



**EN**

## Power source

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Tetrix 230 DC Comfort 2.0 puls TM  
Tetrix 230 AC/DC Comfort 2.0 puls TM

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# General instructions

## WARNING



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

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

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



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

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

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

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

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

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## 2 For your safety

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

#### **DANGER**

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

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

#### **WARNING**

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

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

#### **CAUTION**

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

- The safety information includes the "CAUTION" keyword in its heading with a general warning symbol.
- The risk is explained using a symbol on the edge of the page.



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

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

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

## 2.2 Explanation of icons

Symbol	Description
	Indicates technical aspects which the user must observe.
	Switch off machine
	Switch on machine
	Wrong
	Correct
	Menu entry
	Navigating the menu
	Exit menu
	Time representation (e.g.: wait 4 s/activate)
	Interruption in the menu display (other setting options possible)
	Tool not required/do not use
	Tool required/use

Symbol	Description
	Activate and release/tap/tip
	Release
	Press and keep pressed
	Switch
	Turn
	Numerical value – adjustable
	Signal light lights up in green
	Signal light flashes green
	Signal light lights up in red
	Signal light flashes red

## 2.3 Part of the complete documentation

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

The illustration shows a general example of a welding system.

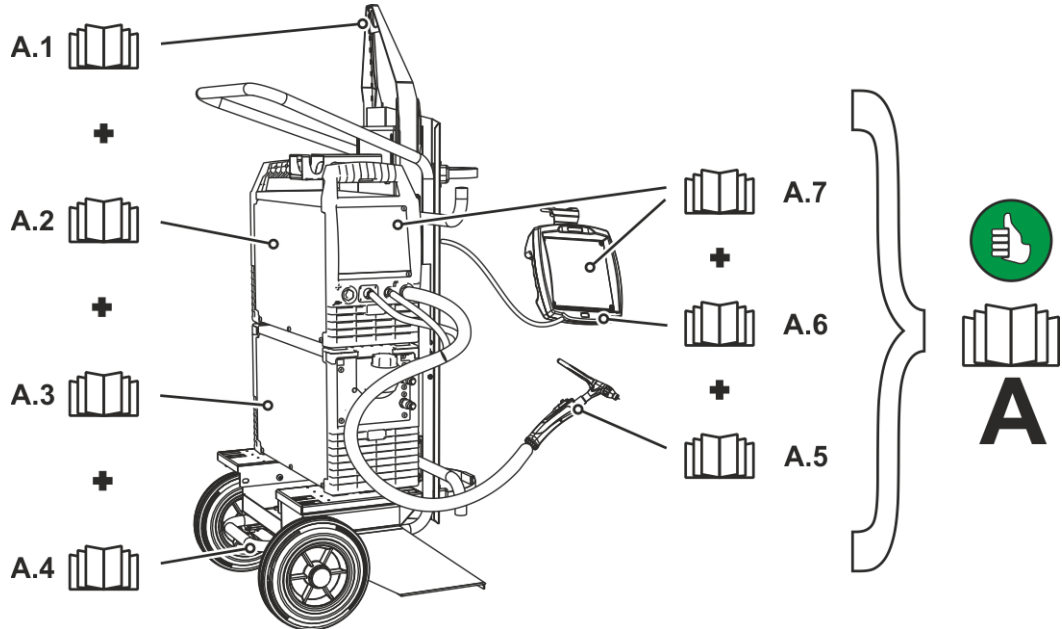


Figure 2-1

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

## 2.4 Safety instructions

### **WARNING**



**Risk of accidents due to non-compliance with the safety instructions!**

**Non-compliance with the safety instructions can be fatal!**

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



**Risk of injury from electrical voltage!**

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

- Never touch live components such as welding current sockets or stick, tungsten or wire electrodes!
- Always place torches and electrode holders on an insulated surface!
- Wear the full personal protective equipment (depending on the application)!
- The machine may only be opened by qualified personnel!

## **WARNING**



### **Hazard when interconnecting multiple power sources!**

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

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

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



### **Risk of injury due to improper clothing!**

**During arc welding, radiation, heat and voltage are sources of risk that cannot be avoided. The user has to be equipped with the complete personal protective equipment at all times. The protective equipment has to include:**

- Respiratory protection against hazardous substances and mixtures (fumes and vapours); otherwise implement suitable measures such as extraction facilities.
- Welding helmet with proper protection against ionizing radiation (IR and UV radiation) and heat.
- Dry welding clothing (shoes, gloves and body protection) to protect against warm environments with conditions comparable to ambient temperatures of 100 °C or higher and arcing and work on live components.
- Hearing protection against harming noise.



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

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

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

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



### **Explosion risk!**

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

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



### **Fire hazard!**

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

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



**⚠ CAUTION****Smoke and gases!**

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

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

**Noise exposure!**

Noise exceeding 70 dBA can cause permanent hearing damage!

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

**Obligations of the operator!**

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

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

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

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

**Requirements for connection to the public mains network**

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

**⚠ CAUTION****Electromagnetic fields!**

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



- Observe the maintenance instructions > see 6.3 chapter!
- Unwind welding leads completely!
- Shield devices or equipment sensitive to radiation accordingly!
- The correct functioning of pacemakers may be affected (obtain advice from a doctor if necessary).

## ⚠ CAUTION



According to IEC 60974-10, welding machines are divided into two classes of electromagnetic compatibility (the EMC class can be found in the Technical data) > see 8 chapter:



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



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

### Setting up and operating

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

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

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

### Recommendations for **reducing interference emission**

- Mains connection, e.g. additional mains filter or shielding with a metal tube
- Maintenance of the arc welding system
- Welding leads should be as short as possible and run closely together along the ground
- Potential equalization
- Earthing of the workpiece. In cases where it is not possible to earth the workpiece directly, it should be connected by means of suitable capacitors.
- Shielding from other equipment in the surrounding area or the entire welding system

## 2.5 Transport and installation

### ⚠ WARNING



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

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

### ⚠ CAUTION



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

- Disconnect all supply lines before transport!



### Risk of tipping!

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

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

 **CAUTION**

**Risk of accidents due to incorrectly installed leads!**

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

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



***The units are designed for operation in an upright position!***

***Operation in non-permissible positions can cause equipment damage.***

- ***Only transport and operate in an upright position!***



***Accessory components and the power source itself can be damaged by incorrect connection!***

- ***Only insert and lock accessory components into the relevant connection socket when the machine is switched off.***
- ***Comprehensive descriptions can be found in the operating instructions for the relevant accessory components.***
- ***Accessory components are detected automatically after the power source is switched on.***



***Protective dust caps protect the connection sockets and therefore the machine against dirt and damage.***

- ***The protective dust cap must be fitted if there is no accessory component being operated on that connection.***
- ***The cap must be replaced if faulty or if lost!***

## 3 Intended use

### WARNING



#### Hazards due to improper usage!

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

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

### 3.1 Applications

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

### 3.2 Documents which also apply

#### 3.2.1 Warranty



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

#### 3.2.2 Declaration of Conformity



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

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

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

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



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

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

### WARNING



Do not carry out any unauthorised repairs or modifications!

