



**EWM** / **HIGHTEC**<sup>®</sup>  
**WELDING**

**SIMPLY MORE**

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## **GB** Operating instructions

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### **Machines for MIG/MAG, TIG and MMA welding**

PICOMIG 180



**N. B. These operating instructions must be read before commissioning.**

**Failure to do so may be dangerous.**

**Machines may only be operated by personnel who are familiar with the appropriate safety regulations.**



**The machines bear the conformity mark and thus comply with the**

- EC Low Voltage Directive (2006/95/ EG)
- EC EMC Directive (2004/108/ EG)



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



**The content of the operating instructions does not constitute grounds for any claims on the part of the buyer.**

**The copyright to these operating instructions remains with the manufacturer.**

Reprinting, including extracts, only with written approval.



**SIMPLY MORE**

Mündersbach, 25 February 2009

Dear customer,

Thank you for your order.

Premium quality – made in Germany and with a three-year warranty.

The machines from EWM are impressive, with innovative technology, exceptional user-friendliness and the most up to date inverter and control systems. This makes welding possible that is simple, efficient and resource-saving as well as being highly economical!

Perfection doesn't happen by coincidence: Every single component is 100% tested and the machine is "free welded" before it is delivered.

Our comprehensive service offer and the highly developed modern EWM quality management system guarantee worldwide premium quality "Made in Germany" and a three-year warranty.

Continual further development and optimisation has made us Germany's market leader in the manufacture of light arc welding machines. We have manufacturing, training and service locations throughout the world to advise you and provide you with a comprehensive range of services.

The accompanying operating instructions contain everything about commissioning the machine, notes regarding safety, maintenance and care, technical data as well as information regarding the warranty. It is very important to observe all our instructions in order to achieve optimal welding results with the machine and to ensure many years of safe operation.

Thank you for the trust that you have placed in us. We look forward to a long-term and, above all, successful partnership with you.

Yours faithfully

EWM HIGHTEC WELDING GmbH

A handwritten signature in black ink, appearing to read 'B. Szczesny'.

Bernd Szczesny  
Executive management



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## 2 Safety instructions

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

#### NOTE



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

- Notes include the "NOTE" keyword in the heading without a general warning symbol.
- Notes are highlighted using a "hand" symbol at the edge of the page.

#### CAUTION

**Working and operating procedures which must be followed precisely to avoid damaging or destroying the product.**

- The safety information includes the "CAUTION" keyword in its heading without a general warning symbol.
- The hazard is explained using a symbol at the edge of the page.



#### 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.



#### CAUTION

**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 on the edge of the page.



#### DANGER

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




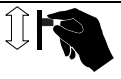
- Safety notes include the "DANGER" keyword in the heading with a general warning symbol.
- The hazard is also highlighted using a symbol on the edge of the page.

# Safety instructions

Notes on the use of these operating instructions

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

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

Symbol	Description
	Press
	Do not press
	Turn
	Switch

## 2.2 General

### CAUTION



**Risk of accidents if these safety instructions are not observed!**

**Non-observance of these safety instructions is potentially fatal!**

- Carefully read the safety information in this manual!
- Observe the accident prevention regulations in your country.
- Inform persons in the working area that they must observe the regulations!

### CAUTION



**Obligations of the operator!**

**In the European Economic Area (EEA), the relevant national version of the basic guidelines must be followed and observed!**

- National version of the basic guidelines (89/391/EEC) as well as the relevant individual guidelines.
- In particular the Directive (89/655/EEC) on the minimum regulations for safety and health protection when staff members are using equipment during work.
- The accident prevention regulations of the relevant country (e.g. in Germany, BGV D 1).
- Check at regular intervals that users are working in a safety-conscious way!



**Damage due to the use of non-genuine parts!**

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

- Only use system components and options (power sources, welding torches, electrode holders, remote controls, spare parts and replacement parts, etc.) from our range of products!



**Electromagnetic interference!**

**The machines are intended to be used in industrial areas, according to IEC 60974-10. If they are used in residential areas, for example, problems may occur with ensuring electromagnetic compatibility.**

- Check whether interference is caused to other machines!

### CAUTION



**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!

## CAUTION



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

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

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

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



### **Explosion risk!**

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

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



### **Smoke and gases!**

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

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



### **Fire hazard!**

**Flames may arise as a result of the high temperatures, stray sparks, glowing-hot parts and hot slag produced during the welding process.**

**Stray welding currents can also result in flames forming!**

- Check for fire hazards in the working area!
- Do not carry any easily flammable objects such as matches or lighters.
- Keep appropriate fire extinguishing equipment to hand in the working area!
- Thoroughly remove any residue of flammable substances from the workpiece before starting welding.
- Only continue work on welded workpieces once they have cooled down.  
Do not allow to come into contact with flammable material!
- Connect welding leads correctly!

 **DANGER**



**Electromagnetic fields!**

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

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



**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)!



**Electric shock!**

Welding machines use high voltages which can result in potentially fatal electric shocks and burns on contact. Even low voltages can cause you to get a shock and lead to accidents.

- Do not touch any live parts in or on the machine!
- Connection cables and leads must be free of faults!
- Switching off alone is not sufficient! Wait for 2 minutes until the capacitors have discharged.
- Place welding torch and stick electrode holder on an insulated surface!
- The unit should only be opened by specialist staff after the mains plug has been unplugged!
- Only wear dry protective clothing!

## 2.3 Transport and installation

### CAUTION



- Equipment damage when not operated in an upright position!**  
**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!



### CAUTION



#### 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, -3, -10).**

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



#### Damage due to supply lines not being disconnected!

**During transport, supply lines which have not been disconnected (mains supply leads, control leads, etc.) may cause hazards such as connected equipment tipping over and injuring persons!**

- Disconnect supply lines!



### CAUTION



#### Incorrect handling of shielding gas cylinders!

**Incorrect handling of shielding gas cylinders can result in serious and even fatal injury.**

- Observe the instructions from the gas manufacturer and in any relevant regulations concerning the use of compressed air!
- Place shielding gas cylinders in the holders provided for them and secure with fixing devices.
- Avoid heating the shielding gas cylinder!

## 2.4 Ambient conditions

### CAUTION



**Equipment damage due to dirt accumulation!**

**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)!



**Non-permissible ambient conditions!**

**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!



**Installation site!**

**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.

### 2.4.1 In operation

**Temperature range of the ambient air:**

- -20 °C to +40 °C

**Relative air humidity:**

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

### 2.4.2 Transport and storage

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


- -25 °C to +55 °C

**Relative air humidity**

- Up to 90% at 20 °C

## 3 Technical data

### 3.1 PICOMIG 180

Setting range	MIG/MAG	TIG	MMA
Welding current	5 A to 180 A	5 A to 180 A	5 A to 150 A
Welding voltage	14.3 V to 23 V	10.2 V to 17.2 V	20.2 V to 26 V
<b>Duty cycle (DC) at 40 °C</b>			
25%	180 A	-	-
30%	-	180 A	-
35%	-	-	150 A
60 %	120 A	140 A	110 A
100 %	100 A	120 A	100 A
Load alternation	10 min. (60% DC $\Delta$ 6 min. welding, 4 min. pause)		
Open circuit voltage	90 V		
Mains voltage (tolerances)	1 x 230 V (-40% to +15%)		
Frequency	50/60 Hz		
Mains fuse (safety fuse, slow-blow)	16 A*		
Mains connection lead	H07RN-F3G2.5		
Max. connected load	6.4 kVA	4.4 kVA	5.5 kVA
recommended generator rating	7.5 kVA		
cos $\phi$	0.99		
Insulation class/protection classification	H/IP 23		
Ambient temperature	-20 °C to +40 °C		
Machine/torch cooling	Fan/gas		
Torch connection	Central connection for welding torch (Euro)		
Wire feed speed	0.5 m/min to 15 m/min		
Standard roller fitting	0.8/1.0 mm for steel wire		
Drive	4-roller (37 mm)		
Workpiece lead	25 mm <sup>2</sup>		
Dimensions L x W x H in mm	620 x 300 x 360		
Weight	19 kg		
constructed to standards	IEC 60974-1, -5, -10 /  / C $\epsilon$		

\* Recommended: DIAZED 16A gG

## 4 Machine description

### 4.1 PICOMIG 180

#### 4.1.1 Front view

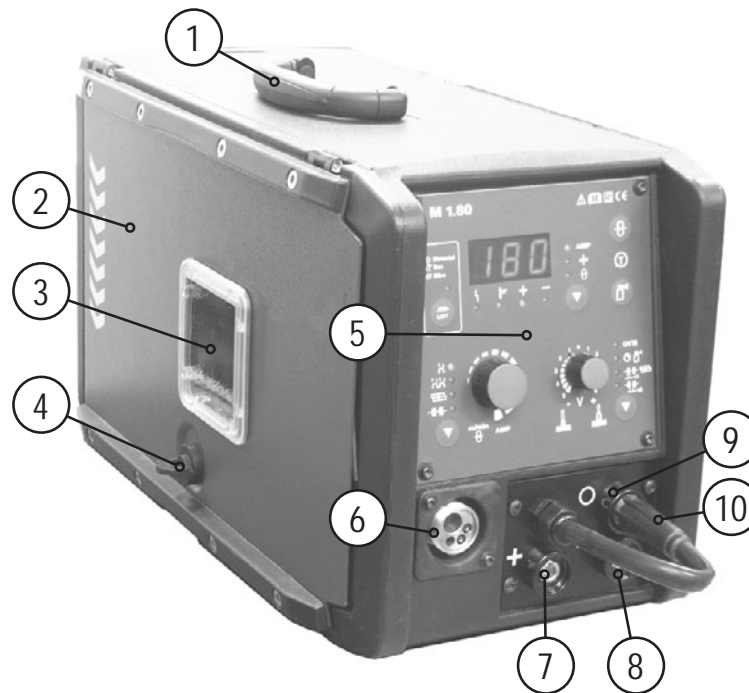






Figure 4-1

Item	Symbol	Description
1		<b>Carrying handle</b>
2		<b>Wire delivery unit cover</b>
3		<b>Wire spool inspection window</b> Check wire supply
4		<b>Wire feed unit cover lock</b>
5		<b>Machine control</b> See Machine control – operating elements chapter
6		<b>Central connection for welding torch (Euro)</b> Integrated welding current, shielding gas and torch trigger
7		<b>Connection socket for “+” welding current</b> <ul style="list-style-type: none"> <li>Signal light for “+”:polarity setting      Connection polarity selection plug</li> <li>Signal light for “-”:polarity setting      Workpiece lead connection</li> </ul>
8		<b>Connection socket, “-” welding current</b> <ul style="list-style-type: none"> <li>Signal light for “+”:polarity setting      Workpiece lead connection</li> <li>Signal light for “-”:polarity setting      Connection polarity selection plug</li> </ul>
9		<b>Park socket, polarity selection plug</b> Retainer for the polarity selection plug in MMA mode or for transport.
10		<b>Polarity selector plug, welding current cable</b> Internal welding current cable for central connection/welding torch. <b>Connections with:</b> <ul style="list-style-type: none"> <li>Signal lights for polarity setting “+”:      Connection socket for “+” welding current</li> <li>Signal lights for polarity setting “-”:      Connection socket for “-” welding current</li> <li>MMA welding:                                      Park socket</li> </ul>

## 4.1.2 Rear view

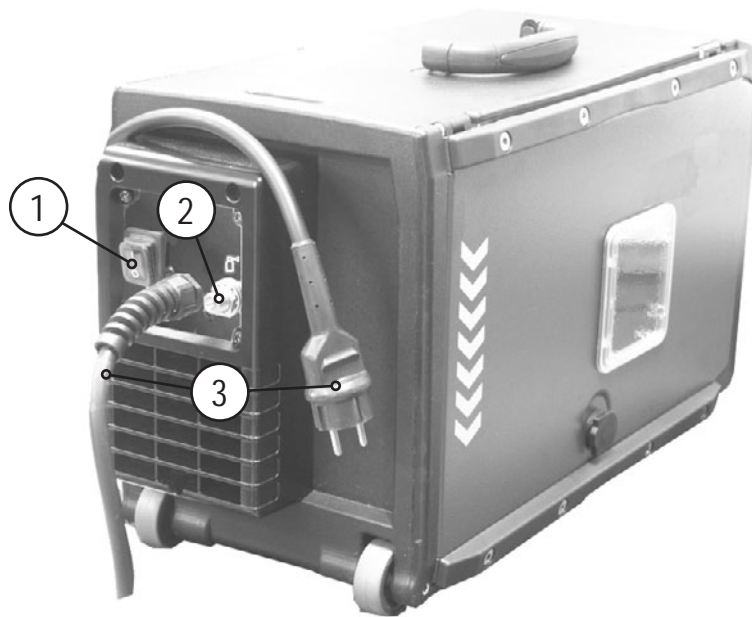




Figure 4-2

Item	Symbol	Description
1		Main switch, machine on/off
2		Connecting nipple G $\frac{1}{4}$ , shielding gas connection
3		Mains connection cable with connector plug

