



**EN**

## **Welding machine**

**Pico 160 cel puls**

**Pico 160 cel puls VRD (RU)**

**Pico 160 cel puls VRD (AUS)**

099-002129-EW501

11.05.2017

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## General instructions

### **WARNING**



#### **Read the operating instructions!**

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

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



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

***A list of authorised sales partners can be found at [www.ewm-group.com](http://www.ewm-group.com).***

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

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

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

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## 1 Contents

<b>1</b>	<b>Contents</b>	<b>3</b>
<b>2</b>	<b>For your safety</b>	<b>5</b>
2.1	Notes on the use of these operating instructions	5
2.1.1	Complete documentation	5
2.2	Explanation of icons	6
2.3	General	7
<b>3</b>	<b>Intended use</b>	<b>8</b>
3.1	Documents which also apply	8
3.1.1	Warranty	8
3.1.2	Declaration of Conformity	8
3.1.3	Welding in environments with increased electrical hazards	8
3.1.4	Calibration/Validation	8
<b>4</b>	<b>Machine description – quick overview</b>	<b>9</b>
4.1	Front view	9
4.2	Rear view	10
4.3	Machine control – Operating elements	10
<b>5</b>	<b>Design and function</b>	<b>12</b>
5.1	Transport and installation	12
5.1.1	Machine cooling	12
5.1.2	Workpiece lead, general	12
5.1.3	Ambient conditions	13
5.1.3.1	In operation	13
5.1.3.2	Transport and storage	13
5.1.4	Adjusting the length of the carrying strap	13
5.1.5	Notes on the installation of welding current leads	13
5.1.5.1	Stray welding currents	14
5.1.6	Mains connection	15
5.1.6.1	Mains configuration	15
5.2	Operating the machine control	15
5.2.1	Machine display	15
5.2.2	Welding power setting	15
5.2.3	Welding parameter setting in the operation sequence	15
5.2.4	Setting advanced welding parameters (Expert menu)	15
5.2.5	Changing basic settings (machine configuration menu)	15
5.3	MMA welding	16
5.3.1	Connecting the electrode holder and workpiece lead	16
5.3.2	Welding task selection	16
5.3.3	Arcforce	17
5.3.4	Hotstart	17
5.3.5	Antistick	17
5.3.6	Average value pulse welding	18
5.3.7	Expert menu (MMA)	19
5.4	TIG welding	20
5.4.1	Connecting a TIG welding torch with rotating gas valve	20
5.4.2	Shielding gas supply (shielding gas cylinder for welding machine)	20
5.4.3	Pressure regulator connection	21
5.4.4	Welding task selection	21
5.4.4.1	Gas test – setting the shielding gas volume	21
5.4.5	Arc ignition	22
5.4.5.1	Liftarc	22
5.4.6	Average value pulse welding	22
5.4.7	Expert menu (TIG)	23
5.5	Arc length restriction (USP)	24
5.6	Power-saving mode (Standby)	24
5.7	Voltage reducing device	24
5.8	Access control	25

5.9	Machine configuration menu .....	26
<b>6</b>	<b>Maintenance, care and disposal .....</b>	<b>28</b>
6.1	General.....	28
6.2	Cleaning .....	28
6.2.1	Dirt filter.....	28
6.3	Maintenance work, intervals .....	29
6.3.1	Daily maintenance tasks.....	29
6.3.2	Monthly maintenance tasks .....	29
6.3.3	Annual test (inspection and testing during operation) .....	29
6.4	Disposing of equipment.....	30
6.5	Meeting the requirements of RoHS.....	30
<b>7</b>	<b>Rectifying faults.....</b>	<b>31</b>
7.1	Error messages (power source).....	31
7.2	Checklist for rectifying faults .....	32
7.3	Display machine control software version.....	32
7.4	Dynamic power adjustment.....	32
7.5	Resetting welding parameters to the factory settings .....	33
<b>8</b>	<b>Technical data.....</b>	<b>34</b>
8.1	Pico 160 cel puls .....	34
<b>9</b>	<b>Accessories .....</b>	<b>35</b>
9.1	Electrode holder / workpiece lead .....	35
9.2	Remote controls and accessories.....	35
9.3	TIG welding torch .....	35
9.4	General accessories .....	35
9.5	Options .....	35
<b>10</b>	<b>Service documents .....</b>	<b>36</b>
10.1	Spare and replacement parts.....	36
10.2	Circuit diagram .....	38
<b>11</b>	<b>Appendix A.....</b>	<b>39</b>
11.1	Parameter overview – setting information.....	39
<b>12</b>	<b>Appendix B.....</b>	<b>40</b>
12.1	Overview of EWM branches.....	40

## 2 For your safety

### 2.1 Notes on the use of these operating instructions

#### 2.1.1 Complete documentation



**These operating instructions are part of the complete documentation and valid only in combination with the "Safety instructions"!**

**Read and observe the documents for all system components!**

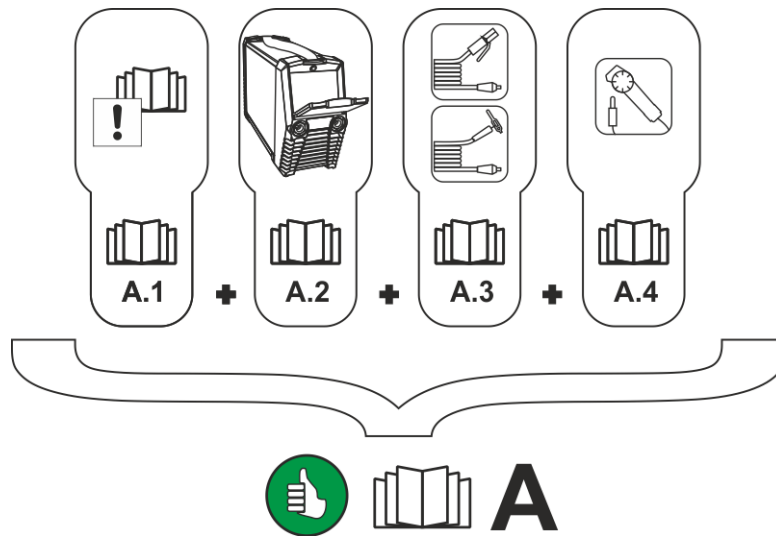
























Figure 2-1

Item	Documentation
A.1	Safety instructions
A.2	Power source
A.3	Electrode holder/welding torch
A.4	Remote control
A	Complete documentation

## 2.2 Explanation of icons

Symbol	Description	Symbol	Description
	Indicates technical aspects which the user must observe.		Activate and release/tap/tip
	Switch off machine		Release
	Switch on machine		Press and keep pressed
			Switch
	Wrong		Turn
	Correct		Numerical value – adjustable
	Menu entry		Signal light lights up in green
	Navigating the menu		Signal light flashes green
	Exit menu		Signal light lights up in red
	Time representation (e.g.: wait 4 s/activate)		Signal light flashes red
	Interruption in the menu display (other setting options possible)		
	Tool not required/do not use		
	Tool required/use		

## 2.3 General



### ***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.***

## 3 Intended use

### WARNING



#### **Hazards due to improper usage!**

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

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

Arc welding machine for MMA DC welding with TIG DC welding with lift arc (touch starting) as secondary process.

