



EWM / **HIGHTEC[®]**
WELDING

SIMPLY MORE

EWM
HIGHTEC WELDING GmbH

Dr. Günter - Henle - Straße 8 • D-56271 Mündersbach

Phone: +49 2680 181 0 • Fax: +49 2680 181 244

www.ewm.de • info@ewm.de

GB Operating instructions

Welding machines for MMA welding

PICO 162

PICO 162 MV



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.



SIMPLY MORE

Dear customer,

Congratulations! You have chosen a quality product from EWM HIGHTEC WELDING GmbH.

EWM machines provide results of the highest perfection thanks to their PREMIUM quality. Therefore we are happy to provide you with a full 3-year warranty according to our operating instructions.

We develop and produce quality! From individual components to the final product, we retain sole responsibility for our machines.

In all their high-tech components, our welding machines embody future-oriented advanced technology at the utmost level of quality. Each of our products is carefully checked; we guarantee that the material and processing of our products is faultless.

These operating instructions contain everything about commissioning the machine, notes regarding safety, maintenance and care, technical data as well as information regarding the warranty. Please heed all these notes to ensure many years of safe operation of the machine.

Thank you for the trust that you have placed in us. We look forward to a long-term partnership with you in the spirit of "ONCE EWM – ALWAYS EWM".

Yours sincerely,

EWM HIGHTEC WELDING GmbH

A handwritten signature in black ink, appearing to read "B. Szczesny", written in a cursive style.

Bernd Szczesny
Executive management



Please enter the EWM machine data and your company's data in the appropriate fields.

EWM HIGHTEC® WELDING		EWM HIGHTEC WELDING GMBH D-56271 MÜNDERSBACH	
TYP:		SNR:	
ART:		PROJ:	
GEPRÜFT/CONTROL:		CE	

Name of Customer / company

Adress

Post code / Place

Country

Stamp / Signature of EWM-distibutor

Date of purchase

Name of Customer / company

Adress

Post code / Place

Country

Stamp / Signature of EWM-distibutor

Date of purchase

1 Contents

1	Contents	4
2	Safety instructions	6
2.1	For your safety	6
2.2	Transport and installation	8
2.2.1	Ambient conditions	8
2.3	Notes on the use of these operating instructions	9
3	Technical data	10
3.1	PICO 162, PICO 162 MV	10
4	Machine description	11
4.1	PICO 162, PICO 162 MV	11
4.1.1	Front view	11
4.1.2	Rear view	12
5	Functional characteristics	13
5.1	Machine control – Operating elements	13
5.2	MMA welding	13
5.2.1	Selecting MMA welding	13
5.2.2	Arcforcing	13
5.2.3	Hotstart device	13
5.2.4	Antistick	14
5.3	TIG welding	14
5.3.1	TIG welding selection	14
5.3.2	TIG arc ignition	14
6	Commissioning	15
6.1	General	15
6.2	Area of application – proper usage	15
6.3	Installation	15
6.4	Mains connection	15
6.4.1	PICO 162, PICO 162 MV	15
6.5	Machine cooling	15
6.5.1	Dirt filter	16
6.6	Workpiece lead, general	16
6.7	MMA welding	17
6.7.1	PICO 162, PICO 162 MV	17
6.7.1.1	Electrode holder connection	17
6.7.1.2	Connection for workpiece lead	17
6.8	TIG welding	18
6.8.1	PICO 162, PICO 162 MV	18
6.8.1.1	Connecting a TIG welding torch with rotating gas valve	18
6.8.1.2	Connection for workpiece lead	18
6.8.1.3	Shielding Gas Supply	19

7	Maintenance and testing	20
7.1	General	20
7.2	Cleaning	20
7.3	Test	20
7.3.1	Test equipment	20
7.3.2	Scope of the test	21
7.3.3	Visual inspection	21
7.3.4	Measuring the open circuit voltage	21
7.3.5	Measurement of insulation resistance	21
7.3.6	Measuring the leakage current (protective conductor and contact current)	22
7.3.7	Measurement of protective conductor resistance	22
7.3.8	Functional test of the welding machine	22
7.3.9	Documentation of the test	22
7.4	Repair Work	23
7.5	Disposing of equipment	24
7.5.1	Manufacturer's declaration to the end user	24
7.6	Meeting the requirements of RoHS	24
8	Warranty	25
8.1	General Validity	25
8.2	Warranty Declaration	26
9	Operating problems, causes and remedies	27
9.1	General	27
9.2	Error messages (power source)	27
9.3	Customer checklist	28
10	Spare parts list	29
10.1	PICO 162, PICO 162 MV	29
10.1.1	Front view	29
10.1.2	Rear view	30
10.1.3	Inside view	31
11	Accessories, options	32
11.1	MMA welding	32
11.2	TIG welding	32
11.3	Options	32
11.4	General accessories	32
12	Circuit diagrams	33
12.1	PICO 162	33
12.2	PICO 162 MV	34
13	Appendix A	35
13.1	Declaration of Conformity	35

2 Safety instructions

2.1 For your safety



Observe accident prevention regulations!
Ignoring the following safety procedures can be fatal!