### 4.1.3 Inside view

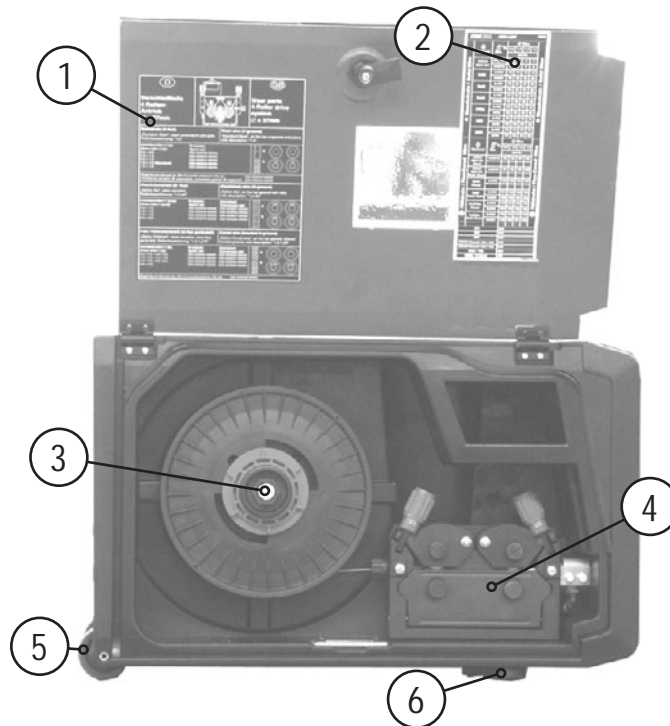


Figure 4-3

Item	Symbol	Description
1		Label, Wire feed parts subject to wear
2		Sticker, JOB List
3		Spool holder
4		Wire delivery unit
5		Conveyor rolls
6		Machine feet

## 5 Functional characteristics

### 5.1 Machine control – Operating elements

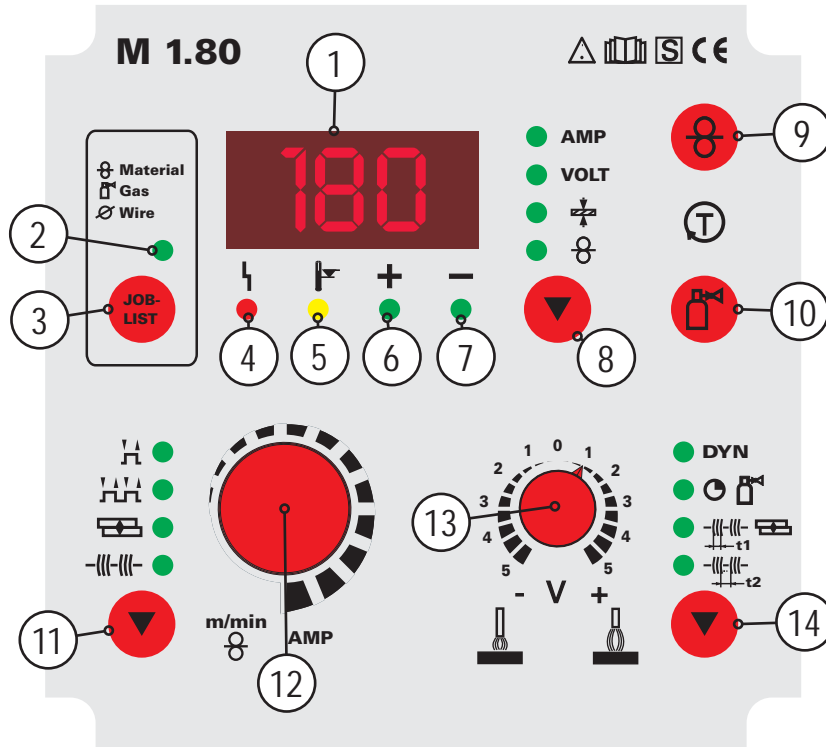











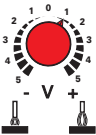










Figure 5-1

Item	Symbol	Description
1		Display, 3-digit
2	Material Gas Wire	<b>Signal light, JOB-List</b> Illuminates upon display or selection of the JOB number
3		<b>Key button, JOB-List</b> Selection of the welding task (JOB) from the JOB list
4		<b>"Collective interference" signal light</b>
5		<b>"Excess temperature" signal light</b>
6		<b>Signal light, polarity setting</b>
7		<b>Signal light, polarity setting</b>
8	AMP VOLT Material thickness Wire speed	<b>Button, welding parameter display mode</b> AMP Welding current VOLT Welding voltage (correction) Material thickness Wire speed
9		<b>"Wire inching" button</b>

Item	Symbol	Description
10		<b>Button, gas test</b>
11	    	<b>Operating mode button</b>  Non-latched  Latched  Spots  Interval
12		<b>Welding parameter setting dial</b> For setting the welding performance, for selecting the JOB (welding task) and for setting other welding parameters.
13		<b>Arc length correction rotary dial</b>
14	    	<b>Runtime parameters button</b> For selecting the parameters to be set. Also for entering and exiting the menus for advanced settings. <ul style="list-style-type: none"> <li><b>DYN</b> Choke effect/dynamics</li> <li> Gas post-flow time</li> <li> Spot time</li> <li> Pause time</li> </ul>

## 5.2 MIG/MAG welding

### NOTE

 **Principally, MIG/MAG welding tasks can be defined in two ways with this machine:**

- define welding task by selecting a pre-defined JOB
- conventional welding task definition via wire speed and voltage (MSG non synergic JOB 188)

How to define welding parameters by selecting a pre-defined job is described below. Operation with conventional welding parameter definition is described in chapter "Conventional MIG/MAG Welding" onwards.

### 5.2.1 Definition of MIG/MAG welding tasks

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

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

### 5.2.2 Selecting MIG/MAG welding tasks








#### 5.2.2.1 JOB selection

EWM HIGHTEC WELDING		JOB-LIST		094-014428-00000			
Material	Gas	Ø Wire					
		0,6	0,8	1,0	1,2		
		Job-Nr.					
● <b>Massivdraht</b>	SG2/3 G3/4 Si1	CO <sub>2</sub> 100 / C1	176	1	3	4	
		Ar80 - 90 / M21	175	6	8	9	
	CrNi	Ar91 - 99 / M12		34	35		
		Ar/He / I3		42	43		
	CuSi Löten / Brazing	Ar100 / I1		114	115	116	
		Ar91 - 99 / M12		110	111	112	
	AlMg	Ar100 / I1		74	75	76	
	AlSi	Ar100 / I1		82	83	84	
Al99	Ar100 / I1		90	91	92		
● <b>Fülldraht</b>	Material	Ø Wire					
		0,9	1,0	1,1	1,2		
			Job-Nr.				
	E71T-11	Self-Shielded	172		171	170	
MSG non synergic		188					
WIG / TIG		127					
E-Hand / MMA		128					


Figure 5-2

- Select JOB (welding task) by means of the JOB list.  
The "JOB list" sticker is on the inside of the cover of the wire feed unit.












**It is only possible to change the JOB number when no welding current is flowing.**

Operating element	Action	Result	Display
	1 x 	Select JOB list Material Gas Wire (LED  is on)	
		Set JOB number. Wait 3 s until the setting has been applied.	

**NOTE**

-  **Pay attention to the signal light for the polarity setting!**  
It may be necessary to change the welding current polarity depending on the JOB selected or the welding process.
- Reconnect the polarity selection plug if necessary (see chapter "Commissioning")

**5.2.2.2 Operating mode**

Operating element	Action	Result
     	n x 	<b>Selecting the operating mode</b> The LED indicates the selected operating mode. <ul style="list-style-type: none"> <li> Non-latched operation</li> <li> Latched operation</li> <li> Spots</li> <li> Interval operation</li> </ul>

## 5.2.3 Welding data display

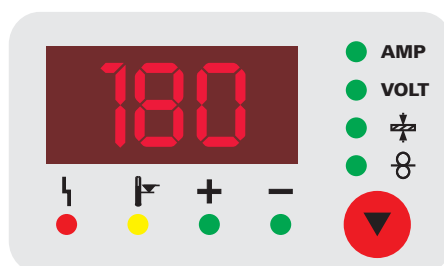


Diagram 5-3

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

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

The display shows:

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

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





After welding you can change back to the nominal values

- by pressing the buttons or using the dials on the controls
- or by briefly pressing the torch trigger.

## 5.2.4 MIG/MAG operating point

### 5.2.4.1 Selecting the welding parameter display mode

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

Operating element	Action	Result
		<b>Switching the display between:</b> <b>AMP</b> Welding current <b>VOLT</b> Welding voltage (correction)  Material thickness  Wire speed

#### Application example

The required wire speed is to be determined. There are the following parameters:

Filler material	Gas	Wire diameter	Material thickness
SG2 or SG3	CO <sub>2</sub> or Ar80-90	1.0 mm	1.4 mm




From the given parameters, JOB 3 the welding task is determined by means of the JOB LIST (see chapter "JOB selection").

- Select JOB 3
- Switch to the material thickness display
- Set material thickness to 1.4 mm
- Switch to the wire speed display



A wire speed of 2.2 m/min will be shown.

### 5.2.4.2 Operating point setting using material thickness, welding current, wire speed

The process of setting the operating point via the wire speed parameters is described as an example below.

Operating element	Action	Result	Display
		Increase or reduce welding performance via the wire speed parameter. Display example: 10.5 m/min	

### 5.2.4.3 Arc length correction setting

Operating element	Action	Result
		"Arc length correction" setting  Setting range: -5 V to +5 V

#### NOTE



**The basic settings are now completed.**

Other welding parameters have already been set optimally in the factory; they can, however, be modified to suit individual requirements.

## 5.2.5 Further welding parameters

### NOTE



#### Validity of the settings.

Settings for

- Spot time,
- Pause time and
- Wire feed speed

apply for all JOBS.

- Choke effect/dynamics,
  - Gas post-flow time,
  - Gas pre-flow time and
  - Wire burn-back correction
- are saved separately for each JOB.

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

**Resetting to factory configuration, see chapter “Resetting the controls (Reset all)”**

### 5.2.5.1 Choke effect / dynamics

Operating element	Action	Result	Display
	n x	<b>Selecting the parameter to be set</b> The LED indicates the parameter selected. DYN Choke effect/dynamics Gas post-flow time Spot time Pause time (interval operation)	Parameter value set
		<b>Set choke effect/dynamics.</b>  Setting range: 40: Arc hard and narrow. -40: Arc soft and wide.	

### 5.2.5.2 Gas post-flow time

Operating element	Action	Result	Display
	n x	<b>Selecting the parameter to be set</b> The LED indicates the parameter selected. DYN Choke effect/dynamics Gas post-flow time Spot time Pause time (interval operation)	Parameter value set
		<b>Adjusting the gas post-flow time.</b>  Setting range: 0.0 s to 20.0 s in increments of 0.1 s	

### 5.2.5.3 Spot time

**NOTE**

Select the respective operating mode before setting the spot or pause time.