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

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

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

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

Spare parts can be obtained from the relevant authorised dealer.

#### 3.2.5 Calibration/Validation

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

## 4 Machine description – quick overview

### 4.1 Front view

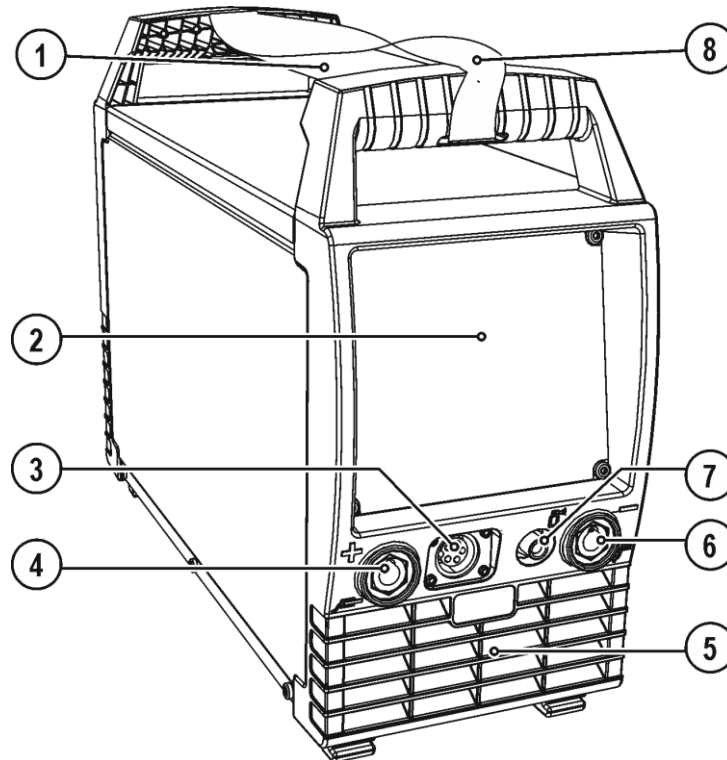




Figure 4-1

Item	Symbol	Description
1		<b>Carrying handle</b>
2		<b>Machine control, see the relevant control operating instructions</b>
3		<b>Connection socket, welding torch control cable &gt; see 5.2.1.1 chapter</b>
4		<b>Connection socket, "+" welding current</b> <ul style="list-style-type: none"> <li>• MMA: Electrode holder or workpiece lead connection</li> <li>• TIG: Connection for workpiece lead</li> </ul>
5		<b>Cooling air inlet</b>
6		<b>Connection socket, "-" welding current</b> <ul style="list-style-type: none"> <li>• TIG: TIG welding torch connection</li> <li>• MMA: Electrode holder or workpiece lead connection</li> </ul>
7		<b>G<math>\frac{1}{4}</math>" connecting nipple, "-" welding current</b> Shielding gas connection (with yellow insulating cap) for TIG welding torch
8		<b>Carrying strap &gt; see 5.1.4 chapter</b>

## 4.2 Rear view

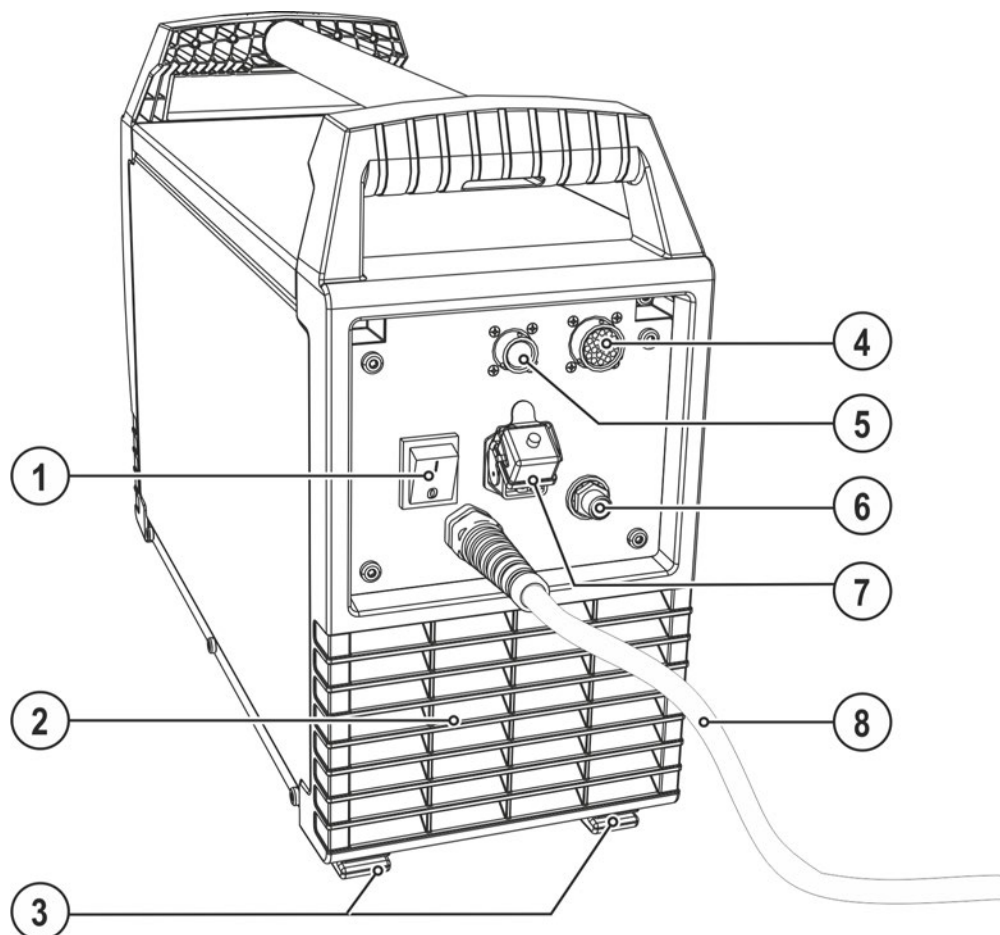


Figure 4-2

Item	Symbol	Description
1		Main switch, machine on/off
2		Cooling air outlet
3		Machine feet
4		Connection socket, 19-pole Remote control connection
5		8-pole connection socket Cooling unit control lead
6		G $\frac{1}{4}$ " connecting nipple Shielding gas connection on the pressure regulator.
7		4-pole connection socket Cooling unit voltage supply
8		Mains connection cable > see 5.1.7 chapter