### 3.1 Documents which also apply

#### 3.1.1 Warranty



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

#### 3.1.2 Declaration of Conformity



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

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

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

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



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

#### 3.1.4 Calibration/Validation

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



## 4 Machine description – quick overview

### 4.1 Front view

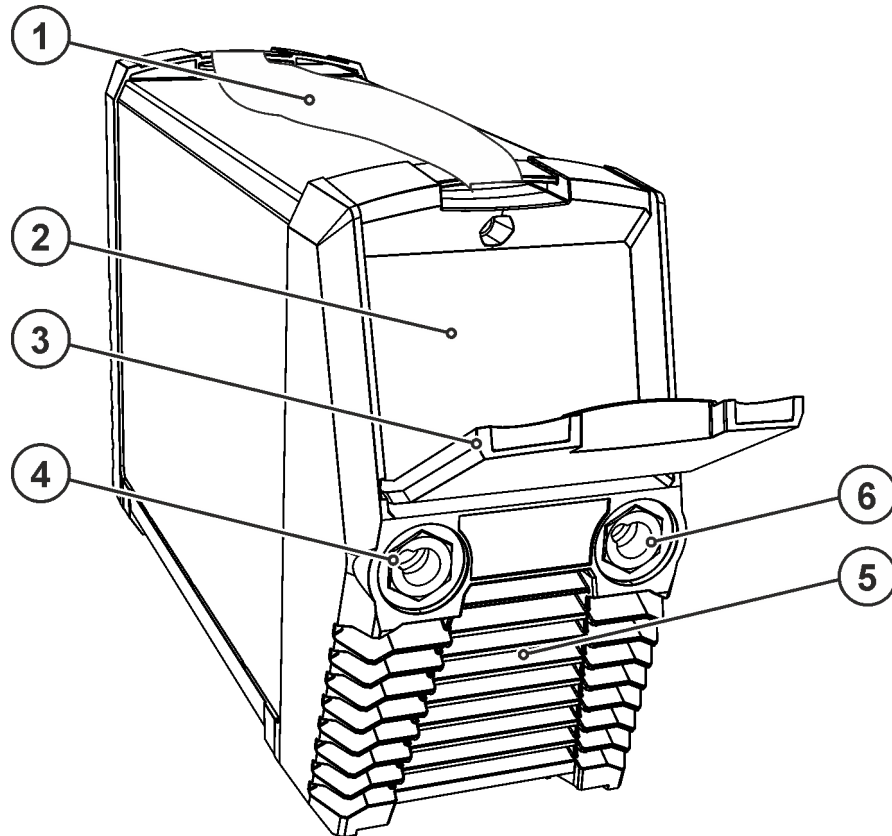


Figure 4-1

Item	Symbol	Description
1		Carrying strap > see 5.1.4 chapter
2		Machine control > see 4.3 chapter
3		Protective cap
4	+	Connection socket, "+" welding current <ul style="list-style-type: none"> <li>• MMA: Electrode holder or workpiece lead connection</li> <li>• TIG: Connection for workpiece lead</li> </ul>
5		Cooling air outlet
6	—	Connection socket, "-" welding current <ul style="list-style-type: none"> <li>• MMA welding: Electrode holder or workpiece lead connection</li> <li>• TIG welding: Welding current lead connection for TIG welding torch</li> </ul>

## 4.2 Rear view

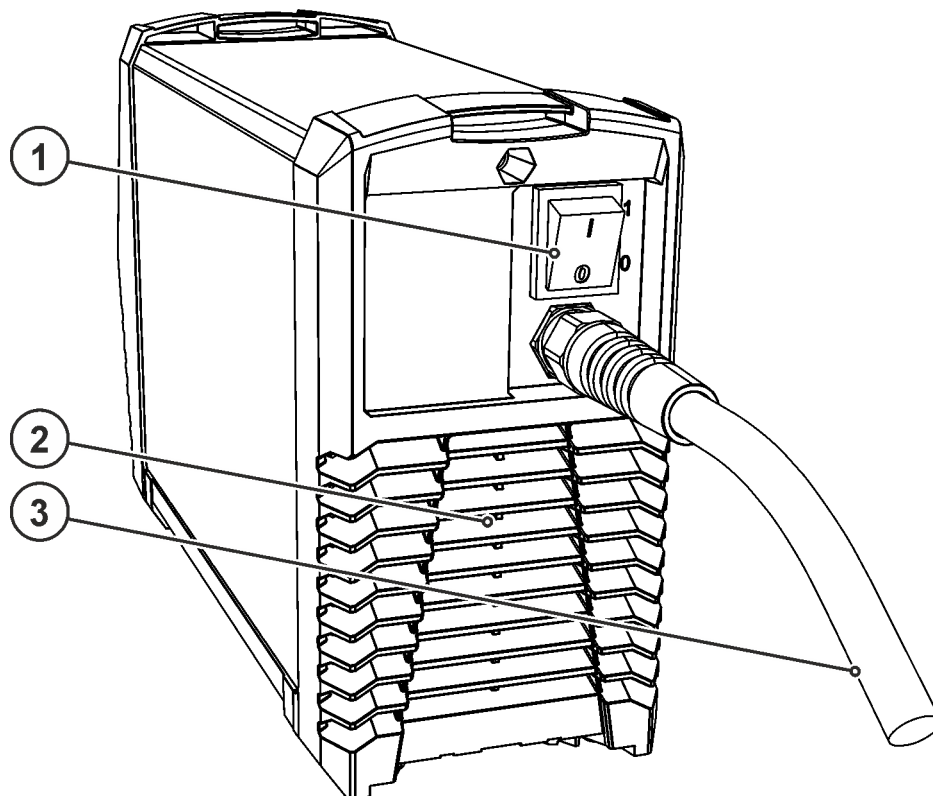



Figure 4-2

Item	Symbol	Description
1		Main switch, machine on/off
2		Cooling air inlet
3		Mains connection cable > see 5.1.6 chapter

## 4.3 Machine control – Operating elements

The setting ranges for the parameter values are summarised in the Parameter overview section > see 11.1 chapter.

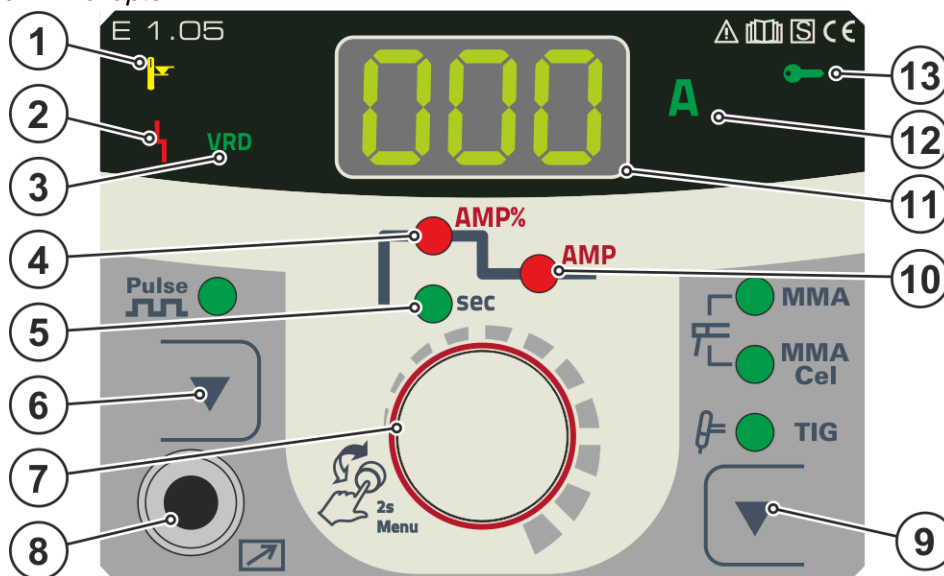










Figure 4-3

Item	Symbol	Description
1		<b>Excess temperature signal light</b> 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.
2		<b>Collective interference signal light</b> For error messages, > see 7 chapter
3	VRD	<b>Voltage reduction device (VRD) signal light</b> The VRD signal light is illuminated when the voltage reduction device is operating without fault and the output voltage is reduced to a value specified in the relevant standard (see technical data) > see 5.7 chapter. The voltage reduction device is only active on VRD machine versions.
4	AMP%	<b>Hotstart current signal light</b>
5	sec	<b>Hotstart time signal light</b>
6		<b>Pulsed welding/power-saving mode push-button</b> MMA ----- pulse welding > see 5.3.6 chapter TIG ----- pulse welding > see 5.4.6 chapter Press for 2 s to put the machine into power-saving mode. To reactivate, activate one of the operating elements > see 5.6 chapter.
7		<b>Control button</b> Central control button to be pressed or turned > see 5.2 chapter.
8		<b>2-pole connection socket</b> Remote control control cable
9		<b>Welding procedure push-button</b> MMA ----- MMA welding MMA Cel ----- MMA welding (Cel characteristics) TIG ----- TIG welding
10	AMP	<b>Main current signal light</b> I <sub>min</sub> to I <sub>max</sub> (1 A increments)
11		<b>Welding data display (3-digit)</b> Displays the welding parameters and the corresponding values > see 5.2.1 chapter
12	A	<b>“Welding current unit” signal light</b> Illuminates when welding currents are displayed.
13		<b>Access control active signal light</b> Signal light is on when access control is active on the machine control > see 5.8 chapter.

## 5 Design and function

### WARNING



**Risk of injury from electric shock!**

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

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

### 5.1 Transport and installation

#### WARNING



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

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

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



***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.***

#### 5.1.1 Machine cooling



***Insufficient ventilation results in a reduction in performance and equipment damage.***

- ***Observe the ambient conditions!***
- ***Keep the cooling air inlet and outlet clear!***
- ***Observe the minimum distance of 0.5 m from obstacles!***

#### 5.1.2 Workpiece lead, general

#### CAUTION





**Risk of burning due to incorrect welding current connection!**

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

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

## 5.1.3 Ambient conditions

-  **The machine must not be operated in the open air and must only be set up and operated on a suitable, stable and level base!**
  - The operator must ensure that the ground is non-slip and level, and provide sufficient lighting for the place of work.
  - Safe operation of the machine must be guaranteed at all times.
-  **Unusually high quantities of dust, acid, corrosive gases or substances may damage the equipment.**
  - Avoid high volumes of smoke, vapour, oil vapour and grinding dust!
  - Avoid ambient air containing salt (sea air)!