Operating element	Action	Result	Display
DYN Gas post-flow time Spot time Pause time (interval operation) 	n x	<b>Selecting the parameter to be set</b> The LED indicates the parameter selected. DYN Choke effect/dynamics Gas post-flow time Spot time Pause time (interval operation)	Parameter value set
		<b>Setting the stop time.</b>  Setting range: 0.1 s to 20.0 s in increments of 0.1 s	

### 5.2.5.4 Pause time (interval operation)

Operating element	Action	Result	Display
DYN Gas post-flow time Spot time Pause time (interval operation) 	n x	<b>Selecting the parameter to be set</b> The LED indicates the parameter selected. DYN Choke effect/dynamics Gas post-flow time Spot time Pause time (interval operation)	Parameter value set
		<b>Setting the pause time.</b>  Setting range: 0.1 s to 20.0 s in increments of 0.1 s	

### 5.2.6 Dynamic power adjustment

This machine has been equipped with dynamic power adjustment, which reliably prevents unintentional triggering of the mains fuse.

The welding voltage and thus the welding performance can be increased with the "arc length correction" rotary dial. This can produce welding performance levels that lead to the 16 A fuse of the 230 V mains power supply being triggered.

In this case, the dynamic power adjustment feature automatically adjusts the welding performance to an uncritical level.

**NOTE**

**A correctly designed mains fuse is a prerequisite.**

- Observe the details about the mains fuse in the "Technical Data" chapter!

## 5.2.7 Advanced settings

- Preselection: Select a MIG/MAG JOB (see chapter “Selecting MIG/MAG welding tasks”).
- Enter the menu (ENTER) Keep the runtime parameter button pressed for 5 s.
- Leave the menu (EXIT) Keep the runtime parameter button pressed for 2 s.

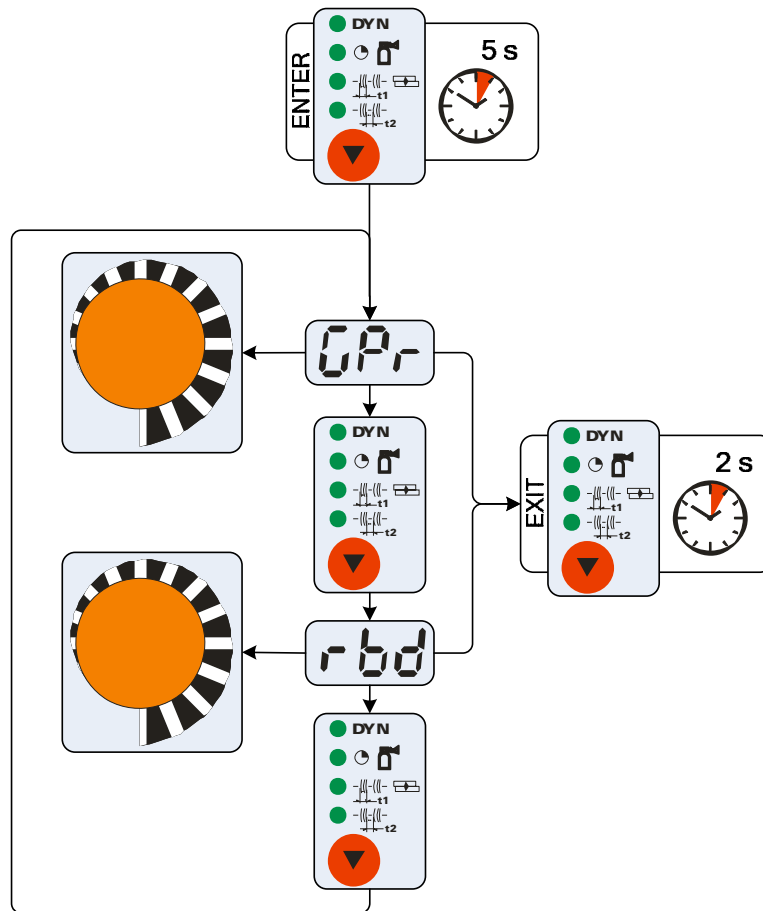















Figure 5-4

Display	Parameter/Setting range
	<b>Gas pre-flow time</b> 0.1 s to 20.0 s (0.1 s increments)
	<b>Wire burn-back correction</b> -50 % to +50 % of the wire burn back time specified in the JOB (1 % increments)

## 5.2.8 MIG/MAG functional sequences / operating modes

### 5.2.8.1 Explanation of signs and functions

Symbol	Meaning
	Press torch trigger
	Release torch trigger
	Shielding gas flowing
	Welding output
	Wire electrode is being conveyed
	Wire creep
	Wire burn-back
	Gas pre-flows
	Gas post-flows
	Non-latched
	Latched
<b>t</b>	Time
<b>t<sub>1</sub></b>	Spot time
<b>t<sub>2</sub></b>	Pause time

## 5.2.8.2 Non-latched mode

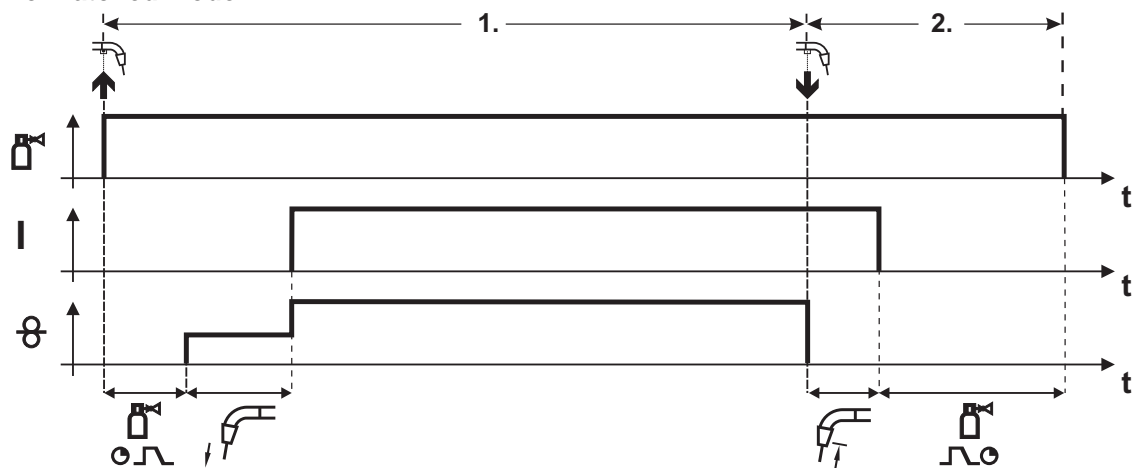


Figure 5-5

### Step 1

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

### Step 2

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

5.2.8.3 Latched mode

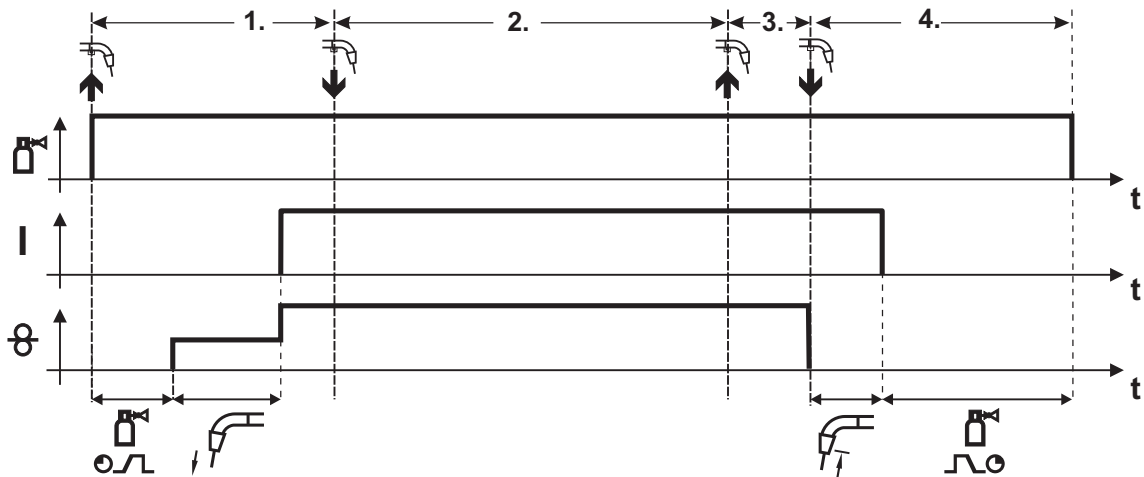


Figure 5-6

**1. cycle**

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

**2. cycle**

- Release torch trigger (no effect)

**3. cycle**

- Press torch trigger (no effect)

**4. cycle**

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

## 5.2.8.4 Spots

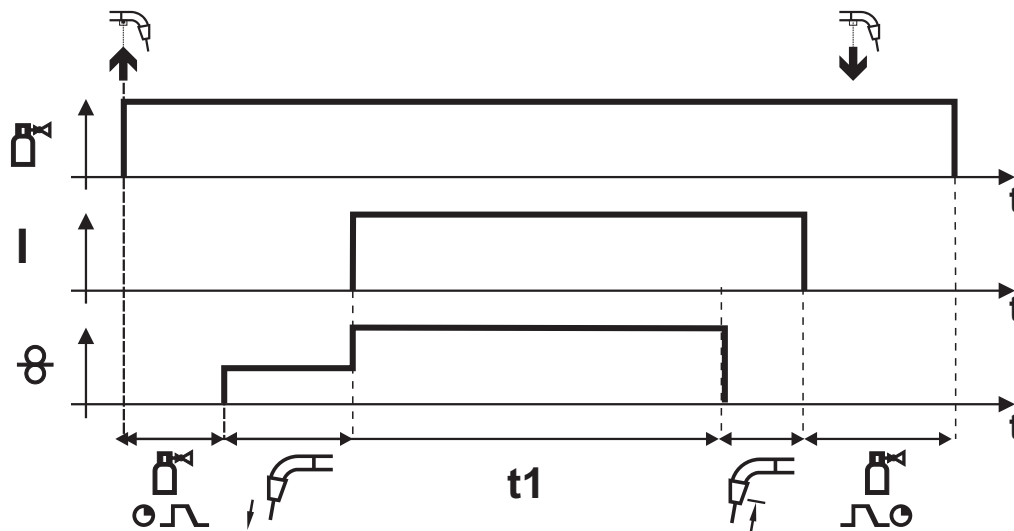


Figure 5-7

### Start

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

### Premature termination

- Release torch trigger.

5.2.8.5 Interval

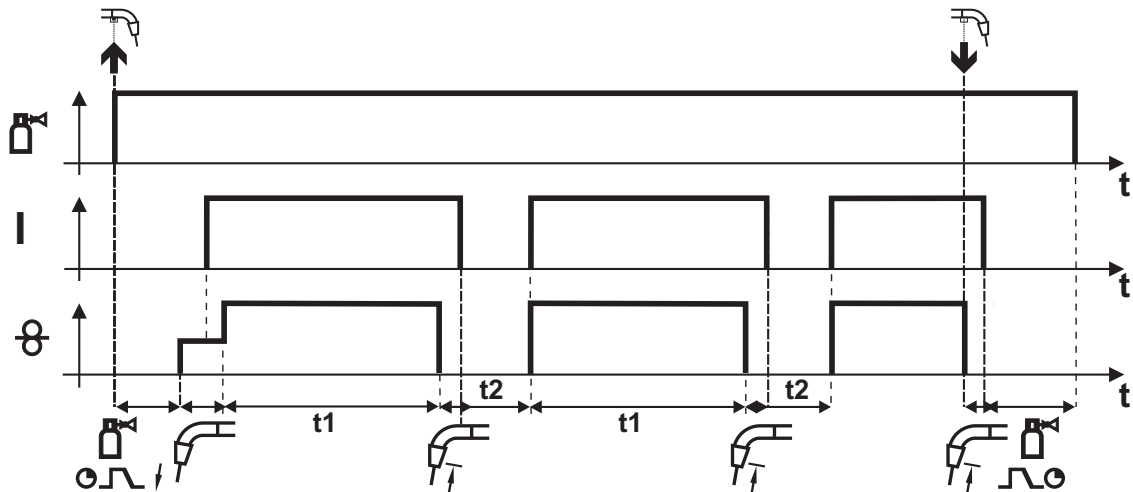


Figure 5-8

**Start**

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

**Sequence**

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

**End**

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







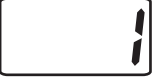



**If the pause time is less than 3 s, wire creep only takes place in the first spot phase.**

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

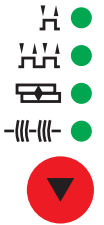





## 5.2.9 Conventional MIG/MAG Welding

- Select JOB 188

It is only possible to change the JOB number when no welding current is flowing.