Proper usage

This machine has been manufactured according to the latest developments in technology and current regulations and standards. It is to be operated only for the use for which it was designed (see chapter Commissioning/Area of application).

Improper usage

However, this machine may be a hazard to persons, animals and property if it is

- not used as directed
- used by unskilled persons who have not been trained
- modified or converted improperly



Our operating instructions will provide you with an introduction into the safe use of the machine. Therefore please read them carefully and only start work when you are familiar with them.

Any person involved in the operation, maintenance and repair of this machine must read and follow these operating instructions, especially the safety precautions. Where appropriate, this should be confirmed by signature.

Furthermore, the

- relevant accident prevention regulations,
- generally accepted safety regulations,
- local regulations, etc. must be observed.



Before undertaking welding tasks, put on prescribed dry protective clothing, e.g. gloves.

- Protect eyes and face with protective visor.



Electric shocks can be fatal!

- Do not touch any live parts in or on the machine!
- The machine may only be connected to correctly earthed sockets.
- Only operate with intact connection lead including protective conductor and safety plug.
- An improperly repaired plug or damaged mains cable insulation can cause electric shocks.
- The machine may only be opened by qualified and authorised specialist staff.
- Disconnect from the mains before opening. Switching off is not sufficient. Wait for 2 minutes until the capacitors have discharged.
- Always put down welding torch, stick electrode holder in an insulated condition.
- The machine must not be used to defrost pipes!



Even touching low voltages can cause you to get a shock and lead to accidents, so:

- Protect yourself from falling before working on platforms or scaffolding.
- During welding ensure that you operate earth tongs, torch and workpiece correctly, and not in ways for which they are not intended. Do not touch live parts with bare skin.
- Only replace electrodes when wearing dry gloves.
- Never use torches or earth cables with damaged insulation.



Smoke and gases can lead to breathing difficulties and poisoning.

- Do not breathe in smoke and gases.
- Ensure that there is sufficient fresh air.
- Keep solvent vapours away from the arc radiation area. Chlorinated hydrocarbon fumes can be converted into poisonous phosgene by ultraviolet radiation.



Workpiece, flying sparks and droplets are hot!

- Keep children and animals well away from the working area. Their behaviour is unpredictable.
- Move containers with inflammable or explosive liquids away from the working area. There is a danger of fire and explosion.
- Never heat explosive liquids, dusts or gases by welding or cutting. There is also a danger of explosions when apparently harmless substances develop high pressures in enclosed containers by heating.



Take care to avoid fire hazards

- Any kind of fire hazards must be avoided. Flames can form e.g. when sparks are flying, when parts are glowing or hot slag is present.
- A constant check must be kept on whether fire hazards have arisen in the working area.
- Highly inflammable objects, such as matches and cigarette lighters for example, must not be carried in trouser pockets.
- You must ensure that fire extinguishing equipment - appropriate for the welding process - is available close to the welding work area and that this equipment can be accessed easily.
- Containers in which fuels or lubricants have been present must be thoroughly cleaned before welding begins. It is not sufficient simply for the receptacle to be empty.
- After a workpiece has been welded, it must only be touched or brought into contact with inflammable material when it has cooled down sufficiently.
- Loose welding connections can completely destroy protective conductor systems of interior installations and cause fires. Before beginning welding work, ensure that the earth tongs are properly fixed to the workpiece or welding bench and that there is a direct electrical connection from the workpiece to the power source.



Noise exceeding 70 dBA can cause permanent hearing damage!

- Wear suitable earmuffs or plugs.
- Ensure that other people who spend time in the working area are not inconvenienced by the noise.



Interference by electrical and electromagnetic fields is possible e.g. from the welding machine or from the high-voltage pulses of the ignition unit.

- As laid down in Electromagnetic Compatibility Standard EN 50199, the machines are intended for use in industrial areas; if they are operated in residential environments, for example, problems may occur in ensuring electromagnetic compatibility.
- The functioning of heart pacemakers can be adversely affected when you are standing near the welding machine.
- It is possible that electronic equipment (e.g. EDP, CNC equipment) in the vicinity of the welding site could malfunction.
- Other mains supply leads, control leads, signal and telecommunications leads above, under and near the welding device may be subject to interference.



Electromagnetic interference must be reduced to a level that no longer constitutes interference.

Possible reduction measures:

- Welding machines must be serviced regularly. (see Chap. Maintenance and care)
- Welding leads should be as short as possible and run closely together on or near to the ground.
- Selective shielding of other leads and equipment in the environment can reduce radiation.



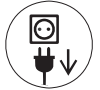
Repair and modifications may only be carried out by authorised, trained, specialist staff.

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

2.2 Transport and installation



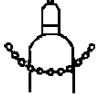
The machines may only be transported and operated in an upright position.



Before carrying away or moving, pull out mains plug and place on the machine.



When setting up the machine, resistance to tilting is only guaranteed up to an angle of 10° (as specified in EN 60974-1).



Secure the gas cylinder!

- Place shielding gas cylinders in the holders provided for them and secure with safety chains.
- Take care when handling cylinders; do not throw or heat, guard against them toppling over.
- When moving by crane, take off the gas cylinder from the welding machine.