### 5.1.3.1 In operation

Temperature range of the ambient air:

- -25 °C to +40 °C

Relative air humidity:

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

### 5.1.3.2 Transport and storage


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

- -30 °C to +70 °C

Relative air humidity

- Up to 90% at 20 °C

## 5.1.4 Adjusting the length of the carrying strap

-  **To demonstrate adjustment, lengthening the strap is shown in the figure. To shorten, the strap's loops must be inched in the opposite direction.**

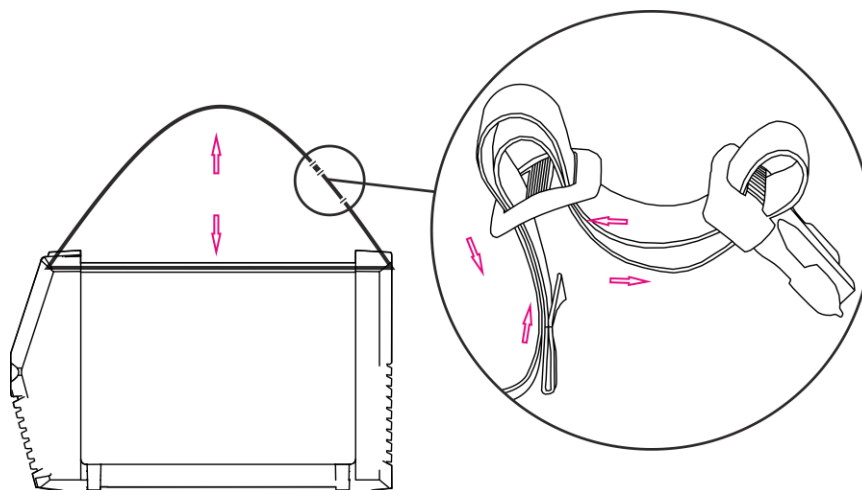


Figure 5-1

## 5.1.5 Notes on the installation of welding current leads

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

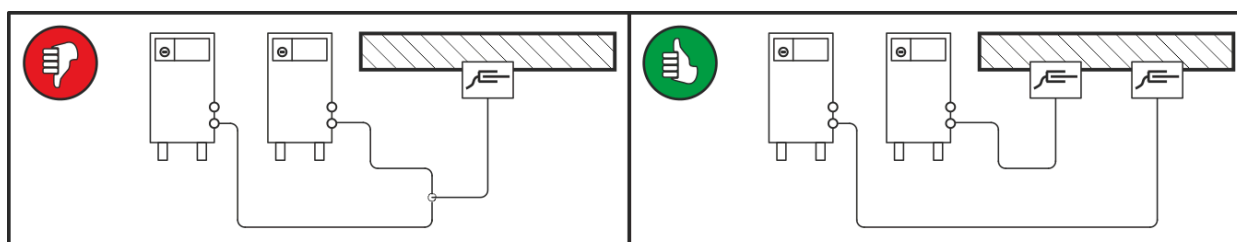


Figure 5-2

- Fully unroll welding current leads, torch hose packages and intermediate hose packages. Avoid loops!**
- Always keep leads as short as possible!**
- Lay any excess cable lengths in meanders.**

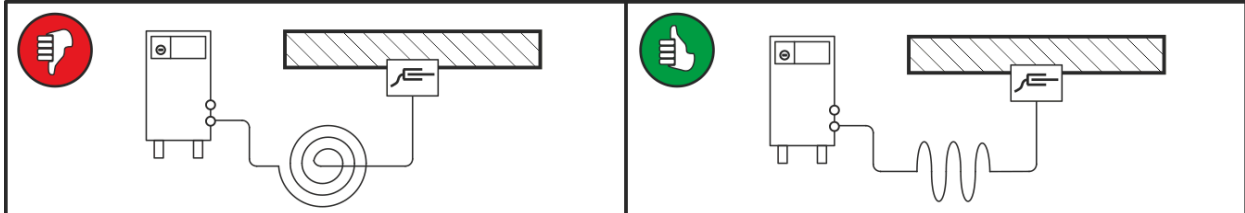


Figure 5-3

## 5.1.5.1 Stray welding currents

### **WARNING**



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

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

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

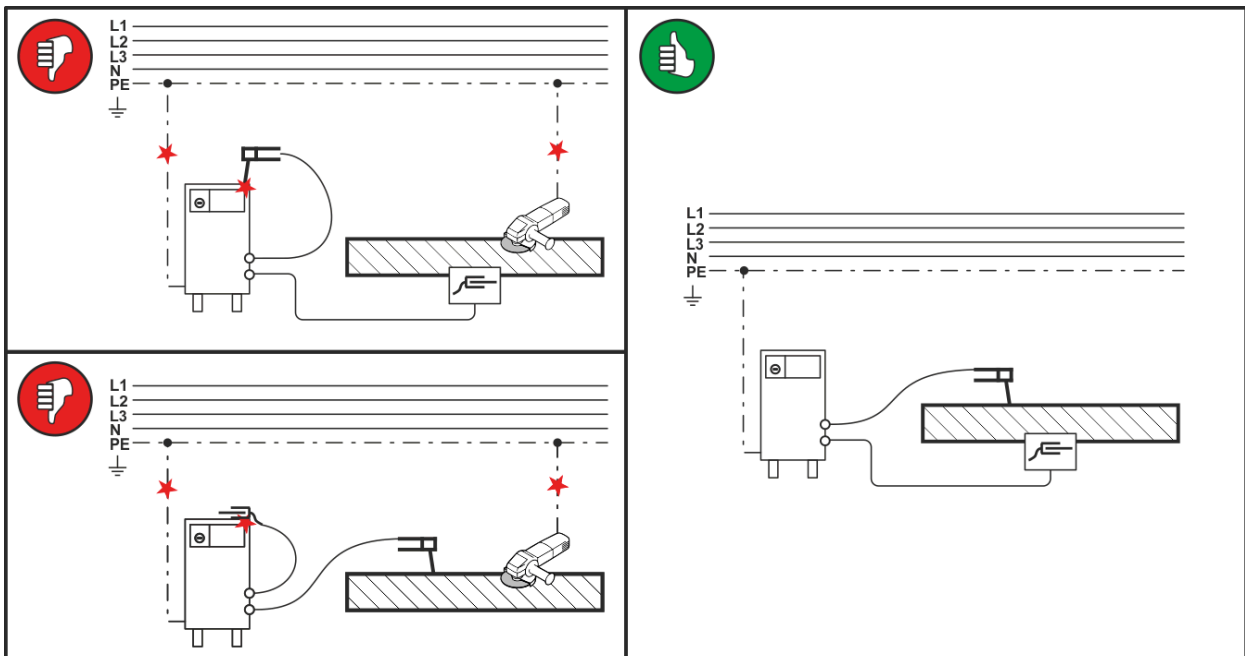


Figure 5-4

### 5.1.6 Mains connection

#### DANGER



#### Hazards caused by improper mains connection!

#### An improper mains connection can cause injuries or damage property!

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

#### 5.1.6.1 Mains configuration



**The machine may only be connected to a one-phase system with two conductors and an earthed neutral conductor.**

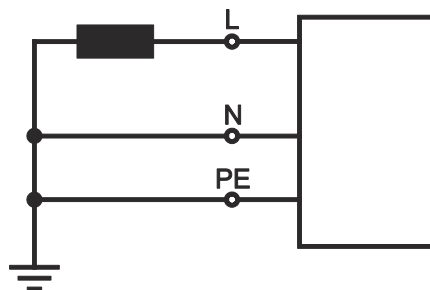


Figure 5-5

#### Legend

Item	Designation	Colour code
L	Outer conductor	brown
N	Neutral conductor	blue
PE	Protective conductor	green-yellow

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

## 5.2 Operating the machine control

### 5.2.1 Machine display

The machine control switches to the main screen after it has been turned on or a setting has been completed. This means that the previously selected settings (indicated by signal lights where applicable) have been applied and the current nominal value (A) is displayed in the welding data display.

### 5.2.2 Welding power setting

The welding power is set using the control button. You can also adjust the parameters in the operation sequence or settings in the different machine menus.

### 5.2.3 Welding parameter setting in the operation sequence

During the operation sequence you can set a welding parameter by briefly pressing the control button (navigate the parameters) and then turning the button (set the parameter).

### 5.2.4 Setting advanced welding parameters (Expert menu)

The Expert menu contains functions and parameters which cannot be set directly in the machine control or which do not need to be set on a regular basis. The number and display of these parameters depends on the previously selected welding procedure or the functions.

