circuit in the welding circuit.
  - \* Request service.

#### **Error 39: Electronics error**

- ✓ Secondary overvoltage
  - Switch the machine off and on.
  - \* Request service.

#### **Error 40: Electronics error**

- ✓ Error I>0
  - Request service.

#### Error 47: Radio link (BT)

Category B

- ✓ Connection error between welding machine and peripheral unit.
  - Note the documentation for the data interface with radio transmission.



#### **Error 48: Ignition error**

Category B

- No ignition at process start (automated machines).
  - Check the wire feeding
  - \* Check the load cable connections in the welding circuit.
  - \* Clean corroded surfaces on the workpiece before welding if necessary.

#### **Error 49: Arc interruption**

Category B

- ✓ An arc interruption occurred during welding with an automated system.
  - Check the wire feeding.
  - ★ Adjust the welding speed.

#### Error 50: Program number

Category B

- ✓ Internal error.
  - \* Request service.

#### **Error 51: Emergency stop**

Category A

- ★ The external emergency stop circuit has been interrupted.
  - Check the emergency stop circuit and eliminate the cause of the error.
- ✓ The emergency stop circuit of the power source has been activated (internally configurable).
  - ★ Deactivate the emergency stop circuit.

#### Error 52: No wire feeder

- - ★ Check or connect the control cables of the wire feeders.
  - Check the identification number of the automated wire feeder (for 1DV: number 1, for 2DV: each a wire feeder with number 1 and a wire feeder with number 2).

#### Error 53: No wire feeder 2

Category B

- ✓ Wire feeder 2 was not detected.
  - Check the control cable connections.

#### **Error 54: VRD errors**

- Error in the open-circuit voltage reduction.
  - 🛠 If necessary, disconnect the external machine from the welding circuit.
  - \* Request service.

#### Error 55: Excess wire feeder current

Category B

- Excess current detected in the wire feed mechanism.
  - ★ Do not lay the liner in tight radii.
  - ★ Check the liner for ease of movement.

#### **Error 56: Mains phase failure**

- One phase of the mains voltage has failed.
  - \* Check mains connection, mains plug and mains fuses.

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#### Error 57: Slave tacho error

Category B

- ✓ Fault in the wire feeder (slave drive).
  - Check the connections (connectors, lines).
- Permanent overload of the wire drive (slave drive).
  - Do not lay the liner in tight radii.
  - ★ Check the liner for ease of movement.

### **Error 58: Short circuit**

Category B

- ✓ Short circuit in the welding circuit.
  - ★ Eliminate the short circuit in the welding circuit.
  - Representation of the second o

### **Error 59: Incompatible machine**

- - \* Disconnect the incompatible machine from the system.

#### Error 60: Incompatible software

- ✓ The software of a machine is not compatible.
  - ★ Disconnect the incompatible machine from the system
  - \* Request service.

#### **Error 61: Welding monitoring**

- ✓ The actual value of a welding parameter is outside the specified tolerance range.
  - \* Maintain the tolerance ranges.
  - \* Adjust the welding parameters.

#### **Error 62: System component**

- ✓ The system component was not found.
  - \* Request service.

#### Error 63: Mains voltage error

- ✓ Operating and mains voltage are incompatible.
  - Check or adjust the operating and mains voltage.
- [1] See technical data for values and other switching thresholds.

# 7.3 Resetting welding parameters to the factory settings

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

To reset the welding parameters or machine settings to the factory settings, select parameter  $\overline{E5}$  in the service menu  $\overline{5cu}$  > see 5.10 chapter.

### 7.4 Software version of the machine control

The query of the software versions only serves to inform the authorised service staff. It is available in the machine configuration menu > see 5.10 chapter.