Operating element	Action	Result	Display
	1 x 	Select JOB list  Material  Gas  Wire (LED  is on)	
		Set JOB number. Wait 3 s until the setting has been applied.	

### 5.2.9.1 Operating mode

Operating element	Action	Result
	n x 	<b>Selecting the operating mode</b> The LED indicates the selected operating mode.  Non-latched operation  Latched operation  Spots  Interval operation

### 5.2.9.2 Welding data display

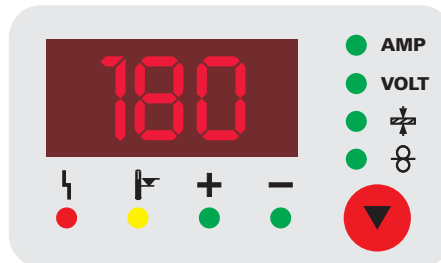


Diagram 5-9

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

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

The display shows:

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

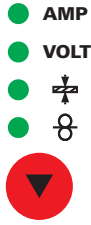



Parameter	Nominal values	Actual values	Hold values
<b>Welding current</b>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Wire speed</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Welding voltage</b>	<input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

After welding you can change back to the nominal values



- by pressing the buttons or using the dials on the controls
- or by briefly pressing the torch trigger.

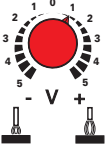

### 5.2.9.3 Setting the operating point (welding output)

The operating point (welding performance) is set with the wire speed and the welding voltage.

Operating element	Action	Result
		<b>Switch the display between:</b> <b>AMP</b> Welding current (only actual and hold values are displayed) <b>VOLT</b> Welding voltage  Material thickness (will be skipped)  Wire speed

Settings are made using the "welding parameter setting" and "arc length correction" rotary dials, which are used here to set the wire speed and the welding voltage.

Operating element	Action	Result
		Increase or reduce welding performance via the wire speed parameter.

Operating element	Action	Result
		Set the welding voltage  Setting range: 10 V to 30 V

#### NOTE



#### Automatic display mode switching:

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

If the display mode is set to display the welding current, it will always show "0" before welding begins. Actual values are shown during welding; these can be changed as necessary using the "welding parameter setting" rotary dial.

## 5.2.10 Cored wire welding

### NOTE













**Fault in the weld seam!**

The additional use of shielding gas has a negative effect on the welding result when welding with self-shielding cored wire.

- Shut off the shielding gas supply..

- Select cored wire JOB 172, 171 or 170 (depending on the diameter of the wire used).

It is only possible to change the JOB number when no welding current is flowing.

Operating element	Action	Result	Display
	1 x 	Select JOB list  Material  Gas  Wire (LED  is on)	
		Set JOB number. Wait 3 s until the setting has been applied.	

### NOTE



**Pay attention to the signal light for the polarity setting!**

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

- Reconnect the polarity selection plug if necessary (see chapter "Commissioning")

## 5.2.11 MIG/MAG automatic cut-out

### NOTE



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











- Ignition fault (no welding current flows within 5 s after the start signal).
- Arc interruption (arc is interrupted for longer than 3 s).

## 5.3 TIG welding


### 5.3.1 TIG welding task selection

- Select TIG JOB 127.

It is only possible to change the JOB number when no welding current is flowing.



Operating element	Action	Result	Display
	1 x 	Select JOB list <ul style="list-style-type: none"> <li> Material</li> <li> Gas</li> <li> Wire</li> </ul> (LED  is on)	
		Set JOB number. Wait 3 s until the setting has been applied.	

#### NOTE



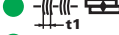





-  **Pay attention to the signal light for the polarity setting!**  
 It may be necessary to change the welding current polarity depending on the JOB selected or the welding process.
- Reconnect the polarity selection plug if necessary (see chapter “Commissioning”)

### 5.3.2 TIG welding current setting

Set the welding current via the dial for the operating point.

Operating element	Action	Result	Display
		Set welding current	current nominal value

### 5.3.3 Adjusting the gas post-flow time

Operating element	Action	Result	Display
<ul style="list-style-type: none"> <li> DYN</li> <li></li> <li></li> <li></li> <li></li> </ul>	1 x 	Select setting for gas post-flow time	parameter value setting
		Setting the gas post-flow time  Setting range: 0.0 s to 20.0 s	

## 5.3.4 Further welding parameters

- Preselection: Select TIG JOB 127. (see chapter “Selecting TIG welding tasks”)
- Enter the menu (ENTER) Keep the runtime parameter button pressed for 5 s.
- Leave the menu (EXIT) Keep the runtime parameter button pressed for 2 s.

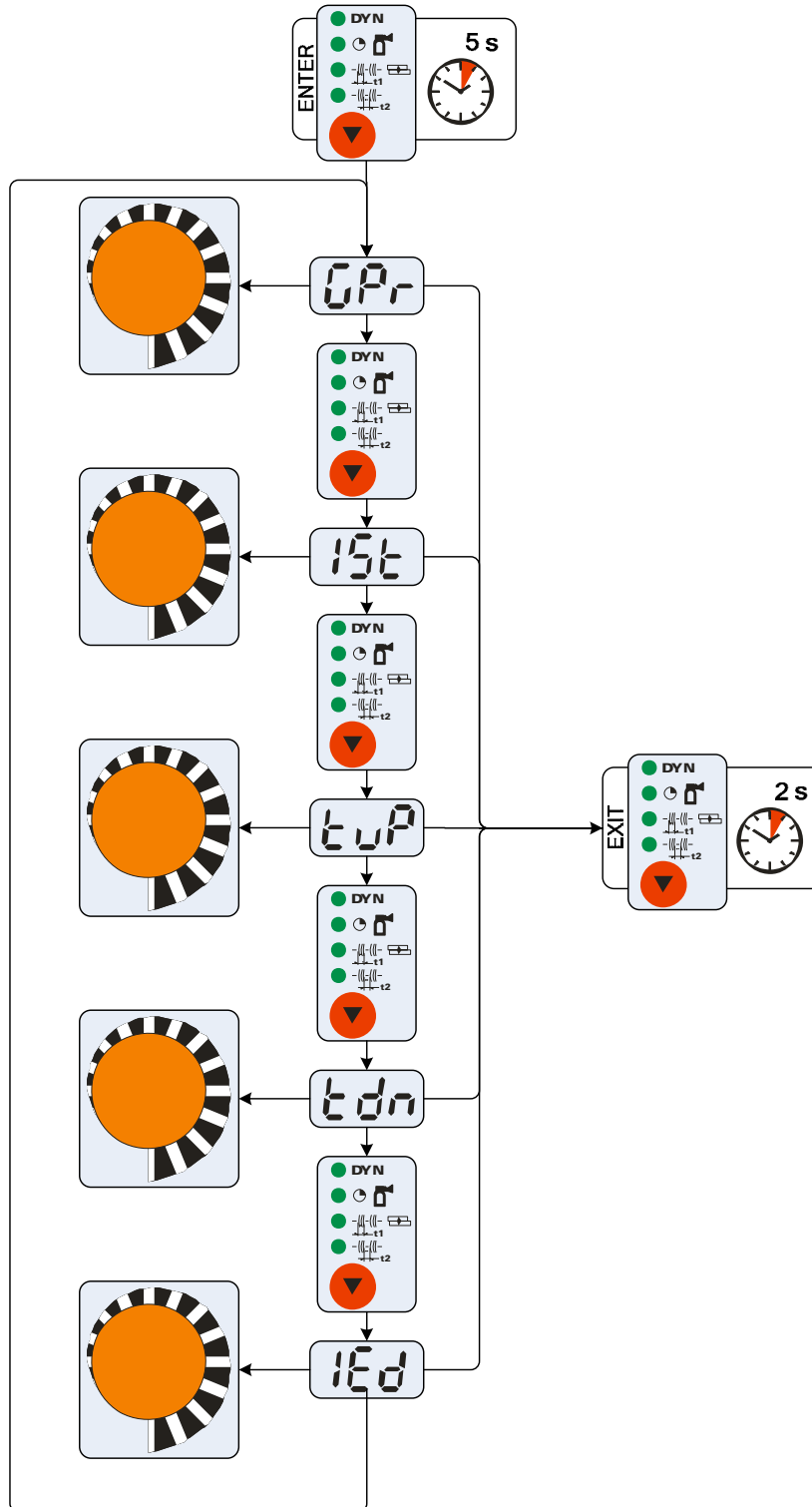







Figure 5-10

Display	Parameter/Setting range
	<b>Gas pre-flow time</b> 0.1 s to 5.0 s (0.1 s increments)
	<b>Ignition current</b> 1% to 200% of the welding current (1% increments)
	<b>Upslope time</b> 0.0 s to 20.0 s (0.1 s increments)
	<b>Downslope time</b> 0.0 s to 20.0 s (0.1 s increments)
	<b>End current</b> 1% to 200% of the welding current (1% increments)

## 5.3.5 TIG welding data display

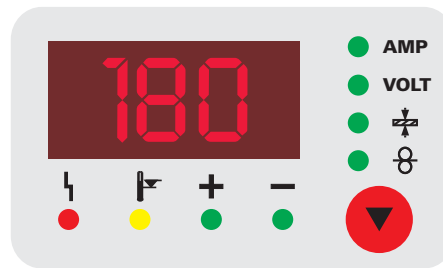


Diagram 5-11

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

Each time the button is pressed it switches between welding current and welding voltage.

The display shows:

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

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

The display switches back from hold values to actual values for approximately 5 s after welding is finished.

## 5.3.6 TIG arc ignition

### 5.3.6.1 Liftarc ignition

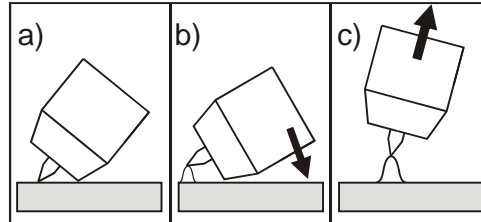


Figure 5-12









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

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

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

### 5.3.7 TIG function sequences / operating modes

#### 5.3.7.1 Legend

Symbol	Meaning
	Press torch trigger
	Release torch trigger
I	Welding current
	Gas pre-flows
	
	Gas post-flows
	
	Non-latched
	Latched
t	Time
t <sub>Up</sub>	Upslope time
t <sub>Down</sub>	Downslope time
I <sub>start</sub>	Ignition current
I <sub>end</sub>	End-crater current