### 5.2.5 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 5.9 chapter.

## 5.3 MMA welding

### 5.3.1 Connecting the electrode holder and workpiece lead

#### ⚠ CAUTION



**Risk of crushing and burns!**

**When changing stick electrodes there is a risk of crushing and burns!**

- Wear appropriate and dry protective gloves.
- Use an insulated pair of tongs to remove the used stick electrode or to move welded workpieces.

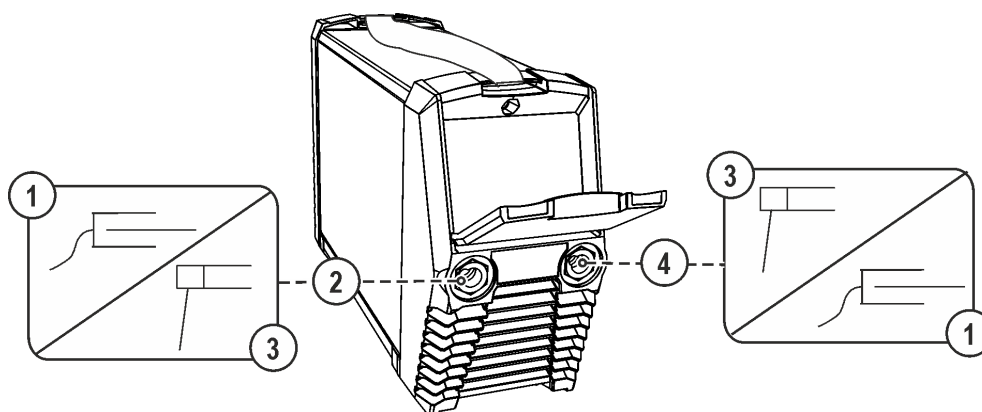


Figure 5-6

Item	Symbol	Description
1		Workpiece
2		Connection socket for "+" welding current Electrode holder or workpiece lead connection
3		Electrode holder
4		Connection socket, "-" welding current Workpiece lead or electrode holder connection



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

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

### 5.3.2 Welding task selection

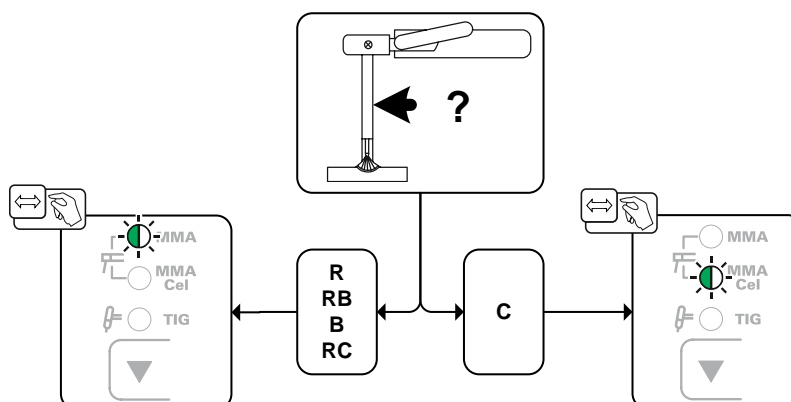


Figure 5-7



Type	Electrode type
R	Rutile
RB	Rutile-basic
B	Basic
RC	Rutile cellulose
C	Cellulose

## 5.3.3 Arcforce

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

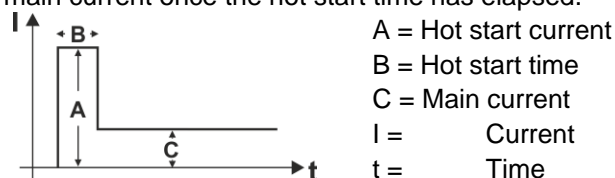


**For parameter setting, > see 5.3.7 chapter.**

## 5.3.4 Hotstart

The hot start function improves the arc striking.

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



Setting

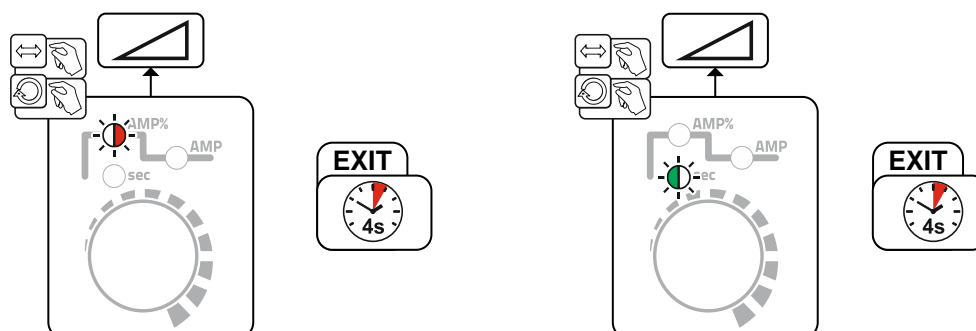
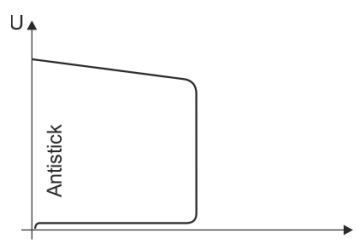


Figure 5-8

## 5.3.5 Antistick



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

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

Figure 5-9

## 5.3.6 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 ( $\overline{bAL}$ ) and a frequency ( $\overline{FrE}$ ) having been defined first. The predefined ampere current average value is decisive, the pulse current (Ipuls) is defined by the  $\overline{IPL}$  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.

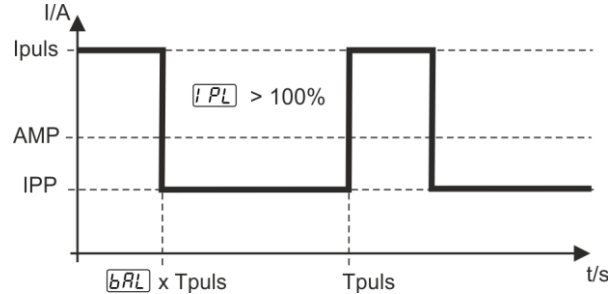


Figure 5-10

AMP = Main current; e.g. 100 A

IPL = Pulse current =  $IP1 \times AMP$ ; e.g.  $170\% \times 100 \text{ A} = 170 \text{ A}$

IPP = Pulse pause current

$T_{puls}$  = Duration of one pulse cycle =  $1/\overline{FrE}$ ; e.g.  $1/1 \text{ Hz} = 1 \text{ s}$

$\overline{bAL}$  = Balance

### Selection

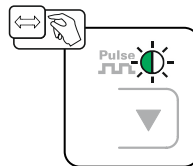


Figure 5-11



**For parameter setting, > see 5.3.7 chapter.**

## 5.3.7 Expert menu (MMA)

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.

The setting ranges for the parameter values are summarised in the Parameter overview section > see 11.1 chapter.

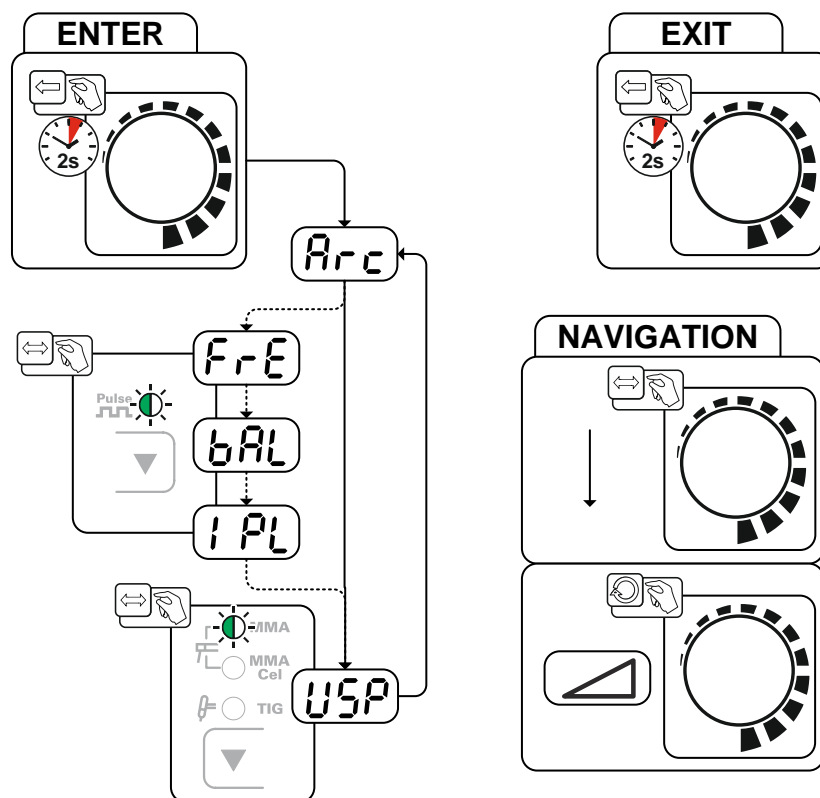


Figure 5-12

Display	Setting/selection
<b>Arc</b>	<b>Arcforce correction</b> <ul style="list-style-type: none"> <li>• Increase value &gt; harder arc</li> <li>• Decrease value &gt; softer arc</li> </ul>
<b>FrE</b>	<b>Pulse frequency</b>
<b>bAL</b>	<b>Pulse balance</b>
<b>I PL</b>	<b>Pulse current &gt; see 5.3.6 chapter</b>
<b>USP</b>	<b>Arc length restriction &gt; see 5.5 chapter</b> <ul style="list-style-type: none"> <li><b>on</b> -----Function switched on</li> <li><b>OFF</b> -----Function switched off</li> </ul>

## 5.4 TIG welding

### 5.4.1 Connecting a TIG welding torch with rotating gas valve

Prepare welding torch according to the welding task in hand (see operating instructions for the torch).