## 5 Design and function

### ⚠ WARNING



**Risk of injury from electric shock!**

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

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

### 5.1 Transport and installation

### ⚠ WARNING



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

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


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

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

#### 5.1.1 Ambient conditions

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

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

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

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

##### 5.1.1.1 In operation

**Temperature range of the ambient air:**

- -25 °C to +40 °C

**Relative air humidity:**

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

##### 5.1.1.2 Transport and storage

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

- -30 °C to +70 °C

**Relative air humidity**

- Up to 90% at 20 °C

#### 5.1.2 Machine cooling

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

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



## 5.1.3 Workpiece lead, general

### CAUTION



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

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

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

## 5.1.4 Adjusting the length of the carrying strap



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

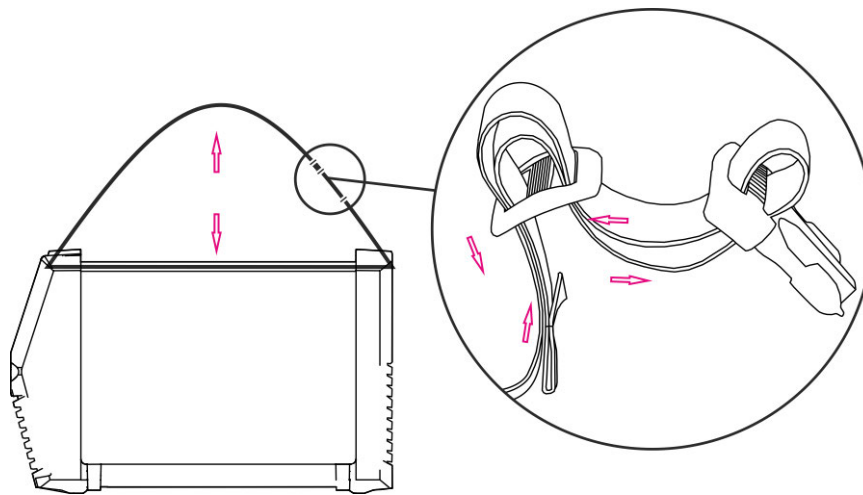


Figure 5-1



## 5.1.5 Welding torch cooling system

### 5.1.5.1 Welding torch cooling unit connection

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

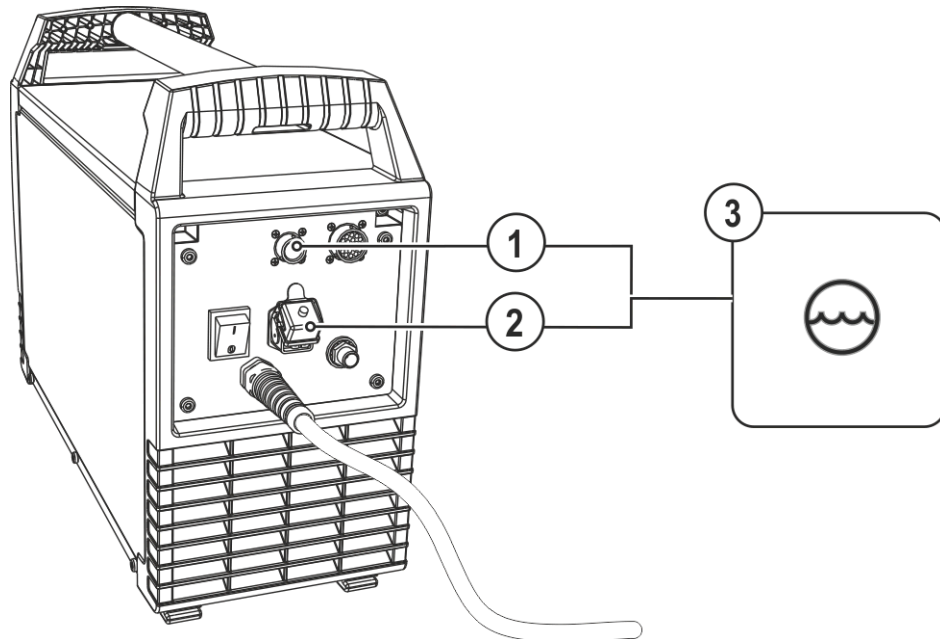


Figure 5-2

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

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

## 5.1.6 Notes on the installation of welding current leads



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

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

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

**Always keep a distance of at least 20 cm to leads of other power sources to avoid interferences**

**Always keep leads as short as possible! For optimum welding results max. 30 m (welding lead + intermediate hose package + torch lead).**