2.2.1 Ambient conditions

This machine must not be operated in any area where any risk of explosion exists. The following conditions must be observed during operation:

Temperature range of the ambient air

- During welding: -10°C to +40°C *)
 - For transport and storage: -25°C to +55°C *)
- *) Using the appropriate coolant.

Relative air humidity

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

The ambient air must be free of unusual amounts of dust, acids, corrosive gases or substances, etc., assuming these are not produced by the welding process.

Examples of unusual operating conditions:

- unusual corrosive smoke,
- vapour,
- excessive oil vapour,
- unusual vibrations or jolts,
- excessive quantities of dust such as grinding dust etc.,
- severe weather conditions,
- unusual conditions near the coast or on board ship.

When setting up the machine, ensure a free inlet and outlet of air.

The machine is tested to protection class IP23, i.e.:

- Protection against penetration of solid foreign bodies $\varnothing > 12\text{mm}$,
- Protection against water spray up to an angle of 60° to the vertical.

2.3 Notes on the use of these operating instructions

These operating instructions are arranged into chapters.

To help you find your way around more quickly, in the margins you will occasionally see symbols along with the sub-headings. These symbols refer to particularly important passages of text which are graded as follows depending on their importance:



Please note:

Technical features which users must observe.



Warning:

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



Caution:

Working and operating procedures which must be followed precisely to avoid risk to persons and includes the "Warning" symbol.

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

3 Technical data

3.1 PICO 162, PICO 162 MV

PICO range	PICO 162		PICO 162 MV (115 V)	
	PICO 162 MV (230 V)		PICO 162 MV (115 V)	
Setting range:				
TIG	Welding current Welding voltage		10 A to 120 A 10.4 V to 14.8 V	
MMA	Welding current Welding voltage		10 A to 110 A 20.4 V to 24.4 V	
Duty cycle at 20 °C	TIG	MMA	TIG	MMA
40 %	-	-	-	110 A
45 %	160 A	-	-	-
50 %	-	150 A	-	-
60 %	-	-	120 A	90 A
100 %	120 A	120 A	100 A	80 A
Duty cycle at 40 °C				
30 %	160 A	-	-	-
35 %	-	150 A	-	110 A
60 %	130 A	120 A	120 A	90 A
100 %	100 A	100 A	100 A	80 A
Load alternation	10 min (60% DC \triangleq 6 min welding, 4 min idle)			
Open circuit voltage	105 V			
Mains voltage (tolerances)	1 x 230 V (-40% to +15%) (162 mV: -20% to +15%) 1 x 240 V (-40% to +10%) (162 mV: -20% to +10%)		1 x 115 V (-15% to +15%) 1 x 110 V (-15% to +20%)	
Frequency	50/60 Hz			
Mains fuse (safety fuse, slow-blow)	16 A		25 A	
Mains connection lead	H07RN-F3G2.5			
Max. connected power	6 kVA			
Recommended generator rating	8.1 kVA			
cosϕ at I_{max} / efficiency	0.99 / 88%			
Insulation class / protection classification	H / IP 23			
Ambient temperature	-10°C to +40°C			
Machine cooling / torch cooling	Fan / Gas			
Workpiece lead	16 qmm			
Dimensions L/W/H	365 x 116 x 224 mm			
Weight	4.8 kg (PICO 162 MV: 5.1 kg)			
Constructed to standards	IEC 60974 / EN 60974 / VDE 0544 EN 50199 / VDE 0544 Part 206 ☐ / C E			

4 Machine description

4.1 PICO 162, PICO 162 MV

4.1.1 Front view



Figure 4-1

Item	Symbol	Description
1		Carrying strap
2		Control / Operating elements (see chapter Function specification)
3	+	Connection socket, "+" welding current Workpiece lead or electrode holder connection
4		Cooling air outlet
5		Machine feet
6	-	Connection socket, "-" welding current <ul style="list-style-type: none"> MMA welding: Electrode holder or workpiece lead connection TIG welding: Welding current lead connection for TIG welding torch