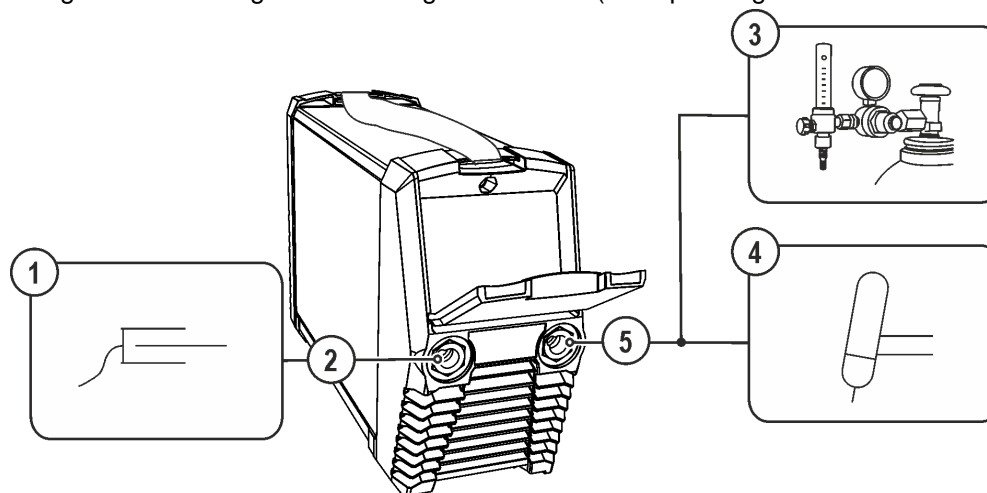



Figure 5-13

Item	Symbol	Description
1		Workpiece
2		Connection socket for "+" welding current Workpiece lead connection
3		Output side of the pressure regulator
4		Welding torch
5		Connection socket, "-" welding current Welding current lead connection for TIG welding torch

- Insert the welding current plug on the welding torch into the welding current connection socket and lock by turning to the right.
- Insert the cable plug on the work piece lead into the "+" welding current connection socket and lock by turning to the right.
- Screw the shielding gas hose of the welding torch to the pressure regulator outlet.

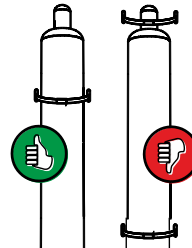
### 5.4.2 Shielding gas supply (shielding gas cylinder for welding machine)

**⚠ WARNING**



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

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





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

- **All shielding gas connections must be gas tight.**

## 5.4.3 Pressure regulator connection

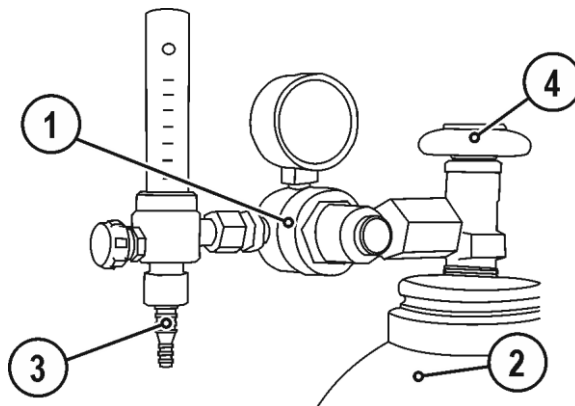


Figure 5-14

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

- Before connecting the pressure regulator to the gas cylinder, open the cylinder valve briefly to blow out any dirt.
- Tighten the pressure regulator screw connection on the gas bottle valve to be gas-tight.

## 5.4.4 Welding task selection

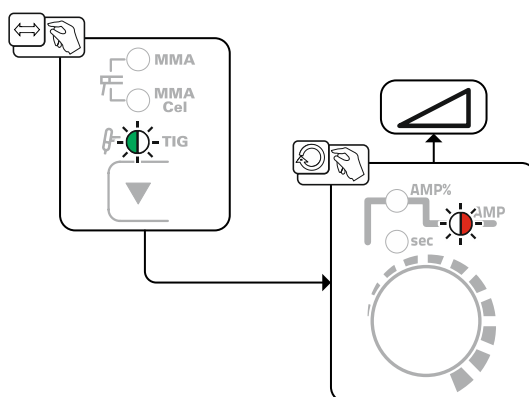


Figure 5-15

### 5.4.4.1 Gas test – setting the shielding gas volume



***If the rotary gas valve is open, the shielding gas flows permanently from the welding torch (no adjustment with a separate gas valve). The rotary valve must be opened before each welding procedure and closed after each welding procedure.***

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!

Rule of thumb for the gas flow rate:

Diameter of gas nozzle in mm corresponds to gas flow in l/min.

Example: 7mm gas nozzle corresponds to 7l/min gas flow.

- Slowly open the gas cylinder valve.
- Set the relevant gas quantity for the application on the pressure regulator.

## 5.4.5 Arc ignition

### 5.4.5.1 Liftarc

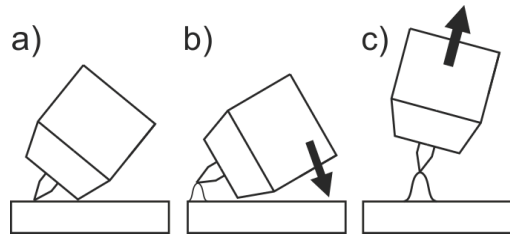


Figure 5-16

**The arc ignites through contact with the workpiece:**

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

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

## 5.4.6 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 ( $\overline{bAL}$ ) and a frequency ( $\overline{FrE}$ ) having been defined first. The predefined ampere current average value is decisive, the pulse current (Ipuls) is defined by the  $\overline{PL}$  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.

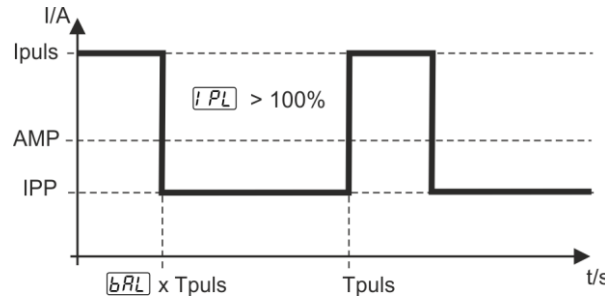


Figure 5-17

AMP = Main current; e.g. 100 A

IPL = Pulse current =  $IP1 \times AMP$ ; e.g.  $170\% \times 100 \text{ A} = 170 \text{ A}$

IPP = Pulse pause current

$Tpuls$  = Duration of one pulse cycle =  $1/\overline{FrE}$ ; e.g.  $1/1 \text{ Hz} = 1 \text{ s}$

$\overline{bAL}$  = Balance



**For parameter setting, > see 5.4.7 chapter.**

### Selection

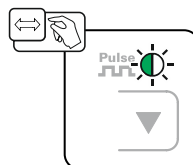


Figure 5-18

## 5.4.7 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.

The setting ranges for the parameter values are summarised in the Parameter overview section > see 11.1 chapter.