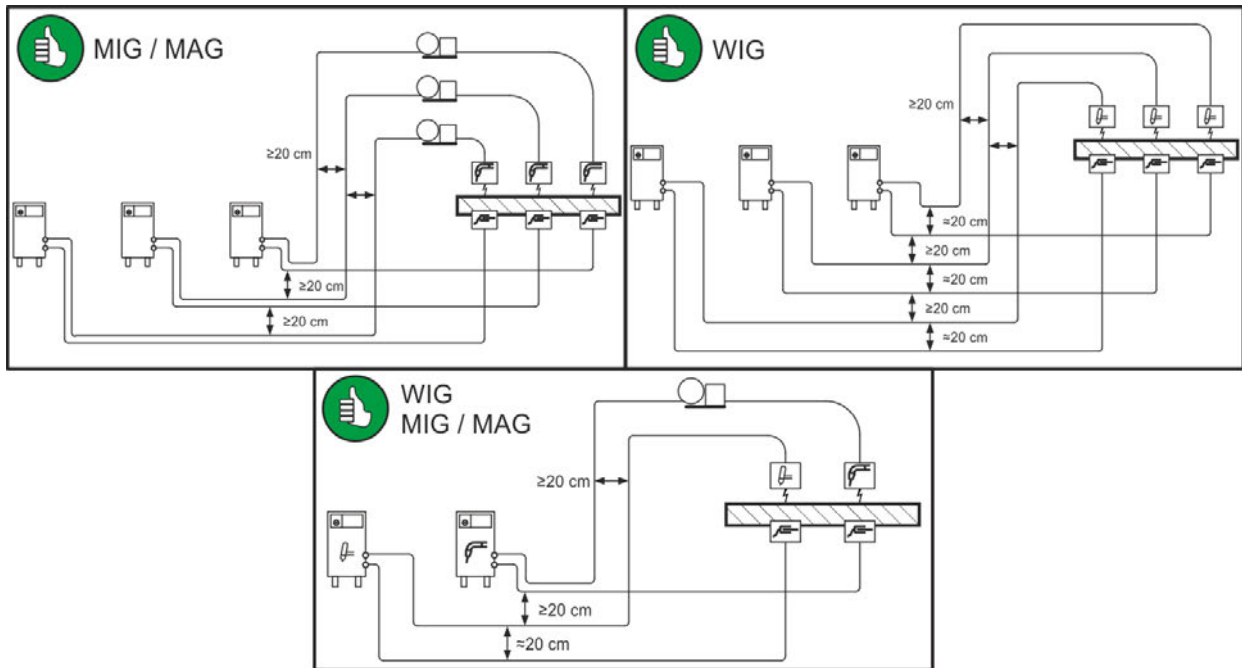


Figure 5-3



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

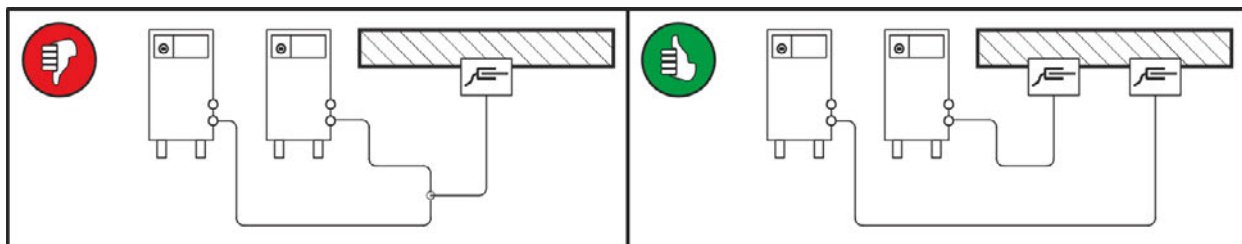


Figure 5-4



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



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



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

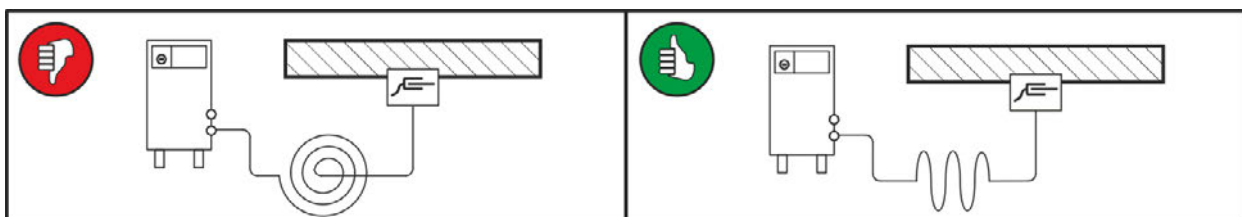


Figure 5-5

## 5.1.6.1 Stray welding currents

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

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

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

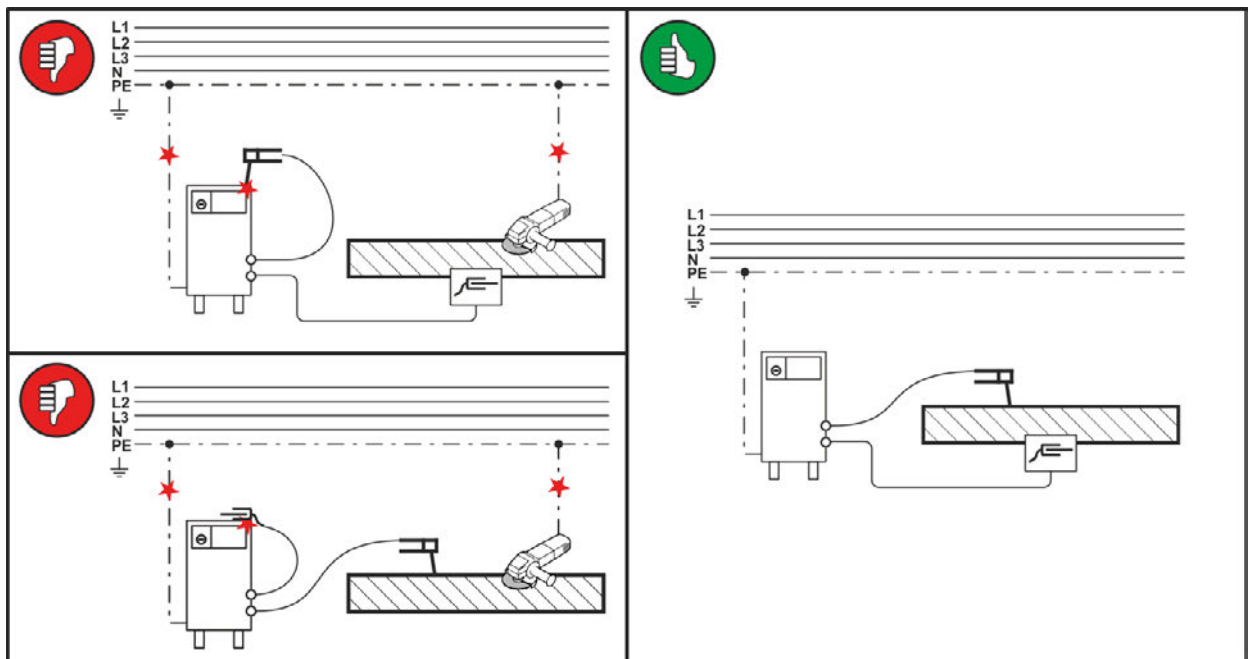


Figure 5-6

## 5.1.7 Mains connection

**⚠ DANGER****Hazards caused by improper mains connection!**

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

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

## 5.1.7.1 Mains configuration



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

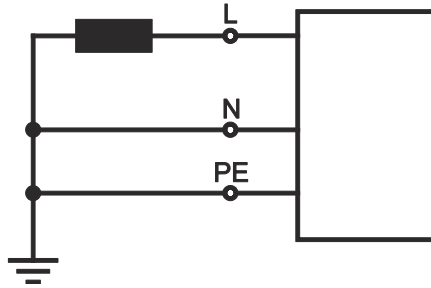


Figure 5-7

### Legend

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

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

## 5.2 TIG welding

### 5.2.1 Welding torch and workpiece line connection

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

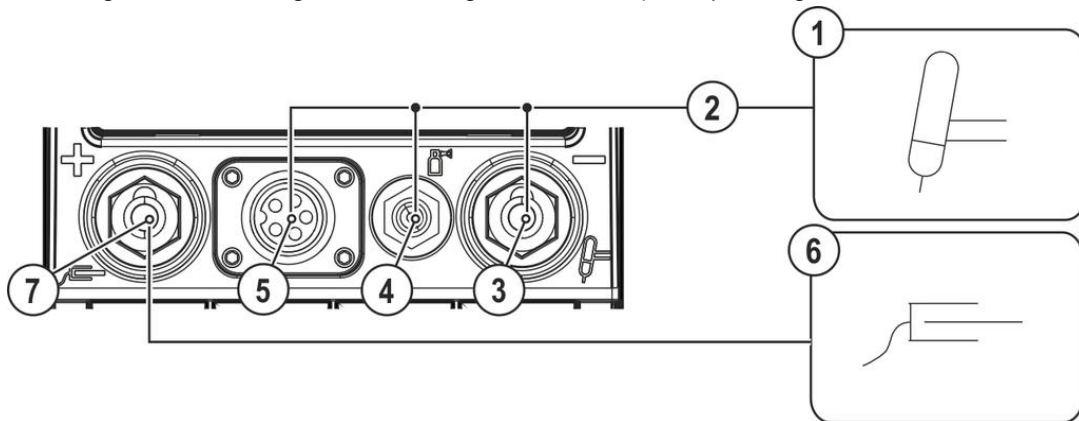


Figure 5-8

Item	Symbol	Description
1		Welding torch
2		Welding torch hose package
3		Connection socket, "-" welding current Welding current lead connection for TIG welding torch
4		G $\frac{1}{4}$ " connecting nipple TIG welding torch shielding gas connection
5		Connection socket, welding torch control cable > see 5.2.1.1 chapter
6		Workpiece
7		Connection socket for "+" welding current Workpiece lead connection

- Insert the welding current plug on the welding torch into the welding current connection socket and lock by turning to the right.
- Remove yellow protective cap on G $\frac{1}{4}$  connecting nipple.
- Screw welding torch shielding gas connection tightly onto the G $\frac{1}{4}$ " connection nipple.
- Plug the welding torch control cable plug into the welding torch control cable connection socket and secure.