#### 8 **Appendix**

#### Parameter overview – setting ranges 8.1

#### 8.1.1 **TIG** welding

Name	Displa	ay		Setting range			
	Code	Standard	Unit	min.		max.	
Gas pre-flow time	[Pr	0,5	s	0	-	20	
Electrode diameter (metric)	ndA	2,4	mm	1,0	-	4,8	
Electrode diameter (imperial)	ndR	93	mil	40	-	187	
Ignition optimisation	cor	100	%	25	-	175	
Start current (per cent of [])	1 5E	50	%	1	-	200	
Start current (absolute, power source dependent)	1 5E	-	Α	-	-	-	
Start time	£5£	0,01	s	0,01	-	20,0	
Slope time (time from [5] to [1])	EUP	0,00	s	0,00	-	20,0	
Main current (power source dependent)	[ ]	-	Α	-	-	-	
Slope time (time from L to L2)	E5 1	0,00	s	0,00	-	20,0	
Slope time (time from 🗀 to 🗐)	£52	0,00	s	0,00	-	20,0	
Secondary current (per cent of [])	1 2	50	%	1		200	
Secondary current (absolute, power source dependent)	12	-	Α	-		-	
Slope time (time from I to IEd)	Edn	0,00	s	0,00	-	20,0	
End current (per cent of —)	I Ed	20	%	1	-	200	
End current (absolute, power source dependent)	I Ed	-	Α	-	-	-	
End current time	E E d	0,01	s	0,01	-	20,0	
Gas post-flow time	GPE	8	s	0,0	-	40,0	
activArc (main current dependent)	RRP			0	-	100	
Welding tasks (JOB)	Job	1		1	-	100	
spotArc time	E P	2	s	0,01	-	20,0	
spotmatic time ( $565 > 00$ )	E P	200	ms	5	-	999	
spotmatic time ( $5E5 > 0FF$ )	E P	2	S	0,01	-	20,0	
JOB presets	сРЈ	-		1		100	



### 8.1.1.1 Pulse parameters

Name		Display			Setting range		
	Code	Standard	Unit	min.		тах.	
Pulse current (average value pulses)	I PL	140	%	1		200	
Pulse time (thermal pulsing)	E 1	0,01	S	0,00	-	20,0	
Pulse pause time (thermal pulsing)	E 2	0,01	S	0,00	-	20,0	
Pulse balance (average value pulses)	ЬЯL	50,0	%	0,1	-	99,9	
Pulse frequency (average value pulses)	FrE	2,00	Hz	0,10	-	20000	

# 8.1.2 MMA welding

Name	Display			Setting range		
	Code	Standard	Unit	min.		тах.
Hot start current (per cent of [])	1 hE	120	%	1	-	200
Hot start current (absolute, power source dependent)	I hE	-	Α	-	-	-
Hot start time	EHE	0,5	s	0,0	-	10,0
Main current (power source dependent)	1 1	-	Α	-	-	-
Arcforce	Rrc	0		-40	-	40
JOB presets	с₽Ј	-		101	-	108
JOB presets (CEL)	с₽Ј	-		109	-	116

### 8.1.2.1 Pulse parameters

Name	Displ	Display			Setting range			
	Code	Standard	Unit	min.		max.		
Pulse current (average value pulses)	[ PL	142		1	-	200		
Pulse balance (average value pulses)	ЬЯL	30	%	0,1	-	99,9		
Pulse frequency (average value pulses)	FrE	1,2	Hz	0,1	-	500		



#### Global parameters 8.1.3

Name	Display			Setting range		
	Code	Standard	Unit	min.		тах.
Standby	S <sub>b</sub> R	20	m	5	-	60
Re-ignite after arc interruption	I ŁA	Job	S	0,1	-	5
Torch mode	Eod	1	-	1	-	6
Up/down speed	ulld	10	-	1	1	100
Current jump	dl	1	Α	1	-	20
Retrieval of JOB number	nrd	100	-	1	-	100
Start JOB	5ŁJ	1	-	1		100
Welding torch cooling, post-flow time	cŁ	7	-	1	-	60
Welding torch cooling, temperature error limit	ĿĿ	70	С	50	-	80
Welding torch cooling, temperature error limit (imperial)	EE	158	F	122	-	176
Welding torch cooling, flow error limit	FLo	0,6	I	0,5	-	2,0
Welding torch cooling, flow error limit (imperial)	FLo	0.16	gal	0.13	-	0.53
Dynamic power adjustment	FUS	16	-	10	-	32
Arc detection for welding helmets (TIG)	oPE	0	-	0	-	2



# 8.2 Searching for a dealer

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



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