Machine description

PICO 162, PICO 162 MV

4.1.2 Rear view

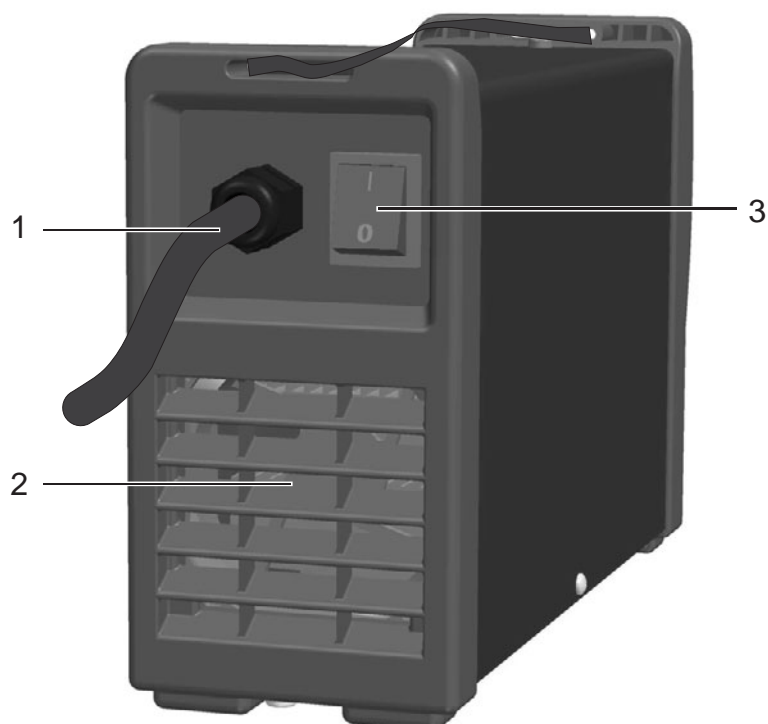



Figure 4-2

Item	Symbol	Description
1		Strain relief with mains connection cable
2		Cooling air inlet
3		Main switch, machine on/off

5 Functional characteristics

5.1 Machine control – Operating elements



Figure 5-1

Item	Symbol	Description
1		Welding current rotary dial Infinite adjustment of the welding current from 10A to maximum current
2		Welding process changeover switch <ul style="list-style-type: none"> • = MMA welding • = TIG welding
3		"Ready for operation" signal light Signal light on when the machine is switched on and ready for operation
4		"Functional error" signal light For error messages, see chapter on Troubleshooting, causes and remedies

5.2 MMA welding

5.2.1 Selecting MMA welding

Operating element	Action	Result
		MMA welding process selected
		Main current setting

5.2.2 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.

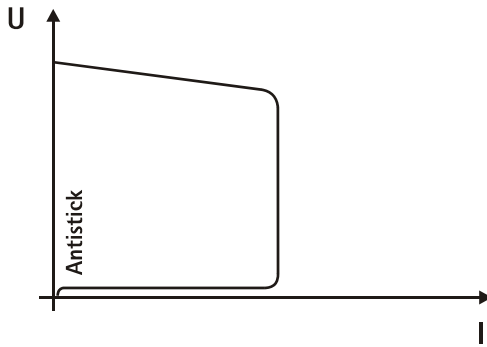
5.2.3 Hotstart device



The hotstart device uses an increased ignition current to improve arc ignition. There are presets for the optimum hotstart current and hotstart time parameters on the machine.

After striking the stick electrode, the arc will ignite with the hotstart current and will then drop to the main current setting.

5.2.4 Antistick




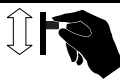

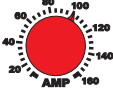

Anti-stick prevents the electrode from annealing.

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 5-2

5.3 TIG welding

5.3.1 TIG welding selection

Operating Element	Action	Result
		TIG  welding process selected
		Main current setting

5.3.2 TIG arc ignition

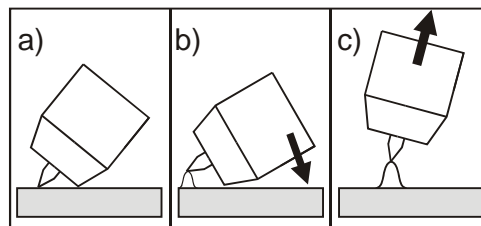


Figure 5-3

The arc is ignited on contact with the workpiece:

- Carefully place the torch gas nozzle and tungsten electrode tip onto the workpiece (liftarc current flowing, regardless of the main current set).
- Incline the torch towards the torch gas nozzle until there is a gap of approx. 2-3mm between the tip of the electrode and the workpiece (arc ignites, current increases to the main current set).
- Lift off the torch and swivel to the normal position.

Ending the welding process: Remove the torch from the workpiece until the arc goes out.

6 Commissioning

6.1 General



Warning – Risk from electrical current!

Follow the safety instructions on the opening pages entitled “For your safety”.

Connection and welding leads (e.g. electrode holder, welding torch, workpiece lead, interfaces) may only be connected when the machine is switched off.

6.2 Area of application – proper usage

This welding machine is suitable only for MMA and TIG welding with liftarc.

- MMA direct current welding for rutile, rutile/basic, basic and rutile/cellulose electrode types. Any other use is regarded as “improper” and no liability is assumed for any damage arising therefrom.

6.3 Installation



Ensure that the machine is set up in a stable position and is appropriately secured.

With modular systems (power source, transport vehicle, cooling module), observe the operating instructions for the relevant machine.

Set up the machine so that there is sufficient room to adjust the operating elements.

6.4 Mains connection



The operating voltage shown on the rating plate must match the mains voltage.

For mains fuse protection, please refer to the “Technical Data” chapter.

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

6.4.1 PICO 162, PICO 162 MV



The correct mains plug must be attached to the mains supply lead on the machine.

The connection must be made by a qualified electrician in compliance with the relevant local laws and regulations.

The phase sequence for three-phase machines is optional and has no effect on the fans direction of rotation.

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.

6.5.1 Dirt filter



These accessory components can be retrofitted as an option, see Accessories chapter.

The dirt filter can be used in places with unusually high levels of dirt and dust in the ambient air. The filter reduces the duty cycle of the welding machine via the reduced flow of cooling air. The filter must be disassembled and cleaned regularly depending on the level of dirt (blow out with compressed air).