- Insert the cable plug on the work piece lead into the "+" welding current connection socket and lock by turning to the right.

If fitted:

- Lock connecting nipples of the cooling water tubes into the corresponding quick connect couplings: Return line red to quick connect coupling, red (coolant return) and supply line blue to quick connect coupling, blue (coolant supply).

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

### 5.2.1.1 Connection variant, welding torch control cable

TIG welding machines are equipped ex works with a dedicated connection socket for the welding torch control cable (5- or 8-pole). As mobile machines offer more free space, they may even feature two control cable connection sockets. The functionality increases with the number of poles. One of these connection sockets may be converted or retrofitted > see 9 chapter.

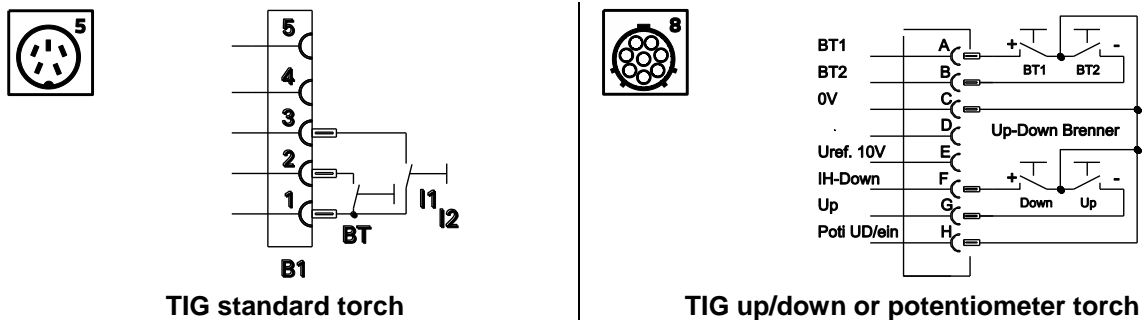


Figure 5-9

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

**⚠ WARNING**

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

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

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

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

## 5.2.2.1 Connecting the shielding gas supply

- Place the shielding gas cylinder into the relevant cylinder bracket.
- Secure the shielding gas cylinder using a securing chain.

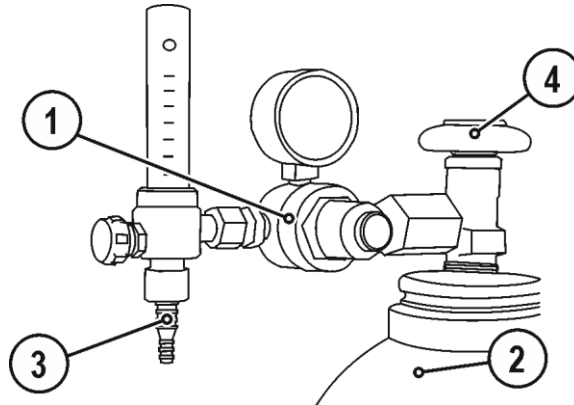


Figure 5-10

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

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

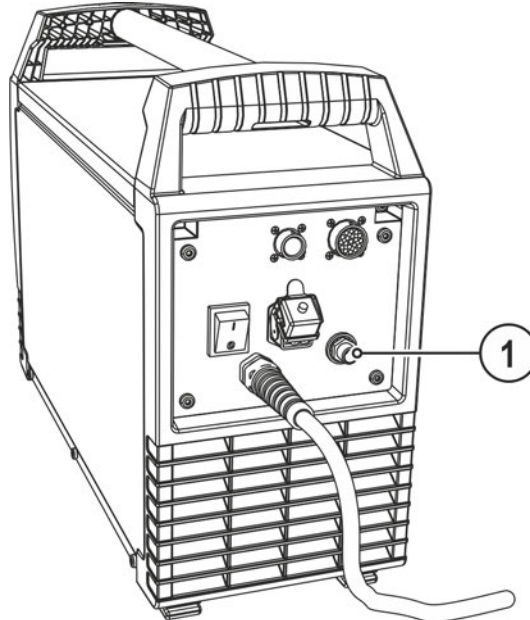


Figure 5-11

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

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

## 5.3 MMA welding

### 5.3.1 Connecting the electrode holder and workpiece lead

#### ⚠ CAUTION



#### Risk of crushing and burns!

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

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



#### Shielding gas connection!

During MMA welding open circuit voltage is applied at the shielding gas connection (G $\frac{1}{4}$ " connecting nipple).

- Place yellow insulating cap on the G $\frac{1}{4}$ " connection nipple (protects against electrical voltage and dirt).