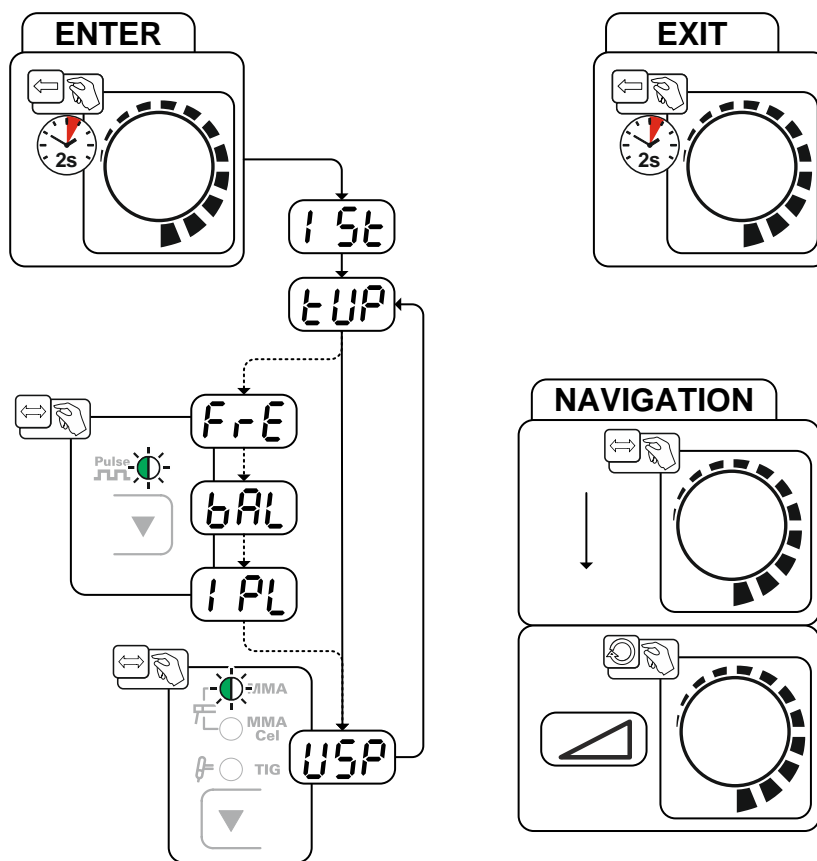


Figure 5-19

Display	Setting/selection
1St	Ignition current (as percentage, dependent on main current)
tUP	Upslope time to main current
FrE	Pulse frequency
bAL	Pulse balance
1PL	Pulse current > see 5.4.6 chapter
USP	Arc length restriction > see 5.5 chapter
	on -----Function switched on
	off -----Function switched off

## 5.5 Arc length restriction (USP)

The arc length restriction **USP** function stops the welding process when an excessive arc voltage is detected (unusually high gap between electrode and workpiece). This function can be adjusted in the corresponding Expert menu, depending on the process:

MMA welding > see 5.3.7 chapter

TIG welding > see 5.4.7 chapter

The arc length restriction cannot be used for cel characteristics (if available).

## 5.6 Power-saving mode (Standby)

You can activate the power-saving mode by either pressing the push-button > see 4.3 chapter for a prolonged time or by setting a parameter in the machine configuration menu (time-controlled power-saving mode **5bA**) > see 5.9 chapter.



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

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

## 5.7 Voltage reducing device

Only machine variants with the (VRD/AUS/RU) code are equipped with a voltage reduction device (VRD). The VRD is used for increased safety, especially in hazardous environments such as shipbuilding, pipe construction or mining.

A VRD is mandatory in some countries and required by many on-site safety instructions for power sources.

The VRD > see 4.3 chapter signal light is illuminated when the voltage reduction device is operating without fault and the output voltage is reduced to a value specified in the relevant standard (see technical data > see 8 chapter).



## 5.8 Access control

The control can be locked to secure some basic parameters against unauthorised or unintentional adjustment of machine settings. The access block operates as follows:

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

The parameters for the access block are configured in the machine configuration menu > *see 5.9 chapter*.

### Enabling the access block

- Assign the access code for the access block: Select parameter **[cod]** and select a number code (000–999).
- Enable the access block: Set parameter **[acc]** to access block enabled **[on]**.

The access block activation is indicated by the "Access block active" signal light > *see 4.3 chapter*.

### Disabling the access block

- Enter the access code for the access block: Select parameter **[cod]** and enter the previously selected number code (000–999).
- Disable the access block: Set parameter **[acc]** to access block disabled **[off]**. The only way to disable the access block is to enter the previously selected number code.

5.9 Machine configuration menu

Basic machine settings are defined in the machine configuration menu.

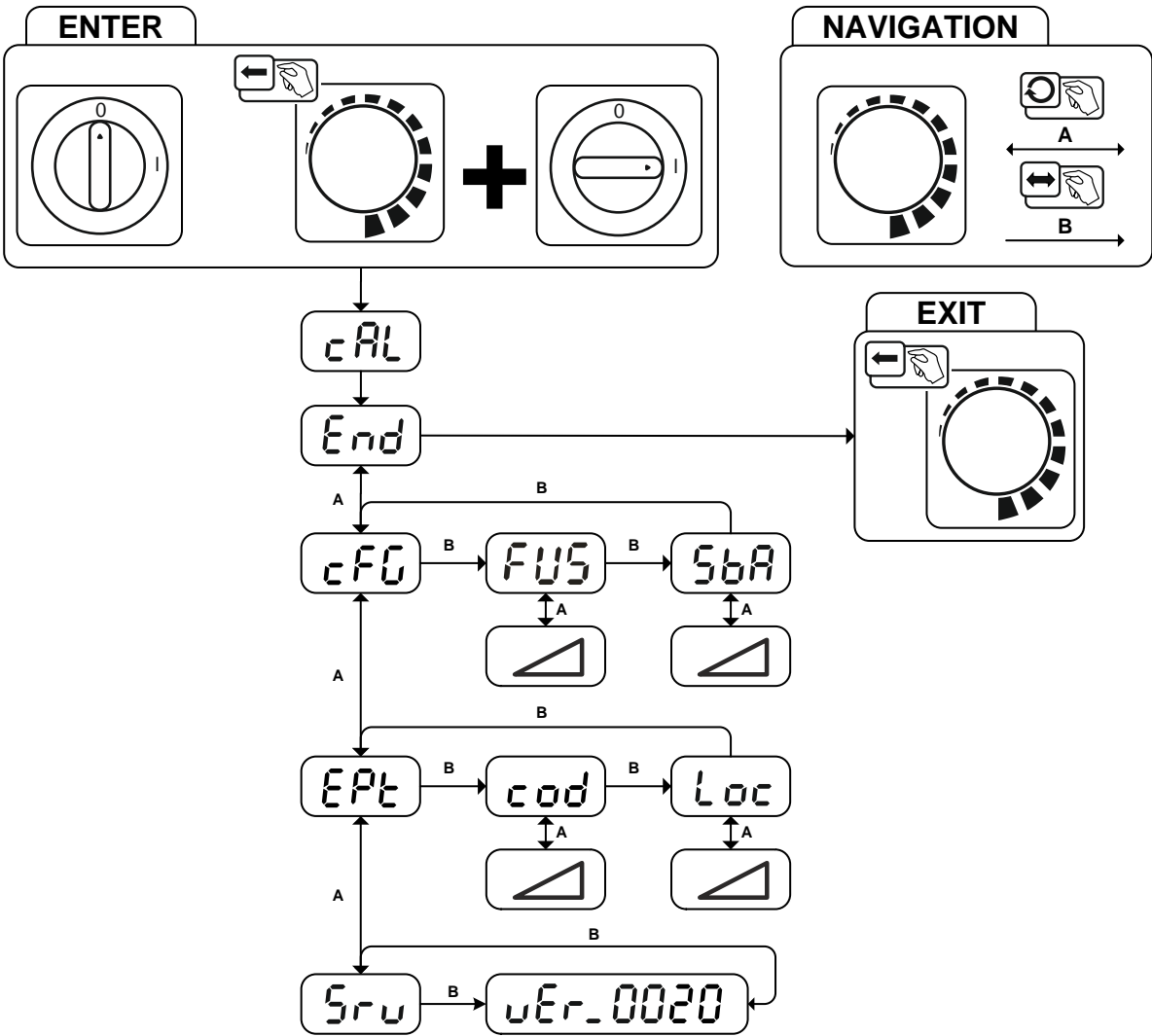




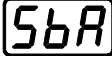



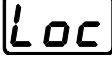



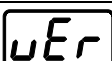


Figure 5-20

Display	Setting/selection
	<b>Calibration</b> The machine will be calibrated for approx 2 seconds each time it is switched on.
	<b>Exit the menu</b> Exit
	<b>Machine configuration</b> Settings for machine functions and parameter display
	<b>Dynamic power adjustment &gt; see 7.4 chapter</b>
	<b>Time-based power-saving mode &gt; see 5.6 chapter</b> 5 min.–60 min. = Time to activation of power-saving mode in case of inactivity.  -----inactivated
	<b>Expert menu</b>
	<b>Access control – access code</b> Setting: 000 to 999 (000 ex works)
	<b>Access control &gt; see 5.8 chapter</b>  -----Function enabled  -----Function disabled (ex works)
	<b>Service menu</b> Any changes to the service menu should be agreed with the authorised service personnel.
	<b>Software version of the machine control</b> Version display

## 6 Maintenance, care and disposal

### 6.1 General

#### DANGER



**Risk of injury due to electrical voltage after switching off!**

**Working on an open machine can lead to fatal injuries!**

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

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

#### WARNING



**Incorrect maintenance, testing and repair!**

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

Observe the maintenance instructions > see 6.3 chapter.