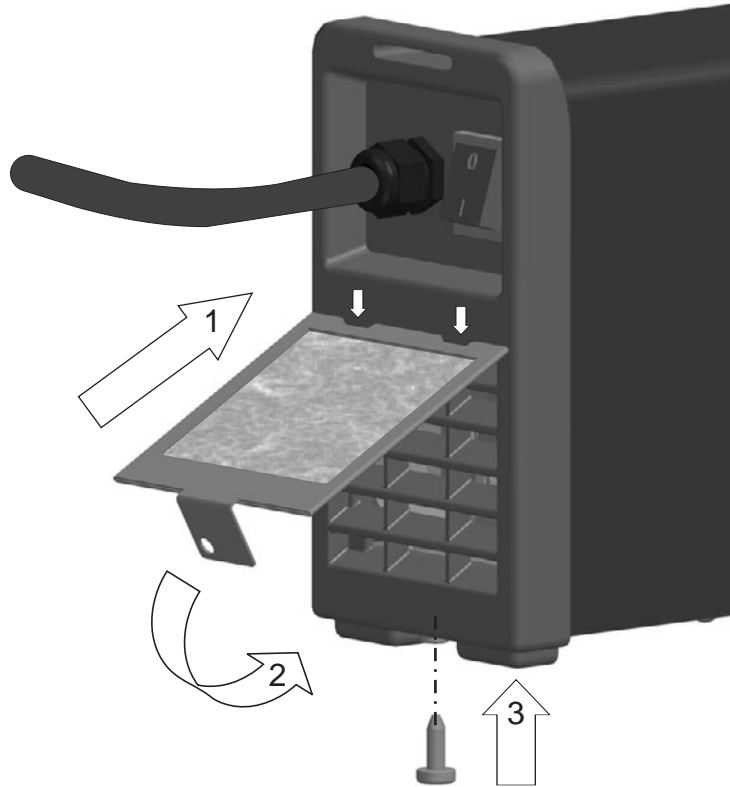


Figure 6-1

- As shown in the diagram, insert the dirt filter into the rear of the machine, above the air inlet, using both clips (1).
- Fold down the dirt filter (2).
- Fasten the dirt filter to the underside of the machine (3) using fixing screws.

6.6 Workpiece lead, general



Remove paint, rust and dirt from clamping and welding areas with a wire brush. The workpiece clamp must be mounted near the welding point and must be fixed in such a way that it cannot come loose of its own accord.

Structural parts, pipes, rails etc. may not be used as return leads for the welding current unless they are part of the actual workpiece.

Correct current connection must be ensured when using welding benches and appliances.

6.7 MMA welding

6.7.1 PICO 162, PICO 162 MV



Figure 6-2

Item	Symbol	Description
1	+	Connection socket, “+” welding current Workpiece lead or electrode holder connection
2	-	“-” Welding current connection socket Electrode holder or workpiece lead connection

6.7.1.1 Electrode holder connection



Caution: Risk of injury from crushing!

Suitable protective gloves should be worn when changing spent stick electrodes.

When pausing work, always place the electrode holder on an insulated surface.

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



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

6.7.1.2 Connection for workpiece lead

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



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

6.8 TIG welding

6.8.1 PICO 162, PICO 162 MV



Figure 6-3

Item	Symbol	Description
1	+	Connection socket, “+” welding current Connection for workpiece lead
2	-	“-” Welding current connection socket TIG welding torch welding current lead connection

6.8.1.1 Connecting a TIG welding torch with rotating gas valve



When pausing work, always place the welding torch on an insulated surface.

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

The welding torch shielding gas is supplied directly from the shielding gas cylinder.

- Fit the tungsten electrode and gas nozzle onto the welding torch (observe current load, see torch operating instructions).
- Insert the welding current plug into the “-” welding current connection socket and lock by turning to the right.

6.8.1.2 Connection for workpiece lead

- Insert cable plug of the workpiece lead into the “+” or “-” welding current socket and lock by turning to the right.



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

6.8.1.3 Shielding Gas Supply



No dirt must be allowed to enter the shielding gas supply, as this would cause blockages in the shielding gas supply. All shielding gas connections must be gastight.

- Place shielding gas cylinder in the retainer provided for it and secure with chains.
- Before connecting the pressure reducer to the gas cylinder, open the cylinder valve briefly to blow out any dirt.
- Mount the pressure reducer onto the gas cylinder valve.
- Screw the gas hose of the welding torch tightly to the pressure regulator.
- Slowly open the gas cylinder valve.
- Open the rotating valve on the welding torch
- Set the required amount of shielding gas on the pressure reducer, about 4 - 15 l/min depending on the current strength and the material.



Rule of thumb for gas flow rate:

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

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

Before each welding process, the rotating valve must be opened; after the welding process, it must be closed.

7 Maintenance and testing



The maintenance, cleaning and testing work described below must be conducted correctly and on an annual basis in order to be entitled to claim under the EWM warranty.

7.1 General

Under the indicated environmental conditions and normal operating conditions, this machine is largely maintenance-free and requires minimum care. However, a number of points 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 level of contamination in the environment and the usage time of the welding machine.