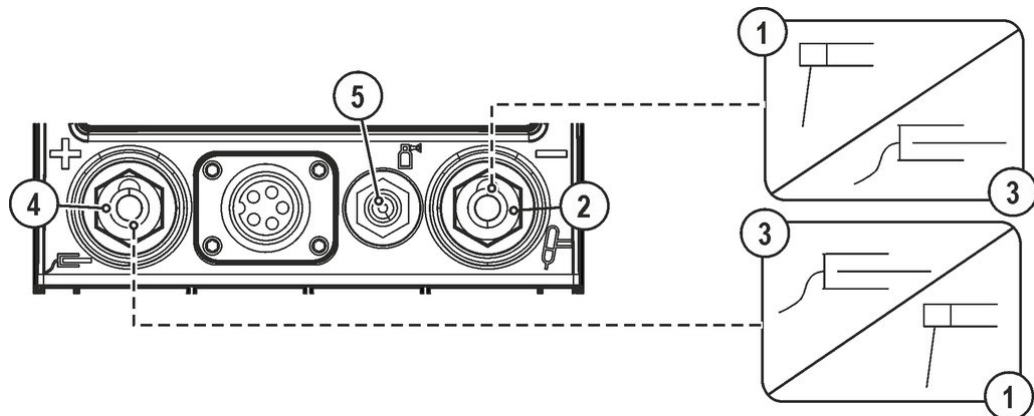


Figure 5-12

Item	Symbol	Description
1		Electrode holder
2		Connection socket, "-" welding current Workpiece lead or electrode holder connection
3		Workpiece
4		Connection socket for "+" welding current Electrode holder or workpiece lead connection
5		Connecting nipple G $\frac{1}{4}$ , shielding gas connection




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

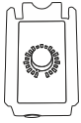
- Insert cable plug of the electrode holder into either the "+" or "-" welding current connection socket and lock by turning to the right.
- Insert cable plug of the workpiece lead into either the "+" or "-" welding current connection socket and lock by turning to the right.
- Fit yellow protective cap onto G $\frac{1}{4}$ " connecting nipple.



## 5.4 Remote control

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

### 5.4.1 RT1 19POL



#### Functions

- Infinitely adjustable welding current (0% to 100%) depending on the preselected main current on the welding machine.

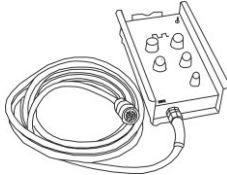
### 5.4.2 RTG1 19POL



#### Functions

- Infinite setting of the welding current (0% to 100%) depending on the main current preselected at the welding machine

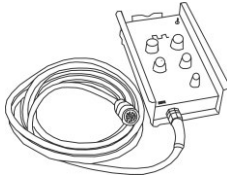
### 5.4.3 RTP1 19POL



#### Functions

- TIG/MMA
- Infinitely adjustable welding current (0% to 100%) depending on the preselected main current on the welding machine.
- Pulse/spot/normal
- Pulse, spot and break times are infinitely adjustable.

### 5.4.4 RTP2 19POL



#### Functions

- TIG/MMA.
- Infinitely adjustable welding current (0% to 100%) depending on the preselected main current on the welding machine.
- Pulse/spot/normal
- Frequency and spot times infinitely adjustable.
- Coarse adjustment of the cycle frequency.
- Pulse/pause ratio (balance) adjustable from 10% to 90%.

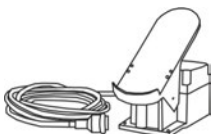
### 5.4.5 RTP3 spotArc 19POL



#### Functions

- TIG / MMA.
- Infinitely adjustable welding current (0% to 100%) depending on the preselected main current on the welding machine.
- Pulse / SpotArc spots / normal
- Frequency and spot time infinitely adjustable.
- Coarse adjustment of the pulse frequency.
- Pulse/pause ratio (balance) adjustable from 10% to 90%.

### 5.4.6 RTF1 19POL



#### Functions

- Infinitely adjustable welding current (0% to 100%) depending on the preselected main current on the welding machine.
- Start/stop welding operation (TIG)

**ActivArc welding is not possible in combination with the foot-operated remote control.**



## 5.5 Voltage reducing device

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

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

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

## 5.6 Interfaces for automation



**Damage to the machine due to improper connection!**

**Unsuitable control leads or incorrect connection of input and output signals can cause damage to the machine.**

- **Only use shielded control leads!**
- **If the machine is to be operated with control voltages connection via suitable isolation amplifiers is required!**
- **To control the main or secondary current via control voltages, the relevant inputs must be enabled (see specification for activation of control voltage).**

### 5.6.1 Remote control connection socket, 19-pole

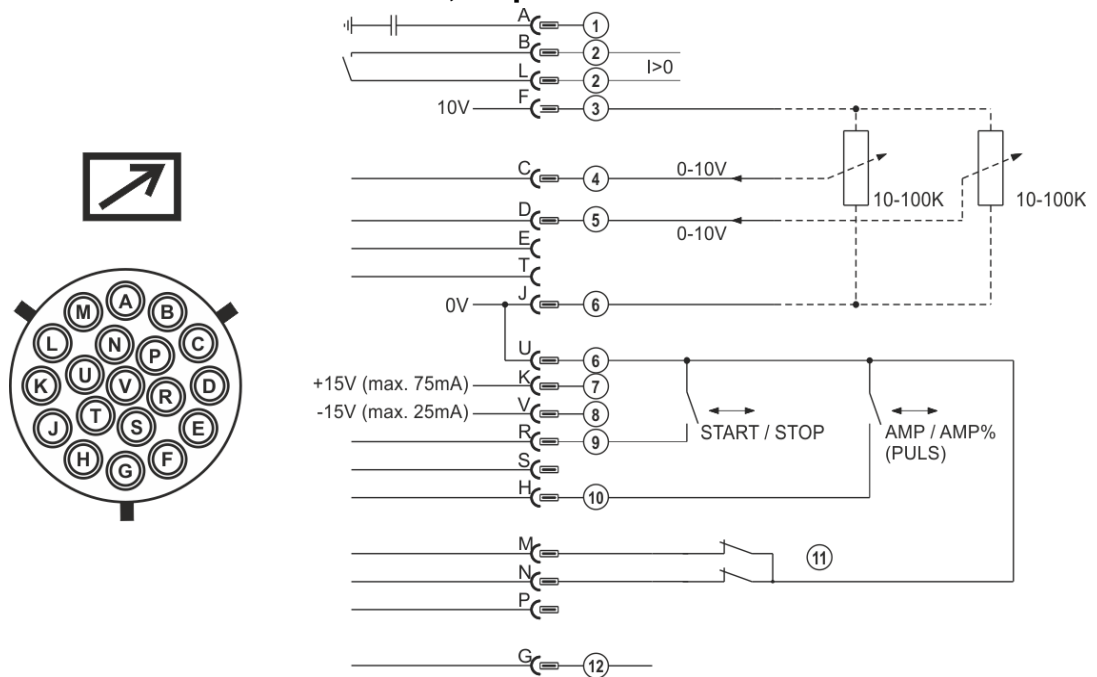


Figure 5-13

Item	Pin	Signal shape	Designation
1	A	Output	Connection for cable screen (PE)
2	B/L	Output	Current flowing signal $I > 0$ , galvanically isolated (max. $\pm 15V/100mA$ )
3	F	Output	Reference voltage for potentiometer 10V (max. 10mA)
4	C	Input	Control voltage specification for main current, 0–10V ( $0V = I_{min}/10V = I_{max}$ )
5	D	Input	Control voltage specification for secondary current, 0–10V ( $0V = I_{min}/10V = I_{max}$ )
6	J/U	Output	Reference potential 0V
7	K	Output	Power supply +15V, max. 75mA
8	V	Output	Power supply -15V, max. 25mA
9	R	Input	Start/Stop welding current
10	H	Input	Switching between main and secondary welding currents (pulses)
11	M/N	Input	Activation of control voltage specification Signals M and N must be set to reference potential 0V to activate the external control voltage specification for main and secondary current.