- In the event that the provisions of one of the below-stated tests are not met, the machine must not be operated again until it has been repaired and a new test has been carried out!

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

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

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

### 6.2 Cleaning

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

#### 6.2.1 Dirt filter

The duty cycle of the welding machine decreases as an effect of the reduced cooling air volume. Depending on the amount of dirt building up (at least every two months), the dirt filter has to be uninstalled and cleaned regularly (e.g. by purging with compressed air).

## **6.3 Maintenance work, intervals**

### **6.3.1 Daily maintenance tasks**

#### Visual inspection

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

#### Functional test

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

### **6.3.2 Monthly maintenance tasks**

#### Visual inspection

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

#### Functional test

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

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

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



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

## 6.4 Disposing of equipment



### **Proper disposal!**

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

- **Do not dispose of in household waste!**
- **Observe the local regulations regarding disposal!**
- According to European provisions (guideline 2012/19/EU of the European Parliament and the Council of July, 4th 2012), used electric and electronic equipment may no longer be placed in unsorted municipal waste. It must be collected separately. The symbol depicting a waste container on wheels indicates that the equipment must be collected separately.  
This machine is to be placed for disposal or recycling in the waste separation systems provided for this purpose.
- According to German law (law governing the distribution, taking back and environmentally correct disposal of electric and electronic equipment (ElektroG) from 16.03.2005), used machines are to be placed in a collection system separate from unsorted municipal waste. The public waste management utilities (communities) have created collection points at which used equipment from private households can be disposed of free of charge.
- Information about giving back used equipment or about collections can be obtained from the respective municipal administration office.
- EWM participates in an approved waste disposal and recycling system and is registered in the Used Electrical Equipment Register (EAR) under number WEEE DE 57686922.
- In addition to this, returns are also possible throughout Europe via EWM sales partners.



## 6.5 Meeting the requirements of RoHS

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

## 7 Rectifying faults

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

### 7.1 Error messages (power source)



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

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



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

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

Error message	Possible cause	Remedy
E 0	Start signal set in the event of errors	Do not press the torch trigger or the foot-operated remote control
E 4	Temperature error	Allow the machine to cool down
E 5	Mains overvoltage	Switch off the machine and check the mains voltage  Switch the machine on and off again. If the error persists, notify service department
E 6	Mains undervoltage	
E 7	Electronics error	
E 9	Secondary overvoltage	
E12	Voltage reduction error (VRD)	
E13	Electronics error	Switch off the machine, place the electrode holder in an insulated position and switch the machine back on. If the error persists, notify service department
E14	Adjustment error in current recording	
E15	Error in on of the electronics supply voltages	
E23	Temperature error	Allow the machine to cool down
E32	Electronics error	Switch the machine on and off again. If the error persists, notify service department
E33	Adjustment error in voltage recording	Switch off the machine, place the electrode holder in an insulated position and switch the machine back on. If the error persists, notify service department
E34	Electronics error	Switch the machine on and off again. If the error persists, notify service department
E37	Temperature error	Allow the machine to cool down
E40	Motor fault	Check wire feed unit, switch the machine off and on again, inform the service department if the fault persists.
E55	Failure of a mains phase	Switch off the machine and check the mains voltage
E58	Short circuit in welding circuit	Switch off machine and check welding current leads for correct installation, e.g., put down electrode holder in an electrically insulated manner, disconnect degausser current lead.

## 7.2 Checklist for rectifying faults



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

Legend	Symbol	Description
	↗	Fault/Cause
	✕	Remedy

### Excess temperature signal light illuminates

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

### Functional errors

- ↗ All machine control signal lights are illuminated after switching on
- ↗ No machine control signal light is illuminated after switching on
- ↗ No welding power
  - ✕ Phase failure > check mains connection (fuses)
- ↗ Connection problems
  - ✕ Make control lead connections and check that they are fitted correctly.
- ↗ Loose welding current connections
  - ✕ Tighten power connections on the torch and/or on the workpiece
  - ✕ Tighten contact tip correctly

## 7.3 Display machine control software version

The query of the software versions only serves to inform the authorised service staff. It is available in the machine configuration menu > see 5.9 chapter.

## 7.4 Dynamic power adjustment



**This requires use of the appropriate mains fuse.**  
**Observe mains fuse specification > see 8 chapter!**

This function enables aligning the machine to the mains connection fusing to avoid continuous tripping of the mains fuse. The maximum power input of the machine is limited by an exemplary value for the existing mains fuse (several levels available).

You can predefine this value in the machine configuration menu > see 5.9 chapter using parameter **FUS**. The selected value will be shown on the machine display **CAL** for two seconds after the machine has been switched on.

The function automatically adjusts the welding power to an uncritical level for the mains fuse.



**When using a 20-A mains fuse, a suitable mains plug has to be installed by a qualified electrician.**



## 7.5 Resetting welding parameters to the factory settings

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

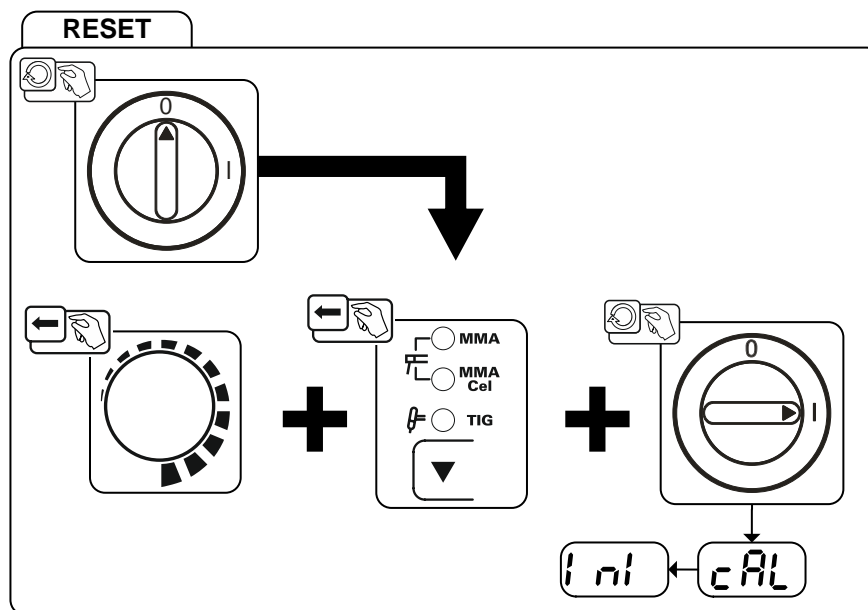




Figure 7-1




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

## 8 Technical data



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

### 8.1 Pico 160 cel puls

	MMA	TIG
Current setting range	5 A–150 A	5 A–160 A
Voltage setting range	20.2 V–26.0 V	10.2 V–16.4 V
Duty cycle 40 °C		
30%	150 A	160 A
60%	120 A	
100%	110 A	
Load cycle	10 min. (60% DC $\wedge$ 6 min. welding, 4 min. pause)	
Open circuit voltage	94 V	
Reduced open circuit voltage (VRD AUS)	33 V	
Reduced open circuit voltage (VRD RU)	12 V	12 V
Mains voltage (tolerances)	1 x 230 V (+15% to –40%)	
Maximum mains impedance (@PCC)	$Z_{max} \text{ XXX m}\Omega^1$	
Frequency	50/60 Hz	
Mains fuse (safety fuse, slow-blow)	16 A <sup>2</sup>	
Continuous primary current (100%)	20 A	13 A
Mains connection lead	H07RN-F3G2,5	
Maximum connected load	7.3 kVA	4.9 kVA
Recommended generator rating	9.9 kVA	
cos $\phi$ /efficiency	0.99/83%	
Ambient temperature	–25 °C to +40 °C	
Machine cooling/torch cooling	Fan (AF)/gas	
Noise level	< 70 dB(A)	
Workpiece lead (minimum)	16 mm <sup>2</sup>	
Insulation class/protection classification	H/IP 23	
EMC class	A	
Safety identification	 /  / 	
Harmonised standards used	see declaration of conformity (machine documentation)	
Dimensions L/W/H	370 x 129 x 236 mm 14.6 x 5.1 x 9.3 inch	
Weight	4.9 kg 10.8 lb	

<sup>1</sup> This welding direction does not conform to IEC 61000-3-12. When connecting a welding machine to a public low-voltage supply system, the manufacturer or operator has to consult the electricity utilities to make sure the welding machine may be connected.

<sup>2</sup> DIAZED xxA gG safety fuses are recommended. When using automatic cutouts, the "C" trigger characteristic must be used.