Cleaning, testing and repairing of the welding machines may only be carried out by competent, capable personnel. A capable person is one who, due to training, knowledge and experience, is able to recognise the dangers that can occur during testing of 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



Before cleaning, carefully disconnect the machine from the mains. DISCONNECT THE MAINS PLUG!

(Switching off or removing the fuse does not provide adequate insulation protection.)

Wait 2 minutes until the capacitors are discharged. Remove the casing cover.

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 instead use suction from a vacuum cleaner for cleaning purposes.

Coolant: Check for impurities and replace if necessary.

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

7.3 Test

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 firstly, international, and secondly, specific to arc welding equipment.



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



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.



The following description of the test is only a brief overview of the products to be tested. For details on 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

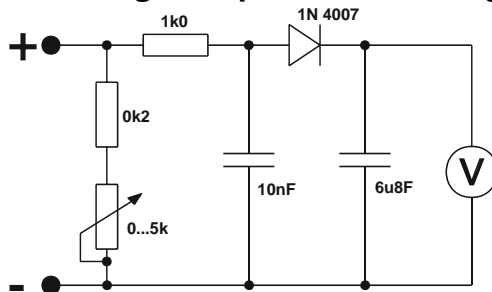
- a) Visual inspection
- b) Electrical test: measurement of
 - open circuit voltage
 - insulation resistance, or alternatively
 - leakage currents
 - protective conductor resistance
- c) Functional test
- d) Documentation

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 k Ω to 5 k Ω during the measurement. The measured voltage should not deviate from that specified on the rating plate by more than +/- 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 M Ω
Welding current circuit and electronics	against	Protective conductor circuit (PE)	2.5 M Ω
Mains current circuit	against	Protective conductor circuit (PE)	2.5 M Ω

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 50/60Hz. 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.

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

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

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 0.3Ω up to 5m in length. For longer leads, the permissible value increases by 0.1Ω per 7.5m of lead. The maximum permissible value is 1Ω.

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



This machine does not belong in household waste, in accordance with the German Law on Electrical Equipment Waste.

In Germany, waste equipment from private households can be disposed of free of charge at local community collection points. Your administrative office will be pleased to inform you of the options. 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, within Europe the machine can also be returned to your EWM sales partner.

7.5.1 Manufacturer's declaration to the end user

- In accordance with European guidelines (Directive 2002/96/EC from the European Parliament and the Council of 27.01.03), it is no longer permissible to dispose of used electrical and electronic equipment in unsorted household waste collections. It must be kept separate from other waste. The symbol on the wheeled bins indicates the requirement to separate this waste. Help to protect the environment and ensure that this equipment, when you no longer want to use it, is disposed of in the relevant system of separated waste disposal.
- In Germany, (German Law on the Distribution, Return and Environmentally-Friendly Disposal of Electrical and Electronic Equipment (ElektroG) of 16.03.05) you are required to take old equipment to a waste collection point separated from household waste. The public waste disposal contractor (local authorities) have set up collection points for this purpose where old equipment from private households in your area can be collected for you free of charge. It is also possible that the legally responsible waste disposal company will collect old equipment from private households.
- Please obtain the relevant information from your local waste calendar or from your town council or local authority on the options available in your area for returning or collecting old equipment.

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.

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

9.1 General

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.



9.2 Error messages (power source)



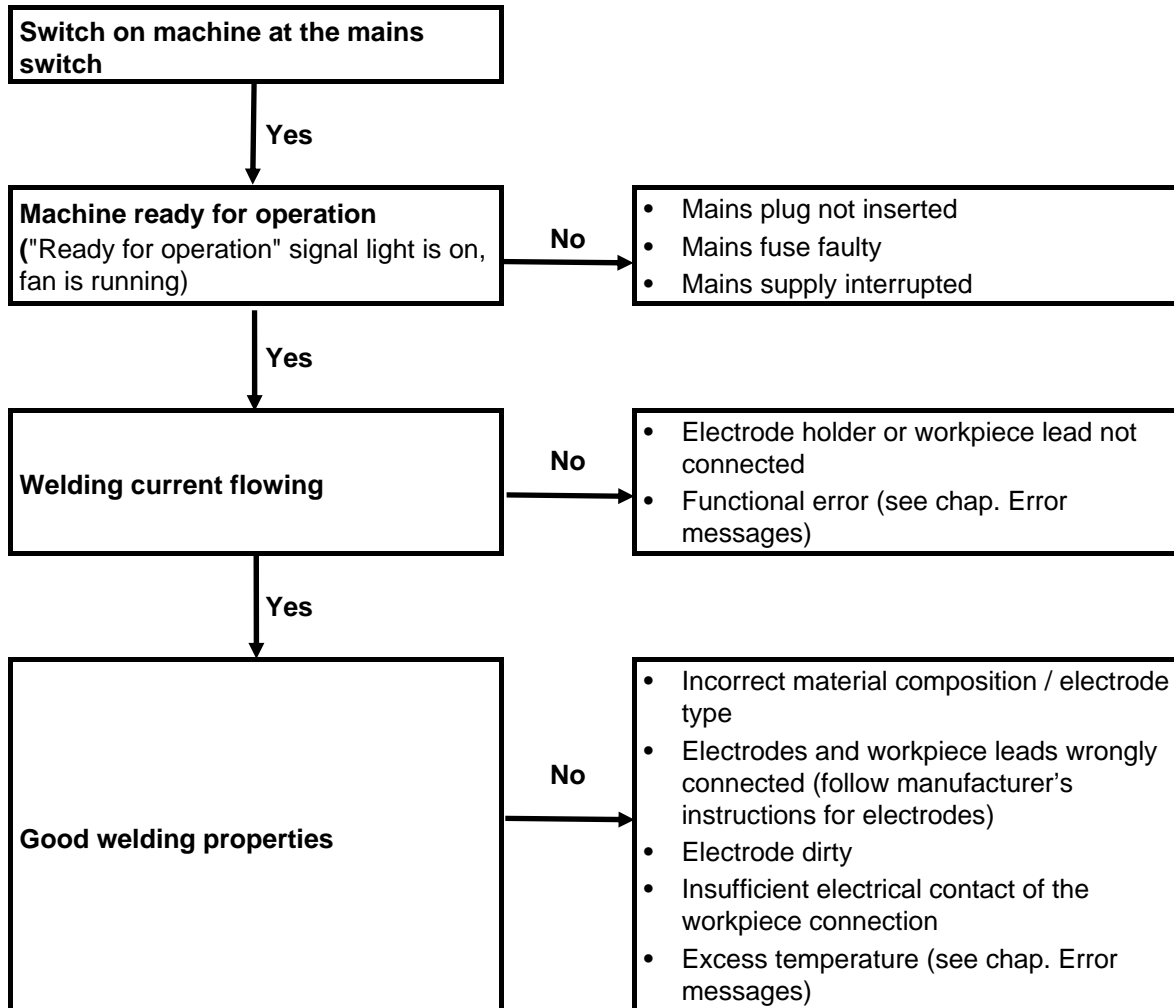
Item	Description
1	"Ready for operation" signal light
2	Functional error" signal light