## 6 Maintenance, care and disposal

### 6.1 General

#### DANGER



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

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

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

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

#### WARNING



**Incorrect maintenance, testing and repair!**

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

Observe the maintenance instructions > see 6.3 chapter.

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

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

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

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

### 6.2 Cleaning

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

#### 6.2.1 Dirt filter

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

## 6.3 Maintenance work, intervals

### 6.3.1 Daily maintenance tasks

#### Visual inspection

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

#### Functional test

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

### 6.3.2 Monthly maintenance tasks

#### Visual inspection

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

#### Functional test

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

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

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



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

## 6.4 Disposing of equipment



### **Proper disposal!**

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

- **Do not dispose of in household waste!**
- **Observe the local regulations regarding disposal!**
- According to European provisions (guideline 2012/19/EU of the European Parliament and the Council of Juli, 4th 2021), used electric and electronic equipment may no longer be placed in unsorted municipal waste. It must be collected separately. The symbol depicting a waste container on wheels indicates that the equipment must be collected separately.  
This machine is to be placed for disposal or recycling in the waste separation systems provided for this purpose.
- According to German law (law governing the distribution, taking back and environmentally correct disposal of electric and electronic equipment (ElektroG) from 16.03.2005), used machines are to be placed in a collection system separate from unsorted municipal waste. The public waste management utilities (communities) have created collection points at which used equipment from private households can be disposed of free of charge.
- Information about giving back used equipment or about collections can be obtained from the respective municipal administration office.
- EWM participates in an approved waste disposal and recycling system and is registered in the Used Electrical Equipment Register (EAR) under number WEEE DE 57686922.
- In addition to this, returns are also possible throughout Europe via EWM sales partners.



## 6.5 Meeting the requirements of RoHS

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

## 7 Rectifying faults

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

### 7.1 Checklist for rectifying faults



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

Legend	Symbol	Description
	↗	Fault/Cause
	✘	Remedy

#### Mains fuse triggers

- ↗ Unsuitable mains fuse
- ✘ Set up recommended mains fuse.

#### Functional errors

- ↗ Insufficient coolant flow
  - ✘ Check coolant level and refill if necessary
  - ✘ Eliminate kinks in conduit system (hose packages)
  - ✘ Reset automatic cutout of the coolant pump by activating
- ↗ Air in the coolant circuit
  - ✘ Vent coolant circuit > see 7.2 chapter
- ↗ Several parameters cannot be set (machines with access block)
  - ✘ Entry level is blocked, disable access lock
- ↗ All machine control signal lights are illuminated after switching on
- ↗ No machine control signal light is illuminated after switching on
- ↗ No welding power
  - ✘ Phase failure > check mains connection (fuses)
- ↗ Connection problems
  - ✘ Make control lead connections and check that they are fitted correctly.

#### Welding torch overheated

- ↗ Loose welding current connections
  - ✘ Tighten power connections on the torch and/or on the workpiece
  - ✘ Tighten contact tip correctly
- ↗ Overload
  - ✘ Check and correct welding current setting
  - ✘ Use a more powerful welding torch

#### No arc ignition

- ↗ Incorrect ignition type setting.
  - ✘ Ignition type: Select "HF start". Depending on the machine, the setting is defined by the changeover switch for ignition types or the  $\boxed{HF}$  parameter in one of the machine menus (see the "Control operating instructions", if applicable).

#### Bad arc ignition

- ↗ Material inclusions in the tungsten electrode due to contact with filler material or workpiece
  - ✘ Regrind or replace the tungsten electrode
- ↗ Bad current transfer on ignition
  - ✘ Check the setting on the "Tungsten electrode diameter/Ignition optimisation" rotary dial and increase if necessary (higher ignition energy).

## Unstable arc

- ✓ Material inclusions in the tungsten electrode due to contact with filler material or workpiece
  - ✗ Regrind or replace the tungsten electrode
- ✓ Incompatible parameter settings
  - ✗ Check settings and correct if necessary

## Pore formation

- ✓ Inadequate or missing gas shielding
  - ✗ Check shielding gas setting and replace shielding gas cylinder if necessary
  - ✗ Shield welding site with protective screens (draughts affect the welding result)
  - ✗ Use gas lens for aluminium applications and high-alloy steels
- ✓ Unsuitable or worn welding torch equipment
  - ✗ Check size of gas nozzle and replace if necessary
- ✓ Condensation (hydrogen) in the gas tube
  - ✗ Purge hose package with gas or replace

## 7.2 Vent coolant circuit

- ☞ **Coolant tank and quick connect coupling of coolant supply and return are only fitted in machines with water cooling.**
- ☞ **To vent the cooling system always use the blue coolant connection, which is located as deep as possible inside the system (close to the coolant tank)!**