## 9 Accessories

### 9.1 Electrode holder / workpiece lead

Type	Designation	Item no.
EH25 QMM 4M	Electrode holder	094-005800-00000
WK16mm² 170A/60% 4m/K	Workpiece lead	094-005801-00000

### 9.2 Remote controls and accessories

Type	Designation	Item no.
RG13	Remote control	090-008113-00000

### 9.3 TIG welding torch

Type	Designation	Item no.
TIG 26 GDV 4m	TIG welding torch, rotary gas valve, gas-cooled, decentral	094-511621-00100
TIG 26 GDV 8m	TIG welding torch, rotary gas valve, gas-cooled, decentral	094-511621-00108
DM 842 Ar/CO2 230bar 30l D	Pressure regulator with manometer	394-002910-00030
GH 2X1/4" 2M	Gas hose	094-000010-00001

### 9.4 General accessories

Type	Designation	Item no.
SKGS 16A 250V CEE7/7, DIN 49440/441	Safety plug	094-001756-00000
ADAP CEE16/SCHUKO	Earth contact coupling/CEE16A plug	092-000812-00000

### 9.5 Options

Type	Designation	Item no.
ON Filter Pico160	Air inlet dirt filter, retrofit option	092-003206-00000
ON Handle Pico 160	Grip, retrofit option	092-003205-00000

## 10 Service documents

### ⚠ WARNING



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

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

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

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

### 10.1 Spare and replacement parts

Spare parts can be obtained from the relevant authorised dealer.

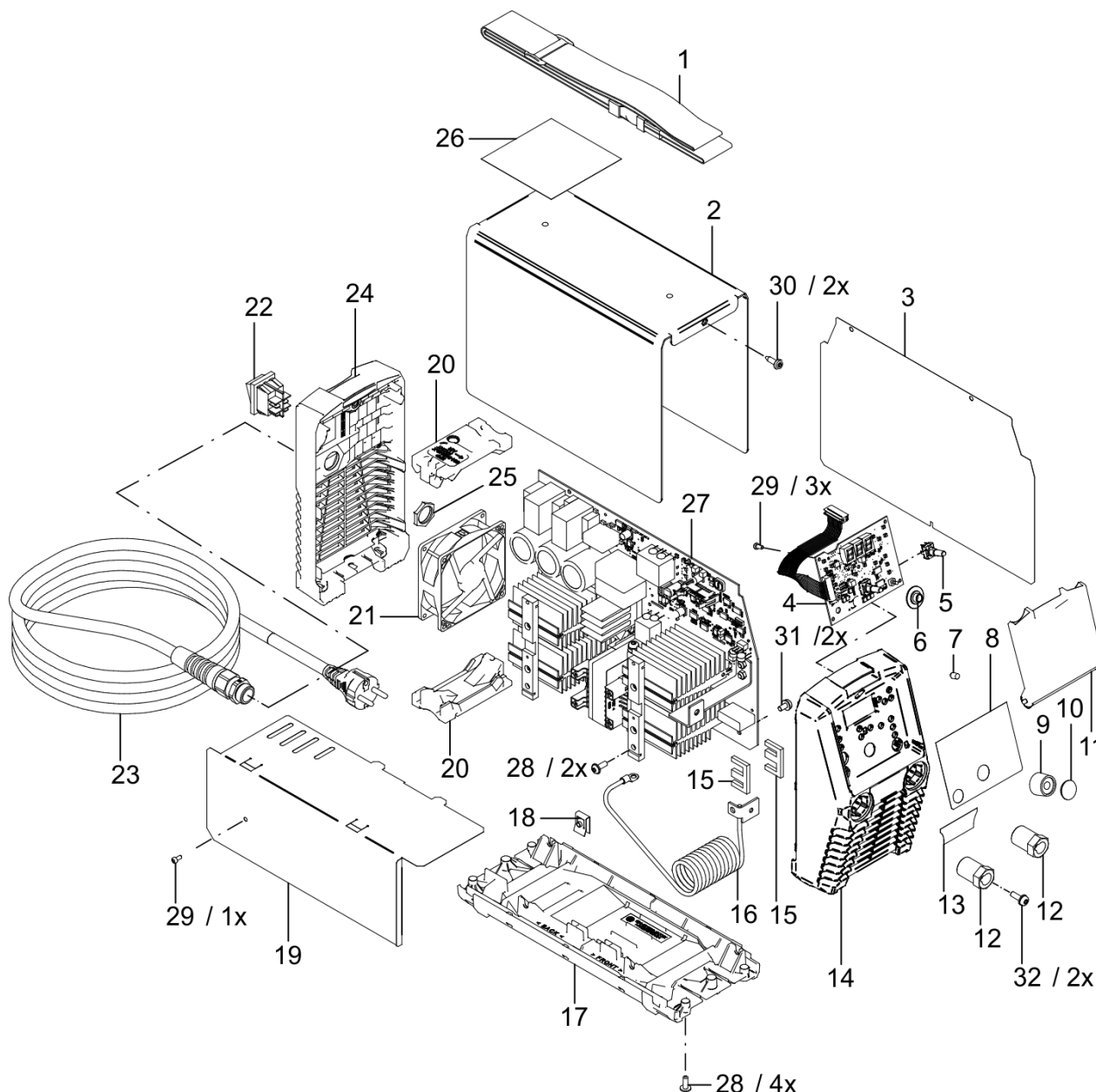


Figure 10-1






















Item	Order number	Item	Type
1	094-015236-E0501	Carrying strap	TG3-E
2	094-021818-E0501	Casing panel	BH276,5X201,5X124,2
3	094-021826-00000	Insulating foil	IP
4	040-001090-E0000	Operating panel assembly with rotary transducer	E160
5	044-004185-10015	Rotary transducer	30POS/1,5NCM
6	094-019308-00000	Plastic insulation for rotary transducer	KID/D23X7,3
7	094-021994-00000	Fibre optics	LL8X6
8	094-021794-00502	Adhesive film	KLF-E 1.05
9	074-000315-00000	Rotary knob	KNOB 23MM
10	094-015043-00001	Rotary knob cover	KNOB COVER 23MM
11	094-021514-00000	Cover cap	KKS
12	094-021511-00000	Socket	EB/35-50QMM
13	094-021795-00502	Adhesive film	LOGO/PLUS/MINUS
14	094-021477-00000	Casing, front section	KFG
15	094-022172-00001	Spacer	AHD35X22X4
16	092-003193-00001	Choke	WD
17	094-021509-00000	Casing, lower section	KBG
18	094-014311-00000	Plate nut	M5/21X15X6
19	094-021508-00000	Air duct	IPL
20	094-015248-00000	Foam, fan support	S95X48X23
21	092-019418-00000	Fan	92X92X32
22	094-008045-10000	Mains switch	WS 250V/20A 2POLE
23	092-003003-00001	Mains cable	3X2.5QMM/3.5M SCHUKO
24	094-021478-00000	Casing, back panel	KRG
25	094-019537-00000	Nut	M20x1,5
26	094-021796-00500	Adhesive film	processes PICO CEL PULS
27	040-001084-E0000	PCB inverter circuit board	HB160
28	094-012942-00000	Screw	M5X14/DELTA-PT-SCHRAUBE
29	094-010089-00000	Screw, Torx	M3X8-DG-SCHRAUBE
30	094-015135-00000	Screw	M5X16/KOMBITORX PLUS T25
31	094-021833-00000	Screw	M5X10/DIN6900-5 Z9/8.8/VERZ.
32	094-022122-00000	Clamping screw	M5X16/DIN6900-5 Z9/8.8/VERZ.

[illegible]

Figure 10-2

## 11 Appendix A

### 11.1 Parameter overview – setting information

Welding data display (3-digit)	Parameters/function	Setting range			
		Standard (ex works)	Min.	Max.	Unit
MMA (MMA)					
	Main current (AMP)		5	- 150	A
	Hot start current (AMP%)	120	50	- 200	%
	Hot start time (sec)	0,5	0,1	- 20,0	s
	Arcforce correction	0	-10	- 10	
	Pulse frequency	1,2	0,2	- 500	Hz
	Pulse balance	30	1	- 99	%
	Pulse current	142	1	- 200	%
	Arc length restriction	off	off	- on	
TIG (TIG)					
	Main current AMP		5	- 160	A
	Ignition current	20	1	- 200	%
	Up-slope time	1,0	0,0	- 20,0	s
	Pulse frequency	2,8	0,2	- 2000	Hz
	Pulse balance	50	1	- 99	%
	Pulse current	140	1	- 200	%
	Arc length restriction	on	off	- on	
Basic parameters (independent of procedure)					
	Calibration				
	Exit menu				
	Machine configuration				
	Dynamic power adjustment	16	10	- 20	A
	Time-based power-saving mode	off	5	- 60	min.
	Expert menu				
	Access control – access code	000	000	- 999	
	Access control	off	off	- on	
	Service menu				
	Power-saving mode active				

## 12 Appendix B

### 12.1 Overview of EWM branches

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