## 5.3.7.2 Non-latched mode

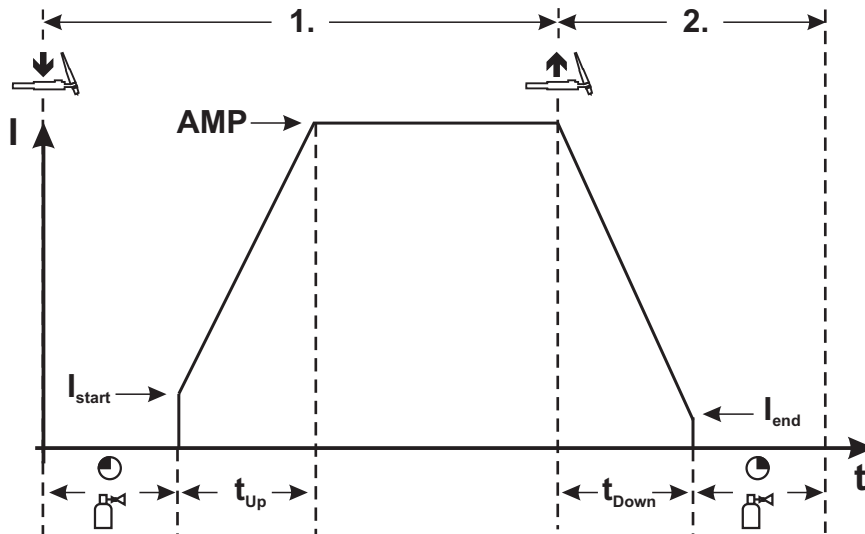


Figure 5-13

### 1st cycle

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

### The arc is ignited using liftarc.

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

### 2nd cycle

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

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

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

### 5.3.7.3 Latched mode

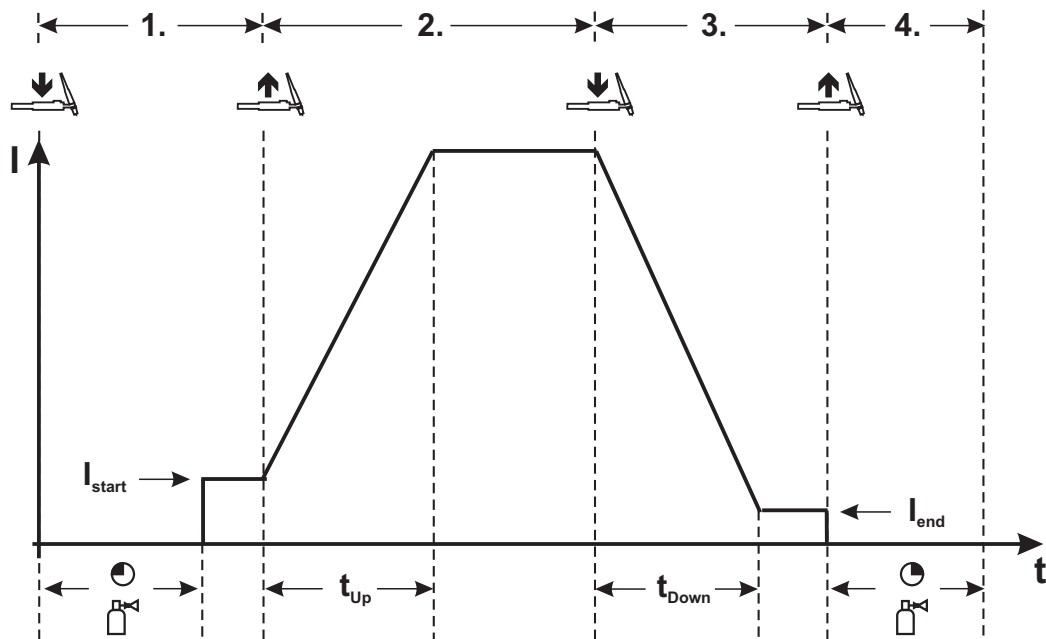


Figure 5-14

#### 1st cycle

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

#### The arc is ignited using liftarc.

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

#### 2nd cycle

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

#### 3rd cycle

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

#### 4th cycle


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

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

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

### 5.3.8 TIG automatic cut-out

#### NOTE











-  **The welding machine ends the ignition process or the welding process with an**
- Ignition fault (no welding current flows within 3 s after the start signal).
  - Arc interruption (arc is interrupted for longer than 3 s).

## 5.4 MMA welding


### 5.4.1 MMA welding task selection

- Select MMA JOB 128.

It is only possible to change the JOB number when no welding current is flowing.



Operating element	Action	Result	Display
	1 x 	Select JOB list <ul style="list-style-type: none"> <li> Material</li> <li> Gas</li> <li> Wire</li> </ul> (LED  is on)	
		Set JOB number. Wait 3 s until the setting has been applied.	

### NOTE

-  Pay attention to the polarity of the welding current!  
 Change the welding polarity if necessary, depending on the type of electrode used.  
 (See chapter “Commissioning”)
- Observe the information from the electrode manufacturer!

### 5.4.2 MMA welding current setting

Set the welding current via the dial for the operating point.

Operating element	Action	Result	Display
		Set welding current	current nominal value

### 5.4.3 MMA welding data display

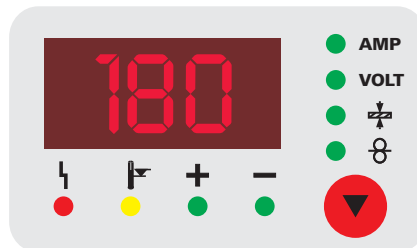


Diagram 5-15

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

Each time the button is pressed it switches between welding current and welding voltage.

The display shows:








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

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

The display switches back from hold values to actual values for approximately 5 s after welding is finished.

### 5.4.4 Arcforcing

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.

Operating element	Action	Result	Display
<ul style="list-style-type: none"> <li>● DYN</li> <li>● </li> <li>● </li> <li>● </li> <li>● </li> </ul>	1 x 	Select DYN setting	Parameter value setting
		<b>Arc forcing setting for electrode types:</b> Setting range -10 to 10	
		Negative values:	Rutile
		Values around zero:	Basic
		Positive values:	Cellulose

### 5.4.5 Hotstart

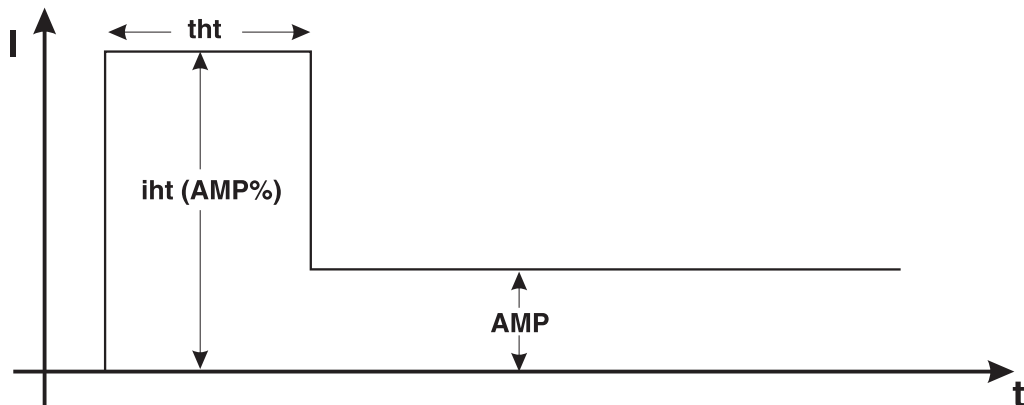


Figure 5-16

The hotstart device improves the ignition of the stick electrodes using an increased hotstart current. After striking the stick electrode, the arc ignites with hotstart current (iht) for the preset hotstart time (tht) and then reduces to the main current (AMP).

The parameter values for hotstart current and time can be optimised for the electrode types being used.

## 5.4.5.1 Hotstart settings

- Select MMA JOB 128. (see chapter “Selecting MMA welding tasks”)
- Enter the menu (ENTER) Keep the runtime parameter button pressed for 5 s.
- Leave the menu (EXIT) Keep the runtime parameter button pressed for 2 s.

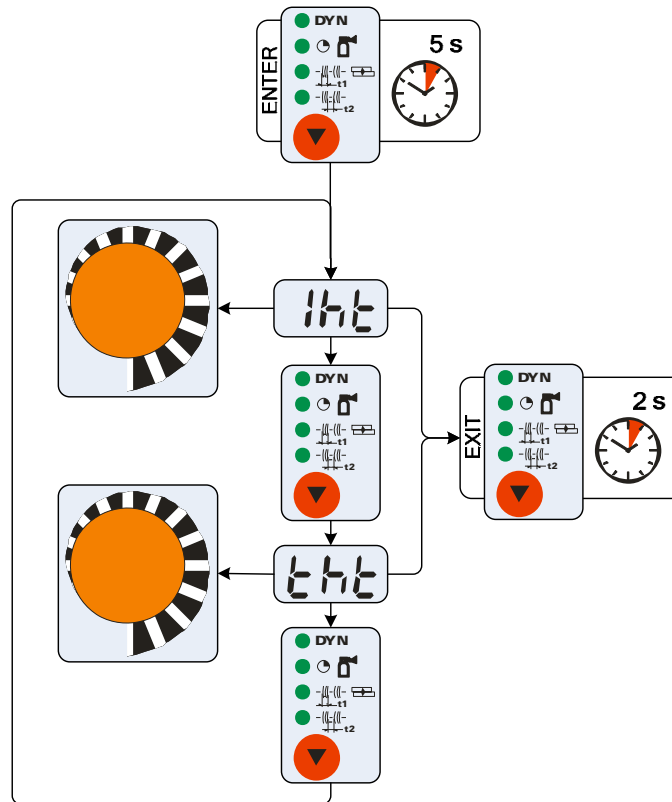




Figure 5-17

Display	Parameter/Setting range
	<b>Hotstart current</b> 50% to 200% of the welding current (1% increments)
	<b>Hotstart time</b> 0.1 s to 20.0 s (0.1 s increments)

## 6 Commissioning

### 6.1 General

#### CAUTION



**Risk of burns on the welding current connection!**

**If the welding current connections are not locked, connections and leads heat up and can cause burns, if touched!**

- Check the welding current connections every day and lock by turning in clockwise direction, if necessary.

#### CAUTION



**Hazards due to electrical current!**

**Serious injuries can result from incorrect operation or failure to observe the safety information!**

- Follow safety instructions on the opening pages!
- Only connect welding or connection leads (such as electrode holders, welding torches, workpiece leads, interfaces) when the equipment is switched off.

#### CAUTION



**Using protective dust caps!**

**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!

### 6.2 Area of application – proper usage

These welding machines are suitable exclusively for MIG/MAG, TIG and MMA welding.

#### CAUTION



**Hazards due to improper usage!**

**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 proper usage and by trained or expert staff!
- Do not modify or convert the equipment improperly!

#### CAUTION



**Damage due to the use of non-genuine parts!**

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

- Only use system components and options (power sources, welding torches, electrode holders, remote controls, spare parts and replacement parts, etc.) from our range of products!

## 6.3 Installation

### CAUTION



#### Installation site!

**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.

## 6.4 Mains connection

### CAUTION



#### Operating voltage - mains voltage!

**The operating voltage shown on the rating plate must be consistent with the mains voltage, in order to avoid damage to the machine!**

- For mains fuse protection, please refer to the “Technical data” chapter!

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

## 6.5 Machine cooling

To obtain an optimal duty cycle from the power components, the following precautions should be observed:

- Ensure that the working area is adequately ventilated.
- Do not obstruct the air inlets and outlets of the machine.
- Do not allow metal parts, dust or other objects to get into the machine.

## 6.6 Workpiece lead, general

### CAUTION



#### Risk of burns due to incorrect connection of the workpiece lead!

**Paint, rust and dirt on the connection restrict the power flow and may lead to stray welding currents.**

**Stray welding currents may cause fires and injuries!**

- Clean the connections!
- Fix the workpiece lead securely!
- Do not use structural parts of the workpiece as a return lead for the welding current!
- Take care to ensure faultless power connections!

## 6.7 Connecting the MIG/MAG or TIG welding torch and the workpiece lead

### 6.7.1 Preparing the MIG/MAG welding torch

Depending on the wire electrode diameter and wire electrode type, either a spiral guide or a plastic core with the appropriate interior diameter must be inserted into the welding torch!

Recommendation:

- Use a spiral guide for welding hard wire electrodes (steel).
- Use a plastic core for welding or brazing soft wire electrodes.

### 6.7.2 Preparing the central connection (Euro)

#### NOTE



#### Fault with the wire guide!

**On delivery, the central connector (Euro) is fitted with a capillary tube for welding torches with spiral guides. Conversion is necessary if a welding torch with a plastic core is used!**

Welding torch with plastic core:

- use with support tube!

Welding torch with spiral guide:

- use with capillary tube!

#### Preparation for connecting welding torches with a plastic core:

- Push forward the capillary tube on the wire feed side in the direction of the central connector and remove it there.
- Slide plastic core support tube off the central connector.
- Carefully insert the central plug for the welding torch, with the still oversized plastic core, into the central connector and screw together with crown nut.
- Use a suitable tool to cut off the plastic core just before the wire feed roller, making sure not to pinch it.
- Unfasten and remove the central plug on the welding torch.
- Cleanly remove the burr from the separated end of the plastic core!