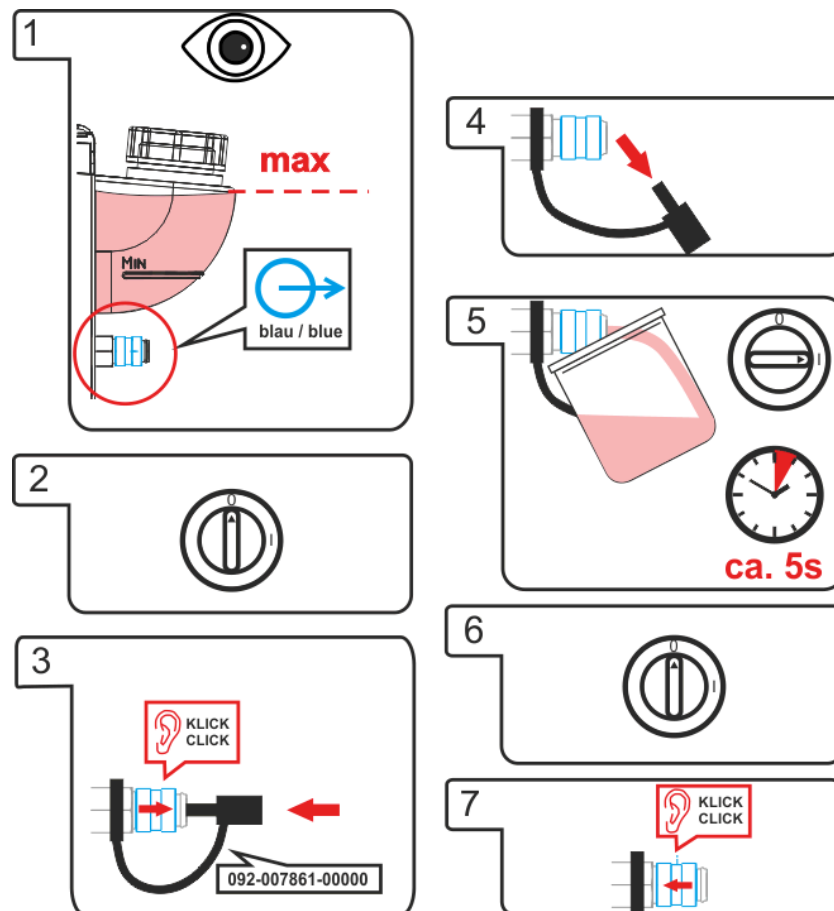


Figure 7-1

## 8 Technical data



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

### 8.1 Tetrix 230

Setting range	TIG	MMA
Welding current DC	3 A–230 A	3 A–180 A
Welding voltage	10.1 V–19.2 V	20.2 V–27.2 V
Duty cycle (DC) at 40 °C		
40% DC	230 A	180 A
60% DC	200 A	150 A
100% DC	170 A	120 A
Load cycle	10 min. (60% DC $\triangle$ 6 min. welding, 4 min. pause)	
Open circuit voltage (DC)	90 V	
Reduced open circuit voltage (VRD AUS)	22 V	
Reduced open circuit voltage (VRD RU)	12 V	
Mains voltage (tolerances)	1 x 230 V (–40% to +15%)	
Maximum mains impedance (@PCC)	$Z_{max} XXX m\Omega^1$	
Frequency	50/60 Hz	
Mains fuse	1 x 16 A <sup>2</sup>	
Mains connection lead	H07RN-F3G2,5	
Max. connected load	5.5 kVA	6 kVA
Recommended generator rating	8.1 kVA	
Noise level	< 70 dB(A)	
cos $\phi$ /efficiency	1.0/86%	
Insulation class/protection classification	H/IP 23	
Ambient temperature	–25 °C to +40 °C	
Machine cooling	Fan	
Torch cooling	Gas	
Workpiece lead	35 mm <sup>2</sup>	
EMC class	A	
Safety identification	☐ / CE / ENEC	
Harmonised standards used	see declaration of conformity (machine documentation)	
Dimensions L x W x H	539 x 210 x 415 mm	
	21.2 x 8.3 x 16.3 inch	
Weight	17 kg	
	37.5 lb	

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

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



**8.2 Tetrrix 230 AC/DC**

Setting range	TIG	MMA
<b>Welding current</b>		
DC	3 A–230 A	3 A–180 A
AC	5 A–230 A	-
<b>Welding voltage</b>	10.1 V–19.2 V	20.2 V–27.2 V
<b>Duty cycle (DC) at 40 °C</b>		
40% DC	230 A	180 A
60% DC	200 A	150 A
100% DC	170 A	120 A
<b>Load cycle</b>	10 min. (60% DC $\triangleq$ 6 min. welding, 4 min. pause)	
<b>Open circuit voltage</b>	45 V	
<b>Reduced open circuit voltage (VRD AUS)</b>	22 V	
<b>Reduced open circuit voltage (VRD RU)</b>	12 V	
<b>Mains voltage (tolerances)</b>	1 x 230 V (-40% to +15%)	
<b>Maximum mains impedance (@PCC)</b>	Zmax XXX m $\Omega$ <sup>1</sup>	
<b>Frequency</b>	50/60 Hz	
<b>Mains fuse</b>	1 x 16 A <sup>2</sup>	
<b>Mains connection lead</b>	H07RN-F3G2,5	
<b>Max. connected load</b>	5.5 kVA	6 kVA
<b>Recommended generator rating</b>	8.1 kVA	
<b>Noise level</b>	< 70 dB(A)	
<b>cos<math>\phi</math>/efficiency</b>	1.0/85%	
<b>Insulation class/protection classification</b>	H/IP 23	
<b>Ambient temperature</b>	-25 °C to +40 °C	
<b>Machine cooling</b>	Fan	
<b>Torch cooling</b>	Gas	
<b>Workpiece lead</b>	35 mm <sup>2</sup>	
<b>EMC class</b>	A	
<b>Safety identification</b>	[S] / CE / EMC	
<b>Harmonised standards used</b>	see declaration of conformity (machine documentation)	
<b>Dimensions L x W x H</b>	539 x 210 x 415 mm	
	21.2 x 8.3 x 16.3 inch	
<b>Weight</b>	18.8 kg	
	41.4 lb	

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

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

## 9 Accessories



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

### 9.1 Remote controls and accessories

Type	Designation	Item no.
RTF1 19POL 5 M	Foot-operated remote control current with connection cable	094-006680-00000
RT1 19POL	Remote control current	090-008097-00000
RTG1 19POL 5m	Remote control, current	090-008106-00000
RTG1 19POL 10m	Remote control, current	090-008106-00010
RTP1 19POL	Remote control spot welding / pulses	090-008098-00000
RTP2 19POL	Remote control spot welding / pulses	090-008099-00000
RTP3 spotArc 19POL	spotArc remote control for spot welding / pulses	090-008211-00000
RA5 19POL 5M	Remote control e.g. connection cable	092-001470-00005
RA10 19POL 10M	Remote control e.g. connection cable	092-001470-00010
RA20 19POL 20M	Remote control e.g. connection cable	092-001470-00020
RV5M19 19POLE 5M	Extension cable	092-000857-00000

### 9.2 Welding torch cooling system

Type	Designation	Item no.
cool40 U31	Cooling module	090-008593-00502

### 9.3 Transport systems

Type	Designation	Item no.
Trolley 55-5	Transport cart, assembled	090-008632-00000
Trolley 35.2-2	Transport vehicle	090-008296-00000
Trolley 38-2 E	Transport vehicle, long wheelbase	090-008270-00000

### 9.4 General accessories

Type	Designation	Item no.
GH 2X1/4" 2M	Gas hose	094-000010-00001
DM 842 Ar/CO2 230bar 30l D	Pressure regulator with manometer	394-002910-00030
5POLE/CEE/16A/M	Machine plug	094-000712-00000

### 9.5 Options

Type	Designation	Item no.
ON 12pol Retox TIG 190/230	Optional retrofit 12-pole connection socket, torch	092-002519-00000
ON TR Trolley 55-5	Cross arm and holder for wire feeder	092-002700-00000
ON Filter TIG 200/300-2	Retrofit option, dirt filter for air inlet	092-002551-00000
ON PC PLUG	Protective cap for plug	092-003074-00000

## 10 Appendix A

### 10.1 Overview of EWM branches

#### Headquarters

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