Figure 9-1

The following functional errors are indicated:

Error display	Meaning	Possible cause	Fault elimination
 on	Excess temperature	Duty cycle of the machine has been exceeded.	Allow the machine to cool down whilst still switched on.
 flashing	Overvoltage (primary)	Main supply voltage too high (e.g. during generator operation).	Check mains supply voltage and correct as necessary (replace generator if necessary).

9.3 Customer checklist



10 Spare parts list

10.1 PICO 162, PICO 162 MV

10.1.1 Front view



Figure 10-1

Item	Designation	Type	Item Number
1	40 x 1500 mm	Carrying strap	094-007543-00000
2	2523060	Rotary dial	074-000315-00000
	4123002	Lid	074-000315-00001
	4223002	Arrow indicator	074-000315-00002
3	BH302 X 199 X 110-EWM	Hood	094-009535-00001
4	KFG223.5 X 115.5 X 42	Casing front panel, plastic	094-009531-00000
5	CX30/10-25 qmm	Built-in socket	094-000062-00000

10.1.2 Rear view

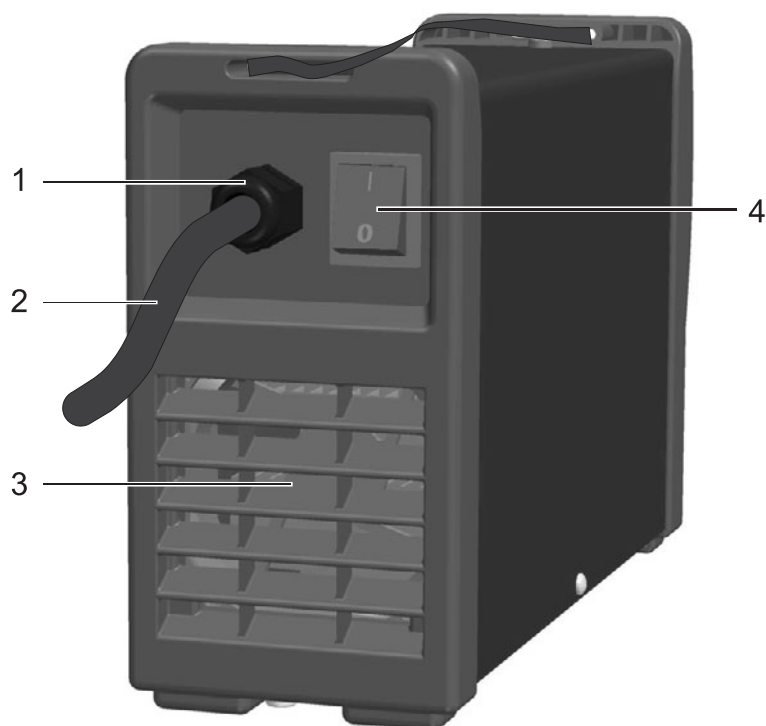


Figure 10-2

Item	Designation	Type	Item Number
1	Strain relief, cap nut	M20 X 1.5 SIZE THREADED JOINT METR.	094-007871-00000
	Lock nut	M20 X 1.5 7035 LOCK NUT METR.	094-007878-00000
2	Mains cable	MAINS CABLE 3 X 2.5 qmm/3.5 m SHOCK-PROOF	094-010342-00000
3	Casing back panel, plastic	BRG257.5 X 185 X 44	094-009532-00000
4	Mains switch (PICO 162)	ROCKER, 2-POLE 250V/20A	094-008045-00000
	Mains switch (PICO 162 MV)	ROCKER, 2-POLE/2XUM	094-010053-10000