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

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

### 6.7.3 Preparing the TIG welding torch




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

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

## 6.7.4 Connection



Figure 6-1

Item	Symbol	Description
1		<b>Central connection for welding torch (Euro)</b> Integrated welding current, shielding gas and torch trigger
2		<b>Connection socket for “+” welding current</b> <ul style="list-style-type: none"> <li>Signal light for “+”:polarity setting      Connection polarity selection plug</li> <li>Signal light for “-”:polarity setting      Workpiece lead connection</li> </ul>
3		<b>Connection socket, “-” welding current</b> <ul style="list-style-type: none"> <li>Signal light for “+”:polarity setting      Workpiece lead connection</li> <li>Signal light for “-”:polarity setting      Connection polarity selection plug</li> </ul>
4		<b>Polarity selector plug, welding current cable</b> Internal welding current cable for central connection/welding torch. <b>Connections with:</b> <ul style="list-style-type: none"> <li>Signal lights for polarity setting “+”:      Connection socket for “+” welding current</li> <li>Signal lights for polarity setting “-”:      Connection socket for “-” welding current</li> <li>MMA welding:      Park socket</li> </ul>

- Insert the central plug for the welding torch into the central connector and screw together with crown nut.

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

- Select JOB (see chapter “Function description, selecting MIG/MAG or TIG welding tasks”)
- Polarity selection “+” or polarity selection “-” signal lights show the polarity setting.
- Insert the plug of the workpiece lead in the respective welding current connection socket and lock in place by turning to the right.
- Insert the polarity selection plug in the respective welding current connection socket and lock in place by turning to the right.

## 6.8 Shielding gas supply

### 6.8.1 Connecting the shielding gas supply

#### CAUTION



#### **Incorrect handling of shielding gas cylinders!**

**Incorrect handling of shielding gas cylinders can result in serious and even fatal injury.**

- Observe the instructions from the gas manufacturer and in any relevant regulations concerning the use of compressed air!
- Place shielding gas cylinders in the holders provided for them and secure with fixing devices.
- Avoid heating the shielding gas cylinder!


#### NOTE



**Before connecting the pressure reducer to the gas cylinder, open the cylinder valve briefly to expel any dirt.**

- Tighten the pressure reducer screw connection on the gas bottle valve to be gas-tight.
- Tighten gas hose on pressure reducer to be gas tight.

### 6.8.2 Gas test

- Slowly open the gas cylinder valve.
- Open the pressure reducer.
- Switch on the power source at the main switch.
- Initiate gas test function on the machine control.
- Set the relevant gas quantity for the application on the pressure reducer.
- The gas test is triggered on the machine control by pressing the  button briefly. Shielding gas flows for around 25 seconds or until the button is pressed again.

### 6.8.3 Setting the shielding gas quantity

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

#### NOTE



#### **Incorrect shielding gas setting!**


**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!

## 6.9 MIG/MAG welding wire supply

### 6.9.1 Fixing the wire spool retainer (pre-tension adjustment)

#### NOTE

 Because the spool brake also secures the wire spool retainer, the following steps are to be carried out for every spool change and before every adjustment of the spool brake.

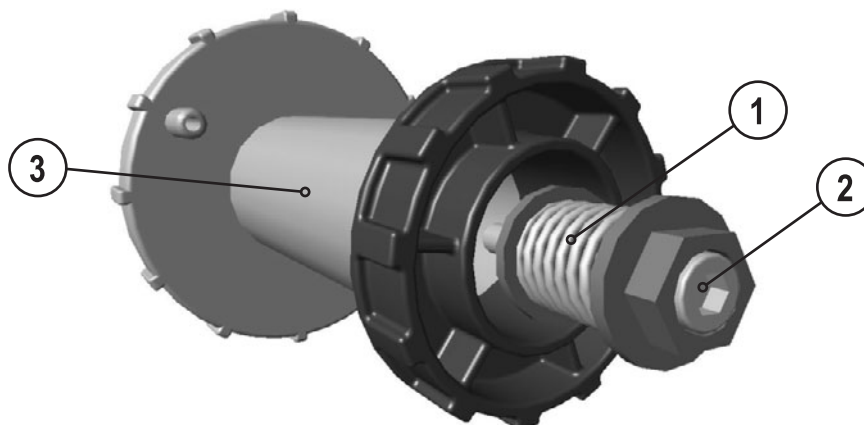


Figure 6-2

Item	Symbol	Description
1		Securing and braking unit
2		Allen screw Securing the wire spool retainer and adjustment of the spool brake
3		Wire spool retainer

- Loosen the hexagonal socket screw of the securing and braking unit until the screw is free of the thread in the wire spool retainer (do not remove it completely to prevent losing the small parts).
- Pre-tension the securing and braking unit in the wire spool retainer by screwing the hexagonal socket screw clockwise, making at least 4 complete turns (4 x 360°).

## 6.9.2 Spool brake setting

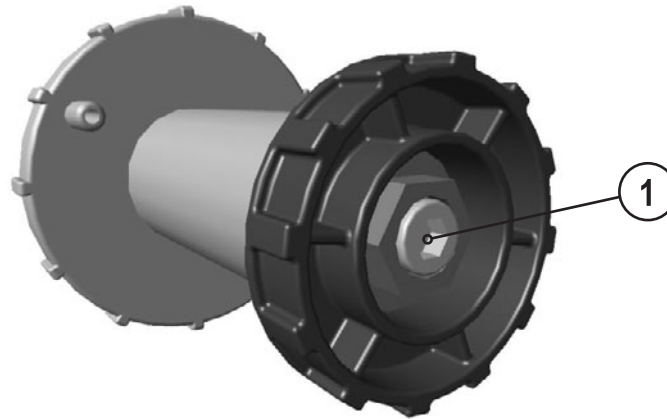


Figure 6-3

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

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

### NOTE



**Do not jam the wire spool!**

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

**The fixing of the pin reel must be checked if the hexagonal socket screw is released.**

See chapter "Fixing of the pin reel (adjustment of the pre-tensioning)"

## 6.9.3 Inserting the wire spool

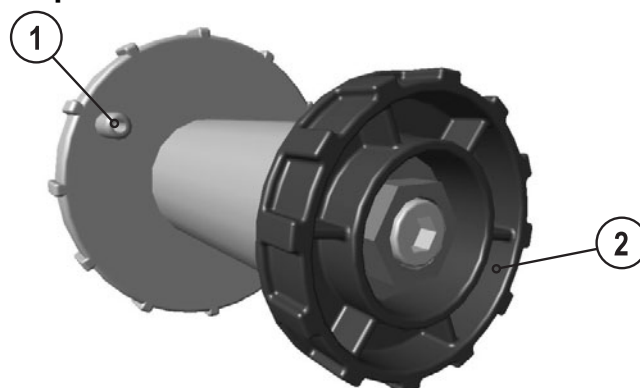


Figure 6-4

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

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

## 6.9.4 Changing the wire feed rollers

### NOTE



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

Wire feed rollers must be suitable for the diameter of the wire and the material.

- Check the roller label to verify that the rollers are suitable for the wire diameter. Turn or change if necessary!
- use V-Nut rollers with for steel wires and other hard wires,
- use U-Nut rollers for aluminium wires and other soft, alloyed wires.

- Slide new drive rollers into place so that the diameter of the wire used is visible on the drive roller.
- Screw the drive rollers in place with knurled screws.

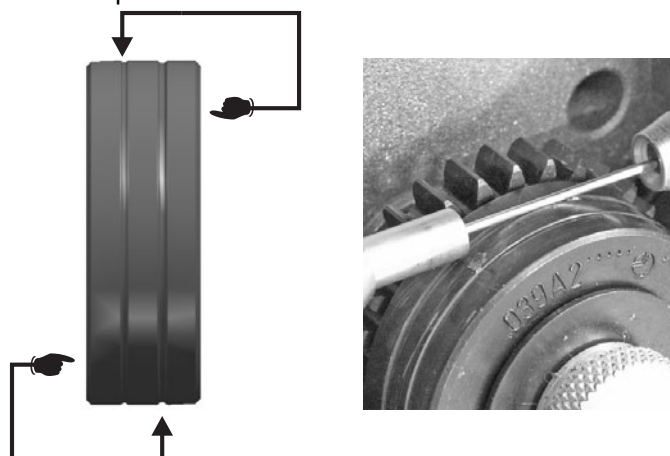


Figure 6-5

### 6.9.5 Inching the wire electrode

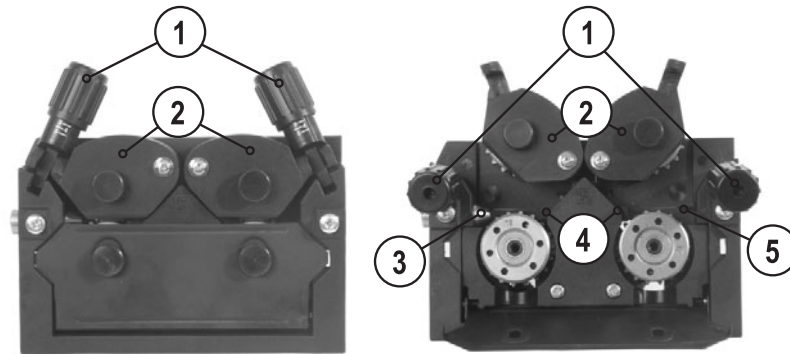


Figure 6-6

Item	Symbol	Description
1		Pressure units
2		Clamping units
3		Wire feed nipple
4		Guide tube
5		Capillary tube or plastic core with support tube, depending on the torch equipment

- Extend and lay out the torch tube package.
- Unfasten pressure units and fold out (clamping units and counter-pressure rollers will automatically flip upwards).
- Unwind welding wire carefully from the wire spool and insert through the wire inlet nipple over the drive roller grooves and the guide pipe into the capillary tube and Teflon core using guide pipe.
- Press the clamping element with the counter pressure roller back downwards and fold the wire units back up again (wire electrode should be in the groove on the drive roller).

**The clamping pressure must be set on the adjusting nuts of the pressure units so that the wire electrode is conveyed but will still slip through if the wire spool jams.**

**The clamping pressure for the front rollers (viewed from the direction of the feed) should always be slightly higher than that of the rear rollers.**

- Press the wire inching button until the wire electrode projects out of the welding torch.

#### CAUTION



**Risk of injury due to driven wire electrode!**

**The wire electrode can exit the welding torch or the wire feed at high speed thereby causing injury.**

- Never point a welding torch at people or animals!

## 6.10 MMA welding

### ⚠ CAUTION



**Risk of being crushed or burnt.**

**When replacing spent or new stick electrodes**

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

### 6.10.1 Connecting the electrode holder and workpiece lead



Figure 6-7

Item	Symbol	Description
1	○	<b>Park socket, polarity selection plug</b> Retainer for the polarity selection plug in MMA mode or for transport.
2		<b>Polarity selector plug, welding current cable</b> • Connect to the park socket.
3	+	<b>Connection socket for "+" welding current</b> Electrode holder or workpiece lead connection
4	-	<b>Connection socket, "-" welding current</b> Electrode holder or workpiece lead connection

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

### NOTE



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

## 7 Maintenance and testing

### NOTE


 **The maintenance, cleaning and testing work described below must be conducted correctly and on an annual basis in order qualify for claims under the EWM warranty.**

### 7.1 General

When used in the specified environmental conditions and under normal operating conditions, this machine is largely maintenance-free and requires a minimum of care.

There are some points, which should be observed, to guarantee fault-free operation of your welding machine. Among these are regular cleaning and checking as described below, depending on the pollution level of the environment and the length of time the unit is in use.

### NOTE

 **The welding machine may only be cleaned, tested and repaired by competent, capable persons!**  
**A capable person is one who, because of his training, knowledge and experience, is able to recognise the dangers that can occur while testing welding power sources as well as possible subsequent damage and who is able to implement the required safety procedures.**  
**In the event of failure to comply with any one of the following tests, the machine must not be operated again until it has been repaired and a new test has been carried out!**

### 7.2 Cleaning



### DANGER



**Electric shocks!**

**Cleaning machines that are not disconnected from the mains can lead to serious injuries!**

- Disconnect the machine completely from the mains.
- Remove the mains plug!
- Wait for 2 minutes until the capacitors have discharged.


The individual components should be handled as follows:

Power source: Depending on the amount of dust, blow out using oil- and moisture-free compressed air.