10.1.3 Inside view

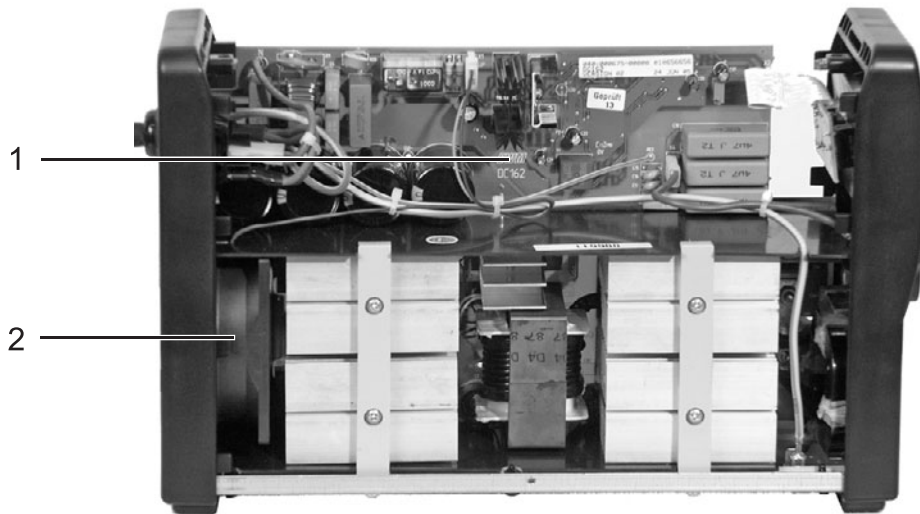


Figure 10-3

Item	Description	Type	Item Number
1	PCB (PICO 162)	PCB INVERTER BOARD	040-000675-E0000
	PCB (PICO 162 MV)	PCB INVERTER BOARD	040-000692-E0000
2	Fan	3612KL-05W-B50-E00	094-009798-10000

11 Accessories, options

11.1 MMA welding

Type	Description / Name	Item number
EH16 QMM 4M	Electrode holder	094-005313-00000

11.2 TIG welding

Type	Description / Name	Item number
TIG 17 GDV 4M	TIG welding torch, rotary gas valve, gas, decentral	094-007866-00000
DM1 32L/MIN	Manometer pressure reducer	094-000009-00000

11.3 Options

Type	Description / Name	Item number
ON FILTER	Retrofit option, dirt filter for air inlet	092-002072-00000

11.4 General accessories

Type	Description / Name	Item number
ADAP 16/25-35 QMM	Welding current socket adapter from 16/25 to 30 QMM	094-001780-00000
ADAP SCHUKO/16ACEE	Earth contact coupling on CEE16A plug	092-000812-00000
WK16QMM 4M KL	Workpiece lead, clamp	094-005314-00000

13 Appendix A
13.1 Declaration of Conformity

		<h2 style="text-align: center;">EG - Konformitätserklärung</h2> <p style="text-align: center;">EC – Declaration of Conformity Déclaration de Conformité CE</p>	
<p>Name des Herstellers: Name of manufacturer: Nom du fabricant:</p>		<p>EWM HIGHTEC WELDING GmbH (nachfolgend EWM genannt) (In the following called EWM) (nommé par la suite EWM)</p>	
<p>Anschrift des Herstellers: Address of manufacturer: Adresse du fabricant:</p>		<p>Dr.- Günter - Henle - Straße 8 D - 56271 Mündersbach – Germany info@ewm.de</p>	
<p>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.</p>		<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>Gerätebezeichnung: Description of the machine: Description de la machine:</p>		<p>_____</p>	
<p>Gerätetyp: Type of machine: Type de machine:</p>		<p>_____</p>	
<p>Artikelnummer EWM: Article number: Numéro d'article</p>		<p>_____</p>	
<p>Seriennummer: Serial number: Numéro de série:</p>		<p>_____</p>	
<p>Optionen: Options: Options:</p>		<p>keine none aucune</p>	
<p>Zutreffende EG - Richtlinien: Applicable EU - guidelines: Directives de la CE applicables:</p>		<p>EG - Niederspannungsrichtlinie (2006/95/EG) EC – Low Voltage Directive (2006/95/EG) Directive CE pour basses tensions (2006/95/EG)</p> <p>EG- EMV- Richtlinie (2004/108/EG) EC – EMC Directive (2004/108/ EG) Directive CE EMV (2004/108/EG)</p>	
<p>Angewandte harmonisierte Normen: Used co-ordinated norms: Normes harmonisées appliquées:</p>		<p>EN 60974 / IEC 60974 / VDE 0544 EN 50199 / VDE 0544 part 206 GOST-R</p>	
<p>Hersteller - Unterschrift: Manufacturer's signature: Signature du fabricant:</p>			
		<p>Michael Szczesny , Geschäftsführer managing director gérant</p>	
		<p>01.2007</p>	