Electronics: Do not blast electronic components or circuit boards with compressed air but clean them with a vacuum cleaner instead.

Coolant: Check for impurities and replace if necessary.

### NOTE

 **Mixing coolants with other liquids or the use of other coolants voids our manufacturer's guarantee.**

## 7.3 Test

### NOTE


 **Additional machines and add-on parts (e.g. cooling units, wire feed devices, welding torches,...) should be tested together with the welding power source.**

Some points, such as: insulation and protective conductor resistance, can be tested directly at the same time and it can be ensured that the total leakage current from the welding power source, additional machines and add-on parts does not exceed the limits.

For this reason, the full process of testing the welding power source is described below. If additional machines or add-on parts are tested individually, the test points are to be adjusted if necessary (e.g. no open circuit voltage measurement).

The test should be conducted in accordance with IEC/DIN EN 60974-4 "Arc welding equipment – Inspection and testing during operation" in accordance with the German Ordinance of Operational Safety. This standard is not only an international standard but is also specific to arc welding equipment.

### NOTE

 **The former term of repetition test has been replaced due to a change in the corresponding standard with "Inspection and testing during operation".  
In addition to the regulations on the test given here, the relevant local laws and regulations must also be observed.**

### 7.3.1 Test equipment


### NOTE

 **Due to the special conditions of inverter arc welding equipment, not all test equipment is suitable for testing in accordance with VDE 0702 to the full extent!**

EWM as a manufacturer offers all appropriately trained and authorised EWM sales partners the appropriate test equipment and measuring devices conforming to VDE 0404-2, which evaluate the frequency response conforming to DIN EN 61010-1 Appendix A – Measuring Circuit A1.

You as the user are tasked with ensuring that your EWM machines conform to the standard IEC/DIN EN 60974-4 and are tested with the relevant test equipment and measuring devices given above.

### NOTE

 **The following description of the test is only a brief overview of the points to be tested.  
For details about the test points or in the event of any queries, please refer to IEC/DIN EN 60974-4.**

### 7.3.2 Scope of the test

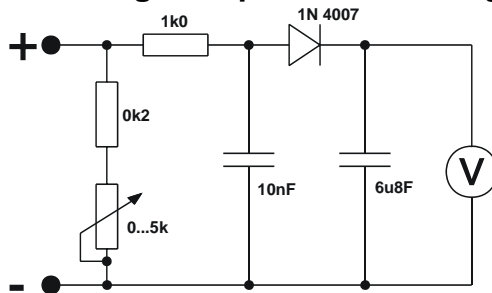
- a) Visual inspection
- b) Electrical test: measurement of
  - open circuit voltage
  - insulation resistance, or alternatively
  - leakage currents
  - protective conductor resistance
- c) Functional test
- d) Documentation

### 7.3.3 Visual inspection

The key areas in the test are:

1. Torch/stick electrode holder, welding current return lead clamp
2. Power supply: leads including plugs and strain relief
3. Welding current circuit: leads, plugs and couplings, strain relief
4. Casing
5. Operating, message, safety and adjustment devices
6. Other, general condition

### 7.3.4 Measuring the open circuit voltage



*Measuring circuit according to DIN EN 60974-1*

Connect the measuring circuit to the welding current sockets. The voltmeter must display mean values and have an internal resistance  $\geq 1 \text{ M}\Omega$ . In the case of step switch controlled devices, set the maximum output voltage (step switch). Adjust the potentiometer from 0 kΩ to 5 kΩ during the measurement. The measured voltage should not deviate from that specified on the rating plate by more than  $\pm 5\%$  and may be no greater than 113 V (for devices with VRD: 35 V).

### 7.3.5 Measurement of insulation resistance

The mains switch must be on so that the insulation in the interior of the machine can also be checked through to the transformer. If a mains contactor is fitted, this should be bridged or the measurement must be carried out on both sides.

The insulation resistance must not be less than:

Mains current circuit	against	Welding current circuit and electronics	5 MΩ
Welding current circuit and electronics	against	Protective conductor circuit (PE)	2.5 MΩ
Mains current circuit	against	Protective conductor circuit (PE)	2.5 MΩ

## 7.3.6 Measuring the leakage current (protective conductor and contact current)

Note: Even if the leakage current measurement according to the standard is only an alternative to the insulation resistance measurement, EWM recommends always performing both measurements, especially following repair work. The leakage current is based for the greater part on a physical effect other than the insulation resistance. For this reason, it may not be possible to uncover a dangerous leakage current using the insulation resistance measurement.

These measurements cannot be performed with a normal multimeter. Even test devices for VDE 0702 (especially older devices) are generally only intended for 50/60 Hz. With inverter welding machines, however, significantly higher frequencies occur, which can interfere with some measuring devices, and result in others measuring the frequency incorrectly.

A test device must meet the requirements of VDE 0404-2. For the frequency response measurement, please refer to DIN EN 61010-1 Appendix A – Measuring circuit A1.

### NOTE



**For these measurements, the welding machine must be switched on and supplying open circuit voltage!**

1. Protective conductor current: < 5 mA
2. Leakage current from the welding sockets separately to PE: < 10 mA

## 7.3.7 Measurement of protective conductor resistance

Measure between the plug earthed contact and accessible live parts, e.g. casing screws.

During the measurement, the connection lead must be moved across the entire length, especially near the casing and plug inlet points. This should uncover any interruptions in the protective conductor. All conductive parts of the casing accessible from outside should also be tested to ensure a correct PE connection for safety class I.

The resistance must not exceed a mains connection lead  $0.3\Omega$  up to 5m in length. For longer leads, the permissible value increases by  $0.1\Omega$  per 7.5m of lead. The maximum permissible value is  $1\Omega$ .

## 7.3.8 Functional test of the welding machine

Safety devices, selector switches and command units (if fitted) and the entire machine or the entire system for arc welding, must be functioning perfectly.

1. Main switch
2. Emergency stop devices
3. Voltage reducing device
4. Gas solenoid valve
5. Message and control lamps

## 7.3.9 Documentation of the test

The test report must contain:

- the designation of the tested welding equipment,
- the date of the test,
- the test results,
- the signature, name of technician and the relevant institution,
- the name of the test equipment.

A label with the date of the test must be affixed to the welding machine to show that the test has been passed.

## 7.4 Repair Work

Repair and maintenance work may only be performed by qualified authorised personnel; otherwise the right to claim under the warranty is void. In all service matters, please contact your EWM sales partner. Returns of defective equipment subject to warranty may only be made through your EWM sales partner. In the event of problems or queries, please contact the EWM Service Department directly (+49 (0) 2680 181 0). Use only genuine spare parts and replacement parts when replacing. When placing an order, please quote the type designation and item number, as well as the type, serial number and item number of the relevant equipment.

**We hereby confirm that the servicing and maintenance instructions given above and the test described above have been completed correctly.**

<p>_____</p> <p>Date/Stamp/Signature of EWM sales partner</p> <p>_____</p> <p>Date of next maintenance work and test</p>	<p>_____</p> <p>Date/Stamp/Signature of EWM sales partner</p> <p>_____</p> <p>Date of next maintenance work and test</p>
<p>_____</p> <p>Date/Stamp/Signature of EWM sales partner</p> <p>_____</p> <p>Date of next maintenance work and test</p>	<p>_____</p> <p>Date/Stamp/Signature of EWM sales partner</p> <p>_____</p> <p>Date of next maintenance work and test</p>
<p>_____</p> <p>Date/Stamp/Signature of EWM sales partner</p> <p>_____</p> <p>Date of next maintenance work and test</p>	<p>_____</p> <p>Date/Stamp/Signature of EWM sales partner</p> <p>_____</p> <p>Date of next maintenance work and test</p>

## 7.5 Disposing of equipment

### NOTE



#### Disposal!

In Germany, waste equipment from private households can be disposed of free of charge at local community collection points. Your local administration point can provide information on the options available. 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.

- This equipment must be disposed of in accordance with official regulations.

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

- According to European provisions (guideline 2002/96/EG of the European Parliament and the Council of January, 27th 2003), 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.

## 7.6 Meeting the requirements of RoHS

We, EWM HIGHTEC Welding GmbH Mündersbach, hereby confirm that all products supplied by us which are affected by the RoHS Directive, meet the requirements of the RoHS (Directive 2002/95/EC).

## 8 Warranty

### 8.1 General Validity

#### 3-year warranty

on all new EWM machines\*:

- Power sources
- Wire feeds
- Cooling units
- Trolleys



\* If these are operated with genuine EWM accessories (such as intermediate tube package, remote control, remote control extension cable, coolant, etc.).

#### 1-year warranty on:

- Used EWM machines
- Automation and mechanisation components
- Remote control
- Inverters
- Intermediate tube packages

#### 6-month warranty on:

- Spare parts supplied separately (such as circuit boards, ignition units)

#### Manufacturer/supplier warranty on:

- All additional parts used by EWM, but manufactured by other companies (e.g. motors, pumps, fans, torches, etc.)

Non-reproducible software errors and parts subject to mechanical ageing are excluded from the warranty (e.g. wire feed unit, wire feed rollers, replacement and spare wire feed parts, wheels, solenoid valves, workpiece leads, electrode holders, connection tubes, replacement torches and spare torch parts, mains and control leads, etc.).

These terms shall apply without affecting the customer's legal rights to a warranty and subject to our General Terms and Conditions of Business and our terms on the warranty declaration. Agreements to the contrary must be confirmed by EWM in writing.

Our General Terms and Conditions of Business are available for access anytime online at [www.ewm.de](http://www.ewm.de).

## 8.2 Warranty Declaration

### Your 3-year warranty

Regardless of statutory warranty rights and based on our General Terms and Conditions, EWM HIGHTEC WELDING GmbH provides a 3-year warranty for its welding products starting on the date of purchase. Different warranty periods apply to accessories and spare parts; please see the “General Validity” section for these periods. Parts subject to wear are naturally exempt from the warranty.

EWM guarantees the error-free condition of the products in terms of materials and processing. If the product proves to be defective in terms of materials or processing within the warranty period, you are entitled to free repair or to replacement with an appropriate product, at our discretion. On receipt by EWM the returned product becomes the property of EWM.

### Condition

The prerequisite for receiving the full 3-year warranty is simply to operate the products in accordance with the EWM operating instructions observing the relevant legal recommendations and guidelines and having annual maintenance work and testing conducted by an EWM sales partner (see “Maintenance and testing” chapter). This is because only machines that are maintained regularly function correctly in the long term.

### Making a claim

When making a claim under the warranty, please contact your EWM authorised sales partner only.

### Warranty exclusions

No warranty claims can be accepted if the EWM products in question are not operated using genuine EWM accessories (such as intermediate tube package, remote control, remote control extension cable, coolant, etc.). The warranty does not apply to products that are damaged due to accidents, misuse, improper operation, incorrect installation, use of force, disregard of the specifications and operating instructions, inadequate maintenance (see chapter “Maintenance and testing”), exterior influences, acts of God or personal misfortunes. Furthermore, it is not valid in the case of improper changes, repairs or modifications. In addition, a claim for warranty does not exist in the case of partially or completely dismantled products and interventions by persons who are not authorised by EWM, as well as in the case of normal wear.

### Limitation

All claims regarding fulfilment or non-fulfilment on the part of EWM from this declaration in connection with this product are limited as follows to the replacement of the actual damages. EWM's liability stemming from this declaration in connection with this product is fundamentally limited to the amount that the purchaser originally paid for the original purchase. This limitation does not apply to personal injuries or damage to property caused by negligent behaviour on the part of EWM. In no way will EWM be responsible for lost profits, indirect or subsequent damage. EWM is not liable for damages based on the claims of third parties.

### Place of jurisdiction

If the person making the claim is a business person, the sole place of jurisdiction for all disputes resulting directly or indirectly from the contractual relationship shall be the headquarters or the branch office of the supplier, at the discretion of the supplier. The purchaser gains ownership of the products supplied as replacements within the framework of the warranty adjustment at the time of the exchange.

## 9 Operating problems, causes and remedies

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

### 9.1 Customer checklist

Error	Possible cause	Remedy
No wire feed	Spatter has blocked the contact nozzle Feed roller is slipping Wire feed motor is not turning over Wire bent Wire coil brake too strong Torch defective	Clean nozzle, spray on separating agent Check contact pressure roller. Check for wear and tear and replace if necessary Check automatic cut-out on the wire feed motor Unfasten contact nozzle, cut off wire after bent section Set coil brake correctly Replace
Loop in wire	Core or nozzle blocked Tube package bent too much	Clean, replace if necessary Stretch out tube package
Wire feed irregular	Wire feed coils blocked or damaged Wire coil brake too strong Contact nozzle too small	Clean, replace if necessary Set coil brake correctly Check, replace if necessary
Weld seam porous	Incorrect shielding gas setting Gas cylinder empty Electrode is projecting too far forwards Air current Poor wire quality Very dirty workpiece Local overheating of the workpiece Gas line is drawing in air	Correct: Rule of thumb "Wire diameter *10 = flow in l/min" Change Move torch closer to weld seam Shield welding area Use high quality wire, store in a dry and clean location. Clean workpiece first Include occasional pauses in welding to allow the workpiece to cool down. Check seal tightness on lines, seal / replace if necessary.
Machine will not switch on	No mains voltage Power source faulty	Check the mains fuses, replace as necessary Contact service
Strong spatter	Blow effect No gas	Connect workpiece line more appropriately Set gas quantity to match the application
No welding current	Workpiece line has no or poor contact Power source overheating	Check connection Allow machine to cool down
Wire feed or gas valve faulty	Electronic control	Check line connections, replace electronics if necessary. Contact service
Mains fuse is triggered	Unsuitable mains fuse	Check mains fuse. Set up the mains fuse according to the "Technical Data" chapter.

## 9.2 Error messages (power source)

### NOTE










A welding machine error is indicated by the collective fault signal lamp (A1) lighting up and an error code (see table) being displayed in the machine control display. In the event of a machine error, the power unit shuts down.

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






























Error message	Possible cause	Remedy
E 0	No error	Ensure that torch trigger 1 is not being pressed.
E 4	Temperature error	Allow machine to cool down.
E 5	Excess mains voltage	Switch off the machine and check the mains voltage.
E 6	Insufficient mains voltage	
E 7	Electronics error	Switch the machine off and back on again. If the error persists, inform the service dept.
E 9	Secondary excess voltage	
E12	Voltage reduction error (VRD)	
E13	Electronics error	
E14	Balancing error in current recording	Switch off the machine, place the electrode holder on an insulated surface and switch the machine back on. If the error persists, inform the service dept.
E15	Error in one of the electronics supply voltages	Switch the machine off and back on again. If the error persists, inform the service dept.
E32	Electronics error	
E33	Balancing error in voltage recording	Switch off the machine, place the electrode holder on an insulated surface and switch the machine back on. If the error persists, inform the service dept.
E37	Temperature error	Allow machine to cool down.
E40	Motor fault	Check wire feed unit, switch machine off and on again, inform the service department if the fault continues.

## 9.3 Resetting the control (Reset all)

The parameters for all JOBs will be reset to factory settings!

Operating element	Action	Result	Display
		Switch off machine at the main switch.	
		Press and hold buttons for the gas test and runtime parameters.	
		Switch machine on again at the main switch.	
		Release the buttons. The parameters will be reset	

## 9.4 Display machine control software version

Operating element	Action	Result	Display
		Switch off machine at the main switch.	
<ul style="list-style-type: none"> <li> AMP</li> <li> VOLT</li> <li> </li> <li> </li> <li></li> </ul>		Press and hold welding parameter display mode button.	
		Switch machine on again at the main switch. Wait until "Elt" appears in the display. Release the welding parameter display mode button.	
		<b>Selecting the software version</b> Parameter names and software versions will alternate.	 
		Select "Exit"	
<ul style="list-style-type: none"> <li> AMP</li> <li> VOLT</li> <li> </li> <li> </li> <li></li> </ul>		<b>Confirm exit from the menu.</b> The machine will start up again.	

## 10 Accessories, options

### 10.1 General accessories

Type	Designation	Item no.
DM1 32L/MIN	Manometer pressure reducer	094-000009-00000
G1 G1/4 R 3M	Gas hose	094-000010-00003
GS16L G1/4" SW 17	Pilot static tube	094-000914-00000
GS25L G1/4" SW 17	Pilot static tube	094-001100-00000
SG2 D200 0.8MM	Solid wire, 2 kg roll	097-003313-00000
FD D200 0.9MM	Cored wire, self-shielding, 2 kg roll	097-003314-00000
ON FILTER PICOMIG 180	Retrofit option, dirt filter for air inlet	092-002553-00000

### 10.2 Welding torch, electrode holder and workpiece lead

Type	Designation	Item no.
ADAP 16/25-35 QMM	Welding current socket adapter, 16/25 to 35 mm <sup>2</sup>	094-001780-00000
WK25QMM 4M KL	Workpiece lead, clamp	092-000016-00000
EH25QMM 4M	Electrode holder	092-000017-00000
MT220G 3M EZA	MIG welding torch, gas cooled	094-013427-00000
MT220CG 3M EZA	MIG welding torch, gas cooled	094-013427-03000
TIG 150 GD 4M EZA	TIG welding torch	094-012291-04600

### 10.3 Wire feed rollers

#### 1.1.1 Wire feed rollers for steel wire

Type	Designation	Item no.
FE 2DR4R 0,6+0,8	Drive rollers, 37 mm, steel	092-000839-00000
FE 2DR4R 0,8+1,0	Drive rollers, 37 mm, steel	092-000840-00000
FE 2DR4R 0,9+1,2	Drive rollers, 37 mm, steel	092-000841-00000
FE 2DR4R 1,0+1,2	Drive rollers, 37 mm, steel	092-000842-00000
FE/AL 2GR4R	Counterpressure rollers, smooth, 37mm	092-000844-00000
URUE VERZ>UNVERZ FE/AL 4R SF	Conversion kit, 37mm, 4-roller drive on non-toothed rollers (steel/aluminium)	092-000415-00000

#### 10.3.1 Wire feed rollers for aluminium wire

Type	Designation	Item no.
AL 4ZR4R 0,8+1,0	Twin rollers, 37 mm, for aluminium	092-000869-00000
AL 4ZR4R 1,0+1,2	Twin rollers, 37 mm, for aluminium	092-000848-00000
AL 4ZR4R 1,2+1,6	Twin rollers, 37 mm, for aluminium	092-000849-00000
URUE AL 4ZR4R 1,0+1,2 SF	Conversion kit, 37 mm, 4-roller drive for aluminium	092-002266-00000
URUE AL 4ZR4R 0,8+1,0 SF	Conversion kit, 37 mm, 4-roller drive for aluminium	092-002268-00000
URUE AL 4ZR4R 1,2+1,6 SF	Conversion kit, 37 mm, 4-roller drive for aluminium	092-002269-00000

#### 10.3.2 Wire feed rollers for cored wire

Type	Designation	Item no.
ROE 2DR4R 0,8/0,9+0,8/0,9	Drive rollers, 37 mm, cored wire	092-000834-00000
ROE 2DR4R 1,0/1,2+1,4/1,6	Drive rollers, 37 mm, cored wire	092-000835-00000
ROE 2GR4R	Counterpressure rollers, knurled, 37mm	092-000838-00000
URUE ROE 2DR4R 0,8/0,9+0,8/0,9 SF	Conversion kit, 37 mm, 4-roller drive for cored wire	092-000410-00000
URUE ROE 2DR4R 1,0/1,2+1,4/1,6 SF	Conversion kit, 37 mm, 4-roller drive for cored wire	092-000411-00000



12 Appendix A  
12.1 Declaration of Conformity

 <p><b>SIMPLY MORE</b></p>	<h2>EG - Konformitätserklärung</h2> <p>EC – Declaration of Conformity Déclaration de Conformité CE</p>
<b>Name des Herstellers:</b> Name of manufacturer: Nom du fabricant:	<b>EWM HIGHTEC WELDING GmbH</b> (nachfolgend EWM genannt) (In the following called EWM) (nommé par la suite EWM)
<b>Anschrift des Herstellers:</b> Address of manufacturer: Adresse du fabricant:	<b>Dr.- Günter - Henle - Straße 8</b> <b>D - 56271 Mündersbach – Germany</b> <b>info@ewm.de</b>
<b>Hiermit erklären wir, daß das bezeichnete Gerät in seiner Konzeption und Bauart sowie in der von uns in Verkehr gebrachten Ausführung den grundlegenden Sicherheitsanforderungen der unten genannten EG- Richtlinien entspricht. Im Falle von unbefugten Veränderungen, unsachgemäßen Reparaturen Nichteinhaltung der Fristen zur Wiederholungsprüfung und / oder unerlaubten Umbauten, die nicht ausdrücklich von EWM autorisiert sind, verliert diese Erklärung ihre Gültigkeit.</b>	<p>We hereby declare that the machine below conforms to the basic safety requirements of the EC Directives cited both in its design and construction, and in the version released by us. This declaration shall become null and void in the event of unauthorised modifications, improperly conducted repairs, non-observance of the deadlines for the repetition test and/or non-permitted conversion work not specifically authorised by EWM.</p> <p>Par la présente, nous déclarons que le poste, dans sa conception et sa construction, ainsi que dans le modèle mis sur le marché par nos services ci-dessous, correspondent aux directives fondamentales de sécurité énoncées par l'CE et mentionnées ci-dessous. En cas de changements non autorisés, de réparations inadéquates, de non-respect des délais de contrôle en exploitation et/ou de modifications prohibées n'ayant pas été autorisés expressément par EWM, cette déclaration devient caduque.</p>
<b>Gerätebezeichnung:</b> Description of the machine: Description de la machine:	_____
<b>Gerätetyp:</b> Type of machine: Type de machine:	_____
<b>Artikelnummer EWM:</b> Article number: Numéro d'article	_____
<b>Seriennummer:</b> Serial number: Numéro de série:	_____
<b>Optionen:</b> Options: Options:	<b>keine</b> none aucune
<b>Zutreffende EG - Richtlinien:</b> Applicable EU - guidelines: Directives de la CE applicables:	<b>EG - Niederspannungsrichtlinie (2006/95/EG)</b> EC – Low Voltage Directive (2006/95/EG) Directive CE pour basses tensions (2006/95/EG) <b>EG- EMV- Richtlinie (2004/108/EG)</b> EC – EMC Directive (2004/108/ EG) Directive CE EMV (2004/108/EG)
<b>Angewandte harmonisierte Normen:</b> Used co-ordinated norms: Normes harmonisées appliquées:	EN 60974 / IEC 60974 / VDE 0544 EN 50199 / VDE 0544 part 206 GOST-R
<b>Hersteller - Unterschrift:</b> Manufacturer's signature: Signature du fabricant:	
	<b>Michael Szczesny , Geschäftsführer</b> managing director gérant
	01.2007

**13 Appendix B**  
**13.1 JOB-List**

<b>EWM</b> / HIGHTEC WELDING		<b>JOB-LIST</b>		094-014428-00000			
<b>● Massivdraht</b>	⊗ <b>Material</b>	⚗ <b>Gas</b>	⊘ Wire				<b>● Solid Wire</b>
			0,6	0,8	1,0	1,2	
			Job-Nr.				
	SG2/3 G3/4 Si1	CO <sub>2</sub> 100 / C1	176	1	3	4	
		Ar80 - 90 / M21	175	6	8	9	
	CrNi	Ar91 - 99 / M12		34	35		
		Ar/He / I3		42	43		
	CuSi Löten / Brazing	Ar100 / I1		114	115	116	
		Ar91 - 99 / M12		110	111	112	
	AlMg	Ar100 / I1		74	75	76	
AlSi	Ar100 / I1		82	83	84		
Al99	Ar100 / I1		90	91	92		
<b>⊗ Fülldraht</b>	⊗ <b>Material</b>	⊗ <b>Self-Shielded</b>	⊘ Wire				<b>⊗ Flux-Cored Wire</b>
			0,9	1,0	1,1	1,2	
			Job-Nr.				
	E71T-11		172		171	170	
<b>MSG non synergic</b>		188					
<b>WIG / TIG</b>		127					
<b>E-Hand / MMA</b>		128					

Figure 13-1